

Standard gravity and Wind load Analysis on 103 years old Unreinforced Masonry Building

Ambareesh Kumar¹, Kumar Pallav^{2,3}

¹Research Scholar Civil Engineering Department, Motilal Nehru National Institute of Technology
Allahabad-211004, Uttar Pradesh, India

Email: ambar006@gmail.com

²Senior Lecturer, Department of Civil Engineering and Surveying, Cape Peninsula University of
Technology, Bellville, Cape Town, 7530, South Africa

Email: kumarp@cput.ac.za

³(on LIEN) Assistant Professor, Civil Engineering Department, Motilal Nehru National Institute of
Technology Allahabad-211004, Uttar Pradesh, India

Email: kpallav@mnnit.ac.in

Abstract: Finite element modelling and analysis has been performed on 103-years old unreinforced masonry Senate hall building (SHB), Allahabad University, India. It is an Indo-Saracenic style of architecture which was built in 1915. An in-situ survey is conducted to know the actual condition of the SHB. The major and minor cracks are visible and construction material is deteriorated at different location of the SHB. The old documentation, reports, site visit, visual inspection, and photographs are used to prepare the accurate model of the SHB on Ansys workbench (ANSYS 14.0) tool. Macro and homogenization approach has been used in the modelling of the SHB. The standard gravity and wind load analysis is performed with a fixed boundary condition on its based of SHB. The maximum stress and deformation 14.286MPa and 12.491mm have been observed under standard gravity analysis. Further, the maximum stress and deformation obtained under wind load analysis are 4.10MPa and 8.07mm, respectively. The results are compared with a visual inspection of the SHB and it is in good agreement with the present condition of the building.

Keywords: Ancient structure, masonry building, In-situ survey, Cracks, Finite element modelling, Static analysis