C-29: Stress analysis of Abayagiri Stupa

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This paper presents the results of a study of stresses in the Abayagiri Stupa in connection with its present conservation. The dome and the square chamber of the Stupa were analysed under self weight loading to identify any weak zones in this brick structure. The analysis was done by the finite element method using the SAP90 package. The dome was modelled as an axi-symmetric problem and the square chamber was modelled as a 3D problem. The square chamber was analysed with 3 configurations for a reinforced concrete ring beam at its top.

The results show that the stresses in the Stupa are well below the strengths of bricks used. There are some tensile zones in the dome and the square chamber, but with small tensile stresses which can be carried by the brickwork. The introduction of a reinforced concrete ring beam at the top of the square chamber has the beneficial effect of reducing the extent of the tensile zone in the brickwork and lowering the value of the maximum stress.