

New Contributions to the Field

- Proposes a damage-aware surrogate-assisted optimization framework for buckling-delayed shear-link dampers under cyclic seismic loading.
- Compares supervised ML surrogates and RBF interpolation in terms of predictive accuracy, computational cost and optimization suitability.
- Introduces an adaptive FEM validation and retraining loop to verify optimized geometries before acceptance.
- Demonstrates FEM-consistent optimized designs with limited high-fidelity simulations while balancing window damage, frame protection and dissipative performance.