

Earthquake Loads and Lateral Force Resisting Elements in Buildings

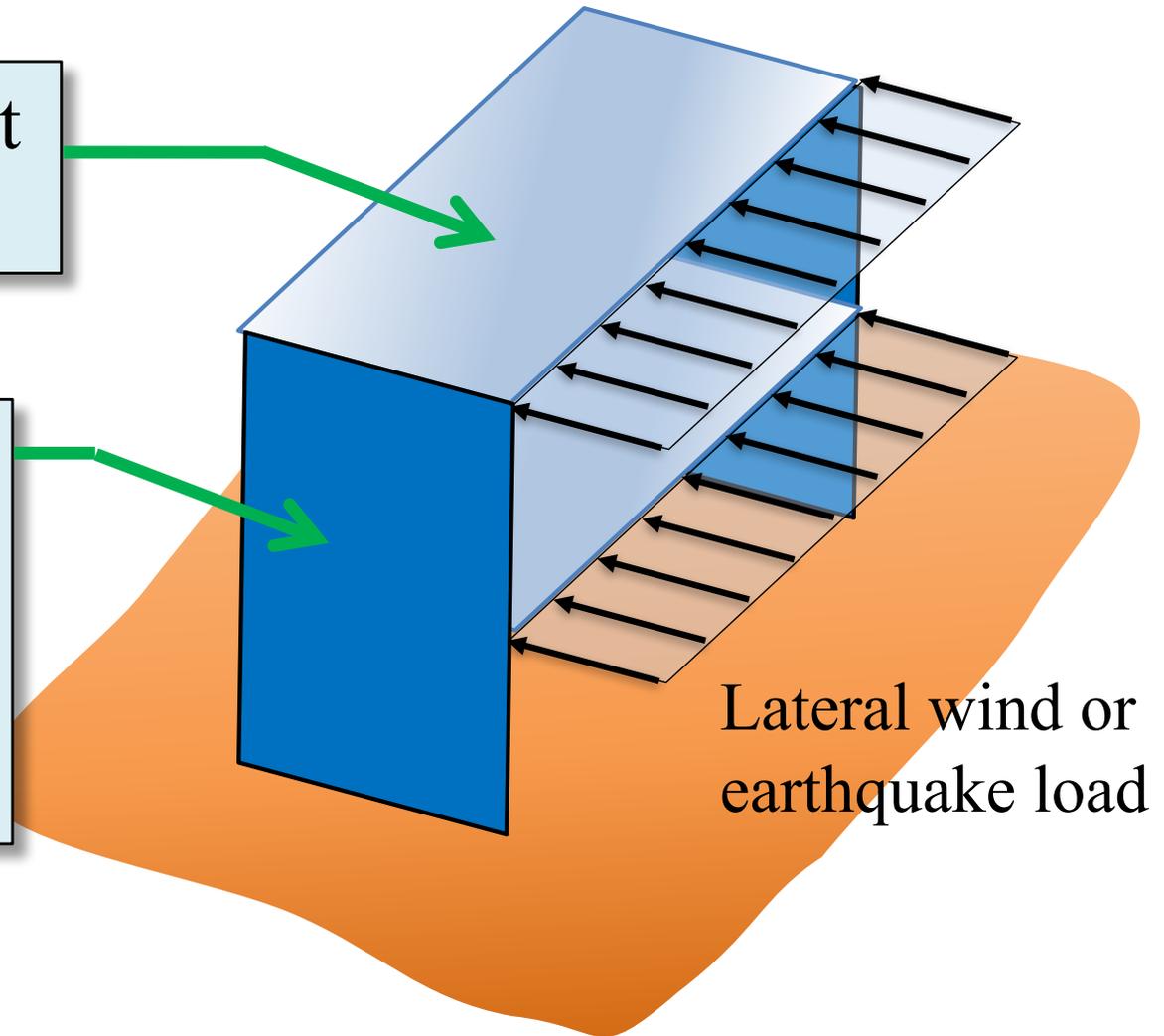
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