THE STUDY ON CONCRETE DETERIORATION IN EXPOSED BUILDINGS

ABSTRACT

The study on concrete deterioration in exposed buildings, which started in September 2002, was undertaken by Evenfit Consult for Pusat Khidmat Pakar, Cawangan Struktur dan Kejuruteraan Pakar Jabatan Kerja Raya (JKR). The focus of the study was on chemical attack of concrete in buildings above ground level.

The main objective of the research was to produce a "corrosivity" map of Peninsular Malaysia; similar to those found in New Zealand, Japan and other countries. A corrosivity map indicates geographically the severity of each locality in terms of "corrosivity" or the likelihood of causing concrete deterioration. With knowledge of corrosivity at a site, appropriate durable concrete can be specified discriminately for building to be replaced or constructed.

A measure of concrete corrosion risk known as Corrosive Risk Rating (CRR) was defined as a numerical scale ranging from 1 to 5. CRR is a dimensionless parameter whose value depends on the sulfate/chloride content at 20mm depth and carbonation depth on a concrete member. This rating relates quite well with JKR condition rating.

A climatic index called Climatic Corrosive Index (CCI) based on 24-hour mean Relative Humidity (RH) and 24-hour mean temperature was also defined. Its value is determined by a formula, which calculates the annual mean of the product of two terms R1 and R2. R1 and R2 are monthly indices related to 24-hour mean temperature respectively.

In order to determine the value of CCI corresponding to concrete corrosion potential represented by CRR, a link between the two parameters was established using a regression model. Other factors affecting concrete deterioration were included in the regression analysis.