

92-42-3242  
MOTC-IOT-S-A-89-006



亞太經濟合作會議 運輸工作小組  
道路安全專家小組  
ASIA PACIFIC ECONOMIC COOPERATION  
TRANSPORTATION WORKING GROUP  
ROAD SAFETY EXPERTS GROUP

**改進亞太地區道路交通安全對策之調查研究**  
**Survey of Countermeasures for Improving**  
**Road Transportation Safety in the APEC Region**

**中華台北**  
**Prepared by Chinese Taipei**

**交通部運輸研究所**  
**Institute of Transportation**  
**Ministry of Transportation and Communications**  
**Chinese Taipei**  
**MAY 2003**

**改進亞太地區道路交通安全對策之調查研究**  
**Survey of Countermeasures for**  
**Improving Road Transportation Safety in the APEC Region**

著 者：張開國、楊智凱、周文靜

出版機關：交通部運輸研究所

地 址：台北市敦化北路 240 號

網 址：[www.iot.gov.tw](http://www.iot.gov.tw)

電 話：(02)23496789

出版年月：二 0 0 三年五月

印 刷 者：承亞興企業有限公司

版(刷)次冊數：初版一刷 150 冊

本書同時登載於交通部運輸研究所網站

定 價：300 元

展 售 處：

交通部運輸研究所運輸資訊組 • 電話：(02)23496880

三民書局重南店：台北市重慶南路一段 61 號 4 樓•電話：(02)23617511

三民書局復北店：台北市復興北路 386 號 4 樓•電話：(02)25006600

國家書坊台視總店：台北市八德路三段 10 號 B1•電話：(02)25787542

五南文化廣場：台中市中山路 2 號 B1•電話：(04)22260330

新進圖書廣場：彰化市光復路 177 號•電話：(04)7252792

青年書局：高雄市青年一路 141 號 3 樓•電話：(07)3324910

GPN:1009201363

## 交通部運輸研究所出版品摘要表

出版品名稱：改進亞太地區道路交通安全對策之調查研究			
國際標準書號（或叢刊號）	政府出版品統一編號 1009201363	運輸研究所出版品編號 92-42-3242	計畫編號 S-A-89-006
主辦單位：運輸安全組 主管：林豐福 計畫主持人：張開國 研究人員：楊智凱、周文靜 電話：(02)2349-6862 傳真：(02)2545-0429			研究期間 自2001年1月 至2001年12月
關鍵詞：亞太經濟合作會議、道路交通安全			
摘要： <p>             道路交通安全與社會經濟的發展與穩定息息相關，在亞太經濟合作會議之運輸工作小組中，我國發起成立「道路安全專家小組」，藉由數十位各會員體的道路安全專家的參與，訂定出亞太地區共通之主要的道路交通安全問題，並由各會員體提供其改善這些問題的經驗與所遭遇的困難。這些主要的道路交通安全問題包括「收集與分享事故資料的最佳方法」、「路網與道路安全設施的改善」、「路側邊坡管理」、「超速問題的改善」、「失能駕駛問題的改善」、「車輛超載問題的改善」、「鼓勵民眾使用安全帶與安全帽問題」、「行人安全」、「老人安全」、「以社區方法減少道路傷亡」、「減少易肇事地點事故」與「提昇社會對道路安全問題的認知」等十二項。本報告即是將各會員體所提供之資料，依其內容分類彙整後撰寫而成，期能作為亞太經濟合作會議各會員體改善道路交通安全的參考手冊。           </p>			
出版日期	頁數	定價	本出版品取得方式
2003年5月	402	300	凡屬機密性出版品均不對外公開。普通性出版品，公營、公益機關團體及學校可函洽本所免費贈閱；私人及私營機關團體可按定價價購。
機密等級： <input type="checkbox"/> 限閱 <input type="checkbox"/> 機密 <input type="checkbox"/> 極機密 <input type="checkbox"/> 絕對機密 （解密【限】條件： <input type="checkbox"/> 年 月 日解密， <input type="checkbox"/> 公布後解密， <input type="checkbox"/> 附件抽存後解密， <input type="checkbox"/> 工作完成或會議終了時解密， <input type="checkbox"/> 另行檢討後辦理解密） <input checked="" type="checkbox"/> 普通			
備註：本研究之結論與建議不代表交通部之意見。			

**PUBLICATION ABSTRACTS OF RESEARCH PROJECTS  
INSTITUTE OF TRANSPORTATION  
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS**

<b>TITLE: Survey of Countermeasures for Improving Road Transportation Safety in the APEC Region</b>			
ISBN(OR ISSN)	GOVERNMENT PUBLICATIONS NUMBER 1009201363	IOT SERIAL NUMBER 92-42-3242	PROJECT NUMBER S-A-89-006
DIVISION: Transportation Safety Division DIVISION CHIEF: Fong-Fu Lin PRINCIPAL INVESTIGATOR: Kai-Kuo Chang PROJECT STAFF: Chih-Kai Yang, Wen-Jing Chou PHONE: 886-2-23496862 FAX: 886-2-25450429			PROJECT PERIOD FROM Jan. 2001 TO Dec. 2001
<b>KEY WORDS:</b> Asia-Pacific Economic Cooperation(APEC), road transportation safety			
<b>ABSTRACT:</b>  <p>Road transportation safety is closely related to the economic development and stability of a society. In the APEC Transportation Working Group (TPT-WG), Chinese Taipei initiates the idea of establishing a Road Transportation Safety Experts Group (RSEG) to improve road safety in the APEC Region. Through the transportation safety experts from each APEC member economy, the RSEG identifies the major road transportation safety problems in Asia Pacific and also shares the experiences and difficulties they encountered while improving the problems. These major road transportation safety problems include twelve issues in total: "Best way to collect and share accident data," "Improvement of road network and traffic safety facilities," "Roadside cut slope management," "Speeding," "Impaired driving," "Vehicle overloading," "Encouraging people to wear seatbelts and motorcycle helmets," "Pedestrian safety," "Elderly people safety," "Community approach to reduce road related injuries and fatalities," "Accident black spot approach to reduce accidents," and "Raising the attention of all societies to road safety problem." This report is based on the materials provided by all member economies, and categorized into different themes. It is expected to serve as the references for the improvement of road transportation safety for all the APEC member economies.</p>			
DATE OF PUBLICATION May 2003	NUMBER OF PAGES 402	PRICE 300	CLASSIFICATION <input type="checkbox"/> SECRET <input type="checkbox"/> CONFIDENTIAL <input checked="" type="checkbox"/> UNCLASSIFIED
The views expressed in this publication are not necessarily those of the Ministry of Transportation and Communications.			

# **總 目 錄**

## **Table of Contents**

<b>第一部分</b>	<b>中文報告</b>
<b>Part I</b>	<b>Chinese Report</b>
<b>第二部分</b>	<b>英文報告</b>
<b>Part II</b>	<b>English Report</b>
<b>第三部分</b>	<b>附錄</b>
<b>Part III</b>	<b>Appendix</b>

# **第一部分 中文報告**

## **Part I Chinese Report**

# 中文報告目錄

	頁次
壹、前言 .....	1
貳、十二項主要道路交通安全問題之改善方案 .....	3
第一章 收集與分享事故資料的最佳方法 .....	4
第二章 路網與道路安全設施的改善 .....	8
第三章 路側邊坡管理 .....	13
第四章 超速問題的改善 .....	16
第五章 失能駕駛問題的改善 .....	19
第六章 車輛超載問題的改善 .....	22
第七章 鼓勵民眾使用安全帶與安全帽問題 .....	25
第八章 行人安全 .....	28
第九章 老人安全 .....	33
第十章 以社區方法減少道路傷亡 .....	36
第十一章 減少易肇事地點事故 .....	39
第十二章 提昇社會對道路安全問題的認知 .....	42
參、結論 .....	44

# 壹、前言

## 一、緣起

道路交通事故所造成的人員傷亡與財物損失，對於社會與經濟都造成很大的負擔，因此道路交通安全之改善對於社會及經濟都有很大的正面效益。

在「亞太經濟合作會議(Asia-Pacific Economic Cooperation, APEC)」第十二次「運輸工作小組會議(Transportation Working Group, TPT-WG)」中(1997年9月28日至10月3日於台北召開)，我國(Chinese Taipei)提議成立「道路安全專家小組(Road Transportation Safety Experts Group, RSEG)」，以推動亞太地區道路交通安全資訊之交流，並發展道路交通安全問題之改善手冊，獲得與會各會員體一致之贊同，「道路安全專家小組(RSEG)」自此成立，並由我國(Chinese Taipei)主辦，隨後我國(Chinese Taipei)並邀請各會員體的參與，共有三十多位道路交通安全專家參與。

## 二、主要的道路交通安全問題

爲了建立道路交通安全問題改善手冊，道路交通安全專家小組(RSEG)於APEC第十四屆運輸工作小組會議(1998年於漢城召開)邀集專家們擬訂出亞太地區共通的「主要道路交通安全問題(Major road transportation safety problems)」共十二項，之後由我國(Chinese Taipei)針對此十二項主要的道路交通安全問題設計一份問卷，請各會員體分別就各個問題，提供相關資料，問卷中依據問題的特性，將此十二項問題區分爲五類，此五項類別及十二項問題分別是：

第一類：事故資料(Accident Data)：

問題一：收集與分享事故資料的最佳方法

第二類：公路與交通工程(Highway and traffic engineering)。

問題二：路網與道路安全設施的改善

問題三：路側邊坡管理

第三類：行爲(Behavior)

問題四：超速問題的改善

問題五：失能駕駛問題的改善

問題六：車輛超載問題的改善

問題七：鼓勵民眾使用安全帶與安全帽問題

第四類：弱勢團體(Vulnerable groups)

問題八：行人安全

問題九：老人安全

第五類：其它(Others)

問題十：以社區方法減少道路傷亡



問題十一：減少易肇事地點事故

問題十二：提昇社會對道路安全問題的認知

### 三、問卷設計

問卷的內容設計包括三個部份，包括「問卷簡介(Questionnaire description)」、「問題描述(Problem description)」以及「回答之範例與答案卷(Answer examples and answer sheet)」。

問卷簡介部份係介紹問卷之背景、目的、問卷內容、問卷架構以及填寫問題之注意事項等。

問題描述部分則對於十二項主要道路交通安全問題，依據其類別分別做初步的說明與分析，以協助會員體了解問題的探討範圍。

問題的最後部份是填寫的範例與空白的答案卷。答案卷的設計係要求填答者就十二項主要道路交通安全問題分別填寫一份(或多份)的答案卷，每份答案卷包括「主要道路交通安全問題(Major Road Transportation Safety Problem)」、「子題描述(Specific Problem and its Description)」、「可能的解決方案(Solutions)」、「成果(Achievements)」以及「困難(Difficulties)」等五個子項；「主要道路交通安全問題」項目係請會員體針對十二項主要道路交通安全問題中指定的特定問題進行填答；「子題描述」項目係要求會員體在此項主要道路交通安全問題中更細目的子題並加以描述說明；「可能的解決方案」則是會員體針對前述的問題所已採用或是建議採用的解決方案；「成果」係請會員體提出其採行的解決方案所達成的成果；「困難」則是請會員體說明在改善前述問題時所遭遇的困難。原始問卷內容請參閱附錄一。

### 四、報告之分析架構

經過收集，本問卷共有澳洲(Australia)、加拿大(Canada)、日本(Japan)、南韓(Republic of Korea)、墨西哥(Mexico)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)、祕魯(Peru)、新加坡(Singapore)、中華台北(Chinese Taipei)以及泰國(Thailand)等十一個會員體(Member Economies)提供了它們的寶貴經驗。

根據會員體所提供的資料彙整如附錄二，本報告就十二個主要道路交通安全問題個別分析，就每個問題分析會員體所提供之資料的共通性與特殊性加以分類彙整。因此本報告的內容分為「前言」、「十二項主要道路交通安全問題之改善方案」、「結論」等三個部份，其中「十二項主要道路交通安全問題之改善方案」就各個主要道路交通安全問題分別論述，共分為十二章。

## 貳、十二項主要道路交通安全問題之改善方案

道路安全專家小組(RSEG)於 APEC 第十四屆運輸工作小組會議(1998 年於漢城召開)邀集專家們擬訂出亞太地區共通的主要道路交通安全問題共十二項，並由澳洲(Australia)、加拿大(Canada)、日本(Japan)、南韓(Republic of Korea)、墨西哥(Mexico)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)、祕魯(Peru)、新加坡(Singapore)、中華台北(Chinese Taipei)以及泰國(Thailand)等十一個「會員體(Member Economies)」針對此十二項主要的道路交通安全問題提供其改善的經驗與成果。此十二項問題依據其特性可分為五類，此五項類別及十二項問題分別是：

第一類：事故資料(Accident Data)：

問題一：收集與分享事故資料的最佳方法

第二類：公路與交通工程(Highway and traffic engineering)。

問題二：路網與道路安全設施的改善

問題三：路側邊坡管理

第三類：行為(Behavior)

問題四：超速問題的改善

問題五：失能駕駛問題的改善

問題六：車輛超載問題的改善

問題七：鼓勵民眾使用安全帶與安全帽問題

第四類：弱勢團體(Vulnerable groups)

問題八：行人安全

問題九：老人安全

第五類：其它(Others)

問題十：以社區方法減少道路傷亡

問題十一：減少易肇事地點事故

問題十二：提昇社會對道路安全問題的認知

本篇根據會員體所提供的資料，就十二個主要道路交通安全問題個別分析與論述，共分為十二章。

# 第一章 收集與分享事故資料的最佳方法

「收集與分享事故資料的最佳方法(Best way to collect and share accident data)」係本報告之十二項主要道路交通安全問題中的第一個問題，在本研究中是被分類為第一類：事故資料(Accident Data)。以下分別就此問題之「問題說明」、「改善收集事故資料的方法」、「推動事故資料分享的方法」、「試驗計畫(Pilot project)」、「事故資料收集與分享的困難」以及「各會員體在事故資料收集與分享的成果」等分節敘述。

## 一、問題說明

交通事故資料是分析道路交通安全與駕駛人危險行為的重要資料，因此交通事故資料的品質受到道路安全研究者的重視。為了改善交通事故資料的品質，須從減少人為失誤、改善事故調查表格式、改善事故現場調查程序等等方面著手。以下介紹改善事故資料品質的方法，同時也介紹推動事故資料分享以及運用試驗計畫(Pilot project)協助這些方法執行的做法。

## 二、改善收集事故資料的方法

為了改善事故資料的完整性與精確性，首先必須減少人為的失誤，建議針對交通事故資料處理的相關人員提供教育訓練，而為了避免因工作超過負荷導致作業人員的草率與粗心，建議必須要有足夠的人力以分擔工作量，此外並改善事故調查表格式以減少作業人員在填寫或輸入電腦時所發生的錯誤，並透過輔助性的檢查系統進一步過濾人為的錯誤。以下再分別敘述：

### (一)提供處理交通事故相關資料之人員足夠的教育訓練：

交通事故現場調查人員是取得交通事故現場資料的第一線人員，因此調查人員關於事故資料品質對於交通安全的重要性與益處必須要有正確的認知，方能提高事故資料的完整性與精確性。因此對於交通事故調查人員教育訓練的重點有以下二項：

- (1)增進事故資料品質對交通安全重要性與益處的認知。
- (2)提昇填寫事故調查表的能力。

除了交通事故現場調查人員外，將事故調查表資料輸入電腦資料庫的作業人員對於事故資料的正確性也有很大的影響，因此必須加強事故資料輸入人員的訓練以減少其發生人為錯誤的機會。

### (二)充實處理交通事故相關的人力

人力不足是各會員體在收集交通事故資料時很普遍的問題，在人力不足的且工作負荷過重的情況下，相關的作業人員不論是事故現場調查的員警或資料輸入的作業人員發生錯誤的機會就會大增，同時工作負荷過重會降低作業人員的工作意願，草率或粗心的情形就會更加常見。因此處理交通事故相關人力的擴充是必要的改善方式。

### (三)改善事故調查表格式

在人力有限的情形下，必須提高工作效率以減輕作業人員的工作負荷，而事故調查表之設計對於作業人員(不論是現場處理的調查人員或是將資料輸入電腦的作業人員)的工作效率有直接的影響。設計良好的事故調查表可以提高調查人員的調查意願、減少編碼錯誤、改善事故資料的精確度與品質。會員體所建議事故調查表的改善方式如下：

- 1.建立事故調查表的標準表格
- 2.設計良好的事故調查表與分析系統
- 3.建立一個試驗計畫(Pilot project)，在特定地區使用新的表格，獲得成效後再推廣至其它地區。

### (四)改善現場調查程序

除了作業人員教育訓練以及設計良好的事故調查表以外，良好的調查程序也是另一個改善原始事故資料品質的關鍵。會員體所建議採用的方式如下：

- 1.發展交通事故資料收集程序
- 2.發展可以管理圖形化與地圖資料的交通事故資料收集系統

這些方法可以提昇所收集資料的完整性、精確性與一致性，更可將交通事故資料做進一步的分析。

### (五)輔助性的檢查系統

除了作業人員的教育訓練以及事故調查表格與調查程序的改善之外，還需搭配一些輔助性的檢查系統以減少人為錯誤發生的機會。會員體建議了一些輔助性的檢查系統，例如「比對系統(Identify system)」、「事故資料管理系統(Management system)」、「回饋系統(Feedback system)」等等。

#### 1.比對系統(Identify system)

比對系統係利用其它的交通事故資料來源來檢查報告率(Reporting rates.)與事故資料品質，例如可自衛生主管機關(如救護車、醫院/診所的醫療紀錄)、保險公司、拖吊車服務等處取得與交通事故相關的紀錄與資料，以比對交通事故發生率的方式檢查交通事故資料的完整性。

#### 2.事故資料管理系統(Management system)

事故資料管理系統係要利用設計良好的事故調查表與事故分析系統，建立全國性的事故資料管理系統，改善交通事故資料的品質並將交通事故資料做有效的運用，並結合「地理資訊系統(Geographic Information System, GIS)」提昇交通事故資料的正確性，並讓交通事故資料容易分享

給其它相關的組織。

### 3. 回饋系統(Feedback system)

建立交通事故資料品質問題的回饋系統，透過回饋系統將事故資料品質、報告率及其它資訊如死亡事故的驗屍檔案等等問題回報給員警、交通工程師及資料輸入人員，例如將編碼與紀錄的精確性回饋給負責分析車輛移動和肇事因素的交通工程師以及資料輸入人員。回饋系統可以讓作業人員所發生的錯誤及早發現，以便及早改正。

## 三、推動事故資料分享的方法

在資料分享的方法方面，紐西蘭(New Zealand)建議可以採下列方式：

1. 公開交通事故相關的統計資訊
2. 透過網際網路建立取得交通事故相關統計的管道。
3. 透過網際網路提供交通事故資料的查詢與報告工具。
4. 加入國際性組織，除了可以將自己的交通事故分享給其它國家以外，更可取得世界各國的交通事故資料進行比較。

而日本(Japan)則建議以結合「地理資訊系統(Geographic Information System, GIS)」的方式讓交通事故相關的資料更容易讓相關的組織分享。

## 四、試驗計畫(Pilot project)

「試驗計畫(Pilot project)」係先在一個小區域推行所要進行的改善方案，如果獲得成效，再將這個方案推廣到其它更大的區域，是一種讓方案的推動更容易成功的方法。

加拿大(Canada)以這種「試驗計畫(Pilot project)」的方式來改善資料的品質與報告，泰國(Thailand)也用「試驗計畫(Pilot project)」的方式來訓練員警使用新設計的事故調查表。

## 五、事故資料收集與分享的困難

在交通事故資料的收集方面所遇到的困難可分為以下四個因素：

### 1. 人的因素：

例如調查人員的意願不高，造成教育訓練的效果有限；而員警的焦點通常在駕駛人的過失而非道路或車輛因素，也造成了交通事故資料的客觀性與正確性受到質疑。有些地方政府不願採用新的事故調查表，或是不願收集新的事故調查表中的所有項目，也造成新式事故調查表推行的阻力。

### 2. 資源有限

有限的預算與人力、欠缺專門的技術與專家是會員體普遍面臨的問題。例如在交通事故現場調查、交通事故資料輸入的作業、交通事故資料的檢查等等方面，都需要大量的經費與人力才能改善，而在資源有限的情形下，改善工作不易推動。

### 3. 事故調查表的設計

調查員警在交通事故現場所要蒐集的事故資料很多，事故調查表的項目須是重要且必須收集之資訊，並且須有判斷準則供員警參考，因此事故調查表的設計是許多會員體努力的目標。另一個困難是事故調查表的修正需要許多的財務資源，而且可能要花上數年的時間才能完成。

### 4. 檢查系統的功能有限

從衛生主管機關取得的資料並未依事故的種類分類，而拖車呼叫與車輛保險單則由於主要是針對財損內容而非傷亡事故，因此這些資料對於交通事故資料正確性之驗證的功能有限。

而在交通事故資料分享方面所遇到的困難，有些組織不願意負擔資料分享所需之彙編工作，或是欠缺技術及經濟能力來重整這些資訊等等。

## 六、各會員體在事故資料收集與分享的成果

加拿大(Canada)在交通事故資料分享方面，發展了一套新的「全國事故資料庫(National Collision Database, NCDB)」，一旦實施後即可要求各行政區以標準化的格式及時提供完整且高品質的交通事故資料至聯邦政府。

紐西蘭(New Zealand)則發展了「事故分析系統(Crash Analysis System)」，並對交通事故記錄人員施以訓練(Police training relating to the recording of crash details on the Traffic Crash Report form.)，此外並建立了交通事故資料的回饋系統以及以驗屍檔案比對死亡事故的檢查系統。

而泰國(Thailand)則特別提到了利用「試驗計畫(Pilot project)」改善交通事故資料品質的做法，對於交通事故資料的完整性、一致性都得到了很大的改善。

## 第二章 路網與道路安全設施的改善

「路網與道路安全設施的改善(Improvement of road network and traffic safety facilities)」係本報告的十二項主要道路交通安全問題中的第二個問題，在本研究中是被歸類為第二類：公路與交通工程(Highway and traffic engineering)。以下分別就此問題之「問題說明」、「各會員體目前的整體方案」、「路網與道路安全設施的改善原則」、「路網與道路安全設施的改善方法」、「改善路網與道路安全設施問題所遭遇的困難」以及「會員體在改善路網與道路安全設施問題方面之成果」等分節敘述。

### 一、問題說明：

造成路網與道路安全相關設施之主要問題可概分為有限資源、欠缺技術與其它等三項因素。由於公路建設或工程上的改善都需要大量的經費、人力、機具以及土地等資源，受到這些資源的限制而無法使得道路網與道路安全設施之規劃、建設與改善達到盡善盡美，因此如何將有限的資源妥善且有效率地分配在最需要的地方就成為一個重要的課題。

工程技術也是路網與道路安全設施建設與改善的一個瓶頸，由於工程技術的限制，無法克服地形與環境的障礙，造成有些公路建設達不到應有的安全水準，在多山地區以及人口與車輛密集的地方更加突顯這個問題的嚴重性。除此之外，環保課題、施工區對既有車流之效率與安全的影響等因素對公路建設與改善也造成了限制。

在「路網與道路安全設施的改善」方面，首要的問題是針對路網中各個道路的功能進行改善；例如在都會地區中，如何妥善規劃各個不同功能的道路以及之間的銜接方式，包括高速公路、快速道路、外環道路、市區街道以及連絡道路等等，以減少車流的壅塞與衝突。其次是道路安全設施的設計與改善，例如車道分隔與行人安全等。不良的道路設施將對「用路人(Road users)」造成極大的危險，因此，協調相關單位妥善規劃道路網中各個道路之銜接，以及交通號誌、標誌、標線、護欄、人行道、照明設備等道路安全相關設施的管理與維護，都是改善的重要課題。

依據以上的問題特性，部份「會員體(Member Economies)」提供了相關的經驗與方案以供參考，經過彙整、歸類各「會員體(Member Economy)」所提供的資料後，以下分別介紹「各會員體目前的整體方案」、「路網與安全設施的改善原則」、「路網與安全設施的改善方法」、「改善路網與安全設施問題所遭遇的困難」、「會員體在改善路網與安全設施問題方面之成果」等等。

## 二、各會員體目前的整體方案

如同前述問題說明所述，許多道路安全相關設施都是由不同之單位負責維護與管理，因此在道路安全方面需要將這些相關單位整合起來進行協調，才能徹底改善道路安全問題。因此，會員體建議發展整體性的專案來著手改善，以下簡單介紹加拿大(Canada)與日本(Japan)的道路安全整體方案：

### (一) 加拿大(Canada)

加拿大成立了「加拿大策略性道路研究方案(Canadian Strategic Highway Research Program, C-SHRP)」，針對道路「鋪面品質(Pavement performance)」進行了長期的研究；同時在「總工程協會(Chief Engineer's Council)」的監督下，加拿大發展了全國性指導方針以推動道路基本建設的設計、維護與營運。

### (二) 日本(Japan)：

日本(Japan)由「國家警察署(The National Police Agency)」與「營建部(Ministry of Construction)」依「緊急對策法(The Emergency Measure Law)」在1996年制定了「七年交通安全設施改善方案(Seven-year Traffic Safety Facilities Improvement Program)」以改善既有道路安全，此外更進一步推動「新的道路改善五年計畫(New Five-year Road Improvement Program, FY1998-2002)」，針對公路網系統進行改善，以符合對於交通安全的需求。

## 三、路網與道路安全設施的改善原則：

「會員體(Member Economies)」所提供的資料中提到，部份改善措施屬於路網與道路安全設施整體作業方式與系統性改善的措施，原則包括「建立標準化的幾何設施規範」、「建立道路改善優先順序之準則」、「建立道路安全監督與管理系統」以及「建立完整之路網」等，簡述如下：

### (一) 建立標準化的幾何設施規範：

南韓(Republic of Korea)、墨西哥(Mexico)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)、祕魯(Peru)以及中華台北(Chinese Taipei)等會員體都提到要建立標準化的幾何設施規範。南韓(Republic of Korea)建議幾何與安全設施應該改善並標準化；墨西哥(Mexico)也建議相連道路路段的幾何與結構特性必須一致；紐西蘭(New Zealand)也建議建立較佳的標準以改善道路的設計與規劃，並修正標誌、標線與其它設施標準的適用性與合法性；中華台北(Chinese Taipei)也編著了「台灣都市道路設計標準(A standard for urban road design in Taiwan)」，並且建議設置標誌時要注意設置的地點，包括「預告點(Preintersection point)」、「決策點(Intersection point)」以及「確認點(Exactly point)」。



(二) 建立道路改善優先順序之準則：

加拿大(Canada)結合事故與路網資料來界定國道路網中的「易肇事地點(Black spot areas)」，加拿大的聯邦政府並考慮以「易肇事地點分析(Black spot analysis)」的結果來做為經費分配的優先依據。墨西哥(Mexico)也建議建立明確的分級準則以決定路網改善的優先順序。紐西蘭(New Zealand)也以「利益成本分析(Benefit Cost Analysis, BAC)」的方式來評估建設或是道路改善升級的急迫性。

(三) 建立道路安全監督與管理系統：

南韓(Republic of Korea)認為必須建立「安全監督系統(Safety audit system)」並培養相關的人力與技術專家；紐西蘭(New Zealand)與巴布亞紐幾內亞(Papua New Guinea)也都提議發展「道路安全管理系統(Safety Management Systems)」；新加坡(Singapore)也針對既有道路進行道路安全的審查以檢查路網是否適當，並且定期找出危險路段並進行改善；中華台北(Chinese Taipei)也以建立道路與交通的資料管理系統來進行道路維護的管理；泰國(Thailand)則持續有系統的收集道路事故與安全資料並改善事故預防的措施。

(四) 建立完整之路網：

中華台北(Chinese Taipei)對既有道路網採用重新評估其功能的方式來規劃快速道路網，以填補僅有高速公路與市區道路之路網功能不足之處，建構完整的路網。

#### 四、路網與道路安全設施的改善方法

「會員體(Member Economies)」提供了許多路網與道路安全設施的改善方法，經過分析，簡要將之分為「減少壅塞」、「保護行人」、「減少事故」、「路面維護」等四方面，簡述如下：

(一) 減少壅塞方面：

減少交通壅塞可以減少因壅塞而引起交通事故的機會，因此南韓(Republic of Korea)持續地擴建並改善道路網；墨西哥(Mexico)也加強道路現代化的建設以符合國家成長的需求，同時還以將運量分散到其它運具的方式，鼓勵民眾使用其它運輸工具(特別是鐵路運輸)，以減少公路運量的負荷；紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)與中華台北(Chinese Taipei)則配合土地使用分區 (Land use controls)的規劃，減少土地分區不當而造成對路網的不良影響。

(二) 保護行人方面：

對於行人的保護，日本(Japan)所採用的方法是推廣「人車分離(Separation between pedestrians and vehicles)」的方式，藉以降低行人的交通事故；南韓(Republic of Korea)也利用大量的「人行道緣石(Curbs)」、「人行道護柱(Bollards)」與「護欄(Guardrails)」來保護行人的用路空間；新加

坡(Singapore)在路中設置「帶有安全島的斑馬線區(Zebra crossing with a refuge)」，或是結合「減速墊(Hump)」與斑馬線組成「立體的斑馬線(A raised zebra crossing)」，並用特殊的燈光加強人行穿越道的照明等級。

### (三)減少事故方面：

減少事故方面，概分為道路工程、安全設施、號誌標誌標線等三類方式：

#### 1.道路工程方式：

紐西蘭(New Zealand)建議建立更多的分離式道路；秘魯(Peru)則建議建造可管制進出的外環道路以避開都市地區。

#### 2.安全設施：

紐西蘭(New Zealand)建議要提供更多的「緩衝區(Clear Recover Areas)」與「護欄(Safety Barriers)」來促進道路安全；新加坡(Singapore)也設置「撞擊緩衝器(Crash cushions)」以吸收可能的衝擊。

#### 3.號誌、標誌、標線設計：

巴布亞紐幾內亞(Papua New Guinea)在關鍵路段加強路邊標線之劃設以加強對車輛行進的導引；新加坡(Singapore)在快速路網的出入口處之橋樑結構的「三角形區域(The gore areas)」設置高反光性的標記，並在機車進入主要車流處以「山形標線(Chevron markings)」導引機車的匯入動線；新加坡(Singapore)同時也以增長黃燈時間的方式增加路口清道時間以增進路口安全。

### (四)路面維護方面：

墨西哥(Mexico)針對重型車輛規劃特定的行駛路線，而且並將道路鋪面進行特別改善以符合載重之需求；墨西哥(Mexico)、紐西蘭(New Zealand)與巴布亞紐幾內亞(Papua New Guinea)也以限制車輛載重的方式保護路面，墨西哥(Mexico)更採用自動化的科技測重設備來執法。紐西蘭(New Zealand)則針對路滑的問題建議以監督並改善路面的磨擦力，同時改善路面的排水。

## 五、改善路網與道路安全設施問題所遭遇的困難

改善路網與道路安全設施問題所遭遇的困難各個「會員體(Member Economy)」大多相似，概分為「資源有限」、「執法困難」、「運輸需求成長太快」、「地形條件限制」等方面，簡述如下：

#### (一)資源有限

如問題說明所述，由於公路建設或工程上的改善都需要大量的經費、人力、機具以及土地等資源，因此資源有限是各會員體相當普遍的共通問題。

#### (二)執法困難

貨運業者要求建造更多他們所擁有的車型能行駛的道路，同時也反

對政府所制定的車輛載重限制。

(三)運輸需求成長太快：

由於運輸需求成長太快，造成運輸供給的資源不足以應付運輸需求。

(四)地形條件限制：

部份會員體(如墨西哥)的地形有較多山區與坡地，因此道路的建設與改善需要較多的經費與較高的工程技術。

## 六、會員體在改善路網與道路安全設施問題方面之成果

部份「會員體(Member Economies)」在改善路網與道路安全設施問題方面已有具體之成果，茲分述如下以供參考：

(一)加拿大(Canada)的成果：

「加拿大策略性道路研究方案(Canadian Strategic Highway Research Program, C-SHRP)」的促使社區支持政府對道路的設施、維護與修復採取更多更好的投資與介入(Intervention)策略；加拿大的一個「多運具(Multi-modal)」、「跨行政區(Multi-jurisdictional)」的全國性組織--「加拿大運輸協會(The Transportation Association of Canada)」，最近也更新「道路設計準則(The development of roadway design guidelines)」，其中將道路安全有關的工程考量一併納入，相關資訊請參考 [www.tac-atc.ca](http://www.tac-atc.ca) 網頁。\*\*\*\*\*

(二)日本(Japan)的成果：

日本(Japan)的「七年交通安全設施改善方案(Seven-year Traffic Safety Facilities Improvement Program)」從 1996 年至今，已投入了約 52,700 億日圓的經費從事交通安全的改善，並獲得重大的改善成果。

(三)墨西哥(Mexico)的成果：

墨西哥(Mexico)的針對重型車輛的操作情形以及對於行駛路段之道路安全影響進研究與測試。

(四)祕魯(Peru)的成果：

針對直立式與橫式標誌編著「新技術規格手冊(The New Technical Specification Manual)」；祕魯(Peru)也已針對外環道路對交通事故件數減少之功能進行研究。

(五)新加坡(Singapore)的成果：

新加坡(Singapore)的研究顯示高亮度的障礙物標記能夠即時警示車輛閃開危險區域。

(六)中華台北(Chinese Taipei)的成果：

中華台北(Chinese Taipei)在台北市區的主要幹道上設置多條「公車專用道(Exclusive-bus-lanes)」，對交通秩序有極大的改善效果。

### 第三章 路側邊坡管理

「路側邊坡管理(Roadside cut slope management)」係本報告的十二項主要道路交通安全問題中的第三個問題，在本研究中是被分類為第二類的公路與交通工程(Highway and traffic engineering)。以下分別就此問題之「問題說明」、「路側邊坡管理的改善方法」、「改善路側邊坡管理所遭遇的困難」以及「會員體在改善路側邊坡管理之成果」等分節敘述。

#### 一、問題說明：

道路路側邊坡對交通安全的危害可分為兩個方面，一是不穩定的邊坡造成落石或是路基下陷而對行經的人車造成傷害；另一種是由於邊坡的坡度太陡，當車輛失控衝出路外時，對人車造成更嚴重的傷害。

依據以上的問題特性，部份「會員體(Member Economies)」提供了相關的經驗與方案以供參考，經過彙整、歸類各會員體所提供的資料後，以下分別介紹「路側邊坡管理的改善方法」、「改善路側邊坡管理所遭遇的困難」、「會員體在改善路側邊坡管理之成果」。

#### 二、路側邊坡管理的改善方法

會員體提供了許多路側邊坡管理的改善方法，經過分析，簡要將之分為「邊坡工程改善」、「設置護欄」、「危險路段的監督與管制」等三項，簡述如下：

##### (一) 邊坡工程改善

邊坡工程改善必須以天然環境、土壤狀況、地形、經濟等特性為基礎，針對這些特性採取對策以獲得良好的改善效果。常見的改善方式是將土壤植被以穩定邊坡，此外還有「改善邊坡的坡度」、「穩定邊坡結構」、「改善排水」等方式。

##### 1. 改善邊坡的坡度

係將岩石修圓或是用填土將邊坡的坡度改善。紐西蘭(New Zealand)的做法是儘可能將所需坡度與路堤保持在最小的限度，以成功的確保邊坡的安全性。

##### 2. 穩定邊坡結構

常見採用穩定邊坡結構有「擋土牆(Structural concrete diaphragm walls, brickworks)」、「鐵絲網(Wire netting)」等等。例如紐西蘭(New Zealand)採用「蛇籠(Gabion walls)」來穩定邊坡。

##### 3. 改善排水

例如將向上流至表面的水流導離路堤(Divert upstream surface

drainage away from the embankment)、改善地下排水等等。

## (二) 設置護欄

設置護欄保護車輛，以免車輛因為衝出路外而撞上山壁或是墜入山谷。例如加拿大(Canada)就以電腦程式評估路堤的坡度來設置護欄。

## (三) 危險路段的監督與管制

對於容易發生落石坍方的路段，建立監督與預警的機制，並設置警告標誌，一旦發生落石坍方可能傷及人車時，立即管制車輛的進入並通報附近車輛改道，同時儘快移除落石。

# 三、改善路側邊坡管理所遭遇的困難

邊坡的工程改善時，地形與地質之條件對於改善工程的技術與經費有很大的影響，因此對於多山地區的道路而言，邊坡的改善工程需耗費許多的人力與金錢；而邊坡之安全管理也變得十分重要。以下簡述在改善邊坡時主要面對的困難：

## (一) 地形地質限制

由於邊坡的坡度愈平緩則愈穩定，但是道路兩側必須要有足夠的空間才可做出較平緩的邊坡，而道路土地空間則受限於地形的條件；而地質對於邊坡的穩定也是有直接的影響。

## (二) 工程技術限制

對於土地空間不足或是地質不良的道路邊坡，就必須依賴工程技術的彌補，因此有許多穩定邊坡的工程技術發展應用，然而工程技術仍有其限制，對於太差的土壤地質或是太小的土地空間，工程技術有時仍然無法克服。

## (三) 經費限制

由於邊坡的工程改善需要許多土地與工程的經費，邊坡的安全管理也需要許多的人力與技術，因此也需耗費大量的金錢。

# 四、會員體在改善路側邊坡管理之成果

部份「會員體(Member Economies)」在改善路側邊坡管理方面已有具體之成果，茲分述如下以供參考：

## (一) 加拿大(Canada)的成果

加拿大在路側邊坡管理方面已有許多具體的成果，並且有許多書面的報告可供參考，這些報告可以從「國際道路研究資料庫(International Road Research Database)」的網際網路獲得，網址是<http://www.oecd.org/dsti/sti/transport/road/stats/IRRD/IRRD.HTM>。這些報告包括：

- Environment Friendly Solutions to Erosion Control in Alberta.
- Manual of Control of Erosion and Shallow Slope Management.
- Freeway Construction Techniques in Areas of Sensitive Clay Soils :  
Highway 416 Case Study.
- New Design Method for Reinforced Sloped Embankments.
- The Effectiveness of Surficial Erosion Control Products
- Comparative Evaluation of the Effectiveness of Erosion Control Materials.
- Stresses and Deformations in a Reinforced Soil Slope
- Benefit-Cost Analysis of Flatter Embankment Slopes.

(二) 泰國(Thailand)的成果：

泰國在 1996 年選定一個「侵蝕與道路滑動控制之道路維護委員會(A Committee on the Erosion and Land slide Control for Highway Maintenance)」，負責協調所有人員與活動，並將技術應用於道路邊坡改善。自 1996 年以來，委員會至少調查並重新設計了 122 個因侵蝕與道路滑動而造成危險的邊坡。此外，這個委員會並設立侵蝕與道路滑動控制的人員訓練課程，在 1990 年就訓練了 266 位人員。

## 第四章 超速問題的改善

「超速(Speeding)」係本報告的十二項主要道路交通安全問題中的第四個問題，在本研究中是被分類為第三類：行為(Behavior)。以下分別就此問題之「問題說明」、「超速問題的改善方法」、「其它與超速相關的課題」、「改善超速問題所遭遇的困難」以及「會員體在改善超速問題之成果」等分節敘述。

### 一、問題說明：

在加拿大(Canada)幾乎四分之一的嚴重事故造成駕駛死亡，其主因都是超速，在南韓(Republic of Korea)超速也是最常見的交通違規。駕駛人在超速時，通常也會有其它高危險的駕駛行為，例如不使用安全帶、酒後駕車或是闖紅燈等；有時駕駛人在超速時並不覺得他們已經超速了；超速也容易造成車輛的失控因而肇事，而速度愈快所造成的傷亡也愈嚴重。

依據以上的問題特性，部份「會員體(Member Economies)」提供了相關的經驗與方案以供參考，經過彙整、歸類各會員體所提供的資料後，以下分別介紹「超速問題的改善方法」、「其它與超速相關的課題」、「改善超速問題所遭遇的困難」以及「會員體在改善超速問題之成果」。

### 二、超速問題的改善方法

會員體們提供了許多超速問題的改善方法，經過分析，簡要將之分為教育、執法與工程等三方面，簡述如下：

#### (一)教育：

根本的解決「用路人(Road users)」行為不當的問題是以教育的方式改善用路人的觀念與行為，因此加拿大(Canada)、日本(Japan)、南韓(Republic of Korea)、墨西哥(Mexico)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)、秘魯(Peru)、新加坡(Singapore)以及中華台北(Chinese Taipei)等「會員體(Member Economies)」都把教育列為改善駕駛人的超速行為問題的必要方式。加拿大(Canada)就建議教育民眾超速的危險性以及其所衍生的社會與醫療成本；而以媒體廣告對民眾進行宣導也是常用的方式。

#### (二)執法：

除了以教育的方式引導駕駛人改善自己駕駛行為之外，還須用執法的手段來強制要求駕駛人守法，才能建立安全有序的駕駛行為。因此加拿大(Canada)、日本(Japan)、南韓(Republic of Korea)、墨西哥(Mexico)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)、秘魯(Peru)、新加坡(Singapore)、中華台北(Chinese Taipei)以及泰國(Thailand)等會員體都建議加強執法並加重罰則來嚇阻駕駛人的超速行為，例如加重罰金、限制

駕駛、對累犯進行強制的再教育等。部份加拿大(Canada)的行政區就在特定的社區安全區對超速的駕駛人施以「遞增(Escalating)」或「差別(Discriminatory)」的罰金，而南韓(Republic of Korea)也採用類似的方式對超速愈多的駕駛人施以更重的處罰；而以「超速雷達照相(Photo radar)」來進行超速執法也是常見的方式，例如加拿大(Canada)、南韓(Republic of Korea)、紐西蘭(New Zealand)、新加坡(Singapore)、中華台北(Chinese Taipei)等；紐西蘭(New Zealand)更採用「路邊駕照吊扣制度(A roadside licence suspension regime)」，員警對於當場攔查時速超過速限五十公里以上的駕駛人當場施以吊扣駕照二十八天的處罰，新加坡(Singapore)也採用類似的制度，針對時速超過速限六十公里以上的駕駛人當場施以吊扣駕照；巴布亞紐幾內亞(Papua New Guinea)則採用「駕照違規記點(Driver's license demerit point system)」的方式記錄駕駛人的違規紀錄；秘魯(Peru)則建立駕駛人的違規資料庫。

### (三) 工程：

以工程手段改善超速問題可分為三類，一是以交通工程的設計來配合教育與執法的措施，其次是以交通工程的技術讓駕駛人不得不減低速度通過，第三類是以車輛工程的方式減少因車輛高速行駛所造成的傷亡。

在配合教育與執法的交通工程措施方面，加拿大(Canada)建議在駕駛人容易超速的主要道路上設置加大尺寸的標誌，說明超速的罰金，且部分地區業已施行；紐西蘭(New Zealand)則在彎道或是必要的路段設置警告標誌。

在以交通工程的技術促使駕駛人減速方面，日本(Japan)是利用「人類視覺錯覺(The optical illusion)」的方式設置標線，讓駕駛人以爲自己開太快了而自動減速；紐西蘭(New Zealand)則是採用設置「減速墊(Humps)」或是減小車道寬的方式使駕駛人減速，泰國(Thailand)也採用減速墊來減慢車輛行經的速度，但是紐西蘭(New Zealand)也特別註明，減速墊有時也可能變成肇事的原因。

在以車輛工程的技術減少傷亡方面，紐西蘭(New Zealand)建議改善車輛的煞車系統以促進行車安全，例如在車輛上採用「防鎖死煞車系統(Anti-Lock Braking System, ABS)」；紐西蘭(New Zealand)也提出「善待行人(Pedestrian friendly)」的車輛設計概念，但是這種方式需要長時間的努力才能有一定的效果；新加坡(Singapore)則在重型車輛上強制裝設「限速器(Speed limiters)」。

## 三、其它與超速相關的課題

員警在處理車輛事故釐清肇事因素時，在沒有其它明顯的證據可顯示肇事因素下，通常傾向以超速作為肇事的主要因素，但有時可能其它的潛在因素才是真正的肇事主因，如此一來將來在以此事故資料做進一步分析



時，可能會誤導研究人員的分析方向，而擬定了不適當的改善策略。因此，加拿大(Canada)建議用統計資料教育員警在分析肇事因素要考慮其它的交通安全課題，例如「失能(Impaired)」駕駛或是「未繫安全帶(Unbelted)」等等。

此外，員警也需接受特別的訓練課程並學習新的執法技術才能有效地進行超速執法。

#### 四、改善超速問題所遭遇的困難

各個會員體(Member Economy)改善超速問題所遭遇的困難大多相似，簡列如下：

- (一)超速的範圍難以定義；
- (二)執法的水準受限於員警的人力、器材等資源限制；
- (三)部份會員體的人民非常反對使用超速雷達照相執法；
- (四)教育活動需要巨額的經費；
- (五)駕駛人的觀念不易改變，仍有駕駛人認為超速被罰是因為運氣不好；
- (六)教育不易產生立即改善的效果；
- (七)汽車業的廣告往往會造成駕駛人認為高速行駛是突顯汽車性能的方式。

#### 五、會員體在改善超速問題之成果

各「會員體(Member Economy)」所採取的教育、執法與工程手段大多能減少部份的超速行為，並且對於因超速而導致之事故件數也有一定的減少效果。茲將其它較具體的相關成果分述如下以供參考：

##### (一)加拿大(Canada)的成果：

加拿大(Canada)針對高危險駕駛者成立了一個「全國性的專案小組(A national task force)」，而超速被認定為主要的危險課題之一；這個專案小組將依據道路安全主管當局所完成的一份調查結果來定義高危險駕駛人，並依此定義建立有效的解決方案來改善這些高危險駕駛人的駕駛行為，其中當然也包括超速行為。

##### (二)紐西蘭(New Zealand)的成果：

紐西蘭(New Zealand)對「超速照相機(The speed camera)」方案進行評估的結果發現，在都市設置超速照相機的地點事故件數減少了百分之二十三，而在郊區設置超速照相機的地點則事故件數減少了百分之十一。而隱藏式的超速照相機也減少了百分之十九的傷亡人數。

而紐西蘭(New Zealand)也推動大規模的廣告宣導活動，針對超速、酒後駕車、未使用安全帶等問題進行教育宣導。根據客觀的評估報告指出，這個活動在前兩年共減少了超過一百件死亡人數以及超過一千件重傷人數，並大幅減少酒後駕車事故的件數以及因超速導致重大傷亡的事故件數。

## 第五章 失能駕駛問題的改善

「失能駕駛(Impaired driving)」係本報告的十二項主要道路交通安全問題中的第五個問題，在本研究中是被分類為第三類：行為(Behavior)。以下分別就此問題之「問題說明」、「會員體針對失能駕駛問題的整體改善方案」、「失能駕駛問題的改善方法」、「改善失能駕駛問題所遭遇的困難」以及「會員體在改善失能駕駛問題之成果」等分節敘述。

### 一、問題說明：

所謂失能駕駛一般而言係指在酒醉、嗑藥或疲勞而失能的狀況下駕駛車輛。加拿大(Canada)從 1998 年的事故資料中發現，百分之三十九的死亡事故與百分之十九的重傷事故在事故發生前有飲酒或失能的情形，百分之三十九的車禍致死人數中(車上乘員及非車上乘員)被測得體內有酒精，百分之六十酒後失能駕駛者「血液中的酒精濃度(Blood alcohol concentration levels)」超過了 0.15%，幾乎是法規限制(0.08%)的兩倍。在許多「會員體(Member Economies)」中，酒後駕車也是重大的肇事因素之一。

酒後駕車通常也會伴隨著其它危險的駕駛行為，包括不繫安全帶、超速、闖紅燈等等。

依據以上的問題特性，部份會員體提供了相關的經驗與方案以供參考，經過彙整、歸類各會員體所提供的資料後，以下分別介紹各會員體「針對失能駕駛問題的整體改善方案」、「失能駕駛問題的改善方法」、「改善失能駕駛問題所遭遇的困難」以及「會員體在改善失能駕駛問題之成果」。

### 二、針對失能駕駛問題的整體改善方案

各會員體對失能駕駛問題大多已從各個方面著手改善，其中加拿大(Canada)與紐西蘭(New Zealand)簡要提出了他們針對這個問題所實施的方案，簡述如下：

#### (一)加拿大(Canada)：

加拿大(Canada)在 1995 年起在全國推動「二〇〇一減少失能駕駛策略(The Strategy to Reduce Impaired Driving 2001, STRID 2001)方案」，目標要將因酒後駕車事故所造成的傷亡人數比 1990 至 1995 年基準線還要減少百分之二十；其作法包括執法、立法、初犯者的教育、累犯者吊扣駕照(期限長短按累犯次數計)、吊押車輛、以是否提供訓練課程作為酒商能否保有其「賣酒執照(Liquor license)」或取消其「免稅資格(Exemptions)」的條件。

(二) 紐西蘭(New Zealand)：

紐西蘭(New Zealand)有一個「社區酒精活動贊助計畫(Funding of Community Alcohol Action Projects)」，同時也有許多以社區為基礎的計畫，透過教育活動、增進民眾認知、執法與宣導活動等方式，減少酒精相關的車禍。

### 三、失能駕駛問題的改善方法

會員體們提供了許多失能駕駛問題的改善方法，經過分析，簡要將之分為教育、執法與其它等三方面，簡述如下：

(一) 教育：

與超速行為相同，失能駕駛大多是屬於「用路人(Road users)」行為不當的問題，因此其根本的解決之道仍需以教育的方式改善用路人的觀念與行為，故加拿大(Canada)、南韓(Republic of Korea)、墨西哥(Mexico)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)、祕魯(Peru)、新加坡(Singapore)、中華台北(Chinese Taipei)以及泰國(Thailand)等會員體(Member Economies)都把教育列為改善駕駛人的失能駕駛問題的必要方式。加拿大(Canada)同樣建議教育民眾失能駕駛的危險性以及其所衍生的社會與醫療成本；紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)、中華台北(Chinese Taipei)也採用強勢且密集的廣告來教育民眾。

(二) 執法：

失能駕駛行為仍需用執法的手段來強制要求駕駛人守法，因此加拿大(Canada)、日本(Japan)、南韓(Republic of Korea)、墨西哥(Mexico)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)、新加坡(Singapore)以及泰國(Thailand)等會員體都建議加強執法並加重罰則來嚇阻駕駛人的酒後駕駛行為，例如加重罰金、吊扣駕照、扣留車輛、對累犯進行重罰與強制教育等。

加拿大(Canada)針對酒醉駕車事故大多發生在夜間的特性，建議加強夜間的交通執法，同時配合短期吊扣駕照或扣留車輛的方式嚇阻駕駛人；日本(Japan)也採用吊扣駕照的強制執法方式；紐西蘭(New Zealand)採用「強制呼吸測試(Compulsory breath-testing, CBT)」的執法，同時也以「累進處罰(Graduated penalties)」的方式對累犯施以更重的處罰，並配合吊扣駕照或扣留車輛的處罰；中華台北(Chinese Taipei)也採用「強制呼吸測試(CBT)」的執法。

(三) 其它

日本(Japan)也利用社會的力量來懲治酒醉駕車的人員，例如如果公務員因酒醉駕車而肇事，將被要求參加「紀律訓練活動(Disciplinary actions)」；巴布亞紐幾內亞(Papua New Guinea)則以鼓勵使用大眾運輸的方式來減少酒醉駕車的風險；祕魯(Peru)則在國家道路網適當的地點設置休

息區供長途駕車的駕駛人可以中途休息。

#### 四、改善失能駕駛問題所遭遇的困難

和許多改善交通安全問題時會遭遇的困難相同，教育與執法都需要巨額的經費與人力才能全面性的推動，也才能有明顯的效果，因此「會員體(Member Economies)」在改善失能駕駛問題所遭遇的共同困難仍是經費與人力的欠缺。此外，部份會員體還提出了其它較特殊的問題，簡述於下。

##### (一) 員警工作負荷問題

加拿大(Canada)的研究發現，員警處理每個失能駕駛案件時所需的時間長達三個小時，對於員警人力與工作都是極大的負荷；同時加拿大(Canada)也發現許多酒後駕車的駕駛人都是累犯，目前的執法對這群人幾乎沒有什麼威嚇效果。

##### (二) 對失能的定義不易判定

雖然許多會員體都定有法定的酒精含量標準，但是並不是每個酒精含量超過標準的駕駛人都處於失能狀況，這也牽涉到法律條文的問題，還待立法單位修改法律來解決這個問題。

##### (三) 對於藥物與疲勞駕駛不易執法

藥物與疲勞駕駛由於員警不易由外表或簡單迅速的方式來判定，因此在執法時這些駕駛人往往成了漏網之魚。

#### 五、會員體在改善失能駕駛問題之成果

許多「會員體(Member Economies)」對於駕駛人的酒精含量都已定有法定的標準，例如加拿大(Canada)的駕駛人血液中的酒精濃度法規限制是0.08%；紐西蘭(New Zealand)對二十歲以上駕駛人的法定酒精限制是每100 毫升血液中酒精含量不得超過 80 毫克，對於未滿二十歲的駕駛人限制更嚴格，不得超過 30 毫克。

各會員體所採取的教育、執法與其它手段大多能減少部份的失能駕駛問題，並且對相關事故件數也有一定的減少效果。茲將其它較具體的相關成果分述如下以供參考：

##### (一) 加拿大(Canada)的成果：

自從一九九六年起推動「二〇〇一減少失能駕駛策略(STRID 2001)方案」後，酒醉駕車致死的駕駛人減少了 13.3%，而酒醉駕車受傷的駕駛人減少了 9.5%。

##### (二) 紐西蘭(New Zealand)的成果：

紐西蘭(New Zealand)針對超速、酒後駕車、未使用安全帶等問題所推動的大規模廣告宣導活動，在酒精相關事故方面也有顯著的效果，活動的第一年在都市地區酒精相關重大傷亡事故的件數就減少了 16%，在第二年，更減少了 33%；第二年時在郊區也減少了 32%。

## 第六章 車輛超載問題的改善

「超載(Vehicle Overloading)」係本報告的十二項主要道路交通安全問題中的第六個問題，在本研究中是被分類為第三類：行為(Behavior)。以下分別就此問題之「問題說明」、「超載問題的改善方法」、「改善超載問題所遭遇的困難」以及「會員體在改善超載問題之成果」等分節敘述。

### 一、問題說明：

「超載(Vehicle Overloading)」除了與人的行為因素有關之外，這個問題還牽涉到車輛工程與運輸業的管理課題，而運輸業的超載行為在各個會員體是個普遍存在的問題。

墨西哥(Mexico)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)、新加坡(Singapore)與中華台北(Chinese Taipei)都指出車輛超載對路面與橋樑造成很大的損壞，在雨天是更為明顯；而超載對於車輛的安全也會造成不良的影響，例如轉向不易、煞車距離增長、加速緩慢、機件損壞等等，更有車輛因而肇事的情形。

中華台北(Chinese Taipei)另提出了載客車輛的超載問題，例如部份校車及幼稚園車輛將車內的座椅改裝，以求能載較多的人員並節省成本。

依據以上的問題特性，部份「會員體(Member Economies)」提供了相關的經驗與方案以供參考，經過彙整、歸類各會員體所提供的資料後，以下分別介紹「超載問題的改善方法」、「改善超載問題所遭遇的困難」以及「會員體在改善超載問題之成果」。

### 二、超載問題的改善方法

會員體提供了許多超載問題的改善方法，經過分析，簡要將之分為執法、車輛工程、經濟面的手段、教育等四方面，簡述如下：

#### (一) 執法：

超載亦須用執法的手段來強制要求駕駛人守法，因此加拿大(Canada)、日本(Japan)、南韓(Republic of Korea)、墨西哥(Mexico)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)、新加坡(Singapore)、中華台北(Chinese Taipei)以及泰國(Thailand)等會員體都建議加強執法並加重罰則來嚇阻超載。

在適當地點設置控制點與測重儀器是目前常用的超載執法方式；而「自動測重系統(Weight in Motion)」則是許多會員體所推薦的超載執法器材，自動測重系統是以電子設備測量行進間車輛的各個輪軸的重量，而不必將車輛攔下測量，可以減少對交通的干擾；例如加拿大(Canada)、南韓

(Republic of Korea)都建議採用。

紐西蘭(New Zealand)則成立「商用車輛調查警員小組(The Police Commercial Vehicle Investigation Unit, CVIU)」，針對重型車輛的裝載安全進行持續的執法；而載重超過限重 10%以上車輛，也會被要求將貨物卸載。

## (二) 車輛工程

加拿大(Canada)在載運原木的貨車每個輪軸上裝設測重儀，確保車輛沒有超載；加拿大(Canada)建議載重車的底盤使用可靠度較高的「氣壓式懸吊載重系統(Air suspension weight devices)」；紐西蘭(New Zealand)建議發展「車輛性能標準(Performance standards)」，以建立車輛裝載的穩定度與事故風險之間的關係；中華台北(Chinese Taipei)則限制車齡十五年以上的車輛必須淘汰，以確保車輛的安全性。

## (三) 經濟面的手段

加拿大(Canada)針對運輸業者普遍超載的問題，建議採用經濟面的解決方式，就是將超載的金錢誘因排除，如此一來運輸車輛超載的問題就可以減少。

日本(Japan)以加重雇主責任的方式來抑制超載，也就是如果雇主允許其駕駛人超載或是其它的違規行為，雇主也必須遭受連帶的處罰。

## (四) 教育

與其它的駕駛人違規行為改善方式不同，對於超載問題的改善方法中，會員體較少提到要加強教育的部份，但是還有是部份會員體(Member Economies)提出以教育的手段改善超載問題；例如紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)是將立法的相關紀錄(Fact Sheets)公佈讓民眾知道限制車重的原委；中華台北(Chinese Taipei)則是針對所有民眾進行教育。

# 三、改善超載問題所遭遇的困難

由於超載執法需要許多的貴重儀器與人力，因此會員體在改善超載問題所遭遇的共同困難仍是儀器、經費與人力的欠缺。此外，部份會員體還提出了其它較特殊的問題，簡述於下。

## (一) 營利優先之問題

加拿大(Canada)指出貨運業雖然試著想以技術的方式減少超載的問題，但是由於貨物運送時的價格競爭，所以運輸業者不願意投入大量的資金將理論應用在技術的改良上；而在許多會員體都有發生貨車業為營利而超載的行為。

## (二) 執法不易

日本(Japan)指出，由於土地空間不足，因此不易找到合適的地點對超載車輛進行執法；此外，運輸車輛之間彼此也會互通訊息，一旦執法單位選定攔檢定點後，運輸車輛就會避開此路段行駛。