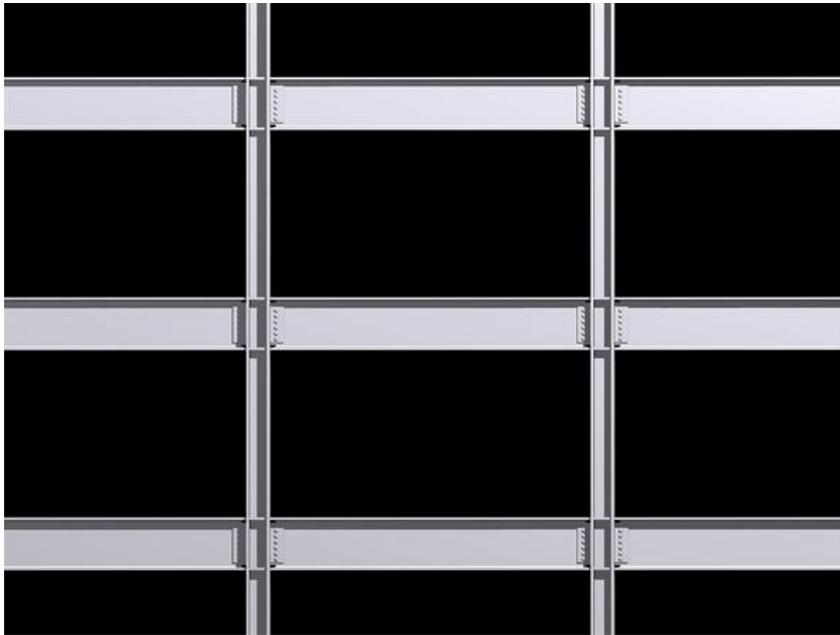
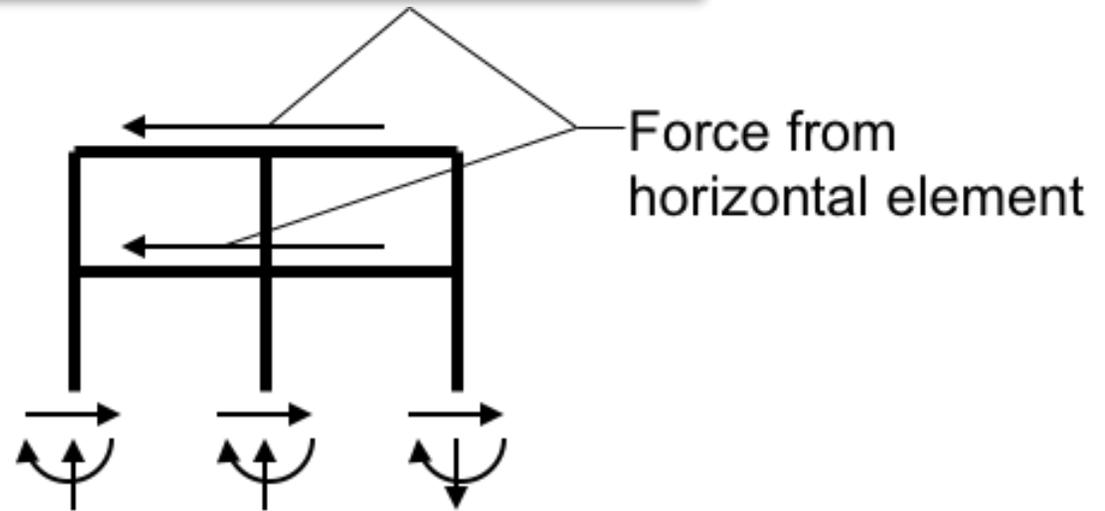
The Lateral Force Resisting System (LFRS) is Comprised of Horizontal and Vertical Elements

