

# LESSONS LEARNED FROM DISASTROUS EARTHQUAKES

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# LESSONS LEARNED FROM DISASTROUS EARTHQUAKES

## Causes of Damage:

- Inadequate seismic resistance
- Lack of appropriate seismic detailing and construction materials
- Irregularities in elevation and floor plan
- Inappropriate change of non-structural elements (partitions)
- Fire following rupture of utilities



# LESSONS LEARNED FROM DISASTROUS EARTHQUAKES

- We should always prepare for the next larger earthquake.
- Find out those vulnerable buildings existing in our societies.
- Establish prompt preliminary seismic assessment methods for the existing buildings.
- Develop more efficient and economical retrofitting strategies to increase the popularization of seismic retrofitting among the older buildings.
- Enhance structural health monitoring techniques.



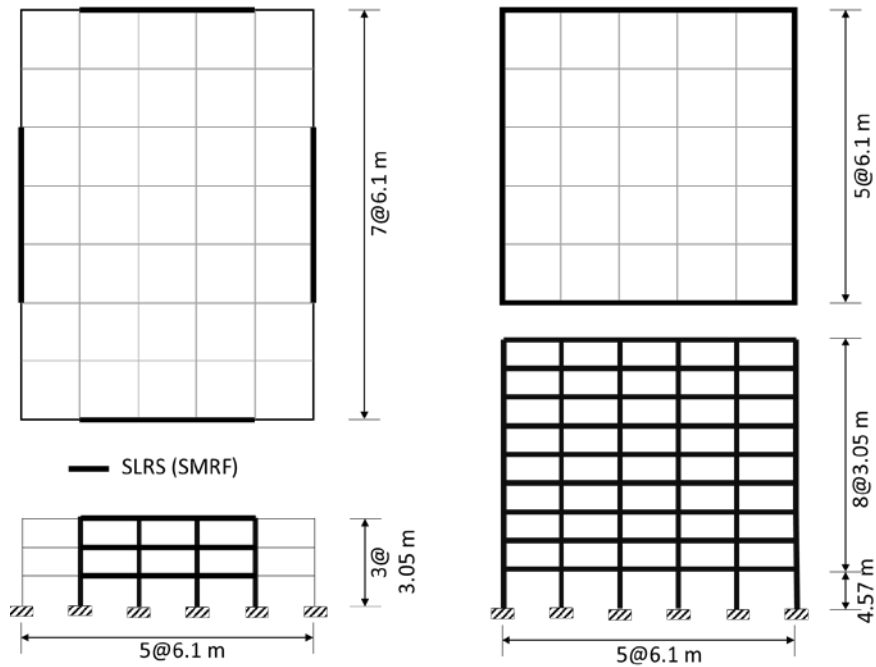
Develop more efficient and economical retrofitting strategies to increase the popularization of seismic retrofitting.