### (三) 貨運業者的反對

墨西哥(Mexico)指出，貨運業者認為車輛限重將會減少其車輛所能車運的貨物，因而導致獲利的減少，因此強烈反對車輛限重。

## 四、會員體(Member Economies)在改善超載問題之成果

各會員體(Member Economy)所採取的執法、經濟、教育與其它手段大多能減少部份的超載問題，並且對相關事故件數也有一定的減少效果。祕魯(Peru)在 1999 年設立兩個固定的車輛載重檢查站以及九個移動式的測重單位，共有 93%的運輸業者依新的車重規定調整車輛。

## 第七章 鼓勵民眾使用安全帶與安全帽問題

「鼓勵民眾使用安全帶與安全帽(Encouraging people to wear seatbelts and motorcycle helmets)」係本報告的十二項主要道路交通安全問題中的第七個問題，在本研究中是被分類為第三類：行為(Behavior)。以下分別就此問題之「問題說明」、「鼓勵民眾使用安全帶與安全帽的整體改善方案」、「鼓勵民眾使用安全帶與安全帽的方法」、「其它相關課題」、「鼓勵民眾使用安全帶與安全帽所遭遇的困難」以及「鼓勵民眾使用安全帶與安全帽之成果」等分節敘述。

### 一、問題說明：

在澳洲(Australia)車禍致死的人員中，有三分之一沒有繫上安全帶；而加拿大(Canada)的研究也發現有 40%車禍致死的車上乘員未繫安全帶，20%車禍受傷的車上乘員未繫安全帶；在日本(Japan)車禍致死的人員中，更有三分之二沒有繫上安全帶。

### 二、鼓勵民眾使用安全帶與安全帽的整體改善方案

各「會員體(Member Economy)」對鼓勵民眾使用安全帶與安全帽問題大多已從各個方面著手改善，其中加拿大(Canada)在 1989 年推行「2001 國家乘員限制計畫 (The National Occupant Restraint Program 2001, NORP 2001)」，作為加拿大全國性的原則計畫，目標要在 2001 年針對所有「小型車(Light duty vehicle)」乘客達到百分之九十五的安全帶使用率，該計畫並將延續到 2010 年達到類似的目標（所有車輛乘員達到百分之九十五的安全帶使用率）；「2001 國家乘員限制計畫」專案小組的研究顯示因車禍死亡與受傷的車內乘員中，有許多未繫安全帶，專案小組更將此研究結果提供立法委員、員警以及相關的道路安全主管當局，以引起針對這個問題提供更多經費的意願。

### 三、鼓勵民眾使用安全帶與安全帽的方法

會員體提供了許多鼓勵民眾使用安全帶與安全帽的方法，經過分析，簡要將之分為立法強制、教育、工程、執法等四方面，簡述如下：

#### (一) 立法強制

立法強制使用安全帶與安全帽是個有效的改善方法，澳洲(Australia)、加拿大(Canada)、墨西哥(Mexico)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)、新加坡(Singapore)、中華台北(Chinese Taipei)以及泰國(Thailand)等會員體(Member Economies)就提到採用立法



強制的方式改善民眾不繫安全帶或是騎乘機車不戴安全帽的問題。

## (二) 教育

除了立法強制外，澳洲(Australia)、加拿大(Canada)、日本(Japan)、墨西哥(Mexico)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)、中華台北(Chinese Taipei)以及泰國(Thailand)等會員體(Member Economies)也以加強教育的方式讓民眾了解安全帶或安全帽對於交通安全傷亡之預防功效，進而改善民眾不繫安全帶或是騎乘機車不戴安全帽的問題；紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)也推動社區及學校的教育方案，以求減少交通事故的傷亡。

## (三) 工程

澳洲(Australia)要求車輛製造廠必須在出廠的新車上裝設「未繫安全帶的警告系統(Intrusive seatbelt reminder systems)」；南韓(Republic of Korea)與中華台北(Chinese Taipei)也建議發展更便於使用的安全設備；巴布亞紐幾內亞(Papua New Guinea)建議改善安全帽的設計，使安全帽使用的便利性、視線與聽覺都更加良好。

## (四) 執法：

執法仍是用來強制要求駕駛人使用安全帶或是安全帽的手段，因此南韓(Republic of Korea)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)以及新加坡(Singapore)等會員體(Member Economies)都建議加強執法並加重罰則來強制要求駕駛人使用安全帶與安全帽。

# 四、 其它相關課題

一個與安全帶使用習習相關的課題是兒童使用安全座椅的問題。在紐西蘭(New Zealand)，五歲以上兒童使用「兒童安全座椅(Child seats)」的比例有 76%，而另外有 11%的五歲以上兒童使用成人專用的安全帶。

# 五、 鼓勵民眾使用安全帶與安全帽所遭遇的困難

由於鼓勵民眾使用安全帶與安全帽需要透過教育、執法等多方面的努力，而教育與執法都是需要大量經費與人力才能達到一定的效果，因此會員體在改善民眾使用安全帶與安全帽問題所遭遇的共同困難仍是經費與人力的欠缺。此外，部份會員體還提出了其它較特殊的問題，簡述於下。

## (一) 車廠的反對

澳洲(Australia)由於要求新車必須裝設未繫安全帶警告系統，遭到車廠的大力反對。

## (二) 安全帶與安全帽使用不便

南韓(Republic of Korea)與中華台北(Chinese Taipei)都指出，民眾不願使用安全帶或是安全帽的原因之一是安全帶與安全帽使用起來不方便。

## 六、鼓勵民眾使用安全帶與安全帽之成果

各會員體所採取的立法、教育、工程與執法方式對於安全帶與安全帽的使用推廣有很明顯的效果，並且對相關事故傷亡的減少也有一定的效果。茲將其它較具體的相關成果分述如下以供參考：

### (一) 加拿大(Canada)

加拿大(Canada)透過立法、民眾教育以及執法活動的多方面努力，安全帶的使用率在 2001 年時達到了 90%。

### (二) 紐西蘭(New Zealand)

紐西蘭(New Zealand)前座的安全帶使用已達到 89%，後座也達到了 62%，兒童使用安全帶的比率也穩定地維持在 89%；而在機車前後座乘員使用安全帽的比率上，紐西蘭(New Zealand)也達到了 99%。

## 第八章 行人安全

「行人安全(Pedestrian safety)」係本報告的十二項主要道路交通安全問題中的第八個問題，在本研究中是被分類為第四類的弱勢團體(Vulnerable groups)。以下分別就此問題之「問題說明」、「改善行人安全的方法」、「改善行人安全所遭遇的困難」以及「改善行人安全之成果」等分節敘述。

### 一、問題說明：

行人在道路上的交通安全問題可以歸類以下幾大類：

#### 1.行人在道路上的弱勢

行人在道路交通上通常被迫居於弱勢，因為行人的移動速度慢，夜間時因體積太小而不夠明顯，又欠缺車體的保護，加上駕駛人對於行人的路權通常不予重視，造成行人在道路上的行動空間與安全受到極大的壓迫。

#### 2.行人本身不守法

在部份「會員體(Member Economies)」中，行人違規穿越車道也是造成行人交通事故的原因之一。例如墨西哥(Mexico)就指出部份的行人不用行人專用道來通行。

#### 3.行人安全不受道路主管當局重視

由於行人的傷亡占交通事故傷亡的人數比例不如車上乘員這麼高，例如加拿大(Canada)的死亡「用路人(Road users)」中，平均每年約有 13.5% 是行人，而重傷的也只有 10.5% 是行人，因此目前並沒有針對行人設計的國家交通安全教育計畫，各行政區在行人控制設施方面的經費也顯不足。

#### 4.具有特定的特徵

因交通事故造成傷亡的行人有些具有特定的特徵，例如酒醉的行人、年長的行人等。1998 年加拿大(Canada)超過 25% 車禍致死的行人在事前曾經喝酒，且平均的「血液中酒精濃度(BAC)」達 205 mg；而因交通事故造成死亡與受傷的行人中，年長者分別占了 30% 與 15%。

### 二、改善行人安全的方法

會員體(Member Economies)們提供了許多改善行人安全的方法，經過分析，簡要將之分為教育、交通工程、車輛設計以及其它等四方面，簡述如下：

#### (一)教育

加拿大(Canada)、日本(Japan)、墨西哥(Mexico)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)、祕魯(Peru)、新加坡

(Singapore)、中華台北(Chinese Taipei)以及泰國(Thailand)等會員體在行人安全方面都建議加強對民眾的教育。例如加拿大(Canada)針對行人安全的教育重點是提昇民眾對行人安全的認知，包括「行人衣著的明顯度(Conspicuity)」、酒精的使用、年長行人的安全等等；墨西哥(Mexico)也推動尊重行人的活動；紐西蘭(New Zealand)在學校教育與學前教育加強行人交通安全的知識，例如「到學校的安全路線(Safe Routes to School)」，同時鼓勵行人在行走或慢跑時穿上明亮的衣服或是掛上反光的物質以凸顯自己的位置。

## (二) 交通工程

會員體提供了許多交通工程方面的手段來增進行人的安全，可簡單分為幾項：

### 1. 人車分離

增加更多的行人專用設施，將行人行走的空間與車輛的行走空間分離。例如加拿大(Canada)建議在行人交通量特別大的地區增加更多的行人穿越設施；日本(Japan)與巴布亞紐幾內亞(Papua New Guinea)則加強道路行人設施的基礎建設，提供行人高品質且無障礙的行人空間；南韓(Republic of Korea)也建議明確區分行人與車輛的通行空間；墨西哥(Mexico)也以興建封閉式道路減少行人進入車道的危險，同時建設更多行人保護設施以及天橋；紐西蘭(New Zealand)則興建地下道、人行天橋、分離式步道、購物中心等等來分離人車；新加坡(Singapore)與中華台北(Chinese Taipei)也建造人行天橋、地下道路與分離式步道來分離人車。

### 2. 確保行人之路權

利用標誌、號誌警示來往車輛，以凸顯行人應有的通行權，或是配合行人的行走速度，加長行人號誌的綠燈時間。例如加拿大(Canada)建議在行人交通量大的路側改善標誌警示駕駛人，也建議在年長行人常出現地點加長行人號誌綠燈時間；南韓(Republic of Korea)也建議設置更多的號誌來加強駕駛人對行人路權的認知；新加坡(Singapore)則在行人穿越道設置「安全島(Refuges)」保護行人，並增加「車輛停止線(Stop line)」到行人穿越道的距離，更進一步確保行人的安全；此外並以「倒數計時的行人專用號誌(Countdown timer)」讓行人掌握明確的通行時間，以避免行人提早或太晚通過行人穿越道；泰國(Thailand)也建議在都市地區增加行人穿越道及專用號誌。

### 3. 降低車速

許多會員體都採用降低車輛速限的方式來減少車輛對行人交通安全的危害，包括日本(Japan)、墨西哥(Mexico)、紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)等。日本(Japan)對於未設人行道而迫使行人與車輛共用道路的路段，以降低車輛速限的方式以保障行人安全；墨西哥(Mexico)也降低市區的车辆速限以保護行人；紐西蘭(New Zealand)以

「門檻(Threshold treatments)」的設計來降低車速；新加坡(Singapore)以「減速墊(Humps)」來降低車輛行經行人穿越道的速度。

#### 4.凸顯行人位置

紐西蘭(New Zealand)與巴布亞紐幾內亞(Papua New Guinea)以設置「特徵表面的步道(Textured surfaces)」來凸顯行人穿越道的位置，或是改善街道的照明設備來照亮行人；新加坡(Singapore)也在行人穿越道設計彩色的鋪面，並以「泛光燈(Floodlight)」加強所有的行人穿越道的夜間照明。

#### (三)車輛設計

紐西蘭(New Zealand)也透過車體管制的方式，增進行人的交通安全；例如對於違法裝設的「車前鐵架(Bull-bars)」或其它可能對行人或機車與腳踏車騎士造成危害的配件，予以立法限制；巴布亞紐幾內亞(Papua New Guinea)也建議從車體設計減少對行人傷亡的衝擊。

#### (四)其它

新加坡(Singapore)設計行人天橋的上下斜坡道，或是縮小天橋與地下道的階梯各階的高度，以方便老年人與行動不便者通行；紐西蘭(New Zealand)與新加坡(Singapore)也採用「聲響式號誌(Audible alarms)」協助視障者通行；

### 三、改善行人安全所遭遇的困難

在改善行人安全方面，也是和其它改善道路安全問題時一樣有經費、技術與人力等資源限制的問題，但是除此之外，還有一些比較特殊的問題，分述如下：

#### (一)對行人路權的認知

不止是車輛駕駛人欠缺對行人路權的認知，主管當局與行人本身對於行人應有的路權有時也認識不清，因此在推動改善行人交通安全時，首先要解決的是主管當局與行人的觀念誤差。

#### (二)效率與安全之權衡

增加行人在道路上行走的空間與時間雖然可以增進行人的交通安全，但是同時也會佔用車輛使用道路的空間與時間，對於車流疏導的效率會造成阻礙。

#### (三)人車分離衍生的問題

例如行人單身行走於地下道時的安全性、人行天橋與地下道對行動障礙者之通行與貨物的運送造成不便等等。

#### (四)老年行人問題

老年人的行走速度較慢，因此依一般行人步行速度設計的行人號誌綠燈時間對老年人而言並不足夠，因此造成老年人穿越馬路的危險性增加；而老年人口比例的上升使得這個問題更加常見。

## 四、改善行人安全之成果

各「會員體(Member Economy)」所採取的教育、交通工程、車輛設計及其它方式對於行人交通安全的改善有一定的效果。茲將其它較具體的會員體成果分述如下以供參考：

### (一) 加拿大(Canada)

加拿大在行人安全的改善方面獲得明顯的成果，即使二十年來人口不斷成長，但是交通事故致死的行人數量(從 911 人減為 401 人)與比率(從每十萬人口 3.79 人減為 1.32 人)都大幅地減少。

而「加拿大運輸協會(The Transportation Association of Canada)」發表了「行人穿越控制手冊(The Pedestrian Crossing Control Manual)」，其中介紹行人穿越設施的標誌、標線與號誌控制的準則。這份手冊以及其它道路設施的手冊都可以從[www.tac-atc.ca](http://www.tac-atc.ca)的網站上獲得。

### (二) 紐西蘭(New Zealand)

紐西蘭(New Zealand)正在試驗一個「鸚鵡穿越道(Kea Crossings)」的行人穿越道設施，這個「鸚鵡穿越道」是設置在學校附近，只有在上下學時間行人才有優先通過這個「鸚鵡穿越道」的優先路權，且在穿越點的道路寬度被刻意縮減以改善視線；此外，紐西蘭(New Zealand)還利用「學校交通糾察隊(School patrols)」來協助維護學生的交通安全，成效良好；在教育方面，也在學校教育與學前教育加強行人交通安全的知識，例如「到學校的安全路線(Safe Routes to School)」。

### (三) 新加坡(Singapore)

新加坡(Singapore)在幼童行人交通安全方面提供了很好的經驗。包括以下四項：

#### 1. 學校區方案

在小學附近設置「學校區方案(School zone scheme)」，機動車輛必須減速通過該區，區內設置高反光性的標誌，包括在地上漆繪「腳印(Footprints)」來導引學童使用指定的行人穿越道。

#### 2. 號誌化的行人穿越道

在學校附近設置「號誌化行人穿越道(Signalized pedestrian crossing)」，教育並鼓勵學童使用行人穿越道。

#### 3. 社區與家長參與

邀請社區與家長參與推動學童的交通安全，例如請家長在上下學時間擔任「交通導護(Traffic wardens)」。

#### 4. 員警教學

請員警在學校進行交通安全的講解以教育學童穿越馬路的安全方式與交通規則，同時也開放道路安全公園供學童以遊戲的方式學習交通規則。

#### (四) 日本(Japan)

配合「七年交通安全設施改善方案」的實施，日本推動「社區分區計畫 ( Community Zoning Projects )」以確保住宅區的寧靜與安全。依據這些計畫，道路主管機關可透過執法、設置減速丘及縮小車道寬度等方式強迫駕駛人減速，在二十一個抽樣社區的事前事後分析顯示，事故死亡人數下降約 10%，事故中自行車和行人受傷人數更下降達 30%。

## 第九章 老人安全

「老人安全(Elderly people safety)」係本報告的十二項主要道路交通安全問題中的第九個問題，在本研究中是被分類為第四類的弱勢團體(Vulnerable groups)。以下分別就此問題之「問題說明」、「改善老人交通安全的方法」、「改善老人交通安全所遭遇的困難」以及「改善老人交通安全之成果」等分節敘述。

### 一、問題說明：

老人在道路上的交通安全問題大多和行人交通安全有關，因此在「問題八：行人安全問題」中，可以看見許多「會員體(Member Economies)」針對老年的行人交通安全問題提出改善的方法。而老人的交通安全問題日益受到重視，以下列出幾項會員體所提出關於老年人交通安全問題的現象：

#### 1. 老年人口增加

老年人的行走速度與反應均較一般人慢，因此許多道路或車輛設施對老年人而言並不適用，而老年人口比例的上升使得這個問題更加常見。例如加拿大(Canada)的老年人口比例在過去的二十年間就從 9%成長至 12.3%，而老年駕駛人口的比例也隨之從 7%上昇至 12.2%。

#### 2. 老年人的事故多

加拿大(Canada)道路交通事故致死的人員中有 19%是老年人(65 歲以上)，而交通事故致死的行人中有 30%是老年人，重傷人員中也有 15%是老年人，都占了不小的比例；日本(Japan)交通事故致死的人員中有 30%是老年人，比青年人所占的比例還要高。

### 二、改善老人交通安全的方法

會員體提供了許多改善行人安全的方法，經過分析，簡要將之分為駕駛能力再測驗、教育、交通工程、車輛設計以及其它等五方面，簡述如下：

#### (一) 駕駛能力再測驗

對於老年的駕駛人施以「駕駛能力的再測驗(Re-licensing tests)」。例如加拿大(Canada)半數以上省市的對於 75 歲以上的駕駛人施行駕駛能力再測驗的制度，在部份省市並依法要求醫藥人員針對老年人服用藥物對安全駕駛能力的影響向運輸官員報告；紐西蘭(New Zealand)也對老年的駕駛人進行定期的醫藥與駕駛能力再測驗；新加坡(Singapore)對於 60 歲以上的駕駛人進行定期的視力、聽力以及藥物檢測。

#### (二) 教育



日本(Japan)、南韓(Republic of Korea)、墨西哥(Mexico)、紐西蘭(New Zealand)、中華台北(Chinese Taipei)以及泰國(Thailand)等會員體(Member Economies)在建議推動老年人的交通安全教育。例如紐西蘭(New Zealand)以社區為基礎針對新的道路規則知識推動再訓練方案，並提昇對健康相關課題的認知；中華台北(Chinese Taipei)也教育老年人在出外時穿上較明顯的衣物。

### (三) 交通工程

會員體(Member Economies)提供了許多交通工程方面的手段來增進老人的安全，可簡單分為幾項：

#### 1. 標誌與號誌的改善

在老年行人密度較高的地區，改善標誌並加強號誌。例如新加坡(Singapore)就使用反光效果較佳的反光片做交通與導引標誌。

#### 2. 行走空間的改善

南韓(Republic of Korea)建議在老年行人密集的地方增加更多的行人專用設施，並在路旁設置護欄，以避免違規穿越馬路；紐西蘭(New Zealand)也建議改善道路行人空間，並改善上下坡道的設計，讓輪椅及「代步車(Mobility scooters)」通行；巴布亞紐幾內亞(Papua New Guinea)強調以「交通分離(Traffic separation)」與「交通寧靜區(Traffic calming)」的方法保護老年的行人；中華台北(Chinese Taipei)則建議在適當的地方提供輸送帶等自動化的行人設施。

#### 3. 凸顯老年行人位置

紐西蘭(New Zealand)、巴布亞紐幾內亞(Papua New Guinea)與新加坡(Singapore)建議在老年行人經常出現的位置以標誌警示，

### (四) 車輛設計

祕魯(Peru)建議提昇車輛安全的標準，並更新使用中的車輛，特別是大眾運輸車輛，以減少對老年乘客造成之危險；中華台北(Chinese Taipei)則改用「低底盤公車(Low floor buses)」或是改善公車上下之階梯，避免太高太陡的階梯對老年乘客造成上下車的不方便與危險。

### (五) 其它

日本(Japan)建議在老年行人身上貼附反光物質，讓駕駛人遠遠就可以看到他們的存在。日本(Japan)與紐西蘭(New Zealand)建議設置小公園或休息區，讓老年人在走累的時候能有地方休息恢復體力，並設置導引地圖與指標，以免老年人迷路。紐西蘭(New Zealand)與巴布亞紐幾內亞(Papua New Guinea)建議在老年行人經常出現的地區加強車輛超速的執法。

## 三、改善老人交通安全所遭遇的困難

在改善老人交通安全方面，由於也要改善許多交通設施，或是對於老年駕駛人進行駕駛能力與健康情形的測試與檢查，因此也是和其它改善

道路安全問題時一樣有經費、技術與人力等資源限制的問題，除此之外，以下列出一些比較特殊的困難，分述如下：

(一) 限制老人的行動問題

取消能力不足的老人駕駛人的駕照雖然可以減少他們/她們因駕駛不當而肇事的風險，但是卻造成更多老年人行走於道路上或是搭乘大眾運輸工具時的傷亡。

(二) 人車分離衍生的問題

例如人行天橋與地下道對老年行人之通行造成不便。

#### 四、改善老人交通安全之成果

各「會員體(Member Economy)」所採取的駕駛能力再測驗、教育、交通工程、車輛設計以及其它方式對於老人交通安全的改善有一定的效果。茲將其它較具體的會員體(Member Economies)成果分述如下以供參考：

(一) 加拿大(Canada)

加拿大將 1999 年訂為「成年或老年駕駛人年(The year of the mature or elderly drivers)」，並針對健康、行動能力與道路安全課題成立專案小組，未來將針對成年駕駛人的道路安全課題進行研究，並提昇民眾對年長者道路安全課題的認知。

(二) 紐西蘭(New Zealand)

紐西蘭(New Zealand)修訂了「藥物方面的駕駛適合度」指導方針(Guidelines on Medical Aspects of Fitness to Drive)」，並分送給開業的藥師與驗光師。這個指導方針敘明了藥物對交通安全之影響，包括老年駕駛人相關的部份。

## 第十章 以社區方法減少道路傷亡

「以社區方法減少道路傷亡(Community approach to reduce road related injuries and fatalities)」係本報告的十二項主要道路交通安全問題中的第十個問題，在本研究中是被分類為第五類：其它(Others)。以下分別就此問題之「問題說明」、「推廣社區方法的做法」、「以社區方法減少道路傷亡的做法」、「以社區方法改善道路交通安全所遇到之困難」以及「以社區方法改善交通安全之成果」等分節敘述。

### 一、問題說明：

在推動以社區方法改善交通安全問題時，普遍仍存在以下的問題：

#### (一) 欠缺對社區方法認知：

對於社區的交通安全問題，必須以社區整體特性考量或透過社區的參與來改善，才能有效的解決問題，然而以往在推動交通安全改善時，較少就個別的社區特性來考量，因此有時所採取的交通安全改善措施反而造成該社區另外的交通安全問題。

#### (二) 不同單位間的協調困難

即使各單位都了解了社區方法的必要性，可是不同單位間原有的權責與分工方式若是沒有改變，則在推動社區方法時各單位的協調就會出現問題；例如南韓(Republic of Korea)指出，地方政府、住戶以及道路管理組織在交通安全問題常不能達成共識，且有些住戶較關切金融問題而較不重視交通狀況。

### 二、推廣社區方法的做法

以社區方法改善交通安全問題的做法目前仍未普遍推廣，因此部份會員體有提及如何推廣社區方法，摘述如下：

#### (一) 增進對社區方法的認知

包括政府與民間組織、社區以及交通安全的相關單位，都必須對社區方法有所了解，才能進一步推動以社區方法改善交通安全問題。

#### (二) 鼓勵採用社區方法

針對以社區方法推動之交通安全改善計畫，提供特定經費，以鼓勵社區方法之推廣，如紐西蘭(New Zealand)。

#### (三) 成立社區的道路安全組織

在社區中成立道路安全組織，推動社區內的道路安全。例如加拿大(Canada)在特定社區成立「道路安全諮詢中心(Road Safety Advisory agencies)」或委員會，針對區域與季節性的道路安全課題進行努力。

### 三、以社區方法減少道路傷亡的做法

社區方法在應用上可分為兩種方式：一是以某些社區做示範實驗，針對該種社區之特性與交通安全問題，結合社區力量改善交通安全，若獲得良好的成效，就以同樣的模式推廣到性質類似的其它社區，例如加拿大(Canada)與日本(Japan)都採用這種做法；另一種社區方法是針對具有特殊個別交通安全問題的社區，推動社區交通安全或其它適合的交通安全改善方式，例如南韓(Republic of Korea)就採用這種做法。

就某些道路安全問題而言，由社區的人員參與管理與改善通常會更有效率且更成功，因此有些會員體已開始推動以社區方法改善道路安全。會員體們提供了許多以社區方法改善交通安全的做法，經過分析，簡要將之分為以下五項：

#### (一) 建立正確的優先改善順序

認清社區內的道路安全風險，才能在改善社區安全時能建立正確的優先順序，因此必須收集完整的社區交通安全資料、找出社區的交通安全問題。

#### (二) 相關單位與社區之溝通協調

在進行交通安全改善措施時，相關單位與社區必須先進行協調，才能找出最適合的交通安全改善措施。日本(Japan)的道路管理單位在興建社區道路與人車混合道路時，就須先透過員警結合地區的規章才能進行；新加坡(Singapore)在研擬「學校安全駕駛區(Safe Drive Zone for schools)」課題時也必須結合社區、家長及交通警察的參與。

#### (三) 鼓勵社區民眾參與

以社區導向發起並推動道路安全的公眾教育活動，提昇社區民眾對道路交通安全相關知識，並鼓勵社區民眾參與自己社區的交通安全問題的改善。例如新加坡(Singapore)鼓勵義工及學童的家長擔任交通導護來道引學童穿越馬路。

#### (四) 加強社區執法

針對社區可能發生的特定交通安全問題，加強社區的交通執法。例如加拿大(Canada)選定一些社區做為「安全社區(Community safety zones)」，駕駛人在此區超速將受到加重的罰金。

#### (五) 交通工程

採取適當交通工程設計增進社區的交通安全，例如使用減速墊、設置社區行人徒步區等等。

### 四、以社區方法改善道路交通安全所遇到之困難

由於以社區觀點並配合社區力量改善道路安全的做法尚不常見，因此以社區方法改善道路安全的經費預算幾乎是從零開始逐步爭取而來。然

而社區方法仍需許多的經費、技術、人力等資源，因此最大的困難仍是資源不足的問題。除此之外，推動社區方法還有以下的困難：

(一)對於社區民眾沒有強制力

由於社區方法是透過社區民眾的力量才能有效的改善交通安全，因此社區民眾的參與程度對於社區方法的效果有很大的影響，然而對於不願參與的社區民眾，不易強制其參與，故對於社區方法的成效不易有一定的品質。

(二)全國性政策與地區課題的結合困難

由於全國性的交通政策係以全國整體之考量，因此無法針對部份地區特有的交通安全問題單獨的考量，可能造成社區所需採取的交通安全措施與全國性的政策有所衝突的情形。

(三)社區方法的成效不易評估

由於社區交通安全問題的改善受多種因素影響，因此不易認定所採用的社區方法是否改善了那些交通安全問題，這也進一步影響到財政單位在提供經費時的一個疑慮。

## 五、以社區方法改善交通安全之成果

各「會員體(Member Economy)」以社區方法在改善特定社區的交通安全問題方面，都獲得一定的成效，茲將其它較具體的會員體成果分述如下以供參考：

(一)加拿大(Canada)

加拿大(Canada)在成立社區的道路安全組織方面有成功的經驗。首先在特定社區成立「道路安全諮詢中心(Road Safety Advisory agencies)」或委員會，針對區域與季節性的課題如校車安全、學校糾察隊安全、自行車與行人安全、冬季駕駛行為、兒童「安全設施(Restraints)」的使用、替失能駕駛人駕車回家服務、假日交通壅擠以及其它鼓勵個人負起社區道路安全責任等提議進行努力；並將這些社區的成功案例，推廣到全國相同類型的社區。

(二)日本(Japan)

日本(Japan)在實施「一般交通安全檢查(General Traffic Safety Checks)」時，須有地區人士及「用路人(Road users)」的參與，一方面可以推動道路安全的改善，一方面可以提昇用路人的交通安全認知。

## 第十一章 減少易肇事地點事故

「減少易肇事地點事故(Accident black spot approach to reducing accidents)」係本報告的十二項主要道路交通安全問題中的第十一個問題，在本研究中是被分類為第五類：其它(Others)。以下分別就此問題之「問題說明」、「減少易肇事地點事故的做法」、「減少易肇事地點事故所遇到之困難」以及「減少易肇事地點事故之成果」等分節敘述。

### 一、問題說明：

有些道路路段經常發生事故，但是並未採取適當的改善措施，造成事故一再發生。日本(Japan)也發現，幹道上所發生的交通事故中，有百分之四十的案件是發生在所有區域中的百分之九的位置上。

在收集事故資料以判定易肇事地點及其易肇事因素時，由於事故現場的調查報告表不夠正確或甚至欠缺，造成分析上的困難，也不易確定易肇事因素及採用適當的對策。

以下分別介紹各「會員體(Member Economy)」所提供減少易肇事地點事故的做法。

### 二、減少易肇事地點事故的做法

在減少易肇事地點事故的做法時須處理的問題有：事故資料的收集、找出易肇事地點及其易肇事因素、該採取何種適當的改善措施及如何評估改善的成效等等，摘述如下：

#### (一) 事故資料的收集

改善事故現場資料的收集，將可能影響肇事因素的資料項目皆列入事故現場調查報告表中，並建立資料庫記錄事故相關資料。加拿大(Canada)並建議加強員警在處理事故報告時詳實記錄相關資料的能力；日本(Japan)則成立「交通事故研究與資料分析機構(Institute for Traffic Accident Research and Data Analysis, ITARDA)」專責深入調查並分析事故資料。

#### (二) 找出易肇事地點及其易肇事因素

建立全面性的道路資料系統，並結合事故資料一併分析，以找出易肇事地點。加拿大(Canada)結合「全國運輸事故資料庫(Transport Canada's National Collision Data Base, NCDB)」的事故資料及「加拿大公路資訊系統(The Canadian Highway Information System, CHIS)」的相關資料，以找出易肇事地點及其易肇事因素；南韓(Republic of Korea)另提出事故相關資料應該提供相關主管當局並進行全面的分析，同時建立「公路安全管理系統(Highway Safety Management System)」來彙整分析事故相關資料；紐西

蘭(New Zealand)將事故資料與地圖座標或是一個「節線節點道路系統(A link node road system)」結合，協助找出易肇事地點；新加坡(Singapore)也結合事故資料與「地理資訊系統(GIS)」地圖進行資料的監督與分析。

(三)該採取何種適當的改善措施

易肇事路段的改善措施需針對易肇事地點及其易肇事因素做考量，並沒有一定的改善方式，所以其改善措施與一般的道路安全改善措施相同。

(四)如何評估改善的成效

加拿大(Canada)的「審計總局(Auditor General of Canada)」建議建立「易肇事地點方案(Black Spot Programs)」以決定對於國家公路系統的投資金額。

### 三、減少易肇事地點事故所遇到之困難

減少易肇事地點事故在事故資料蒐集與分析、易肇事地點改善、改善成效評估等等方面，皆需許多的經費、技術、人力等資源，因此會員體共通的困難仍是資源不足的問題。

除此之外，減少易肇事地點還有以下的困難：

(一)欠缺專責機構

由於改善易肇事地點所牽涉的主管機關很多，而這些主管機關又各有職掌，並非道路易肇事地點改善的專責機構，例如資料的蒐集與分析通常由警方負責，而易肇事地點的工程改善又由地方政府其它部門負責；因此在執行易肇事地點改善需耗費許多時間做協調溝通。

(二)成效不易評估

由於易肇事地點的改善受多種因素影響，因此不易認定所採用的改善方法是否改善了那些交通安全問題，這也進一步影響到財政單位在提供經費時的一個疑慮。

(三)事故資料不齊全

雖然許多會員體致力於改善交通事故現場調查資料的品質，但是還是常有資料不齊全的問題，造成這些問題的原因可能是員警的技能不足，但是有時候也有可能有匿報的情形。

### 四、減少易肇事地點事故之成果

各會員體減少易肇事地點事故方面，都獲得一定的成效，茲將其它較具體的會員體成果分述如下以供參考：

(一)澳洲(Australia)

澳洲聯邦政府每年提供了四千萬澳幣給各州改善道路易肇事地點，其中至少 50%的經費必須用在郊區；其計畫必須使用在過去三年內至少三

件死亡事故的地點，且其「益本比(Benefit/cost ratio)」至少達到二以上。改善地點有時也可以由州的道路主管當局、地方政府以及民眾來提出。每一州成立評估小組，由州的道路主管當局以及評估小組評估計畫的可行性並據此向聯邦政府提供建議。

在頭三年，共有 1122 個計畫被批准，總經費達一億一千七百萬澳幣。在這些改善地點預估重傷事故件數減少達三分之二。

## (二) 加拿大(Canada)

加拿大(Canada)的「審計總局(Auditor General of Canada)」建議建立「易肇事地點方案(Black Spot Programs)」以確認在國家公路系統的投資是否適當，同時也建議利用「加拿大公路資訊系統(Canadian Highway Information System)」輔助定出加拿大(Canada)道路系統中的易肇事地點。

## (三) 日本(Japan)

日本(Japan)成立了「交通事故研究與資料分析機構(Institute for Traffic Accident Research and Data Analysis, ITARDA)」專責深入調查並分析事故資料。日本(Japan)已找出 3200 個易肇事地點，並自 1996 年起針對這些易肇事地點進行「緊急改善措施 ( Urgent Measures For Accident Black Spots )」計畫。1996 至 1999 年全國交通事故死亡人數下降 8.8%，而同期經改善的易肇事地點事故死亡人數更下降了 35.1%。

## (四) 墨西哥(Mexico)

墨西哥(Mexico)針對 2300 個高危險的地點，執行一個「注意危險地點方案(The Program of Attention to Dangerous Points)」；其中在 1997 年，危險地點為 705 個，比前一年減少了 706 個。

## (五) 紐西蘭(New Zealand)

自從開始執行易肇事地點方案，約找出了 2100 個易肇事地點並改善；在 1997 年的評估指出，在已改善地點的事故件數約減少了 28%。

## (六) 新加坡(Singapore)

新加坡(Singapore)提出了一個很重要的觀念，就是要預防易肇事地點的產生。新加坡(Singapore)所採用的方式是在道路設計前、設計時及道路興建等階段，透過道路審查程序，找出潛在的道路缺陷並改善，以預防易肇事地點的產生。



## 第十二章 提昇社會對道路安全問題的認知

「提昇社會對道路安全問題的認知(Raising the attention of all societies to road safety problems)」係本報告的十二項主要道路交通安全問題中的第十二個問題，在本研究中是被分類為第五類：其它(Others)。以下分別就此問題之「問題說明」、「提昇社會對道路安全問題之認知的做法」、「提昇社會對道路安全問題之認知所遇到之困難」以及「提昇社會對道路安全問題之認知的成果」等分節敘述。

### 一、問題說明：

社會上對於道路安全問題的風險並未深入認知，包括一般的民眾與許多道路管理單位的人員。以下分別介紹各「會員體(Member Economy)」所提供提昇社會對道路安全問題的認知的做法。

### 二、提昇社會對道路安全問題之認知的做法

在提昇社會對道路安全問題之認知方面，會員體建議了許多方法，經過分析，彙整摘述如下：

#### (一) 建立明確的全國道路安全目標

訂定明確的全國道路安全目標，並且取得相關主管機關的共識。例如加拿大(Canada)在「2010年道路安全願景(Road Safety Vision 2010)」方案就明確定出推動全國道路安全的優先順序，其中第一優先項目就是提昇民眾對道路安全問題之認知；日本(Japan)也建議訂定指導方針。

#### (二) 以教育與執法提昇社會對道路安全問題之認知

要提昇社會對道路安全問題之認知主要是靠教育與宣導、執法等手段：

##### 1. 員警與道路安全主管當局的教育

以交通事故資料再教育員警與道路安全主管當局，建立面對道路安全問題應有的態度。

##### 2. 民眾的教育

加強教育民眾了解道路安全與生活密切相關。日本(Japan)立法要求專業警察要對住戶進行交通安全教育。

##### 3. 執法

針對高風險駕駛行為進行強力執法。例如加拿大(Canada)針對酒醉駕車、未繫安全帶、超速、闖紅燈等等違規行為進行大力執法。

#### (三) 增進社會對道路安全改善的參與度

鼓勵道路安全主管當局及民眾參與更多道路安全改善工作，透過社會的參與來提昇社會對道路安全問題之認知。例如南韓(Republic of Korea)

提供經費支持民間團體進行道路安全的改善。

### 三、提昇社會對道路安全問題之認知所遇到之困難

在提昇社會對道路安全問題之認知方面，需要許多教育、執法等相關的經費、技術、人力等資源，因此會員體(Member Economies)共通的困難仍是資源不足的問題。

除此之外，提昇社會對道路安全問題之認知還有不同部門間的協調合作不易，由於道路安全主管機關很多，而這些主管機關又各有職掌，並非專責機構，因此在執行道路安全問題改善需耗費許多時間協調。

### 四、提昇社會對道路安全問題之認知的成果

茲將會員體(Member Economies)在提昇社會對道路安全問題之認知方面較具體的成果分述如下以供參考：

#### (一) 加拿大(Canada)

加拿大(Canada)的中央及地方所有政府在 1996 年明確訂定四個優先工作，包括提昇民眾對道路安全課題的認知、改善道路安全部門的連繫與合作、加強執法以及改善全國道路安全資料的收集等四項，這些項目連同國家主、次要目標即為其「2010 年道路安全願景」方案中的重要目標。

#### (二) 紐西蘭(New Zealand)

紐西蘭(New Zealand)在這個問題做了深入的分析以及提供許多經驗，並將道路安全問題分為「有形的(Material)」與「無形的(Non-material)」兩種問題，並分別介紹可採取的對策方向。

#### (三) 祕魯(Peru)

祕魯(Peru)成立全國道路安全委員會，並在 1997 年至 1999 年設定四個「道路安全示範計畫(Pilot Projects of Road Safety)」，分別進行部門協調、建立交通事故資料庫、教育與宣導以及更新「祕魯號誌手冊(The Peruvian Signaling Manual)」。

## 參、結論

道路交通事故所造成的人員傷亡與財物損失，對於社會與經濟都造成很大的負擔，因此道路交通安全之改善對於社會及經濟都有很大的正面效益。

我國主導的 APEC 道路交通安全專家小組(RSEG)邀集各會員體的專家們擬訂出亞太地區共通的收集與分享事故資料的最佳方法、路網與道路安全設施的改善、路側邊坡管理、超速問題的改善、失能駕駛問題的改善、車輛超載問題的改善、鼓勵民眾使用安全帶與安全帽問題、行人安全、老人安全、以社區方法減少道路傷亡、減少易肇事地點事故、提昇社會對道路安全問題的認知等共十二項「主要道路交通安全問題(Major road transportation safety problems)」，並由各會員體分別就各個問題，提供相關改善之經驗與建議，相信可做為亞太地區道路交通安全改善有用的參考資料。

綜觀會員體所提供的建議，以下歸納幾項改善道路交通安全問題的方向：

1. 提昇社會全體對道路安全的認知：包括道路交通安全問題對社會經濟的重大影響、遵守交通法規對行車安全與個人安全的必要性與重要性。從前述各項主要道路交通安全問題的問題說明歸納可以得知，社會全體包括民眾與道路主管機關對道路交通安全的認知、用路人的守法觀念、執法者的執法觀念等等都是道路的交通安全很直接的影響因素，因此若要從根本改善道路的交通安全，提昇社會全體對道路安全的認知是必要且急須進行的方向。
2. 改善道路交通安全相關資料的品質：包括交通事故資料與道路上交通安全設施的資料。惟有正確、完整的交通事故與道路交通安全設施資料，才能具體分析道路交通工程、教育、執法各方面在交通安全上的缺失，才能決定出最迫切需改善的目標，以決定改善優先順序，也才能在資源有限的條件下，以具體的證據說服財務單位提供經費，針對最需改善的項目進行改善。
3. 加強交通安全資訊的交流：包括交通事故資料、交通工程科技、整體性的改善方案等等。從前述的各項問題改善建議中可以發現，許多會員體推動的整體性改善方案以及利用新的交通工程科技來提昇道路交通安全觀念與做法都很值得推廣與學習，而交通事故資料的交流也可以讓各會員體之間了解彼此的優缺點，以找出道路交通安全上的問題與良好的改善方法。

總而言之，藉由 APEC 的道路安全專家小組(RSEG)的機會，對於各會員體道路交通安全資訊的交流有很大的幫助，值得各會員體持續的參與並共同推動。

## **第二部分 英文報告**

### **Part II English Report**

**Survey of Countermeasures for  
Improving Road Transportation Safety in the APEC**

**Chinese Taipei**

**April 2003**

# CONTENTS

	Page
Preface .....	1
The Improvement Plan for the Twelve Major Road Transportation Safety Problems .....	3
Chapter 1    Best Way to collect and share accident data .....	4
Chapter 2    Improvement of road network and traffic safety facilities .....	8
Chapter 3    Roadside cut slope management .....	13
Chapter 4    Speeding .....	16
Chapter 5    Impaired driving .....	19
Chapter 6    Vehicle Overloading .....	22
Chapter 7    Encouraging people to wear seatbelts and motorcycle helmets .....	25
Chapter 8    Pedestrian safety .....	28
Chapter 9    Elderly people safety .....	33
Chapter 10    Community approach to reduce road related injuries and fatalities .....	36
Chapter 11    Accident black spot approach to reduce accidents .....	40
Chapter 12    Raising the attention of all societies to road safety problems .....	44
Conclusion .....	46

# Survey of Countermeasures for Improving Road Transportation Safety in the APEC

## Preface

### I. Statement

The casualty and the property loss caused by road transportation accidents bring a heavy burden to the society and the economy. As a result, the improvement of road transportation safety will be of great benefit to the society and the economy.

In the twelfth Transportation Working Group (TPT-WG) Meeting of Asia-Pacific Economic Cooperation (APEC), Chinese Taipei proposed to establish a Road Transportation Safety Experts Group (RSEG) to promote the interchange of the Asia-Pacific region road transportation safety information and to develop a brochure of the road transportation safety improvement. It was agreed by all the APEC member economies, so that the RSEG was set up and hosted by Chinese Taipei. Afterward, Chinese Taipei invited each member economy to join in, and more than thirty road transportation safety experts participated.

### II. Major Road Transportation Safety Problems

In order to develop the brochure of the road transportation safety improvement, at the APEC 14<sup>th</sup> TPT-WG Meeting (held in Seoul in 1988), the RSEG invited experts to map out the common “Major road transportation safety problems” in Asia-Pacific region, twelve problems in total. Chinese Taipei then design a questionnaire aimed at the twelve issues and requested all member economies to provide related information. According to different characteristics, twelve problems are categorized into five types as follows:

#### Type 1: Accident Data

Problem 1: Best Way to collect and share accident data

#### Type 2: Highway and traffic engineering

Problem 2: Improvement of road network and traffic safety facilities

Problem 3: Roadside cut slope management

#### Type 3: Behavior

Problem 4: Speeding

Problem 5: Impaired driving

Problem 6: Vehicle Overloading

Problem 7: Encouraging people to wear seatbelts and motorcycle helmets

#### Type 4: Vulnerable groups

Problem 8: Pedestrian safety

Problem 9: Elderly people safety

#### Type 5: Others

Problem 10: Community approach to reduce road related injuries and fatalities

Problem 11: Accident black spot approach to reduce accidents

## Problem 12: Raising the attention of all societies to road safety problems

### III. Questionnaire design

The questionnaire includes three parts: questionnaire description, problem description as well as the answer examples and answer sheet.

Questionnaire Description introduces the background, objective, contents, frame of the questionnaire, and points for attention when filling the questionnaire.

Problem Description makes a preliminary statement and analysis on the twelve road transportation safety problems according to their types. It helps the member economies to understand the scope of the problems discussed.

The last part is the Answer Examples and Answer Sheet. The design of the questionnaire requires the answerers to fill out one (or more) answer sheet on the twelve major road transportation safety problems. The questionnaire includes 5 sub items: “Major Road Transportation Safety Problems,” “Specific Problem and its Description,” “Solutions,” “Achievements” and “Difficulties.” The “Major Road Transportation Safety Problems” requests each member economy to specify the title chosen from the twelve issues. “Specific Problem and its Description” requests the member economies to answer on more detailed sub items and to make a descriptive statement. “Solutions” requests the member economies to provide the adopted or suggested solutions for the above mentioned problems. “Achievements” requests each member economy to share the outcomes of the solutions implemented. “Difficulties” asks each member economy to explain the difficulties encountered while improving these problems. Please refer the Appendix I for details.

### IV. Report analysis frame

After being collected, eleven member economies provide their precious experiences through the questionnaire, including Australia, Canada, Japan, Republic of Korea, Mexico, New Zealand, Papua New Guinea, Peru, Singapore, Chinese Taipei and Thailand.

According to the information that member economies provided as appendix II, this report makes the analysis regarding the twelve major road transportation safety problems, and categorizes them into five types by the characteristics. Therefore, this report is divided into three parts: “Preface,” “The Improvement Plan for the Twelve Major Road Transportation Safety Problems,” and “Conclusion.” Among the “The Improvement Plan for the Twelve Major Road Transportation Safety Problems,” twelve chapters are edited for specific analysis of individual problem.



## **The Improvement Plan for the Twelve Major Road Transportation Safety Problems**

At the APEC 14<sup>th</sup> TPT-WG Meeting (held in Seoul, 1988), the RSEG invited experts to map out the common “major road transportation safety problems” in Asia-Pacific region, twelve problems in total. Eleven member economies including Australia, Canada, Japan, Republic of Korea, Mexico, New Zealand, Papua New Guinea, Peru, Singapore, Chinese Taipei and Thailand provide their experiences and achievements of improving the twelve major road transportation safety problems. These twelve problems are categorized into five types according to their characteristics, and here are the five types and the twelve problems:

### Type 1: Accident Data

Problem 1: Best Way to collect and share accident data

### Type 2: Highway and traffic engineering

Problem 2: Improvement of road network and traffic safety facilities

Problem 3: Roadside cut slope management

### Type 3: Behavior

Problem 4: Speeding

Problem 5: Impaired driving

Problem 6: Vehicle Overloading

Problem 7: Encouraging people to wear seatbelts and motorcycle helmets

### Type 4: Vulnerable groups

Problem 8: Pedestrian safety

Problem 9: Elderly people safety

### Type 5: Others

Problem 10: Community approach to reduce road related injuries and fatalities

Problem 11: Accident black spot approach to reduce accidents

Problem 12: Raising the attention of all societies to road safety problems

Based on the information that member economies provided, this part is compiled into twelve chapters to analysis the twelve major road transportation safety problems.

## Chapter One

### Best Way to Collect and Share Accident Data

“Best way to collect and share accident data,” categorized into the first type: Accident Data, is the first problem of the twelve major road transportation safety problems. For this problem, the analysis are divided by six sections including “Problem description,” “Solutions of improving accident data collecting,” “Solutions of pushing accident data sharing,” “Pilot project,” “Difficulties of accident data collecting and sharing” and “Achievements of accident data collecting and sharing from member economies.”

#### I. Problem Description

Traffic accident data is an important data to analyze road transportation safety and drivers' dangerous behaviors. Therefore, the quality of the accident data is a matter of importance to road safety researchers. To improve the quality, it has to be started from reducing artificial errors, improving accident report forms, ameliorating the accident site investigation procedures, etc. Some solutions of improving accident data quality are mentioned below, and also the promotion of the accident data sharing and the way how Pilot Project assists the execution.

#### II. Solutions of Improving Accident Data Collecting

To improve the completeness and accuracy of the traffic accident data, the first action is to reduce artificial errors, which is suggested to provide education training to related staff that deals with the accident data. To avoid these staff's thoughtlessness and carelessness due to heavy workload, it's recommended that there should be enough manpower to handle these works. In addition, artificial errors can be reduced by amending the accident report form while staff filling or keying in data, it also can be reduced through the auxiliary inspection system. Following is the individual description.

1. To provide enough education training to related staff that deal with the accident data:

The traffic accident site investigators are the front line staff obtaining the accident site data. These people should have the correct knowledge and understanding of the importance and values of the accident data quality, so that they can improve the completeness and accuracy of the data. Hence, here are two essential points for the investigators education training:

- (1) To raise the acknowledgement of the importance and benefits of providing more comprehensive and better quality data.
- (2) To improve the ability of filling the accident investigation report form.

Besides the accident site investigators, the staff keying in data to database also have impact on the data accuracy. For the reason, the training for them has to be reinforced

to reduce the probability of artificial errors.

2. To supply enough manpower to deal with traffic accidents:

Manpower insufficiency is a common problem of data collecting for each member economy. While the insufficiency and heavy workload occurs at the same time, there is higher probability for the relevant staff to make mistakes, including site investigation police and data key-in staff. Heavy workload also results in poor working willingness, and causes the thoughtlessness and carelessness. As a result, to amplify enough manpower to deal with traffic accidents is the very necessary.

3. To improve the accident report form:

Under the limited-manpower, raising the working efficiency in order to lessen the loading of the staff is necessary. While the design of the accident report form has direct effect on the staff's (whether site investigation police or data key-in staff) working efficiency, a well designed accident report form will raise the investigators' working willingness, reduce the encoding errors, and improve the accident data accuracy and quality. The member economies provide these solutions for improvement:

- (1) A standardized form for traffic accident
- (2) A well-designed accident report form and accident analysis system
- (3) A Pilot Project, with applied a new accident form, implemented in trial area, and then extend the pilot project to other region if it success.

4. To ameliorate the accident site investigation procedures:

Besides the education training for staff and a well-designed accident report form, making fine procedures is another key point to improve the original accident data quality. The member economies suggested such solutions:

- (1) Developing accident data collection procedures
- (2) Developing traffic accident data collection system which can manage graphical and map data.

Through these ways, it can upgrade the completeness, accuracy and consistence of the data, and make further analysis on the data.

5. Auxiliary inspection systems

Besides the solutions mentioned above, to collocate with auxiliary inspection system would make it better to reduce the probability of artificial errors. The member economies advise some of the systems, such as "Identify system," "Management system," and "Feedback system."

(1) Identify system

It makes use of other accident data resource to check the reporting rates and the accident data quality from the police. For instance, from the health and safety organizations (records of ambulance, hospital/clinic medical treatment, etc.), insurance claims or tow-trucks service centers, we may retrieve the accident related data, and identify the reporting rates of the police. By this way, we can do some check on the completeness of traffic accident data.

### (2) Management system

The management system is to utilize the well-designed report form and analysis system to set up a national accident data management system. This system can improve the data quality and make better use of the data, while integrated with a comprehensive management system such as Geographic Information System (GIS), the management system which can upgrade data accuracy and make it easy on data sharing among relevant organizations.

### (3) Feedback system

To set up a feedback system is important. Through the system, the accident data quality, reporting rate and other information such as fatal accidents autopsy records will feedback to the police, traffic engineers and data key-in staff. For example, the precision of encodes and records can be feedback to the traffic engineers in charge of automobiles' move trail and accident causes analysis, and the data key-in staff. This feedback system gives all the staff the opportunity to find out their faults and correct them in advance.

## III. Solutions of pushing accident data sharing

On the dimension of data sharing, New Zealand suggests several ways below:

1. Publish and disseminate traffic accident statistical reports
2. Internet access to traffic accident statistics
3. Internet access to accident query and reporting tools
4. Join in international organizations to share traffic accident data with other countries and further to retrieve traffic accident information from the worldwide for comparative purposes.

Japan suggests combining data with GIS (Geographic Information System), to facilitating efficient accident-related data sharing among relevant organizations.

## IV. Pilot Project

Pilot Project is to firstly implement a new improvement program within a small area. If it comes out successful, then it'll be introduced to other larger regions. It is an easier way to make a new program implementation successful.

Canada used the Pilot Project to improve data quality and reporting practices. Thailand also uses the Pilot Project for training police to use new accident report form.

## V. Difficulties of data collecting and sharing

There are four factors why collecting traffic accident data can be difficult:

1. Human factor:

If the investigators are not willing to learn, the education training will be ineffective. Furthermore, police usually focus on the drivers' mistakes instead of the road or vehicle factors, which make it doubtful of the data objectiveness and correctness. And some of the local governments refuse to use new accident report form or collect all items in the new form, which also block new programs implementation.

2. Limited resources:

Limited budget and manpower, and lacking of special techniques and experts are the commonly seen problems for all member economies. For example, it requires a great expenditure and manpower to improve the accident site investigation, accident data key-in and inspection. Under such limitation, the improvement is hard to be done.

3. Accident report form designing:

For the police, lots of data has to be collected on the accident site. The items in the report form should contain the most important and necessary ones, also should have criteria to be the policemen's judging references. Therefore, to design a fine report form is always a goal that all member economies work hard to reach. Another tough point is that the reporting form modifying requires a great deal of financial resources and may take years to accomplish.

4. Limited inspection system functions:

The records and information from sanitary organizations are not classified by accident type. Information from tow-trucks services and insurance claims focus on property loss instead of casualty/injuries. These information only works slightly for verifying the accident data correctness.

As for the difficulties of sharing accident data, some organizations are unwilling to share the data collation/editing jobs, or lack of techniques and economy ability to reform the data.

## VI. Achievements of accident data collecting and sharing from member economies.

On accident data sharing, the development of a new National Collision Database (NCDB), if implemented, will enable Canada's political jurisdictions to provide the federal government with standardized comprehensive, qualitative and real-time traffic accident data.

New Zealand develops the Crash Analysis System and have police training relating to the recording of crash details on the Traffic Crash Report form. Meanwhile, traffic accident data feedback system and the check system for comparison of coroner records with fatal accidents are both established.

In Thailand, they specifically mentioned the usage of Pilot Project to improve the accident data quality. More comprehensive and uniformity of the accident data are improved considerably from the Pilot Project evaluation.

## **Chapter Two**

### **Improvement of road network and traffic safety facilities**

“Importance of road network and traffic safety facilities,” categorized into the second type: Highway and traffic engineering, is the second problem of the twelve major road transportation safety problems. For this problem, the analysis are divided by six sections including “Problem description,” “Current improvement programs from the member economies,” “Principles improving road network and traffic safety facilities,” “Solutions improving road network and traffic safety facilities,” “Difficulties of improving road network and traffic safety facilities” and “Achievements of improving road network and traffic safety facilities from member economies.”

#### **I. Problem description**

The problems for road network and traffic safety facilities mostly owe to the limited resources, techniques lacking and others. Due to the great demand of financial, manpower, machines, tools and land for highway construction and engineering, the scheme for road network and traffic safety facilities cannot be made perfectly satisfactory. Therefore, how to make the best use of the limited resources on most needed places becomes the most important topic.

Engineering techniques is a bottleneck for improving road network and traffic safety facilities. Because of the engineering technique restriction that disables to overcome the obstacles of terrain and environment, some of the highway constructions cannot reach the safety standards. In mountainous and heavy traffic areas, this problem manifests its criticality. In addition, environmental protection, and the impact of construction areas have on the efficiency and safety of traffic, etc., also causes restrictions to highway construction and improvement.

On the “improvement of road network and traffic safety facilities” aspect, taking actions on progressing the road functions of the road network is the most urgent thing. For example, how to properly map out each different functional road and the connections between each other, such as highways, expressways, loop roads, city streets, connection roads, etc., to decrease traffic jams and conflicts. The next would be the design and improvement of road safety facilities, for example, lanes partition, pedestrian safety, etc. Bad road facilities are harmful to road users. As a result, collaborating with related organizations to appropriately plan out the connections of the road network, management and maintenance of traffic signals, signs, markings, barriers, sidewalks and illumination facilities, are all important lessons for improvement.

According to the qualities of the problems above, some member economies provide related experiences and programs for references. After sorting the information, it's explained in different sections, “Current improvement programs from the member economies,” “Principles improving road network and traffic safety facilities,” “Solutions improving road network and traffic safety facilities,” “Difficulties of improving road network and traffic safety facilities” and “Achievements of improving

road network and traffic safety facilities from member economies.”

## II. Current improvement programs from the member economies

As we previously stated, many of the road safety facilities are maintained and managed by different organizations. To thoroughly improve road safety problems needs coordination with them all together. Member economies suggest starting from developing the integration programs. Followings are brief introductions of Canada and Japan’s road safety integration programs.

### 1. Canada

Under the Canadian Strategic Highway Research Program (C-SHRP), research has been conducted on long-term “pavement performance.” In the meantime, under the supervision of Chief Engineer’s Council, national guiding principles were developed to drive the design, maintenance and operation of road infrastructure.

### 2. Japan

In Japan, The National Police Agency and Ministry of Construction instituted the “Seven-year Traffic Safety Facilities Improvement Program” for existing roads in 1996, based on the Emergency Measure Law. Furthermore, they have also been improving highway network systems which contribute to safer road environment, based on New Five-year Road Improvement Program(FY1998-2002).

## III. Principles improving road network and traffic safety facilities

Member economies mentioned in the provided materials that part of the improvement measures belongs to the operation mode of road network and road safety facilities, and the mode of systematic improvements. Principles including “Developing the standards of geometry facilities,” “Developing the criteria for road improvement,” “Developing the systems of road safety supervision and management,” and “Developing a comprehensive road network.” Following is the brief description for each principle.

### 1. Developing the standards of geometry facilities

Member economies including Republic of Korea, Mexico, New Zealand, Papua New Guinea, Peru and Chinese Taipei mentioned the importance of establishing standardized geometry facility norms. Republic of Korea suggests improving and standardizing the geometry and safety facilities; Mexico suggests unifying the geometry structure of the connection roads; New Zealand recommends setting up better standards to improve road designs and norms, at the same time to amend the adaptation and legitimacy of traffic signs, markings and other facilities standards; Chinese Taipei compiles “A Standard for Urban Road Design in Taiwan,” and also suggests finding better locations for traffic signs, such as “preintersection points,” “intersection points” and “exactly points.”

### 2. Developing the criteria for road improvement priority

Canada combines the accident data and road network information to identify the “black spot areas” of the national road network. Canada’s Federal Government is

considering using “black spot analysis” as the priority order for budget distribution. Mexico also recommends a definite grading criteria for road network improvement order. New Zealand evaluates the urgency for construction or road upgrade with the Benefit Cost Analysis (BCA).

### 3. Developing the systems of road safety supervision and management

Republic of Korea considers that setting up the “safety audit system” and training on related manpower and technicians is a must. New Zealand and Papua New Guinea both suggest the development of “safety management system.” Singapore proceeds on examine of road safety to check whether road network is appropriate, and periodically finds out the dangerous sections to make improvement. Chinese Taipei also sets up a road and traffic data management system to address the road maintenance and management. Thailand is consistently and systematically collecting data of road accidents and safety to improve measures for accident prevention.

