



**Institute of Transportation,
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Advocacy of Monitoring Corrosive Environment for Assurance of Public Work Quality and Longevity

According to the statistical data released by the Federal Highways Administration (FHWA) of the USA, corrosion of materials causes USD 276 billion worth of damage to the US economy annually, which accounts for 3.1% of GDP. Accordingly, it is estimated that the corrosion of materials in Taiwan will cause losses amounting to NTD500 billion. For this reason, the Institute of Transportation, Ministry of Transportation and Communications (hereinafter, "IOT") has launched the installation of a national corrosive environment monitoring network since 2007 and has established 232 monitoring stations across Taiwan (Figure 1) so as to install an information system for the classification of local ambient corrosion of the environment on the basis of the data collected and research findings (Figure 2).

IOT follows the code of the International Standardization Organization (ISO) and the CNS of the Republic of China to conduct long-term field experiments and study to investigate the factors causing corrosion and the exposure of metals (carbon steel, zinc, copper, aluminum), and established the "Taiwan Corrosive Environment Classification System". With the help of Google Maps and the database of the experts, users can quickly search the information on the classification of corrosive environments at different monitoring locations. This information can be used by the people in the inquiry of the trend and changes in corrosion at their concerned areas for comparison. In addition, the Directorate General of Highways can also cite the information as a reference for classifying coating for the steel structure bridges on provincial and county highways, determining the frequency of maintenance, and budgeting. The Highway Bureau can use this information to make improvements for anti-corrosion of the metallic components of road traffic facilities. It is expected that the investigation and research of the IOT and the utilization of the public could help to jointly maintain the quality of public works and take proper measures for protection

so as to prolong the life span of the works, and reduce the possible economic losses caused by the ambient environment.

Taiwan is located in the sub-tropical zone with high temperatures, high humidity, and high salinity, which is a typical island climate region. The thriving industrial development and rapid growth of motor vehicles has driven Taiwan to a C5 level of serious corrosion in many locations along the coast line with some locations even higher than the C5 level under the ambient corrosive environment classification standard (a scale of C1 to C5), and the note was marked as CX. Taiwan lacks information on the local corrosive environment. Furthermore, the data on ambient corrosion compiled by foreign countries has generally been used as a reference in public work construction over the year to assess the rate of corrosion and design for anti-corrosion. The result is corrosion has come much earlier than the designed life span. For example, the Linkou elevated steel bridge on Provincial Highway No. 15 at 20K + 205 was opened to service in 1998 and the anti-corrosion design was made under the Japanese standard of 600gm/m² in applying zinc plating with a projected life span of at least 30 years (the loss rate along the coast line of Japan is approximately 10-20 gm/m² annually). Yet, the zinc plated layer depleted in about 4 to 5 years such that the steel structure required additional anti-corrosion treatment.