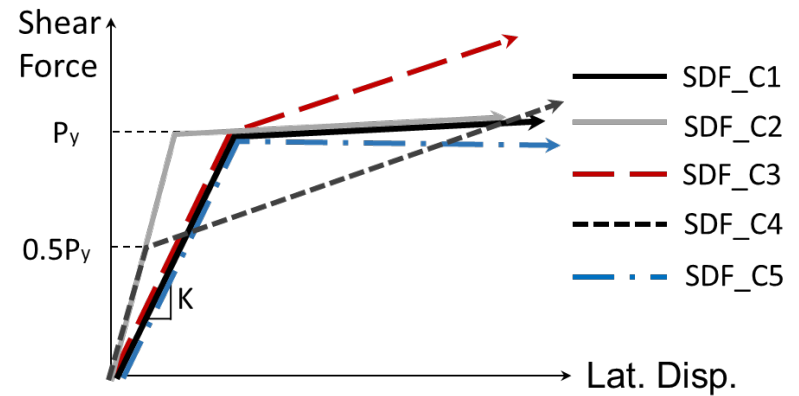
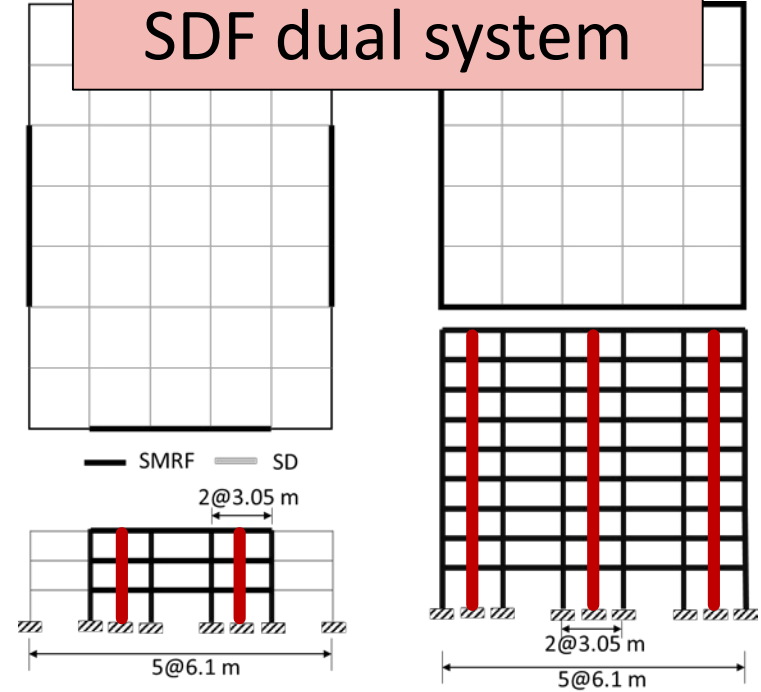
How does local behavior (e.g. initial and post-yielding stiffness of energy dissipaters) affect