### 4. Developing a comprehensive road network

Chinese Taipei reevaluates the functions of the existing road networks to map out the express road networks. This way will make up the insufficiency of freeway and city road networks and make the road network complete.

## IV. Solutions improving road network and traffic safety facilities

Member economies provide numerous improvement solutions for road network and road safety facilities. They are briefly divided into four directions including “Decreasing traffic jams,” “Protecting pedestrians,” “Decreasing accidents” and “Maintenance of pavement.”

### 1. Decreasing traffic jams

To decrease traffic jams will help reduce the probability of traffic accidents. Therefore, Republic of Korea continually extends and improves the road networks. Mexico also enhances the modernization of road construction to fit in with the country’s needs. Meanwhile, they disperse the traffic volume from highway by encouraging people to take other transportation modes (especially the railroad). Others like New Zealand, Papua New Guinea and Chinese Taipei operate with “land use control” to diminish negative impacts to road network, caused by inappropriate land use.

### 2. Protecting pedestrians

Regarding the issue of “protecting pedestrians,” Japan takes actions with “Separation between pedestrians and vehicles” to reduce accidents of pedestrians. Republic of Korea uses a great quantity of curbs, bollards and guardrails to protect pedestrians’ spaces. Singapore sets “zebra crossing with a refuge,” combines humps with zebra crossings to be “raised zebra crossings,” and uses special illumination to improve lighting at pedestrian crosswalks.

### 3. Decreasing accidents

On decreasing accidents, solutions are classified into three kinds:



(1) Road engineering:

New Zealand suggests building up more separated roads; Peru suggests putting up more controllable loop roads to keep away from downtown areas.

(2) Safety facilities:

New Zealand advises to provide more “clear recover areas” and “safety barriers” to advance road safety; Singapore sets up “crash cushions” for possible dashes.

(3) Designs of traffic signals, signs and markings:

Papua New Guinea reinforces the road markings to make better guidance to vehicles; Singapore puts high reflection markings at the “gore areas” of each expressway entrance and exit, and “chevron markings” at the merging areas to guide motorcyclists merging to main lane. In addition, they lengthen yellow change interval for increasing clearance time, which makes safer at the intersections.

4. Maintenance of pavements

Mexico draws out specific routes for heavy vehicles, and special treatments to the pavement in order to meet the loading requirements. To protect the pavement, Mexico, New Zealand and Papua New Guinea also restrain vehicle loadings. Furthermore, Mexico enforces the law with the automatic tech weight measurement. On the problem of road slipperiness, New Zealand suggests more supervision and improvement on pavements' friction and drainage.

## V. Difficulties of improving road network and traffic safety facilities

The difficulties that each member economy encounters on improving road network and traffic safety facilities are mostly similar. To be roughly divided into four types, “Limited resources,” “Enforcement difficulties,” “Rapid growth of transportation demands,” and “Terrain condition restrictions,” following is the brief description for each type.

1. Limited resources

As the “Problem description” states, highway construction or engineering requires a great deal of resources like budget, manpower, machines, land, etc. Therefore, limited resource is quite a common problem among all member economies.

2. Enforcement difficulties

Freight carrier demands more roads for their heavy vehicles to ride, and at the same time protests government restrictions on vehicle loadings.

3. Rapid growth of transportation demands

Due to the rapid growth of transportation demands, limited transportation supply resources are not enough to meet the demand.

4. Terrain condition restrictions

Terrains in some member economies (e.g. Mexico) are mountainous and sloping, which demands more budget and higher engineering techniques to conquer the road

construction difficulties.

## VI. Achievements of improving road network and traffic safety facilities from member economies

Some member economies already have some significant achievement on the improvement of road network and road safety facilities. Here are some information for references.

### 1. Canada

The Canadian Strategic Highway Research Program (C-SHRP) encourages communities to support government on road facilities maintenance and reconstruction, through more investment and intervention strategies. Another national multi-modal and multi-jurisdictional organization, the Transportation Association of Canada, recently updated its manual on “The development of roadway design guidelines,” which incorporates road safety engineering concerns. For more information, visit the website: [www.tac-atc.ca](http://www.tac-atc.ca)

### 2. Japan

Started from 1996, Japan’s “Seven-year Traffic Safety Facilities Improvement Program” has spent around 52,700 billion yens for traffic safety improvement, and achieved significantly.

### 3. Mexico

Mexico has been doing research and tests on heavy vehicle operation and its impacts to road safety.

### 4. Peru

Peru had edited “The New Technical Specification Manual” for upright and transverse traffic signs. They also did research on the impacts of loop road functions to traffic accidents decreasing.

### 5. Singapore

According to Singapore’s research, highlight approach markings for obstructions will alert vehicles avoiding the dangerous areas just in time.

### 6. Chinese Taipei

Chinese Taipei sets numerous “exclusive-bus-lanes” on arterial of Taipei city, which improve a lot for traffic conditions.

## Chapter Three

### Roadside cut slope management

“Roadside cut slope management,” categorized into the second type: Highway and traffic engineering, is the third problem of the twelve major road transportation safety problems. For this problem, the analysis are divided by four sections including “Problem description,” “Solutions improving roadside cut slope management,” “Difficulties of improving roadside cut slope management” and “Achievements of improving roadside cut slope management from member economies.”

#### I. Problem description

The damages that roadside cut slope may cause to traffic safety can be discussed from two aspects. First, unstable roadside slope, which results in falling stones or subgrade depression, will do great harms to pedestrians and vehicles. Second, vehicles from steep roadside may rush out uncontrollably and do more serious harms to other pedestrians and vehicles.

According to the qualities of the problems above, member economies provide their related experiences and programs for references. After sorting the information, it's explained in different sections, “Solutions improving roadside cut slope management,” “Difficulties of improving roadside cut slope management” and “Achievements of improving roadside cut slope management from member economies.”

#### II. Solutions improving roadside cut slope management

Member economies provide numerous solutions for improvement. We simply divide them into three kinds, “Improvement of roadside cut engineering,” “Barriers setting up,” and “Supervision and restrain at dangerous road sections,” with brief explanation of each solution below.

##### 1 Improvement of cut slope engineering

Improvement of cut slope engineering must base on the natural environment, soil condition, terrain, economy, etc. Taking strategies aimed at these qualities will make great progress. The most often seen solutions include soil vegetation, to improve the inclination of cut slope, to steady the cut slope structures, and to improve the drainage, etc.

##### (1) To improve the inclination of cut slope

By trimming round the rocks or stuffing soil to improve the inclination. To firmly make the cut slope secure, New Zealand tries to keep the inclination needed and road embankment at the smallest limitations.

##### (2) To steady the cut slope structures

The structural concrete diaphragm walls, brickworks and wire netting are the

most common ways. New Zealand uses the gabion walls to steady the cut slope structures.

(3) To improve the drainage

For examples, to divert upstream surface drainage away from the embankment, to improve underground drainage, etc.

2 Barriers setting up

To set barriers is a way to protect vehicles from crashing into mountains or falling into valleys uncontrollably. In Canada, computer programs are used to evaluate embankment inclinations and decide whether to set barriers or not.

3 Supervision and restrain at dangerous road sections

To set up supervision and alert systems for road sections where landslides easily happens. Also to put up warning signs, in case landslides happen which may cause serious damages to pedestrian and vehicles around. This will help immediate announcement of changing routes to vehicles nearby, and promptly remove the falling stones.

### III. Difficulties of improving roadside cut slope management

Terrain and geology conditions have great impacts to the techniques and budgets for improvement engineering. For the roads in mountainous areas, cut slope improvement engineering will need a lot of manpower and financial supports, and the cut slope safety management is relatively important at the same time. Here we briefly state the difficulties for improving cut slopes.

1 Restrictions from terrain and geology conditions

The flatter the cut slope inclination, the more stable it is. Only when there is enough space on both sides of a road, can a flatter cut slope be made. Sometimes the roadside space is restricted by the terrain conditions; geology as well directly affects the cut slope stability.

2 Restrictions from engineering techniques

For roadside cut slopes with not enough spaces or bad geology conditions, they must depend on engineering techniques. As a result, many engineering techniques are developed for steadying cut slopes. However, some restrictions remain that block the engineering. For really poor geology conditions or too little roadside spaces, the engineering techniques still cannot conquer.

3 Restrictions from budget

Due to the great demand of land and budget for cut slope improvement engineering, and manpower and techniques for cut slope safety management, it will cost a great deal of expenditure.

### IV. Achievements of improving roadside cut slope management from member economies

Some member economies have noteworthy achievement on roadside cut slope management. The results are stated below for references.

#### 1. Canada

Canada has successfully undertaken a number of projects in roadside cut slope management. Complete bibliographical information and detailed abstracts of these studies are available on CD-ROM or via the Internet from the International Road Research Database (IRRD), an international working group comprised of Organization for Economic Cooperation and Development (OECD) member countries. Reports include:

- Environment Friendly Solutions to Erosion Control in Alberta
- Manual of Control of Erosion and Shallow Slope Management
- Freeway Construction Techniques in Areas of Sensitive Clay Soils: Highway 416 Case Study
- Data Design Solution for Reinforced Sloped Embankments
- The Effectiveness of Surficial Erosion Control Products
- Comparative Evaluation of the Effectiveness of Erosion Control Materials
- Stresses and Deformations in a Reinforced Soil Slope
- Benefit-Cost Analysis of Flatter Embankment Slopes

#### 2. Thailand

In 1996, Thailand assigned Committee on Erosion and Land Slide Control for Highway Maintenance to arrange manpower and activities for cut slope improvement. Since then, the committee has redesigned 122 dangerous cut slopes, caused by erosion and landslide. Meanwhile, it set up the training courses regarding erosion and landslide. 266 people were well-trained in 1990.

## Chapter Four

### Speeding

“Speeding,” categorized into the third type: Behavior, is the fourth problem of the twelve major road traffic safety problems. For this problem, the analysis are divided by five sections including “Problem description,” “Solutions for improving speeding,” “Other issues related to speeding,” “Difficulties of improving speeding” and “Achievements of improving speeding from member economies.”

#### I. Problem description

Speeding was cited as a contributing factor in almost 25% of fatal accidents in which the driver was killed in Canada, and is the most common traffic violation in Republic of Korea. Drivers who are speeding usually take other dangerous actions at the same time, such as unbelted, drunk driving or running through red light , etc. Sometimes drivers do not notice that they are actually speeding. Meanwhile, speeding easily causes cars uncontrollable and ends accidents. The higher the speed, the more serious the injury and fatality.

According to the qualities of the problems above, member economies provide their related experiences and programs for references. After sorting the information, it's explained in different sections, “Solutions for improving speeding,” “Other issues related to speeding,” “Difficulties of improving speeding” and “Achievements of improving speeding from member economies.”

#### II. Solutions for improving speeding

Member economies provide numerous solutions for improvement. After analysis, they are simply divided into three kinds: “Education,” “Law enforcement” and “Engineering.”

##### 1. Education

To solve the problem of road users' improper behaviors is to change their concepts and behaviors with education. Member economies including Canada, Japan, Republic of Korea, Mexico, New Zealand, Papua New Guinea, Peru, Singapore and Chinese Taipei all use education as an essential solution for changing drivers' behaviour. Canada suggests educating people by letting them know the danger of speeding, and the social and medical costs resulting from this behaviour; media publicity as a solution of education is commonly seen as well.

##### 2. Law enforcement

In addition to directing drivers to improve driving behaviors by education, law enforcement is another way to improve safe driving behaviors . Member economies like Canada, Japan, Republic of Korea, Mexico, New Zealand, Papua New Guinea, Peru, Singapore, Chinese Taipei and Thailand all suggest enhancing law enforcement

with heavy penalties to deter drivers from speeding. For example, heavy fines, to restrict driving, to require recidivists to be reeducated, etc. Some Canadian jurisdictions have introduced escalating or discriminatory fines for drivers convicted of speeding in community safety areas. In Republic of Korea, they take similar solutions of heavier fine to speeding drivers who highly exceed the speed limit; photo radar for speeding enforcement is another way frequently used in Canada, Republic of Korea, New Zealand, Singapore and Chinese Taipei. New Zealand implements a “roadside license suspension regime,” that police intercept drivers who speed 50km/hr over the limit and suspend their licenses for 28 days. Singapore also takes a similar system of suspending licenses of drivers who exceed 60 km/hr of the speed limit. Papua New Guinea adopts “Driver’s license demerit point system” to record drivers’ violation records. Peru sets up a drivers’ violation database.

### 3. Engineering

There are three kinds of solutions to improve speeding problems by engineering: first, better traffic engineering design in coordination with education and law enforcement; second, by using traffic engineering techniques to make drivers cannot help but to slow down; third, by using vehicle engineering to decrease the injuries and fatalities in speeding.

To achieve better traffic engineering design in coordination with education and law enforcement, Canada suggests setting up large traffic signs outlining the size of fines that must be paid by drivers convicted of speeding infractions. Some jurisdictions already do this; New Zealand suggests setting up warning signs at curves or essential road sections.

For the solution of using traffic engineering techniques to force drivers to slow down, Japan uses the “optical illusion” to place markings, which will make drivers believe they are speeding and then slow down; New Zealand uses humps or narrows the lanes to force drivers to slow down, and so does Thailand. However, New Zealand also gives clear indication that sometimes humps can be the factor of an accident.

For the solution of using vehicle engineering to decrease the injury and fatality in speeding, New Zealand recommends to improve vehicle braking system for safety, for example, by installing the anti-lock braking system (ABS). New Zealand also brings up the “pedestrian friendly” concept for vehicle design, which will take longer time and efforts to develop. Singapore forces installing “speed limiters” on heavy vehicles.

### III. Other issues related to speeding

While figuring out the causes of car accidents, the police tend to presume speeding as the main factor when there is no other evidence. However sometimes the latent factors could be the main reasons. If so, when analyzing the accident data for further information, this may mislead the researchers’ analysis direction and frame out inappropriate improvement strategies. To avoid such mistakes, Canada suggests educating the police through the use of the statistical data, to consider other accident factors, such as “impaired driving” or “unbelted driving.”

Meanwhile, the police need to be trained specifically for new law execution skills to enforce the law more effectively.

#### IV. Difficulties of improving speeding

The difficulties that each member economy encounters are mostly alike, which are briefly stated below:

- 1 The range of speeding is hard to define.
- 2 Law enforcement level is restricted by limited resources of police, equipment, etc.
- 3 People of some member economies are strongly against using radar photography for law enforcement.
- 4 Education activities cost great deal of budget.
- 5 It's hard to change the drivers' concepts. Some drivers still impute being fined of speeding to bad luck.
- 6 Education hardly produces prompt improvement.
- 7 Vehicle advertisements usually make drivers believe that speeding is to manifest the vehicle's functions and performances.

#### V. Achievements of improving speeding from member economies

The ways each member economy adopts with education, law enforcement and engineering are mostly effective to decrease speeding behaviors and accidents caused by speeding. Here are some notable achievements for references:

##### 1. Canada

Canada established a "national task force" specifically to identify high-risk drivers, and speeding is the one of the main areas of concern. According to survey results from road safety authorities "high-risk drivers" will be identified, based on a standardized definition, and effective solutions will be developed to improve these drivers' behaviors, without doubt including speeding.

##### 2. New Zealand

For the "Speed camera" program, New Zealand finds out that accidents decrease 23% in urban areas where speed cameras are set, while 11% in suburb areas. Hidden speed cameras as well decrease 19% of injuries and fatalities.

New Zealand also drives extensive publicity activities for problems like speeding, drunk driving and unbelted driving. According to objective reports, these activities had decreased more than a hundred of fatalities and more than a thousand of serious injuries in the first two years, and also decrease large number of drunk driving cases and serious accidents caused by speeding.



## Chapter Five

### Impaired driving

“Impaired driving,” categorized into the third type: Behavior, is the fifth problem of the twelve major road transportation safety problems. For this problem, the analysis are divided by five sections including “Problem description,” “Current improvement programs for impaired driving from the member economies,” “Solutions for improving impaired driving,” “Difficulties of improving impaired driving” and “Achievements of improving impaired driving from member economies.”

#### I. Problem description

“Impaired driving” means driving in the condition of drunkenness, taking drugs or being fatigued which results in impairment. Canada utilizes coroner and accident data to determine the number of fatally and seriously injured drivers (39% and 19%, respectively in 1998) (1999 data) involved in crashes who had been drinking or were impaired before driving. 39% of all fatalities (motor vehicle occupants and non-occupants) had alcohol in their bodies. 60% of alcohol-impaired drivers had blood alcohol concentration levels of more than 0.15%, which is almost twice the law limitation (0.08%). In most member economies, drunk driving is one of the main significant accident factors.

Drunk driving usually comes along with other dangerous driving behaviors, including seatbelt unfastened, speeding, running through red light, etc.

Based on the characteristics of the problems above, member economies provide their related experiences and programs for references. After sorting the information, it's explained in different sections, “Current improvement programs for impaired driving from member economies,” “Solutions improving impaired driving,” “Difficulties of improving impaired driving” and “Achievements of improving impaired driving from member economies.”

#### II. Current improvement programs for impaired driving from member economies

The member economies are trying to improve this problem from every way. Canada and New Zealand briefly bring up their programs for this problem.

##### 1. Canada

Canada started “The Strategy to Reduce Impaired Driving 2001, STRID 2001” in 1995, targeting reductions of 20% over the 1990-1995 baseline figures in the percent of road users seriously or fatally injured in crashes involving drinking drivers. Measures include law enforcement, legislation, education for first-time offenders, license suspension of varying lengths depending on the number of previous offences, vehicle impoundment, the provision of training courses as a condition of liquor merchants keeping the liquor license and canceling exemptions for work permits, etc.

## 2. New Zealand

New Zealand implemented the Funding of Community Alcohol Action Projects. In addition, plenty of community-based activities, through the education activities, public awareness, law enforcement and publicity, have reduced the drunk driving accidents.

### III. Solutions for improving impaired driving

Member economies provide numerous solutions for impaired driving improvement. After analysis, the solutions are simply divided into three kinds, “Education,” “Law enforcement,” and “Others.”

#### 1. Education

Same with speeding behaviors, most impaired driving belong to road users’ inappropriate behaviors. The basic solution to improve road users’ concept and behaviors remain education. Therefore, member economies including Canada, Republic of Korea, Mexico, New Zealand, Papua New Guinea, Peru, Singapore, Chinese Taipei and Thailand all suggest including education as a must for impaired driving improvement. Canada also suggests educating people the danger and social/medical cost caused by impaired driving; New Zealand, Papua New Guinea and Chinese Taipei as well adopt powerful and intensive advertisement as education.

#### 2. Law enforcement

Impaired driving requires law enforcement to reinforce drivers to obey. Member economies including Canada, Japan, Republic of Korea, Mexico, New Zealand, Papua New Guinea, Singapore and Thailand all agree on law enforcement and heavy penalties to deter drivers from driving after drinking, such as heavy fines, license suspensions, vehicle impoundment, heavy penalties for repeat offenders and mandatory education, etc.

Since most drunk driving happens at night, Canada suggests increasing enforcement practices at night, along with short-term license suspensions or vehicle impoundment to deter drivers from drinking and driving. Japan also adopts reinforcement of license suspension. New Zealand uses Compulsory Breath Testing (CBT) to enforce law, along with graduated penalties, license suspending and vehicle impoundment for repeated offenders. Chinese Taipei as well adopts CBT for law enforcement.

#### 3. Others

Japan punishes drunk drivers by the power of the society. For instance, government employees revolving in accidents because of drunk driving are required to attend disciplinary actions. Papua New Guinea encourages people to take public transportation to reduce risks of drunk driving. Peru sites appropriate areas at national road network for long distance drivers to take a break.

### IV. Difficulties of improving impaired driving

Difficulties remain the same as the improvement of other traffic safety problems. To

improve impaired driving requires education and law enforcement, which needs great deal of budget and manpower to make remarkable progress. Therefore, limited budget and manpower still are the common difficulties for improving impaired driving in each member economy. Meanwhile, some member economies bring up other special problems, which are stated respectively below.

1. Workload for the police

According to Canada's research, each impaired driving accident will take the police about three hours to investigate, which is quite heavy workload for police manpower. Moreover, Canada finds out that many drunk drivers are repeat offenders. It proves that current law enforcement activities do not deter hard-core drinkers .

2. Hard to define impaired driving

Although most member economies already set up standards for alcohol concentration, it doesn't mean that every drinking driver is in the condition of impairment. This issue involves law clauses that need to be solved by legislation.

3. Driving after taking drugs or fatigue driving are hard to be cited

There is no easy way for the police to tell drivers taking drugs or in fatigue. Therefore, these violations could be simply missed from enforcement.

## V. Achievements of improving impaired driving from member economies

Most member economies already set up standards for alcohol concentration. For example, in Canada, the blood alcohol concentration limitation for drivers is 0.08%; in New Zealand, less than 80mg of alcohol per 100ml blood for drivers over 20 years old, and more strictly, less than 30mg for drivers under 20 years old.

Solutions that each member economy adopts by education, law enforcement and others more or less reduce impaired driving problems and related accidents. Here are some remarkable achievements for references:

1. Canada

Since the implementation of "The Strategy to Reduce Impaired Driving 2001, STRID 2001" in 1996, there has been a 13.3% decrease in the percent of fatally injured drivers who had been drinking and a 9.5% decrease in the percent of those seriously injured.

2. New Zealand

New Zealand drives extensive publicity specifically on issues like speeding, drunk driving and unbelted. Alcohol related accidents are remarkably reduced. In the first year of the propaganda, 16% of alcohol related serious injuries and fatalities in urban areas were reduced and 33% in the second year; in suburb areas were also reduced 32% in the second year.

## Chapter Six

### Vehicle overloading

“Vehicle overloading,” categorized into the third type: Behavior, is the sixth problem of the twelve major road transportation safety problems. For this problem, the analysis are divided by four sections including “Problem description,” “Solutions improving vehicle overloading,” “Difficulties of improving vehicle overloading” and “Achievements of improving vehicle overloading from member economies.”

#### I. Problem description

Besides road users’ behaviors, vehicle overloading is also related to vehicle engineering and carrier management. It’s a commonly seen problem in freight carriers among every member economy.

Mexico, New Zealand, Papua New Guinea, Singapore and Chinese Taipei all indicate that vehicle overloading is harmful to pavements and bridges, especially in rainy days. It also brings negative effects to vehicle safety, such as turning difficulties, longer brake distance, lower acceleration, machine parts damages, etc. even results in accidents.

Chinese Taipei brings up another vehicle overloading problem of carrying passengers. For instance, some school buses and kindergarten buses seats are rearranged for more seats and lower costs.

According to the qualities of the problems above, member economies provide their related experiences and programs for references. After sorting the information, it’s explained in different sections, “Solutions improving vehicle overloading,” “Difficulties of improving vehicle overloading” and “Achievements of improving vehicle overloading from member economies.”

#### II. Solutions improving vehicle overloading

Member economies provide numerous solutions for improvement. After analysis, they are simply divided into three kinds, “Law enforcement,” “Vehicle engineering,” “Measures from economic aspect,” and “Education.”

##### 1. Law enforcement

Overloading requires law enforcement to reinforce drivers to obey. Member economies including Canada, Japan, Republic of Korea, Mexico, New Zealand, Papua New Guinea, Singapore, Chinese Taipei and Thailand all suggest this solution with heavy penalties to deter drivers from overloading their vehicles.

To set up control points and weight measurement equipment at appropriate locations is a commonly seen enforcement solution so far. “Weight in Motion” devices are one form of the weight-measuring enforcement equipment that many member economies

recommend. These devices reduce the disturbance to traffic by measuring wheel axles weight of vehicles on the move, without stopping them. Both Canada and Republic of Korea suggest adopting this equipment.

New Zealand establishes “The Police Commercial Vehicle Investigation Unit, CVIU” in accordance with law reinforcement for the safety of heavy vehicles loading. 10% overloading will be requested to unload.

## 2. Vehicle engineering

In Canada, they set weight measurement equipment on each wheel axle of trucks that carry logs to ensure overloading does not occur. Canada suggests using air suspension weight devices, which are very reliable, on the chassises of heavy vehicles. New Zealand suggests the development of “Performance standards” to evaluate the relation between vehicle loading stability and accidents risks. In Chinese Taipei, vehicles more than 15 years old will be compellingly eliminated to ensure vehicles’ safety.

## 3. Measures from economic aspect

For the ubiquitous overloading problem, Canada suggests removing financial incentives for vehicle overloading. As a result, the overloading problem be reduced significantly.

In Japan, they restrain overloading by increasing employers’ responsibilities. If employers allow their drivers overloading or disobedience to other traffic rules, they will be involved in punishment.

## 4. Education

Different from the improvements for other drivers’ violations, for overloading problems member economies mention less on education enhancement. Still, some of the member economies bring up education solutions for improving overloading problems. New Zealand and Papua New Guinea proclaim the fact sheets from legislation authorities to make the public know of the reasons for vehicle loading restrictions; Chinese Taipei goes on educating the public on this issue.

# III. Difficulties of improving vehicle overloading

Due to the requirements of expensive equipment and manpower to clamp down on overloading, most member economies encounter the same difficulties of the shortage of equipments, budget and manpower. Meanwhile, some other peculiar problems are also brought up by member economies, which are briefly stated below.

## 1. Profit-First issue

Canada points out that even though freight carriers try to reduce overloading problems by technical solutions, for the reason of price competition while transport, they are unwilling to invest a big amount of budget to apply these theories on technical improvements. Overloading for profits do happens in many member economies.

## 2. Difficulties for law enforcement

Japan points out the difficulties of finding appropriate locations to enforce law on overloading vehicles because of limited spaces. Besides, information spreads out among freight transportation drivers. They avoid passing specific road sections that are chosen by police for spot check.

## 3. Protest from freight carriers

Mexico points out that freight carriers consider weight limitation shrinking their profits. Therefore, they strongly protest against vehicle weight limitation.

# IV. Achievements of improving vehicle overloading from member economies

By taking law enforcement, economy, education and other solutions, member economies mostly reduce part of the overloading problems and its related traffic accidents. In Peru, they set up 2 fixed vehicle weight examine stations and 9 moveable weight measurement units in 1999. Among the freight carriers, 93% of them adjusted their vehicles based on the new regulations.

## **Chapter Seven**

### **Encouraging people to wear seatbelts and motorcycle helmets**

“Encouraging people to wear seatbelts and motorcycle helmets,” categorized into the third type: Behavior, is the seventh problem of the twelve major road transportation safety problems. For this problem, the analysis are divided by six sections including “Problem description,” “Integral improvement solutions for encouraging people to wear seatbelts and motorcycle helmets,” “Solutions encouraging people to wear seatbelts and motorcycle helmets,” “Other related issues,” “Difficulties of encouraging people to wear seatbelts and motorcycle helmets,” and “Achievements of encouraging people to wear seatbelts and motorcycle helmets.”

#### **I. Problem description**

In Australia, 1/3 of traffic fatal accidents did not wear seatbelts; In Canada, research shows that 40% of occupants in traffic fatal accidents and 20% of passengers injured did not wear seatbelts; in Japan, 2/3 of fatalities in traffic accidents did not wear seatbelts.

#### **II. Integral improvement solutions for encouraging people to wear seatbelts and motorcycle helmets**

The member economies already started the improvements from every aspect for encouraging people to wear seatbelts and motorcycle helmets. Among them, Canada started The National Occupant Restraint Program 2001 (NORP 2001) in 1989 as the principle national program, targeting 95% seatbelt usage rate in 2001 for light duty vehicle occupants. This program was subsequently extended to 2010, with similar target objectives (95% seat belt use by all motor vehicle occupants). According to the results of a research project in support of NORP 2001, many occupant fatalities and injuries occurred to victims in accidents who did not wear seatbelts. This research results were provided to legislators, police and other related road safety authorities, in order to raise the willingness of allocating more funding for this issue.

#### **III. Solutions encouraging people to wear seatbelts and motorcycle helmets**

Member economies provide numerous solutions for improvement. After analysis, they are simply divided into four kinds, “Legislation,” “Education,” “Engineering,” and “Law enforcement.”

##### **1. Legislation**

Legislation to enforce wearing seatbelts and motorcycle helmets is an effective solution. Member economies including Australia, Canada, Mexico, New Zealand, Papua New Guinea, Singapore, Chinese Taipei and Thailand all mention that adopting legislation reduced the incidence of drivers not wearing seatbelts or motorcycle helmets.

## 2. Education

Besides legislation, member economies including Australia, Canada, Japan, Mexico, New Zealand, Papua New Guinea, Singapore, Chinese Taipei and Thailand try to make people understand the prevention effects of wearing seatbelts and motorcycle helmets for traffic safety by education, to improve this problem. In New Zealand and Papua New Guinea, education programs are implemented in communities and schools for reducing injuries and fatalities from traffic accidents.

## 3. Engineering

In Australia, vehicle manufacturers are required to set up intrusive seatbelt reminder systems on new cars. Republic of Korea and Chinese Taipei as well suggest developing safety equipments that are more convenient to use. Papua New Guinea suggests improving the design of helmets on usage convenience, better vision and hearing.

## 4. Law enforcement

Law enforcement remains an important solution to force drivers/riders wearing seatbelts/helmets. Therefore, member economies including Republic of Korea, New Zealand, Papua New Guinea and Singapore all suggest reinforce law execution and heavy penalties to command drivers/riders to wear seatbelts/helmets.

# IV. Other related issues

There's a closely related issue of seatbelt: Child seats usage. In New Zealand, more than 76% of 5-year-old-or-above children use child seats, while 11% of them wear seatbelts for adults.

# V. Difficulties of encouraging people to wear seatbelts and motorcycle helmets

To encourage people wearing seatbelts and motorcycle helmets will take education, enforcement and many other efforts. It requires great deal of budget and manpower to reach the goal by taking education and enforcement. Therefore, member economies still encounter the difficulties of limited budget and manpower to improve this problem. Meanwhile, some member economies bring up several peculiar problems which are briefly stated below.

## 1. Opposition from the vehicle manufacturers

Vehicle manufacturers in Australia strongly protest setting up "Intrusive seatbelt reminder systems" on new cars.

## 2. Inconveniences of wearing seatbelts and helmets

Both Republic of Korea and Chinese Taipei point out that people are reluctant to wear seatbelts and helmets mainly because of the inconveniences.

# VI. Achievements of encouraging people to wear seatbelts and motorcycle helmets



By taking legislation, education, engineering and law enforcement, member economies see the obvious effects on popularize wearing seatbelts and helmets, as well as reducing related accidents injured and fatal. Specific achievements are stated below for references.

1. Canada

Through legislation, education, enforcement and many other ways, the seatbelt usage rate in 2001 had climbed to 90%.

2. New Zealand

Front seat seatbelt usage rate already reached to 89%, and 62% for back seats; the rate for children wearing seatbelts is stably keeping at 89%. The rate for both motorcycle riders and occupancies wearing helmets is up to 99%.

## Chapter Eight

### Pedestrian safety

“Pedestrian safety,” categorized into the fourth type: Vulnerable groups, is the eighth problem of the twelve major road transportation safety problems. For this problem, the analysis are divided by four sections including “Problem description,” “Solutions improving pedestrian safety,” “Difficulties of improving pedestrian safety,” and “Achievements of improving pedestrian safety.”

#### I. Problem description

Traffic safety problems that pedestrian may encounter on roads can be categorized into the following kinds:

1. Vulnerability of pedestrians on the road

Pedestrians are forced to be the vulnerable groups in road traffic for the reasons of slow movement, being too small to be seen in the dark, not being protected by vehicles, and drivers’ disregard for pedestrians’ rights.

2. Pedestrians disobeying to traffic rules

In some member economies, pedestrians disobeying traffic rules by running through lanes is one of the traffic accident causes. Mexico points out that some pedestrians do not use crosswalks to pass through.

3. Not much attention is paid by authorities concerned to pedestrian safety

Due to the percentage of injured/fatal are less than vehicle occupants, sometimes pedestrian safety is not highly regarded. For instance, in Canada, pedestrians account for 13.5% of all road user fatalities and 10.5% of those seriously injured. As a result, national traffic safety education programs for pedestrians do not exist and funding required to install adequate pedestrian control devices may not be available in all jurisdictions.

4. With specific characteristics

Pedestrians injured or fatal in traffic accidents usually possess certain characteristics, for instance, the drunks or the seniors. In Canada, in 1998, more than 25% of pedestrians killed in traffic accidents had alcohol before accidents occurred, and the average BAC was 205mg; 30% and 15% of pedestrians killed and injured, respectively, in accidents were seniors.

#### II. Solutions improving pedestrian safety

Member economies provide numerous solutions for improving pedestrian safety. After analysis, they are simply divided into four kinds, “Education,” “Traffic engineering,” “Vehicle design” and “Others.”

## 1. Education

Member economies including Canada, Japan, Mexico, New Zealand, Papua New Guinea, Peru, Singapore, Chinese Taipei and Thailand all suggest reinforce education to the public. For example, in Canada, the point for pedestrian safety education is aimed at raising the public awareness of pedestrian safety, including the conspicuity of pedestrian clothing, usage of alcohol, seniors' safety, etc. In Mexico, they are carrying out actions of respecting pedestrians. In New Zealand, they enhance education of pedestrian safety for kids in schools and before entering schools, e.g. safe routes to school; encouraging pedestrians or joggers wearing clothes lighter or glistening to manifest their location.

## 2. Traffic engineering

Member economies provide numerous ways of traffic engineering to improve pedestrian safety, which are simply divided into several kinds.

### (1) Separation from pedestrians and vehicles

Adding more pedestrian facilities to separate spaces from pedestrians and vehicles. Canada suggests adding more crossing facilities for pedestrians in areas of heavy pedestrian traffic. In Japan and Papua New Guinea, they enhance infrastructures of pedestrian facilities, to provide high-quality and barrier-free spaces for pedestrians. Republic of Korea as well suggests clear separated spaces from pedestrians and vehicles. Mexico build up enclosed roads, reducing the dangers of pedestrians rushing into vehicle lanes, and protections and overpasses for pedestrians. New Zealand constructs underground passes, overpasses, separated paths, shopping centers to part pedestrians from vehicles; Singapore and Chinese Taipei also build up overpasses, underground passes and separated paths for pedestrian and vehicle separation.

### (2) To secure right-of-way of pedestrians

Using traffic signs and signals to notify vehicle drivers to manifest the rights of pedestrians; lengthening green light intervals to match up pedestrians' pace. Canada suggests improving traffic signs for drivers at locations with heavy pedestrian traffic, a increasing the duration of traffic lights at locations that elderly pedestrians frequently use. Republic of Korea as well suggests installation more traffic signals at intersections to advance drivers' acknowledgement of the right-of-way to pedestrians. Singapore sets up refuges at pedestrian crosswalks to protect pedestrians, and increases the separation of pedestrian crossing area from the 'Stop' line at all crossing for further protections to pedestrians. Besides, Singapore uses pedestrian signals of countdown timer for pedestrians with better control when crossing, and at the same time prevents crossing too early or too late. Thailand recommends adding pedestrian crossings and light signals in urban areas.

### (3) Lower speed limits

Many member economies including Japan, Mexico, New Zealand and Papua New Guinea, set lower speed limits to reduce dangers of vehicles to pedestrians. In Japan, they reduce the speed of vehicles to secure the safety of pedestrians at the roads without pedestrian sidewalks and shared by both vehicles and pedestrians. In Mexico, speed limit for vehicles in downtown areas is reduced for pedestrian safety.

in New Zealand, “threshold treatments” are designed for reducing the speed of vehicles. In Singapore, humps are equipped at zebra crossings to slow down the speed of vehicles.

#### (4) Manifesting pedestrian locations

New Zealand and Papua New Guinea design “textured surfaces” to manifest the crossings for pedestrians, and improve illumination equipments to make better manifestation for pedestrians. Singapore as well designs coloured pavement at crossing area and equips special lanterns to “floodlight” dark areas at all pedestrian crossing facilities.

### 3. Vehicle design

New Zealand improves pedestrian safety by developing vehicle standard rules, for instance, forbidding, with legislation, vehicles equipping bull-bars or other fixtures which may be harmful to pedestrians, cyclists and motorcyclists; Papua New Guinea as well suggests improvement of vehicle design to reduce harmful impacts to pedestrians.

### 4. Others

Singapore designs ramps on pedestrian overpasses or lower height of risers at staircases for overpasses and underpasses to make convenient for elderly and disabilities; New Zealand and Singapore adopts the “audible alarms” to assist the pedestrians with disabilities.

## III. Difficulties improving pedestrian safety

Limitation of budget, technologies and manpower remain while improving pedestrian safety, the same as solving other traffic problems. In addition, several special difficulties are also encountered, which are briefly stated below.

### 1. Acknowledgement pedestrians’ right-of-way

Not merely vehicle drivers lacking of acknowledgement pedestrians’ right-of-way, authorities concerned and pedestrians themselves do not have clear concepts of it at whiles. To clear the misunderstandings of the authorities concerned and pedestrians themselves should be the first action while improving pedestrian safety.

### 2. Balance between efficiency and safety

While adding more spaces and time for pedestrian on the roads may increase pedestrians’ safety, it also occupy spaces and time for vehicles, which has negative impacts on efficiency of traffic flows.

### 3. Problems involved for vehicle-pedestrian separation

Such problems include the safety of single person walking through underpasses and the inconveniences for goods carrying and the handicapped while using overpasses and underpasses.

### 4. Elderly pedestrians problems

The walk interval design based on common pedestrians’ pace are not enough for

elderly people for they walk slower. This problem makes it more dangerous for elderly people walking through the streets. Meanwhile, the growing proportion of elderly population is making it a more commonly seen problem.

#### IV. Achievements of improving pedestrian safety

The solutions of education, traffic engineering, vehicle design and others that are brought up by the member economies do have certain effects to pedestrian traffic safety. The comparatively concrete achievements of the member economies are briefly stated below for references.

##### 1. Canada

Canada has achieved remarkable improvements in pedestrian safety. Even though the population has been steadily growing during the past 20 years, the number (from 911 to 401) and proportion (from 3.79 to 1.32 per 100,000 people) of pedestrian fatalities resulting from traffic accidents has decreased dramatically.

The Transportation Association of Canada published “The Pedestrian Crossing Control Manual”, which introduces a hierarchical system of signing, marking and signal control to provide a guide for matching crossing systems. This manual and other road infrastructure manuals can be obtained through the Internet at [www.tac-atc.ca](http://www.tac-atc.ca)

##### 2. New Zealand

The pedestrian crossing facility “Kea Crossing” is implemented during the testing stage. These facilities are set near schools that pedestrians have the priority during before/after school periods. The width of the crossing points is cut narrower for better visibility. Meanwhile, school patrols have remarkable effects for assisting students on traffic safety. Traffic safety knowledge is also enhanced in school education and pre-school education, for instance, the “Safe Routes to School.”

##### 3. Singapore

Singapore provides valuable experiences on young children pedestrian traffic safety, which are briefly divided into 4 kinds as below.

###### (1) School zone scheme

Implement school zone scheme near primary schools. Mobiles are required to slow down when passing through these areas. High-reflecting signs, including the painting of “footprints” to guide children to use designated crossing.

###### (2) Signalized pedestrian crossing

To establish “signalized pedestrian crossing” at areas near schools, and to educate and encourage children using these crossings.

###### (3) Participation of the communities and parents

Involve communities and parents in promoting children’s safety, for instance, parents being traffic wardens during school starting and dismissal hours.

#### (4) Police instruction

Police conducts safety talks at schools to educate children on safe crossing habits and traffic rules. A Road Safety Park is also opened for schools to bring the children to participate in safety games and to understand traffic rules and regulation.

#### 4.Japan

“Community Zoning Projects” have initiated to secure calmness and safety in residential areas since Seven-year Traffic Safety Facilities Improvement Program (FY1996-2002). These projects involve the introduction of vehicle speed limit by the Prefectural Police, humps and narrowing the lanes by road administrators to force drivers to slow down. Before-after evaluation for 21 sample projects has revealed the number of casualties decreased by about 10% and that of injuries involving bicycles and pedestrians by about 30%.

## Chapter Nine

### Elderly people safety

“Elderly people safety,” categorized into the fourth type: Vulnerable groups, is the ninth problem of the twelve major road transportation safety problems. For this problem, the analysis are divided by four sections including “Problem description,” “Solutions improving elderly people safety,” “Difficulties of improving elderly people safety,” and “Achievements of improving elderly people safety.”

#### I. Problem description

Most elderly people safety problems relate with pedestrian problems. Therefore, in chapter eight “Pedestrian safety,” several member economies provide kinds of solutions for elderly people safety improvement. Elderly people safety is being paid more and more attention nowadays. Several phenomena related to elderly people traffic safety raised by member economies are briefly stated below.

##### 1. Elderly population grows

Elderly people’s walking pace and response is slower than average that makes some kinds of road or vehicle facilities unfitting for them. But the growing proportion of elderly population makes this problem more commonly seen. For example, the elderly people proportion has grown from 9% up to 12.3% while elderly driver from 7% to 12.2%.

##### 2. Crashes involving elderly road users occur regularly

In Canada, 19% of all fatally injured road users are the elderly (65 years or older) ; 30% of fatally injured pedestrians and 15% of those seriously injured are also elderly road users; in Japan, 30% of traffic accidents fatality are elderly people, more than teenagers.

#### II. Solutions improving elderly people safety

Member economies provide numerous solutions for improving elderly people safety. After analysis, they are simply divided into five kinds, “Re-licensing tests,” “Education,” “Traffic engineering,” “Vehicle design” and “Others.”

##### 1. Re-licensing tests

Have “Re-licensing tests” to elderly drivers. For instance, approximately half of Canada’s provinces and territories have re-licensing tests for drivers once they are 75 years of age. In some jurisdictions, medical personnel are required by law to report to transportation officials medical problems affecting elderly drivers that may impair their ability to safely operate a motorized vehicle. In New Zealand, regular medical and competency re-tests are required to elderly drivers; in Singapore, over-60-year-old drivers are required to take regular medical and competency testing of eye sight/hearing.

## 2. Education

Member economies including Japan, Republic of Korea, Mexico, New Zealand, Chinese Taipei and Thailand all suggest promoting traffic safety education to elderly people. For instance, New Zealand conducts of community-based re-training programmes aimed at refreshing knowledge of road rules and raising awareness of health-related issues; Chinese Taipei educates elderly people to wear conspicuous clothes for safety while moving outdoors.

## 3. Traffic engineering

To improve elderly pedestrian safety, member economies provide several ways of traffic engineering, which are simply categorized into 3 kinds.

### (1) Improvement of traffic signs and signals

Improve traffic signs and signals at areas with high density of elderly population. For instance, Singapore uses better reflective sheeting for traffic and directional signs.

### (2) Improvement of walking spaces

Republic of Korea suggests to construct more supplementary facilities at places with high numbers of elderly pedestrians, and to establish guard fences along roads to prevent illegal crossings. New Zealand as well recommends improving pedestrian spaces, and having better design of footpath ramps to cater for mobility scooters and wheel chairs. In Papua New Guinea, “traffic separation” and “traffic calming” are applied to protect elderly pedestrians. Chinese Taipei recommends setting up automatic devices, such as conveyors, of pedestrian crossings at appropriate locations.

### (3) To manifest elderly pedestrians' location

New Zealand, Papua New Guinea and Singapore suggest setting up warning signs at certain locations that elderly people frequently appear.

## 4. Vehicle design

Peru suggests raising the standard for vehicle safety and renewing vehicles in use, especially public transport vehicles, to reduce dangers to elderly passengers. Chinese Taipei adopts low floor buses and as well to improve the bus stairs' heights and inclination to prevent inconvenience and dangers to elderly passengers.

## 5. Others

Japan suggests the elderly wearing reflecting objects for drivers to see them from distance. Japan and New Zealand both recommend establishing small parks or resting areas for the elderly regaining vigor when feeling tired, and guiding maps and signs for them from getting lost. New Zealand and Papua New Guinea suggest reinforcement of law execution for vehicle speeding, at where elderly pedestrians frequently appear.

## III. Difficulties of improving elderly people safety



For improving elderly people traffic safety, it requires numerous improvements of traffic facilities, and examining for elderly driving ability and health condition, which brings out same difficulties as resolving other traffic problems, e.g. limitation on budgets, techniques and manpower. Moreover, particular difficulties are briefly stated below for reference.

1. Problems of restriction on elderly people's mobility  
Removing drive licenses from ability-insufficient elderly road users may reduce the risks from driving on their own, but also increase injuries and fatalities of the elderly while they walk on the streets or take public transportation.
2. Problems involved for vehicle-pedestrian separation  
For instance, the inconveniences caused for elderly to cross overpasses and underpasses.

#### IV. Achievements of improving elderly people safety

Each solution, including retesting driving ability, education, traffic engineering, vehicle designs and others, that member economies provide to improve elderly road user safety has been effective to a certain degree. Several remarkable achievements of member economies are briefly stated below for reference.

1. Canada  
Year 1999 was designated "The Year of the Mature or Elderly Drivers" in Canada. A national workshop on mature drivers was held that addressed health, mobility and road safety issues among this group. The findings and future directions emanating from this workshop are intended to address the road safety issues affecting mature drivers and help increase the general public awareness of safety issues related to this gradually growing group of road users.
2. New Zealand  
New Zealand amends the "Guidelines on Medical Aspects of Fitness to Drive" and releases to registered medical practitioners and registered optometrists. The guidelines clearly states the impacts of medicine to traffic safety, including the parts related to elderly drivers.

## **Chapter Ten**

### **Community approach to reduce road related injuries and fatalities**

“Community approach to reduce road related injuries and fatalities,” categorized into the fifth type: Others, is the tenth problem of the twelve major road transportation safety problems. For this problem, the analysis are divided by five sections including “Problem description,” “Solutions promoting community approach,” “The practice of community approach to reduce road related injuries and fatalities,” “Difficulties of community approach to reduce road related injuries and fatalities,” and “Achievements of community approach to reduce road related injuries and fatalities.”

#### **I. Problem description**

While promoting community approaches to reduce road related injuries and fatalities, problems as followed remain:

##### **1. Lacking of acknowledgement of community approach**

For community traffic safety problems, it requires participation of the whole community and consideration of the community qualities for effective improvements. In the past experiences improving traffic safety, taking community qualities individually into consideration was hardly used. Therefore, sometimes the traffic safety improvement measures cause other traffic problems to the community.

##### **2. Difficulties of coordination between different departments**

If the existing responsibilities and job functions of each do not change, even though each unit acknowledges the importance of the community approach, it will cause coordination problems while promoting community approach. For example, the Republic of Korea points out that some provincial governments, inhabitants and road management organizations usually cannot reach a common consensus on traffic safety problems, and some inhabitants concern more about financial burden rather improved traffic conditions.

#### **II. Solutions promoting community approach**

To improve traffic safety by using community approach is not wide-spread promoted. Following solutions of how to promote community approach are brought up by member economies:

##### **1. To increase acknowledgement of community approach**

Authorities concerned including government, non-government organizations, communities and traffic safety organizations have to acknowledge more about community approaches to further make improvements on traffic safety problems by using the solutions.

2. To encourage adopting community approach

In New Zealand, budget is allotted for projects of traffic safety improvement by using community approach, to encourage promotion of the solutions.

3. To establish road safety organizations in the community

Establish road safety organizations in the community to promote road safety in the community. In Canada, Road Safety Advisory agencies or committees are created in selected communities, making progress on regional and seasonal road safety issues.

### III. The practice of community approach to reduce road related injuries and fatalities

There are two types of community approach in application: one is to undertake a pilot study, which is based on the community qualities and traffic safety problems, in certain community to improve traffic safety by combining the community forces. If the results turn out well, the same modes will be promoted to other quality-similar communities. For example, in Canada and Japan, they adopted this solution to improve traffic safety. The other is to promote community traffic safety or other solutions for improvement in individual community that has its unique traffic safety problems. For example, the Republic of Korea adopts this solution.

For some of the road safety problems, it usually turns out effective and successful by community members participating in management and improvement. Therefore, some member economies have already started promoting the way of community approach. Member economies provide numerous solutions for improvement. After analysis, they are simply divided into five kinds:

1. To build up the right priorities for improvement

To recognize the risks of road safety in order to build up the right priority sequence. Therefore, complete community traffic safety information including problems must be collected.

2. Coordination between authorities concerned and the community

While implementing traffic safety improvement solutions, coordination between authorities concerned and community must be taken for finding out the best improvement solutions for traffic safety. In Japan, the road management authority has to take zoning regulations from the police into consideration for building community roads and mixed pedestrian-vehicular roads. In Singapore, the Safe Drive Zone for schools drafting requires community, parents and traffic police's participation.

3. To encourage community members to participate

This solution requires the community to develop and implement community oriented road safety public education campaigns, to raise community inhabitants' acknowledgement of road traffic safety, and also to encourage them to participate the traffic safety problem improvements for their own community. For example, in Singapore, they encourage volunteers and parents of school kids to be the traffic wardens to guide children at designated crossing.

4. To reinforce law execution in community

To reinforce law execution in community for specific traffic safety problems. For example, in Canada, they select certain community as the “Community safety zones.” Drivers who are speeding will be fined heavier.

5. Traffic engineering

To take proper traffic engineering for promoting community traffic safety. For examples, the humps or pedestrian walking zones in community.

#### IV. Difficulties of community approach to reduce road related injuries and fatalities

It is still uncommon to improve road safety by cooperating with the community forces from the community’s aspects. The budget is gradually collected from almost nothing at the beginning. Therefore, the community approach still requires great deal of resources of budget, techniques, manpower, etc. The limited resource is the biggest difficulty encountered. In addition, other difficulties also occur.

1. Community inhabitants are not compellable

The community approach requires the community residents’ forces to effectively improve the traffic safety. The participation of the community will do great effects to the problems. However, the community inhabitants are not compellable if they are reluctant to participate. Therefore, the quality of the results will differ from site to site.

2. Difficulty combining national policy with regional issues

The national policy based on the national conditions, which does not take each regional condition into consideration, may result in conflicts between national policy and regional traffic measures.

3. Difficulty evaluating for effects of the community approach

Because of community traffic safety improvements being affected by numerous reasons, it’s hard to presume that which community approach improve which problem. This also causes doubts to the finance authorities when allotting budgets.

#### V. Achievements of community approach to improve traffic safety

The community approaches that each member economy adopts to improve traffic safety problems have their own effects to a certain degree. The comparatively concrete achievements of the member economies are briefly stated below for references.

1. Canada

Canada has its own successful experience establishing community road safety organizations. First, the establishment of Road Safety Advisory agencies or Interagency committees in selected communities. The efforts of these committees focus on such regional and seasonal issues like school bus safety, school patrol safety, bicycle and pedestrian safety, winter driving behaviors, proper use of child

restraints, drive home services for impaired drivers, holiday traffic jams and other initiatives aimed at encouraging individuals taking responsibility for road safety in their community. These successful programs are promoted to similar communities nation wide.

## 2. Japan

In Japan, it requires the participation of regional people and road users themselves when implementing “General Traffic Safety Checks.” It will push the road safety improvements and raise road users’ acknowledgement for traffic safety at the same time.

## **Chapter Eleven**

### **Accident black spot approach to reducing accidents**

“Accident black spot approach to reducing accidents,” categorized into the fifth type: Others, is the eleventh problem of the twelve major road transportation safety problems. For this problem, the analysis are divided by four sections including “Problem description,” “Solutions promoting accident black spot approach to reducing accidents,” “Difficulties of accident black spot approach to reducing accidents,” and “Achievements of accident black spot approach to reducing accidents.”

#### **I. Problem description**

Accidents constantly occur at certain road sections, but none actions are taken to reduce from its happening. Therefore, it happens again and again. It is also discovered in Japan that 40% of all traffic accidents at trunk roads are concentrated in only 9% of the total area.

While collecting accidents information for judging the accident black spots and accident factors, the inaccuracy or insufficiency of the site investigation report may cause difficulties for identification accident factors and deciding a proper policy for adoption.

Following solutions are provided by member economies for reducing accidents at accident black spots.

#### **II. Solutions promoting accident black spot approach to reducing accidents**

There are problems to deal with while promoting accident black spot approach to reducing accidents: accidents data collecting, finding out accidents black spots and factors of accidents occurring, deciding the proper solutions for adoption and the results evaluation. Following are brief statements of each.

##### **1. Accidents data collecting**

To improve accident sites data collecting, all data items that might influence the accident factors should be included in the investigation report, and further setting up database for recording related information. Canada recommends training police officers to the utility of and necessity for more comprehensive reporting of roadway related data when completing traffic collision reports; Japan sets up the Institute for Traffic Accident Research and Data Analysis (ITARDA) for deeper investigation and accident data analysis.

##### **2. Finding out accidents black spots and factors of accidents occurring**

In order to find out the accident black spots, it is suggested to set up a comprehensive road information system combining with accident data for overall analysis. In Canada, accident data from Transport Canada’s National Collision Data Base (NCDB) and related policy information from the Canadian Highway

Information System (CHIS) may identify solutions to some black spots areas. Republic of Korea points out the importance that accidents related information should be provided to authorities concerned for further analysis, and at the same time setting up the Highway Safety Management System to integrate and analyze related accident data. New Zealand combines the accident information with the “map coordinates” or a “link node road system” for finding accident black spots. Singapore also combines accident data with Geography Information System (GIS) map for data monitoring and analysis.

### 3. Deciding the proper solutions for adoption

The countermeasures of the accidents black spots approach should take the accident black spots and the factors into consideration. There is not specific solution for its improvement. It should be the same as improving other road safety problems.

### 4. Results evaluation

In Canada, the Auditor General of Canada suggested the establishment of black spot programs for justification of the investment of funds into a national highway system.

## III. Difficulties of accident black spot approach to reducing accidents

To reduce accidents black spots requires accidents data collecting, improvements for accidents black spots and improvements for results evaluation that need resources of budget, techniques and manpower. For all member economies, limited resource is the problem in common.

In addition, there are other difficulties encountered while reducing accidents by black spot approach.

### 1. Lacking the in-charge authorities

Many authorities and organization are involved while improving accident black spots. Each one has its own responsibilities and is not exclusively in charge of the issue. For example, generally the police are in charge of data collecting and analysis, while other departments of the regional governments take care of accident sites engineering improvements. Therefore, it takes great deal of time to coordinate while implementing accident black spots improvements.

### 2. Difficulties evaluating results

Due to the numerous factors affecting accident black spots improvements, it makes it difficult to identify that which traffic problems are improved by adopted solution. This problem also causes doubts for financial department allotting budget.

### 3. Incomplete accident data

Although many member economies are devoting in improving the data quality of traffic site investigation, the issue of incomplete accident data still remain. This could due to the insufficiency of police’s techniques or hiding reporting.

#### IV. Achievements of accident black spot approach to reducing accidents

Each member economy has remarkable achievements for improving accident black spots. Following statements are the selected results from member economies.

##### 1. Australia

Australia Federal Government provides AUS\$40 million per year to the states for improving accident black spots. At least 50% of the budget must be used in suburbs. Projects must have had at least three fatal accidents in the past three years, and have a benefit/cost ratio of at least 2. Accident sites in need of improvements can be brought up by state road authorities, regional governments or the public. Each state establishes a evaluation group that evaluates with the state road management authorities the feasibility of the plan, then provides recommendations to the Federal Government.

In the first three years of the program, 1122 projects have been approved with a value of AUS\$117 million. Accidents of serious injuries at these improvement sites may be expected to have reductions of up to two-thirds.

##### 2. Canada

The Auditor General of Canada suggested establishing “black spot programs” to justify the investment of funds into a national highway system. The use of the Canadian Highway Information System was at the same time recommended to help identify the accident black spots in Canada’s road system.

##### 3. Japan

Japan establishes the Institute for Traffic Accident Research and Data Analysis (ITARDA) for deep investigation and analysis of accident data. Japan has identified 3200 accident black spots at trunk roads, and special emphasis has been placed on the “Urgent Measures For Accident Black Spots” since 1996. While the number of fatal accidents decreased by 8.8% nationwide from 1996 to 1999, the decrease rate during the same duration was 35.1% at the black spots where some countermeasures have been taken.

##### 4. Mexico

Mexico executes The Program of Attention to Dangerous Points that includes 2300 high-dangerous sites. On the actions of 1997, the number of dangerous sites was attended 705 and had a reduction of 706 accidents during the previous year.

##### 5. New Zealand

Ever since the implementation of accident black spot program started, 2100 spots had been identified and improved. According to the evaluation in 1997, the accidents at improved sites had been reduced 28%.

##### 6. Singapore

Singapore points out a very important concept which is the prevention of accident black spots occurring. The solution that Singapore adopts is through road safety audit process of investigation before preliminary design, design stage and



construction stage, potential deficiency can be identified and improved to eliminate black spots from occurring.

## **Chapter Twelve**

### **Raising the attention of all societies to road safety problems**

“Raising the attention of all societies to road safety problems,” categorized into the fifth type: Others, is the twelfth problem of the twelve major road transportation safety problems. For this problem, the discussion are divided by four sections including “Problem description,” “Solutions of raising the attention of all societies to road safety problems,” “Difficulties of raising the attention of all societies to road safety problems,” and “Achievements of raising the attention of all societies to road safety problems.”

#### **I. Problem description**

The society is not recognizing the road safety problems in depth, including the public and many of the road management authorities’ staffs. Following statements are several solutions provided by member economies for raising the attention of all societies to road safety problems.

#### **II. Methods of raising the attention of all societies to road safety problems**

For raising the attention of all societies to road safety problems, member economies provide numerous methods. After analysis, they are briefly stated and categorized as below.

##### **1. To set up clear goals for national road safety**

To set up clear goals for national road safety and obtain the common consensus of authorities concerned. For example, in Canada they set up clear priorities for national road safety as part of an initiative called Road Safety Vision 2010.. The first priority is to raise the attention of all societies to road safety problems. Japan as well suggests setting up guiding principles.

##### **2. Education and law enforcement**

To raise the awareness of all societies to road safety problems would mainly rely on education, law execution, etc.

###### **(1) Education to the police and road safety authorities**

To establish the right attitude facing road safety problems by re-educating the police and road safety authorities with traffic accident data.

###### **(2) Public education**

To enhance educating the public to have the awareness of the close relevance of road safety and life. By law legislation, Japan requires the professional police to educate the residents of traffic safety.

###### **(3) Law enforcement**

To enforce laws for high-risk driving behaviors. In Canada, enforcement

activities are carried out to curtail behaviors that do not conform with traffic rules, including drunk driving, driving without seatbelt, speeding, driving through red light, etc.

3. To promote the participation of public to road safety improvements  
Encouraging the road safety authorities and the public participating more road safety improving works to obtain deeper understanding to road safety issues. For example, in Republic of Korea, they provide budgets to support non-government groups for road safety improvements.