Horizontal Element
(Diaphragm)

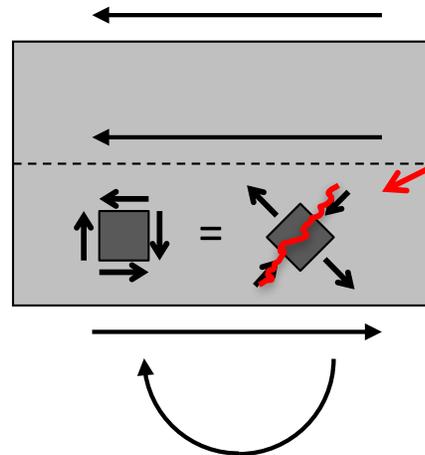
Vertical Element
Common vertical
elements are shown
on the following
slides



Moment Resisting Frame

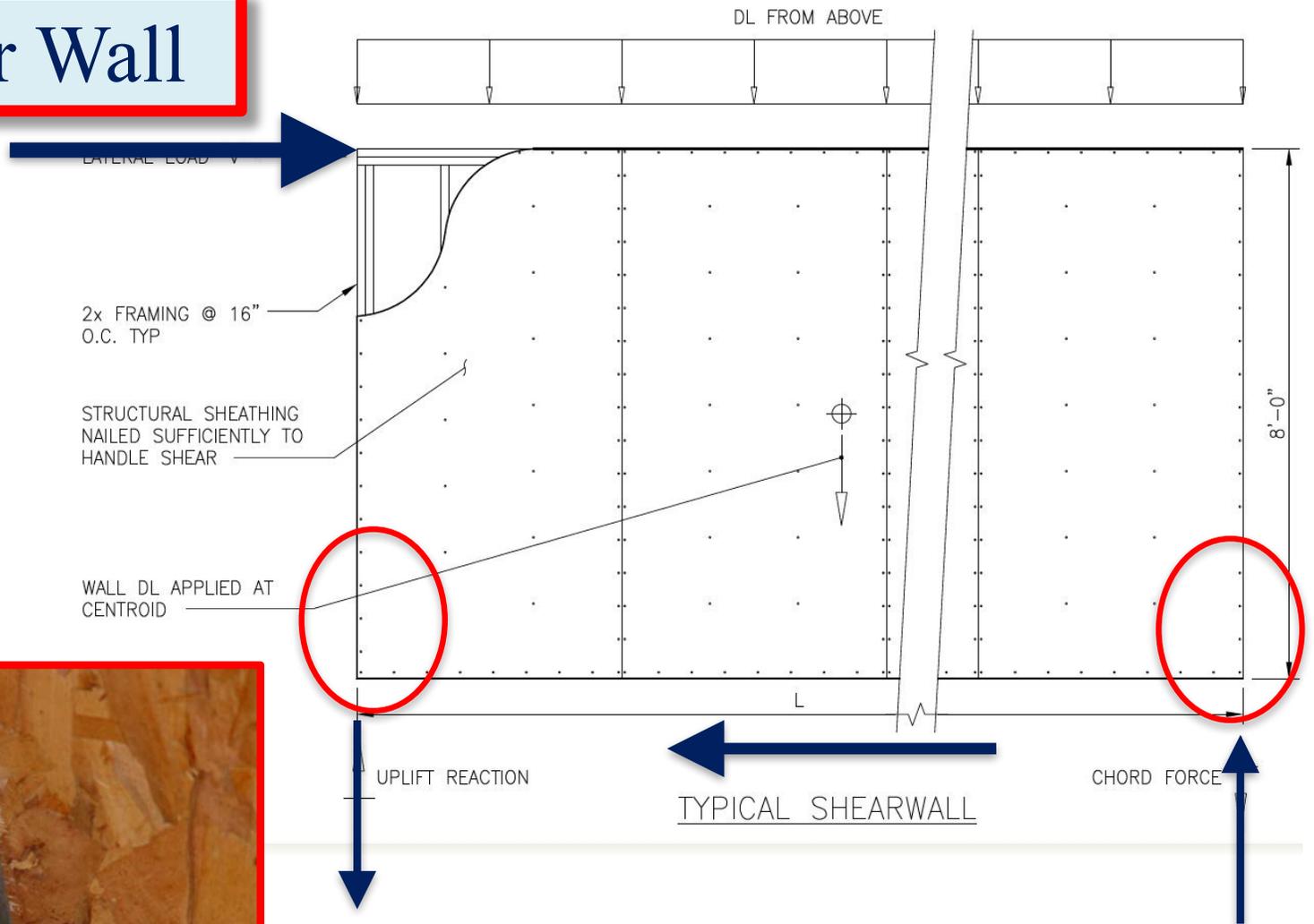