seismic performance of structural system?

# 3-story and 9-story prototype buildings

## SMRF

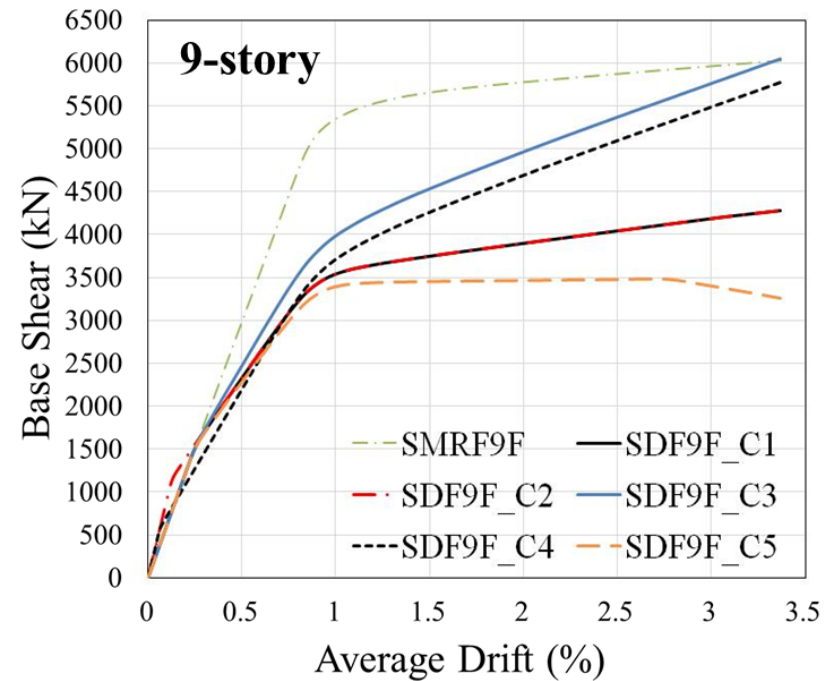
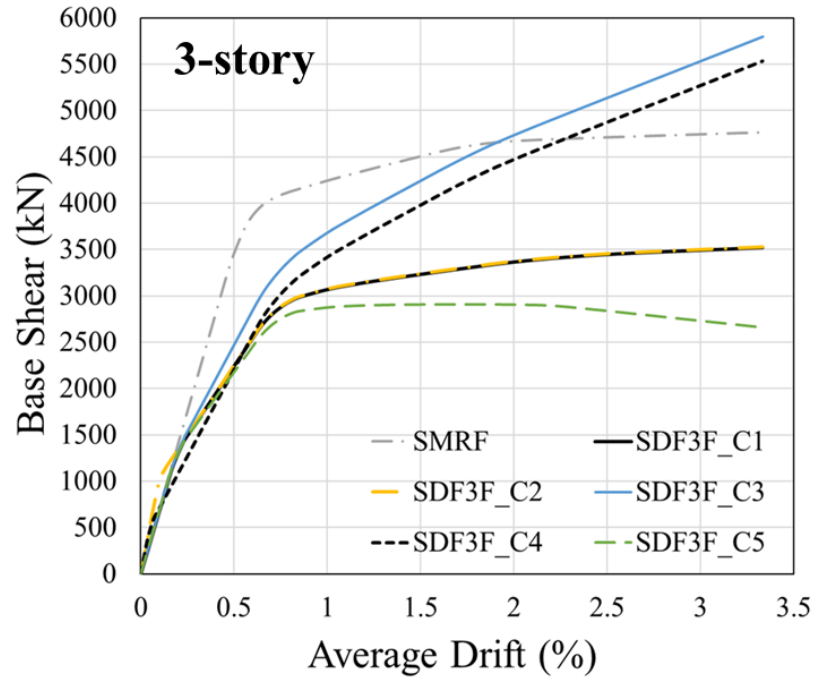


