

EEFIT

Earthquake Engineering Field Investigation Team

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Project title: Guidelines on Field Testing and Material Sample Collection during Earthquake Field Missions.

Researcher: Randolph Carl Borg, (E: randolph.borg@gmail.com)

Supervisor: Dr Tiziana Rossetto, University College London

Description of research question and proposed project:

Data collected from earthquakes, particularly that reported in field mission documents refers to generalised information mainly about population of damaged buildings and general causes and classification of damage vis-à-vis typological aspects of the structure, its geometry and layout. This is based on visual inspection. Little technical information is reported on the material types, properties and quality. This information is generally restricted to engineers and entities involved in the recovery process only and it is very difficult to be obtained by other engineers and researchers. However, such data is very important as it sources from a real event free of hypothetical inaccurate numerical or experimental simulations.

It is understood that the main reasons why such data is often not collected during field missions are:

- limited access to damaged structures,
- limited amount of things that can be carried during earthquake field missions,
- lack of structured guidelines to collect such data
- importance of such information not acknowledged.

In this research, it is therefore proposed to prepare a set of guidelines that define ways to collect data from earthquake field missions defining material and physical properties. This can be done in two ways:

- Tests that can be done on site
- Collection of relevant material from site for laboratory testing.

The process of the preparation of the guidelines will involve:

1. Identification of general structures and associated materials that could be investigated. This will mainly be based on past reports and requirements from users of data that will be collected.
2. Identify the essential properties of materials that may be required and identify associated tests by looking at standard codes and consulting with relevant engineers and technicians

3. What is possible to be collected on site, whether data from a performed site or a sample, and how this can be done will be identified. Reference will be made to standard codes of practice.
4. It is understood that each mission is different, and so are the difficulties. This means that the ability to retrieve physical data will vary. Classification of the activities that can be made on site will be further classified based on practicality aspects related to accessibility, limited apparatus that can be carried, limited weight and type of material that can be carried, time limitation and other aspects that may be identified.

Impact of research:

The suggested guide for this research will encourage field mission members to collect data which is of utmost importance and which has not been given much attention. The collection of data on material properties will be beneficial to engineers in structural analysis particularly in the calibration of the material properties. Such data will also be beneficial to engineers and researchers involved in the use and development of vulnerability assessment procedures, as field data on materials and physical properties serve as benchmark values to engineering demand parameter values obtained analytically or experimentally. Further accuracy in analytical and experimental testing will help in the reduction of uncertainty in the development of fragility functions. This data will also be beneficial in building a link between experimental and analytical simulations, and residual damage in a real structure after an earthquake as benchmarks.