Concrete Shear Wall

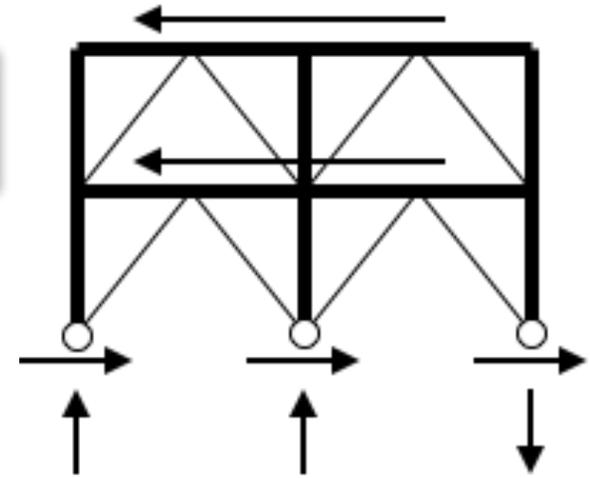


Diagonal Shear Cracks

Timber Shear Wall

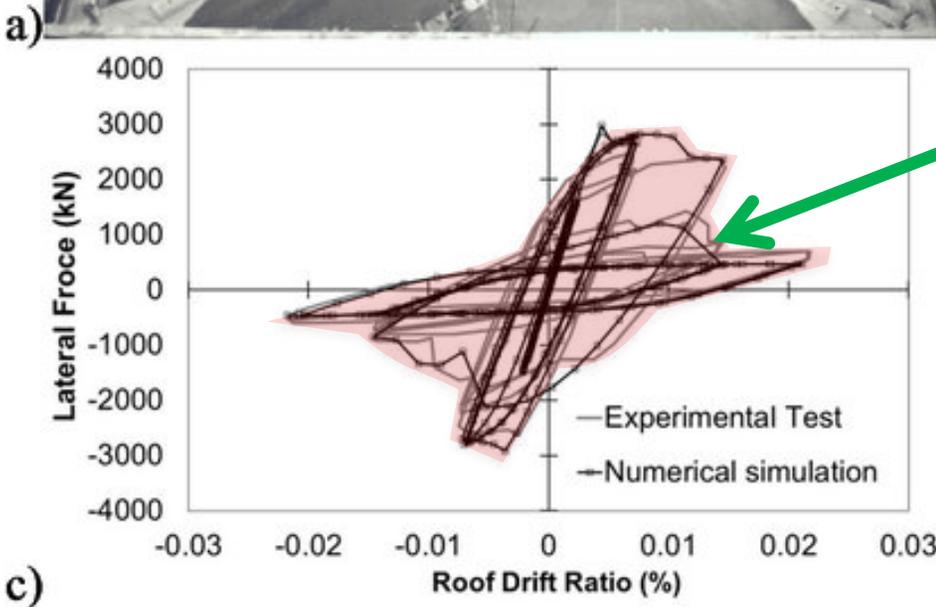
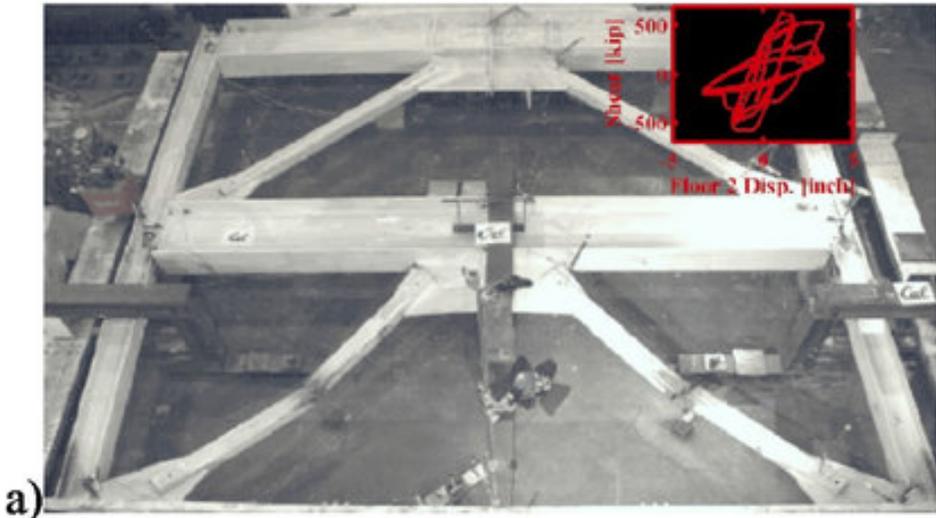
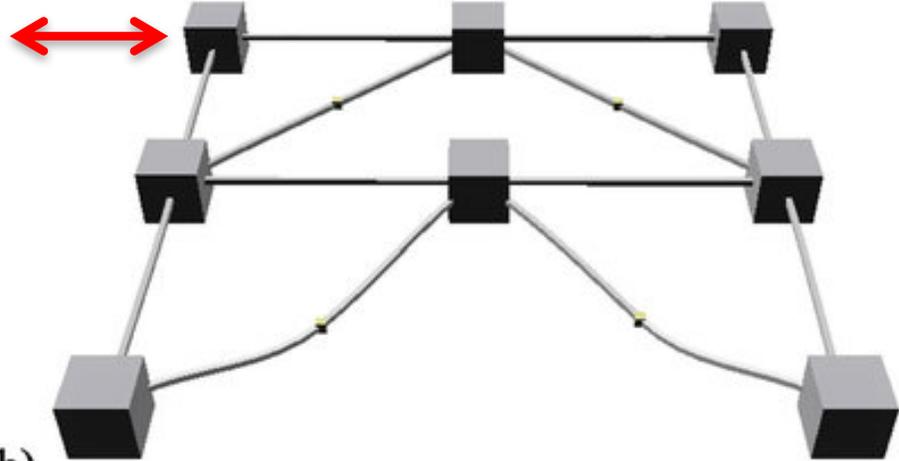


