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Rational Probabilistic Method for Calculating Thermal Cracking Risk of Mass Concrete Structures

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Abstract : The probability of occurrence of thermal cracks in mass concrete in Japan is evaluated by the cracking probability diagram that represents the relationship between the thermal cracking index and the probability of occurrence of cracks in the actual structure. In this paper, we propose a method to directly calculate the cracking probability, following a probabilistic theory by modeling the variance of tensile stress and tensile strength. In this method, the relationship between the variance of tensile stress and tensile strength, the thermal cracking index, and the cracking probability are formulated and presented. In addition, standard deviation of tensile stress and tensile strength was identified, and the method of calculating cracking probability in a general construction controlled environment was also demonstrated.

Keywords : thermal crack control, mass concrete, thermal cracking probability, durability of concrete, calculating method of cracking probability
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