Institute of Catastrophe Risk Management

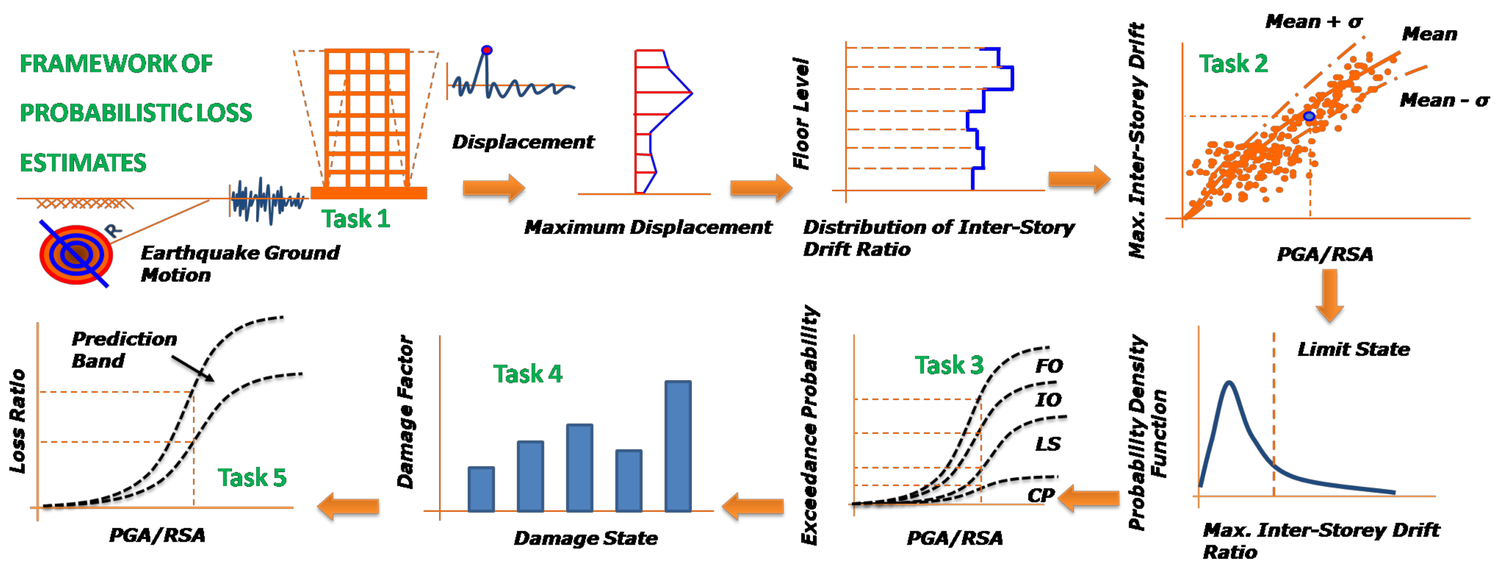
Dr Ning Chaolie
A/P Li Bing
Prof Pan Tso-Chien

Probabilistic Loss Estimates of Non-Ductile Reinforced Concrete Structures

We develop a comprehensive framework to conduct probabilistic damage assessment of non-ductile reinforced concrete structures to seismic events by using an efficient and simplified beam-column joint model. A set of fragility curves is developed and mapped onto the framework for probabilistic loss estimates of low-rise, middle-rise, high-rise and super high-rise buildings in Singapore at different confidence level.

Steps of Probabilistic Loss Estimates:

- ***Task 1:*** Selection of ground motion and representative building
- ***Task 2:*** Incremental dynamic analysis
- ***Task 3:*** Generation of fragility curves
- ***Task 4:*** Determination of damage factor
- ***Task 5:*** Generation of loss ratio



Results of Probabilistic Loss Estimates:

Severe damage to non-seismic detailed beam-column joints (Padang Earthquake, 2009)

