

Annual Concrete Seminar 2005
Durability of Reinforced Concrete Structures

Alkali-Aggregate Reaction of Concrete Structures

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Abstract

Alkali aggregate reaction (AAR) occurs when the alkali in concrete reacts with some deleterious minerals in the aggregate when there is sufficient moisture, causing expansion and cracking of the concrete. AAR was first observed in Hong Kong in 1991. A review of international practice led the promulgation of Works Bureau Technical Circular (WBTC) 5/1994 for controlling the risk of AAR in Hong Kong. WBTC 5/1994 requires limiting alkali content in concrete to 3.0kg/m^3 .

Hong Kong Quality Accreditation Agency operates a Quality Scheme for the Production and Supply of Concrete (QSPSC). All concrete supplied to public works projects has to be from QSPSC accredited producers. One of the requirements of QSPSC is testing of alkali reactivity when an aggregate is first proposed for use. The presumption is that aggregates found to be reactive would not be accepted for use.

To keep abreast with the latest development of AAR control measures adopted universally, Public Works Central Laboratory (PWCL) of Civil Engineering and Development Department (CEDD) commenced a review of international practice and local experience in 2003. The findings of common mitigation measures against the damage to new concrete due to AAR will be presented in this seminar.

PWCL has also actively participated in the development of test for assessment of AAR potential. A report on "The use of accelerated mortar bar test methods (AMBT) for assessment of AAR of aggregate in Hong Kong" was published by GEO in 2002. PWCL is currently developing concrete prism test (CPT) and will develop accelerated concrete prism test (ACPT) in near future. The details of these AAR tests will be given in the presentation.

Hong Kong is in need of an updated control framework for controlling the AAR risk to new concrete structure based on the international practices and local experience. The preparation of updated AAR control framework is underway and The Hong Kong SAR Government will soon circulate the draft framework to consult the relevant parties.