

Direct use of raw historic data for engineering purpose

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ABSTRACT: The damage description and interpretation of historical data in past earthquake can give valuable information for safe and economical design of structures for future earthquakes. The data can also be used in designing suitable retrofit measure for preserving cultural and historical value of monumental structures.

INTRODUCTION

The historical data is considered to play an important role in seismic hazard and risk assessment. The damage descriptions have been more often used to identify intensity scales. There are no standard relationships established so far between intensity scales and ground accelerations. The ground acceleration is one of the important parameters for engineering purposes. The analysis and assessment of data for engineering purposes is of significance because for historic earthquakes no instrumental records are available. The historic data often mentions the degree of damage in various types of structures, construction types and material and performance of structures in past earthquakes. The satisfactory behaviour of many monumental structures in historic earthquakes approve of certain structural types, foundation types and materials of construction adopted in the past. It is quite clear that there can be limited information that can be gathered from such records, nevertheless it can be used to fill up the gap that currently exists about the earthquake measures adopted in the past and also it can serve as guidance to engineers in constructing particularly non engineered structures.

TYPE OF ENGINEERING DATA

The following type of damage data should be analysed for engineering purpose,

- a. Suitability of particular plans/symmetry.
- b. Suitability of foundation type/soil.
- c. Suitability of particular type of construction, construction material, binding material.

- d. Weakness of construction; weak zones of structure
- e. Damage degree : falling of plaster, extent of cracking, mode of failure, collapse.
- f. Overturning and sliding of rigid objects.
- g. Size of earthquakes withstood in past.
- h. Behaviour of similar structures in the same earthquake, influence of founding soil on the behaviour.

USE OF DAMAGE DATA

The analysis of damage data can be used in many ways. Some of these are following:

- a. Improvement in quality of binding material and construction.
- b. Not to adopt particular type of plan and construction like masonry arches, domes and connections with columns.
- c. Improvement in foundation type.
- d. Assessment of acceleration levels by structural analysis of damaged/undamaged structure; this can be used for future designs.
- e. Assessment of loss of strength of material with age.
- f. Design of retrofit measure to preserve cultural and historical value.
- g. Evaluation of seismic capacity.

CONCLUSION

The analysis of historic data of performance of structures can be of value in providing guidance to engineers. The data can also be employed to device methods of retrofitting to preserve cultural and historical value of monumental structures.