

Pakistan Building Code (Seismic Provisions 2007)

Chapter 8: Structural Steel — Advanced Professional Interpretation

Purpose of Chapter 8

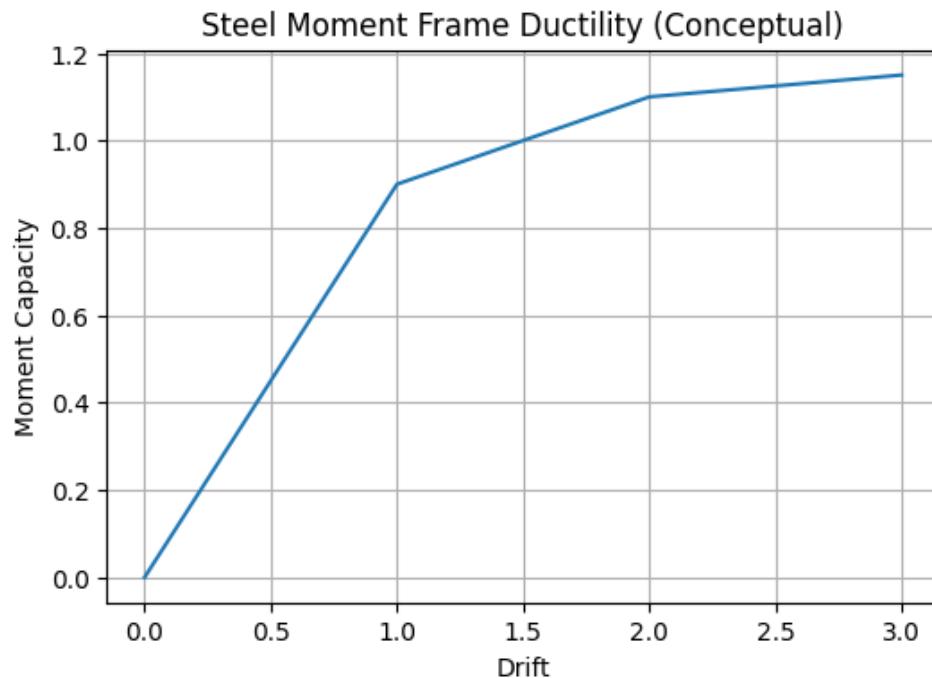
Chapter 8 provides seismic design and detailing requirements for structural steel systems. It ensures ductility, energy dissipation, and reliable connection performance during earthquakes.

1. General Steel Seismic Requirements

The code specifies loads, load combinations, material requirements, and connection detailing needed for steel structures in seismic regions. Connection behavior is the most critical aspect.

2. Special Moment Frames (SMF)

Steel SMFs are highly ductile systems relying on plastic hinging in beams. They require strict beam-to-column connection design, panel zone checks, and lateral bracing.



3. Concentrically Braced Frames (CBF)

CBFs provide high stiffness and strength using diagonal braces. Special and ordinary configurations are defined with different ductility requirements.

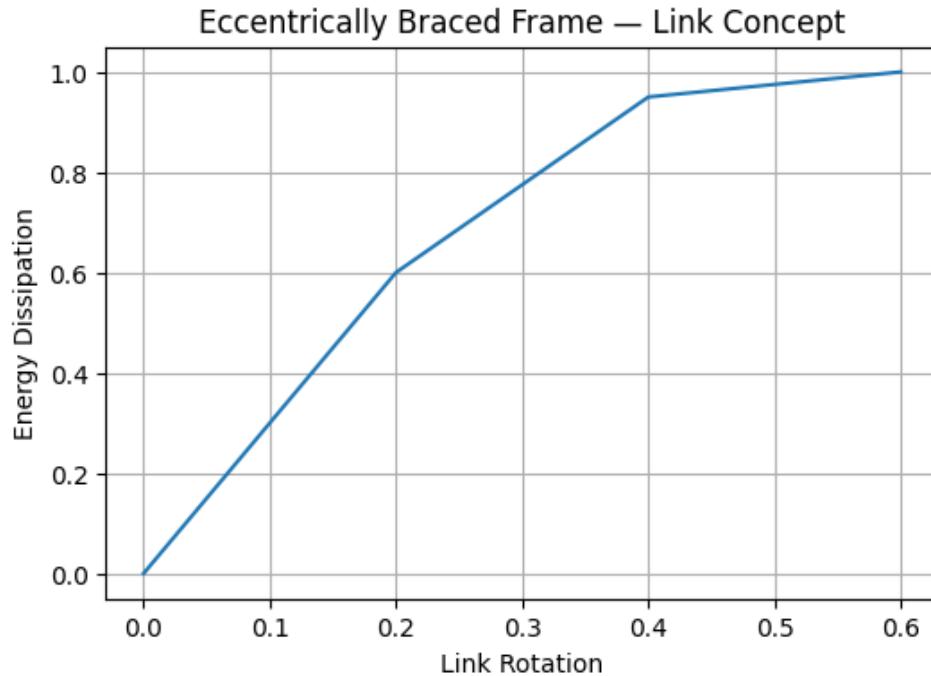
Concentrically Braced Frame Behavior

Column

Brace (Tension/Compression)

4. Eccentrically Braced Frames (EBF)

EBFs use yielding links to dissipate energy while maintaining overall frame stability. Link length, stiffeners, and connection detailing are critical.



5. Buckling-Restrained Braced Frames (BRBF)

BRBF systems use specially detailed braces that yield in both tension and compression, providing stable hysteretic behavior and high energy dissipation.

6. Composite Steel-Concrete Systems

The code also covers composite moment frames, braced frames, and shear walls combining steel and reinforced concrete for enhanced performance.

7. Quality Assurance and Protected Zones

Protected zones must be free of discontinuities and poor welds. A formal quality assurance plan is required for seismic steel construction.

Professional Risk Notes

Common failures include poor beam-column welding, inadequate panel zone design, brace connection failure, and missing lateral bracing. Steel seismic performance is highly connection-sensitive.