AN ATTEMPT TO REINSTATE THE SHAPE OF A HIDDEN WONDER IN THE WORLD: THE GIGANTIC MAHA STUPA *DEMALA MAHA SEYA* IN SRI LANKA

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ABSTRACT

Demala Maha Seya is an uncompleted colossal hemi-spherical stupa shaped dome with a small stupa of about 4 m height built on top, located in ancient ruined city *Polonnaruwa*, *Sri Lanka* (7°42′4″N, 81°0′20″E). This is believed to be initiated during the era of *King. Parakkramabahu* in 1153-1186 AD. This gigantic structure with an approximate circumferential length of 650 m (2,132 ft.), if completed as a stupa, would have been the largest stupa in the whole world. The ongoing archeological excavations and on-site evidences reveal that the natural ground level within this perimeter has been raised to form a circular flattened top surface of approximately 400 m (1,312 ft) circumference by compacting layers of earth and rock for an approximate height of 21.0 m. Another fascinating thing about this construction is the natural rock formation that can be seen inside this massive elevated ground profile. A real answer for why this gigantic structure left incomplete, is still a myth and not known.

This research study was carried out with the aim of finding some answers for the unrevealed truths about the actual shape, size and dimensions of this gigantic stupa of the ancient world from a modern day engineering perspective. An extensive literature survey was carried out with site visits and possible shapes were fitted to the existing actual dimensions of the ruins to reproduce the full shape of the stupa. Finite element models were used to analyze the stresses developed and local concentrations due to self-weight inside the stupa dome, if constructed with ancient brick masonry. Three stupa shapes were modelled and compared for their constructability and stability with the proposed new dimensions of the stupa.

Key words: Stupa, Demala maha seya, Geometrical shapes, Finite element models