## SDF dual system

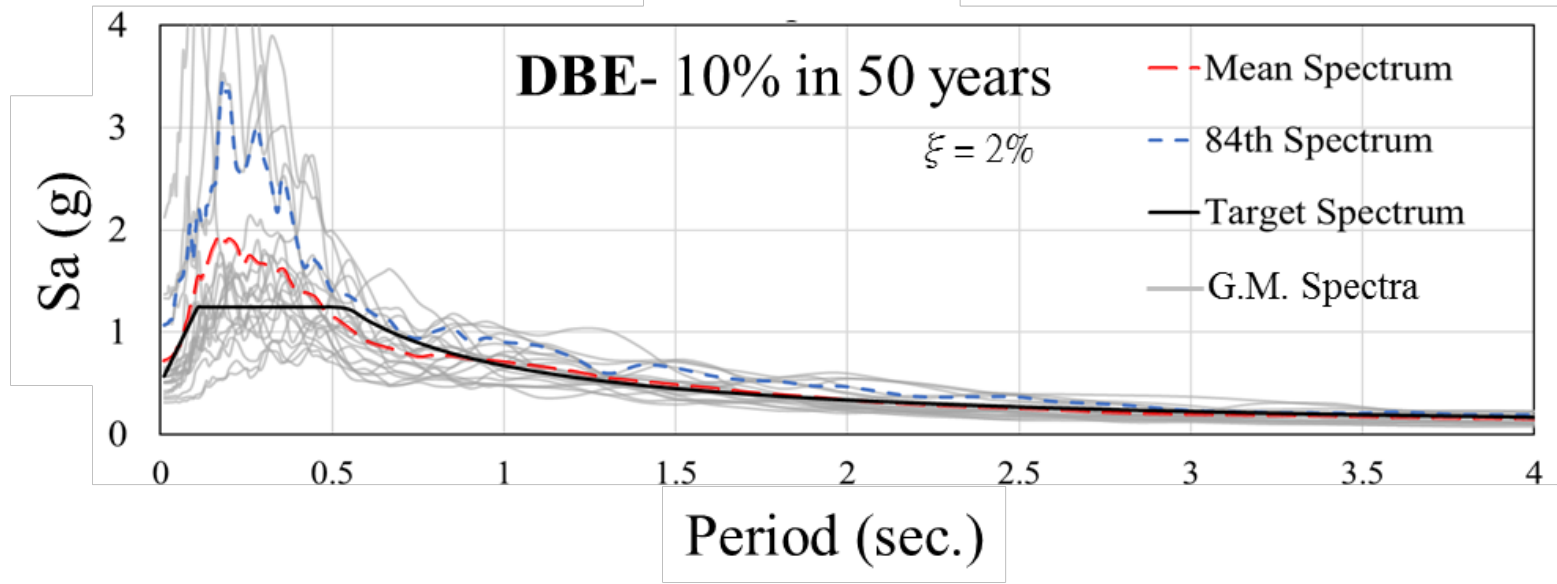
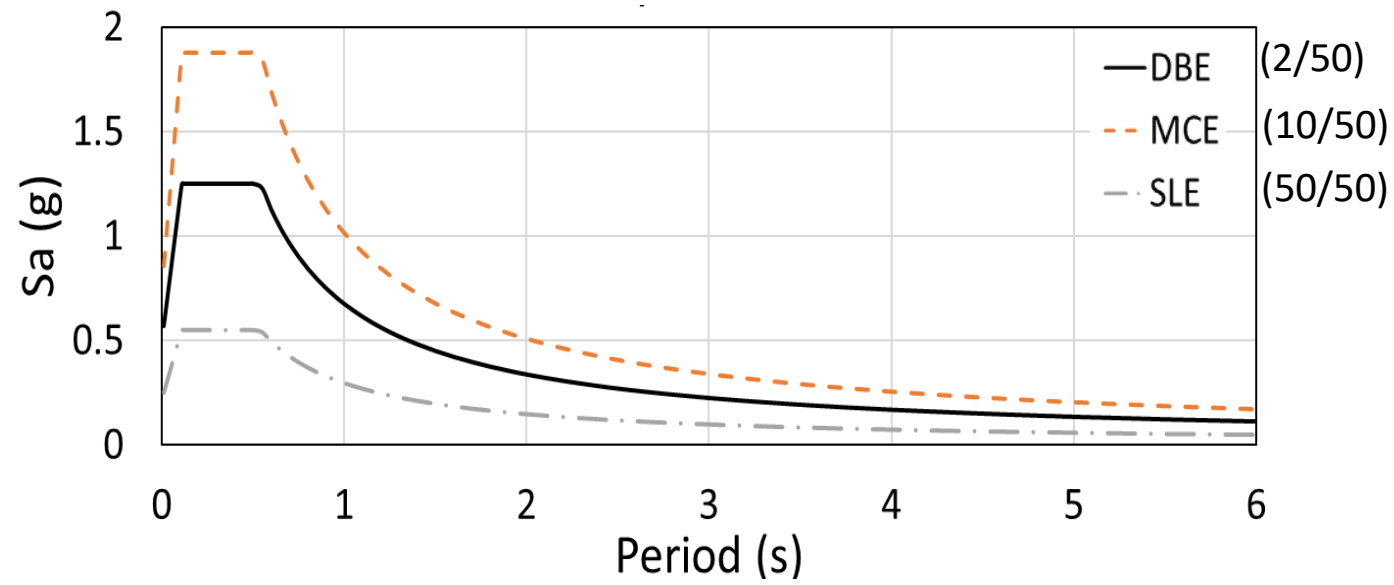


