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EVALUATION OF THERMAL STRESSES IN MASS CONCRETE

Dissertation submitted to
THE UNIVERSITY OF MORATUWA
In partial fulfillment of the
Requirements for the degree of
MASTER OF ENGINEERING
IN STRUCTURAL ENGINEERING DESIGN
By

W.S.U.KUMARA

Department of Civil Engineering
UNIVERSITY OF MORATUWA, SRI LANKA

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Abstract

Development of stresses due to thermal effect with different type of restraints conditions is a major problem for mass concrete structures. This report presents two methods, which can be used for thermal stress analysis with known temperature distribution. For most thick sections, the temperature distribution across the section is parabolic. A literature survey was carried out to get general knowledge about mass concrete behavior, reasons for development of tensile strain in concrete and factors affecting the cracking of concrete due to temperature rise in concrete. It is learnt that tensile stresses that developed in two to three days after casting may be greater than tensile strain capacity of the concrete at that age and lead to crack. Usually, top surface of the concrete is in tension while middle part is in compression. There is a chance to develop tensile forces in bottom part of concrete, but this may not be critical due to low thermal conductivity of the sub grading material. Also it was confirmed by this analysis that concrete will crack ,:"hen the limiting temperature difference is between 20°C -23°C for granite aggregate Concrete used in Sri Lanka.

DECLARATION

I. here by confirm that this dissertation is submitted in partial satisfaction of the requirements for Master of Engineering in Structural Engineering Design and it is the result of my own investigation and that has not been submitted in candidature for a degree /diploma of this University or any other University.

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