

## A Case Study of Mass Concrete Footing Construction for a High-rise Building Development in Sri Lanka

T Prasanthan<sup>1#</sup> and S Asamoto<sup>2</sup>

<sup>1</sup>Faculty of Technology, General Sir John Kotelawala Defence University, Ratmalana, Sri Lanka

<sup>2</sup>Faculty of Civil & Environmental Engineering, Saitama University, Saitama, Japan

#prasanthan.t@kdu.ac.lk

### Abstract

Currently, scale down mock up test is widely practiced in construction industry to predict the possible temperature rise and temperature differential in mass concrete construction. Also, it can be used to validate the finite element thermal and structural models and thereby correctly predict the risk of thermal cracking in actual mass concrete structures. Accordingly, a case project was selected to verify the prediction accuracy of cracking risk in mass concrete structure. This study results show that the combination of finite element modeling and scale-down mock up test is the most suitable way to predict the possible thermal cracking risk in mass concrete structural elements. This can be mainly applied to identify the suitable insulation material for the mass concrete construction to prevent the structure from early age thermal surface cracking. Further, this study proves that widely practice maximum allowable temperature limits 20°C is more conservative for medium grade mass concrete construction in tropical countries like Sri Lanka and it contribute to increase the cost in curing plan.

**Keywords:** *Mass concrete, Thermal cracking, Mock up test, Finite element modelling*