

# Pakistan Building Code (Seismic Provisions 2007)

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## Chapter 8: Structural Steel — Advanced Professional Interpretation

### Purpose of Chapter 8

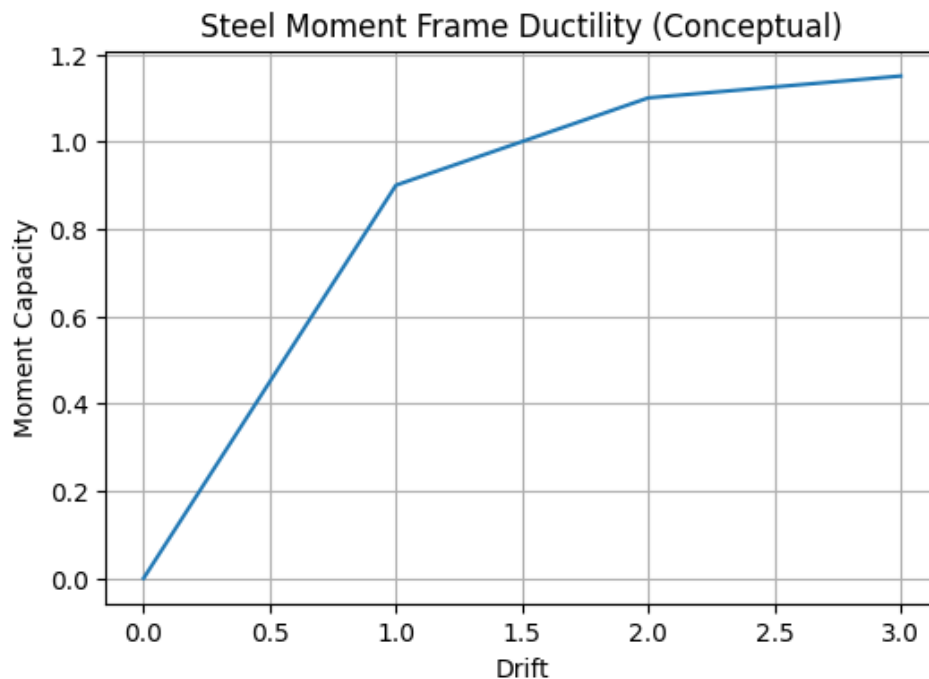
Chapter 8 provides seismic design and detailing requirements for structural steel systems. It ensures ductility, energy dissipation, and reliable connection performance during earthquakes.

### 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.

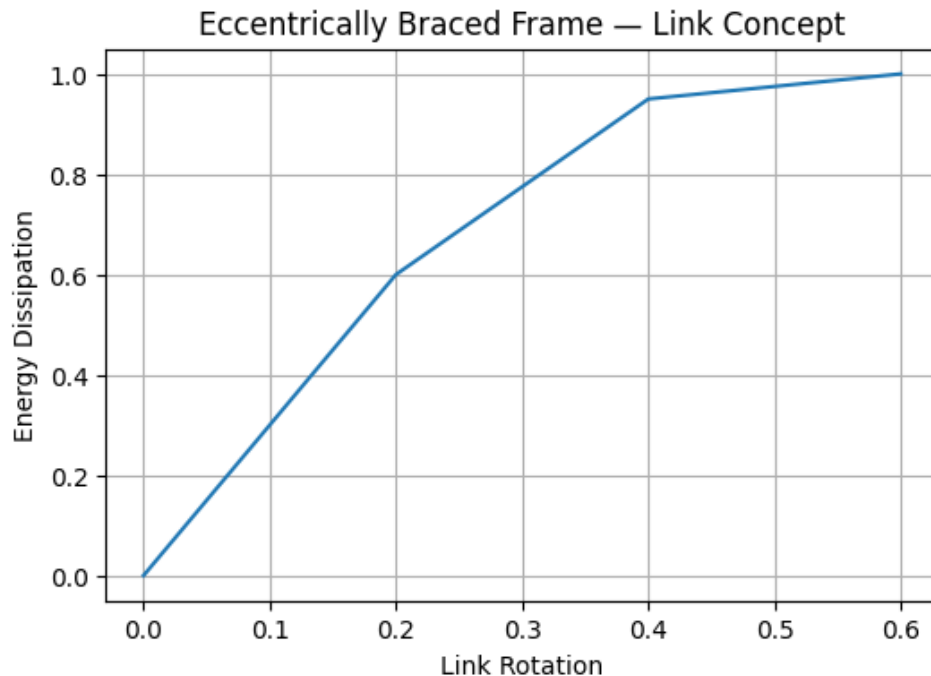
#### **Concentrically Braced Frame Behavior**

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.