# Pushover Analysis

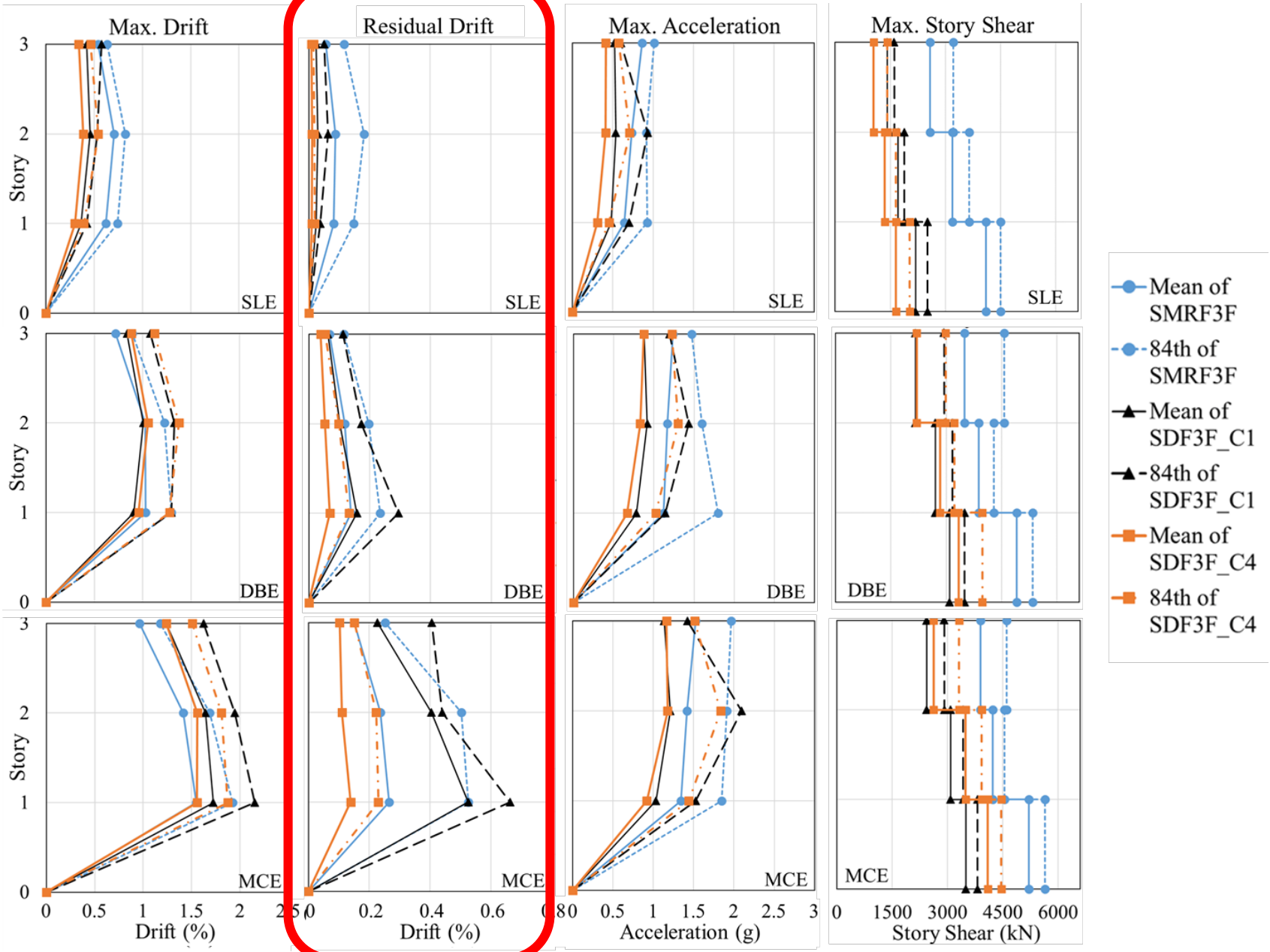
## SMRF v.s. SDF dual system



# Seismic Excitation for the dynamic analysis

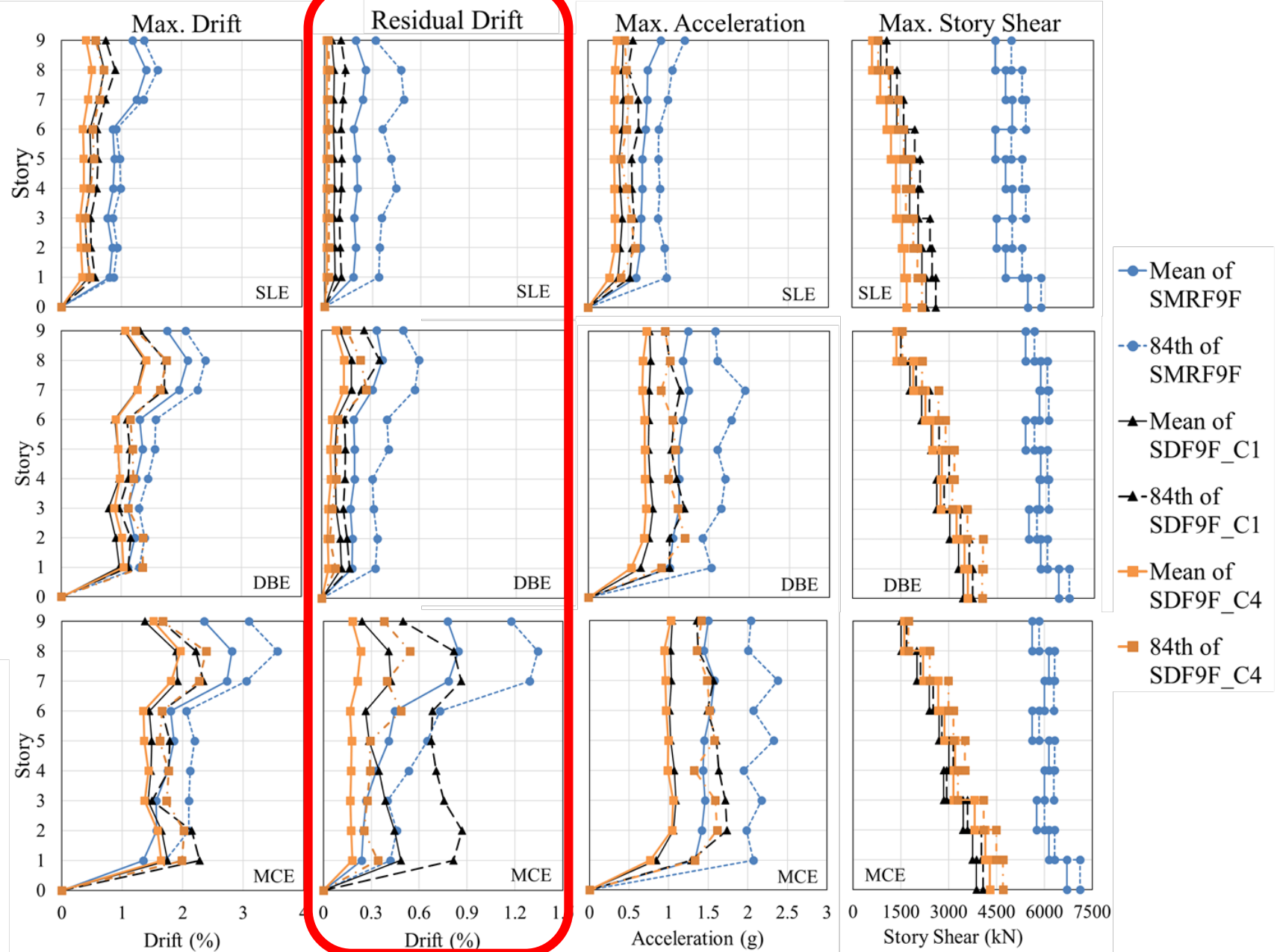


