

C-31: Investigation of cracks in Senanayaka Samudra spillway

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This paper presents results of an investigation into the cracks that have developed in the access gallery and the sluice gate gallery, and the upstream side of the spillway of the Senanayaka Samudra reservoir. The cracks that appear on the galleries are almost horizontal while those on the upstream surface closely resemble map cracking.

In order to predict possible causes for these cracks, the spillway was analysed numerically using the finite element method. Two finite element models were used with the SAP90 package and these were analysed for 3 loading conditions coming from the self weight, hydrostatic pressure and thermal gradient.

Based on the finite element results, it can be concluded that the observed cracks in the galleries may be due to a thermal loading caused by a temperature gradient between the galleries and the surface of the spillway, combined with the self weight of the structure. It may also be concluded that the loadings considered will not give rise to surface cracks on the upstream side. They may however be due to Alkali-Silica Reaction.