

Comparative Study of Different RVS Methods Used For Seismic Assessment of Existing RC Buildings

ABSTRACTS

- Determination of seismic safety of existing buildings is a time consuming and challenging process.
- Instead, rapid survey methods were developed which identify deficient structures from a large building stock in a city or town.
- This study presents a comparison and critical review of existing rapid visual survey methods used for seismic assessment of existing reinforced concrete buildings.

METHODS

Comparison of RVS Methods based on Scoring System

Sub-Criteria	Sinha & Goyal (2004)	Arya (2003)	Jain et al. (2010)	BMTPC (2012)	FEMA-154 (2015)
1.1 experimental values	0	0	0	0	0
1.2 site – specific	3	3	3	3	3
2.1 global parameter	2	2	2	3	2
2.2 local parameter	2	1	3	3	3
2.3 scope	1	1	2	3	3
2.4 impact of NSE*	0	0	0	3	0
3.1 damage grade	3	3	2	1	1
3.2 calibration	0	0	3	3	0
Summation	11	10	15	19	12

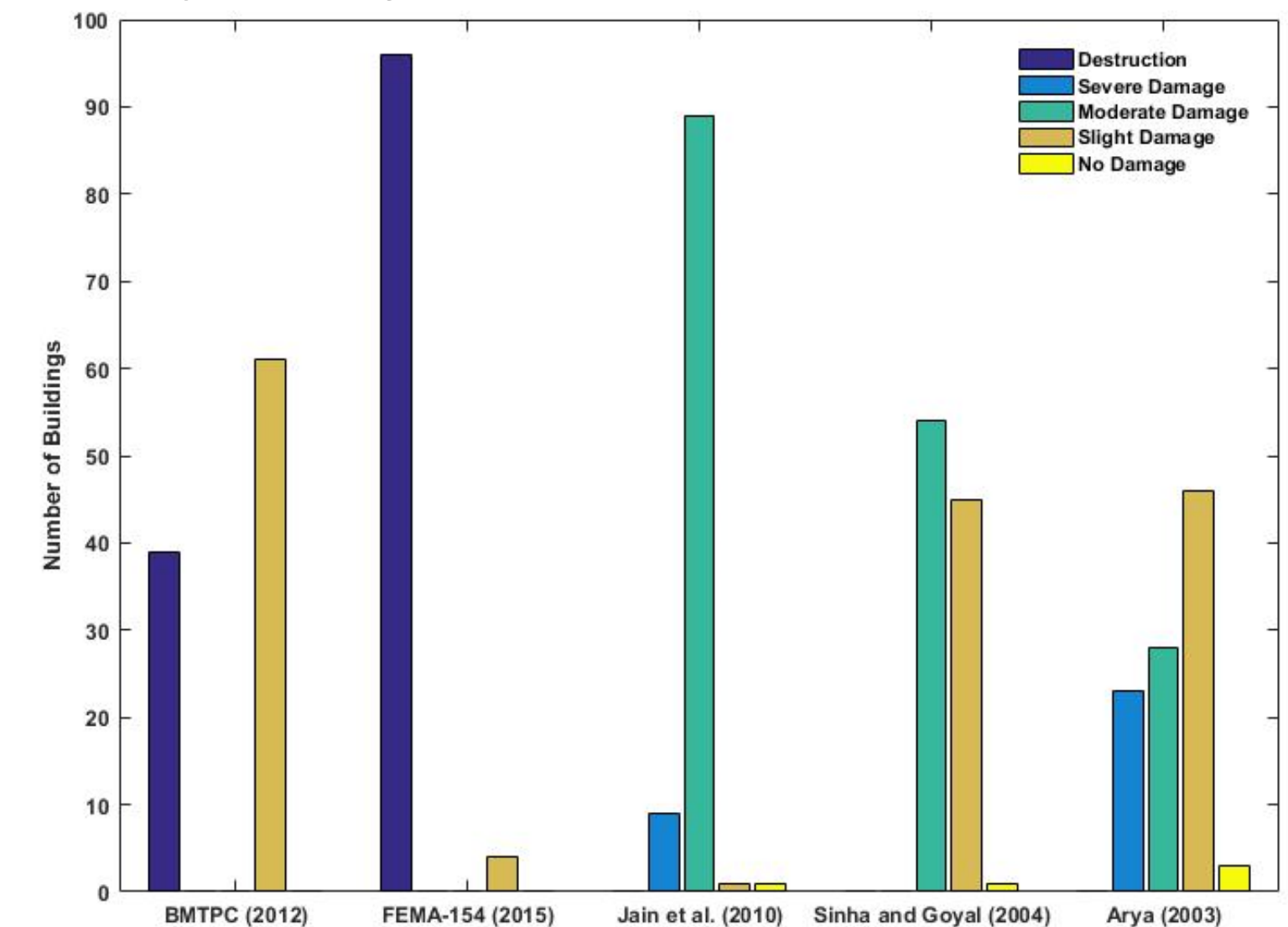
Condition	Definition	Score
Unsatisfactory	Not a single observation available	0
Minimum	Guidelines meet the minimum requirement (1 or 2) for the criteria	1
Moderate	Very few (3 to 4) observations are available for any criteria	2
Significant	Enough (more than 4) observations are available for any criteria	3

Comparison of RVS Methods based on MCDM

Weighting Scenarios	Criteria A	Criteria B	Criteria C	Description
I	33.33 %	33.33 %	33.33 %	Default
II	50 %	25 %	25 %	Experimental and site-specific measurements
III	25 %	50 %	25 %	Safety analysis based on physical parameters
IV	25 %	25 %	50 %	Decision makers based on damage description

RVS Methods	Ranks			
	Scenario I	Scenario II	Scenario III	Scenario IV
Sinha & Goyal (2004)	3	3	4	3
Arya (2003)	4	4	5	3
Jain et al. (2010)	2	2	2	2
BMTPC (2012)	1	1	1	1
FEMA-154 (2015)	4	4	3	4

Comparison of RVS Results



CONCLUSION

- It was investigated that the important reason for such varying results is the relative weights assigned to each vulnerable parameter in each RVS method.
- The vulnerable parameters such as soil type, soft storey, and plan irregularity have different relative weights in each RVS method.
- Therefore, to have unanimity in the results of different RVS methods, it is necessary to fix the relative weights of each vulnerable parameter.