### III. Difficulties of raising the attention of all societies to road safety problems

To raise public awareness for road safety problems requires resources of budgets, techniques and manpower about education and enforcement, etc. Therefore, the common difficulty for member economies is the insufficiency of resources.

Other than the issue mentioned above, to coordination and cooperation between different departments is also difficult. To raise the public awareness of road safety problems, it involves many authorities concerned. Not exclusively in charge of this issue, each has its own responsibilities. Therefore, it takes a lot of time on coordination to solve this problem.

### IV. Achievements of raising the attention of all societies to road safety problems

The comparatively concrete achievements by member economies are briefly stated below for reference.

#### 1. Canada

All levels of federal and provincial governments concluded in 1996 four strategic priorities that include raising public attention of road safety issues, improving communication, cooperation and collaboration among road safety agencies, toughening enforcement measures and improving national road safety data collecting. These priorities as well as a national target and sub-targets form the main strategic objectives of Canada's Road Safety Vision 2010.

#### 2. New Zealand

New Zealand has done analysis in depth on this problem and provided many experiences. They divide road safety problems into two kinds: Material and Non-material. Strategies for each of them are introduced individually.

#### 3. Peru

Peru established National Road Security Council and set up four "Pilot Projects of Road Safety" from 1997 to 1999. Program contents include coordination between institutions, creation of a Traffic Accidents Database, education and publicity, and the updating of the Peruvian Signaling Manual.

## Conclusion

People injuries and fatalities, and properties lost caused by road traffic accidents are great burdens to the societies and the economy. For this reason, road traffic safety improvements have positive effects and great benefits to the society and economy.

The APEC Road Safety Experts Group (RSEG), led by Chinese Taipei, invited experts from member economies to draw up twelve major road transportation safety problems in the Asia Pacific region. The problems are the “Best way to collect and share accident data,” “Improvement of road network and traffic safety facilities,” “Roadside cut slope management,” “Speeding,” “Impaired driving,” “Vehicle overloading,” “Encouraging people to wear seatbelts and motorcycle helmets,” “Pedestrian safety,” “Elderly people safety,” “Community approach to reduce road related injuries and fatalities,” “Accident black spot approach to reduce accidents,” and “Raising the attention of all societies to road safety problem.” In addition, experts provide their experiences and recommendations to each problem that are believed to be useful references for improving road traffic safety in the Asia Pacific region.

Comprehensively speaking on the suggestions provided by member economies, they can be categorized into several directions for road traffic safety improvements:

1. To raise the public awareness and attention of road traffic safety:  
It includes propagating the significant impacts of road traffic safety problems to the society and the economy, as well as the importance and essentiality of obeying traffic rules to driving safety and individual safety. From the summary of the “problem descriptions” of each major road transportation safety problem mentioned above, we realize some direct factors affecting road traffic safety. These factors include the awareness of all societies including public and road management authorities, road users’ concepts of obeying traffic rules, law enforcers’ concepts of enforcement, etc. To fundamentally improve traffic safety, it’s essential and urgent to raise the awareness and attention of all societies to road traffic safety.
2. To improve the quality of road traffic safety related data:  
The data include traffic accidents data and road traffic safety facilities data. With correct and complete accidents data and traffic safety facilities data, we can just analyze concretely the deficiency of road traffic safety on every aspect, including traffic engineering, education and enforcement, so that we can decide the priority for improvements. With concrete evidences, we can convince the financial departments to provide finance for the items that are most urgent.
3. To enhance the communication of traffic safety information:  
The information includes traffic accident data, traffic engineering technologies, integral improvement programs, etc. From the suggestions for each road safety problem, it appears that many member economies have integral improvement programs and new traffic safety concepts by using new traffic engineering technologies, which are really worthy of promoting and

learning. Traffic accidents data exchange also let member economies know the advantages and disadvantages of each other and further find out the road traffic safety problems and good measures of improving.

In summary, by taking the opportunity of establishing Road Safety Experts Group (RSEG), member economies could earn great benefits from road safety information exchange. The RSEG activities are worth promoting continuously by each member economy.

## **第三部分      附    錄**

## **Part III      Appendix**

## 附錄目錄

## Contents

附錄一 十二項道路重要安全問題問卷

Appendix I: Questionnaire on the Twelve Major Road Transportation Safety Problems

附錄二 各會員體回覆資料彙整

Appendix II: Summary of the questionnaire on the Twelve Major Road Transportation Safety Problems

**附錄一：十二項道路重要安全問題問卷**

**Appendix I : Questionnaire on  
the Twelve Major Road Transportation Safety Problems**



**ASIA-PACIFIC ECONOMIC COOPERATION  
TRANSPORTATION WORKING GROUP  
ROAD SAFETY EXPERTS GROUP**

**QUESTIONNAIRE ON THE TWELVE MAJOR ROAD  
TRANSPORTATION SAFETY PROBLEMS**

**Prepared by CHINESE TAIPEI**

## CONTENTS

I. Questionnaire Description.....	3
II. Problem Description.....	7
Category A: (accident data) .....	7
Problem 1. Best way to collect and share accident data.	
Category B: (highway and traffic engineering) .....	11
Problem 2. Improvement of road network and traffic safety facilities	
Problem 3. Roadside cut slope management	
Category C: (behavior) .....	13
Problem 4. Speeding	
Problem 5. Impaired driving	
Problem 6. Vehicle overloading	
Problem 7. Encouraging people to wear seat belt and motorcycle helmet	
Category D: (vulnerable group) .....	16
Problem 8. Pedestrian safety	
Problem 9. Elderly people safety	
Category E: (others) .....	18
Problem 10. Community approach to reduce road related injury and fatality	
Problem 11. Accident black-spot approach to reduce accidents	
Problem 12. Raising the attention of all societies to the road safety problems	
III. Answer Examples and Answer Sheet.....	20
Appendix: The Statements of the Twelve Major Road Transportation Safety Problems From Road Safety Experts	

## **I. Questionnaire Description**

### Background

- i. In order to develop a practice manual to enhance road transportation safety in the Asia-Pacific region, road safety experts first identified the twelve major road transportation safety problems and approved a survey framework for these problems in the APEC 14th TPT-WG meeting in Seoul for future studies.
- ii. In order to give us a general idea of these problems, the experts was requested to provide the information of the definition, description, background, possible solutions and examples of the problems they proposed. The responses of the experts from China, Japan, Korea, New Zealand, Chinese Taipei and U.S.A. were received and summarized in the Appendix.
- iii. This questionnaire is designed based on the expert responses to the twelve major road transportation safety problems.

### Purpose of Questionnaire

- iv. The purpose of the questionnaire is to survey the solutions of the twelve major road transportation safety problems from all APEC member economies so that economies could share the experiences to improve their road transportation safety, as well as understand the achievements and the possible negative impact due to the execution of the solutions.

### Problem Category

- v. The twelve major road transportation safety problems are classified into five categories according to their characteristics.

Category A: (accident data)

Problem 1. Best way to collect and share accident data.

Category B: (highway and traffic engineering)

Problem 2. Improvement of road network and traffic safety facilities

Problem 3. Roadside cut slope management

Category C: (behavior)

Problem 4. Speeding

- Problem 5. Impaired driving
- Problem 6. Vehicle overloading
- Problem 7. Encouraging people to wear seat belt and motorcycle helmet
- Category D: (vulnerable group)
  - Problem 8. Pedestrian safety
  - Problem 9. Elderly people safety
- Category E: (others)
  - Problem 10. Community approach to reduce road related injury and fatality
  - Problem 11. Accident black-spot approach to reduce accidents
  - Problem 12. Raising the attention of all societies to the road safety problems

### Structure of Questionnaire

- vi. The questionnaire includes three parts: Questionnaire Description, Problem Description, as well as Answer Examples and Answer Sheet. The first part, as you are reading, is to introduce the framework of the questionnaire. The second part, Problem Description, is to describe the scope of the twelve major road transportation safety problems and explain these problems in order to make each problem more clear and easily understood. The third part, Answer Examples and Answer Sheet, is to illustrate the format of the answer sheet with two brief examples, and also provides a blank answer sheet for reply. In addition, as mentioned in Paragraph ii, the problem statements made by the road safety experts for the twelve major road transportation safety problems are summarized in the Appendix.
- vii. The first part of the questionnaire describes its background and purpose, classifies the twelve major road transportation safety problems into five categories, explains the structure of the questionnaire, and provides the direction to answer the questionnaire.
- viii. The contents of the “Problem Description” include the explanation and examples of the twelve major road transportation safety problems. They are classified into the five categories describe in Paragraph v. The explanation and examples are provided to give an idea to the questionnaire respondent to catch the problems and reply the problems with proper solutions.

- ix. Two examples are illustrated in the third part, Answer Examples and Answer Sheet. The answer sheet includes five items: “Major Road Transportation Safety Problem”, “Specific Problem and its Description”, “Solutions”, “Achievements”, and “Difficulties”. The following paragraphs will give the instructions about how to fill in the answer sheet for a problem.

#### Notes of Answer

- x. Please refer to the problem description in the second part of the questionnaire (See II Problem Description), and reply the problems with the format of the answer sheet shown in the third part of the questionnaire (See III Answer Examples and Answer Sheet). Please use one answer sheet for one problem.
- xi. Some of the explanation and examples in the problem description are reorganized from the problem statements in the Appendix. You are encouraged to refer to the Appendix to find the original. Because the problem description may not cover the whole range of each problem, the reply to all the problems relating to the main issue are encouraged.
- xii. In the item of “Major Road Transportation Safety Problem”, please specify one of the twelve major road transportation safety problems which you intend to provide solutions.
- xiii. In the item of the “Specific Problem and its Description”, please specify the sub-problem and describe the situation of the sub-problem in your economy. Most of the twelve major road transportation safety problems include some sub-problems involving several fields. Sometimes we solve a problem by aiming at a particular sub-problem first. Therefore, if your solutions aim at some special issues under the major problem indicated in the first item, please specify the sub-problem and give a background of it so that other economies can understand the sub-problem. If there are several sub-problems under the major problem, please reply separately.
- xiv. In the item of the “Solutions”, please provide your solutions of the problem and make explanations for them. The solutions are the main item in the answer sheet and should include as much information as possible, such as targeted groups, measures and required resources. With this information, other economies can understand how to implement the solutions.

- Xv. In the item of the “Achievements”, please provide qualitative and quantitative information which describes the success and achievements of the solutions. This information can enable other economies to make a better decision and more efficient use of their financial resources.
- xvi. In the item of the “Difficulties”, please provide the possible difficulties or disadvantages due to the execution of the solutions.
- xvii. If you have any reports related to solving the twelve major road transportation safety problems (strategies, programs, studies, etc.), please provide them as references.

## II. Problem Description

Category A: (accident data)

### Problem 1. Best way to collect and share accident data.

1. This problem consists of two parts: accident data collection and sharing. We illustrate them individually below.

#### 1.1 accident data collection

2. The causes resulting in the bad quality or insufficient quantity of accident data come from related persons, related processes and regime, related tools and equipment, and so on. The related persons include the policemen who investigate the accident and record the details in the accident report, persons and witness involved in the accident, persons assisting in investigating at the accident site, data entry operators, and so on. The related processes and regime include the education and training system, the regime and processes of accident investigation, the accident database management, and so on. The related tools and equipment primarily include the crash report form, the camera, the lighting facilities, and so on. The possible problems are illustrated as follows.

#### Persons

3. *Policemen and investigators.* The policemen may not know the importance of some specific accident data items that hence are not collected seriously, and the policemen may think that it is less important to investigate an traffic accident than a criminal case. In addition, some policemen know their jobs clearly but sometimes are unwilling or unable to do that for the reason of danger, heavy work load, lack of appropriate tools, and so on. For an investigator, it is difficult to find the evidence at the accident site without suitable education and training of investigation and using proper tools and equipment.
4. *Involved persons.* The involved persons may not want to report the accident to the police because they think it is not necessary and also time wasting to investigate a minor accident. Furthermore, in order to protect themselves from being penalized for the violation or careless driving, persons involved in the accident sometimes report incomplete or incorrect information to the police.

5. *Unintentional errors.* The policemen and the investigators may not collect important evidences or even lose them unintentionally. The involved persons and witness may also report incorrect information because they can not remember every detail exactly. Therefore, how to reduce unintentional errors to ensure the quality and quantity of the accident data is an important issue in accident data collection.

### Processes and Regime

6. *Investigation Process.* Incorrect or missing accident data may be caused by erroneous recording during the investigation process. One of the problems is no proper process for handling an accident, such as lacking communications between agencies, and an inefficient commanding system. The other problem is that the policemen may investigate an accident based on their experiences because there is no clear and detailed manual for investigating, such as how to collect the evidences at the accident site, how to inquire the persons involved in the accident, and so on.
7. *Investigation Regime.* Insufficient quantity of the accident data cannot reflect the fact of the road safety. The problem of insufficient quantity may be because the accidents are not reported and recorded properly. For example, some accidents, especially minor accidents, are not reported to the police, and some accident data are not recorded into the accident database by the local police agency because they don't think it is important and necessary. Therefore, how to use other sources of data, such as insurance claims and hospital records, to enhance the accident information is issues worthy of a further study. In addition, the lack of the professional investigators might be a common situation in some economies. Therefore, how to arrange the manpower efficiently and effectively will affect the quality of collecting accident data.
8. *Accident data management.* Accident data may be erroneously recorded during data key-in process. These problems may need a checking system to improve the quality of the database. Another problem is how to build an accident database which not only contains correct and useful information but is easily accessed by any user group. For example, traffic engineers can use this database to locate accident-prone locations. Insurance company can also use it to identify the group with higher risk of accidents.



9. *Education and training.* Some policemen and investigators are not well educated and trained for investigating an accident. For example, there is no or inappropriate school courses and/or on-job training programs. The policemen have no time to attend the training courses because of heavy workload. In addition, how to educate and promote the knowledge of keeping the original accident scene to the public is crucial for collecting good quality of accident data.

#### Tools and Equipment

10. Using appropriate and advanced tools and equipment is important for accident investigation and data collection. These will highly influence the quality and quantity of accident data and the willingness of related staffs to do their job well. For example, small but important evidences may not be found by an old camera.
11. *Crash report form.* The common problems of the crash report form are not well designed in its contents and the convenience for use. For example, the report includes the inadequate classification of the data items, and the unclear definitions of the data items. These will confuse the policemen when they record the accident data. In addition, the form is not handy to carry and use, especially in a rainy day and also affect the quality of collecting accident data.

#### Monitoring and feedback system

12. The defect in collecting accident data could be corrected through well-designed monitoring and feedback systems. These systems will definitely enhance the quality of accident data. However, it is difficult to design and implement the monitoring and feedback systems because the systems require a lot of communications and coordinations among groups and agencies.

#### 1.2 accident data sharing and exchanging

13. Some organizations do not know and recognize the importance of sharing and exchanging the accident data because they think it is not necessary and it won't benefit themselves. The other problem of the accident data sharing and exchanging is related to the willingness of the organizations to share their data with other institutes.

14. Some organizations do not share and exchange the accident data because there is no existing channel available. How to establish an efficient channel is the first issue of sharing and exchanging the accident data. Which data items should be shared or exchanged and whether or not the definition of data items are identical are also the commonly encountered issues.
15. Therefore, the major concerns in the accident data sharing and exchanging include how to promote, and encourage organizations to share the accident data, and maintain a database which is accessible by any organization.

Category B: (highway and traffic engineering)

Problem 2. Improvement of road network and traffic safety facilities

Problem 3. Roadside cut slope management

16. These two problems are classified into the category of the highway and traffic engineering. These problems may be resulted from the limited resources, lack of technology, and other factors.
17. *Limited resources.* Highway construction or reconstruction requires large amount and different kinds of resources, such as expensive construction equipment, professional manpower, and land space. For example, it is difficult to determine which construction or improvement should be taken first with limited finance resource. It is also difficult in some economies to find enough and qualified professional experts and workmen to design and construct a road. A highly populated city usually has no space to construct a new road. Therefore, the most common problem on the resources is how to distribute and locate the limited resources and how to use the resources more effectively.
18. *Lack of Technology.* Some roads cannot be built with a higher safety standard because of lacking technology or the limitation of the environmental factors such as topography, geology, and geography. Learning and developing advanced technologies of highway design, construction, and management are needed to improve these problems. For example, how to improve the geometric design of a road intersection, how to operate traffic signals to reduce the conflict of vehicles, how to improve road surface friction, how to stabilize a roadside cut slope, and how to deal with the traffic flow with mixed vehicle composition, such as motorcycles and cars, are the typical problems.
19. *Other Factors.* The concerns of environment protection and other related groups may change the original design of a road and force to lower highway design standards, which could increase the risk of having traffic accidents at that road section. For example, the original design of a straight road is changed to a curve road for preserving wildlife refuge. In addition, working zone safety is another important issue in constructing a highway. One of the problems is that there is no regulation to enforce the constructor to install safety facilities in the working zone. Another problem is that there is no sufficient measures developed for traffic-impact analysis and the safety of working zone.

### Improvement of road network and traffic safety facilities

20. The first issue is how to improve the network function of the road. For example, how to coordinate the freeways, expressways, bypasses, and local streets to reduce the risk of the conflict. Another issue is how to improve the road safety by the highway engineering. For example, how to improve the separation between vehicle lanes and sidewalks is essential for pedestrian safety.
21. Inappropriate design and installation of the traffic safety facilities will endanger the road users. For example, the drivers cannot immediately recognize the signs at night because of the poor light reflection of the signs or insufficient illumination. Crash barrier is designed to prevent the head-on accidents or accidents occurred off the road, which are often resulted in severe injury. Inappropriate design and installation of crash barrier may not be able to reduce the accident severity but could cause more severe injury.
22. Traffic safety facilities include traffic signals, signs, markings, sidewalks, street lamps, and so on. They might be managed and maintained by different agencies. Insufficient coordination among agencies can not maintain the satisfactory safety level of the road. For example, traffic signals and signs might be blocked by the trees.

### The roadside cut slope management

23. The falling rock and the running-off of the roadbed frequently cause road closings and accidents. Some special measures of the roadside cut slope management are needed to ensure the road users' safety.
24. With the characteristics of high uncertainty and frequency of the rock falling and roadbed-running-off, it is difficult to monitor the stability of the slope and forecast when and where the rocks will fall. When the rock falling occurs in a remote area, it is difficult to inform the drivers to change their route immediately. Under this condition, delay and accidents are likely to occur. Therefore, how to stabilize the cut slope, how to provide an immediate warning and how to guide the traffic flow to avoid delay and accidents are also essential to the roadside cut slope management.
25. If the rocks falling or the running-off of the roadbed happens, it takes time to remove the rocks and reconstruct the road, and it will also influence the traffic flow and cause a great society loss. A quick responsive road reconstruction and traffic control system is needed.

Category C: (behavior)

Problem 4. Speeding

Problem 5. Impaired driving

Problem 6. Encouraging people to wear seat belt and motorcycle helmet

Problem 7. Vehicle overloading

26. These four problems are directly related to the human behavior. The main methods to improve the human behavior are enforcement and education. We illustrate these problems mainly based on the human behavior, enforcement, and other factors.

Human behavior

27. The basic factors influencing the human behavior are the awareness and willingness to obey traffic rules. The reason of violating traffic rules might be that road users don't well understand the serious consequence from their illegal traffic behavior. For example, a driver might over-estimate his drink capacity and believe that he still can drive as usual even if he is drunk.
28. Sometimes road users do not obey a traffic rule because they think the rule is not reasonable. For example, some drivers think the speed limit is too low for a wide and straight highway. Some drivers think that the purpose of wearing the seat-belt and the helmet is to protect individual life instead of the public and, therefore, it should be decided by the occupants rather than the government.
29. Road users might intentionally violate traffic regulations because they don't think they are so unlucky to be caught by the police. It usually happens in the area with insufficient police force.
30. Some drivers might have other reasons for their illegal behavior. For example, the commercial drivers often drive over speed and over-time in order to get more profit and some of them might even take the stimulative medicine for over-time driving.

### Enforcement

31. The first problem we illustrated in the enforcement is that policemen are not willing to enforce some traffic regulations because they think these behaviors against traffic regulations are not serious. Another reason that the policemen are not willing to enforce is the danger encountered during enforcement. For example, it is dangerous for both the policemen and the road users when policemen try to stop a speeding vehicle.
32. Sometimes it is difficult for the policemen to identify if the driver behavior against the traffic regulations. The lack of enforcement technique and equipment are the primary reasons. For example, it is difficult to identify if a driver has stimulative drugs or drives over time and it is also difficult to check if a moving vehicle is overloading.
33. One of the reasons that traffic regulations are not enforced effectively is insufficient and inadequate instruments for alcohol testing, measuring speed, weighting load, and so on. Drunk driving and speeding are common illegal behavior. It may result from insufficient instruments for enforcing the traffic law.
34. The willingness and morale of the policemen will influence the efficiency and effectiveness of enforcement. How do we know the morale of the policemen is sinking lower? What kind of measures can be used to raise their morale? How do we design an effective rewards system?
35. The lack of the police manpower is a common problem in many economies. How can we allocate the police manpower efficiently and effectively?

### Other factors

36. Education is the most fundamental way to improve the behavior of drivers and to train the enforcement technique of the policemen. But it is difficult to evaluate the effectiveness of education and to ensure that the education is applied to the specific groups we want to apply.
37. Sometimes the illegal behavior of the drivers or passengers is resulted from the design of vehicles and related devices. For example, some seatbelts are not comfortable to use. The motorcycle riders don't like to wear a helmet because it is heavy, it obstructs riders' vision and hearing, and there is no storage space for it.

### Vehicle overloading

38. The management of carriage is one of the factors that cause the vehicle overloading. Some drivers are purposely asked by the carriage company or consignors to over-load in order to gain more profit.

Category D: (vulnerable group)

Problem 8. Pedestrian safety

Problem 9. Elderly people safety

39. Pedestrians and the elderly are more vulnerable than other road users. The related safety factors include the pedestrians and the elderly themselves, other road users, vehicle design, and road facilities. These factors are illustrated as follows.

Pedestrians and the elderly

40. The elderly is moving slower than others. It takes longer time for the elderly to cross a road or react to a dangerous situation. It also needs more time for the elderly to conduct a proper maneuver to avoid an accident especially when they drive a car.
41. Some traffic safety problems result from the inappropriate behavior of pedestrians and the elderly, such as not using pedestrian crossings to cross the street, not obeying traffic signals and signs, walking at night with dark clothes, and so on.

Other road users

42. Other road users include the vehicle drivers, the motorcyclists, the bicyclists, and so on. They may intentionally or unintentionally neglect the pedestrians. For example, the vehicle drivers do not give the right of ways to the pedestrians and the elderly when they approach an intersection.
43. Some drivers are impatient to the slow motion of the elderly. For example, some bus drivers start the bus even before the elderly sit well.

Vehicle design

44. The main concept of vehicle design is to protect the occupants in the vehicle rather than the persons outside the vehicle. The injury of the pedestrians is usually very severe in a vehicle-and-pedestrian accident.



45. The blind spots of a vehicle are the areas around the vehicle where drivers are unable to see and find an object. These blind spots are the most dangerous areas for the pedestrians and the elderly. This limitation is more serious for the large vehicles.
46. The steep stairs of the bus usually make the elderly be in danger when they get on/off the bus.

#### Road facilities

47. The planning and design of a roadway usually focus on the demand of vehicles but ignore the demand of the pedestrians and the elderly. It will affect their safety. For example, there is no or insufficient pedestrian crossings and sidewalk space.
48. Another problem is that some roads do not equip sufficient and adequate facilities to protect pedestrians and the elderly. For example, the lack of lighting facilities and the bad design of signal timing are often contributing to the pedestrian accidents.

Category E: (others)

Problem 10. Community approach to reduce road related injury and fatality

49. The community approach is to establish appropriate sharing of roles between the public and the agencies, and promote injury prevention activities at the local level. The reason to take such a community approach is that the traffic safety measures are promoted more effectively and efficiently by the participation of the regional residents. The purposes are to solve the local highway and traffic safety problems, and other injury problems. It uses a “bottom up” approach involving the citizens addressing key safety problems. The problems of the community approach are illustrated as follows.
50. The concept and knowledge of the community approach may not be well known by the public and the agencies. Therefore, how to educate the public and the agencies about the importance and necessity of the community approach is the first step. For example, what kind of strategies and measures can be taken to raise the awareness of the community approach?
51. The second problem is how to promote the community approach to reduce road-related injuries and fatalities. When the public and agencies are aware of the importance and necessity of the community approach, how can they gain the community involvement in the road safety? In addition, how to set up the rules for participation, how to translate the national policies into local initiatives, and how to cater for the local area uniqueness, are also important.
52. The third problem is how to solve the encountered problems when we take the community approach to improve the road safety. For example, how can we ensure the efforts of the community being targeted and coordinated appropriately? How can we analyze the linkages between projects and road safety outcomes, and therefore to justify fundings? How can we determine the appropriate level of detail and prescription? How can we apply the successful practice projects to other local communities?

Problem 11. Accident black-spot approach to reduce accidents

53. The purpose of the accident black-spot approach is to improve the safety of the accident-prone locations and road sections in order to reduce the number of accidents and related injuries and fatalities. The basic process includes identifying the black spots, analyzing the factors causing the accidents, applying appropriate countermeasures, and evaluating the effectiveness of the improvement.

54. The most difficult problem is to identify the accident-prone locations and road sections. Does the accident database provide enough and correct information? Is there any index and guidance for us to identify the accident-prone locations and road sections? How can we know if the accident-prone locations and road sections we choose to improve are necessary and urgent?
55. It is difficult to find out the real causes of an accident, because it is always resulted from multiple factors. Therefore, how to separate the combined factors and find out the main defect, and what countermeasures can be applied are the common problems we may encounter in taking the accident black-spot approach.

Problem 12. Raising the attention of all societies to the road safety problems

56. Raising the attention of all societies to the road safety problems is more difficult to solve than other safety problems, because attention becomes known to us solely through their material manifestation in some way or others, usually through behavior. Even then, behavior can be deceptive because it can arise from more than one motives, including contradictory motives: a saint and a sinner can perform the same act, but for opposite motives.
57. How to identify the lack of attention of the societies to the road safety is the first problem we may encounter. Then, we need to find a way to raise the societies' attention. This may result in the following questions. What kinds of road safety problems are deeply concerned by the public? What is the priority of road safety problems from the view of the general public? What is the level of the society's attention to the road safety problems?
58. We also need to analyze why the public ignore these road safety problems in order to adopt appropriate measures aiming at the causes. Is it because the public don't know these road safety problems? Is it because they don't know the serious consequence of these problems? How can we find the reason why the public ignore these road safety problems?
59. Some advanced but basic problems might show up when we design and promote the countermeasures. For example, how can we ensure the effectiveness of countermeasures? How can we ensure that we apply the countermeasures to the specific group we want to?

### III. Answer Examples and Answer Sheet

#### Example 1

#### **Questionnaire on the Twelve Major Road Transportation Safety Problems**

#### **Answer Sheet**

Major Road Transportation Safety Problem:

*Problem 1: Best way to collect and share accident data*

Specific Problem and its Description:

*The quality of data reported or recorded:*

*Some errors are found in the accident data. For instance, the location of some accident is recorded at a place that is not existing, the age or sex of involved persons are recorded incorrect or not recorded. The government will make wrong decisions and result in a great loss because of the errors of accident data. For example, the resources used to improve the accident-prone locations and road sections will be not located on the sections of urgent need because the accident data cannot provide correct information on the accident location. The possible factors might be the follows:*

- Some items of the investigating form are inappropriate in some cases.*
- Some policemen might not know the importance of some specific accident data items that hence are not collected seriously.*
- The Police may not know all the quality problems of accident data.*
- There are errors in the data entry and the process of judging the causal factor.*

Solutions:

- Well-designed crash report form and crash analysis system*
- Training of the Police who investigate accidents and record crash details in crash report form*
- Feedback to the Police on quality problems*
- Feedback to traffic engineers who determine vehicle movement and causal factor codes and data entry operators on accuracy of coding and recording.*

Achievements:

- *The completeness, accuracy and uniformity of the accident data are improved significantly.*

Difficulties:

- *Ongoing resources required to train new recruits, given dependence on the Police to record all relevant information*
- *Emphasis among the Police on driver faults (for prosecution) rather than road and vehicle factors*
- *Need to monitor and audit reports to enhance clarity and completeness of reporting*
- *Need to monitor and audit reports to enhance accuracy of coding and data-entry*

## Example 2

### **Questionnaire on the Twelve Major Road Transportation Safety Problems**

#### **Answer Sheet**

Major Road Transportation Safety Problem:

*Problem 5: Impaired driving*

Specific Problem and its Description:

*High incidence of Alcohol-related injury and fatal crashes:*

*The analysis of the accident data shows that the death rate and injury rate of the accidents involving drunk driving increase in recent years. The possible factors might be the follows:*

- Drinking is a common social activity for business.*
- The drunker has no idea that he/she is really drunk.*
- The drivers don't well understand the serious consequence of drunk driving.*
- Some drivers intentionally violate traffic regulations because they don't think they are so unlucky to be caught by the police.*

Solution 1:

- Compulsory breath testing (CBT) enforcement — targeting “anyone, anytime, anywhere”*
- The drivers causing the traffic accidents will be sued for a willful murder.*

Achievement 1:

- The drunk drivers reduce from 7% to 5% of all drivers who have tested.*
- The accident rate involving drunk driving is lower than that of last year by 20%.*

Difficulty 1:

- Requires ongoing intensive resources*
- Requires specialised equipment*
- Generally conducted in urban areas with high traffic volume, as it is difficult to create same level of deterrence impact in rural areas*
- The increase litigation cases also increase the workload of the court.*

Solution 2:

- *Use of hard-hitting and graphic advertisements*

Achievement 2:

- *The advertisements raise the public concern about the drunk driving problems. This concern pushes the advanced lawmaking for preventing drunk driving.*

Difficulty 2:

- *Requires ongoing resources*
- *Occasional criticism from public and liquor/hospitality industry*

## **Questionnaire on the Twelve Major Road Transportation Safety Problems**

### **Answer Sheet**

Major Road Transportation Safety Problem:

Specific Problem and its Description:

Solutions:

Achievements:

Difficulties:

Note 1: Please make more hardcopies if necessary.

2: Please use one answer sheet for one problem.

3: Please type.



**ASIA-PACIFIC ECONOMIC COOPERATION  
TRANSPORTATION WORKING GROUP  
ROAD SAFETY EXPERTS GROUP**

**APPENDIX  
THE STATEMENTS OF THE TWELVE MAJOR ROAD TRANSPORTATION SAFETY PROBLEMS  
FROM ROAD SAFETY EXPERTS**

**PREPARED BY CHINESE TAIPEI**

## CONTENTS

1. Best way to collect and share accident data.....	A-3
2. Improvement of road network and traffic safety facilities .....	A-6
3. Roadside cut slope management.....	A-12
4. Speeding.....	A-14
5. Impaired Driving.....	A-16
6. Vehicle Overloading.....	A-18
7. Encouraging people to wear seat belt and motorcycle helmet.....	A-19
8. Pedestrian safety.....	A-22
9. Elderly people safety.....	A-26
10. Community approach to reduce road related injuries and fatalities.....	A-28
11. Accident black-spot approach to reduce accidents.....	A-34
12. Raising the attention of all societies to the road safety problems.....	A-36

# 1. Best way to collect and share accident data

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Best way to collect and share accident data	Republic of Korea	<ul style="list-style-type: none"> <li>- MOCT (Ministry of Construction and Transportation) cannot obtain the accident data for their use.</li> <li>- The police do not give the accident data to the highway agencies (neither hand writing data nor computer data).</li> <li>- The police publish the road accident statistics book every year.</li> </ul>	<ul style="list-style-type: none"> <li>- The police should share the accident data with the highway agencies</li> <li>- By the Law</li> <li>- By the mutual agreement between the police and highway agencies</li> <li>- By establishing a new cooperative institute among the related ministries</li> </ul>	

1. Best way to collect and share accident data (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Crash data collection	New Zealand	1. Quality of data reported or recorded	1. Well-designed crash report form and crash analysis system 2. Training of Police who attend a crash and record crash details in the use of crash report form 3. Feedback to Police on quality problems 4. Feedback to LTSA traffic engineers who determine vehicle movement and causal factor codes and data entry operators on accuracy of coding and recording	1. Ongoing resources required to train new recruits, given dependence on Police to record all relevant information 2. Emphasis among Police on driver faults (for prosecution) rather than road and vehicle factors 3. Need to monitor and audit reports to enhance clarity and completeness of reporting 4. Need to monitor and audit reports to enhance accuracy of coding and data-entry
		2. Quantity of data reported or recorded	1. Use other sources of data(eg ambulances, tow- trucks, insurance claims)to identify reporting rates	
		3.Data items collected	1. Ensure data items collected by enforcement agencies are comprehensive	1. Limited capacity to add more questions to collect all the data items that are desirable
		4.Data sharing	1. Publish and disseminate statistical reports, ie annual <i>Motor Accidents in New Zealand: Statistical Statement</i> , annual <i>Regional Road Safety Reports</i> ; quarterly <i>Road Safety Progress Report</i> ; monthly <i>Official Road Fatality Statistics: Road Deaths; Fact Sheets</i> on specific safety issues; Maps 2. Internet access to statistics 3. Internet access to crash query and reporting tools 4. Becoming a member of the International Road Traffic Accident Database(IRTAD)to gain regular access to crash data, particularly OECD countries	

Present Status of Korea

- Accident data collection on site: By the police (Accident investigation team in each police station), using the designated accident record form (in hand writing)
- Filling of the computer processing form: By the police in each police station
- Sending of computer accident data: Each police station → Local Police Agency → Central National Police Agency
- Data management: National Police Agency is assisted by Road Traffic Safety Association

## 2. Improvement of road network and traffic safety facilities

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Improvement of road network and traffic safety facilities	Japan	<p>The development of high-quality road networks progresses as a result of drastic traffic safety measures consisting of both new road construction and reconstruction work such as the improvement of expressways, bypasses and ring roads, and the separation of vehicle lanes and sidewalks. As a result of these measures, a road network with a low ratio of traffic accidents is expanded and separation between pedestrians and vehicles is promoted.</p> <p>Improvement of facilities such as sidewalks, roads for both pedestrians and bicycles, traffic signs/markings, road lighting, traffic lights, etc., are executed under a comprehensive improvement program formulated in cooperation of the National Police Agency and the Ministry of Construction.</p> <p>A comparison of accident rates before and after improvement of major traffic safety facilities reveals their beneficial effect. Eventhough, the improvement of road network and traffic safety facilities is not sufficient yet.</p>	<p>Traffic safety measures implemented are described as follows:</p> <ul style="list-style-type: none"> <li>- The promotion of the infrastructure development aimed at creating a road network, including national expressways and regional expressways is the core the nation's fundamental traffic safety measures.</li> <li>- Promotion of general traffic safety policies for general roads requiring urgent measures to secure traffic safety in accordance with the Seven-year Traffic Safety Facilities Improvement Program.</li> <li>- Promotion of general traffic safety policies for expressways and national routes in accordance with the Project Schedules for Traffic Safety Measures for National Expressways.</li> </ul>	

## 2. Improvement of road network and traffic safety facilities (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
	Republic of Korea	<ul style="list-style-type: none"> <li>- The installation of road safety facilities lacks in harmonization between related agencies (especially installing time).</li> <li>- The improvement of road safety facilities after the accidents takes long time.</li> <li>- The dividing between vehicle ways and footpath is very poor in minor local roads.</li> </ul>	<ul style="list-style-type: none"> <li>- The power to install road safety facilities needs to belong to one body.</li> <li>- Introduction of immediate road improvement scheme after accidents is needed.</li> <li>- Road safety audit scheme is needed to be introduced.</li> <li>- The installation of curb, bollard or guardrail is needed in minor local roads for the pedestrian safety.</li> </ul>	

## 2. Improvement of road network and traffic safety facilities (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Improvement of road network and traffic safety facilities	New Zealand	1. Insufficient number of divided highways for high traffic volumes	• Construct more divided highways	• Insufficient funds
		2. Unforgiving roadsides and lack of clear areas and roadside protection	• Provide more clear recovery areas or safety barriers	• High cost
		3. Variable application of geometric design and standards for cross-section	• Establish better standards • Improve design and planning	• High cost • Lack of appreciation of the problem
		4. Variable application of standards for signs, markings and other facilities	• Correct application of standards and compliance with regulations • Better design and maintenance • Safety Management Systems	• Availability of skills and resources • Cannot enforce compliance
		5. Slippery roads	• Monitor and improve surface friction	• Cost of materials and maintenance • Availability of materials
		6. Network has not evolved consistent with modern needs	• Techniques for prioritising upgrades, etc • Landuse controls to minimise further degradation of network • Constraints on vehicle size and weights	• Increasing economic and social demand for road use and access • Costs • Time for change
		7. Difficult road construction environment -topography -geology -geography -ecology	• Innovative engineering designs to minimise ecological impact, and reduce risk of damage due to seismic, etc. activities	• Cost • Lack of expertise • High expectation



2. Improvement of road network and traffic safety facilities (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Improvement of road network and traffic safety facilities	New Zealand	a) Run off-the-road-accidents	Profiled edge line marking at critical locations	Vulnerable road users, such as cyclists and motorcyclists
		b) Inattention to speed limit signs at the entrance the towns	Threshold signs with other treatments such as extended kerbs, planting, flush medians or centre islands, and contrasting colour surfacing	Visibility for any access behind the sign

Example of Japan

Seven-year Traffic Safety Facilities Improvement Program (Reference 1)

This Plan has been drawn up jointly by the National Police Agency and the Minister of Construction on the basis of the Emergency Measures Law on provision of Traffic Safety Facilities (established in 1996). Under this Plan, infrastructure projects are to be implemented in order to meet the urgent need for securing traffic safety on general roads.

Promotion of infrastructure programs, including traffic safety facilities such as traffic signals, measures for providing traffic information, improvement of road junctions, and creation of pedestrian ways from Fiscal 1996 in accordance with the Seven-year Traffic Safety Facilities Improvement Program.

Unit: 100 million yen

Breakdown	Specified Traffic Safety	Regional Unit Traffic Safety (For reference)	General traffic safety (For reference)
Portion of Road Management Operators	(3,500) 24,800	19,500	44,300
Portion of Prefectural Police	(200) 2,100	6,300	8,400
Total	(3,700) 26,900	25,800	52,700

Note: Figures in parentheses ( ) at the top of Project Scale column are internal figures relating to cost adjustments for the plan.

#### Present Status of Korea

- The police install traffic lights, road signs (regulatory & warning) and road markings.
- The MOCT and local governments install direction signs, guardrails, and other safety facilities.
  - MOCT : on national trunk roads
  - Local governments : on local roads

### 3. Roadside cut slope management

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Roadside cut slope management	Republic of Korea	<ul style="list-style-type: none"> <li>- Mountainous terrains produce many cut slopes in road construction.</li> <li>- Many soft soil slopes exist in the road threatening the slope stability.</li> <li>※Cut slope management is a matter of car-to-obstacle accidents, not a matter of car-to-car accident.</li> </ul>	<ul style="list-style-type: none"> <li>- Construction of the slope with smaller angle slope is needed.</li> <li>- Stabilization of the slope using additional measures. <ul style="list-style-type: none"> <li>. Lawn seeding</li> <li>. Blocks overlaying</li> <li>. Steel net overlaying</li> <li>. Concrete spreading on the slope</li> </ul> </li> <li>- Emergency road management and traffic control system is needed. Including the fast removal system of fallen rocks.</li> </ul>	
	New Zealand	1. Slips due to insufficient vertical slope in high embankments	1. Maintain minimum required slopes, berms, etc. wherever possible 2. Grassing/seeding 3. Building retaining structures	<ul style="list-style-type: none"> <li>• Depend on the ground conditions/steepness of embankment</li> <li>• Too expensive</li> </ul>
		2. Embankment slips due to unstable ground conditions	1. Advance warning to traffic on condition of the area of posting	
			2. Improve stability of soil	• Depend on feasibility studies
			3. Divert upstream surface drainage away from the embankment (this measure yields good improvement)	
			4. Provide/improve sub- soil drainage (this measure yields good improvement)	
			5. Building retaining structures/Gabion walls	• Expensive

### 3. Roadside cut slope management (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Roadside cut slope management	New Zealand	3. Surface soil erosion and deposit on the road shoulder/carriage way making the road slippery	1. Advance warning to traffic on road condition	
			2. Improve upstream land surface drainage and maintenance and/or improvement of roadside drainage (this is an effective measure)	
			3. Surface grouting	• Expensive
			4. Grassing/seeding (this is a very effective measure)	
		4. Falling rock boulders from embankments, specially from rocky areas	1. Advance warning to traffic	
			2. Regular inspections and remove loose boulders from cut slopes	
			3. Pressure grouting	• Expensive

#### Present Status of Korea

- Rock fallings from the cut slope are frequent (especially in summer season).
- Road closings and accidents frequently result from the fallen rocks.

#### 4. Speeding

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Speeding	Republic of Korea	<ul style="list-style-type: none"> <li>- Speeding is common behavior of most drivers (especially taxis in urban area, and trucks in rural area).</li> <li>- Speed enforcement is relatively hard by the walking policeman.</li> <li>- Poor road alignment exists in the curve sections.</li> </ul>	<ul style="list-style-type: none"> <li>- More installation of speed enforcement camera (Korea is now operating about 100 on-line digital cameras connected to the central processing system).</li> <li>- Severe punishment by the level of exceeding speed (applying more punishment steps)</li> <li>- Present : 2 steps (under 20kph, over 20kph)</li> <li>- Future : 4 steps (~20kph, 20~30, 30~40, 40kph~)</li> <li>- Equipment of speed limiters to more trucks and coaches.</li> <li>- More public campaign and education to the drivers.</li> </ul>	Speeding is hard to be proved in real accidents
	New Zealand	1. Drivers lose control, particularly on bends	<ul style="list-style-type: none"> <li>• Speed cameras at black-spots, operated by the Police</li> <li>• General enforcement by the Police</li> </ul>	• Limited camera and police resources
			<ul style="list-style-type: none"> <li>• Speed advisory signs on curves</li> </ul>	• Such signs are often perceived as an underestimation of the speed capable of negotiating the curve and therefore disregarded
			<ul style="list-style-type: none"> <li>• Speed Limits</li> </ul>	• Often disregarded
			<ul style="list-style-type: none"> <li>• Environmental countermeasures such as speed humps and chicanes</li> <li>• Perceptual countermeasures such as lane width restrictions</li> </ul>	<ul style="list-style-type: none"> <li>• Expensive</li> <li>• Some may actually cause crashes</li> </ul>

#### 4. Speeding (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Speeding	New Zealand	2. As speed increases the severity of an injury in a crash increases	• Nationwide television, radio and billboard advertising campaign with the slogan – “The faster the speed, the bigger the mess”	• Speeding is currently not widely accepted by the public as a road safety problem • Expensive
			• Vehicle design countermeasures	• Expensive • Not a short-term measure • Does not overcome pedestrian injuries
		3. As speed increases braking distance is reduced, causing difficulties at intersections	• Engineering countermeasures (sight distances)	• Expensive
			• Increased brake technology (eg ABS brakes)	• Expensive • Not a short-term measure
		4. Speed often occurs in combination with drink driving	• See solutions under <i>Impaired Driving</i>	

#### Present Status of Korea

- 1997 fatalities of speeding accidents : 512 persons
- Ratio of speeding fatalities to the total : 4.4% (by the police statistics).
  - \* Estimation of real speeding fatalities : about 30% (Speeding is hard to be proved in real accidents)

## 5. Impaired Driving

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Impaired driving	New Zealand	1.High incidence of Alcohol-related injury and fatal crashes	1.Compulsory breath testing (CBT) enforcement – targeting “anyone, anytime, anywhere”	1.Requires ongoing intensive resources 2.Requires specialised equipment 3.Generally conducted in urban areas with high traffic volume, as it is difficult to create same level of deterrence impact in rural areas
			2.Use of hard-hitting and graphic advertisements	1.Requires ongoing resources 2.Occasional criticism from public and liquor/hospitality industry
			3.Legal alcohol limit of 80mg alcohol per 100ml blood for adults	1.Difficult to target those who are impaired at BAC levels of below 80mg
			4.Lower BAC of 30mg for young drivers (under 20s)	1.Inability to market it as a “zero limit” 2.Difficulty of enforcement at roadside without mandatory carriage of photo licence
			5.Graduated penalties – eg. Higher penalties for repeat drink-driving offenders and roadside licence suspension for those caught with more than twice the legal limit being proposed in the Land Transport Bill	1.Requires legislative changes – awaiting approval of Parliament 2.Limited control over how courts will apply higher discretionary penalties 3.Higher cost to enforce penalty 4.Uncertain impact of this measure on re-offending rate
			6.Funding of Community Alcohol Action Projects and other community- based projects which aimed at reducing alcohol-related crashes in communities by raising awareness and increasing education, enforcement and publicity	1.Requires ongoing funding resources 2.Requires constant monitoring 3.Difficulty in evaluating the effectiveness of these programmes



5. Impaired Driving (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
	Chinese Taipei	Because of lack of the well-developed public transportation system, some of users are used to private vehicles, like passenger cars and motorcycles, even the drunker. The drunker have no idea that he/she is really drunk. They think that it might not happen unluckily to meet the police on the way. The number of deaths per accident involving drunk driving is 34% higher than the average.	Enhance the practice of breath alcohol concentration test on the major road section.	
		The freight and passenger transportation company must manage the working time of the their own drivers according the Law. However the personal commercial drivers are not managed by any transportation company and some companies don't manage their drivers' working hours according the Law. In order to earn more money, the personal commercial driver usually drive over time, and some transportation company would ask their own drivers to drive over time. The commercial drivers take some stimulative medicine for over-time driving.		Lack of the test technique of the dragged and tired driving.

## 6. Vehicle Overloading

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Vehicle Overloading	China	Many passenger vehicles are over-loaded during holiday in the low development area. The serious accident involving lots of deaths and injuries usually result from over-loaded. The reason is that the transportation capacity cannot meet the demand of passenger trips during holidays. The personal commercial vehicles are over-loaded for more profit.	<ul style="list-style-type: none"> <li>• Enhance enforcement on the major road section and crossing in holidays.</li> <li>• Transfer the overloaded passengers to other vehicles</li> <li>• Impose the overloading drivers with the fine or the penalty road.</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
Vehicle over-loading (heavy vehicles)	New Zealand	1.Failure of vehicle componentry	• Strategically placed enforcement weigh stations	• Requires ongoing resources
		2.Failure/fatigue of roads and bridges	• Mobile enforcement with portable weigh scales	• Labour intensive
		3.Vehicle handling and control reduced (brakes/stability)	• Education – release Fact Sheets detailing legal weight limits	
		4.Inadequate load security (anchor points overstressed)	• Off-load goods if exceed legal weight by 10% or more	• Problems with storing livestock and perishable goods
		5.Loss of Road User Charges revenue	• Constant surveillance	• Requires ongoing resources
Vehicle over-loading (light vehicles)	New Zealand	1.Overloading beyond towing capacity of vehicle to which trailer is attached	• Control weight of light trailers by specifying restrictions for unbraked light trailers and braked light trailers in the form of plain English Vehicle Standards Rules	<ul style="list-style-type: none"> <li>• Difficult for drivers to assess the weight of the load they are towing</li> <li>• Lack of enforcement resources</li> </ul>

## 7. Encouraging people to wear seat belt and motorcycle helmet

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Seat belts	New Zealand	1. High incidence of injuries sustained through failure to wear restraints.	1. Make wearing compulsory for all users.	1. May require legislative change. 2. Requires ongoing enforcement. 3. Difficult to implement if number of occupants exceeds available restraints.
			2. Extensive enforcement.	1. Requires ongoing resources
			3. Use of graphic advertising.	1. Requires ongoing resources 2. Occasional negative response from public.
			4. Conducting of community and school based education programmes aimed at reducing injuries.	1. Requires ongoing funding resources. 2. Requires constant monitoring. 3. Difficult to evaluate effectiveness of these programmes except in long term eg. Anti- smoking campaigns.
Motorcycle helmets	New Zealand	1. Injuries sustained through failure to wear secure correctly fitted cycle and motorcycle helmets.	1. Make wearing compulsory for all users.	1. May require legislative change 2. Requires ongoing enforcement 3. Passes compliance costs on to user who is often the innocent victim in a crash
			2. Extensive enforcement.	1. Requires ongoing resources
			3. Use of graphic advertising	1. Requires ongoing resources 2. Occasional negative response from public 3. Necessary to advertise from both the helmet user and general motorist perspective
			4. Conducting of community and school based education programmes aimed at reducing injuries.	1. Requires ongoing funding resources 2. Requires constant monitoring 3. Difficult to evaluate effectiveness of these programmes except in long term eg. anti- smoking campaigns

7. Encouraging people to wear seat belt and motorcycle helmet (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
	Chinese Taipei	80 % of deaths and 40 % of injuries of motorcycle accidents result from head injury. Most of persons choose the motorcycle as the major transport vehicle because that the motorcycle is cheaper than other vehicles. The motorcycle can go through the traffic jam area and it is easier to park a motorcycle. There are over ten million motorcycles, almost half of the population, in Taiwan. The motorcycle rides don't like to use the helmet because that the weight of helmet is too heavy, it makes riders feel too warm, it obstruct riders' vision and hearing, and there are no space to place the helmet when the riders parking outside.	Legislate and enforce for driving without use of helmet. Improve the design of helmet on the ventilation, visibility and hearing. Ask the motorcycle manufacturers to install helmet met-in or lift facility on the motorcycle. Educate riders the correct use of helmet.	

7. Encouraging people to wear seat belt and motorcycle helmet (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
	U.S.A	<p>In 1996, the Georgia legislature strengthened the state's occupant protection laws by requiring belt use by all front seat occupants in passenger cars, and by applying the child passenger safety law to children through the age of 17. No activities to implement the new laws were undertaken at the time of enactment, because all efforts were focused on issues related to the Olympic games, hosted in Atlanta.</p> <p>As a result, after an initial and short-lived increase in safety belt use, rates began to decline.</p>	<p>The Georgia Office of Highway Safety developed the Occupant Protection Enforcement program in 1997 to encompass a variety of strategies and activities designed to meet the goal of the program.</p> <ul style="list-style-type: none"> <li>- In August 1997, the Georgia State Patrol applied for and received an Air Bag Safety Coalition grant to launch a statewide seat belt enforcement campaign <b><i>Operation Strap 'N Snap: Buckle Up or Pay Up</i></b></li> <li>- Under the new two-year grant, the State Patrol planned for eight waves of intensive enforcement activities in collaboration with local law enforcement agencies</li> <li>- Curricula were developed by the Georgia Occupant Protection Coordinator for training all 900 state officers in child passenger safety, including strategies for enforcement and proper use of occupant protection devices</li> <li>- The National Highway Traffic Administration(NHTSA)Region 4 office was instrumental in negotiating a liaison with the Georgia division of Pizza Hut, Incorporated to join forces in educating the public about occupant protection</li> <li>- Pizza Hut developed an incentive program to be used as a tool with the occupant protection program, called <b>Seat Belts Give You The Edge</b>. The chain provided 70,000 buy-one/get-one-free coupons, which were distributed by local law enforcement agencies and the Georgia State Patrol to operators of cars in which everyone was properly buckled</li> </ul>	

## 8. Pedestrian safety

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Pedestrian safety	Japan	It is a Japanese characteristic point among advanced nations that pedestrian fatalities make up approximately 30% of the total.	In order to bring about a living environment in which everybody, including the elderly and the handicapped, can leave in peace and safety, efforts are made to develop the following infrastructure facilities. The aim is to provide high-quality and safe barrier-free pedestrian spaces. Sidewalks are being widened for aged citizens and others. At the same time, new projects for the improvement of roads that have no sidewalks and are shared by both motor vehicles and pedestrians will be launched. For these "sidewalk-less" roads, measures to reduce the speed of motor vehicles and secure the safety of pedestrians will be implemented.	
Pedestrian safety	New Zealand	1. Vulnerability of pedestrians	1.Speed control: - Speed limits - Design — platforms, threshold treatments, chicanes, etc - Enforcement	- Efficiency versus safety Cost (\$ and social) to amend road design and network to effectively change traffic speed or demand
			2.Vehicle design	- Cost - Effectiveness - Time any technical development takes to be incorporated into a significant part of the vehicle fleet

## 8. Pedestrian safety (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Pedestrian safety	New Zealand	1. Vulnerability of pedestrians	3. Separation of pedestrians from traffic: - Under- or over- passes - Malls - Separated footpaths	- Cost - Personal security issues particularly for underpasses - Access issues—pedestrians with disabilities, public passenger and goods transport
			4. Provision of crossing points with pedestrian priority: - 'zebra' crossings - pedestrian signals	- Non-compliance by both pedestrians and drivers - Location cannot always match demand—pedestrians continue to cross elsewhere - Inefficiencies due to design parameters (eg. walking speeds)

8. Pedestrian safety (continued)

Safety problem	Eco-nomy	Description of the problem		Description of solutions	Description of difficulties
	New Zealand	2.Spread of physical and behavioural characteristics	Elderly	<ul style="list-style-type: none"> <li>- Design</li> <li>- Education — special course for the elderly</li> <li>- Training of practitioners</li> </ul>	<ul style="list-style-type: none"> <li>- Access to target groups</li> <li>- Non-acceptance or lack of recognition of issues by all groups of road users</li> <li>- Peer group pressures</li> <li>- Poor adult role models</li> </ul>
			Young	<ul style="list-style-type: none"> <li>- School crossing facilities</li> <li>- Education</li> <li>- Safe routes</li> <li>- Publicity</li> <li>- Rules</li> </ul>	<ul style="list-style-type: none"> <li>- pressure for non- standard or excessive devices or controls</li> <li>- non-acceptance or lack of recognition of issues by all groups of road users</li> <li>- increasing proportion of older road users</li> <li>- poor adult role models</li> </ul>
			Walking speeds	<ul style="list-style-type: none"> <li>- signal timing — minimum walking speed, variable (use of special detectors)</li> <li>- road design — gradients, surface, distance</li> </ul>	<ul style="list-style-type: none"> <li>- cost</li> <li>- reliability (particularly special detectors)</li> </ul>
			People with disabilities	<ul style="list-style-type: none"> <li>- special facilities eg textured footpaths, audible signals,</li> <li>- road design</li> </ul>	<ul style="list-style-type: none"> <li>- Non-standard treatments sending mixed messages</li> <li>- Cost — particularly in changing existing infrastructure</li> </ul>



## 8. Pedestrian safety (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
	New Zealand	3.Alcohol	- land use and traffic planning - enforcement - host responsibility	- existing infrastructure difficult to change significantly or quickly
		4.Light conditions – dark compared to light	- street lighting - publicity - reflectorised materials - footpaths	- cost of installation for generally low volumes of pedestrian movement - issues of what is fashionable
		5.Compliance with rules	- education - enforcement	- Access to specific groups - Enforcement priorities
		6.Inadequate facilities for pedestrians	- road design training of practitioners, politicians, etc	- cost – particularly in changing existing infrastructure and competition for funds for all road work - lack of agreed guidelines and standards

### Example of Japan

#### Creation of wide pedestrian walkways

Infrastructure development is in progress to create wide pedestrian walkways (general 3meters or more in width) to permit safe passage for the elderly and handicapped and secure amenity and safety for pedestrians and cyclists in general.

Apart from the development of wide pedestrian walkways, existing pedestrian sidewalks will be cut back to set them off against the road (ramp construction) and a suitable incline or gradient will be provided. This will create a pedestrian environment that lets the elderly and handicapped use the road in safety. In order to ensure traffic safety for the visually used by the visually handicapped and on road connecting to stations, bus stops and facilities heavily used by the visually handicapped.

## 9. Elderly people safety

Safety problem	Eco-nomy	Description of the problem	Description of solutions	Description of difficulties
Elderly people safety	Japan	Recently the population of elderly people is increasing rapidly in Japan. The number of traffic deaths involving elderly persons (aged 65 and over) accounts for approximately 30% of all road deaths. The elderly have the highest share of the death statistics by age group, exceeding that of the younger population (aged 16-24).	In order to bring about a living environment in which everybody, including the elderly and the handicapped, can leave in peace and safety, efforts are made to promote practical traffic education for elderly and to develop infrastructure facilities.	
Older drivers	New Zealand	1.High incidence of crashes per kilometre travelled among older drivers; fragility means injuries sustained tend to be more severe than for younger drivers.	1.Regular medical and competency re-testing	1.Requires ongoing resources 2.Requires ongoing enforcement 3.May incur compliance costs out of proportion to size of problem
			2.Extensive enforcement	1.Requires ongoing resources which may be out of proportion to size of problem
			3.Use of graphic advertising	1.Requires ongoing resources which may be out of proportion to size of problem 2.Occasional negative response from public
			4.Conducting of community based re-training programmes aimed at refreshing knowledge of road rules and raising awareness of health related issues	1.Difficult to evaluate effectiveness of these programmes although they do appear to be succeeding in getting some drivers to self-regulate and to cease driving

## 9. Elderly people safety (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Older Pedestrians	New Zealand	1.A vulnerable group with a high rate of injuries compared to other adult groups; injuries sustained usually severe through fragility.	1. Extensive use of traffic separation methods and traffic calming in areas used by elderly pedestrians	1.Expensive — cost may be out of proportion to size of problem
			2. Extensive enforcement to monitor vehicle speeds in areas used by elderly pedestrians	1.Requires ongoing resources
			3.Use of advertising	1.Advertising needs to target drivers 2.Cost out of proportion to size of problem
			4.Use of road signs to warn of presence of elderly pedestrians	1.Low level of speed compliance

### Example of Japan

#### 1. Promotion of Traffic Safety Education for the Elderly

Participatory and practical education are promoted by giving it at the sites of actual traffic accidents or incorporating experiments showing the effectiveness of reflectors at nighttime.

#### 2. Promotion of Measures to Support Elderly Drivers

In order to improve the education for elderly drivers, the police have made it mandatory for those aged 75 and over to sit special classes for elderly car drivers. Besides, when cars driven by elderly people aged 75 and over carry the elderly driver's mark, other cars are prohibited to come too close to the cars driven by the elderly or cut in before them.