# Nonlinear dynamic responses – 3-story Buildings



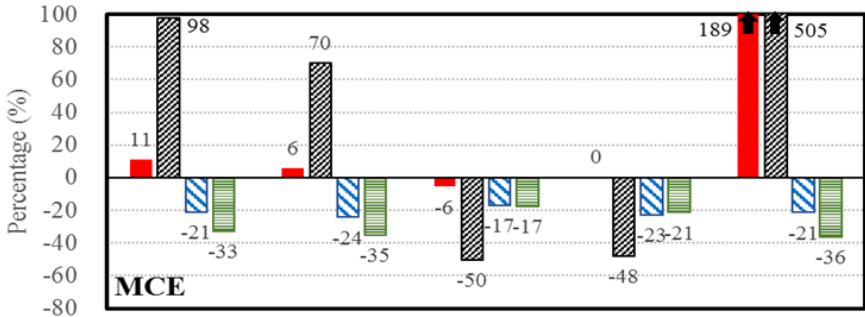
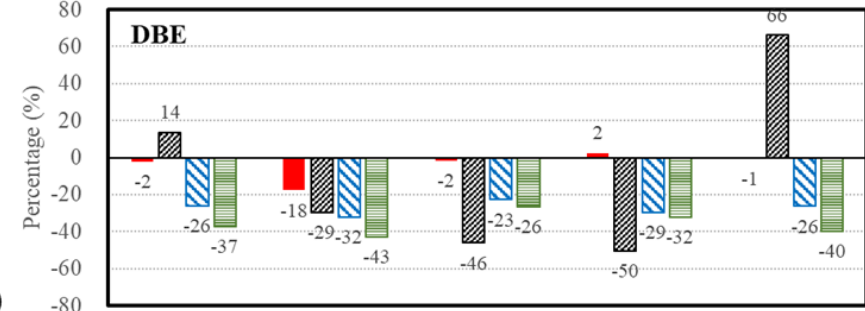
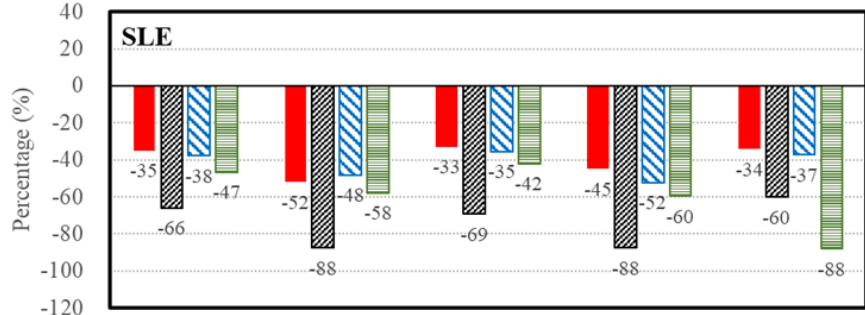