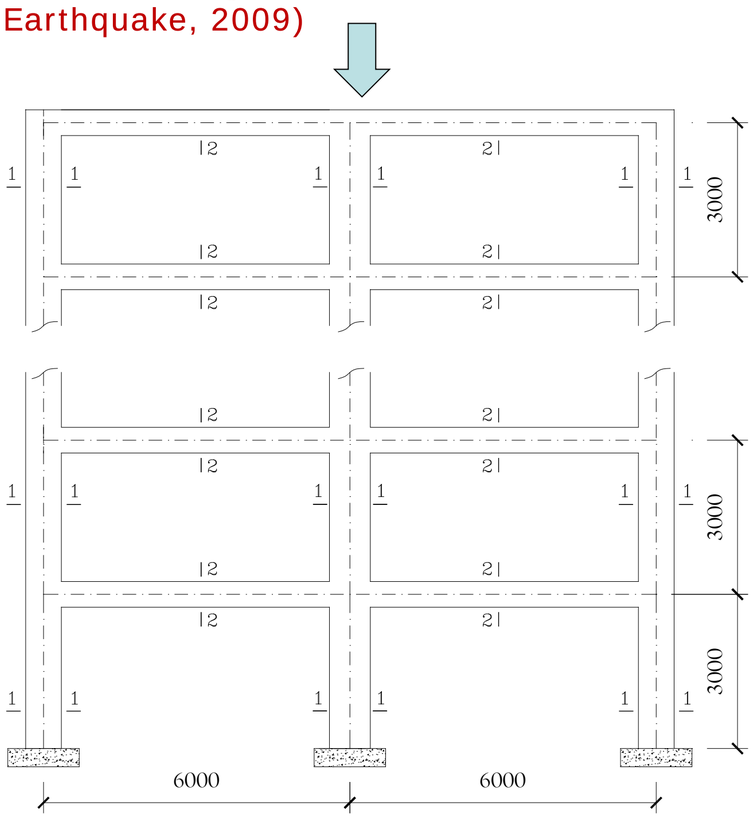
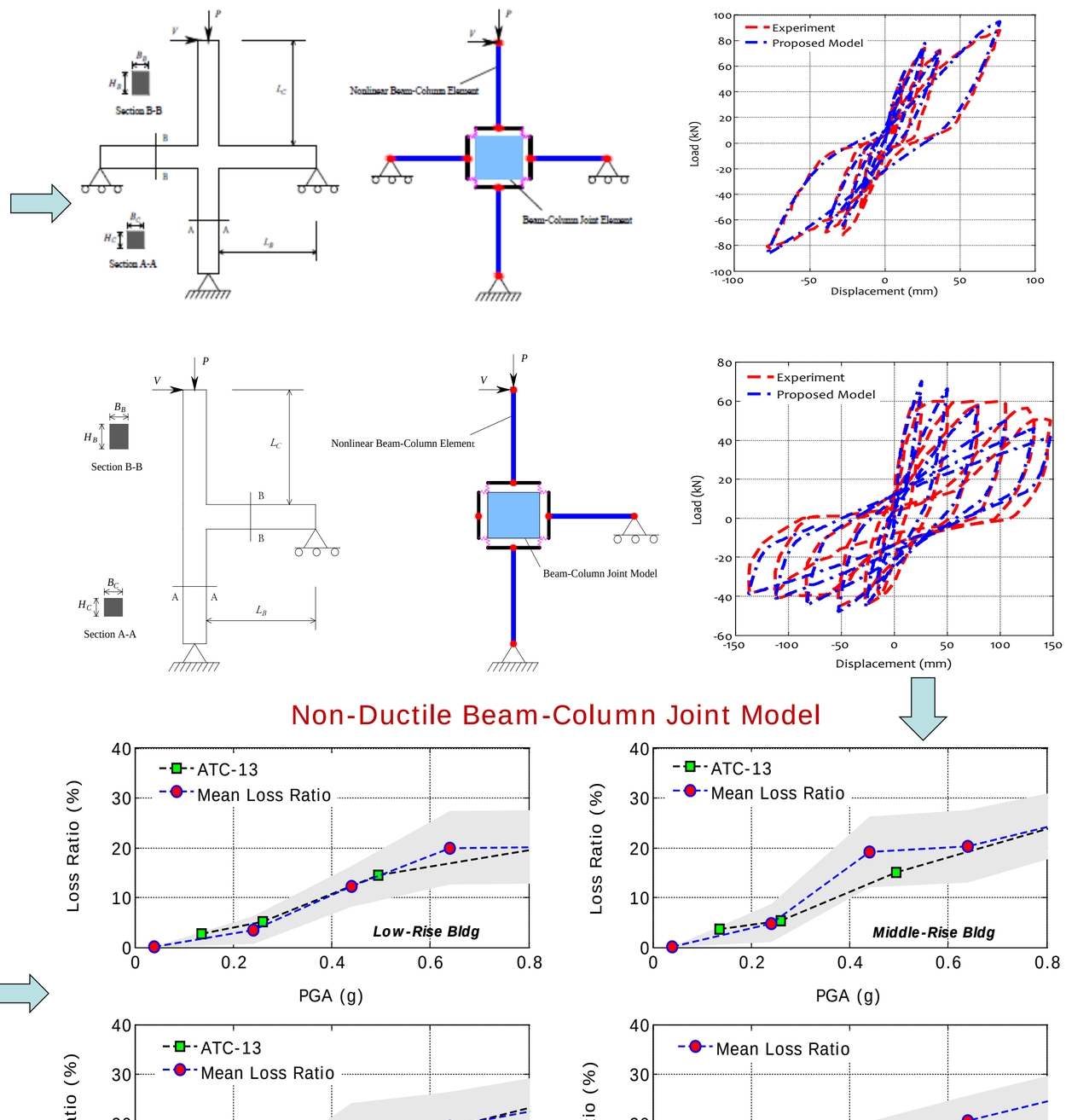


Illustration of Non-Ductile Reinforced Concrete Structures

Framework of Probabilistic Loss Estimates



Non-Ductile Beam-Column Joint Model

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Contact Us:
Executive Director, ICRM (ExecDir-ICRM@ntu.edu.sg)
N1-B1b-07, 50 Nanyang Avenue, Singapore 639798
Tel: +65 6592 1866 Website: http://icrm.ntu.edu.sg