#### 3. Creation of wide pedestrian walkways (Pedestrian walkways include pedestrian roads)

## 10. Community approach to reduce road related injuries and fatalities

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Community approach to related injuries and fatalities	Japan	Recently in Japan it is intended to establish appropriate sharing of roles between people and administration. It is important that the traffic safety measures are promoted effectively and efficiently by the participation of the regional population.	<p>For residential area, area-wide infrastructure development efforts involving the creation of community roads and mixed pedestrian-vehicular road will be made by road management operators in conjunction with zoning regulations through the Police. The participation of the regional population is carried out at workshops, when these measures are implemented.</p> <p>General Traffic Safety Checks will be implemented with the participation of the regional population and road users themselves in order to promote road safety. These efforts will be shared between the administrative authorities and the citizens on the basis of a heightened awareness of traffic safety by the road user.</p>	

10. Community approach to reduce road related injuries and fatalities (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Community approach to related injuries and fatalities	New Zealand	1. Difficulties in gaining community involvement in the ownership of road safety	1. Development of the National Road Safety Plan (NRSP) and Road Safety Targets	1. Difficulty in determining the effect of community interventions in working towards the targets
			2. National advertising campaign	1. Requires substantial and ongoing resources
			3. Funding of community projects and road safety co-ordinators	1. Requires constant monitoring. 2. Funding for community projects difficult to obtain as it is difficult to analyse the linkages between projects and road safety outcomes, and therefore to justify funding. 3. Inability to fund all initiatives coming up from the community, resulting in the loss of valuable community resources, effort and initiative being applied to road safety. 4. The challenge of synergising with other community initiatives.
		2. Translation of national policies into local initiatives, catering for the local areas uniqueness.	1. Issuing of guidelines setting out criteria for funding.	1. Determining appropriate level of detail and prescription.

10. Community approach to reduce road related injuries and fatalities (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
			2. Employment of road safety co-ordinators to provide link between the bureaucracy and the community.	1. Variability of performance across the co-ordinators in terms of addressing local needs.
			3. Identification of best practice community projects.	1. To continue to catalyse innovation. 2. Application of best practice projects to other local communities.
		3. Ensuring the efforts of the community are targeted and co-ordinated appropriately.	1. Application of NRSP key principles (Co-ordination, Demonstrated Best Practice, Value for Money, Monitoring and Evaluation, Treaty of Waitangi and Road Safety Ownership) and the application of good management at all levels.	1. Implementation of the key principles underlying the NRSP. 2. Ensuring sound management.
			2. Road Safety Information provided down to local authority level.	1. Various interpretations can be applied to information provided.

10. Community approach to reduce road related injuries and fatalities (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Community approach to reduce road related injuries and fatalities	U.S.A	A Safe Community is a community that promotes injury prevention activities at the local level to solve local highway and traffic safety and other injury problems. It uses a “bottom up” approach involving its citizens in addressing key injury problems.	<p>Safe Communities have the following elements:</p> <ul style="list-style-type: none"> <li>- A Safe Community program uses an integrated and comprehensive injury control system with prevention, acute care, and rehabilitation partners as active and essential participants in addressing community injury problems.</li> <li>- The community has a coalition/task force that is comprehensive and community-based with representation from citizens, law enforcement, public health, medical, injury prevention, education, business, civic and service groups, public works offices, and traffic safety advocates that provides program input, direction, and involvement in the Safe Community program.</li> <li>- The community conducts comprehensive problem identification and uses estimating techniques that determine the economic costs associated with traffic related fatalities and injuries within the context of the total injury problem.</li> <li>- The community conducts program assessments from a “best practices” and a prevention perspective to determine gaps in highway and traffic safety and other injury activity.</li> <li>- The community implements a plan with specific strategies that addresses the problems and program deficiencies through prevention countermeasures and activities.</li> <li>- The community evaluates the program to determine the impact and cost benefit where possible.</li> </ul>	

### Example of Japan

#### 1. Community Zone Development Projects

In areas in which priority should be given to the flow of pedestrian traffic, area-wide infrastructure development efforts involving the creation of community roads\*1 and mixed pedestrian-vehicular roads\*2 will be made by road administrators in conjunction with traffic control through the Prefectural Police.

\*1 Community roads: Roads designed to bring pedestrian and vehicular road use into a harmonious balance by controlling vehicle speed through measures such as the provision of a zigzag car lanes to allow shared used with pedestrians.

\*2 Mixed pedestrian-vehicular roads: Aimed at crowded roads, the objective is to give priority to pedestrians and control vehicular traffic through a combination of measures, including jumps and tapering.



After the start of three model projects on a nationwide basis in fiscal 1996 the work is to be extended to approximately 100 locations in fiscal 1998.

## 2. General Traffic Safety Checks

General Traffic Safety Checks will be implemented with the participation of the regional population and road users themselves in order to promote road safety. These efforts will be shared between the administrative authorities (Prefectural Police and Road Administrators) and the citizens on the basis of a heightened awareness of traffic safety by the road user.

Improvements are made to the road environment on the basis of user participation involving the local citizens and the road users. This integrated approach harnessing the efforts of the public and private sectors, companies and individual alike, is designed to ensure traffic safety with practical traffic safety education and through participation and trial.

Since fiscal 1997, nationwide checks have been made in conjunction with the Spring and Autumn Traffic Safety Movements.

## 3. Survey on School Route Safety Checks

Surveys have been carried out to check in particular the width of walkways and the eye-level of children (height of line of view) for facility projects including traffic safety facilities such as school routes for children and overpass/underpass road crossings. The aim of these efforts is to secure the safety of children in traffic on their way to school, and the studies were conducted with the cooperation of the schools.

At the end of fiscal 1997, the study had been conducted at approximately 96% of all elementary schools.

## 4. Nationwide Traffic Safety Movement

Traffic Safety Movements are implemented by related authorities and organizations, including the National Police Agency and the Ministry of Construction in the spring and autumn of each year.

## 11. Accident black-spot approach to reduce accidents

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Accident black-spot approach to reduce accidents	Japan	The fact is that 40% of all traffic accidents at trunk roads are concentrated in only 9% of the total area.	Measures are implemented centrally to reduce accidents in accident black spots and the vicinity of such accident-prone locations and to intensify accident survey and analysis activities. For this purpose, using the accident data, and the measures may involve improvements of road junction, the creation of pedestrian ways, and the installation of road lighting in the black spots locations.	
	New Zealand	1.Location of blackspots	- Requires crashes with map coordinates or location on a link node roading system	1.Resources to geocode crashes 2.Under-reporting of crashes 3.Difficulty locating some crashes due to poor quality Police reporting 4.Software to automatically find clumps of crashes (spots) 5.This capability directly by the road developers/maintainers
		2.Location of black routes	- Same as in (1) but using some form of link node system incorporating traffic flow data for calculation of crash rates	1.Quality of traffic flow estimates 2.Maintenance of flow estimates 3.Software to calculate crash rates and report the results
		3.Knowledge of appropriate countermeasures	- Engineering experience	Useful to monitor the effectiveness of the countermeasures and report back to the engineering community
		4.Funding for countermeasures		

## 11. Accident black-spot approach to reduce accidents (continued)

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Accident black-spot approach to reduce accidents	New Zealand	a) Ignoring no overtaking line markings which results in head on accidents	Profiled no overtaking line markings	

### Example of Japan

#### 1. Centralized implementation of urgent measures for accident black spots

Based on the accident data of Institute for Traffic Accident Research and Data Analysis (ITARDA), 3,200 accident black spots have been identified on trunk roads. From fiscal 1996, countermeasures have been developed and promoted by the Accident Black Spot Countermeasures Council, a body set up by the Road Administrators (Ministry of Construction, prefectures and municipalities) and the Prefectural Police. Recently, the National Police Agency and the Ministry of Construction carried out follow-up studies and surveys to monitor the progress in the development of countermeasures and their implementation status.

#### 2. Establishment of Institute for Traffic Accident Research and Data Analysis

Approval for the establishment of a foundation called the Institute for Traffic Accident Research and Data Analysis (ITARDA) was given on March 5, 1992. This organization was founded with the cooperation of the National Police Agency, Ministry of Transport and Ministry of construction. The objectives of this foundation are to integrate transportation-related data consisting of inspection data of traffic accidents, and data concerning drivers, vehicle standards, and road structures, and conduct comprehensive research and analysis of traffic accidents from the viewpoints of people, vehicles, roads, etc.

The Center contributes to the enhancement of scientific research and analysis of traffic accidents and, consequently, the implementation of effective traffic safety measures.

## 12. Raising the attention of all societies to the road safety problems

Safety problem	Economy	Description of the problem	Description of solutions	Description of difficulties
Raising the attention of all societies to the road safety problems	New Zealand	Raising the attention of all segments in the community to road safety problems can be problematic. While this is not the same as saying that it can be difficult to improve a nation's "safety culture", the concepts are similar and are treated as synonyms in this brief response.	The key to solving this issue lies in : (a) identifying the <i>manifestations</i> of a lack of attention/culture, and (b) then applying the appropriate countermeasure;	

### New Zealand

#### **Problem Analysis**

It is easier to describe virtually every other road safety problem than it is to describe a lack of community attention to road safety, or lack of a safety culture. The difficulty, or crux of the problem, lies in the difference between the material and the non- material.

\_ A faulty car brake is material. A narrow bridge and a sharp curve in the road are material. An icy road surface is material. Speed and drink driving are also material, as is neglect to wear a seatbelt. These problems are perceptible to the external senses. Therefore they are susceptible to empirical analysis,

including relative ease of measurement. Most importantly of all, it is easy to identify the appropriate road safety solution: it suffices to apply a material counter-measure.

\_ But personal or community "attention" and "culture" *in themselves* are not material. That fact gives rise to difficulties of : (a) identification, (b) measurement and (c) application of appropriate counter-measures.

Our grasp of "attention" and "culture" is only *indirect*. Attention and culture become known to us solely through their material *manifestation* in some way or other, usually through behaviour. Even then, behaviour can be deceptive because it can arise from more than one motive, including contradictory motives: a saint and a sinner can perform the same act, but for opposite motives.

### **Principle to Solutions**

The key to solving this issue lies in :

- \_ (a) identifying the *manifestations* of a lack of attention/culture, and (b) then applying the appropriate countermeasure;
- \_ if the manifestation is in the area of human behaviour, the solution is to facilitate the habitual practice of the *direct opposite* behaviour; if the manifestation is speed, then slow down; if it is drink driving, then stop drink driving.

### **Possible Solutions**

The solutions cover the entire range of road safety interests. In particular, two approaches are required:

- \_ a robust safety management framework;
- \_ a holistic approach to road safety interventions.

#### *Safety management framework*

A robust safety management framework will include:

- \_ high level leadership, including the political will to succeed;
- \_ high level advocacy and national coordination arrangements (e.g. in NZ through the National Road Safety Committee);
- \_ the specification of safety performance, including shared targets (e.g. in NZ through the Strategic Result Areas and the National Road Safety Plan);
- \_ the expression of accountabilities for contributing to the shared targets (e.g. in NZ through the National Road Safety Plan and the National Road Safety Advisory Group);
- \_ established safety funding processes, with well developed community participation (e.g. in NZ through the New Zealand Road Safety Programme);
- and
- \_ mechanisms to review safety priorities (e.g. in NZ through the LTSA's Safety Directions Programme).

### *Holistic approach to road safety interventions*

Another key to raising attention/culture is to seek to include a road safety awareness element in every safety intervention.

Interventions should include:

- \_ people safety, vehicle safety and road safety;
- \_ primary (before crash), secondary (in/during crash) and tertiary (after crash) interventions.

For example:

	<b>Road Safety Interventions</b>		
	<b>Primary</b> (before crash)	<b>Secondary</b> (in/during crash)	<b>Tertiary</b> (after crash)
<i>People safety</i> (driver, passenger, motorcyclist, bicyclist & pedestrian)	Education: <i>e.g. know the Road Code</i> Training: <i>e.g. industry oriented</i> Attitudes & Behaviour: <i>e.g. don't drink and drive; avoid fatigue &amp; distractions</i> Driver licence regime Conspicuous clothing: <i>bicyclists, pedestrians</i> Enforcement: of laws e.g. speed Demand restraint: e.g. promote public transport	Behaviour: <i>use of seat-belts</i>	Trauma management: emergency services Medical treatment Rehabilitation: physical, vocational, social
Vehicle safety	Engineering: <i>design standards e.g. brakes; road worthiness; visibility; intelligent transport system vehicle incident detection</i> Enforcement: <i>of WOF requirement</i>	Engineering: <i>impact protection e.g. air bags</i>	Engineering: vehicle salvage & restoration; in-vehicle 'black box'
Road Safety	Engineering: <i>delineation; road geometry; surface condition; visibility; seal width; shoulders; separating modes of transport; road safety audit</i> Exposure reduction: <i>e.g. strategies to reduce traffic congestion</i> Planning: <i>e.g. accesses to arterial routes</i>	Engineering: <i>sealed shoulders; 'feather' edges; safety barriers; frangible poles</i>	Engineering: <i>intelligent transport system network incident detection</i>

In this holistic approach, it is important for road safety managers to avoid capture by particular interests that may bring relatively little safety benefit. Prioritising resources on an empirical basis is an on-going challenge.

## **附錄二：各會員體回覆資料彙整**

**Appendix II : Summary of the questionnaire on  
the Twelve Major Road Transportation Safety Problems**

**ASIA-PACIFIC ECONOMIC COOPERATION  
TRANSPORTATION WORKING GROUP  
ROAD SAFETY EXPERTS GROUP**

**SUMMARY OF THE QUESTIONNAIRE ON THE TWELVE  
MAJOR ROAD TRANSPORTATION SAFETY PROBLEMS**

**Prepared by CHINESE TAIPEI**



## Directory

Introduction.....	1
-------------------	---

### Category A: Accident Data

#### *Problem 1: Best way to collect and share accident data*

Australia.....	1-1
Canada.....	1-2
Japan .....	1-4
Korea.....	1-5
Mexico .....	1-6
New Zealand .....	1-12
Papua New Guinea.....	1-16
Singapore .....	1-20
Chinese Taipei.....	1-21
Thailand .....	1-23

### Category B: Highway and Traffic Engineering

#### *Problem 2: Improvement of road network and traffic safety facilities*

Canada.....	2-1
Japan .....	2-3
Republic of Korea .....	2-5
Mexico .....	2-6
New Zealand .....	2-11
Papua New Guinea.....	2-18
Peru .....	2-20
Singapore .....	2-21
Chinese Taipei.....	2-23
Thailand .....	2-30

### Category B: Highway and Traffic Engineering

#### *Problem 3: Roadside cut slope management*

Canada.....	3-1
Republic of Korea .....	3-3
Mexico .....	3-4
New Zealand .....	3-6
Papua New Guinea.....	3-10
Peru .....	3-11
Singapore .....	3-12

Chinese Taipei.....	3-13
Thailand .....	3-16

#### Category C: Behavior

##### Problem 4: *Speeding*

Canada.....	4-1
Japan .....	4-3
Republic of Korea .....	4-4
Mexico .....	4-5
New Zealand .....	4-7
Papua New Guinea.....	4-14
Peru .....	4-15
Singapore .....	4-16
Chinese Taipei.....	4-17
Thailand .....	4-21

#### Category C: Behavior

##### Problem 5: *Impaired Driving*

Canada.....	5-1
Japan .....	5-4
Republic of Korea .....	5-5
Mexico .....	5-6
New Zealand .....	5-8
Papua New Guinea.....	5-11
Peru .....	5-12
Singapore .....	5-14
Chinese Taipei.....	5-15
Thailand .....	5-17

#### Category C: Behavior

##### Problem 6: *Vehicle Overloading*

Canada.....	6-1
Japan .....	6-3
Republic of Korea .....	6-4
Mexico .....	6-5
New Zealand .....	6-8
Papua New Guinea.....	6-13

Peru .....	6-14
Singapore .....	6-15
Chinese Taipei .....	6-16
Thailand .....	6-21

#### Category C: Behavior

##### *Problem 7: Encouraging people to wear seat belts and wear motorcycle helmets.*

Australia .....	7-1
Canada.....	7-2
Japan .....	7-4
Republic of Korea .....	7-5
Mexico .....	7-6
New Zealand .....	7-7
Papua New Guinea.....	7-10
Singapore .....	7-11
Chinese Taipei.....	7-12
Thailand .....	7-15

#### Category D: Vulnerable Groups

##### *Problem 8: Pedestrian Safety*

Canada.....	8-1
Japan .....	8-3
Republic of Korea .....	8-4
Mexico .....	8-5
New Zealand .....	8-7
Papua New Guinea.....	8-16
Peru .....	8-17
Singapore .....	8-18
Chinese Taipei .....	8-21
Thailand .....	8-23

#### Category D: Vulnerable Groups

##### *Problem 9: Elderly people safety*

Canada.....	9-1
Japan .....	9-3
Republic of Korea .....	9-4
Mexico .....	9-5

New Zealand .....	9-6
Papua New Guinea.....	9-8
Peru .....	9-9
Singapore .....	9-10
Chinese Taipei .....	9-11
Thailand .....	9-13

#### Category E: Others

##### *Problem 10: Community approach to reduce road related injuries and fatalities*

Canada.....	10-1
Japan .....	10-3
Republic of Korea .....	10-4
Mexico .....	10-5
New Zealand .....	10-6
Papua New Guinea.....	10-9
Peru .....	10-10
Singapore .....	10-11
Chinese Taipei.....	10-12
Thailand .....	10-13

#### Category E: Others

##### *Problem 11: Accident black-spot approach to reduce accidents.*

Australia.....	11-1
Canada.....	11-2
Japan .....	11-3
Republic of Korea .....	11-4
Mexico .....	11-5
New Zealand .....	11-6
Peru .....	11-9
Singapore .....	11-10
Thailand .....	11-11

#### Category E: Others

##### *Problem 12: Raising the attention of all societies to road safety problems*

Canada.....	12-1
-------------	------

Japan .....	12-3
Republic of Korea .....	12-4
Mexico .....	12-5
New Zealand .....	12-6
Peru .....	12-10
Singapore .....	12-11
Chinese Taipei.....	12-12
Thailand .....	12-14

## **Summary of the Questionnaire on the Twelve Major Road Transportation Safety Problems**

### **Introduction**

This is a preliminary summary of the Questionnaire on the Twelve Major Road Transportation Safety Problems. The returned questionnaires from eleven economies, including Australia, Canada, Japan, Republic of Korea, Mexico, New Zealand, Papua New Guinea, Peru, Singapore, Chinese Taipei and Thailand, are classified according to the 'major road transportation safety problems' in the Questionnaire.

Please check that if there is any mistake or loss in the summary.

Both modifications to this summary and answers to the Questionnaire from all economies are welcomed and please send it to us by May 5, 2000. Further analysis to this Questionnaire will be proceeded after that.

## Category A: Accident Data

(Australia)

Problem 1: *Best way to collect and share accident data*

### **Specific Problem and its Description:**

(Problem 1, Australia)

While we are able to collect reliable data on numbers of fatalities, collecting data on serious injuries is difficult. We define serious injuries as number of people requiring admission to hospital as a result of a crash. In some states the data provided comes from police reports, however police who attend crash sites are not necessarily aware of the number of people taken to hospital and have no way of knowing if they are treated and discharged (not to be counted) or admitted (counted). In addition the hospital's decision on whether to admit a patient is influenced by more factors than the seriousness of the injury – children and elderly are more likely to be admitted, as are people who do not share homes with people who will care for them.

### **Solutions:**

(Problem 1, Australia)

- Health authorities collect data on types of injuries and causes. We have recently started collecting data from the Australian Institute of Health and Welfare.

### **Achievements:**

(Problem 1, Australia)

- The data we are now receiving specifies user groups, length of admission sex and State.

### **Difficulties:**

(Problem 1, Australia)

- The data does not specify injuries by type of crash.

Problem 1: *Best way to collect and share accident data*

**Specific Problem and its Description:**

(Problem 1, Canada)

- Canada 13 political jurisdictions have authority over all aspects of traffic collision data collection, content and compilation.
- Data quality: incomplete and inaccurate reporting of some traffic collision data elements by police officers occur in many jurisdictions because of the perception that the principle reason for completing traffic collision reports is to provide this information to insurance companies.
- Data consistency: all of Canada political jurisdictions have unique traffic collision report forms. Consequently, no jurisdiction currently collects all data elements found in the Transport Canada national traffic collision data file.
- Timeliness of the data: the provinces and territories have informal non binding agreements with the federal government regarding the provision of their data for national compilation and analyses.

**Solutions:**

(Problem 1, Canada)

- The development and imminent implementation (December 1999) of national traffic collision data collection procedures, called the National Collision Data Base (NCDB), that now tasks the provinces and territories with the responsibility of providing the federal government with standardized, qualitative, comprehensive and more timely data should address some of the above-mentioned problems.
- When revising their traffic collision report forms in the future, all provinces and territories will consider incorporating data elements currently missing from the NCDB.
- Front line police officers are being educated to the benefits of providing more comprehensive and better quality data.

**Achievements:**

(Problem 1, Canada)

- The development and imminent implementation of a new National Traffic Collision Database (NCDB), in December of 1999, will enable Canada's political jurisdictions to provide the federal government with standardized, comprehensive, qualitative and timelier traffic collision data.
- A pilot program, involving an inter-jurisdictional partnership, that examines automated on-site collision data collection and reporting by police officers, is currently being developed and evaluated for possible transfer to other jurisdictions.



- As part of a pilot study that is currently taking place in one province, but which may be adopted nationally, data collectors (front-line police officers) are being educated about the utility of collecting comprehensive and quality collision data to help identify road safety problems within their own communities as well as nationally.

**Difficulties:**

(Problem 1, Canada)

- Provinces and territories still decide which traffic collision data elements are collected on their respective crash report forms. Unfortunately, not all jurisdictions currently collect all data elements found in the NCDB. These jurisdictions may include some missing data elements if they decide to revise their collision report forms in the future.
- The financial resources and political willingness required to modify jurisdictional traffic collision data forms to include new data elements may take several years to accomplish.

**Data Sharing:**

(Problem 1, Canada)

- Annual traffic collision statistics reports, pamphlets, fact sheets, special reports and public education videos are produced and disseminated free of charge.
- Pamphlets, fact sheets, reports on traffic collision statistics, as well as unique reports on topical road safety issues affecting Canadians can be accessed and downloaded via the Internet.
- Transport Canada is a member of the International Road Traffic and Accident Database. Membership enables Canadian traffic collision data to be included in this OECD data base as well as accessibility to data from all other IRTAD member countries.
- The Database of Road Safety Stakeholders in Canada, which is a directory of Canadian associations, government departments, coalitions, foundations that operate road safety programs in Canada is now accessible via the Internet at [www.tc.gc.ca/roadsafety](http://www.tc.gc.ca/roadsafety). The database contains road safety program details, objectives, lists of publications and data available for each participating organization.

Category A: Accident Data

(Japan)

Problem 1: *Best way to collect and share accident data*

**Specific Problem and its Description:**

(Problem 1, Japan)

Analysis of the micro data:

The accident data which the National Police Agency (NPA) collects and analyzes includes 149 items. On the other hand, the Institute for Traffic Accident Research and Data Analysis (ITARDA) collects micro data in some regions. But, the analysis of the micro data is not sufficient. The possible factors might be the follows:

- NPA does not collect the micro data such as photographic data of the accidents and map data of the accident point.
- ITARDA collects the micro data only in some regions.

**Solutions:**

(Problem 1, Japan)

- New traffic accident data collection system which can manage graphical and map data.
- Expansion of the area where ITARDA collect micro data.

**Achievement:**

(Problem 1, Japan)

- Higher analysis of the traffic accident.

**Difficulties:**

(Problem 1, Japan)

- The construction of the new system needs enormous budget.
- ITARDA does not have enough manpower to expand the area.

## Category A: Accident Data

(Republic of Korea)

### Problem 1: *Best way to collect and share accident data*

Specific Problem and its Description: (Problem 1, Republic of Korea)

When traffic accidents occur in Korea, police officers are required to fill out a “accident investigation report” (Form No. 104), a datasheet for statistical records, and an “accident registration table.” Due to these multiple reporting requirements, the same information is recorded twice or three times, thus complicating the administrative process and sometimes leading to discrepancies in the details of accidents. Accident-related data should be shared among and utilized by road management organizations, data-collecting organizations, and research organizations. The following are the main problems in collecting, recording, and sharing accident-related data:

- The causes of accidents are reported arbitrarily due to subjectivity on the part of the person recording the raw data.
- Due to the excessive length and complexity, accident reports are often filled out in a cursory and haphazard manner.
- The exact location of accidents can differ between official reports.
- Inaccessibility of accident-related data hinders the planning and implementation of road maintenance and improvement programs.
- Inaccurate accident information complicates the determining of auto insurance premiums.
- Drivers of transportation companies (taxi, bus & trucking firms) are often managed unreasonably for safer driving.

**Solutions:** (Problem 1, Republic of Korea)

- A standardized form for traffic accident reports should be created.
- A comprehensive management system such as GIS should be established, facilitating efficient accident-related data sharing among relevant organizations.

**Achievements:** (Problem 1, Republic of Korea)

- Improved accuracy of accident-related data; fewer traffic accidents

**Difficulties:** (Problem 1, Republic of Korea)

- Insufficient consultation among relevant organizations on accident-related data sharing
- Lack of manpower training and cooperation among relevant organizations for collecting precise accident-related data

Category A: Accident Data

(Mexico)

Problem 1: *The best way to collect and to share the data of accidents.*

**Specific problem:**

(Problem 1, Mexico)

Accidents non reported.

In some occasions there are smaller incidents, that are not reported to the authorities, others, are not reported because the offender is fear to be punished.

**Solutions:**

(Problem 1, Mexico)

- To consult other information sources (Health Sector, Insurance companies, hauling services, etc.)

**Advances:**

(Problem 1, Mexico)

- Actually, there are works in promoting the interchange of information between the different interested organizations.

**Difficulties:**

(Problem 1, Mexico)

- Some organizations do not want to share its information
- Each organization obtains only the information that is of its particular interest

Category A: Accident Data

(Mexico)

Problem 1: *The best way to collect and to share the accidents data.*

**Specific problem:** (Problem 1, Mexico)

Lack of important information to performance studies of accidents. Some important data for the drawing up of accidents studies are not included at the moment on the accidents report format, which makes difficult the performance of analyses complete and reliable.

**Solutions:** (Problem 1, Mexico)

- To include important data that actually are not recorded in the accidents format.
- To make aware to the ones in charge to process the reports (police) of the importance to include every important data that they have in the scene of the accident.
- To consult other information sources (Health Sector, insurance companies, services of drag, etc.).

**Advances:** (Problem 1, Mexico)

- There are works checking the accidents report formats.

**Difficulties:** (Problem 1, Mexico)

- Is required to give enough training to the police officials that report the accidents.
- It has not been established criterion to identify the most important information that must be collected.

Problem 1: *The best way to collect and to share the accidents data.*

**Specific problem:**

(Problem 1, Mexico)

Bad quality of the collected and reported data.

It has been detected that many of the data registered in the reports are not correct or simply they are omitted, which takes to an incongruence in the analyses, in some times the take of decision is wrong. The record of the information is not made in a codified way, which makes that same data (e.g. name of a highway) are registered in many ways within the data base or to the corresponding electronic file, which difficult the use of these files with planning purposes.

**Solutions:**

(Problem 1, Mexico)

- To improve the format of accidents data collection and to automate (through the use of computers and codification systems) the compilation and operation of the information.
- To make aware at the police officials about the importance of the data accidents that they collect.
- To provide a training course to the police officials to learn how to fill in an accidents report.

**Advances:**

(Problem 1, Mexico)

- The accidents report format and the process to capture and manage of the data has been reviewed.
- There have been some meetings with police authorities to link them in the process to prevent accidents.

**Difficulties:**

(Problem 1, Mexico)

- Unwillingness of some persons that in charge of the data collecting to adopt new methods and to update them.
- In many cases the police corporations are more worried to combat the criminality instead the aspects of road safety.

Problem 1: *The best way to collect and to share the accident data.*

Specific problem: (Problem 1, Mexico)

Loss of data when migrating the information of the written reports to an electronic means.

To the above mentioned problems we have to add the problem of the data migration to a magnetic means. In this process, is very common to loose and codify erroneously important information. For example, the names of the roads or the populations are wrong typed which causes that the data base (that contains the correct names) do not recognize them and therefore it does not add the data suitably. Another common mistake consists of including, omitting or to change the numbers when the codes are typed, which leads to a mistake of location and with the numbers of the victims of the accidents. Also, it is necessary to consider that the people in charge of the data migration, are discharged from the process to prevent accidents, because they are contracted personnel as a capturist.

**Solutions:** (Problem 1, Mexico)

- To make aware to the persons in charge of the information migration of the written reports to a magnetic means because is very important to have reliable data.
- To improve the management systems of the accident data.
- To increase the training to the personnel that are in charge of data migration.

**Advances:** (Problem 1, Mexico)

- The administration systems of the accidents data is been improved and checked.

**Difficulties:** (Problem 1, Mexico)

- Lack off personnel assigned to the migration of the information.
- Lack of technical capacity and trained personnel dedicated to the migration of information.

Problem 1: *The best way to collect and to share the accident data.*

**Specific problem:** (Problem 1, Mexico)

Difficulties on the interchange of the accidents data:

The information about accidents is fragmented (most of them is in power of the police authorities, nevertheless, this information is not complete) and the diverse interested groups do not have access to them due to the lack of channels that facilitate their interchange. On the other hand, the complete accidents data in magnetic means is only available after three years, which makes difficult to update them and the recent analysis of the tendencies and effectiveness of the undertaken corrective measures. Although some organizations generate electronic files of the information that they compile, the processing of these files is concluded in a very delayed way. In addition, the efforts are not enough to take national records of the vehicles and drivers involved on accidents and infringement, that can be used to the establishment of politics to give permits and licences.

**Solutions:** (Problem 1, Mexico)

- To joint the information that must contain the reports of accidents in agreement with the necessities of the potential users of information.
- To encourage an opening culture to the information interchange
- To publish and to diffuse the information on accidents.
- Standardization the marshaling of the information
- To make the migration information processes to a magnetic means efficient.
- To negotiate that the electronic data bases are processed and put them to the disposition of the users in an appropriate way.

**Advances:** (Problem 1, Mexico)

- The “National Committee to the Prevention of Accidents” has created where diverse groups are participating and they are interested in the subject of the road safety with the purpose to coordinate the works in their different scopes.
- We have set up agreements to improve the information interchange.
- The efficient systems for the accidents data administration has been checked.
- The possibility to access at the accidents information through has been explored.

**Difficulties:** (Problem 1, Mexico)

- Difficulty in the conciliation of interests between the involved parts.
- Unwillingness of the responsible for the compilation of the data to share the information.



- Lack of technical and economic capacity to marshalling the information of some involved organisms.
- There is a little knowledge and interchange in international forums related to the matter

Category A: Accident Data

(New Zealand)

Problem 1: *Best way to collect and share accident data*

**Specific Problem and its Description:**

(Problem 1, New Zealand)

1. Quality of data reported or recorded

**Solutions:**

(Problem 1, New Zealand)

1. Well-designed crash report form and crash analysis system.
2. Training of Police who attend a crash and record crash details in the use of crash report form.
3. Feedback to Police on quality problems.
4. Feedback to Land Transport Safety Authority (LTSA) traffic engineers who determine vehicle movement and causal factor codes and data entry operators on accuracy of coding and recording

**Achievements:**

(Problem 1, New Zealand)

1. The Crash Analysis System has been recently redeveloped.
2. The LTSA has input where appropriate into Police training relating to the recording of crash details on the Traffic Crash Report form.
3. Appropriate feedback is provided to Police on quality of information. Supplementary information is also sought and some details verified from Coroner's files on fatal crashes which the LTSA obtains on the majority of fatal crashes that are investigated by the Coroner.
4. Appropriate feedback is given to LTSA engineers on coding and recording.

**Difficulties:**

(Problem 1, New Zealand)

1. On-going resources required to train new recruits, given dependence on Police to record all relevant information.
2. Emphasis among Police on driver faults (for prosecution) rather than road and vehicle factors.
3. Need to monitor and audit reports to enhance clarity and completeness of reporting.
4. Need to monitor and audit reports to enhance accuracy of coding and data-entry.

Category A: Accident Data

(New Zealand)

Problem 1: *Best way to collect and share accident data*

**Specific Problem and its Description:**

(Problem 1, New Zealand)

2. Quantity of data reported or recorded

**Solutions:**

(Problem 1, New Zealand)

- Use other sources of data (e.g. hospital admissions, ambulances, tow- trucks, insurance claims) to identify reporting rates.

**Achievements:**

(Problem 1, New Zealand)

- The LTSA uses ambulance and hospital-admissions data to verify reporting rates.

**Difficulties:**

(Problem 1, New Zealand)

- Information from tow-truck call-outs and vehicle insurance claims are not very useful for verifying reporting rates as these are biased towards crashes involving property damage rather than injuries. The LTSA's Crash Analysis System is an injury data-base so comparisons with other injury data-bases are more relevant.

Category A: Accident Data

(New Zealand)

Problem 1: *Best way to collect and share accident data*

**Specific Problem and its Description:**

(Problem 1, New Zealand)

3. Data items collected

**Solutions:**

(Problem 1, New Zealand)

- Ensure data items collected by enforcement agencies are comprehensive

**Achievements:**

(Problem 1, New Zealand)

- While there is always a demand for more information to be collected, the scope of the information collected is probably about as comprehensive as it can be given current constraints.

**Difficulties:**

(Problem 1, New Zealand)

- Limited capacity to add more questions to collect all the data items that are desirable.

Category A: Accident Data

(New Zealand)

Problem 1: *Best way to collect and share accident data*

**Specific Problem and its Description:**

(Problem 1, New Zealand)

4. Data sharing

**Solutions:**

(Problem 1, New Zealand)

1. Publish and disseminate statistical reports, ie annual *Motor Accidents in New Zealand: Statistical Statement*, annual *Regional Road Safety Reports*; quarterly *Road Safety Progress Report*; monthly *Official Road Fatality Statistics: Road Deaths*; Fact Sheets on specific safety issues; Maps
2. Internet access to statistics.
3. Internet access to crash query and reporting tools.
4. Becoming a member of the International Road Traffic Accident Database (IRTAD) to gain regular access to crash data, particularly OECD countries and to allow other countries access to New Zealand's crash statistics for comparative purposes.

**Achievements:**

(Problem 1, New Zealand)

- The LTSA has implemented all the suggested solutions or is in the process of doing so with regard to internet access and reporting tools.

**Difficulties:**

(Problem 1, New Zealand)

Problem 1: *Best Way to collect and Share Accident Data.*

**Specific Problem and its Description:** (Problem 1, Papua New Guinea)

(a) The quality of data reported or recorded:

Incomplete report or errors in the completeness of the reports. Receipt of reports for data entry being delayed because of this. Some policemen are ignorant or illiterate and some do not know the importance of some specific accident data items and hence are not collected seriously. Police have no appreciation nor know all the quality problems of accident data. There is always the problem of casual judgement because of the ignorance of the importance of quality data.

**Solutions:** (Problem 1, Papua New Guinea)

- Well-designed accident reporting and analysis system.
- Training of Policemen who investigate and record traffic accident details on the report forms.
- Feedbacks to police on the quality of reporting problems.
- Feedback to traffic engineers who determine vehicle movement and casual factors and data entry operators on accuracy of coding and recording.

**Achievements:** (Problem 1, Papua New Guinea)

- Ongoing resources required subject to the management will and supported by budget to train and sustain personnel, given dependence on police to record all relevant data.
- Emphasis among police on driver faults (for prosecution) rather than road and environment and vehicle factors.
- Need to monitor and audit reports to enhance accuracy of coding and data entry.

Category A: Accident Data

(Papua New Guinea)

Problem 1: *Best Way to collect and Share Accident Data.*

**Specific Problem and its Description:** (Problem 1, Papua New Guinea)

(b) The quantity of data recorded:

The data entered on the accident report form is as per limited to the data required. Use of other sources of data such as from the ambulances, tow-trucks, insurance claims, etc. are not used to identify reporting rates.

**Solution:** (Problem 1, Papua New Guinea)

Integrated approach to accident reporting. Use of data from other sources - eg. Ambulances, tow-trucks, insurance claims, hospital/clinic treatment records etc.

**Achievement:** (Problem 1, Papua New Guinea)

-Improved quality of accident data.

**Difficulties:** (Problem 1, Papua New Guinea)

- The will to reduce the number and severity of road accidents.
- Training and resource sustainability to make it work.

Category A: Accident Data

(Papua New Guinea)

Problem 1: *Best Way to collect and Share Accident Data.*

**Specific Problem and its Description:**

(Problem 1, Papua New Guinea)

(c) Data items collected:

**Solution:**

(Problem 1, Papua New Guinea)

- To ensure data items collected by enforcement agencies are comprehensive, complete, accurate and uniform.



Category A: Accident Data

(Papua New Guinea)

Problem 1: *Best Way to collect and Share Accident Data.*

**Specific Problem and its Description:** (Problem 1, Papua New Guinea)

(d) Data Sharing:

**Solution:** (Problem 1, Papua New Guinea)

- Publish and disseminate statistical reports, i.e. Annual Traffic Accident Reports, Statistical Statements, Official Road Fatality Statistics, etc..
- Access to statistics.
- Access to accident query and reporting tools.

**Difficulties:** (Problem 1, Papua New Guinea)

- Ongoing budget to sustain these activities.
- System not in place to access by agencies except through manual print.

**Present status:** (Problem 1, Papua New Guinea)

- Accident data collection on site by police, using the designated accident report form (in hand writing)
- Completion of computer accident report form by police.
- Sending of accident report forms to Headquarter Police, (Traffic Division) for validation of the reports.
- Police send validated reports to Department of Transport for the Data to be stored, analyzed and disseminated to stake holders.
- Data managed by Road Safety & Traffic Management, Department of Transport.

Category A: Accident Data

(Singapore)

Problem 1: *Best way to collect and share accident data*

**Specific Problem and its Description:**

(Problem 1, Singapore)

- Nil

**Solution 1:**

(Problem 1, Singapore)

- Police share accident data with the Land Transport Authority through mutual agreement
- LTA has access to Traffic Police's database
- Monthly submission on accident statistics to LTA
- Police published accident statistics book annually

Problem 1: *Best way to collect and share accident data.*

**Specific Problem and its Description:**

(Problem 1, Chinese Taipei)

Bad quality of accident data:

Some errors are found in the accident data. For instance, the location of some accident is recorded at a place that is not existing, the description of the process of accident are not logical. The authority can't improve the real dangerous place as soon as because of the errors of accident data. There are some main factors described in the following:

- Some policemen don't have enough professional knowledge of accident.
- Some accidents are not treated immediately, however some important information of accident has been changed through time.
- The data of accident are not recorded completely.
- The judgement of some policemen may not correct.

**Solutions:**

(Problem 1, Chinese Taipei)

- Training of the Police who investigate accidents and record crash details in crash report form.
- The people who engage in the accident work or the safety of traffic should often learn the professional knowledge.
- The conference that is about safety of traffic or the skill of accident treated and so on is hold periodically.
- The data of accident should be double check. If the error which are coded incorrect, it should be correction.

**Achievements:**

(Problem 1, Chinese Taipei)

- The completeness, accuracy of the accident data is improved significantly.
- The accident data could offer the people study deeply in the future.

**Difficulties:**

(Problem 1, Chinese Taipei)

- Lack of skills and resources
- Lack of expertise
- People usually care the more efficient than the safe in traffic.

Problem 1: *Best way to collect and share accident data*

**Specific Problem and its Description:** (Problem 1, Chinese Taipei)

Lack of manpower of the police and lack of skill of investigating:

The administrative police dispose most scenes of traffic accident. Because they were not well trained, some errors are found in the accident data. Hence the amount and character of information about traffic accident are not well enough for the government to make accurate decisions, which will result in a great losses because of the error of accident-prone locations. And road section will be not located on the section of urgent need because the accident data cannot provide correct information on the accident location.

**Solutions:** (Problem 1, Chinese Taipei)

- Expand traffic police organization and specialization
- Well-designed crash report form and crash analysis system
- Training of the police who investigate accidents and record details in crash report form
- Feedback to the police on quality problems
- Establish the national traffic safety center to strengthen related information

**Achievements:** (Problem 1, Chinese Taipei)

- The completeness, accuracy, and uniformity of the accident data will improve significantly.

**Difficulties:** (Problem 1, Chinese Taipei)

- High cost
- Requires substantial and ongoing resources
- Ongoing resources required to train new recruits, given dependence on the Police to record all relevant information
- Need to monitor and audit reports to enhance clarity and completeness of reporting

Category A : Accident Data

(Thailand)

Problem 1: *Best way to collect and share accident data*

**Specific Problem and Its Description:**

(Problem 1, Thailand)

Lack of sufficient accident data:

Several governmental agencies under different ministry are taking part in collect accident data for their own authorities and responsibilities: The main collector is the Police, the second one is Department of Highways, the third is hospitals. Different forms for different purposes are emerged with insufficient data sharing. These non-uniformity, insufficiency and non-quality of accident data cause difficulties to use the accident data for improving the road safety situation in the country.

**Solutions:**

(Problem 1, Thailand)

The quality of data reported or recorded:

- well-designed accident report with uniformity by training involved staff from several governmental agencies. Firstly a police station was introduced a new accident form to fill in as a pilot project and then extend the pilot project to several provinces.

**Achievements:**

(Problem 1, Thailand)

- More comprehensive and uniformity of the accident data are improved considerably from the pilot project evaluation.

**Difficulties:**

(Problem 1, Thailand)

- Limit capacity of personnel and other resources to add more questions to collect all data items.
- Limit resources to extend more pilot projects and the use of new accident form countrywide.



Problem 2: *Improvement of road network and traffic safety facilities*

**Specific Problem and its Description:**

(Problem 2, Canada)

- Canada has a recognized national transportation system. However, all aspects of road design, construction, maintenance and operation are legally administered by the provinces and territories.
- Whereas funding for improvements to the national highway system were previously provided on an ad hoc basis, the Canadian federal government has indicated that black spot analyses may be used to determine future funding for the national road system.

**Solutions:**

(Problem 2, Canada)

- The development and implementation of national guidelines for the design, maintenance and operation of roadway infrastructure is carried out under the auspices of the Chief Engineer Council, which includes representatives from all Canadian political jurisdictions' transportation departments' as well as the country ten largest municipalities.
- Selected provinces are currently merging collision and road network data in an effort to identify black spot areas on the road networks. The federal government intends to use results of black spot analysis to prioritize funding for improvements to the national roadway system.
- Under the Canadian Strategic Highway Research Program (C-SHRP), research has been conducted on long-term pavement performance. Research results have been transferred to practicing communities to support better investment and intervention strategies for design, maintenance and rehabilitation of highways.

**Achievements:**

(Problem 2, Canada)

- ◆ Under the auspices of a national, multi-modal, multi-jurisdictional organization called the Transportation of Canada (see [www.tac-atc.ca](http://www.tac-atc.ca)), a number of manuals and studies that focus on the development of roadway guidelines and which implicitly contain road safety elements were recently updated and published. They include:
  - the Manual of Uniform Traffic Control Devices for Canada, 4<sup>th</sup> Edition;
  - the Pedestrian Crossing Control Manual;
  - the 1999 Geometric Design Guide for Canadian Roads;
  - Design Vehicle Dimensions for use in the Geometric Design; and
  - the Canadian Guide to Neighbourhood Traffic Calming.

- ◆ Research conducted under the auspices of the Canadian Strategic Highway Research Program (C-SHRP) has helped improve the performance and durability of highways and made them safer for motorists and highway workers.

**Difficulties:**

(Problem 2, Canada)

- Financial resources required to identify black spot areas are substantial and difficult to obtain.
- Funding required to build/modify existing road networks is limited.



Problem 2: *Improvement of road network and traffic facilities*

**Specific Problem and its Description:**

(Problem2, Japan)

The improvement of road network and traffic safety facilities is not sufficient yet:

A comparison of accident rates before and after improvement of major traffic safety facilities reveals their beneficial effect. Even though, the improvement of road network and traffic safety facilities is not sufficient yet. The possible factor might be the follow:

-Limited budget

**Solutions:**

(Problem2, Japan)

- The development of high-quality road networks progresses as a result of drastic traffic safety measures consisting of both new road construction and reconstruction work such as the improvement of expressways, bypasses and ring roads, and the separation of vehicle lanes and sidewalks.
- Seven-year Traffic Safety Facilities Improvement Program:

This Plan has been drawn up jointly by the National Police Agency and the Minister of Construction on the basis of the Emergency Measure Law on provision of Traffic Safety Facilities (established in 1996). Under this Plan, infrastructure projects are to be implemented in order to meet the urgent need for securing traffic safety on general roads.

Promotion of infrastructure programs, including traffic safety facilities such as traffic signals, measures for providing traffic information, improvement of road junctions, and creation of pedestrian ways from Fiscal 1996 in accordance with the Seven-year Traffic Safety Facilities Improvement Program.

**Achievement:**

(Problem2, Japan)

- 5,270,000 million yen was gained for general traffic safety.
- As a result of these measures, a road network with a low ratio of traffic accidents is expanded and separation between pedestrians and vehicles is promoted. For example, the ratio of traffic accidents on expressways is almost one twelfth compared with the other roads.

**Difficulties:**

(Problem2, Japan)

- Severe financial status (especially in local autonomies)

**Note:**

(Problem2, Japan)

Seven-year Traffic Safety Facilities Improvement Program Reference 1

This Plan has been drawn up jointly by the National Police Agency and the Minister of Construction on the basis of the Emergency Measures Law on provision

of Traffic Safety Facilities (established in 1996). Under this Plan, infrastructure projects are to be implemented in order to meet the urgent need for securing traffic safety on general roads.

Promotion of infrastructure programs, including traffic safety facilities such as traffic signals, measures for providing traffic information, improvement of road junctions, and creation of pedestrian ways from Fiscal 1996 in accordance with the Seven-year Traffic Safety Facilities Improvement Program.

Unit: 100 million yen

Breakdown	Specified Traffic Safety	Regional Unit Traffic Safety (For reference)	General Traffic Safety (For reference)
Portion of Road Management Operators	(3,500) 24,800	19,500	44,300
Portion of Prefectural Police	(200) 2,100	6,300	8,400
Total	(3,700) 26,900	25,800	52,700

Note: Figures in parentheses ( ) at the top of Project Scale column are internal figures relating to cost adjustments for the plan.

*Problem 2: Improvement of road network and traffic safety facilities*

**Specific Problem and its Description:**

(Problem 2, Republic of Korea)

The Korean government continues to expand and improve the nation's road networks to ease traffic congestion in urban and rural areas. However, the shortage of land and other factors often prevents the construction of ideal roads. In Korea, there are many steep slopes with small-radius curves, which makes driving unsafe. To diminish the danger in such areas, road management organizations have employed a variety of measures to improve road safety. However, several problems remain:

- Insufficient safety measures for pedestrians and vehicles on roadsides
- Poorly demarcated pedestrian walkways and roadways on rural roads
- Inadequate financial resources and consultations between organizations responsible for improving road safety

**Solutions:**

(Problem 2, Republic of Korea)

- A combined organization in charge of establishing road safety facilities is required.
- A road safety audit system should be introduced.
- More curbs, bollards, and guardrails should be erected to ensure pedestrian safety.
- Road geometry and safety facilities should be improved and standardized.

**Achievement:**

(Problem 2, Republic of Korea)

- Road safety would be enhanced.

**Difficulties:**

(Problem 2, Republic of Korea)

- It is necessary to establish safety audit system and cultivate related manpower and technical experts.
- The results of ongoing studies must be utilized as feedback.

*Problem 2: Improvement of road network and traffic safety facilities*

**Specific problem:**

(Problem 2, Mexico)

Improvement of the highways network and the safety infrastructure for the transit:

Many traffic on roads with high volumes of transit.

Approximately, 30% of the federal road network operates under many traffic conditions. This is due to the transit flow that is concentrated on the 10 main axes and to the fact that the most of the highways in Mexico are of two tracks (one by sense). Hand, the lack of resources has prevented that the network is modernized to the rate that demands the growth of the country and the problems of many traffic is accentuated and, consequently, those of safety. In addition, in Mexico almost all the domestic transportation of goods and people is made by road; the participation of other modes of transportation is marginal.

**Solutions:**

(Problem 2, Mexico)

- Construction of new roads in sections that can be justifiable.
- To accelerate the modernization of the sections that require.
- To improve the modal distribution, impelling a greater participation of the other transportation modes(particularly the railroads)

**Advances:**

(Problem 2, Mexico)

- The high-priority sections have been determined and its modernization has been undertaken.

**Difficulties:**

(Problem 2, Mexico)

- Lack of funds destined to the construction and maintenance of the road infrastructure.
- The mountainous topography of the country makes extremely difficult to modernize some roads.
- The transportation necessities grow faster than the generation of resource for its attention.
- It does not exist a clear policy of integral administration of the network roads focused to the manage of the transit.

*Problem 2: Improvement of road network and traffic safety facilities*

**Specific problem:**

(Problem 2, Mexico)

Improvement of the roads network and the safety infrastructure the transit:

Marked contrast on the geometric characteristics between diverse segments of the road network.

The evolution of the Mexican road network has not maintained a constant tendency, has not been much since it has had stages of boom and stages in which the advanced in this area has been smaller. At the moment, 53% of the federal road network is more than 30 years old, the 31% is between 30 and 15 years old and only 16% is less than 15 years old. The previous lead that the connectivity of the network is deficient and that the drivers, in long hauls, must drive by roads of geometric characteristics and variants structural.

**Solutions:**

(Problem 2, Mexico)

- To establish clear criteria to hierarchize the necessities of the road network.
- To promote the modernization of the segments on the road with minor specifications.

**Advances:**

(Problem 2, Mexico)

- In the integral modernization has been worked, throughout the main axes of the country with the purpose as far as possible to homogenize the geometric and structural characteristics of the diverse sections that compost them.

**Difficulties:**

(Problem 2, Mexico)

- Deficiency of budgetary resources to accelerate the modernization modernization.
- Deficiency of alternative fiscal mechanisms that allow to obtain additional resources for modernization.
- The topographical conditions makes difficult the modernization of some segments of the network.

*Problem 2: Improvement of road network and traffic safety facilities*

**Specific problem:**

(Problem 2, Mexico)

Improvement of the highways network and the safety infrastructure for the transit:

The evolution of the road network has been exceeded by the present necessities.

The Mexican road network has the main function to communicate the country and once fulfilled this purpose it began to grow from the first segments. Nevertheless, his growth stayed behind the necessities imposed by the development, particularly, in relation to the weights and dimensions of the vehicles that use this network. At the moment, 53% of the federal road network is more than 30 years old, 31% is between 30 and 15 years and only 16% is less than 15 years old. However, over them travel incompatible modern vehicles of load, with geometrical and structural characteristics of the network. Particular, the bends require to be wider, that is so for of those unitary vehicles in which the design of most of the roads was based.

**Solutions:**

(Problem 2, Mexico)

- To modernize the segments of the network in which travel vehicles of great dimensions.
- To establish specific routes to the circulation of these vehicles.
- To check and performance of deep studies about the impacts generated on the road safety in which the circulation is allowed.

**Advances:**

(Problem 2, Mexico)

- Recently, the Regulation has been modified in which are the rules for the circulation of great dimension vehicles and the routes and highways on which it is allowed their circulation is mentioned.
- Some studies and field tests have performed to verify the operations conditions of these vehicles and their impact on the road safety.

**Difficulties:**

(Problem 2, Mexico)

- The lack of resources has not allowed to carry out the modernization of the roads to the rate demanded by the present needs.
- The sheer topography of the country makes difficult the modernization works in many segments of the road network.
- There is some pressure by the carriers to accede to a higher number of roads with this type of vehicles.

*Problem 2: Improvement of road network and traffic safety facilities*

**Specific problem:**

(Problem 2, Mexico)

Improvement of the road network and the safety infrastructure for the transit:

Deterioration of the physical state of the road network.

Before the evolution of the transportation necessities in the country, the national road network could not stay at the same height, particularly the aspects related with weights and dimensions. The roads that were designed for certain vehicles and certain weights soon received the transit of vehicles that exceeded their geometric and structural capacity, which lead to its fast deterioration. The previous thing was aggregated with some deficiencies in the maintenance programs. The deterioration of the road network has caused an important extra cost in the vehicular operation costs and is considered that is an important factor in a great number of road accidents.

**Solutions:**

(Problem 2, Mexico)

- To reinforce the destined programs to improve the physical state of the network.
- To impose restrictions to the vehicular weight for the load vehicles.
- To reinforce vigilance operatives regard to the comply of the vehicular weight that is allowed.

**Advances:**

(Problem 2, Mexico)

- Better conservation programs and improvements to the infrastructure are handled.
- The operatives to verify weights and dimensions are reinforced.
- The adoption of technologies that allow the automated verification of the weights and the dimensions are promoted.

**Difficulties:**

(Problem 2, Mexico)

- Insufficient resources for the modernization and important of the infrastructure.
- Pressures by the carriers to increase the weight of the vehicles.
- Deficiencies in the verifications operatives.

*Problem 2: Improvement of road network and traffic safety facilities*

**Specific problem:**

(Problem 2, Mexico)

Improvement of the network of highways and the infrastructure of security for the transit:

Lateral strips to the way that represents danger for the vehicles that leave the roads.

The sheer Mexican topography originates that in many cases the lateral strips of the ways are constituted by high embankments and/or deep gorges. In other cases in order of making the surroundings more pleasant of the road they have stood you hoist that with time they live grown and they have become a danger for the users. On the other hand, the lack of maintenance and the invasion of the right of via also has even contributed to the problem action of security in the lateral strips of the lateral strips of the way. All the previous one prevents that the count on a recovery area and that faces situations of high danger that in numerous cases they finish in fatal accidents.

**Solutions:**

(Problem 2, Mexico)

- Use of protective obstacles in sites where is justified.
- Review the type of vegetation to use in the lateral strips of the road .
- To improve the maintenance on the lateral strips and to prevent the invasion of the right of route.

**Advances:**

(Problem 2, Mexico)

- The maintenance programs have been improved.
- The designs of the protective obstacles have been improved.

**Difficulties:**

(Problem 2, Mexico)

- Lack of resources.
- Political problems associated to the invasion of the right of route.
- Lack of attention to lateral strips of the way.



Category B: Highway and Traffic Engineering

(New Zealand)

Problem 2: *Improvement of road network and traffic safety facilities*

**Specific Problem and its Description:** (Problem 2, New Zealand)

1. Insufficient number of divided highways for high traffic volumes

**Solutions:** (Problem 2, New Zealand)

- Construct more divided highways.

**Achievements:** (Problem 2, New Zealand)

- More divided highways are being planned subject to BCA (benefit cost analysis) criteria and available funds.

**Difficulties:** (Problem 2, New Zealand)

- Insufficient funds.

Category B: Highway and Traffic Engineering

(New Zealand)

Problem 2: *Improvement of road network and traffic safety facilities*

**Specific Problem and its Description:**

(Problem 2, New Zealand)

2. Unforgiving roadsides and lack of clear areas and roadside protection

**Solutions:**

(Problem 2, New Zealand)

-Provide more clear recovery areas or safety barriers.

**Achievements:**

(Problem 2, New Zealand)

-More are being planned subject to BCA (benefit cost analysis) criteria and available funds.

**Difficulties:**

(Problem 2, New Zealand)

-High cost.

Category B: Highway and Traffic Engineering

(New Zealand)

Problem 2: *Improvement of road network and traffic safety facilities*

**Specific Problem and its Description:**

(Problem 2, New Zealand)

3. Variable application of geometric design and standards for cross-section

**Solutions:**

(Problem 2, New Zealand)

-Establish better standards.

-Improve design and planning.

**Achievements:**

(Problem 2, New Zealand)

-Proposals have been developed for Safety Management Systems. These will be implemented subject to Government approval.

**Difficulties:**

(Problem 2, New Zealand)

-High cost.

-Lack of appreciation of the problem.

Problem 2: *Improvement of road network and traffic safety facilities*

**Specific Problem and its Description:** (Problem 2, New Zealand)

4. Variable application of standards for signs, markings and other facilities

**Solutions:** (Problem 2, New Zealand)

- Correct application of standards and compliance with regulations.
- Better design and maintenance.
- Safety Management Systems.

**Achievements:** (Problem 2, New Zealand)

- Proposals have been developed for Safety Management Systems. These will be implemented subject to Government approval.

**Difficulties:** (Problem 2, New Zealand)

- Availability of skills and resources.
- Difficult to enforce compliance with current system. The implementation of Safety Management Systems should largely overcome this problem.

Category B: Highway and Traffic Engineering

(New Zealand)

Problem 2: *Improvement of road network and traffic safety facilities*

**Specific Problem and its Description:**

(Problem 2, New Zealand)

5. Slippery Roads

**Solutions:**

(Problem 2, New Zealand)

- Monitor and improve surface friction.
- Better signage.

**Achievements:**

(Problem 2, New Zealand)

- Both are being undertaken subject to funding priorities.

**Difficulties:**

(Problem 2, New Zealand)

- Cost of materials and maintenance.
- Materials are not always available locally and if they have to be transported some distance to the particular site, the transportation costs can be significant. The materials required for some special treatments have to be imported from other countries as they are not produced in New Zealand.

Category B: Highway and Traffic Engineering

(New Zealand)

Problem 2: *Improvement of road network and traffic safety facilities*

**Specific Problem and its Description:**

(Problem 2, New Zealand)

6. Network has not evolved consistent standards

**Solutions:**

(Problem 2, New Zealand)

- Techniques for prioritising upgrades, etc.
- Land use controls to minimise further degradation of network.
- Constraints on vehicle size and weights.

**Achievements:**

(Problem 2, New Zealand)

- Progress on these is subject to funding.

**Difficulties:**

(Problem 2, New Zealand)

- Increase economic and social demand for road use and access.
- Costs.

Problem 2: *Improvement of road network and traffic safety facilities*

**Specific Problem and its Description:**

(Problem 2, New Zealand)

7. Difficult road construction environment due to:

- topography
- geology
- geography
- ecology

**Solutions:**

(Problem 2, New Zealand)

- Innovative engineering designs to minimise ecological impact, and reduce risk of damage due to seismic, etc. activities.

**Achievements:**

(Problem 2, New Zealand)

- Research is being undertaken on more effective use of materials and other resources.

**Difficulties:**

(Problem 2, New Zealand)

- Cost.
- Lack of expertise.
- Road users have high expectations in terms of the quality of road construction in relation to what is affordable.

*Problem 2: Improve of Road Network and Traffic Safety Facilities.*

**Description of the Problem:**

(Problem 2, Papua New Guinea)

1. Unforgiving, roadsides and lack of clear areas and roadside safety barriers or protection.
2. Variable application of geometric design and standards for cross-section.
3. Variable applications of standards of signage, carriageway markings and other facilities.
4. Road surface condition, slippery roads, pot hole filled roads, etc.
5. Difficult road construction environment:
  - . Topography
  - . Geology
  - . Geography
  - . Ecology
6. High percentage of run-off-the road accidents.
7. Inattention to speed limits in Urban Areas.
8. Pedestrian facilities.
9. High number and severity of casualties per single vehicle accident.

