

Assessment of Inelastic Dynamic Response of Block Masonry Infill RC Frames

Funded By:

Higher Education Commission (HEC), Pakistan

Investigators:

Dr Mukesh Kumar

Prof. Muhammad Masood Rafi

Project Period: 3 years (October 2014 - October 2017)

Background:

In order to obtain reliable predictions of the seismic performance of existing buildings or to carry out an optimum earthquake resistant design of new buildings for an anticipated earthquake ground motion scenario, it is vital to understand the factors influencing the inelastic dynamic response of the buildings. Recent studies have shown that one of the key factors that influence the dynamic response of buildings is presence of infill walls which are embedded in the skeleton of the reinforced concrete (RC) frames. Conventionally, infill panels are considered as non-structural elements and their contribution is ignored in the seismic design and assessment process of buildings. However, the presence of masonry infill walls enhances the stiffness and strength of building at storey and global levels, thereby attracting larger inertial forces in the event of an earthquake. This may result in the premature failure of the key structural components of the building or, in some cases, complete collapse of the building.

This project investigates the influence of infill walls which are made cement concrete (cc) blocks on the inelastic dynamic response of RC buildings. The infill frames will be subjected to shake table tests will to obtain the required data (Figure 1). These facilities are available at the Department of Earthquake Engineering at NED University of Engineering and Technology. Experimental testing will be augmented by numerical modelling. Simplified models to represent the influence of masonry infill walls on the inelastic response of the frames will be developed which will serve as an aid to the practicing engineers.

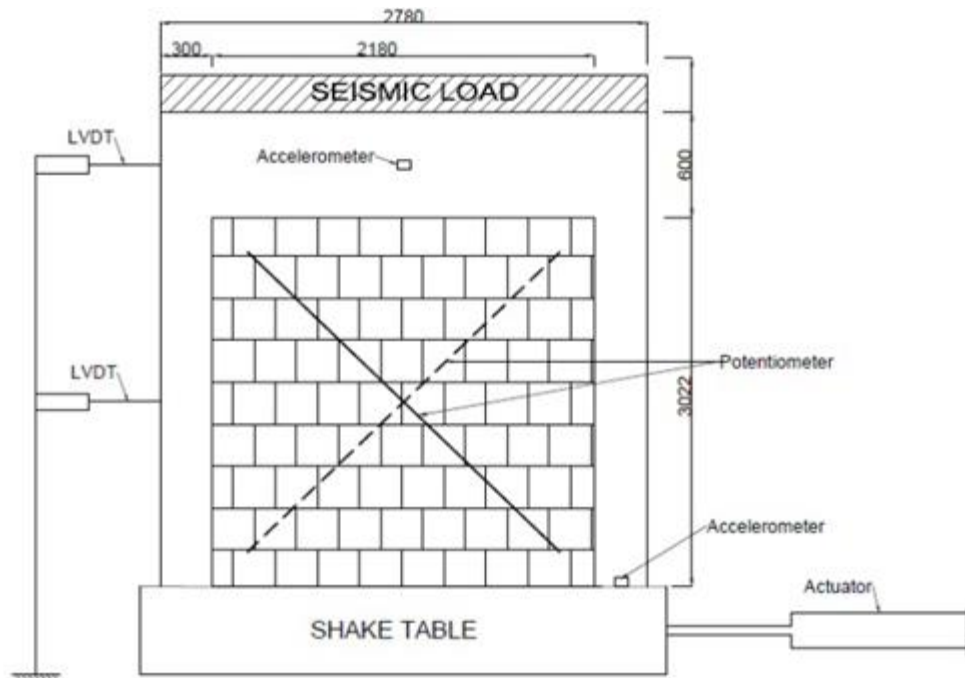


Figure 1: Schematic of shaking table test

Objectives and Scope:

The aim of the work proposed in this project is to mitigate seismic vulnerability of buildings so that human and financial losses can be reduced in case of an earthquake event. This aim is to be realized by pursuing the following objectives.

1. To investigate the performance, and failure mode and mechanism of infill wall panels made of cement concrete blocks.
2. To carry out experimental testing of RC frame infill panels using shake table
3. To investigate strength and stiffness characteristics of infill panels
4. To quantify the results obtained from experimental testing work
5. To develop detailed finite element model and to calibrate these against the experimental results.
6. To formulate and publish the proposals for design and assessment of infill masonry frame buildings.
7. To disseminate the knowledge by organizing seminars and conference under the auspices of CESNED and Framed Infill Network.