Concentric Braced Frame (CBF)



Energy Dissipation of Concentric Braced Frame (CBF)

Force applied in both directions



Area under curve is proportional to earthquake energy dissipated by the braced frame

Buckling Restrained Braced Frame (BRBF)



Buckling Restrained Braced Frame at the New SJSU Rec Center



Buckling Restrained Brace

Buckling Restrained Braces – Engineering Overview

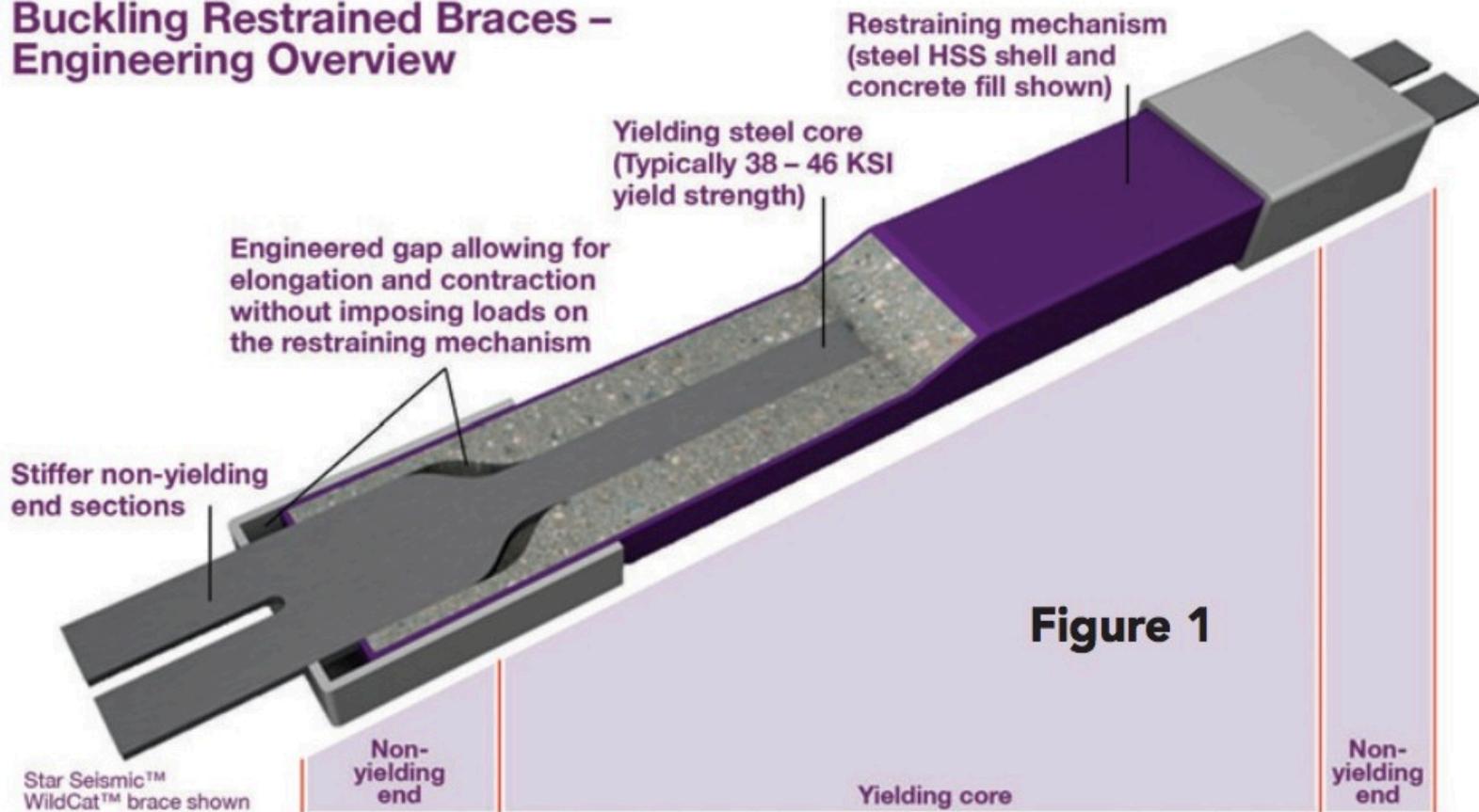
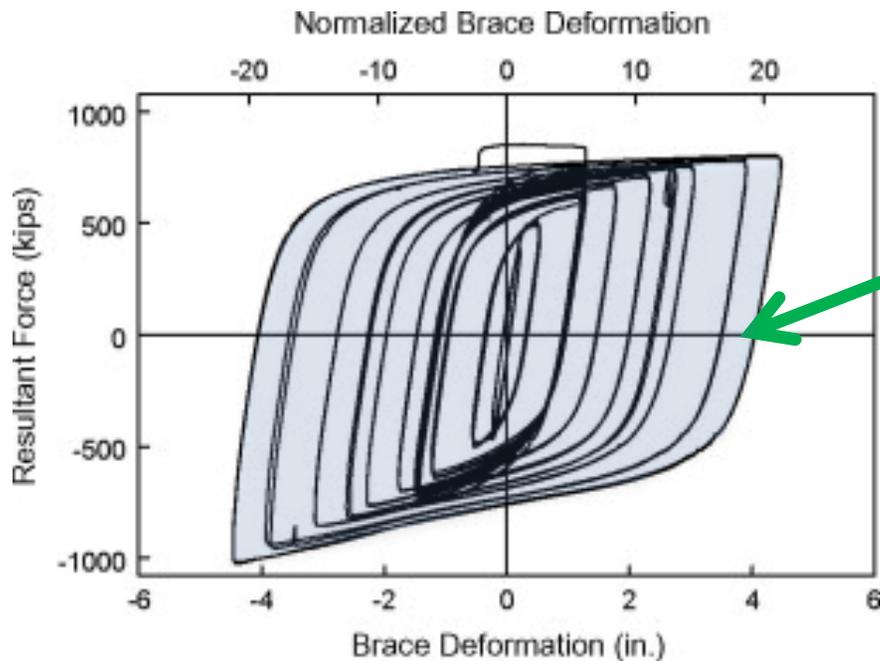
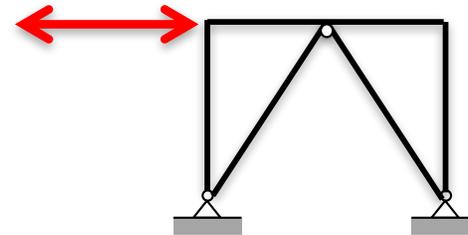