**Solutions:**

(Problem 2, Papua New Guinea)

1. Provide more clear recovery areas or safety barriers.
2. Establish better standards and code of Practice.
3. Improve design and planning.
4. Correct application of Standards and Compliance with regulation.
5. Better design and maintenance.
6. Safety Management Systems.
7. Monitor and improve road surface friction.
8. Land use controls to minimize further degradation of network.
9. Constraints on vehicle size and weights.
10. Innovative engineering designs to minimize and reduce risk of road damage and accidents.
11. Profiled edge line marking at critical locations.
12. Threshold signs with other treatments such as extended kerbs, planting, flush medians or center islands, and contrasting colour surfacing.
13. Urban road not well lit at night time.

**Difficulties:**

(Problem 2, Papua New Guinea)

1. Lack of budget support.
2. Lack of the appreciation of the problem indicated by the budget support.



3. Availability of skills and resources.
4. Cannot enforce compliance and uniformity in practice.
5. Lack of expertise.
6. Vulnerable road users such as pedestrians.
7. Visibility for any access behind the sign.

Problem 2: *Improvement of Road Network and Traffic Safety Facilities*

**Specific Problem and its Description:**

(Problem 2, Peru)

Peru has an irregular topography and the costs it must cover for conservation, rehabilitation and construction are high. Slopes are another factor, which determines not only the visibility but also curve radii that limit the traffic of higher-dimensions vehicles.

Many roads are not properly designed, causing many traffic accidents the separation between vehicle and pedestrian traffic, which is not well channeled, these points are known as black-spots.

The Handbook of Control Devices for Streets and Roads has not duly spread.

There are no specialists in Road Security Audit who evaluate the signs or other control devices.

**Solutions:**

(Problem 2, Peru)

- To strengthen the Road Safety Program.
- To turn one level intersections into uneven Road Interchanges with high tech engineering techniques avoiding points of conflict that produce accidents or make it necessary to build Evitamiento Roads which do not go through urban zones and which have controlled access through bypasses.
- A New Control Devices Manual in streets and roads to uniform horizontal and vertical signal design.
- Technical specifications of the materials to be used in horizontal and vertical signs, incorporating reflective materials to be seen from large distances.

**Achievements:**

(Problem 2, Peru)

- Studies are being developed for the construction of Road Interchanges and Evitamiento Road, to reduce the number of traffic accidents.
- Training of experts in Security Road Audit.
- The Ministry of Transportation, Communications, Housing and Construction has prepared a New Technical Specification Manual. Such specifications are related to vertical and horizontal signs.
- Positively influence in decisions of the sector authorities, thus reducing the traffic accidents.

**Difficulties:**

(Problem 2, Peru)

- Problems with the local counterpart assignments, to comply with the paripassu of the undersigned investment agreements.
- The aforementioned solutions are expensive for our economy, however they are being adopted since the road safety is an aspect to be taken into account.

*Problem 2: Improvement of road network and traffic safety facilities*

**Specific Problem and its Description:**

(Problem 2, Singapore)

1. Unforgiving hard areas at the gore of bridge structures, including exits and entrance to the expressway network.
2. Vulnerability of pedestrians at zebra crossings along roads and slip roads as some motorists do not slow down to give-way.
3. “Acute slip road” with ‘Give-way’ priority having poor visibility. The driver needs to turn back (almost 180 deg) to observe the traffic along the main road before merging into the main stream of traffic
4. Improve visibility of signalised junctions located round tight bends or after crest of road.
5. Short time for heavy vehicles to clear a wide signalised junction safely when the traffic light turns from green to red.
6. Improve visibility and reduce failure of traffic signals aspects using LED signals

**Solutions:**

(Problem 2, Singapore)

1. Install object markers at the gore areas through the use of highly reflective sheeting materials to warn motorists. Installing crash cushions to absorb possible impacts.
2. Implementing zebra crossing with a refuge in the middle of road, construct a “raised zebra crossing”, a hump and zebra crossing combined. Improving lighting levels at the crossing with special lanterns to light up the crossing area.
3. Introduce chevron markings to guide motorists as they form up to enter the main traffic flow. Physical improvements to create an angle of 70 degree for the entry angle.
4. Install advance flashing lights to warn motorists.
5. Increase amber time for vehicles to clear the junction safely.
6. Road safety audits on existing roadways to check on adequacy of the road network
7. Hazardous road locations are identified monthly and improvements implemented

**Achievements:**

(Problem 2, Singapore)

- Studies showed that vehicles shy away from these areas with the use of the object markers. Crash cushions are being considered.

**Difficulties:**

(Problem 2, Singapore)

- High cost to install these crash cushions. Fear of increase in non-injury

- accident when motorists traverse across the chevron markings.
- High cost to realign angle of slip roads at junction with main road.
- Constraints at locations hinder improvement works.
- High cost in installing advance flashing lights

Problem 2: *Improvement of road network and traffic safety facilities*

**Specific Problem and its Description:**

(Problem 2, Chinese Taipei)

The guide signs are not updated comprehensively:

Because of the inconsistency, incompleteness and bad design of guide sign system, road users often confuse the guiding information and hardly distinguish the direction of way. Furthermore, it may disorder the traffic, even cause accidents. The possible factors might be the follows:

- Lack of consistence.
- Lack of comprehensive.
- Confusion in the information of different roadway levels.
- Lake of information in signs.

**Solutions:**

(Problem 2, Chinese Taipei)

- To unify the sign style, color and size and the concepts of signs including place, direction, miles and number of route.
- The location of setting signs are classified into “preintersection point”, “intersection point”, and “exactly point”, each sign of the point keeps consistently and comprehensive.

**Achievements:**

(Problem 2, Chinese Taipei)

- The uniform sign can provide the roadway users more clearly in distinguish the place, direction and miles, it can also make drivers get to the destination more effective, safe and convenient.
- The three location of setting signs can provide repeated information to the drivers.

**Difficulties:**

(Problem 2, Chinese Taipei)

- For the limited financial resources, it can only be improved gradually every year.
- The coordination between different administration of right of way is not easy.

Problem 2: *Improvement of road network and traffic safety Facilities*

**Specific Problem and its Description:**

(Problem 2, Chinese Taipei)

Poor regional road network

Regional road network includes freeways, expressways, major, arteries, minor roads, and local streets. Due to car ownership growing rapidly, road transportation problem is becoming significant. The problems are as follows:

- Poor inter-city road network connection
- Lack of road functional classification plan
- Lack of interaction between land-use and traffic functions
- Insufficient traffic capacity

**Solutions:**

(Problem 2, Chinese Taipei)

- Undertake eighteen regional road network master plans around Taiwan
- Coordination of urban planning, ex. Control land-use intensity on the major arteries
- Enhance traffic control regulations

**Achievements:**

(Problem 2, Chinese Taipei)

- Smooth road network transportation
- Increase road capacity by deleting curb parking space
- Increase traffic safety

**Difficulties:**

(Problem 2, Chinese Taipei)

- Construction funds
- Urban planning process needs much time

Problem 2: *Improvement of road network and traffic safety facilities*

**Specific Problem and its Description:**

(Problem 2, Chinese Taipei)

Functional classification of road and coordination among authorities:

Due to the land resource is limited, the functional classification of road network is much more important in urban area. Since we can separate through traffic and local traffic by some control devices (separation, signal etc.) according the classification of road function, the conflict on these two different traffics can be reduced effectively. However, it is difficult to identify the function of the existing roads and to classify into several categories. In addition to the functional classification, the coordination between the road networks such as freeways, expressways, major streets, minor streets, local streets is also a difficult task. There are some main factors described in the following:

- Land-use that mix the residential area and business area results in multi-objective activities at CBD (Central Business District).
- The criteria and standard of function identification is inappropriate.
- The high percentage of motorcycle in the traffic flow increases the complication of road management.
- The identification between through-traffic and local-traffic for each road is not easy.
- There is not enough information related with road and traffic for planners and traffic engineers to study the required functions of road network.

**Solutions:**

(Problem 2, Chinese Taipei)

- Re-evaluating the function of the existing road networks.
- Establishing the “pedestrian based traffic “ concept and establishing the land space plan.
- Studying the trip characteristic and modal application of land-use that mix the residential area and business area.
- Establishing the criteria and standard of the classification of road function.
- Establishing database management system of the road and traffic.
- Training of traffic engineers who plan road network and design traffic control devices.

**Achievements:**

(Problem 2, Chinese Taipei)

- The expressway network are planned (total one hundred kilometers)
- There are totally thirty kilometers of exclusive-bus-lanes, which are set in seven trunk roads
- Fifty-five bus lines form the Grid Bus Network
- The MRT network of first stage is built and the follow-up MRT network is

under construction

- The safety and efficiency of traffic are improved
- The quality of life is improved

**Difficulties:**

(Problem 2, Chinese Taipei)

- High Cost
- Lack of skills and resources
- Change of land use
- Lack of expertise



Problem 2: *Improvement of road network and traffic safety facilities.*

**Specific Problem and its description:**

(Problem 2, Chinese Taipei)

- Circled railway system separates downtown and urban.
- In the downtown area, traffic jam at roads near the entrance and exit of freeway.
- Because of high traffic loading, road system can not offer full-convenience service.

**Solutions:**

(Problem 2, Chinese Taipei)

- Build railway underground to eliminating level crossings to improve road traffic situation.
- Build expressway to connect freeway to reduce traffic jam from freeway.
- According to urban planning and government budge, build new roads year by year.

**Achievements:**

(Problem 2, Chinese Taipei)

**Difficulties:**

(Problem 2, Chinese Taipei)

- High cost.
- Lands for road construction can not get easily.

Category B: Highway and Traffic Engineering

(Chinese Taipei)

Problem 2: *Improvement of road network and traffic safety facilities.*

**Specific Problem and its Description:**

(Problem 2, Chinese Taipei)

To evolve some facilities to meet recent needs.

These facilities include control center, management section, Intelligent Transportation System, traffic signs, and so on.

**Solutions:**

(Problem 2, Chinese Taipei)

- Establish better standards.
- Improve design and planning.

**Achievements:**

(Problem 2, Chinese Taipei)

- Upgrade effect of management.
- Alleviate overload of traffic flow on expressway.

**Difficulties:**

(Problem 2, Chinese Taipei)

- Cost.
- Need to coordinate among related agencies and groups.

Category B: Highway and Traffic Engineering

(Chinese Taipei)

Problem 2: *Improvement of road network and traffic safety facilities*

**Specific Problem and its Description:**

(Problem 2, Chinese Taipei)

Variable application of geometric design and standards for urban roads.

**Solutions:**

(Problem 2, Chinese Taipei)

-Establish standards for design and planning.

**Achievements:**

(Problem 2, Chinese Taipei)

-"A standard for urban road design in Taiwan" had been published.

**Difficulties:**

(Problem 2, Chinese Taipei)

-Lack of legislation and cannot enforce related agencies to obey.

*Problem 2: Improvement of road network and traffic safety facilities*

**Specific Problem and Its Description:**

(Problem 2, Thailand)

Inter-city Motorway System development:

Subject to the inter-city Motorway Master Plan, the Department of Highways has proceeded to construct the high standard and control access highway all over the country at the distance of approximately 4152 kilometers. At present, Department of Highways has opened two inter-city Motorways, namely Bangkok-Chonburi (new highway) in a distance of 82 kilometers and Outer Ring Road (Eastern Portion) in a distance of 64 kilometers. However, there are some problems relating to techniques and safety facilities occurred during the construction of these two routes and after the opening to traffic, as follows:

- Some mistakes in the design of passageway and interchange.
- Fencing barrier is not high enough to obstruct people and animals interfering the traffic.
- Traffic signals are not sufficient and partly installed in unsuitable location.
- Most drivers use higher speed than the limit.
- Some truck driver take drugs and alcohol.

**Solutions:**

(Problem 2, Thailand)

- Need to collect mistake from the project for further improvement.
- Require training course for drivers from both public and private sector.
- Require speed, drug and alcoholic checking of drivers.
- Require monitoring and perfectly improving traffic signals.
- Require more strict legal aspect and higher penalty (especially the production and usage of amphetamine).

**Achievements:**

(Problem 2, Thailand)

- The accident and road transportation safety data are completely collected to improve the prevention continuously and systematically.

**Difficulties:**

(Problem 2, Thailand)

- Incapability because of being new formed agency.
- Government policy is discontinuous and sometimes unsuitable under the circumstances.
- Improper regulations lead to slow-proceeding project.
- Limit of budget to support the project.
- Limit of well-knowledge personnel because of lower salary.
- Limit of modern equipment, facilities and technology affect directly to efficiency and quality of work.

Problem 3: *Roadside cut slope management*

**Specific Problem and its Description:**

(Problem 3, Canada)

- Finding environmentally friendly solutions to erosion of materials as a result of highway construction activities.
- Sharp rock cuts on divided motorways are potentially hazardous in run off road crashes.
- Slope stability issues in road and bridge construction in sensitive clay soils.
- Revegetation of sandy slopes following road construction.
- How to develop warrants for the use of guide rails on embankment slopes.

**Solutions:**

(Problem 3, Canada)

- Hydroseeding and harrowing the soil.
- Rock cuts on some divided motorways are being rounded or sections of roads with rock cuts are being filled in with soil.
- Structural concrete diaphragm walls in conjunction with cement bentonite ground water cutoff wall.
- Use sedge and grass species for revegetation.
- Use computer program designed specifically to evaluate embankment side slopes and guide rail installations.

**Achievements:**

(Problem 3, Canada)

-Several reports which document case studies of *Roadside cut slope management* practices in Canada are listed below. Complete bibliographical information and detailed abstracts of these studies are available on CD-ROM or via the Internet from the International Road Research Database (IRRD), an international working group comprised of Organization for Economic Cooperation and Development (OECD) member countries. (Internet address : [www.oecd.org/dsti/sti/transport/road/stats/IRRD/IRRD.HTM](http://www.oecd.org/dsti/sti/transport/road/stats/IRRD/IRRD.HTM)). These studies include:

- Environment Friendly Solutions to Erosion Control in Alberta.
- Manual of Control of Erosion and Shallow Slope Management.
- Freeway Construction Techniques in Areas of Sensitive Clay Soils : Highway 416 Case Study.
- New Design Method for Reinforced Sloped Embankments.
- The Effectiveness of Surficial Erosion Control Products
- Comparative Evaluation of the Effectiveness of Erosion Control Materials.

-Stresses and Deformations in a Reinforced Soil Slope

-Benefit-Cost Analysis of Flatter Embankment Slopes.

**Difficulties:**

(Problem 3, Canada)

-Some methods of *Roadside cut slope management* are very expensive.

Problem 3: *Roadside cut-slope management*

**Specific Problem and its Description:**

(Problem 3, Republic of Korea)

In Korea, mountains account for approximately 70% of the total area. Accordingly, there are many cut-slopes along the roads. For this reason, rockslides and landslides are a common occurrence. The specific problems are as follows:

- Considering the adverse economic impact, insufficient investigation and efforts are being conducted on reducing the angle of the slope along roadsides.
- Soft soil of the slope worsens road safety.
- Falling rocks cause frequent accidents.

**Solutions:**

(Problem 3, Republic of Korea)

- It is necessary to cut more gentle slopes along roadsides.
- In order to ensure a more solid slope, additional safety measures - sodding, brickworks, and wire netting - should be employed.
- Removal of fallen rocks from roads should be speedier.

**Achievements:**

(Problem 3, Republic of Korea)

- Improved safety of roads with cut-slopes
- Systematic maintenance of cut-slopes
- Improved traffic flow through prompt removal of fallen rocks

**Difficulties:**

(Problem 3, Republic of Korea)

- Major funding would be required to conduct detailed investigation and design.
- The vast number of cut-slopes throughout the nation makes it difficult to devise and establish adequate measures within a short timeframe.

Problem 3: *Roadside cut slope management*

**Specific problem:**

(Problem 3, Mexico)

Control of the cut slopes in the adjacent strips of the road (landslides and slidings on the roads):

Due to the topography of the country, many of the Mexican highways are located on mountainous zones which causes that a great amount of cuts and fillings, in many cases of considerable height. In addition, in these zones, generally, there are intense precipitations during the summer that cause the material fall. On the other hand, the great diversity of the grounds along the Mexican territory makes difficult the adoption of procedures generalized for their processing.

The landslides are an important potential danger and happen frequently on the Mexican roads.

**Solutions:**

(Problem 3, Mexico)

- Suitable warning signals.
- To maintain appropriate minimum slopes.
- Use of berms and works of earth containment.
- Improvements in drainage works.
- Use of vegetation and meshes.
- Improvement on the stability studies of slopes.

**Advances:**

(Problem 3, Mexico)

- Continuously treatment works of slopes located on the mountainous zones that are performed.
- The walls have been used.
- Containment methods with vegetation and meshes with concrete are performed.

**Difficulties:**

(Problem 3, Mexico)

- Lack of technical and monetary resources.
- Great ground diversity and materials on the national territory.



Problem 3: *Roadside cut slope management*

**Specific problem:**

(Problem 3, Mexico)

Control of cut slopes in the adjacent strips of road (settle on the rolling surface):

Due to the topography of the country, many of the Mexican highways are located on mountainous zones which causes that have a great amount of cuts and fillings, in many cases of considerable height. With the time some of the fillings of high altitude have experimented important settle that are translated in a rolling surface with discontinuities that generates dangerous situations, in some cases have caused serious consequences accidents.

**Solutions:**

(Problem 3, Mexico)

- To promote and to reinforce the studies of mechanical grounds on the roads works.
- To improve the works of drainage in highways constructed in mountainous zones.
- To detect and to repair the sit

Problem 3: *Roadside cut slope management*

**Specific Problem and its Description:**

(Problem 3, New Zealand)

1. Slips due to insufficient vertical slope in high embankments

**Solutions:**

(Problem 3, New Zealand)

1. Maintain minimum required slopes, berms, etc. wherever possible - Highly successful.
2. Grassing/seeding - Moderately successful.
3. Building retaining structures - Highly successful.

**Achievements:**

(Problem 3, New Zealand)

1. Slope protection is an item included in most major construction work and the day- to-day maintenance. The method of slope protection is based on feasibility studies depending on a number of factors such as nature of the problem, soil conditions, topography, economics etc. Generally the solutions seem to be working well.
2. See above for assessments of effectiveness of solutions.

**Difficulties:**

(Problem 3, New Zealand)

1. Minimum required slopes, berms etc depends on availability of road reserve/land.
2. Grassing/seeding depends on ground conditions/steepness of embankment.
3. Retaining structures are expensive.

Problem 3: *Roadside cut slope management*

**Specific Problem and its Description:**

(Problem 3, New Zealand)

2. Embankment slips due to unstable ground conditions

**Solutions:**

(Problem 3, New Zealand)

1. Advance warning to traffic on condition of the area by posting signs - Highly successful.
2. Improve stability of soil - Moderately successful.
3. Divert upstream surface drainage away from the embankment - Moderately successful.
4. Provide/improve sub-soil drainage - Moderately successful.
5. Building retaining structures/gabion walls (Gabion walls are a commonly-used retaining structure to prevent embankment slips. They are PVC-coated-steel mesh cages that are filled with rock boulders) - Highly successful.

**Achievements:**

(Problem 3, New Zealand)

1. See above for assessments of effectiveness of solutions.

**Difficulties:**

(Problem 3, New Zealand)

1. It is a continuing challenge to erect appropriate signs that will attract the attention of road users. Correct techniques for signage and placement must be used.
2. Improving soil stability depends on feasibility studies.
3. Diversion of upstream drainage requires frequent maintenance.
4. Provision/improvement of sub-soil drainage is expensive.
5. Retaining structures are expensive.

Problem 3: *Roadside cut slope management*

**Specific Problem and its Description:**

(Problem 3, New Zealand)

3. Surface soil erosion and deposit on the road shoulder/carriageway making the road slippery.

**Solutions:**

(Problem 3, New Zealand)

1. Advance warning to traffic on road condition - Highly successful.
2. Improve upstream land surface drainage and maintenance/improvement of roadside drainage - Highly successful.
3. Surface grouting - Highly successful.
4. Grassing/seeding - Highly successful.

**Achievements:**

(Problem 3, New Zealand)

1. See above for assessments of effectiveness

**Difficulties:**

(Problem 3, New Zealand)

1. It is a continuing challenge to erect appropriate signs that will attract the attention of road users. Correct techniques for signage and placement must be used.
2. Frequent maintenance required of improved upstream land surface drainage.
3. Surface grouting is expensive.
4. Grassing/seeding requires frequent maintenance.

Problem 3: *Roadside cut slope management*

**Specific Problem and its Description:**

(Problem 3, New Zealand)

4. Falling rock boulders from embankments

**Solutions:**

(Problem 3, New Zealand)

1. Advance warning to traffic - Highly successful.
2. Regular inspections and removal of loose boulders from cut slopes - Moderately successful.
3. Pressure grouting - Moderately successful.

**Achievements:**

(Problem 3, New Zealand)

1. See above for assessments of effectiveness

**Difficulties:**

(Problem 3, New Zealand)

1. It is a continuing challenge to erect appropriate signs that will attract the attention of road users. Correct techniques for signage and placement must be used.
2. Boulders are more likely to dislodge in rainy season but frequently there is no advance warning that this will occur.
3. The effectiveness of inspections depends on the quality and frequency of the inspection.
4. Pressure grouting is expensive.

Problem 3: *Roadside Cut Slope Management.*

**Description of the problem:**

(Problem 3, *Papua New Guinea*)

1. Slips due to insufficient vertical slope in high embankments.
2. Embankment slip due to unstable ground conditions resulting from the weather.

**Description of Solutions:**

(Problem 3, *Papua New Guinea*)

1. Maintain minimum required slopes, berms, etc wherever possible
2. Grassing or vegetation.
3. Building retaining structures.
4. Advance warning to traffic condition of the area of posting.
5. Improve stability of soil.
6. Provide or improve drainage.

**Difficulties:**

(Problem 3, *Papua New Guinea*)

1. Depends on the ground condition and steepness of slope or embankment.
2. Heavy rainfall all year round.
3. Expensive.

Problem 3: *Roadside Cut Slope Management*

**Specific Problems and its Description:**

(Problem 3, Peru)

Several roads have been built in the middle of the slope and in courts surrounded by the topography of our soil, by which the Andes Chain crosses, which is in constant movement producing rocks slides.

There are also unstable slopes that create the displacement of large volumes of land, that completely close the vehicular traffic.

**Solutions:**

(Problem 3, Peru)

- To strengthen the Road Safety Program, taking into account slopes, forestation and other activities.
- Studies to stable slopes have been undertaken in landslide areas.
- There are Chief Departments charged of the roads routine and periodical maintenance.

**Achievements:**

(Problem 3, Peru)

- Accidents are prevented or the road is closed.
- A timely response of the Chief Departments, which have the maintenance machinery and personnel.

**Difficulties:**

(Problem 3, Peru)

- To solve these emergencies an appropriate equipment is needed. However it happens very often that such an equipment is not budgeted.

Category B: Highway and Traffic Engineering

(Singapore)

Problem 3: *Roadside cut slope management*

**Specific Problem and its Description:**

(Problem 3, Singapore)

- Rare occurrences of shallow earth slips

**Solution:**

(Problem 3, Singapore)

- Minimum slope gradient is maintained according to the type of soil
- We do not have a proactive maintenance method of slope management. We take action as when we detect slope failure.

**Difficulty:**

(Problem 3, Singapore)

- We don't have many roadside slopes and the occurrence of slope failure is very low. Most of these failures are small and localized and usually happens after a long spell of rainfall.



Problem 3: *Roadside cut slope management*

**Specific Problem and its Description:**

(Problem 3, Chinese Taipei)

Lack of warning information for drivers:

The drivers are lack of information when passing the rock falling and roadbed-running-off zone. The possible factors might be the follows:

- Lack of warning sign.
- Lack of warning marking.

**Solutions:**

(Problem 3, Chinese Taipei)

- Install the warning signs at the front-point, falling point.
- Draw the no-*parking* line and warning land line in the rock falling and roadbed-running-off zone.

**Achievements:**

(Problem 3, Chinese Taipei)

- The warning *sign* and marking can provide the drivers more information about the rock falling zone and drive as soon as possible when passing these zone, it would make drivers more safety and reduce the injure events.

**Difficulties:**

(Problem 3, Chinese Taipei)

- For the limited financial resources, it can not be improved for all rock falling and roadbed-running-off zone.

Problem 3: *Roadside cut slope management*

**Specific Problem and its Description:**

(Problem 3, Chinese Taipei)

- Slips are due to insufficient vertical slope and unstable ground condition in cut slope section.
- Settlements are due to high underground water-table in both excavation and embankments roadbed.
- It takes time to remove the rock and reconstruct the road.

**Solutions:**

(Problem 3, Chinese Taipei)

- Using earth/rock-anchor or Retaining-wall to resist the cut-slope sliding, grouting surface of rock slope and using grillage-beam to protect the cut-slope.
- Using sand-pile, pervious pipe and sand blanket under roadbed to improve it.
- Remove the falling rock in 24 hours.

**Achievements:**

(Problem 3, Chinese Taipei)

- Minimize the influence of the falling rock and the running-off of the roadbed to the traffic flow and road user's safety.

**Difficulties:**

(Problem 3, Chinese Taipei)

Problem 3: *Roadside cut slope management.*

**Specific Problem and its Description:**

(Problem 3, Chinese Taipei)

Roadside cut slopes exist in expressways through the mountainous terrain.

**Solutions:**

(Problem 3, Chinese Taipei)

- Exhaustively collect geological data.
- Thoroughly analyze cut slopes problem.
- Appropriately design protection measures on slope surfaces.

**Achievements:**

(Problem 3, Chinese Taipei)

- Minimize the rock falls of debris flows occurred in the roadside of expressway.

**Difficulties:**

(Problem 3, Chinese Taipei)

- Right-of-way limitation.
- High cost.

Problem 3: *Roadside cut slope management*

**Specific Problem and Its Description:**

(Problem 3, Thailand)

1. During the rainy season, highway slopes in mountainous area of northern, southern and northeastern region of Thailand are damaged through soil erosion and landslide.

Soil erosion and landslide are induced the problems as follows:

- Damage of cut slopes and embankment slopes
  - Blocking the traffic flow
  - Annual budge
  - Environmental impact of the area
2. Knowledge and understanding on preventive maintenance and remedial measures on highway slopes protection of the local responsible personnel are restrictive.

**Solutions:**

(Problem 3, Thailand)

1. Soil erosion and landslide control should be performed during the stage of construction.
2. Application of the vetiver grass technology in slope stabilization, erosion and sediment control.
3. In 1996, Department of Highways designated a committee on the Erosion and Land slide Control for Highway Maintenance. The committee to coordinate all local personnel, activities and transfer of technology on slope protection works, to evaluate the results obtained.

**Achievements:**

(Problem 3, Thailand)

1. Since 1996, more than 122 damaged slopes caused by erosion and landslide on 28 highway have been investigated and redesigned by the Committees.
2. During the year 1999, the Committee on the Erosion and Landslide Control for Highway Maintenance under Department of Highways set up four erosion and landslide control training course for local personnel and the total number of trainees are 266 persons.

**Difficulties:**

(Problem 3, Thailand)

- Due to economic crisis Thailand is facing, the highway maintenance budget has been cut down.

Problem 4: *Speeding*

**Specific Problem and its Description:**

(Problem 4, Canada)

- Excessive speed or driving too fast for the road conditions were cited in almost 25% of single vehicle crashes in which the driver was killed.
- Speeding is often associated with other 'high risk' driver behavior such as non-use of seat belts, driving after drinking and running red lights.
- In the absence of any other obvious descriptive elements to explain traffic collision occurrences, police officers tend to include 'speeding' as a contributing factor on crash report forms when in fact it may not always be the case. Consequently, the true magnitude of speeding as a road safety problem may not be known.

**Solutions:**

(Problem 4, Canada)

- Utilization of public education campaigns to educate motorists to the dangers of speeding and the overall societal and health costs resulting from this behavior.
- Increased police enforcement.
- Educate police to some of the other problem areas by providing them with summary statistics for major traffic safety issues; e.g. impaired and unbelted occupant casualties.
- Introduce more severe penalties, both driving restrictions and fines, for recidivists.
- Introduce mandatory reeducation programs for habitual offenders aimed at changing driver behavior.
- Post signs on major roadways outlining the size of fines issued to drivers convicted of speeding.

**Achievements:**

(Problem 4, Canada)

- To reduce the incidence of aggressive driving, some Canadian jurisdictions have introduced escalating or discriminatory fines for drivers convicted of speeding in areas designated as community safety zones.
- Some jurisdictions have introduced 'photo radar' as a deterrent to speeding.
- All jurisdictions use a variety of public education campaigns to alert drivers to the dangers of speeding and to the health and societal costs of this behavior.
- Speeding was one of the major issues identified by a national task force on high risk drivers. The task force recently used the results of a questionnaire completed by road safety stakeholders to define the profile of high risk drivers

This profile will be used to establish effective approaches to modifying high risk driving behaviors, including speeding.

**Difficulties:**

(Problem 4, Canada)

- The true extent of the 'speeding' problem is hard to define. The level of enforcement, which varies according to resources available, determines the number of recorded citations, and vice-versa.
- Public education campaigns aimed at curbing speeding are expensive. Funding necessary for these campaigns is not always available.
- Resources required for increased enforcement are difficult to obtain or unavailable.
- Photo radar has proven to be extremely unpopular in some jurisdictions.
- Resources required for mandatory reeducation programs for habitual offenders may be difficult to obtain.

Category C: Behavior

(Japan)

Problem 4: *Speeding*

**Specific Problem and its Description:**

(Problem4, Japan)

Unsafe Drivers:

Unsafe Drivers repeatedly violate the Road Traffic Law or cause traffic accidents. The possible factor might be the follows:

- They are not eliminated from road traffic.
- They do not understand the danger of speeding.
- They do not feel their speeding.

**Solutions:**

(Problem4, Japan)

- Speed enforcement and administrative punishment
- Traffic safety education
- Road markings which make drivers feel their speeding by the optical illusion.

**Achievement:**

(Problem4, Japan)

- Traffic accidents in high speed are decreasing.

**Difficulties:**

(Problem4, Japan)

- Many people feel only that they are unfortunate when they are enforced.
- Education does not have an immediate effect.
- It is difficult to make use of road marking in trunk roads.

Problem 4: *Speeding*

**Specific Problem and its Description:**

(Problem 4, Republic of Korea)

In Korea, speeding is one of the most frequent traffic violations. Taxi drivers in cities and truck drivers in rural areas are under economic pressure to reduce travel time, resulting in excessive speeding. In addition, as road structure has been greatly improved by the “straightening” and expansion of roadways, the opportunity for speeding has likewise increased. The following are major speeding-related problems in Korea:

- There is insufficient equipment and manpower for crackdowns on speeding violators.
- There are no established speed limits for combined-use (car and pedestrian) roads.
- Additional funding to purchase more and better equipment is lacking.

**Solutions:**

(Problem 4, Republic of Korea)

- Installment of more cameras to detect and deter speeding
- Introduction of a graduated speed limit system and multi-tiered penalties for speeding
- Improvement of traffic safety facilities to prevent speeding
- Launching of public campaigns and driver training programs

**Achievements:**

(Problem 4, Republic of Korea)

- Reduced occurrence of speeding and, consequently, speeding-related accidents

**Difficulties:**

(Problem 4, Republic of Korea)

- Install new safety facilities for preventing speeding is difficult.
- Additional funding must be obtained to purchase equipment and increase manpower.
- New control techniques and specialized training programs for police officers are required.



Problem 4: *Speeding*

**Specific problem:**

(Problem 4, Mexico)

Most of the conductors do not respect the speed limits.

This it is a problem that appears on the urban and interurban roads of the country. Some studies show that in the last ones up to 80% of the drivers circulate at speeds above of the established limits. On the other hand, the construction of the road infrastructure with better specifications has caused the indiscriminate increase of speeds.

In this aspect, is possible to indicate that the police action in many cases is insufficient, some cases by lack of resources and in others by the apathy of its elements.

On the other hand, most of the drivers do not know the transit regulations.

**Solutions:**

(Problem 4, Mexico)

- To design more effective methods to vigilance. This applicable to all the types of regulations (physical-mechanical conditions of the vehicles, contamination, etc.), because the application of a control is very deficient.
- To promote general and specific campaigns of road education.
- Establishment of advertising campaigns.
- Establishment of minimum and maximum speeds according with the operation conditions of the road.

**Advances:**

(Problem 4, Mexico)

- Some directed campaigns have been undertaken to reduce this problem.
- On the Roads have been installed allusive signalling regard to the speed limits and other safety recommendations.
- There are diverse initiatives to attack this problem.

**Difficulties:**

(Problem 4, Mexico)

- Little conscience of the society in general.
- Lack of monetary and human resources to reinforce the vigilance and application of the regulations.
- Advertising campaigns from automotive manufacturers that incite the development of higher speeds.

Problem 4: *Speeding*

**Specific problem:**

(Problem 4, Mexico)

Remarkable variability in the operation speeds between vehicles.

The great diversity in the geometric and structural conditions of the ways as well as in the park to vehicular propitious a remarkable disparity in the present speeds in the highways of Mexico. By a side modern vehicles that cross the ways at great speeds and by another one vehicle exist, particularly of load exist in circulation, old and in bad mechanical conditions that circulate at very low speeds. This disparity is accentuated when the last ones are overloaded and/or in road sections, with pronounced slopes which generates operation situations that are dangerous.

**Solutions:**

(Problem 4, Mexico)

- Establishment of minimum and maximum speeds congruent with the operation conditions of the road.
- To oversee that the load vehicles are in good physical-mechanical conditions and that they do not drive with overload.
- To look for mechanisms that allow the renewal of the obsolete vehicular fleet.

**Advances:**

(Problem 4, Mexico)

- There are checking and vigilance operatives of the physical-mechanical conditions of the vehicles and the observance of the weights and dimensions regulations.

**Difficulties:**

(Problem 4, Mexico)

- Lack of monetary and human resources to reinforce the vigilance and application of the regulations.
- Reluctance of the motor-carriers to renew its units, particularly those named “truck-man, because of the lack of financial resources.
- Tendency of the motor-carriers to overload its units with the purpose to obtain more money in a short term.

Problem 4: *Speeding***Specific Problem and its Description:**

(Problem 4, New Zealand)

1. Drivers lose control, particularly on bends

**Solutions:**

(Problem 4, New Zealand)

1. Speed cameras at black-spots, operated by the Police.
2. General enforcement by the Police.
3. Speed advisory signs on curves.
4. Speed limits.
5. Environmental countermeasures such as speed humps and chicanes.
6. Perceptual countermeasures such as lane width restrictions.

**Achievements:**

(Problem 4, New Zealand)

1. The table below shows the percentages of both fatal and injury crashes over the last 9 years where travelling too fast for conditions was a contributing factor.

Year	% of fatal crashes	% of injury crashes
1990	35%	17%
1991	34%	18%
1992	36%	17%
1993	37%	16%
1994	39%	16%
1995	36%	16%
1996	34%	17%
1997	29%	16%
1998	32%	17%

While the percentages of speed-related fatal crashes has reduced slightly over this time, the percentages of injury crashes involving speed has remained relatively constant. Speed still remains a serious road safety problem in New Zealand.

2. An evaluation of the speed camera programme suggested there had been a 23% reduction in crashes at urban speed camera sites and an 11% reduction at rural sites. A trial of hidden speed cameras was recently undertaken in one geographical area in New Zealand. An evaluation of this trial showed a 19% reduction in casualties.
3. Advisory speed signs are installed on curves by the relevant road controlling authority as and when necessary.
4. Recent introduction of a roadside licence suspension regime where the Police

immediately suspend, for 28 days, the driver licences of drivers caught driving more than 50kph over the applicable speed limit.

5. A speed limit rule is under development.

**Difficulties:**

(Problem 4, New Zealand)

1. Limited camera and Police resources.
2. Advisory speed signs are often perceived as an underestimation of the speed capable of negotiating the curve and therefore disregarded.
3. Speed limits are often disregarded.
4. Environmental countermeasures such as speed humps and chicanes are expensive and some may actually cause crashes.

Problem 4: *Speeding*

**Specific Problem and its Description:** (Problem 4, New Zealand)

2. As speed increases the severity of an injury in a crash increases

**Solutions:** (Problem 4, New Zealand)

1. Nationwide television, radio and billboard advertising campaign with the slogan - "The faster the speed, the bigger the mess".
2. Vehicle design countermeasures.

**Achievements:** (Problem 4, New Zealand)

1. The "faster you go, the bigger the mess" advertising message formed part of a larger a campaign involving graphic television advertisements and enforcement targeting speed, alcohol and the non-use of seatbelts. An independent evaluation of this campaign indicated that it resulted in savings of over 100 lives and over 1000 serious injuries in the first 2 years. While the larger reductions in alcohol related casualty crashes were obtained, smaller but significant reductions in speed-related serious casualty crashes also resulted.
2. Six rules relating to aspects of vehicle occupant protection have been developed and are currently in use.

**Difficulties:** (Problem 4, New Zealand)

1. Speeding is currently not widely accepted by the public as a road safety problem.
2. Advertising is expensive.
3. Vehicle design countermeasures are available but they are not a short-term measure.
4. While there are 'pedestrian friendly' features in vehicle design, these will not overcome all speed-related pedestrian injuries.

Problem 4: *Speeding*

**Specific Problem and its Description:** (Problem 4, New Zealand)

3. As speed increases braking distance is reduced, causing difficulties at intersections

**Solutions:** (Problem 4, New Zealand)

1. Engineering countermeasures (sight distances).
2. Improvements in brake technology (eg ABS brakes).

**Achievements:** (Problem 4, New Zealand)

1. Engineering solutions are carried out subject to funding priorities.
2. Two brake rules (one for light vehicles and one for heavy vehicles) are currently under development.

**Difficulties:** (Problem 4, New Zealand)

1. Engineering solutions can be expensive.
2. Improved brake technology is available but it is not a short-term measure.

Problem 4: *Speeding*

**Specific Problem and its Description:**

(Problem 4, New Zealand)

4. Speed often occurs in combination with drink-driving.

**Solutions:.**

(Problem 4, New Zealand)

(Same as solutions under *Impaired Driving*)

1. Compulsory breath-testing (CBT) enforcement – targeting “anyone, anytime, anywhere”.
2. Use of hard-hitting and graphic advertisements.
3. Legal alcohol limit of 80mg alcohol per 100ml blood for adults (aged 20 or more).
4. Lower BAC of 30mg alcohol/100ml blood for young drivers (under the age of 20).
5. Graduated penalties – higher penalties for repeat drink-driving offenders.
6. Roadside licence suspension applied by the Police for those caught with high breath or blood alcohol levels and those who refuse to supply a blood specimen.
7. Roadside vehicle impoundment applied by the Police to disqualified drivers many of whom are likely to be disqualified as a result of drink-drive offending.
8. Funding of Community Alcohol Action Projects and other community-based projects which are aimed at reducing alcohol-related crashes in communities by raising awareness and increasing education, enforcement and publicity.

**Achievements:**

(Problem 4, New Zealand)

(Same as achievements under *Impaired Driving*)

1. CBT has been established as a key feature of the Police alcohol enforcement strategy and is well-endorsed by the public.
2. Alcohol impaired driving was targeted in a larger a campaign involving graphic television advertisements and enforcement that also targeted speeding and the non-use of seatbelts. An independent evaluation of this campaign indicated that it resulted in significant savings of over 100 lives and over 1000 serious injuries in the first 2 years. The Campaign was credited with bringing about significant reductions in alcohol related serious casualty crashes. In the first year of the campaign, a reduction of 16% in alcohol-related serious casualty crashes in urban areas was recorded. In the second year, a 33% reduction in such crashes were reported in urban areas and a 32% reduction in rural areas.
3. Mandatory carriage of driver licences was recently introduced along with

photo driver licences. Photo driver licences are being phased in over the current year and for the first part of next year. These two countermeasures should help overcome previous problems the Police encountered establishing the correct identity and age of young drivers for the enforcement of the lower alcohol limits that apply to drivers under the age of 20.

4. Graduated penalties for repeat drink-driving offences were recently introduced. This involves a third and subsequent drink-drive offence that has more severe penalties.
5. Roadside licence suspension targeting highly intoxicated drivers was recently introduced. Drivers who are detected by the Police with alcohol levels more than twice the adult legal limit and those who refuse to supply a blood specimen have their licences immediately suspended by the Police for 28 days. This penalty is additional to any penalty the court imposes for this offence.
6. Roadside vehicle impoundment was recently introduced. This targets disqualified drivers, drivers whose licences are suspended through demerit points or as a result of the licence suspension regime mentioned above, and unlicensed drivers who have previously been forbidden to drive until licensed. It indirectly captures serious traffic offenders such as drink-drivers since there is a high overlap between drivers convicted of drink-driving and driving while disqualified. Vehicle impoundment is applied administratively by the Police. Impounded vehicles are seized and towed to an impoundment yard where they are stored for 28 days. The vehicle's owner is liable for the towage and storage costs.
7. Funding of Community Alcohol Action Projects and other community-based projects which aimed at reducing alcohol-related crashes in communities by raising awareness and increasing education, enforcement and publicity.

**Difficulties:**

(Problem 4, New Zealand)

(Same as difficulties under *Impaired Driving*)

1. CBT requires on-going intensive resources including specialised equipment.
2. CBT is generally conducted in urban areas with high traffic volume, as it is difficult to create same level of deterrence impact in rural areas.
3. Hard-hitting advertising requires ongoing resources and is subject to occasional criticism from public and liquor/hospitality industry.
4. While the current legal blood alcohol limit is 80 mg, it is difficult to target those who are impaired at BAC levels below 80mg.
5. Inability to market the 30 mg limit for under 20 year old drivers as a "zero limit".



6. Graduated penalties are more expensive to enforce (eg higher court costs since more people may opt for defended hearings and higher costs to the corrections system resulting from more expensive and longer sentences such as prison terms).
7. Limited control over how courts will apply the higher penalties.
8. New sanctions require legislative change which is time consuming.
9. Community Alcohol Action Programmes require on-going funding resources and constant monitoring.
10. Difficult to evaluate the effectiveness of community-based programmes.

Problem 4: *Speeding*.

**Specific Problem and its Description:** (Problem 4, Papua New Guinea)

1. Disregard of speed limits within specified speed limits.
2. Poor road alignment exists in the curve sections.
3. Drivers loose control of vehicle on bends, etc.
4. As speed increases, severity of injury in an accident increases.
5. As speed increases braking distance is reduced.
6. Speed often occurs in combination with drink driving or whilst impaired.

**Solutions:** (Problem 4, Papua New Guinea)

1. Severe punishment by the level of exceeding speed.
2. General enforcement.
3. Speed zoning, speed limits, advisory signs on curves, etc.
4. Environmental countermeasures such as speed humps, lane width restrictions, etc.
5. Engineering countermeasures (sight distances)
6. Vehicle design countermeasures.
7. Advertising campaign-speed kills.
8. Public campaigns and driver education.
9. Driver's license demerit point system.

**Difficulties:** (Problem 4, Papua New Guinea)

1. Speed limits are often disregarded.
2. Speeding is not widely accepted by the public as a road safety problem.
3. Vehicle design countermeasures are expensive.
4. Engineering countermeasures are expensive.
5. Shift in the community behavior on speeding targeted at the young in ages is only indicative when these reach the driving age-time delay to achieve a shift in behavior.

Problem 4: *Speeding*

**Specific Problem and its Description:**

(Problem 4, Peru)

- Irresponsibility when driving a vehicle doing it without dire care and exceeding the speed limit.
- Some people drive under the influence of alcohol or drug.
- Reckless driving is a determining factor for traffic accidents.

**Solutions:**

(Problem 4, Peru)

- To organize 24 hour squads to control the speed of the vehicle.
- To impose preventive fines ( for the first time ) making drivers conscious of the risks taking note of the vehicle's plate, the name of the driver and his/her number license.
- To created a database with information of the infractors (driver's record) to set it as a background.
- TV and graphic advertisements related to the consequences of traffic accidents.
- To coordinate with the staff charged of administering the road tolls to inform the drivers about the weather in the area through the sealing of the toll tickets .
- To stand boards with advisement related to the compliance and respect of the traffic and Road Security Road.
- To organize campaigns in the roads

**Achievements:**

(Problem 4, Peru)

- To Prohibit drivers from driving under the influence of alcohol and drugs.
- To reduce traffic accidents in a regular percentage.
- To make drivers conscious so that they respect speed limits.

**Difficulties:**

(Problem 4, Peru)

- It is difficult to control operations since the Highways Policeman units at national level have only 30% speed-control radar pistol to control the velocity.
- Lack of resources for the implementation of advertisement and guidance.
- In the approach roads to the capital and major cities of the country the demographic development at both sides of the roads can be appreciated causing narrowing of the roads.
- Lack of appropriate roadsigns in most of the sections of the National Road Network.

Problem 4: *Speeding*

**Specific Problem and its Description:**

(Problem 4, Singapore)

- Speeding is the main cause of road accidents

**Solution:**

(Problem 4, Singapore)

- Enforcement - Installation of automatic speed camera system and the use of mobile stealth cameras
- Enhanced penalties – immediate suspension of driving licences for motorists exceeding speed limit of a road by 60km/h
- Mandatory installation of speed limiters on heavy vehicles exceeding 12 tonnes in unladen weight and buses exceeding 10 tonnes
- Annual anti speeding campaign highlighting the dangers of speeding

**Difficulties:**

(Problem 4, Singapore)

- Limited cameras and Police resources

Problem 4: *Speeding*

**Specific Problem and its Description:**

(Problem 4, Chinese Taipei)

- Speeding is common behavior of most drivers
- Speeding enforcement is relatively hard by walking policemen
- As speed increases the severity of an injury in a crash increase

**Solutions:**

(Problem 4, Chinese Taipei)

- More installation of speed enforcement camera
- Severe punishment by level of exceeding speed
- Speed cameras at black-spots, operated by the police
- More public campaign and education to the drivers

**Achievements:**

(Problem 4, Chinese Taipei)

- The fatalities of speeding accidents are decrease apparently

**Difficulties:**

(Problem 4, Chinese Taipei)

- Speeding is hard to prove in real accident
- Limited camera and police resources

Problem 4: *Speeding*

**Specific Problem and its Description:**

(Problem 4, Chinese Taipei)

Intentional violation of traffic regulations:

The cases of speeding have not been decreased in recent years. The possible factors might be the follows:

- Road users don't think that they are so unlucky to be caught by the police.
- Some drivers do not obey a traffic rule because they think the speed limit is not reasonable for certain roads.
- Road users don't well understand the serious consequence from their illegal traffic behavior.

**Solutions:**

(Problem 4, Chinese Taipei)

- Increase the amount of fine for speeding.
- Educate people and show them the possible consequence caused by speeding.

**Achievements:**

(Problem 4, Chinese Taipei)

-

**Difficulties:**

(Problem 4, Chinese Taipei)

- Police manpower and adequate instruments are not sufficient to enforce the regulations.
- It is difficult to evaluate the effectiveness of education and to ensure that the education is applied to the specific groups we want to apply.

Category C: Behavior

(Chinese Taipei)

Problem 4: *Speeding*.

**Specific Problem and its Description:**

(Problem 4, Chinese Taipei)

Drivers lose control, particularly on bends.

**Solutions:**

(Problem 4, Chinese Taipei)

-Speed advisory signs on curves.

-Speed limits.

**Achievements:**

(Problem 4, Chinese Taipei)

-We adopt out-of-the-art technology implement to take a photo and get affirmation to inform drivers. In this way, the events of speeding will reduce.

**Difficulties:**

(Problem 4, Chinese Taipei)

-Speed limit often disregarded by drivers.

Problem 4: *Speeding*

**Specific Problem and its Description:**

(Problem 4, Chinese Taipei)

Special groups that are inclined to be speeding:

Several groups are often speeding, for example, taxi, truck and motorcycle.

The drivers of taxi or truck are usually speeding for business. Some motorcyclists like speeding just for fun.

**Solutions:**

(Problem 4, Chinese Taipei)

- Increasing the police manpower in some areas

- Educate drivers of these groups to understand that the safety is more important than the business and fun.

**Achievements:**

(Problem 4, Chinese Taipei)

- Reducing the injury rate and the fatality of the drivers of vehicles.

**Difficulties:**

(Problem 4, Chinese Taipei)

- Some drivers don't like to obey the speed limit.

- Lack of police manpower



Problem 4: *Speeding*

**Specific Problem and Its Description:**

(Problem 4, Thailand)

Speeding is common behavior of most drivers, particularly cars and motorcycles on urban roads and bus and trucks on inter- city roads during the night.

**Solutions:**

(Problem 4, Thailand)

- More enforcement on speed surveillance and severe punishment are undertaken by the police. In addition, more public campaign and education for over speeding and no drug and alcohol taking during the driving are emphasized.
- Road improvement to remind all vehicles passing to reduce the speed, e.g. rumble strip, etc. is available for certain roads.

**Achievements:**

(Problem 4, Thailand)

- Keep monitoring and controlling to the manageable limit.

**Difficulties:**

(Problem 4, Thailand)

- Limit police resources.
- Limit resources to run the campaign.
- Limit resources for improving roads.

Problem 5: *Impaired Driving*

**Specific Problem and its Description:**

(Problem 5, Canada)

- The most current crash data available showed that 39% of all fatally injured drivers and 19% of those seriously injured (of those tested) had been drinking alcohol or were legally impaired prior to crash occurrence. Additionally, 39% all road user fatalities (including vulnerable and non-vulnerable road users) involved alcohol.
- 60% of fatally injured drinking drivers had exceedingly high blood alcohol concentration levels (150 mg % or higher), almost twice the legal limit of 80 mg %.
- Driving after drinking is a safety problem that is associated with other high risk driving behavior, including non-use of seat belts, speeding and running red lights. A recent study showed that nearly three of every four drivers fatally injured in night time crashes was unbelted at the time of crash occurrence.
- Results of a recent national survey of police officers indicated that the length of time required by police to process each impaired driving charge was approximately 3 hours, which in the opinion of many officers was far too long.
- Police perceptions that convictions are hard to obtain due to existing court procedures considerably reduces the likelihood that marginally intoxicated drivers will be charged with impaired driving.
- Many police agencies conduct the majority of their traffic enforcement activities during daylight hours, when traffic is heaviest and not during nighttime hours when the majority of driving after drinking takes place.

**Solutions:**

(Problem 5, Canada)

- Increased police enforcement, particularly at night, increases the likelihood of detection of impaired drivers.
- Educating the public to the hazards and societal costs of driving after drinking through informative public education campaigns.
- Reduce the time required by police officers to lay impaired driving charges.
- In jurisdictions where time constraints and low conviction rates are factors, increase the use of alternative measures such as short term license suspensions, impoundment of vehicles or identification of sober drivers.
- Educate police to the magnitude of the impaired driving problem.

**Achievements:**

(Problem 5, Canada)

- Recent amendments to Canadian Criminal Code have resulted in increased penalties and sentencing options for convicted offenders.
- The Strategy to Reduce Impaired Driving 2001 (STRID 2001), a program involving all provincial and territorial jurisdictions in Canada, has been operational since 1995. The goal of STRID 2001 is to reduce by 20%, over the 1990-1995 baseline figure, the percent of road users killed and seriously injured in crashes involving drinking drivers. The core elements of the STRID 2001 program include enforcement and awareness, legislative and communications initiatives.
- Some of the principal initiatives within the core elements of STRID 2001 that are carried out in selected jurisdictions include:
  - enforcement and awareness campaigns which focus on drinking and driving during holiday periods;
  - mandatory education program for first time offenders, increased suspension periods for subsequent offenders ranging from 3 years for second time offenders to life time suspensions for 3<sup>rd</sup> convictions, with an option to reduce the suspension to 10 years if ignition interlock and treatment are introduced;
  - introduce increased fines or vehicle-based sanctions such vehicle impoundment or seizure for suspended drivers caught driving;
  - plan/develop communications to promote and increase the visibility of STRID 2001;
  - the implementation of server training programs as a condition of establishments maintaining their liquor license;
  - information and education campaigns directed at police, crown prosecutors and the judiciary about the severity of the impaired driving problem;
  - implement administrative license suspensions if drivers are over the legal BAC limit of 80 mg %, at some lower BAC limit or refuses a breath/blood test;
  - remove exemptions for work permits;
  - introduce mandatory assessment and treatment for drinking-driving offenders.
- Since the STRID 2001 program commenced, there has been a 13.3% decrease in the percent of fatally injured drivers who had been drinking and a 9.5% decrease in the percent of those seriously injured.

**Difficulties:**

(Problem 5, Canada)

- True levels of impaired driving are not known as the annual number of charges levied are entirely dependent on the extent of enforcement, which in turn is

dependent on availability of resources and willingness of police officers to lay charges.

- Existing laws and court procedures make convictions for impaired driving difficult to obtain.
- Police perception that convictions are hard to obtain because courts often give greater credibility to defence experts than to officer testimony of a driver level of impairment as well as time and administrative effort required are major deterrents to police officers from more rigorously enforcing drinking driving laws.
- Resources required to finance increased police enforcement are difficult to obtain and not readily available.
- Police officers focus the majority of their enforcement efforts on issuing citations for speeding. This activity limits the time available for other road safety issues such as driving after drinking and non-use of seat belts.
- Many drinking drivers are recidivists or so-called hard core drinkers. Current interventions have little or no effect in deterring this group of road users from driving after drinking. Developing and establishing programs that will be successful deterrents for recidivists may be very difficult to accomplish.

Category C: Behavior

(Japan)

Problem 5: *Impaired Driving*

**Specific Problem and its Description:**

(Problem5, Japan)

Unsafe Drivers :

Unsafe Drivers repeatedly violate the Road Traffic Law or cause traffic accidents. The possible factor might be the follows:

- They are not eliminated from road traffic.

**Solutions:**

(Problem5, Japan)

- Enforcement and administrative punishment:

If a drunk driver is enforced, his license is to be suspended by the police without exception.

- Social punishment:

If public officials cause traffic accidents when they are drunk, they are submitted to disciplinary actions.

**Achievement:**

(Problem5, Japan)

- The number of fatal accidents which drunk drivers cause is decreasing.

**Difficulties:**

(Problem5, Japan)

- Many drunk drivers do not reflect on their drunk driving until they cause accidents.

Problem 5: *Impaired Driving*

**Specific Problem and its Description:**

(Problem 5, Republic of Korea)

Traffic accidents caused by drunk driving have greatly increased every year in Korea. This is attributed to drivers' overconfidence in their driving skills and disregard for the serious dangers of driving while intoxicated. In addition, the geographic coverage of police checkpoints is very limited.

Another problem concerns driver unfamiliarity with road directions at busy intersections, leading to a high frequency of accidents at such locations. Also, as current traffic regulations permit right-hand turns at all intersections, there is a greater risk of collisions with pedestrians at crosswalks and with other vehicles.

**Solutions:**

(Problem 5, Republic of Korea)

- Lowering the legal blood-alcohol level and increasing the penalties for drunk driving
- Improving road signs at intersections and establishing additional traffic safety facilities
- Improving traffic signal systems and related facilities to decrease accidents between pedestrians and vehicles making right-hand turns

**Achievements:**

(Problem 5, Republic of Korea)

- Reduced frequency of accidents caused by drunk driving
- Reduced frequency of accidents involving vehicles and pedestrians at intersections

**Difficulties:**

(Problem 5, Republic of Korea)

- Breathalyzers and related equipment must be improved.
- More effective traffic safety facilities must be developed and constructed.
- Continuous driver training and guidance is needed.

Problem 5: *Impaired Driving*

**Specific problem:**

(Problem 5, Mexico)

Driving under the alcohol effects:

In a great amount of accidents, the drunk drivers are involved. In addition these accidents tend to be with more serious consequences. There is a little conscience of the society with respect to this problem and does not exist a culture to obey the laws and regulations. In addition, the sanctions of the offending are little severe.

**Solutions:**

(Problem 5, Mexico)

- Promotion of effective campaigns directed to dissociate the alcohol consumption with the driving.
- To implement more effective methods.
- To impose more severe legal sanctions to the offending and recidivist.

**Advances:**

(Problem 5, Mexico)

- Oriented campaigns have been made to avoid the combination of alcohol-driving.
- Works in the implementation of coordinated campaigns between diverse dependencies and organizations.

**Difficulties:**

(Problem 5, Mexico)

- Lack of resources for the acquisition and use of modern devices to determine alcohol levels in the blood.
- Permanent massive campaigns urging the alcohol consumption by the producers of wines and liquors.
- Opposition of the wines and liquors producers to adopt measures oriented to the restriction in the alcohol consumption.
- Little conscience and participation of the society in the solution of this problem.

Problem 5: *Impaired Driving*

**Specific problem:**

(Problem 5, Mexico)

Driving under the effects of the fatigue:

The lack of mechanisms adapted for the control and supervision of the hours of service of the drivers of heavy vehicles and the eagerness to obtain more money in the short term, have caused that many of these drivers incur in more hours of service, risking their own life and the one of the others. The vehicles fleets of particular service have not this problem. This problem also appears between the drivers of particular vehicles although has its origin in other causes (e.g. extensive schedules of work) this is minor whit the public transportation drivers. In general, the companies of interurban buses maintain stricter with this and with other operative aspects.

**Solutions:**

(Problem 5, Mexico)

- Design of more effective vigilance methods.
- To set up campaigns oriented to the solution of this problem.
- To set up actions of supervision and to follow the driving time between the motor-carriers companies.
- To support the construction of resting and services areas of the long-haul itineraries.

**Advances:**

(Problem 5, Mexico)

- There are drawing up plans and campaigns destined to the reduction of this problem.
- It has done emphasis in this and in other aspects, mainly between the drivers that transport dangerous materials and wasstes.

**Difficulties:**

(Problem 5, Mexico)

- Little disposition to respect the rulemaking.
- Deficiency of systematic procedures for a suitable control of the hours of service.
- Reluctance by some companies and drivers to adopt this type of measures.
- Resources to invest in recreational and resting areas in the routes of long haul.



Problem 5: *Impaired Driving*

**Specific Problem and its Description:** (Problem 5, New Zealand)

1. High incidence of alcohol-related fatal and injury crashes

**Solutions:** (Problem 5, New Zealand)

1. Compulsory breath-testing (CBT) enforcement – targeting “anyone, anytime, anywhere”.
2. Use of hard-hitting and graphic advertisements.
3. Legal alcohol limit of 80mg alcohol per 100ml blood for adults (aged 20 or more).
4. Lower BAC of 30mg alcohol/100ml blood for young drivers (under the age of 20).
5. Graduated penalties – higher penalties for repeat drink-driving offenders.
6. Roadside licence suspension applied by the Police for those caught with high breath or blood alcohol levels and those who refuse to supply a blood specimen.
7. Roadside vehicle impoundment applied by the Police to disqualified drivers many of whom are likely to be disqualified as a result of drink-drive offending.
8. Funding of Community Alcohol Action Projects and other community-based projects which are aimed at reducing alcohol-related crashes in communities by raising awareness and increasing education, enforcement and publicity.

