

Progetto DPC-ReLuis 2024-2026 WP5

task 5.1

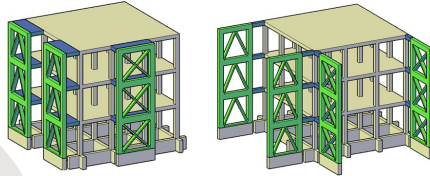
Dissipative and recentering exoskeletons for seismic retrofit

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Componenti: Angelo Lavino, Osvaldo Pecorari, Salvatore Mottola, Parvane Rezaei Ranjbar

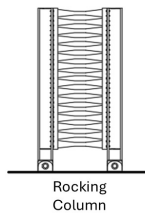
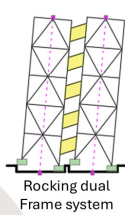
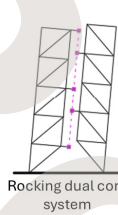
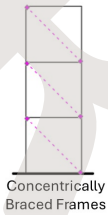
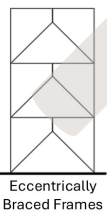
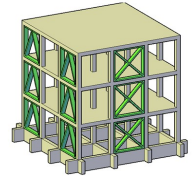
EXOSKELETON

- Ease of inspection and replacement
- Low maintenance expenses
- Low weight
- No occupancy disruption
- Own foundations
- Integrability with environmental, architectonic issues (energy efficiency)



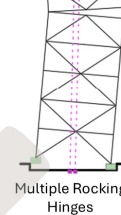
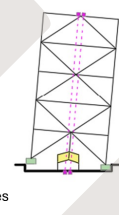
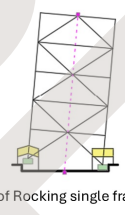
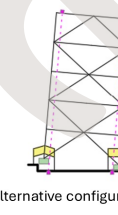
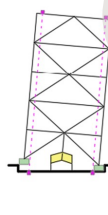
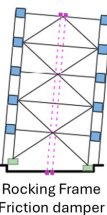
ENDOSKELETON

- Occupancy disruption
- Considerable rise in the loads transferred from columns to foundations



- Up-lifting base
- Friction bearing joint
- Fuse
- Post-tensioning

STRUCTURAL TYPOLOGIES

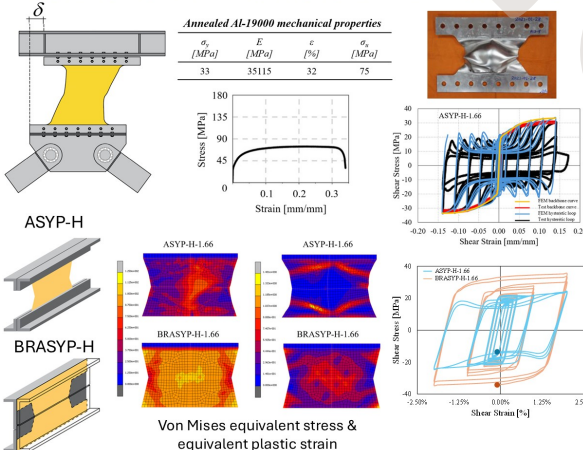


CLASSIFICATION

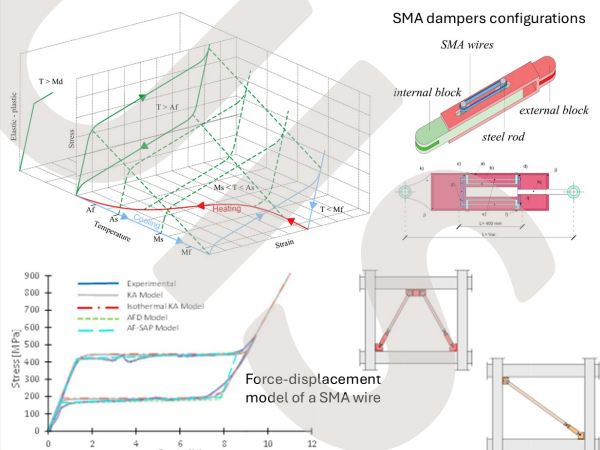
- Materials (**steel**, concrete);
- Geometries (**2D or 3D**);
- Orientations (**parallel or orthogonal**);
- Structural typology (e.g., **concentric or eccentric braced frames**, RC frames, **rocking systems**);
- Innovative Dissipation and recentering devices (**aluminum**, **SMA**)

INNOVATIVE MATERIALS AND DEVICES

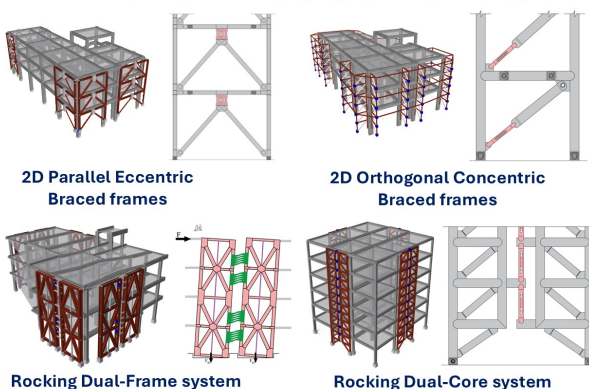
BUCKLING-RESTRAINED ALUMINUM SHEAR-YIELDING DAMPERS



RECENTERING SHAPE MEMORY ALLOYS (SMA) DAMPERS



RETROFIT OF REAL CASE STUDY BUILDINGS



FRAGILITY CURVES