# Nonlinear dynamic responses – 9-story Buildings

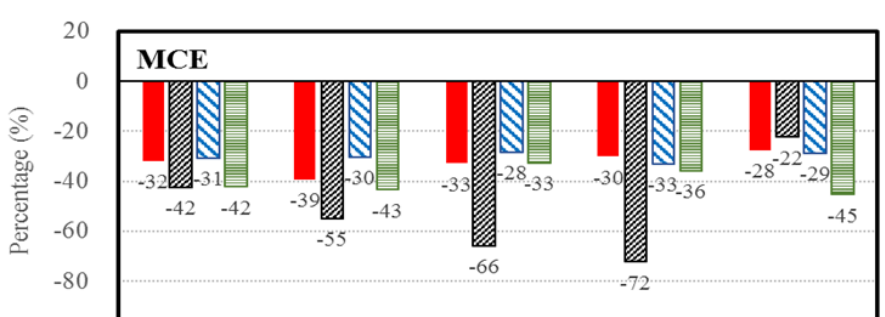
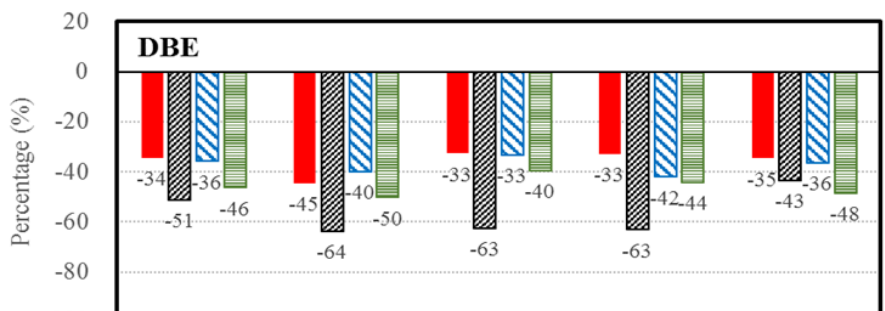
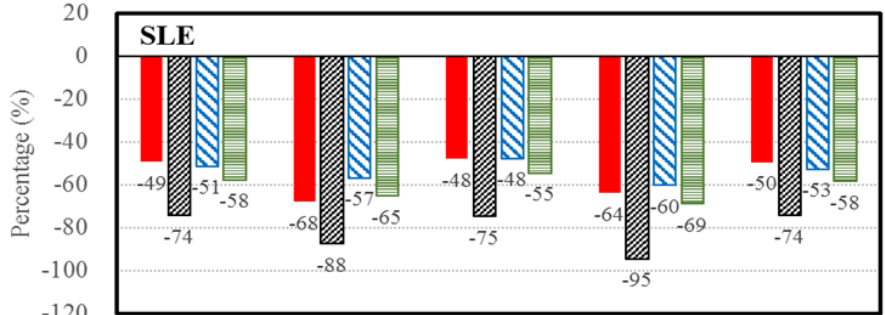


# Seismic Performance

3-story



9-story



■ Max. Drift   ■ Res. Drift   ■ Max. Accel.   ■ Max. Base Shear

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