

STATUS REPORT

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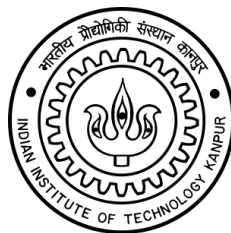
**Development of draft protocol for testing of
structural components and systems for use in schemes under
'Housing for all' project of the Government of India**

Submitted to

**Ministry of Housing & Urban Poverty Alleviation
Government of India**

BY

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Work done so far

A presentation ([Annexure-I](#)) on work done so far on the project “*Development of draft protocols for testing of structural components and systems*” was made by IIT Kanpur at the on 23rd November 2016 at New Delhi to JS(Housing). Following are the brief description of the work done so far:

- Task force was created with identified strength in various areas required for successful completion of project (<http://www.iitk.ac.in/ce/test/task.html>)
- An exhaustive list of testing protocols for materials and components have been reviewed and compiled (<http://www.iitk.ac.in/ce/test/Materials/material.html>). The list has been shared with BMPTC for their feedback.
- List of testing facilities for materials and components available at IIT Kanpur has been updated (<http://www.iitk.ac.in/ce/test/list.html>). It is to be shared with other institutions across the country for their input, which will then be incorporated in the database. Hence, a comprehensive database of testing facilities for various institutions will be available in this link.
- A workshop on "*Earthquake Resistance of Low-Cost Engineered Housing in North-East India*" was held at IIT Guwahati during 24-25 June 2016. The target group for this workshop was various government department of the seven sister states, who are involved in implementing housing for all mission. The details of this workshop are available at <http://www.iitk.ac.in/ce/test/workshop.html>.
- Testing protocols have been reviewed and compiled for in-situ testing of masonry walls with flat-jack tests (http://www.iitk.ac.in/ce/test/Masonry_PrismFlatJackHammerPulseTests.pdf)
- Testing protocols for various building systems and sub-assemblages e.g., pre-cast systems - Beams, Columns, Joints, Slabs, Wall panels, Diaphragms;RCC Structures – Beam, Columns, Joints, and Sub-assemblages; Steel Structures – Beam-Column Joints; Study on performance of pre-cast concrete structures subjected to earthquake loading conditions- Experimental case studies available in literature (http://www.iitk.ac.in/ce/test/ComponentSystem_23_2016%20-5.pdf).
- Study is going on Energy efficiency of fast track housing units in Delhi (http://www.iitk.ac.in/ce/test/PPT_Slides_EnergyStudy_HPL.pdf)

Work to be completed

Review of testing protocols for following is under way:

- ***Load bearing masonry structures***: A document is under preparation for good construction practices involving various tests required at various stages of construction.
- ***Case study of a sample G+6 storey single bedroom apartments building***: A case study involving a G+6-storey RCC frame building in situated in IIT Kanpur is under way. The purpose of this case study is to provide a model plan, analysis files (involving seismic and wind analysis as well), design files, and BOQ and cost estimates.
- ***Confined masonry structures***
Though a document on confined masonry house is already available on NICEE website (National Information Centre for Earthquake Engineering at IIT Kanpur, http://www.iitk.ac.in/nicee/IITK-GSDMA/ConfinedMasonryHouse_003_2013_31May.pdf). However, this document doesn't have details about structural testing protocols. Currently work is under progress at IIT Patna to include current state-of-the art in India and abroad.

No-Cost extension has been requested till June 30, 2017 for the following:

- Complete the remaining work
- Workshop II to be organized in March/April 2017 in Delhi with the logistic support of BMTPC.
- Preparation of completion report
- Project proposal for full-scale testing of 2-3 stories pre-cast housing units to evaluate seismic performance of these units.