

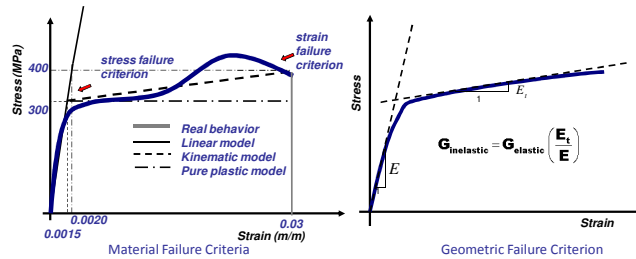
PROGRESSIVE COLLAPSE OF MULTI-STORY STEEL FRAME BUILDINGS: Phase I

Objectives

- Establish Analysis procedure
- Trace the collapse behaviors for various conditions
- Determine effective failure criteria range
- Parametric study
- Derive damage prediction
- Develop fast running algorithm

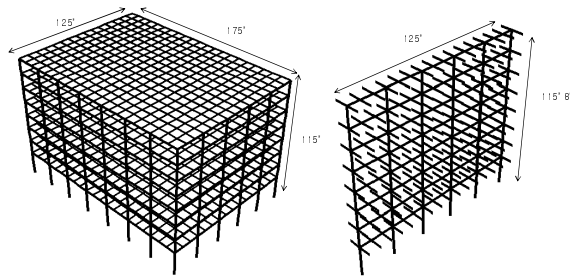
Failure Criteria

Material or geometric failure



Model Definition

- Geometry modeling
- Material modeling
- Simplification

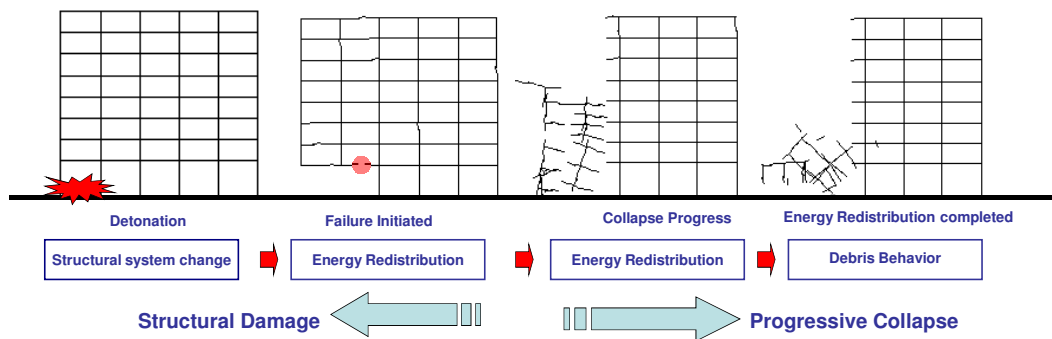


Numerical Analysis

- Element elimination in external criteria screening technique
- Numerical stabilization by variable boundary condition technique
- Time-cost analysis to establish optimal process

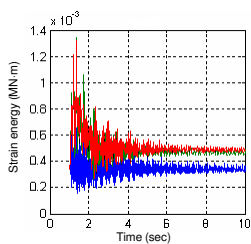
Behavior

- Applied material
- Applied failure criteria
- Occurred damage
- Debris action
- Background Database

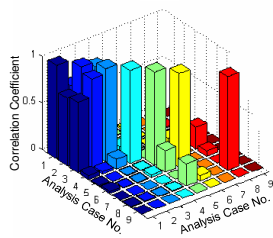


Time-History Signal processing

- Select appropriate procedure
- Determine Warning Signal characteristics



Strain energy time histories



Correlation Matrix

Damage Assessment Tool

- Behavior and Symptom Observation
- Condition Assessment and Identification
- Optimal sensor placement
- Damage and Action Report
- Future Behavior Prediction and Warning