

Durability of Hot Dip Galvanizing

Hiroshi Shibayama*

Japan Galvanizers Association

2-21-3 Akasaka, Minato-Ku, Tokyo 107-0052 Japan

shibayama@aen-mekki.or.jp

Keywords: Galvanizing, Durability, Service life,

Zinc is well known as metal which protects steel from corrosion. There are various corrosion prevention methods using zinc such as hot dip galvanizing, electroplated zinc coating, zinc spraying and zinc rich paint. Each method has its own characteristic and is applied depending on the type and usage of steel structure, and also the environment in which the structure is placed.

Coating film formed in hot dip galvanizing is, different to paint or electroplated zinc coating, a metallurgical bond between zinc and base steel. Therefore it is very strong and maintain effective corrosion prevention performance in various corrosion environment for a long period. It is widely used for construction, electric power facilities, communication facilities, street furniture, railway equipment, agricultural and fishery facilities and so on. In Japan, about 1.2 million tons of steel was hot dip galvanized last year and more than 40% of them was used for construction.

When designing steel structure using hot dip galvanizing, it is important to estimate its service life correctly. To estimate the service life, corrosion rate is the key, that is, how much coating film is lost every year in the environment the structure is placed. To know the corrosion rate, various laboratory experiment methods have been developed but none of them is satisfactory. To know the corrosion rate in the environment, investigation on the actual condition of a real structure in service, or exposure test using small samples near by the real structure is the most effective and useful. This kind of investigation takes long time. JGA has been performing those investigations and tests in various environment for a half century. The results are arranged for designing of galvanized steel structure.

This paper summarizes the results of these investigations and provide guideline for estimation of service life of hot dip galvanizing.