**Achievements:** (Problem 5, New Zealand)

1. CBT has been established as a key feature of the Police alcohol enforcement strategy and is well-endorsed by the public.
2. Alcohol impaired driving was targeted in a larger a campaign involving graphic television advertisements and enforcement that also targeted speeding and the non-use of seatbelts. An independent evaluation of this campaign indicated that it resulted in significant savings of over 100 lives and over 1000 serious injuries in the first 2 years. The Campaign was credited with bringing about significant reductions in alcohol related serious casualty crashes. In the first year of the campaign, a reduction of 16% in alcohol-related serious casualty crashes in urban areas was recorded. In the second year, a 33% reduction in such crashes were reported in urban areas and a 32% reduction in rural areas.
3. Mandatory carriage of driver licences was recently introduced along with photo driver licences. Photo driver licences are being phased in over the current year and for the first part of next year. These two countermeasures

should help overcome previous problems the Police encountered establishing the correct identity and age of young drivers for the enforcement of the lower alcohol limits that apply to drivers under the age of 20.

4. Graduated penalties for repeat drink-driving offences were recently introduced. This involves a third and subsequent drink-drive offence that has more severe penalties.
5. Roadside licence suspension targeting highly intoxicated drivers was recently introduced. Drivers who are detected by the Police with alcohol levels more than twice the adult legal limit and those who refuse to supply a blood specimen have their licences immediately suspended by the Police for 28 days. This penalty is additional to any penalty the court imposes for this offence.
6. Roadside vehicle impoundment was recently introduced. This targets disqualified drivers, drivers whose licences are suspended through demerit points or as a result of the licence suspension regime mentioned above, and unlicensed drivers who have previously been forbidden to drive until licensed. It indirectly captures serious traffic offenders such as drink-drivers since there is a high overlap between drivers convicted of drink-driving and driving while disqualified. Vehicle impoundment is applied administratively by the Police. Impounded vehicles are seized and towed to an impoundment yard where they are stored for 28 days. The vehicle's owner is liable for the towage and storage costs.
7. Funding of Community Alcohol Action Projects and other community-based projects which aimed at reducing alcohol-related crashes in communities by raising awareness and increasing education, enforcement and publicity.

**Difficulties:**

(Problem 5, New Zealand)

1. CBT requires on-going intensive resources including specialised equipment.
2. CBT is generally conducted in urban areas with high traffic volume, as it is difficult to create same level of deterrence impact in rural areas.
3. Hard-hitting advertising requires ongoing resources and is subject to occasional criticism from public and liquor/hospitality industry.
4. While the current legal blood alcohol limit is 80 mg, it is difficult to target those who are impaired at BAC levels below 80mg.
5. Inability to market the 30 mg limit for under 20 year old drivers as a "zero limit".
6. Graduated penalties are more expensive to enforce (eg higher court costs since more people may opt for defended hearings and higher costs to the corrections system resulting from more expensive and longer sentences such

as prison terms).

7. Limited control over how courts will apply the higher penalties.
8. New sanctions require legislative change which is time consuming.
9. Community Alcohol Action Programmes require on-going funding resources and constant monitoring.
10. Difficult to evaluate the effectiveness of community-based programmes.

Problem 5: *Impaired Driving.*

**Description of the Problem:** (Problem 5, Papua New Guinea)

High incidence of alcohol-related injury and fatal accidents.

**Description of Solutions:** (Problem 5, Papua New Guinea)

1. Use of hard-hitting and graphic advertisement.
2. Higher and increasing range of penalties for repeated drink-driving offenders.
3. Community awareness through school education, enforcement and publicity.
4. Encourage the use of public transport facilities.

**Difficulties:** (Problem 5, Papua New Guinea)

1. Requires ongoing intensive resources.
2. Difficult to launch effective awareness campaigns because of budgetary support.
3. Requires legislative changes.
4. Limited control over how courts will apply higher discretionary penalties.
5. Difficulty in evaluating the effectiveness of the community awareness programs.
6. Lack of the test technique of the dragged and tired driving-how do you measure fatigue?

Problem 5: *Impaired Driving*

**Specific Problems and its Description:**

(Problem 5, Peru)

- Driving for more than 14 hours without stopping.
- Some drivers take alcohol or drug.
- The lack of skill and physical tiredness in some drivers especially in load transportation.

**Solutions:**

(Problem 5, Peru)

- To coordinate permanently with the authorities charged of regulating public and private transportation of passengers or load.
- To organize campaigns to educate people on the Road Regulations.
- To create a database with information of the infractors (driver's record).
- Use TV and graphic advertising.
- To control the domestic departure turns and the nominal list of drivers to control the existence of the driver and co-driver through police operations.
- To carry out training courses for drivers at a national level.
- To make drivers conscious so that they respect speed limits.
- To coordinate with the staff charged of administering the tolls to inform the drivers about the weather in the area through the sealing of the toll tickets.
- To patrol the National Road Network intensively, advising the drivers against any incident that may have taken place in the area.

**Achievements:**

(Problem 5, Peru)

- Traffic accidents for driving under the influence of alcohol or drug will decrease by a regular percentage.
- Each vehicle will be driven by a driver and co-driver.
- Strategic points have been located along The National Road Network, so drivers of load vehicles may be able to park and rest with the custody of a vehicle of The Road Police, reducing with this measure the traffic accidents

**Difficulties:**

(Problem 5, Peru)

- There is no specialized equipment to record information about infractors
- There is no enough money for advertising.
- Some companies have proved to be irresponsible by permitting passengers vehicle and load transportation to operate with deficiencies.
- Lack of road signs in most of the sections of The National Road Network.
- Ignorance of The Traffic standards for Interprovincial Land Transportation of Passengers and Load.
- There are no security implements (cones, triangles, danger lights) so drivers put stones and odd objects on the road and these end by causing accidents.

- Lack of technical reviews to verify the optimum operative state of a vehicle in the roads.

Category C: Behavior

(Singapore)

Problem 5: *Impaired Driving*

**Specific Problem and its Description:**

(Problem 5, Singapore)

- Drink Driving
- Alcohol related injury and fatal accidents

**Solution:**

(Problem 5, Singapore)

- Enhanced penalties for repeat drink driving offenders
- Continual enforcement through road blocks especially during the festive seasons
- Annual campaigns and regular education programmes

**Difficulty:**

(Problem 5, Singapore)

- Requires ongoing Police resources

Problem 5: *Impaired Driving*

**Specific Problem and its Description:**

(Problem 5, Chinese Taipei)

- High incidence of alcohol related injury and fatal crashes
- The commercial drivers take some stimulate medicine for over-time driving

**Solutions:**

(Problem 5, Chinese Taipei)

- Compulsory blood alcohol concentration testing
- Use of hard-hitting and graphic advertisements
- Strengthen enforcement
- Severe punishment (jail or fine)
- More public campaign and education to the drivers

**Achievements:**

(Problem 5, Chinese Taipei)

- The fatalities of drunk driving accidents are decrease apparently

**Difficulties:**

(Problem 5, Chinese Taipei)

- Require ongoing intensive resources
- Difficult of enforcement at roadside without mandatory carriage of photo license
- Lack of the test technique of dragged and tired driving



Problem 5: *Impaired driving*

**Specific Problem and its Description:**

(Problem 5, Chinese Taipei)

The injury rate of accidents of drunken or tired driving increases in recent years.

It is easy to make accidents after people who take drugs. Some drivers of commercial vehicles take some wine with drinks that contain stimulate medicine because they think it will make them clear-headed when they drive overtime.

**Solutions:**

(Problem 5, Chinese Taipei)

- Increasing the police manpower in some areas
- Trying to make people understand that the safety is more important than the business.

**Achievements:**

(Problem 5, Chinese Taipei)

- Reducing the injury rate and the fatality of the drivers of vehicles.

**Difficulties:**

(Problem 5, Chinese Taipei)

- There are not suitable rules to prohibit the businessmen to promote these drinks that contain stimulate medicine with advertisement implying the clear-headed effect of the drink.
- Lack of police manpower

Problem 5: *Impaired Driving*

**Specific Problem and Its Description:**

(Problem 5, Thailand)

High incident of alcohol-related and drug-related injury and fatal crashes

**Solutions:**

- More public and enforcement, particularly on roadside by coordination among the police, medical officers, and other relevant agencies should be available.
- More campaign on drivers of freight trucks for not using drugs.
- More severe punishment for the driving with drug and alcohol taking.
- Extend Transport school for training and educate the Public, both in central and regional areas, for good quality and safe driving.

**Achievements:**

(Problem 5, Thailand)

- Reduce number of avoidable accident and crashes.

**Difficulties:**

(Problem 5, Thailand)

- Require ongoing funding resources and monitoring.
- Limit of the police officer to enforce at roadside checking.

Problem 6: *Vehicle Overloading*

**Specific Problem and its Description:**

(Problem 6, Canada)

- In Canada, vehicle overloading is not regarded as a road safety problem in the entire commercial vehicle industry; however, over loading is a habitual problem in the logging and gravel haulage industries because these commercial vehicle operators are paid by load size.
- Owner/operators are more likely than large companies to exceed the legal load size limit for economic reasons; large companies are less likely to exceed the legal limit because of their concern over motor carrier safety performance ratings.
- cursory examinations of loaded commercial vehicles by non experts make vehicle overloading very difficult to identify.

**Solutions:**

(Problem 6, Canada)

- Enforcement is carried out by government agencies to ensure compliance with weight restrictions (the national standard allows for maximum vehicle weights that vary depending on vehicle configuration; the absolute maximum weight for loaded vehicles is 62,500 kg.) through the use of manual and automatic weigh scales; associated stiff penalties for violators ensures compliance to weight restrictions.
- Economic solution : if financial incentives for vehicle overloading are removed, then it will only be done by accident.

**Achievements:**

(Problem 6, Canada)

- Some jurisdictions currently have automated weight systems in place. These 'eight in motion' devices electronically weigh each axle as well as the entire vehicle load; once completed, these vehicles with electronic plates do not have to be weighed for the remainder of their trip.
- Instrumentation in log-skidders is now available that can determine the actual weight of logs being loaded onto trucks.
- Many logging trucks now have on board weigh scales for each axle to ensure compliance with weight limits; vehicles equipped with air suspension weight devices are reliable.

**Difficulties:**

(Problem 6, Canada)

- The trucking industry has tried to find technical solutions. However, it is characterized by rudimentary technology that is driven by price. For example,

transponders although good in theory, are fragile; the technology is not yet robust enough.

- Commercial trucking is an intensely competitive industry; when operators are competing for small economic returns, limited effort is focused on overloading.

Category C: Behavior

(Japan)

Problem 6: *Vehicle overloading*

**Specific Problem and its Description:**

(Problem6, Japan)

More effective guidance and control:

In order to ensure safety and smooth flow of traffic on roadways, it is necessary to keep traffic accidents in check by cracking down on vicious and highly dangerous traffic law violations.

**Solutions:**

(Problem6, Japan)

- As for traffic law violations related to corporate business activities, the police are trying not only to crack down on drivers alone but also to investigate thoroughly the background responsibility of employers who have ordered and permitted their drivers to commit these acts of traffic law violation.

**Achievement:**

(Problem6, Japan)

- Not clear

**Difficulties:**

(Problem6, Japan)

- The enforcement is difficult because the place for it is limited and drivers exchange the information each other.

Problem 6: *Vehicle overloading*

**Specific Problem and its Description:**

(Problem 6, Republic of Korea)

Korean cargo vehicles are commonly overloaded for economic reasons in violation of relevant traffic regulations. The following are problems relating to overloading:

- Regulations and penalties for overloading are stipulated under the Road Act and the Road Traffic Act.
- Control techniques and facilities are insufficient, and officials assigned to the surveillance of overloaded vehicles generally suffer from low worker morale.

**Solutions:**

(Problem 6, Republic of Korea)

- Relevant regulations should be unified and tightened.
- Innovative control equipment such as WIM and high-performance cameras should be utilized.
- Personnel should be augmented and provided with necessary training.

**Achievements:**

(Problem 6, Republic of Korea)

- Preventing overloading helps maintain road facilities.
- Restricting heavy vehicles enhances traffic safety.

**Difficulties:**

(Problem 6, Republic of Korea)

- Road management organizations and transportation companies usually have conflicting interests.
- Working conditions for control personnel should be improved.
- Control equipment should be improved and installed in areas prone to overloading.

Problem 6: *Overload of the vehicles*

**Specific problem:**

(Problem 6, Mexico)

Damages to the road infrastructure:

In Mexico little disposition exists to respect the laws and regulations of transit and transport. A clear example of the previous thing is the fact that a great amount of load vehicles circulate with an excess of weight, exceeding the allowed values in many occasions in order obtain more money in the short term. This brings to a remarkable deterioration on the rolling surface of the roads which is accentuated on the rains season. The combination weigh-excess generates a remarkable deterioration of the infrastructure that is sometimes show the appearance of dangerous pathole that creates operation situations little safe and some accidents of certain magnitude. The overload also has a negative impact in the vehicular bridges.

**Solutions:**

(Problem 6, Mexico)

- To impose greater restrictions to the weights allowed to the vehicles.
- To apply a greater vigilance of regulations.
- To impose more severe sanctions to the offending.
- Implementation of suitable policy of charges to the users.

**Advances:**

(Problem 6, Mexico)

- Some operatives of checking and vigilance are made to comply with the weights and the dimensions regulations.
- There are programs of corrective maintenance that are applied when the raining season is finished.

**Difficulties:**

(Problem 6, Mexico)

- Lack of resources to extend vigilance operatives.
- Hard opposition of the motorcarrier to the reduction of the vehicular weight.
- Habit to overload the vehicles in order to obtain more money.

Problem 6: *Overload of the vehicles*

**Specific problem:**

(Problem 6, Mexico)

Use of load vehicles for the collective transportation of people in countryside:

In some countryside of the country a great amount of manual labor for certain temporary agricultural activities is demanded. By the above mentioned the medium and heavy load vehicles are used for the public transportation who travel crowded together in the space destined to the load, which is prohibited in the transit regulations. Some of these vehicles have accidents on the roads when they are transporting people to their workings, which cause many victims.

**Solutions:**

(Problem 6, Mexico)

- To apply a greater vigilance in the application of the regulations.
- To impose more severe sanctions to the offendings.
- To estimate programs for the transportation of passengers that cover this type of necessities.

**Advances:**

(Problem 6, Mexico)

- The operative of vigilance have been reinforced.

**Difficulties:**

(Problem 6, Mexico)

- Little availability of resources to provide alternating transportation programs to the rural communities.
- Little disposition to comply with the transit and transport regulations.



Problem 6: *Overload of the vehicles*

**Specific problem:**

(Problem 6, Mexico)

Reduction in the stability and the manoeuvre of the vehicles:

The practice to overload the vehicles with the purpose to obtain more money leads to that the vehicles have a bad stability and their manoeuvres are reduced. The First of these problems can lead to on overturn of the vehicle when it is circulating around closed curves, on roadside ditches or the fall of the transported objects. The second one diminishes the capacity of answer of answer of the vehicle during its operation because it requires, more braking lengths and greater fuel consumption. On the highways of Mexico, frequently are involved overloaded vehicles in accidents. Sometimes is the only vehicle crashed which is due to the overturn or mechanic faults.

**Solutions:**

(Problem 6, Mexico)

- To impose bigger restrictions to the allowed weights of the vehicles.
- To reinforce a greater vigilance in the application of the regulations.
- To impose more severe sanctions to the offendings.
- Implementation of a suitable policy of chargest to the users.

**Advances:**

(Problem 6, Mexico)

- Operatives of checking and vigilance of the physical-mechanical conditions of the vehicles are performed to comply with the weights and dimensions regulations.
- It has been obtained a greater awareness in the organized groups of motorcarriers.

**Difficulties:**

(Problem 6, Mexico)

- Lack of resources to extend the operatives of vigilance monitoring.
- Hard opposition of the motorcarriers to the reduction of the vehicular weight.
- Habit to overload the vehicles in order to obtain more money.
- Habit to modify the units with the purpose to overload them.

Category C: Behavior

(New Zealand)

Problem 6: *Vehicle overloading* (heavy vehicles)

**Specific Problem and its Description:**

(Problem 6, New Zealand)

Vehicle overloading (heavy vehicles):

1. Failure of vehicle componentry

**Solutions:**

(Problem 6, New Zealand)

- Strategically placed enforcement weigh stations.

**Achievements:**

(Problem 6, New Zealand)

- On-going dedicated enforcement by the Police Commercial Vehicle Investigation Unit (CVIU) of heavy vehicle safety (load and load stability) and economic compliance with Road User Charges

**Difficulties:**

(Problem 6, New Zealand)

- Enforcement requires on-going resources.

Category C: Behavior

(New Zealand)

Problem 6: *Vehicle overloading*

**Specific Problem and its Description:**

(Problem 6, New Zealand)

Vehicle overloading (heavy vehicles):

2. Failure/fatigue of roads and bridges

**Solutions:**

(Problem 6, New Zealand)

- Mobile enforcement with portable weigh scales and at fixed sites to enforce compliance with weight restrictions to reduce damage to roads and bridges.

**Achievements:**

(Problem 6, New Zealand)

- On-going dedicated enforcement by the Police CVIU.

**Difficulties:**

(Problem 6, New Zealand)

- Labour intensive.

Problem 6: *Vehicle overloading*

**Specific Problem and its Description:**

(Problem 6, New Zealand)

Vehicle overloading (heavy vehicles)

3. Vehicle handling and control reduced (brakes/stability)

**Solutions:**

(Problem 6, New Zealand)

- Education - release Fact Sheets detailing legal weight limits.
- Develop performance standards.

**Achievements:**

(Problem 6, New Zealand)

- Work has been undertaken to develop performance standards that establish the relationship between load stability and crash risk.
- Implement rule with safety performance standards relating to the overall safety performance of the vehicle as affected by size and weight limits of vehicle.

**Difficulties:**

(Problem 6, New Zealand)

- Technical and practical difficulties (eg reduction on the load heights of logging trucks).

Problem 6: *Vehicle overloading*

**Specific Problem and its Description:**

(Problem 6, New Zealand)

Vehicle overloading (heavy vehicles):

4. Inadequate load security (anchor points overstressed)

**Solutions:**

(Problem 6, New Zealand)

- Off-load goods if exceed legal weight by 10% or more.

**Achievements:**

(Problem 6, New Zealand)

- Enforced by the Police CVIU.

**Difficulties:**

(Problem 6, New Zealand)

- Problems with storage of perishable goods and livestock.

Problem 6: *Vehicle overloading*

**Specific Problem and its Description:**

(Problem 6, New Zealand)

Vehicle overloading (light vehicles):

1. Overloading beyond towing capacity of vehicle to which trailer is attached

**Solutions:**

(Problem 6, New Zealand)

- Control weight of light trailers by specifying restrictions for unbraked light trailers and braked light trailers in the form of Vehicle Standards Rules.

**Achievements:**

(Problem 6, New Zealand)

- A Rule is under development.

**Difficulties:**

(Problem 6, New Zealand)

- Difficult for drivers to assess the weight of the load they are towing.
- Lack of Police enforcement resources.

Problem 6: *Vehicle Loading.*

**Description of the Problem:**

(Problem 6, Papua New Guinea)

1. Because of the number of vehicles per population density is low, the use of vehicle overloaded is common. The serious accidents cause lots of deaths and injuries in single vehicle accidents.
2. Failure of vehicle components.
3. Failure or fatigue of roads and bridges.
4. Vehicle handling and control reduced (brakes/stability, etc.)
5. Inadequate load security (anchor points overstressed).
6. Inadequate or wrong material type use as load restraints.
7. Unserviceable weigh bridge stations-Funding problems to sustain them in serviceable conditions.

**Description of Solutions:**

(Problem 6, Papua New Guinea)

1. Enhance enforcement.
2. Excessive overloading penalties.
3. Strategic placement of weigh stations.
4. Mobile enforcement with portable weigh scales.
5. Education-release of Fact Sheets.

**Difficulties:**

(Problem 6, Papua New Guinea)

1. Requires ongoing resources.
2. Labor intensive.
3. Legislative changes each time with vehicle technology and type.
4. Economic and quality of life aspects for transportation demand versus the supply of transport services.
5. Ride taking for profit.

Problem 6: *Vehicle Overloading*

**Specific Problems and its Description:**

(Problem 6, Peru)

The Regulation of Weight and Measure was not applied which allowed transporters to overpass their loads, causing the deterioration of the roads and the increase of the traffic accidents.

**Solutions:**

(Problem 6, Peru)

- In 1993 the roads rehabilitation begun and a Specialized Agency for Roads Maintenance was created having as its main function the maintenance of the National Roads (Asphalted) in order to preserve the roads through the collection of the toll.
- Another function is to control the weight of the vehicles for which the regulation to control the vehicle's weight is revised and adapted.

**Achievements:**

(Problem 6, Peru)

- In 1999 two stationary stations to control weight were built in 2 main points of the country, in addition to 9 mobile units located all along the National Road Network permitting that 93% of the transporters adapt their units to the new regulation, which means a decrease in traffic accidents caused by this reason and a better preservation of the road.

**Difficulties:**

(Problem 6, Peru)

- The adaptation of transport units to comply with the allowed weights has produced an increase in such units to compensate the freights.



Problem 6: *Vehicle Overloading*

**Specific Problem and its Description:**

(Problem 6, Singapore)

In Singapore, enforcement against overloaded vehicles are carried out on the roads by enforcement officers from the Land Transport Authority (LTA). Enforcement against such vehicles is necessary because they are dangerous to the road users and can damage our roads and bridges.

**Solution:**

(Problem 6, Singapore)

- Vehicles suspected of being overloaded are escorted to the LTA's premises for weighing to verify the weight carried by the vehicles before enforcement action can be taken against their owners. On-the-road checks on overloading of vehicles are also conducted on a regular basis using portable weighing pads. The severity of penalties imposed for overloading offences depends on the extent of overloading

Problem 6: *Vehicle Overloading*

**Specific Problem and its Description:**

(Problem 6, Chinese Taipei)

- High incidence of related injury and fatal crashes
- Failure/fatigue of road and bridge

**Solutions:**

(Problem 6, Chinese Taipei)

- Strategically placed enforcement weigh stations
- Impose the overloading driver with the fine or the penalty
- More public campaign and education to the drivers

**Difficulties:**

(Problem 6, Chinese Taipei)

- Require ongoing intensive resources
- Labor intensive
- Problem with storing place for the overload goods

Problem 6: *Vehicle overloading*

**Specific Problem and its Description:**

(Problem 6, Chinese Taipei)

Illegal change of vehicle:

Some of transportation companies change the vehicle size bigger illegally so that they can load more goods on each vehicle and reduce the cost. However, it makes the vehicle out of control.

**Solutions:**

(Problem 6, Chinese Taipei)

- Increasing the police manpower in some areas
- Trying to make people understand that the safety is more important than the business.

**Achievements:**

(Problem 6, Chinese Taipei)

- Reducing the injury rate and the fatality of the drivers of vehicles.

**Difficulties:**

(Problem 6, Chinese Taipei)

- People doesn't like to obey the rules
- Lack of police manpower

Problem 6: *Vehicle overloading*

**Specific Problem and its Description:**

(Problem 6, Chinese Taipei)

Potential damage to the roads and danger to other nearby vehicles:

This problem mainly relates to commercial vehicles whose drivers are purposely asked by the carriage company or consignors to over-load in order to gain more profit.

**Solutions:**

(Problem 6, Chinese Taipei)

- Increase the fine for each violation
- Educate people the potential damage and danger of vehicle overloading

**Achievements:**

(Problem 6, Chinese Taipei)

-

**Difficulties:**

(Problem 6, Chinese Taipei)

- There are no sufficient and adequate instruments for weighing load.
- It is difficult to evaluate the effectiveness of education and to ensure that the education is applied to the specific groups we want to apply.

Problem 6: *Vehicle overloading*

**Specific Problem and its Description:**

(Problem 6, Chinese Taipei)

Trucks are easily failed in the components or out of control because they are usually overloaded on the road.

**Solutions:**

(Problem 6, Chinese Taipei)

- In addition to strengthen the enforcement on the overloading, the truck's possessor would be reported if his/her vehicle against road traffic rule over ten times, and trucks that overload repeatedly will be prohibited on highway.
- Besides, the truck's life is limited to fifteen years to insure the vehicle is safe on road.

**Achievements:**

(Problem 6, Chinese Taipei)

-

**Difficulties:**

(Problem 6, Chinese Taipei)

-

Problem 6: *Vehicle overloading*

**Specific Problem and its Description:**

(Problem 6, Chinese Taipei)

Illegal refitted school bus for kindergarten:

Some of school buses for kindergarten are refitted more seats and less safety equipment, so that they can load more children in the bus and reduce cost.

**Solutions:**

(Problem 6, Chinese Taipei)

- Enhance enforcement on the major road section. Revise the traffic rule to raise fine.

**Achievements:**

(Problem 6, Chinese Taipei)

- The illegal refitted school bus for kindergarten will gradually reduce.

**Difficulties:**

(Problem 6, Chinese Taipei)

- It takes times to revise traffic rule and legislate. And it is difficult for highway inspector to identify the inside of school buses on the continuous traffic flow.

Problem 6: *Vehicle overloading*

**Specific Problem and Its Description:**

(Problem 6, Thailand)

Some freight vehicles are over-loading especially loading of some kind of goods e.g. construction materials, agricultural products. This cause increase in road damage and decrease in vehicle braking efficiency which increase road accident later.

Main aim for those commercial vehicles is to keep lower cost of transport.

**Solutions:**

(Problem 6, Thailand)

- Strictly checking and surveillance on roadside weight stations in main in-out roads of big cities and impose the drivers with the fine

**Achievements:**

(Problem 6, Thailand)

- Decrease vehicle overloading as less as possible.

**Difficulties:**

(Problem 6, Thailand)

- Requires ongoing resources and limit of enforcement resources both personnel and equipment.

*Problem 7: Encouraging people to wear seatbelts and motor cycle helmets*

**Specific Problem and its Description:**

(Problem 7, Australia)

Australia has been very successful with seatbelts and helmets. Belt wearing rates for front seat passengers is around 95%. However, one third of occupant fatalities are unbelted. It would seem that there is a sub-culture of road users who disregard road rules. They speed, drink drive and don't wear seatbelts, and they have serious crashes.

**Solution 1:**

(Problem 7, Australia)

- By 1973 all states had passed legislation requiring seatbelts and helmets to be worn. This legislation was very effective. Part of this success is attributed to public education on the benefit prior to the legislation which led people to believe that they should wear seatbelts.

**Achievements 1:**

(Problem 7, Australia)

- As stated above, seatbelt wearing rates are high. Motor cycle helmet wearing rates are also similarly high.

**Difficulties 1:**

(Problem 7, Australia)

- Wearing rates in rural areas are lower than in urban areas. This is attributed to enforcement being more difficult in areas of low population density, and compliance being similarly lower. Unfortunately travel in rural areas also involves greater risk.

**Solution 2:**

(Problem 7, Australia)

- There is considerable support in Australia for a design rule requiring new vehicles to have intrusive seatbelt reminder systems. This would involve sensors to detect the presence of an occupant in each seating position and to detect if the seat belt is fastened, together with a signal such as an audible warning such that occupants would find it more convenient to wear their belts than to listen to the signal. It is hoped that this system could eventually halve the non-wearing rate and save 100 lives per year.

**Achievements 2:**

(Problem 7, Australia)

- Nil – planning stage only.

**Difficulties 2:**

(Problem 7, Australia)

- Strong international pressure exists to discourage individual countries adopting unique vehicle design rules. This proposal would be more likely to succeed if other economies were to support the adoption of an international rule. At present we are only aware of Sweden supporting this proposal.



Problem 7: *Encouraging people to wear seat belts and wear motorcycle helmets.*

**Specific Problem and its Description:**

(Problem 7, Canada)

- Mandatory motorcycle helmet wearing laws have been in effect in Canada for almost 30 years. During this period, a combination of legislation, public education, enforcement and acceptance by riders has resulted in almost universal helmet wearing by moped and motorcycle riders. Consequently, in Canada, non-wearing of motorcycle helmets is not regarded as a major road safety transportation problem.
- Seat belt usage rates have remained static for the past four years at approximately 90% among light duty vehicle occupants.
- Recent research has shown that the 10% of motor vehicle occupants who do not wear seat belts account for 40% of fatally injured occupants and 20% of those seriously injured in crashes.
- Police agencies do not view non-wearing of seat belts to be a major road safety issue in Canada.

**Solutions:**

(Problem 7, Canada)

- Mandatory seat belt wearing laws exist in all of Canada provinces and territories. Programs of public education and enforcement have enabled usage rates among all light duty vehicle occupants to climb to approximately 90%, where it has remained for the past four years.
- The principal national program currently in place in support of increased seat belt use is the National Occupant Restraint Program 2001 (NORP 2001). This program was introduced in 1989 and has a goal of 95% seat belt use by all occupants of light duty vehicles by 2001.
- The National Occupant Restraint Program Task Force is using recent research on unbelted drivers, which demonstrated the large percentages of all fatally and seriously injured occupants that they represent, to build and present a business case to legislators, police forces and other interested road safety stakeholders in order to generate renewed interest in and funding for this ongoing road safety problem.
- The extent of occupant fatalities and serious injuries associated with non-use of seat belts and the importance of wearing seat belts when operating motor vehicles will be the key message delivered to police agencies throughout the country later this year as part to their annual 'Operation Impact' program. Police officers will then reiterate these same messages to the motoring public

during their one day blitz throughout the country as part of the mandate of Operation Impact to increase public awareness of this road safety issue.

**Achievements:**

(Problem 7, Canada)

- Legislation, public education and enforcement activities have contributed to seat belt usage rates in Canada that are among the highest in the world (90% during 1998).
- A national task force whose mandate is to achieve and maintain seat belt usage rates of 95% nationally is currently exploring ways to renew interest in this important initiative.

**Difficulties:**

(Problem 7, Canada)

- Seat belt use has remained relatively stagnant at approximately 90% during the past four years. Having achieved this high seat belt usage rate nationally, there is a perception among stakeholders that non-use of seat belts is no longer a road safety problem, when in fact the small segment of road users who do not wear belts annually account for very substantial numbers of fatally and seriously injured occupants.
- The increased resources required to increase police enforcement activities are very difficult to obtain or not available.

Category C: Behavior

(Japan)

Problem 7: *Encouraging people to wear seat belt and motorcycle helmet*

**Specific Problem and its Description:**

(Problem7, Japan)

Seat belts:

In 1997, of those who were fatally injured during their ride in motor vehicles, 2,696 persons were not wearing seat belt, the number being far larger than the number of those who were belted at 1,338. But some people do not wear them. The possible factor might be follow:

- The importance of them is not widespread.

**Solutions:**

(Problem7, Japan)

- In cooperation with cities, towns and villages, the police are actively promoting publicity campaigns to popularize the practice of wearing seat belt among car drivers and passengers.

**Achievement:**

(Problem7, Japan)

- The rate of wearing seat belt is gradually increasing.

**Difficulties:**

(Problem7, Japan)

Category C: Behavior

(Republic of Korea)

Problem 7: *Encouraging people to wear seatbelt and motorcycle helmet*

**Specific Problem and its Description:**

(Problem 7, Republic of Korea)

Drivers in Korea often neglect to wear seatbelts or helmets, deeming them inconvenient despite the sometimes-fatal consequences. The following are difficulties in encouraging Korean drivers to take these safety precautions:

- Seatbelt and helmet regulations are rarely enforced.
- The public is not fully aware of the potentially fatal results of not wearing seatbelts or helmets.
- Drivers find seatbelts and helmets inconvenient.

**Solutions**

(Problem 7, Republic of Korea)

- The police should tighten enforcement of seatbelt and helmet laws.
- Training programs and publicity activities are needed to prevent traffic injuries and fatalities caused by not wearing seatbelts and helmets.
- More convenient safety products should be developed.

**Achievements:**

(Problem 7, Republic of Korea)

- Traffic injuries and fatalities could be reduced.

**Difficulties:**

(Problem 7, Republic of Korea)

- A variety of ongoing publicity activities on the necessity of wearing seatbelts and helmets are required.
- Safer and more convenient seatbelts and helmets should be developed.

*Problem 7: Promotion of the use of the seat belt and helmet for motorcyclists*

**Specific problem:**

(Problem 7, Mexico)

Limited use of the lap belt by the drivers and passengers:

The seat belt has a limited use on the urban roads and highways. A high percentage of the drivers and other occupants of vehicles do not use it. The previous thing lead that in the road accidents there are a great number of victims which who could be avoided with the use of the sit belt. In addition, a great amount of local jurisdictions exists (state and municipal) whose laws do not demand it. In the case of interurban buses, the accidents have happened when the occupants of the front seats crash with the frontal crystal of the unit.

**Solutions:**

(Problem 7, Mexico)

- To promote and to supervise the obligatory use of the seat belt.
- To reinforce the campaigns in favor of its use at all educative levels
- Make obligatory the use of the seat belts at all levels.

**Advances:**

(Problem 7, Mexico)

- Campaigns to promote of the use of the sit belt have been undertaken in which they participate artist and famous sportsmen.
- On the season holidays the operatives are implemented in which the police checks and promotes the use of the seat belt.

**Difficulties:**

(Problem 7, Mexico)

- Generally there is a small road education with the population
- Small consient of the benefits that comes from the use of the seat belts.
- Legal problems that force the use of the seat belts in the passengers.

Problem 7: *Encourage people to wear seat belts and motorcycle helmets*

**Specific Problem and its Description:** (Problem 7, New Zealand)

1. High incidence of injuries sustained through failure to wear restraints

**Solutions:** (Problem 7, New Zealand)

1. Compulsory use of restraints for all vehicle occupants.
2. Extensive enforcement.
3. Use of graphic advertising.
4. Conducting of community and school-based education programmes aimed at reducing injuries.

**Achievements:** (Problem 7, New Zealand)

1. New Zealand's most recent national restraint use surveys show a 89% compliance rate with seatbelt use by front seat adult occupants and 62% compliance rate by rear-seat adult passengers. Restraint use by children of all ages remains relatively constant at 89% compared to previous survey results. However restraint use is higher for children in the front seat at 97% compliance than in the rear seat at 85%. Use of child seats by children under the age of 5 years is less at only 76% although a further 11% of under 5 year olds are restrained by adult seatbelts (not sufficient under current regulations).
2. The fine for non-use of an available seat-belt has recently been doubled from NZ\$75 to NZ \$150.
3. The lack of restraint use is one of the priority areas for the current hard-hitting road safety advertising and police enforcement campaign. In the 12 months to June 1999, 43 people (including 4 children) were killed whose lives would have been saved had they used the seatbelts that were available to them according to assessments made by Police officers who attended these crashes.

**Difficulties:** (Problem 7, New Zealand)

1. Compulsory wearing laws are likely to require legislative change.
2. Compulsory use laws require on-going enforcement.
3. The law is difficult to implement if number of occupants exceeds available restraints.
4. Extensive enforcement requires on-going resources.
5. Use of graphic advertising requires on-going resources.
6. Graphic advertising generates occasional negative responses from the public.
7. Community and school based education programmes:
  - require on-going resources and constant monitoring.

- difficult to evaluate effectiveness of these programmes except in long term and to isolate impacts from the effects of other initiatives.

Problem 7: *Encourage people to wear seat belts and motorcycle helmets*

**Specific Problem and its Description:** (Problem 7, New Zealand)

2. Injuries sustained through failure to wear secure correctly fitted motorcycle helmets

**Solutions:** (Problem 7, New Zealand)

1. Law requiring the compulsory wearing of motorcycle helmets.
2. Extensive enforcement.

**Achievements:** (Problem 7, New Zealand)

1. National surveys of compliance with motorcycle helmet wearing laws are not undertaken as this would be an inefficient use of resources given that New Zealand has very high compliance rates with this law. Informal surveys suggest that around 99% of motorcycle riders and pillion passengers comply with the regulation.
2. Fine for failure to wear an approved motorcycle helmet was recently doubled from NZ\$75 – NZ\$150.

**Difficulties:** (Problem 7, New Zealand)

1. Compulsory helmet-wearing laws are likely to require legislative change.
2. Compulsory wearing laws require on-going enforcement.
3. Compulsory law passes compliance costs on to motorcycle riders/pillions who may be the innocent victims in a crash.



*Problem 7: Encourage People To Wear Seat Belt And Motor Cycle Helmet*

**Description of Problem:** (Problem 7, Papua New Guinea)

High incidence of injuries sustained through failure to wear restraints/seatbelts and bicycle and motor cycle helmets.

**Description of Solutions:** (Problem 7, Papua New Guinea)

1. Legislation of the wearing of seat belts and the bicycle or motor cycle helmets.
2. Extensive enforcement.
3. Use of graphic advertising.
4. Conducting of Community and school based education programs aimed at reducing injuries.
5. Improve the design of helmets on the ventilation, visibility and hearing.

**Difficulties:** (Problem 7, Papua New Guinea)

1. Requires ongoing enforcement.
2. Requires ongoing resources.
3. Difficult to evaluate effectiveness of these programs except in long term.
4. Requires legislative changes.
5. Requires constant monitoring.

Problem 7: *Encouraging people to wear seat belts and motorcycle helmets*

**Specific Problem and its Description:** (Problem 7, Singapore)

Seat Belts - Injuries sustained for failing to wear seat belts.

Motorcycle Helmets - Injuries sustained through failure to secure helmets properly

**Solution:** (Problem 7, Singapore)

Seatbelts:

- The wearing of seat belts is mandatory
- Enforcement of the seat belt rule by traffic police officers

Helmets:

- The wearing of helmets mandatory is for all motorcyclists except Sikhs.
- Extensive enforcement

**Difficulty:** (Problem 7, Singapore)

Requires on going enforcement by Police

Problem 7: *Encouraging people to wear seat belt and motorcycle helmet*

**Specific Problem and its Description:**

(Problem 7, Chinese Taipei)

Low will to wear seat belt or motorcycle helmet:

Due to the effective enforcement of regulations, most motorcyclists in urban area wear helmets; in addition, most drivers and passengers on highways and fast ways wear seat belts. But drivers and passengers who are not on highways and expressways tend to leave seat belts aside. The possible factors might be the follows:

- Presently, there are no rules to force drivers and passengers to wear seat belts off the highways and expressways.
- Some seat belts are not comfortable to use.

**Solutions:**

(Problem 7, Chinese Taipei)

- Setting traffic regulations to force drivers and passengers to wearing seat belts on all conditions
- Encourage car manufactures to design seat belts comfortable to use
- Educate peoples to understand the possible consequence in accidents without seat belts.

**Achievements:**

(Problem 7, Chinese Taipei)

- Due to the effective enforcement of regulations, most motorcyclists in urban area wear helmets.

**Difficulties:**

(Problem 7, Chinese Taipei)

- There are not enough police manpower and adequate instruments to enforce the regulations.
- It is difficult to evaluate the effectiveness of education and to ensure that the education is applied to the specific groups we want to apply.

Problem 7: *Encouraging people to wear seatbelt and motorcycle helmet*

**Specific Problem and its Description:** (Problem 7, Chinese Taipei)

- Injuries sustained through failure to wear correctly fitted cycle and motorcycle helmets
- High incidence of injuries sustained through failure to wear restraints

**Solutions:** (Problem 7, Chinese Taipei)

- Make wearing compulsory for all user
- Extensive enforcement
- Use of graphic advertising
- Improve the design of helmet on the ventilation, visibility and hearing

**Difficulties:** (Problem 7, Chinese Taipei)

- Require ongoing enforcement
- Necessary to advertise from both the helmet user and general motorist perspective

Problem 7: *Encouraging people to wear seat belt and motorcycle helmet*

**Specific Problem and its Description:**

(Problem 7, Chinese Taipei)

Encouraging people to wear seat belt:

According to the traffic rule, drivers and passengers who sit in the front seats are request to wear seat belts only on some specific freeways and expressways. It is difficult for policemen to enforce because they should enforce this rule depend on the classification and jurisdiction of roads.

**Solutions:**

(Problem 7, Chinese Taipei)

- Legislating to ask every occupant in the vehicle to wear seat belt.

**Achievements:**

(Problem 7, Chinese Taipei)

- Wearing seat belt can raise the safety of drivers and passengers

**Difficulties:**

(Problem 7, Chinese Taipei)

- It is difficult to educate people to obey the rules
- Lack of police manpower

Problem 7: *Encouraging people to wear seat belt and motorcycle helmet*

**Specific Problem and Its Description:**

(Problem 7, Thailand)

Make wearing compulsory for all users nationwide.

**Solutions:**

(Problem 7, Thailand)

- More public campaign and education to the importance and necessity of wearing seat belt and motorcycle helmet for road user lives. In addition to general road users, the children are educated as well.
- Firstly make wearing compulsory for the users in big cities, and then extend to other cities.

**Achievements:**

(Problem 7, Thailand)

- Most of the drivers wear seat belt and motorcycles helmet in big cities.

**Difficulties:**

(Problem 7, Thailand)

- Require ongoing resources for campaigning and education.
- Require resources encouraging people to wear seat belt and motorcycle helmet countrywide.

Problem 8: *Pedestrian Safety*

**Specific Problem and its Description:**

(Problem 8, Canada)

- Although pedestrians account for approximately 13.5% of fatally injured road users and approximately 10.5% of those seriously injured each year, pedestrian safety is not regarded as a major road safety issue in Canada. The majority of national road safety programs focus on motor vehicle occupants because they account for almost 80% of road users killed and seriously injured annually.
- 40% of fatally injured pedestrians had been drinking prior to being struck and killed. The average BAC levels among fatally injured pedestrians who had been drinking was 205 mg %, considerably more than twice the legal limit.
- Elderly road users (those aged 65 years or older) account for very substantial proportions of fatally (30%) and seriously injured (15%) pedestrians.

**Solutions:**

(Problem 8, Canada)

- Use public education campaigns to raise awareness of pedestrian safety issues such as conspicuity, alcohol use and the elderly.
- Improve roadside signing for drivers in areas with heavy pedestrian traffic.
- Increase duration of traffic lights in areas inhabited by elderly pedestrians.
- Install more pedestrian crossing control devices in areas of heavy pedestrian traffic.

**Achievements:**

(Problem 8, Canada)

- Despite a gradually increasing population, (26% in the past 20 years), pedestrian fatalities have decreased dramatically, both in numerical terms (from 911 to 401) and on a rate basis (3.79 to 1.32 killed per 100,000 population) during this same 20 year period.
- The 'Pedestrian Crossing Control Manual', which presents a hierarchical system of signing, marking and signal control to provide a guide for matching crossing systems with conditions found at specific locations has been developed and was recently published by the Transportation Association of Canada. This publication as well as other roads infrastructure manuals can be obtained through the Internet at **[www.tac-atc.ca](http://www.tac-atc.ca)**.
- Improved roadside signing and lengthier traffic lights exist in some areas more densely populated by elderly pedestrians.

**Difficulties:**

(Problem 8, Canada)

- No national programs aimed at improving pedestrian safety currently exist because pedestrian safety is not perceived to be a major road safety issue in Canada.
- Funding required to install adequate pedestrian control devices may not be available in all provinces and municipalities.



Category D: Vulnerable Groups

(Japan)

Problem 8: *Pedestrian safety*

**Specific Problem and its Description:**

(Problem8, Japan)

Road facilities and traffic safety education:

Pedestrian fatalities make up approximately 30% of the total in Japan. The possible factors might be the follows:

- The planning and design of a roadway usually focus on the demand of vehicles but ignore the demand of the pedestrian and the elderly.
- The traffic safety education for pedestrians is not sufficient.

**Solutions:**

(Problem8, Japan)

- Infrastructure facilities to provide high-quality and safe barrier-free pedestrian spaces.
- Sidewalks are being widened for aged citizens and others. At the same time, new projects for the improvement of roads that have no sidewalks and are shared by both motor vehicles and pedestrian will be launched. For these “sidewalk-less” roads, measures to reduce the speed of motor vehicles and secure the safety of pedestrians will be implemented.
- Education and publicity campaign campaigns on traffic safety

**Achievement:**

(Problem8, Japan)

- Not clear

**Difficulties**

(Problem8, Japan)

- Vehicle drivers lack consideration for pedestrians.

Problem 8: *Pedestrian safety*

**Specific Problem and its Description:**

(Problem 8, Republic of Korea)

As many roads in Korea have no clearly marked division between sidewalk and roadway, the possibility of vehicle-pedestrian collisions is high. At many intersections, drivers simply refuse to acknowledge pedestrians' right-of-way. Collisions between vehicles and pedestrians in rural areas are particularly common at night, owing to poor lighting and frequent traffic violations by pedestrians.

**Solutions:**

(Problem 8, Republic of Korea)

- Clearer demarcation of sidewalks and roadways
- Installation of more traffic signals at intersections giving the right-of-way to pedestrians
- Installation of additional traffic safety facilities to minimize accidents and to enhance drivers' awareness of pedestrians' rights

**Achievements:**

(Problem 8, Republic of Korea)

- Pedestrians' right-of-way and general traffic safety would be strengthened.

**Difficulties:**

(Problem 8, Republic of Korea)

- Coordination and cooperation is insufficient between road management organizations (in charge of road facilities) and the National Police Agency (in charge of traffic safety facilities)
- An efficient management system is necessary to install and maintain pedestrian facilities.

Problem 8: *Pedestrian Safety*

**Specific problem:**

(Problem 8, Mexico)

The communities have not road enclosing:

At the beginning the road network was conceived in order to communicate the Mexican along the territory, reason why the roads entered in every population. Once performed the previous goal and with the modern necessities of efficiency and safety on the routes of long haul the convenience of constructing road in closing was recognized, that avoided the circulation of passengers vehicles by the communities. In spite of the previous thing, at the moment, many communities have not this type of infrastructure works. The transit of vehicles that pass has generated a great amount of accidents within the urbanized zones in which there are an important number of hasty persons.

**Solutions:**

(Problem 8, Mexico)

- Construction of road enclosing.
- Construction of works to protect the pedestrians
- Construction of pedestrian bridges.
- Obligatory speeds reduction on the surrounding areas of the towns.

**Advances:**

(Problem 8, Mexico)

- There is a project to construct road enclosings in many urban zones and communities.
- Diverses works to control the speed on the populated zones have carried out.

**Difficulties:**

(Problem 8, Mexico)

- Lack of insufficient budget to the construction of road enclosing.
- Lack of vial education, because the pedestrian bridges have a reduced use.
- There is not enough vigilance to comply with the speed limits.

Problem 8: *Pedestrian Safety*

**Specific problem:**

(Problem 8, Mexico)

Lack of infrastructure for the pedestrians in suburban zones:

The incessant increase of the population and the constant migration of people towards the urban zones have caused the growth of the cities. This growth occurs most of the occasions in direction to the roads that communicate the cities. The appearance of these suburbs, generally, is accompanied of a deficiency of services between one of them is the lack of infrastructure adapted for pedestrians, because there is not sidewalks and pedestrians are involved. Is also frequent by cultural deficiencies, that he pedestrians do not use them.

**Solutions:**

(Problem 8, Mexico)

- To reinforce and to fulfill comply with of urban growth plans.
- Special construction of sidewalks and other special works for pedestrians.
- To promote campaigns to respect the pedestrian.
- To promote campaigns of road education directed to pedestrians.

**Advances:**

(Problem 8, Mexico)

- Works in provision of services in the suburban zones.
- Some devices for the control speeds have been constructed.

**Difficulties:**

(Problem 8, Mexico)

- Anarchy in the urban growth
- Lack of Resources for the construction of works to protec the pedestrians.
- Lack of road education.
- Important imbalances between the amounts destined to the vehicles and pedestrians infrastructure.

Problem 8: *Pedestrian safety*

**Specific Problem and its Description:**

(Problem 8, New Zealand)

1. Vulnerability of pedestrians

**Solutions:**

(Problem 8, New Zealand)

1. Speed control:
  - Speed limits
  - Design – platforms, threshold treatments, chicanes, etc
  - Enforcement
2. Vehicle design
3. Separation of pedestrians from traffic:
  - under and over passes
  - malls
  - separated footpaths
4. Provision of crossing points with pedestrian priority:
  - ‘zebra’ crossings
  - pedestrian signals

**Achievements:**

(Problem 8, New Zealand)

1. In terms of speed control, threshold treatments have reduced speeds by an average of 3-4 kph.
2. Over recent years, over 600 platforms have been installed. While there are no hard data on effectiveness, anecdotal reports suggest that there have only been a small number of collisions involving pedestrians at these sites.
3. A speed limit rule is under development. If proposals are adopted by the Government, this could result in areas with high pedestrian traffic being set lower speed limits providing associated engineering solutions are also applied in these areas.
4. Enforcement is undertaken by the Police.
5. Vehicle design – vehicles standards rules have been developed that out-law certain types of bull-bars and other fixtures on vehicles that could be dangerous to vulnerable road users such as pedestrians and cyclists.
6. In relation to initiatives that separate pedestrians from traffic, malls have fallen from favour to some extent due to their negative impacts on access (eg for services and special needs groups such as people with disabilities). There has been a greater tendency to adopt shared zones instead.
7. Under and overpasses are used where appropriate but frequently, areas in New Zealand do not have the volume of pedestrian traffic to justify the costs.
8. Some limited trials of new technologies relating to pedestrian signals have

been undertaken but these have not been evaluated scientifically.

9. In relation to crossing points, 'Kea Crossings' have been trialled. These can be installed at crossing near schools. Pedestrians do not have priority except at special times of the day (ie before and after school when school patrols are operating to assist children to cross the road). The road width at the crossing point is reduced and there is improved visibility to assist pedestrians to cross if they use the crossing point at other times of the day.

**Difficulties:**

(Problem 8, New Zealand)

1. Speed control:
  - Efficiency versus safety
  - Costs (\$ and social) to amend road design and network to effectively change traffic speed or demand.
2. Vehicle design:
  - Cost
  - Effectiveness
  - The time any technical development takes to be incorporated into a significant part of the vehicle fleet.
3. Separation of pedestrians from traffic:
  - Personal security issues particularly for underpasses.
  - Access issues – pedestrians with disabilities, public passenger and goods transport.
4. Crossing points:
  - Non-compliance with by both pedestrians and drivers.
  - Location cannot always match demand – pedestrians continue to cross elsewhere.
  - Inefficiencies due to design parameters (eg walking speeds).

Problem 8: *Pedestrian safety*

**Specific Problem and its Description:**

(Problem 8, New Zealand)

2. Spread physical and behavioural characteristics (young pedestrians)

**Solutions:**

(Problem 8, New Zealand)

1. School crossing facilities.
2. Education.
3. Safe routes.
4. Publicity.
5. Rules.

**Achievements:**

(Problem 8, New Zealand)

1. In relation to school crossings, school patrols that are conducted by school children with parent/teacher supervision, have been operating now in New Zealand for over 60 years. They have proven to be a highly effective road safety initiative with only one reported fatality and a few serious injury collisions at patrolled crossings during this time.
2. A range of school and pre-school based education programmes are used (*eg Safe Routes to School*).
3. On-going publicity especially at high-risk times (eg in February when school children return to school after the summer break).

**Difficulties:**

(Problem 8, New Zealand)

1. Pressure for non-standard or excessive devices or controls.
2. Non-acceptance or lack of recognition of issues by all groups of road users.
3. Increasing proportion of older road users.
4. Poor adult role models.

Problem 8: *Pedestrian safety*

**Specific Problem and its Description:** (Problem 8, New Zealand)

3. Spread of physical and behavioural characteristics (walking speeds)

**Solutions:** (Problem 8, New Zealand)

1. Signal timing – minimum walking speed variable (use of special detectors).
2. Road design – gradients, surface, distance.

**Achievements:** (Problem 8, New Zealand)

1. Not a great deal of work as been done on the use of new technologies to control signal timing but there have been concerns about the reliability of this technology.

**Difficulties:** (Problem 8, New Zealand)

1. Signal timing uses the 85<sup>th</sup> percentile walking speed but this is too fast for older pedestrians. If signal timing is longer to adjust for the slower walking speed of older pedestrians, this creates driver frustration.
2. Cost of new technology.
3. Reliability particularly of special detectors.



Problem 8: *Pedestrian safety*

**Specific Problem and its Description:** (Problem 8, New Zealand)

4. Spread of physical and behavioural characteristics (people with disabilities)

**Solutions:** (Problem 8, New Zealand)

1. Special facilities (eg textured footpaths, audible signals).
2. Road design.

**Achievements:** (Problem 8, New Zealand)

1. Greater use of textured surfaces where people cross.
2. Increased use of traffic signals with either noise or vibrators for partially-sighted people in areas where they are more likely to be and when signals are upgraded.

**Difficulties:** (Problem 8, New Zealand)

1. Non-standard treatments sending mixed messages.
2. Cost – particularly in changing infrastructure.

Problem 8: *Pedestrian safety*

**Specific Problem and its Description:**

(Problem 8, New Zealand)

5. Spread of physical and behavioural characteristics (Alcohol)

**Solutions:**

(Problem 8, New Zealand)

1. Land use and traffic planning.
2. Enforcement.
3. Host responsibility.

**Achievements:**

(Problem 8, New Zealand)

1. In terms of land use, to a large extent we have to live with the existing infrastructure. Changes to the liquor licensing laws could affect the distribution of retail outlets that sell alcohol. There is a balance between a reduction in distances travelled to get and from these outlets in relation an increased number of outlets.

**Difficulties:**

(Problem 8, New Zealand)

1. Existing infrastructure is difficult to change significantly or quickly.

Problem 8: *Pedestrian safety*

**Specific Problem and its Description:**

(Problem 8, New Zealand)

6. Light conditions – dark compared to light

**Solutions:**

(Problem 8, New Zealand)

1. Street lighting.
2. Publicity.
3. Reflectorised materials.
4. Footpaths.

**Achievements:**

(Problem 8, New Zealand)

1. In terms of street lighting, New Zealand has a shared standard with Australia.
2. It is accepted though that amenity lighting is not as good as it could be. There has been a gradual improvement in flood-lighting at pedestrian crossings.
3. Use of reflectorised materials is encouraged for people walking or jogging at night.

**Difficulties:**

(Problem 8, New Zealand)

1. Cost of installation of lighting for generally low volumes of pedestrian movement.
2. Issues of what is fashionable.

Category D: Vulnerable Groups

(New Zealand)

Problem 8: *Pedestrian safety*

**Specific Problem and its Description:**

(Problem 8, New Zealand)

7. Compliance with rules

**Solutions:**

(Problem 8, New Zealand)

1. Education.
2. Enforcement.

**Achievements:**

(Problem 8, New Zealand)

1. Education and enforcement are undertaken as required.

**Difficulties:**

(Problem 8, New Zealand)

1. Access to specific groups.
2. Enforcement priorities.

Category D: Vulnerable Groups

(New Zealand)

Problem 8: *Pedestrian safety*

**Specific Problem and its Description:**

(Problem 8, New Zealand)

8. Inadequate facilities for pedestrians

**Solutions:**

(Problem 8, New Zealand)

1. Road design.
2. Training of practitioners, politicians, etc.

**Achievements:**

(Problem 8, New Zealand)

1. Pedestrian needs are taken into account in road design but perhaps not to the extent they should be. As pedestrians do not contribute directly to roading funds in the same way that drivers do, their needs tend to be allocated a lower priority.

**Difficulties:**

(Problem 8, New Zealand)

1. Cost – particularly in changing existing infrastructure and competition for funds for all road work.
2. Lack of agreed guidelines and standards for pedestrian facilities.

Problem 8: *Pedestrian Safety*

Pedestrians and the elderly are more vulnerable than other road users. The related safety factors include the pedestrians, the children, the elderly, other road users, vehicle design, and road facilities.

**Description of the problem:** (Problem 8,Papua New Guinea)

1. In PNG pedestrian accidents constitute on average about 25% of the total road accidents off which 80% are fatal.
2. Vulnerability of pedestrians.
3. Inadequate pedestrian facilities.

**Description of the Solutions:** (Problem 8,Papua New Guinea)

1. Establish a road environment in which everybody, including the elderly and the handicapped can have access in peace and safety. The aim is to provide high quality and safe barrier-free pedestrian facilities.
2. Speed controls.
3. Vehicle design to minimize impact severity.
4. Separation of pedestrians from traffic.
5. Being seen at night, street lightings.
6. Provisions of crossing points with pedestrian priority.
  - 'Zebra' crossing.
  - Pedestrian signals.
7. Walking speeds-signals timing at minimum walking speed, being variable with use of special detectors-Road design-gradients etc.
8. For people with disabilities-special facilities, e.g., Textured footpaths, audible signals at crossing, etc Road design for access.
9. Road design training of practitioners, politicians, etc.
10. Education and Enforcement.
11. Land use and traffic planning.
12. Publicity Information.

**Description of Difficulties** (Problem 8,Papua New Guinea)

1. Lack of agreed guidelines and standards.
2. Cost-particularly competing for funds for road maintenance and new projects targeted for nation building.
3. Access issues-pedestrians with disabilities, public transport and commercial (goods) transport.
4. Non-compliance by both pedestrians and drivers
5. Efficiency versus safety cost to amend road design and network to effectively change traffic speed or demand.

Problem 8: *Pedestrian Safety*

**Specific Problems and its Description:**

(Problem 8, Peru)

- Lack of a culture based in the respect of the security. This inappropriate behavior is mainly observed in large cities.
- Lack of safety devices for pedestrians in urban zones: pedestrian bridges, crosswalks, traffic lights, preventive signs for drivers, etc.
- Traffic control is not strict enough.
- Drivers inappropriate behavior whenever there is no traffic lights or traffic policeman, they do not give preference to the pedestrians so that they can cross by the carriageway.

**Solutions:** (Problem 8, Peru)

- Reengineering, with devices oriented to the security of the pedestrians and facility of use.
- Better police control
- Education and Training of pedestrians and drivers, in schools, centers to training drivers and other media, as campaigns.

**Achievements:**

(Problem 8, Peru)

- Several institutions carry out educative actions, though irregularly, in private and public schools.
- Greater concern regarding pedestrian security is shown in engineering projects. Wills conciliation and efforts coordination are fundamental aspects.

**Difficulties:**

(Problem 8, Peru)

- Non-continuous educative activities.
- Road education campaigns are too short.
- There is no enough technical and police institutional capacity to develop a more extensive and effective control of the traffic.
- Reduced budget to perform works.
- Lack of professionals and technician specialized in the field.

Problem 8: *Pedestrian Safety*

**Specific Problem and its Description:**

(Problem 8, Singapore)

Vulnerability of pedestrians

**Solutions:**

(Problem 8, Singapore)

- Provision of pedestrian crossing facility for safe movements. .
- Construct overhead bridges and underpass
- Separate footpaths
- Improve design of zebra crossings with the use of refuges and road humps to slow down speed of vehicles
- Increase the separation of pedestrian crossing area from the 'Stop' line at all crossing
- Make the pedestrian conspicuous to motorists at night through increased lighting levels at all pedestrian crossing facilities. Special lanterns used to "floodlight" dark areas.
- Coloured pavement at crossing areas
- "Countdown" timer during green man phase to encourage pedestrian not to start crossing if they have not begun.
- New pedestrian push button at traffic signals that less likely to be damaged by vandals to encourage usage of crossing.

**Achievements:**

(Problem 8, Singapore)

- Reduction in speeds of vehicles passing zebra crossings with refuge and raised hump

**Difficulties:**

(Problem 8, Singapore)

- High cost to implement over- and underpass
- Personal security issues particularly for underpass
- Access issues for pedestrians with disabilities and elderly pedestrians to overpass and underpass
- Non-compliance by both pedestrians and drivers at pedestrian crossings
- Warrants for pedestrian crossings needs to review



Problem 8: *Pedestrian Safety*

**Specific Problem and its Description:**

(Problem 8, Singapore)

Physical and behavioral characteristics of pedestrian users:

- Elderly/Pedestrian with disabilities
- Young children
- Compliance with rules

**Solutions:**

(Problem 8, Singapore)

- Elderly/Pedestrians with disabilities
  - Construct ramps on pedestrian overpass where space permits
  - Install audible alarms at signalised crossing to aid hearing impaired users
  - Trial project to lower height of risers at staircases for over- and underpass
  - Increase crossing time at pedestrian crossing with high percentage of elderly users
  - Kerbcut ramps at all footpaths and connecting to a designated pedestrian crossing.
- Young children
  - Implement school zone scheme near primary schools. A zone is designated where motorists are to reduce speed. Highly reflective signs, including the painting of “footprints” to guide children to use designated crossing.
  - Provide signalised pedestrian crossing near schools to teach and encourage children to use them.
  - Involve community in promoting safety at these locations through the involvement of parents. Get them to be traffic wardens to guide the children during school starting and dismissal hours.
  - Police conducts safety talks at schools to educate children on safe crossing habits and traffic rules. A Road Safety Park is also opened for schools to bring the children to participate in safety games and to understand traffic rules and regulation
- Compliance with rules
  - Education
  - Enforcement

**Achievements:**

(Problem 8, Singapore)

-

**Difficulties:**

(Problem 8, Singapore)

Physical and behavioral characteristics of pedestrian users:

- Elderly/Pedestrian with disabilities
  - Cost to change existing infrastructure
  - Different standards giving mixed signals
  - Education to elderly target group
  - Lack of recognition of issues by all groups of road users
- Young children
  - Poor role model by adults on safe crossing habits
  - Pressure for excessive devices or controls
  - Road users do not recognise the safety issues at these areas.
- Compliance with rules
  - Enforcement priorities
  - Lack of resources

Problem 8: *Pedestrian safety*

**Specific Problem and its Description:**

(Problem 8, Chinese Taipei)

Most drivers don't give the right of ways to the pedestrians when they approach in intersection. The possible factors might be the follows:

- Drivers are impatient to wait the pedestrians cross the road since the pedestrians move slower than cars.
- Pedestrians would rather give the ways to cars than be hit by the cars.

**Solutions:**

(Problem 8, Chinese Taipei)

- Educate drivers that pedestrians have the higher priority to cross roads
- Educate pedestrians that they should walk quickly when crossing roads

**Achievements:**

(Problem 8, Chinese Taipei)

- Continually television advertisement on this subject
- Visual slides to be displayed at designated spots
- Provide posters at district offices, schools, libraries and so on.
- Releasing news of related regulations through different media

**Difficulties:**

(Problem 8, Chinese Taipei)

- It is difficult to evaluate the effectiveness of education and to ensure that the education is applied to the specific groups we want to apply.

Problem 8: *Pedestrian safety*

**Specific Problem and its Description:**

(Problem 8, Chinese Taipei)

The lack of pedestrian priority devices:

Since pedestrians don't have any protection facilities on road, it is more important to provide pedestrian priority devices on streets for safety. However, there is no or insufficient pedestrian crossings and sidewalk space. Other road users (vehicle drivers, motorcyclists, bicyclists etc.) may intentionally or unintentionally neglect the pedestrian.

**Solutions:**

(Problem 8, Chinese Taipei)

- Improving pedestrian devices such as pedestrian crossings, sidewalk space, overpass bridges
- Educating other road users to give the right of ways to the pedestrian
- Adding the pedestrian phase design to the signal plans

**Achievements:**

(Problem 8, Chinese Taipei)

- Raising the pedestrian safety

**Difficulties:**

(Problem 8, Chinese Taipei)

- The inappropriate design of overpass bridges usually influences the scene of overpass bridges usually influences the scene of city

Problem 8: *Pedestrian safety*

**Specific Problem and Its Description:**

(Problem 8, Thailand)

- Vulnerability of pedestrians, in particular the children, the elderly and the handicapped.
- Insufficiency of pedestrian crossing and light signal.

**Solutions:**

(Problem 8, Thailand)

- Provide more pedestrian crossing and light signal in urban areas.
- Campaign and educate the children and the public for safe road users.
- Improve for better condition of walking space.

**Achievements:**

(Problem 8, Thailand)

- Increasing number of such pedestrian facilities for both pedestrian and the blind.

**Difficulties:**

(Problem 8, Thailand)

- Require ongoing resources to campaign and provide more pedestrian facilities.

Problem 9: *Elderly people safety*

**Specific Problem and its Description:**

(Problem 9, Canada)

- Canada elderly population (persons 65 years of age or older) is growing steadily. During the past 20 years, Canada elderly population grew from 9% to 12.3% of the country total population.
- Elderly drivers represent a growing segment of Canada licensed drivers, increasing from 7% in 1978 to 12.2% in 1998.
- Elderly road users account for substantial proportions of total fatalities (19% in 1998) and very large percentages of fatally and seriously injured pedestrians (30% and 15% respectively).
- Removing elderly road users' drivers licenses' reduces their mobility and independence. In Canada, public transportation services are not as readily available as in many more densely populated and smaller countries.
- Removing drivers' licenses from elderly drivers forces them to use public transit to remain mobile, and consequently increases the number of serious injuries that they suffer due to falls during the winter months when streets are slippery.
- Prescription drug use among elderly drivers has been identified as a road safety issue. The combined effects of multiple prescription drugs as well as and over the counter drugs has also been identified as a potential problem.

**Solutions:**

(Problem 9, Canada)

- Upon reaching certain age milestone, most jurisdictions subject elderly drivers to re-licensing tests; about half of Canada provinces and territories have re-licensing tests for drivers once they are 75 years of age.
- Once drivers reach 80 years of age, there is a much lower threshold for drivers to be subjected to interviews by transportation officials for minor infractions to prove that they are still capable of safely operating vehicles.
- In some jurisdictions, medical personnel are required by law to report to transportation officials medical problems affecting elderly drivers that may impair their ability to safely operate a motorized vehicle.

**Achievements:**

(Problem 9, Canada)

- 1999 has been designated as the year of the mature or elderly drivers, who in Canada encompass the large majority of elderly road users. A national workshop on mature drivers that will address health, mobility and road safety issues among this group will take place in October 1999. The findings and

future directions emanating from this workshop should address the road safety issues affecting mature drivers and help increase the general public awareness of safety issues related to this gradually growing group of road users.

- Mandatory re-licensing tests for elderly drivers at certain age milestones.
- Improved roadside signing and lengthier traffic lights in areas more densely populated by elderly pedestrians.

**Difficulties:**

(Problem 9, Canada)

- Removing drivers licenses from elderly road users often severely limits their mobility.
- It is still unclear at what age threshold a driver is assumed to be a mature or elderly driver. For example, 50-65 year old drivers are treated differently than 75-80 year old drivers.

Category D: Vulnerable Groups

(Japan)

Problem 9: *Elderly people safety*

**Specific Problem and its Description:**

(Problem9, Japan)

The population of elderly people is increasing rapidly:

The number of traffic deaths involving elderly persons (aged 65 and over) accounts for approximately 30% of all road deaths. The elderly have the highest share of the death statistic by age group, exceeding that of the younger population (aged 16-24). The possible factors might be the follows:

- The planning and design of a roadway usually focus on the demand of vehicles but ignore the demand of the pedestrian and the elderly. (Ref. Problem 8)
- It takes longer time for the elderly to cross a road or react to a dangerous situation.

**Solutions:**

(Problem9, Japan)

- Promote practical traffic safety education for the elderly
- Develop infrastructure facilities (For example, small parks to take a rest, information map, guide maps, direction boards)
- Creation of wide pedestrian walkways (Pedestrian walkways include pedestrian roads)
- Attach reflectors so that vehicle drivers can see them

**Achievement:**

(Problem9, Japan)

- Elderly people take more care of their safety
- Roadways become safer for the elderly

**Difficulties:**

(Problem9, Japan)

- Education does not have immediate effects.
- Elderly people hesitate to attach reflectors.



Problem 9: *Elderly people safety*

**Specific Problem and its Description:**

(Problem 9, Republic of Korea)

In most cases, the intervals of green (“walk”) lights at intersections in Korea are too short to accommodate elderly pedestrians. Sometimes, these pedestrians must stop at the central line of the road until the next green light. In addition, they need more time than do younger pedestrians to react to potential accidents. Also, as many lack understanding of traffic safety rules, continuous publicity activities should be provided to address the special needs of the aged. At present, however, policy and publicity efforts in this area are inadequate.

**Solutions**

(Problem 9, Republic of Korea)

- Supplementary facilities such as overpasses should be constructed at places with high numbers of elderly pedestrians.
- Traffic safety programs and campaigns should be directed at the aged.
- Safety facilities such as guard fences along roads should be established to prevent illegal crossings.

**Achievements:**

(Problem 9, Republic of Korea)

- Safety of all pedestrians, including the elderly, could be enhanced.

**Difficulties:**

(Problem 9, Republic of Korea)

- There is a lack awareness or concern for the safety of the elderly in road management organizations.
- Continuous publicity activities and training programs for the elderly are required.

Category D: Vulnerable Groups

(Mexico)

Problem 9: *Elderly people safety*

**Specific problem:**

(Problem 9, Mexico)

The infrastructure is not adapted to its specific necessities.

Mexico is a country with an important population increase and a great number of young people. Nevertheless, the medicine and health advances have increased the life by which an increase in the sector of the elder people the transit system is expected. One of the main problems detected is regard to the little adjustment of the urban infrastructure to needs of the pedestrians pertaining to this user group. In the design of this one the average users is as taken design parameter. Nevertheless, it is known that the necessities of the older people differ significantly from the usuary average. A clear example is the times assigned for the pedestrian crossing on the intersections with traffic light that are insufficient to allow the safe crossing of the elder people, fact that is aggravated by the lack of consideration towards this group by the others users groups.

**Solutions:**

(Problem 9, Mexico)

- To consider the characteristics and necessities of the elder people in the design and project of the transportation infrastructure.
- To promote a greater conscience of attention to the necessities of the elder people.
- To foment integral campaigns of road education.

**Advances:**

(Problem 9, Mexico)

- There is not specific programs nor projects related to this.

**Difficulties:**

(Problem 9, Mexico)

- The elder people is a relatively small group within the infrastructure users, why sufficient attention is not lent to them.
- There is a remarkable lack of road education.
- Some users present little consideration and aggressiveness towards the majority people.

Problem 9: *Elderly people safety*

**Specific Problem and its Description:**

(Problem 9, New Zealand)

1. Older drivers:

High incidence of crashes per kilometer traveled among older drivers.  
Their greater fragility means injuries they sustain in a crash tend to be more severe than for younger drivers.

**Solutions:**

(Problem 9, New Zealand)

1. Regular medical and competency re-testing.
2. Enforcement.
3. Conducting of community-based re-training programmes aimed at refreshing knowledge of road rules and raising awareness of health-related issues.

**Achievements:**

(Problem 9, New Zealand)

1. The older driver relicensing regime was recently revised including the Older Driver practical test which has been made more stringent.
2. Revised guidelines on *Medical Aspects of Fitness to Drive* were recently released to registered medical practitioners and registered optometrists. These clarify medical conditions, including those relating to older drivers, that could affect safe driving.
3. An Austroads-funded project is being carried out by a number of Australian States and New Zealand to looking at alternative methods of relicensing older drivers. If it proves to be successful and Governments endorse it, it could eliminate the need for age-based retesting of all older drivers.
4. Enforcement undertaken as required.
5. Community-based education programmes for older drivers (eg *Safe with Age*) are currently conducted.

**Difficulties:**

(Problem 9, New Zealand)

1. Regular medical and competency retesting:
  - Requires on-going resources
  - Requires on-going enforcement
  - May incur compliance costs out of proportion to size of problem.
2. Enforcement requires on-going resources which may be out of proportion to size of problem.
3. Community-based education programmes are difficult to evaluate in terms of effectiveness but they appear to be succeeding in getting some drivers to self-regulate their driving and to bring them up to date on changes to the road rules.

Problem 9: *Elderly people safety*

**Specific Problem and its Description:**

(Problem 9, New Zealand)

2. Older pedestrians:

A vulnerable group with a high rate of injuries compared to other adult groups; injuries sustained are usually severe due to greater fragility

**Solutions:**

(Problem 9, New Zealand)

1. Road/footpath design.
2. Extensive use of traffic separation methods and traffic calming in areas used by older pedestrians.
3. Extensive enforcement to monitor vehicle speeds in areas used by older pedestrians.
4. Use of road signs to warn of presence of older pedestrians.

**Achievements:**

(Problem 9, New Zealand)

1. Better design of footpath ramps to cater for mobility scooters and wheel chairs and a greater awareness of the need to improve the standards of footpaths.
2. Enforcement undertaken as required.
3. Siting of resthomes/retirement villages where possible away from busy roads with appropriate warning signs.

**Difficulties:**

(Problem 9, New Zealand)

1. Traffic separation methods are expensive – cost may be out of proportion to size of problem.
2. Enforcement requires on-going resources.
3. Low level of speed compliance with warning signs.

Problem 9: *Elderly People Safety.*

**Specific Problem and its Description:** (Problem 9, Papua New Guinea)

The elderly is moving slower than others. It takes longer time to cross a road or react to a dangerous situation, or maneuver to avoid an accident especially when they drive. Inappropriate behavior of not using pedestrian crossings, not obeying traffic signals and signs, not being seen at night etc. are common safety problems. The elderly are a vulnerable group with a high rate of injuries compared to other adults groups. Injuries sustain are usually severe because of fragility.

**Description of the Solutions:** (Problem 9, Papua New Guinea)

1. Extensive use of traffic separation methods and traffic calming in areas used by elderly pedestrians.
2. Extensive enforcement to monitor and control speeds.
3. Use of road signs to warn of presence of elderly pedestrians.
4. Design of and construction of facilities for the elderly and the handicapped.

**Description of Difficulties:** (Problem 9, Papua New Guinea)

1. Very expensive and the cost is going to be out of proportion to the size and magnitude of the problem
2. Low level of speed compliance.
3. Some roads do not equip adequate facilities to protect pedestrians and the elderly nor the handicapped. Lighting facilities cannot be upgraded of funding priority due to limited availabilities.

Problem 9: *Elderly people safety*

**Specific Problem and its Description:**

(Problem 9, Peru)

- Obsolete vehicles in use of public and particular transportation.
- Lack of Road Safety mechanism for example the seat belt.
- Safety mechanism according to the vehicle's price.
- Roads should be secure and have safety roadsigns to protect and guide users.

**Solutions:**

(Problem 9, Peru)

- To gradually renew vehicles in use, mainly public transport vehicles.
- To increase the minimum standard of vehicle's safety.
- To assign an obligatory percentage for each work of signaling and other safety mechanisms.
- To introduce the road safety audit in the three phases of a road project, both in construction and urban maintenance.

**Achievements:**

(Problem 9, Peru)

- Public transportation vehicles is being gradually renewed.
- Updating of the Manual of Signaling and Control Mechanisms.

**Difficulties:**

(Problem 9, Peru)

- High social cost that means the renewing of public fleets vehicle.

Category D: Vulnerable Groups

(Singapore)

Problem 9: *Elder people safety*

**Specific Problem and its Description:**

(Problem 9, Singapore)

- High incident of fatalities among elderly pedestrians age >60.

**Solutions:**

(Problem 9, Singapore)

- Use of road signs to warn of the presence of elderly pedestrians
- Provide pedestrian facilities to enable safe crossing.
- Regular medical and competency testing of eye sight/hearing for motorists over 60 years in age
- Use better reflective sheeting for traffic and directional signs

**Achievements:**

(Problem 9, Singapore)

**Difficulties:**

(Problem 9, Singapore)

- Ignorance of law by elderly road users, using convenient routes to cross instead of designated crossing point.

Problem 9: *Elderly people safety*

**Specific Problem and its Description:**

(Problem 9, Chinese Taipei)

High incidence of injury:

The elderly are more vulnerable than other road users because they tend to move slowly and react slowly to dangerous situations. Other possible factors might be the follows:

- Some drivers are impatient to the slow motion of the elderly.
- Most elderly people get up early and go outdoors while it is still dark.

**Solutions:**

(Problem 9, Chinese Taipei)

- Educate people to give the ways to the elderly
- Educate the elderly to wear bright clothes while moving outdoors

**Achievements:**

(Problem 9, Chinese Taipei)

-

**Difficulties:**

(Problem 9, Chinese Taipei)

- It is difficult to evaluate the effectiveness of education and to ensure that the education is applied to the specific groups we want to apply.



Category D: Vulnerable Groups

(Chinese Taipei)

Problem 9: *Elderly people safety*

**Specific Problem and its Description:**

(Problem 9, Chinese Taipei)

The inappropriate design of the steep stairs of buses:

The steep stairs of buses are very high. It is dangerous for the elderly people to get on/off the buses.

**Solutions:**

(Problem 9, Chinese Taipei)

- Improving the steep stairs of buses
- Trying to increase the amount of low floor buses
- Providing the automatic devices, such as conveyors, of pedestrian crossings

**Achievements:**

(Problem 9, Chinese Taipei)

- Increasing the elderly people safety

**Difficulties:**

(Problem 9, Chinese Taipei)

- People are careless of the elderly people

Category D: Vulnerable Groups

(Thailand)

Problem 9: *Elderly people safety*

**Specific Problem and Its Description:**

(Problem 9, Thailand)

(Same as Problem 8)

- Vulnerability of pedestrians, in particular the children, the elderly and the handicapped.
- Insufficiency of pedestrian crossing and light signal.

**Solutions:**

(Problem 9, Thailand)

(Same as Problem 8)

- Provide more pedestrian crossing and light signal in urban areas.
- Campaign and educate the children and the public for safe road users.
- Improve for better condition of waking space.

**Achievements:**

(Problem 9, Thailand)

(Same as Problem 8)

- Increasing number of such pedestrian facilities for both pedestrian and the blind.

**Difficulties:**

(Problem 9, Thailand)

(Same as Problem 8)

- Require ongoing resources to campaign and provide more pedestrian facilities.

Problem 10: *Community approach to reduce road related injuries and fatalities.*

**Specific Problem and its Description:**

(Problem 10, Canada)

- Lack of or limited knowledge of community road safety issues: a pilot study on community policing revealed that neither the police nor the other road safety stakeholders in their community had any knowledge of the major risks to their safety.
- Limited funding and redirected police priorities to areas other than road safety exist in many communities.

**Solutions:**

(Problem 10, Canada)

- Educate police and other road safety stakeholders within communities of the major risks to their safety so that they can establish their own priorities.
- Educate the police to the need for and utility of collecting comprehensive data to help identify road safety problem within their communities.
- Identify road safety programs for which considerable community interest exists.
- Raise community awareness of road safety by developing and implementing community oriented road safety public education campaigns.
- Increase ownership of local road safety issues by having direct participation of stakeholders in road safety decision making in communities.
- Increase deterrence through increased enforcement.

**Achievements:**

(Problem 10, Canada)

- Selected communities have established 'speed watch' or 'community safety zones', where motorists' convicted of speeding are subjected to discriminatory fines.
- Selected communities have created Road Safety Advisory agencies or Interagency committees composed of government as well as other public and private stakeholders. These committees focus on such regional and seasonal issues as school bus safety, school patrol safety, bicycle and pedestrian safety, winter driving habits, proper use of child restraints, drive home services for impaired drivers, holiday traffic congestion and other initiatives aimed at encouraging individuals to assume responsibility for road safety in their community.
- Dissemination of community awards for particularly successful programs or initiatives.
- A pilot study on community policing is currently taking place in one province,

which if successful, will be used to develop a national model on community policing throughout the country. Front-line police officers and other road safety stakeholders are being educated about the major road safety risks in their community and of ways to determine solutions to these problems.

- Selected jurisdictions have increased funding for community programs aimed at increasing seat belt use and at reducing the incidence of drinking and driving.

**Difficulties:**

(Problem 10, Canada)

- The resources available for community road safety programs vary considerably among the provinces and territories.

Problem 10: *Community approach to reduce road related injuries and fatalities*

**Specific Problem and its Description:**

(Problem10, Japan)

Appropriate sharing of roles between people and administration:

Recently in Japan it is intended to establish appropriate sharing of roles between people and administration. It is important that the traffic safety measures are promoted effectively and efficiently by the participation of the regional population. However, the participation of the regional population is not sufficient. The possible factors might be the follow:

- Opportunities of participation

**Solutions:**

(Problem10, Japan)

- For residential area, area-wide infrastructure development efforts involving the creation of community roads and mixed pedestrian-vehicular road will be made by road management operators in conjunction with zoning regulations through the Police.
- General Traffic Safety Checks will be implemented with the participation of the regional population and road users themselves in order to promote road safety. These efforts will be shared between the administrative authorities and the citizens on the basis of a heightened awareness of traffic safety by the road user.

**Achievement:**

(Problem10, Japan)

- The participation of the regional population is carried out.
- Improvement of the comprehension for the road traffic safety
- The model case at Mitaka Renjyaku area, the number of traffic accidents has been reduced by 60% in 1997 compared with in 1995

**Difficulties:**

(Problem10, Japan)

- The effect of reducing road related injuries and fatalities is not clear

Problem 10: *Community approach to reduce road related injury and fatality*

**Specific Problem and its Description:** (Problem 10, Republic of Korea)

To promote traffic safety and devise appropriate measures for specific regions, the relevant authorities should encourage residents' participation and take into account their interests. There are, however, several problems with this approach to improving traffic safety:

- In many cases, the provincial government, residents, and road management organizations cannot reach agreement on traffic-related issues.
- Improvement projects often face resistance from residents who are more concerned about the financial burden rather improved traffic conditions.
- Undesirable opportunism and a lack of law-abiding spirit poses many obstacles.

**Solutions:** (Problem 10, Republic of Korea)

- The formation of residents' committees should be encouraged.
- The relevant laws and regulations (Road Traffic Act, Road Act, Parking Lot Act, Fire Prevention Act) concerning road operation, road facilities and installment/management of traffic facilities should be unified to avoid administrative confusion in carrying out improvement projects.
- Training programs and publicity activities should be provided to enhance a law-abiding spirit among residents.

**Achievements:** (Problem 10, Republic of Korea)

- Traffic safety-related policies would better reflect regional interests.
- Individual regions could effectively improve their traffic environment.
- Reflecting public opinions in the policy-making process would reduce civil petitions.

**Difficulties:** (Problem 10, Republic of Korea)

- A weak framework for enlisting public participation and the residents' unfamiliarity with their proper role makes it difficult to promote such projects.

Problem 10: *Approach of the communities to reduce victims related to road accidents*

**Specific problem:** (Problem 10, Mexico)

Programs of road safety practically do not exist that involve the communities at a local level:

In the country, at level society, there is little conscience on the problem of road safety. Most of the people do not consider the possibility that they can suffer a traffic accident and perceive this problem like others. On the other hand, a culture of road safety within the organism in charge of the roads does not exist and the transportation is not an approach with the society to try to reduce its consequences. Only in some cities and communities some programs and campaigns limited focused the solution of this problem have been implemented.

**Solutions:** (Problem 10, Mexico)

- To impel the creation of a National Plan of Road Safety which directly involves the communities, as well as the authorities at all the levels (federal, state and municipal) of the country.
- To promote integral campaigns of road education.
- To generate a greater conscience in society of the importance of the road safety within its development.

**Advances:** (Problem 10, Mexico)

- Some cities and communities have undertaken programs of road safety at local level
- In some cities, with the collaboration of the family parents, have launched campaigns for the safety of the children, particularly in the neighborhoods of the schools.

**Difficulties:** (Problem 10, Mexico)

- In general, there is a little conscience of the problem of road safety and the people feel that they not belong to this.
- The authorities have not fomented a safety road culture.
- There is a remarkable lack of road education.

Problem 10: *Community approach to reduce road related injuries and fatalities*

**Specific Problem and its Description:** (Problem 10, New Zealand)

1. Continuing challenge maintaining community involvement in the ownership of road safety.

**Solutions:** (Problem 10, New Zealand)

1. Funding of community projects and road safety co-ordinators in order to contribute to achievement of National Road Safety Plan (NRSP) and National Road Safety Targets.

**Achievements:** (Problem 10, New Zealand)

1. As community projects are accepted as an integral part of international best practice for road safety, the community project intervention is essential to road safety in New Zealand along with engineering, enforcement, publicity/education interventions.

**Difficulties:** (Problem 10, New Zealand)

1. Requires constant monitoring.
2. Funding for community projects is difficult to obtain.
3. Inability to fund all initiatives coming up from the community, resulting in the loss of valuable community resources, effort and initiative being applied to road safety.
4. The challenge of developing synergies with other community initiatives.



Problem 10: *Community approach to reduce road related injuries and fatalities*

**Specific Problem and its Description:** (Problem 10, New Zealand)

2. Translation of national policies into local initiatives, catering for local areas' uniqueness.

**Solutions:** (Problem 10, New Zealand)

1. Issuing of guidelines setting out criteria for funding in accordance with the goals of the LTSA's Community Road Safety Strategy.
2. Employment of road safety co-ordinators to provide a link between the bureaucracy and the community.
3. Identification of best practice community projects.

**Achievements:** (Problem 10, New Zealand)

1. Guidelines setting out funding criteria are produced.
2. Road safety co-ordinators are employed to facilitate the process.
3. Systems are in place to identify best practice community projects while also taking innovative approaches into account in funding decisions.
4. It is accepted that benefit/cost evaluations in terms of road safety outcomes are not feasible with community projects. Therefore, rigorous ex-ante evaluations of projects are undertaken along with ex-post process evaluations.
5. An Austroads review is currently underway to assess the benefits of community road safety programmes in Australia and New Zealand.

**Difficulties:** (Problem 10, New Zealand)

1. Need to continue to foster innovation.

Problem 10: *Community approach to reduce road-related injuries and fatalities*

**Specific Problem and its Description:** (Problem 10, New Zealand)

3. Ensuring the efforts of the community are targeted and co-ordinated appropriately.

**Solutions:** (Problem 10, New Zealand)

- Application of NRSP key principles (Co-ordination, Demonstrated Best Practice, Value for Money, Monitoring and Evaluation, Treaty of Waitangi and Road Safety Ownership), LTSA's Community Road Safety Strategy goals, New Zealand Road Safety Programme funding criteria - all of which result in the application of good management at all levels.

**Achievements:** (Problem 10, New Zealand)

1. Process outlined above is undertaken.

**Difficulties:** (Problem 10, New Zealand)

1. Level of funding

Problem 10: *Community Approach to Reduce Road Related Injury and Fatality.*

**Description of the Problem:**

(Problem 10, Papua New Guinea)

1. Difficulties in gaining Community involvement in the ownership of road safety.
2. Translation of national policies into local initiatives. catering for the local areas uniqueness.
3. Ensuring the efforts of the Community are targeted and co-ordinated appropriately.
4. The public authority, the National Road Safety Council's ignorance of the importance of Community ownership and participation in road safety.

**Description of Solutions:**

(Problem 10, Papua New Guinea)

1. Development of the National Road Safety Plan and Targets.
2. Country wide publicity campaigns.
3. Adequate budget for this project to achieve results.
4. Link and liaisons between bureaucracy and the community.
5. Application of Safety Plan Key principles, i.e. Co-ordination, demonstration of best practices, value for money, monitoring and evaluation, etc.
6. Dissemination of information or fact sheets down to local authority levels.

**Difficulties:**

(Problem 10, Papua New Guinea)

1. Requires substantial and ongoing resources.
2. Funding for community projects difficult to obtain as it is difficult to analyze the linkages between projects and road safety outcomes, and therefore to justify funding.
3. Application of best practice projects to other local communities.
4. Implementing the key principles underlying the Road Safety Plan.
5. Ensuring sound management.

Problem 10: *Community approach to reduce road related injury and fatality*

**Specific Problem and its Description:** (Problem 10, Peru)

- There is no an effective community's participation to solve road problems in the zone.
- Lack of properly planning to educate people about the Road regulations and strategies.
- There is no consciousness of the importance of road safety.
- Projects and their results are not being monitored.

**Solutions:** (Problem 10, Peru)

- To pay more attention to the local community opinion.
- To put vertical and horizontal devices.
- To develop necessary infrastructure to guarantee pedestrians' safety.
- To organize more Police Control, Education, and Training for pedestrians and drivers.
- To homogenize Safety Mechanism applied to the community.

**Achievements:** (Problem 10, Peru)

- To organize educative activities.
- To get more concerned in engineering projects, including the Road Security Audit projects.
- To conciliate wills and to coordinate efforts.

**Difficulties:** (Problem 10, Peru)

- People is not conscious enough about road safety and the seriousness of its consequences for public health.
- Communities and their authorities do not have an adequate communication on the current problems or requirement to reduce the number of injured people by traffic accidents.
- Lack of economic resources to carry out prevention activities.

Problem 10: *Community approach to reduce road related injury and fatality*

**Specific Problem and its Description:** (Problem 10, Singapore)

- Ad-hoc involvement by community on reduction of road accidents.
- Difficulty in educating public and gaining community involvement in road safety.

**Solutions:** (Problem 10, Singapore)

- Started initiative with to involve community and parents in the Safe Drive Zone for schools together with Traffic Police Department. Parents and volunteers are involved as traffic wardens to guide children at designated crossing
- Drive road safety by coordinating the contributions of other agencies.  
Formation of a working group

**Achievements:** (Problem 10, Singapore)

-

**Difficulties:** (Problem 10, Singapore)

- Lack of resources and manpower
- Community still has not caught the concept of playing a part in safety. They expect authorities to solve the problems.

Problem 10: *Community approach to reduce road related injury and fatality*

**Specific Problem and its Description:**

(Problem 10, Chinese Taipei)

Community approach to improve road safety:

Community approach has not been applied to improve road safety. However, it gets more concern by the public and the agencies due to the effectiveness and importance of regional residents' participation. On the other hand, the community approach is not easy to establish. There are some factors described in the following.

- The concept on community approach is not all accepted by the public and the agencies.
- There is no organization to coordinate with the regional residents.
- The guideline or law of "the public listening" procedure is lack.
- There is no method to promote the community approach to reduce road-related injuries and fatalities.
- The cost and benefit of the community approach are difficult to measure before the projects are practiced.

**Solutions:**

(Problem 10, Chinese Taipei)

- Establishing the organization of community road safety
- Developing the standard guideline for community participation
- Increasing the opportunities of communication among community planners, residents and agencies

**Achievements:**

(Problem 10, Chinese Taipei)

- Some crowded roads with mixed pedestrian-vehicle flow are planned to give priority to pedestrians and vehicles are not allowed to access.
- The safety and efficiency of community traffic are improved.
- The life quality of community is improved.

**Difficulties:**

(Problem 10, Chinese Taipei)

- Lack of skills and resources
- Lack of expertise
- Some suggestions of residents are not identical and difficult to coordinate

Problem 10: *Community approach to reduce road related injury and fatality*

**Specific Problem and Its Description:**

(Problem 10, Thailand)

Less roles of community approach in road safety.

**Solutions:**

(Problem 10, Thailand)

- Encourage the community role to increase road safety through the school of their communities. In residential areas several communities construct road humps for reducing vehicle speed, and install warning sign to reduce speed on roads near community park or school.

**Achievements:**

(Problem 10, Thailand)

- Some communities aware that increasing road safety could be some benefit for themselves and their children.

**Difficulties:**

(Problem 10, Thailand)

- Limit resources for encouraging community roles in increasing road safety.

Problem 11: *Accident black spot approach to reducing accidents*

**Specific Problem and its Description:**

(Problem 11, Australia)

Sections of road with poor crash history have not been subject to adequate remedial works.

**Solutions:**

(Problem 11, Australia)

- The Federal Government is providing AUS\$40 million (US\$26 million) per year to the states to rectify road crash black spots. At least 50% of funds must be spent in rural areas and projects must have had at least three casualty crashes in the past three years and have a benefit/cost ratio of at least 2. Projects may also be submitted on the basis of a road safety audit. Sites for treatment may be nominated by state road authorities, local governments and the public. Projects are assessed by state road authorities and panels have been established in each state to consider projects and to provide recommendations to the Federal Government.
- Typical projects are the installation of roundabouts, traffic lights, and in rural areas, shoulder sealing, channelisation of intersections, audible edge lining and overtaking lanes.

**Achievements:**

(Problem 11, Australia)

- In the first three years of the program 1,122 projects have been approved with a value of AUS\$117 million. Based on past experience reductions of up to two-thirds in the number of serious casualty crashes may be expected at these sites and benefits exceeding costs by 4 to 1.

**Difficulties:**

(Problem 11, Australia)

- There is some evidence that as the worst sites get treated first, the future benefits of the program tend to be smaller. However there is also concern that systems for identifying sites for treatment are poorly developed and that many deserving projects remain unrecognised and therefore untreated.



Problem 11: *Accident black-spot approach to reduce accidents*

**Specific Problem and its Description:**

(Problem 11, Canada)

- Black spot programs are perceived to be local improvements and are therefore administered by provincial, territorial or municipal governments. Financial resources necessary to administer these programs are not always available.
- Reporting of detailed roadway related data on traffic collision report forms necessary to perform black spot analysis is often inaccurate or unavailable.

**Solutions:**

(Problem 11, Canada)

- The Auditor General of Canada has recommended the establishment of black spot programs to justify the investment of funds into a national highway system. This program should be in place in two years.
- By accessing Transport Canada National Collision Data Base (NCDB) for crash data and the Canadian Highway Information System (CHIS) for related policy information, some solutions to black spot areas may be identified.
- Train police officers to utility of and necessity for more comprehensive reporting of roadway related data when completing traffic collision reports.

**Achievements:**

(Problem 11, Canada)

- A Canadian Highway Information System is currently being implemented throughout Canada, which could be used to identify black spot areas on the Canadian road system.

**Difficulties:**

(Problem 11, Canada)

- Black spots are perceived to be local improvements. It is therefore difficult to establish funding at a national level for a road safety improvement that is at best regional in nature.
- Black spot programs aimed at reduce traffic collisions are often very expensive to administer.

Problem 11: *Accident black-spot approach to reduce accidents*

**Specific Problem and its Description:**

(Problem11, Japan)

Location of black-spots:

The fact is that 40% of all traffic accidents at trunk roads are concentrated in only 9% of the total area. The improvement of black-spots has not finish. The possible factor might be the follow:

- Location of black-spots

**Solutions 1:**

(Problem11, Japan)

- Establishment of Institute for Traffic Accident Research and Data Analysis

**Achievement 1:**

(Problem11, Japan)

- ITARDA(Institute for Traffic Accident Research and Data Analysis) integrates transportation-related data consisting of inspection data of traffic accidents, and data concerning drivers, vehicle standards, and road structures, and conducts comprehensive research and analysis of traffic accidents from the viewpoints of people, vehicles, roads, etc.
- The Center contributes to the enhancement of scientific research and analysis of traffic accidents and, consequently, the implementation of effective traffic safety measures.

**Solutions 2:**

(Problem11, Japan)

- Identification of the black-spots based on the accident data of ITARDA

**Achievement 2:**

(Problem11, Japan)

- 3,200 accident Black spots have been identified on trunk roads. From fiscal 1996, countermeasures have been developed and promoted by the Accident Black Spot Countermeasures Council.

**Difficulties:**

(Problem11, Japan)

Problem 11: *Accident black-spot approach to reduce accidents*

**Specific Problem and its Description:**

(Problem 11, Republic of Korea)

Since 1988, the Korean government has implemented several projects to improve road safety at high accident locations. Currently, the second improvement project is underway. The following are difficulties in facilitating improvement projects at high accident locations.

- The National Police Agency is in charge of designating, analyzing and formulating improvement plans for high accident locations, while the actual execution of the projects is undertaken by road management organizations. This separation of authority creates difficulties in the effectiveness of improvement projects.
- Due to confusion in classifying causes of accidents, confidence in the improvement projects has been weakened. Despite the implementation of projects, there are still many high accident locations across the nation.
- No rigorous analysis of the cost-effectiveness of projects has been carried out since their implementation. There is a high possibility of excessive investment.

**Solutions:**

(Problem 11, Republic of Korea)

- Analysis of accident causes and comprehensive countermeasures should be established. (National Police Agency).
- Accident-related data should be shared and thoroughly analyzed, so that the relevant authority (road management organizations) can plan and carry out improvement projects, and handle post-evaluation and supplementary process.
- A comprehensive computer network should be established to compile, share and analyze accident-related data.
- A comprehensive Highway Safety Management System should be established.

**Achievement:**

(Problem 11, Republic of Korea)

- More precise investigations into the cause of accidents and appropriate preventive measures could help reduce traffic accidents.
- Improvement projects could be carried out more economically and effectively.

**Difficulties:**

(Problem 11, Republic of Korea)

- Close cooperation among the relevant organizations should be established.
- Concrete guidelines on implementing improvement projects at high accident locations should be drafted and those in charge should be specialists in their area.

Problem 11: *Accident black-spot approach to reduce accidents*

**Specific problem:** (Problem 11, Mexico)

High sinisterness in certain specific points of the road network.

The disproportioned evolution between highways and vehicles has implied the appearance of sites of high danger where a great amount of accidents happens. In Mexico dangerous site or black point is considered in which happen four or more accidents annually.

**Solutions:** (Problem 11, Mexico)

- To implement a program of attention to the black points.
- To implement measures to the elimination of these sites or to diminish its dangerous through low cost actions.

**Advances:** (Problem 11, Mexico)

- Is being carried out the Program of Attention to Dangerous Points that includes 2300 sites of high danger.
- The main efforts have focused to the horizontal signalling.
- On the actions of 1997 were attended 705 dangerous sites and there was a reduction of 706 accidents regard to those registered during the previous year.
- There is a jointly work with the motorcarriers associations who make suggestions about the important matters and the possible solutions.

**Difficulties:** (Problem 11, Mexico)

- Lack of resources to take care of the totality of the identified dangerous sites.

Problem 11: *Accident black-spot approach to reduce accidents*

**Specific Problem and its Description:** (Problem 11, New Zealand)

1. Location of black-spots

**Solutions:** (Problem 11, New Zealand)

- Requires crashes with map co-ordinates or location on a link node road system.

**Achievements:** (Problem 11, New Zealand)

- Since the accident black-spot programme began, around 2,100 accident black-spot sites have been identified and treated. An evaluation carried out in 1997 indicated there had been a 28% reduction in crashes at the treated sites.
- Crash Analysis System has this facility.

**Difficulties:** (Problem 11, New Zealand)

- Resources to geo-code crashes.
- Under-reporting of crashes.
- Difficulty locating some crashes due to poor quality Police reporting.
- Software to automatically find clumps of crashes (spots).
- This capability is needed directly by the road developers and maintainers.

Problem 11: *Accident black-spot approach to reduce accidents*

**Specific Problem and its Description:** (Problem 11, New Zealand)

2. Location of black routes

**Solutions:** (Problem 11, New Zealand)

- Same as in (1) but using some form of link node system incorporating traffic flow data for calculation of crash rates

**Achievements:** (Problem 11, New Zealand)

- Crash Analysis System has this facility.

**Difficulties:** (Problem 11, New Zealand)

- Quality of traffic flow estimates.
- Maintenance of flow estimates.
- Software to calculate crash rates and report results.

Category E: Others

(New Zealand)

Problem 11: *Accident black-spot approach to reduce accidents*

**Specific Problem and its Description:**

(Problem 11, New Zealand)

3. Funding for countermeasures

**Solutions:**

(Problem 11, New Zealand)

- More funds required.

**Achievements:**

(Problem 11, New Zealand)

- Funding allocated according to priorities.

**Difficulties:**

(Problem 11, New Zealand)

- Inadequate funds to treat all sites

Problem 11: *Accident black-spot approach to reduce accidents*

**Specific Problem and its Description:** (Problem 11, Peru)

To identify the place where traffic accidents are common, causing serious injuries and death, and subsequently find the cause of the accident.

**Solutions:** (Problem 11, Peru)

- To identify the black-spots to take action on them.
- To implement a database to register the accidents, locating the accident's place through the street's name and the house's number (urban area) and the road's number and the previous and subsequent kilometer (rural).
- To analyze each accident, identifying possible factors involved in them, taking an effective measure that permit us to reduce the percentage of fatalities.

**Achievements:** (Problem 11, Peru)

- A Form of Traffic Accidents Record has been designed, in which every detail of the accident is written down and subsequently this information is recorded in the computer, through a designated software DATAAC, which will then issue statistics reports and the location of the black points.
- The traffic policeman registers the event in the place where it happened and then such information is sent to his police station to be recorded in the computer.

**Difficulties:** (Problem 11, Peru)

- Coordination improves slowly since the National Police does not consider the Road Security as a priority.
- We are in a pilot stage, working with five police stations (urban area) and a road section (rural zone), however, an agreement with the National Police is making its development slower.
- We need to prepare a National Training Plan for the Police, related to the Data Record Form and DATAAC.



Problem 11: *Accident black-spot approach to reduce accidents*

**Specific Problem and its Description:**

(Problem 11, Singapore)

- Identify and address the problems at the blackspot area
- Accurate maps to identify the locations of these incidents.
- Gore areas at abutments of bridge structures are one of the areas with high incident rates.

**Solutions:**

(Problem 11, Singapore)

- Separate team from Traffic Management branch established to look into these problems
- Worked with Traffic Police on sharing of information and uploading to digital GIS map for data monitoring and analysis.
- Crash cushion on trial at gore areas
- Accident investigation preventive work carried out for all fatal and serious crashes that involved injury
- To identify potential deficiency before preliminary design, design stage and construction stage through road safety audit process to eliminate back spots from occurring.

**Achievements:**

(Problem 11, Singapore)

**Difficulties:**

(Problem 11, Singapore)

- Lack of manpower and need to prioritize measures for implementation
- High cost and resources to maintain an accurate database, which require verification
- Lack of formalised training in accident investigations
- Site constraints at times limits the possible remedial action due to scarcity of land in Singapore

Problem 11: *Accident black-spot approach to reduce accidents*

**Specific Problem and Its Description:** (Problem 11, Thailand)

- Lacking of uniformity on traffic accident data which are reported from government agencies such as police stations, highway district office, and hospitals.
- The number of traffic safety devices providing in the construction project is less than the international standard.
- Annual budget in traffic safety is not enough for tracing the road accident's problem.
- Knowledge and understanding on traffic engineering of the engineering of the local staff is restrictive.

**Solutions:** (Problem 11, Thailand)

- The national traffic accident report in a solid/uniformity format should be set up for using every agencies throughout the whole kingdom of Thailand.
- National Budget Bureau should engage on increasing traffic safety budget annually in approximately 3-4% of the construction project.
- The road safety budget for other regions must be reserved in 5 percentage of the whole highway district budget for the fiscal budget year.
- Practical training in traffic engineering point of view such as new technologies, conflict study audit, etc. should be handled consecutively year by year.

**Achievements:** (Problem 11, Thailand)

- The mitigation of traffic accidents on major roads are taken into consideration the first priority accounted to the reduction of traffic severity accidents.

**Difficulties:** (Problem 11, Thailand)

- Coordination among the different government agencies is hardly successful since the politics' nature.

Problem 12: *Raising the attention of all societies to road safety problems*

**Specific Problem and its Description:**

(Problem 12, Canada)

- Lack of awareness of important road safety issues by national and community-based road safety stakeholders.

**Solutions:**

(Problem 12, Canada)

- Use current traffic collision data to re-educate police and other road safety stakeholders of magnitude of ongoing road safety problems.
- Implement comprehensive public education campaigns that draw public attention to and help provide solutions for both national and community road safety issues.
- Target police enforcement efforts at road users who exhibit high-risk driving behavior such as driving after drinking, non-use of seat belts, speeding and running red lights.
- Establish collaborative road safety initiatives among wide cross-section of road safety stakeholders.
- Provide national leadership by chairing or participating as members of task forces on important road safety issues.
- Provide funding and expertise for important road safety initiatives that would otherwise not be undertaken.
- Establish national road safety goals or targets that can serve as focal points for programs or initiatives introduced by all governmental and non-governmental road safety stakeholders.
- Increase ownership of local road safety issues by having direct participation of stakeholders in road safety decision making in communities and by establishing community oriented programs.

**Achievements:**

(Problem 12, Canada)

- In 1996, all federal and provincial/territorial Ministers' of Transportation and Highways agreed to a comprehensive initiative designed to make Canada roads the safest in the world. The initiative is supported by and commits all levels of government and key private sector stakeholders to the following four priorities:
  - raising public awareness of road safety issues;
  - improving communication, cooperation and collaboration among road safety agencies;

- toughening enforcement measures; and
- improving national road safety data collection.

**Difficulties:**

(Problem 12, Canada)

- The provincial and territorial governments legally control driver licensing, vehicle registrations, road design and maintenance and road safety programs to be implemented in their jurisdictions. Efforts by the federal government to provide national leadership, program guidelines and in some instances funding for road safety programs and initiatives is often difficult to coordinate and achieve.
- Generating coordinated efforts on road safety initiatives and programs in many political jurisdictions and among key private sector stakeholders often takes considerable time.
- Resources necessary to implement programs and initiatives designed to raise awareness of road safety issues varies considerably among jurisdictions.

Problem 12: *Raising the attention of all societies to the road safety problems*

**Specific Problem and its Description:**

(Problem12, Japan)

What kinds of road safety problems are deeply concerned by the public:

It is important that proper and systematic education according to the ages is promoted not only by the police but also by the civic. But it is difficult to know what kind of education is proper. The possible factor might be the follow:

- No guideline

**Solutions:**

(Problem12, Japan)

- Make the guideline
- The Road Traffic Law was revised in 1997 to stipulate that each prefectural police has to strive to conduct traffic safety education for the residents. The revised law also provides that the National Police Agency prepare guidelines of traffic safety education under which to create opportunities for citizens to learn skills and knowledge to ensure proper traffic.

**Achievement:**

(Problem12, Japan)

- Police and civic can promote proper and systematic education.

**Difficulties:**

(Problem12, Japan)

- Effects are not clear
- Education does not have immediate effect.

Category E: Others

(Republic of Korea)

Problem 12: *Raising the attention of all societies to the road safety problems*

**Specific Problem and its Description:** (Problem 12, Republic of Korea)

Major civic groups concerned with road traffic safety are Networks for green transport, Citizen's solidarity for a sustainable city, Coalition of transportation culture, etc.. The following are difficulties in encouraging greater interest and participation from civic groups.

- Insufficient financial resources
- Lack of easy access to information on traffic safety
- Lack of public participation

**Solutions:** (Problem 12, Republic of Korea)

- The government could provide financial assistance to civic groups.
- Relevant information could be made available to the public.
- Nationwide campaigns could encourage greater government and public participation.

**Achievements:** (Problem 12, Republic of Korea)

- Understanding and awareness of traffic safety could be enhanced through the activities of civic groups.
- Civic groups could play a bridging role between the government and the public on traffic safety issues.

**Difficulties** (Problem 12, Republic of Korea)

- Government funding for civic groups is limited.
- Significant public participation in such activities is unlikely over the short term.

**Problem 12:** *Raising the attention of all societies to the road safety problems*

**Specific problem:** (Problem 12, Mexico)

Little conscience of the society to the problems of road safety:

Generally there is not enough attention from the society to the problems of road safety. One of the reasons is that the people do not consider the possibility be involved in traffic accidents and they tend to underestimate the consequences of these accidents. On the other hand the lack of road education and the tendency to disobey the regulations have contributed too a great unnumber of accidents in the national state road. The efforts of the authorities have been insufficient to create a conscience of road safety. Traditionally, greater priority has been given to other problems of public health (gastrointestinal diseases, infantile undernourishment, etc).

Some campaigns directed to certain aspects of the road safety have been undertaken, standing out those spreaded through means massive communication and focused to the use of the seat belt and the dissosiation of the alcohol and the driving. Others more modest have been applied only during certain police operatives in the seasonal periods. Some companies of the deprived sector, and from the wines and liquors have even participated in certain campaigns and strategies of road safety.

**Solutions:** (Problem 12, Mexico)

- To implement integral programs of road safety.
- To involve diverse sectors of the society in the implementation and diffusion of road safety campaigns.
- To coordinate the efforts of the public and private sectors.

**Advances:** (Problem 12, Mexico)

- Diverse campaigns of road security have been implemented.
- The participation of the private initiative has been obtained.
- Recently, was integrated the “National Committee to Prevent Accidents”, that works with divers sectors to improve the road safety at a national level.

**Difficulties:** (Problem 12, Mexico)

- Insufficient resources to implement campaigns of road education able to generate greater conscience of the road safety problem.
- The public society does not perceive the problem of road safety like a problem of public health.

Problem 12: *Raising the attention of all societies to road safety problems*

**Specific Problem and its Description:** (Problem 12, New Zealand)

- Raising the attention of all segments in the community to road safety problems can be problematic.
- While this is not the same as saying that it can be difficult to improve a nation's "safety culture", the concepts are similar and are treated as synonyms in this brief response.

**Problem Analysis:** (Problem 12, New Zealand)

It is easier to describe virtually every other road safety problem than it is to describe a lack of community attention to road safety, or lack of a safety culture.

The difficulty lies in the difference between the material and the non-material.

- A faulty car brake is material. A narrow bridge and a sharp curve in the road are material. An icy road surface is material. Speed and drink driving are also material, as is neglect to wear a seatbelt. These problems are perceptible to the external senses. Therefore they are susceptible to empirical analysis, including relative ease of measurement. Most importantly of all, it is easy to identify the appropriate road safety solution: it suffices to apply a material counter-measure.
- But personal or community "attention" and "culture" *in themselves* are not material. That fact gives rise to difficulties of: (a) identification, (b) measurement and (c) application of appropriate counter-measures.

Our grasp of "attention" and "culture" is only *indirect*. Attention and culture become known to us solely through their material *manifestation* in some way or other, usually through behaviour.

**Solutions:** (Problem 12, New Zealand)

*Principle to Solutions:*

The key to solving this issue lies in:

- (a) identifying the *manifestations* of a lack of attention/culture, and (b) then applying the appropriate countermeasure;
- if the manifestation is in the area of human behaviour, the solution is to facilitate the habitual practice of the *direct opposite* behaviour: if the manifestation is speed, then slow down; if it is drink driving, then stop drink- driving.

*Possible Solutions:*

The solutions cover the entire range of road safety interests. In particular, two approaches are required:

- a robust safety management framework;



- a holistic approach to road safety interventions.

*Safety management framework:*

A robust safety management framework will include:

- high level leadership, including the political will to succeed;
- high level advocacy and national coordination arrangements (e.g. in NZ through the National Road Safety Committee);
- the specification of safety performance, including shared targets (e.g. in NZ through the Strategic Result Areas and the National Road Safety Plan);
- the expression of accountabilities for contributing to the shared targets (e.g. in NZ through the National Road Safety Plan and the National Road Safety Advisory Group);
- established safety funding processes, with well developed community participation (e.g. in NZ through the New Zealand Road Safety Programme); and
- mechanisms to review safety priorities (e.g. in NZ through the LTSA's Safety Directions Programme).

*Holistic approach to road safety interventions:*

Another key to raising attention/culture is to seek to include a road safety awareness element in every safety intervention.

Interventions should include:

- people safety, vehicle safety and road safety;
- primary (before crash), secondary (in/during crash) and tertiary (after crash) interventions.

**For example:**

(Problem 12, New Zealand)

	<b>Road Safety Interventions</b>		
	<b>Primary</b> (before crash)	<b>Secondary</b> (in/during crash)	<b>Tertiary</b> (after crash)
<b>People safety</b> (driver, passenger, motorcyclist, bicyclist & pedestrian)	Education: <i>e.g. know the Road Code</i> Training: <i>e.g. industry oriented</i> Attitudes & Behaviour: <i>e.g. don't drink and drive; avoid fatigue &amp; distractions</i> Driver licence regime Conspicuous clothing: <i>bicyclists, pedestrians</i> Enforcement: <i>of laws e.g. speed</i> Demand restraint: <i>e.g. promote public transport</i>	Behaviour: <i>use of seat-belts</i>	Trauma management: <i>Emergency services</i> Medical treatment Rehabilitation: <i>physical, vocational, social</i>
<b>Vehicle safety</b>	Engineering: <i>design standards e.g. brakes; road worthiness; visibility; intelligent transport system vehicle incident detection</i> Enforcement: <i>of WOF requirement</i>	Engineering: <i>impact protection e.g. air bags</i>	Engineering: <i>vehicle salvage &amp; restoration; in-vehicle 'black box'</i>
<b>Road Safety</b>	Engineering: <i>delineation; road geometry; surface condition; visibility; seal width; shoulders; separating modes of transport; road safety audit</i> Exposure reduction: <i>e.g. strategies to reduce traffic congestion</i> Planning: <i>e.g. accesses to arterial routes</i>	Engineering: <i>sealed shoulders; safety barriers; frangible poles</i>	Engineering: <i>intelligent transport system network incident detection</i>

**Achievements:**

(Problem 12, New Zealand)

1. We have been working on achieving a robust management framework as defined above with:
  - High level leadership, including the political will to succeed;
  - High level of advocacy and co-ordination arrangements.
  - The specification of shared targets – these take us up to the year 2001. Longer term targets up to 2010 are currently being developed.
  - Clearer specification of accountabilities with the new targets.
  - Established safety-funding processes, with well developed community participation.

- Mechanisms in place to review safety priorities.
- 2. In terms of a holistic strategy, ‘safety culture’ is intrinsic to everything we do – it is not a separate construct on its own.

**Difficulties:**

(Problem 12, New Zealand)

1. Problems associated with developing a definition of what is “safety culture”.
2. Problems relating to how to measure “safety culture”.

Problem 12: *Raising the attention of all societies to the road safety problems*

**Specific Problem and its Description:** (Problem 12, Peru)

- There is no interest with regard to the road insecurity.
- There is a false perception that accidents are unavoidable situations as any natural disaster.
- The adopted measures are simple.
- Public is insensitive with regard to this problem.

**Solutions:** (Problem 12, Peru)

- Rational diffusion of the road safety situation.
- To include road safety in the governmental priorities, assuring resources or the support of international financial organizations.
- Rational and emotional support, making the population sensitive to the situation.

**Achievements:** (Problem 12, Peru)

- Creation of the National Road Security Council.
- Installation of four Pilot Projects of Road Safety, between 1997 and 1999. The first project was referred to the coordination between institutions in order to know the actions linked to road safety. The second project was referred to the creation of a Traffic Accidents Database. The third project was oriented to the education and communication, so that Road Safety will be managed in the schools and in the target population of high risks. Finally the fourth project to the updating of the Peruvian Signaling Manual.
- The following stage will be financed also by the World Bank and contains specific projects to achieve the increase of the attention of all the society in the road safety problems.

**Difficulties:** (Problem 12, Peru)

- Real knowledge about the problem generated by road insecurity, both at political decision levels and in the public.
- Road Safety is not a priority in the political agenda.
- The Public assumes the situation as irreparable.

Problem 12: *Raising the attention of all societies to the road safety problems*

**Specific Problem and its Description:** (Problem 12, Singapore)

- Different agencies often have different focus (e.g. better land use and housing) which may affect road safety
- There is a need for greater coordination and cooperation across different agencies to address issues pertaining to road safety, which is a multi-faceted problem being the responsibility of a few agencies.

**Solutions:** (Problem 12, Singapore)

- Working with different groups such as the Traffic Police Department, National Safety Council and AAS to drive safety message to different target groups. Eg. motorists etc
- Traffic Police Department conducts educational emphasis to all road users nation wide through the use of campaigns. During holiday seasons, message such as “Drink, Don’t drive” and taxi companies participating in the programme.

**Achievements:** (Problem 12, Singapore)

-

**Difficulties:** (Problem 12, Singapore)

- Require all road users to participate in these programmes.
- High resources and cost involved.
- Difficulty in change behavioral patterns of road users

Problem 12: *Raising the attention of all societies to the road safety problems*

**Specific Problem and its Description:** (Problem 12, Chinese Taipei)

**Solutions:** (Problem 12, Chinese Taipei)

- Ask related persons, such as faculty, students and traffic guides of public and private schools as well as private kindergarten bus drivers and assistants, to attend traffic safety seminars, lectures, and painting and technic competitions on traffic subjects to promote traffic safety education.
- Students are invited to visit vegetative patients, who are caused by traffic accidents, at a center run by creation social welfare foundation.

**Achievements:** (Problem 12, Chinese Taipei)

- Many seminars and lectures on traffic-related topics have been held for schools. In addition, painting and technic competitions on traffic-related subjects and traffic accident first aid training are held continually for students.

**Difficulties:** (Problem 12, Chinese Taipei)

- The biggest difficulty is lack of manpower to handle the traffic education issue.
- There is no specific office or staff appointed to take full responsibility for promotion and other work for the traffic safety education promotion. Staff was asked to deal with the issue case by case.

Problem 12: *Raising the attention of all societies to the road safety problems*

**Specific Problem and its Description:** (Problem 12, Chinese Taipei)

Raising the attention of all societies to the road safety problems:

Raising the attention of all societies to the road safety problems is more difficult than any other safety problem. The possible factors might be the follows:

- The habit and characteristic of different societies are different.
- The analysis method and measure indexes of raising the attention of all societies both are lack.

**Solutions:** (Problem 12, Chinese Taipei)

- Improving the engineering, education and enforcement (3E) of traffic environment
- Increasing the opportunities of safety training
- Increasing the traffic safety advertisements

**Achievements:** (Problem 12, Chinese Taipei)

- The safety and efficiency of community traffic are improved.
- The life quality is improved.

**Difficulties:** (Problem 12, Chinese Taipei)

- Lack of skills and resources
- Lack of expertise

Problem 12: *Raising the attention of all societies to the road safety problems*

**Specific Problem and Its Description:** (Problem 12, Thailand)

The specific problems and their descriptions are more or less similar to your project descriptions on page 19, paragraph 56 - 59.

**Solutions:** (Problem 12, Thailand)

- Organisations concerned should be encouraged to educate road users by having a chance to perform their own authorities and responsibilities.

**Achievements:** (Problem 12, Thailand)

- The road users learn how to perform their manners on the roads with safety awareness; all societies have learnt the road safety problems.

**Difficulties:** (Problem 12, Thailand)

- Introducing the right attitudes on using the road transport safety to all societies.