Figure 1

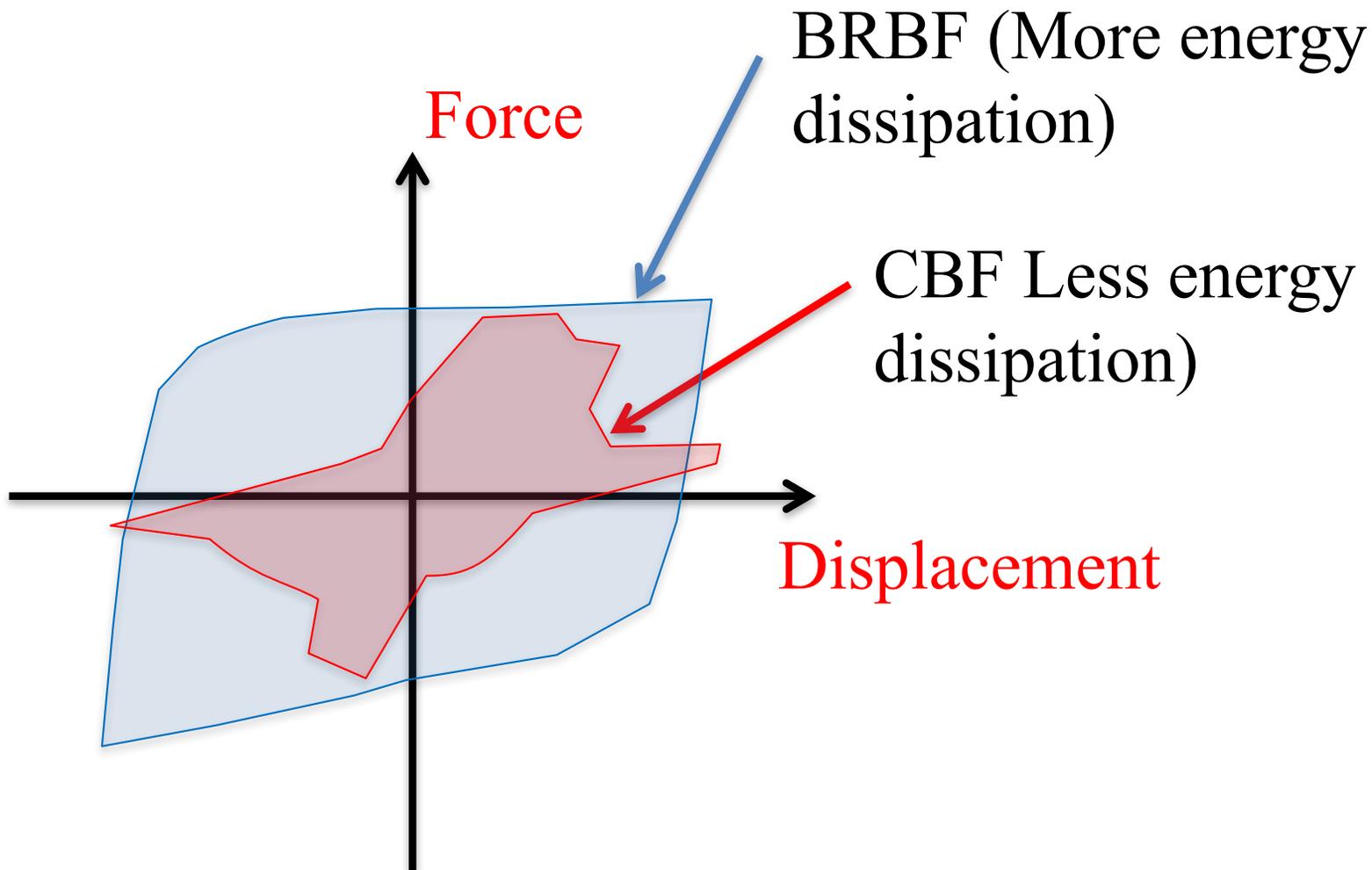
Energy Dissipation of Buckling Restrained Braced Frame (BRBF)

Force applied in both directions

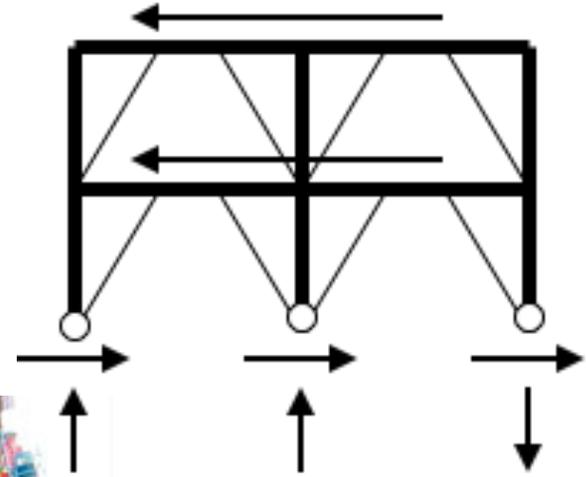


Area under curve is proportional to earthquake energy dissipated by the braced frame

Energy Dissipation of Buckling Restrained Braced Frame (BRBF) versus Concentric Braced Frame (CBF)



Eccentric Braced Frame (EBF)



Link Beam

Energy Dissipation of Eccentric Braced Frame

Area under shear vs. deformation plot is proportional to energy dissipated

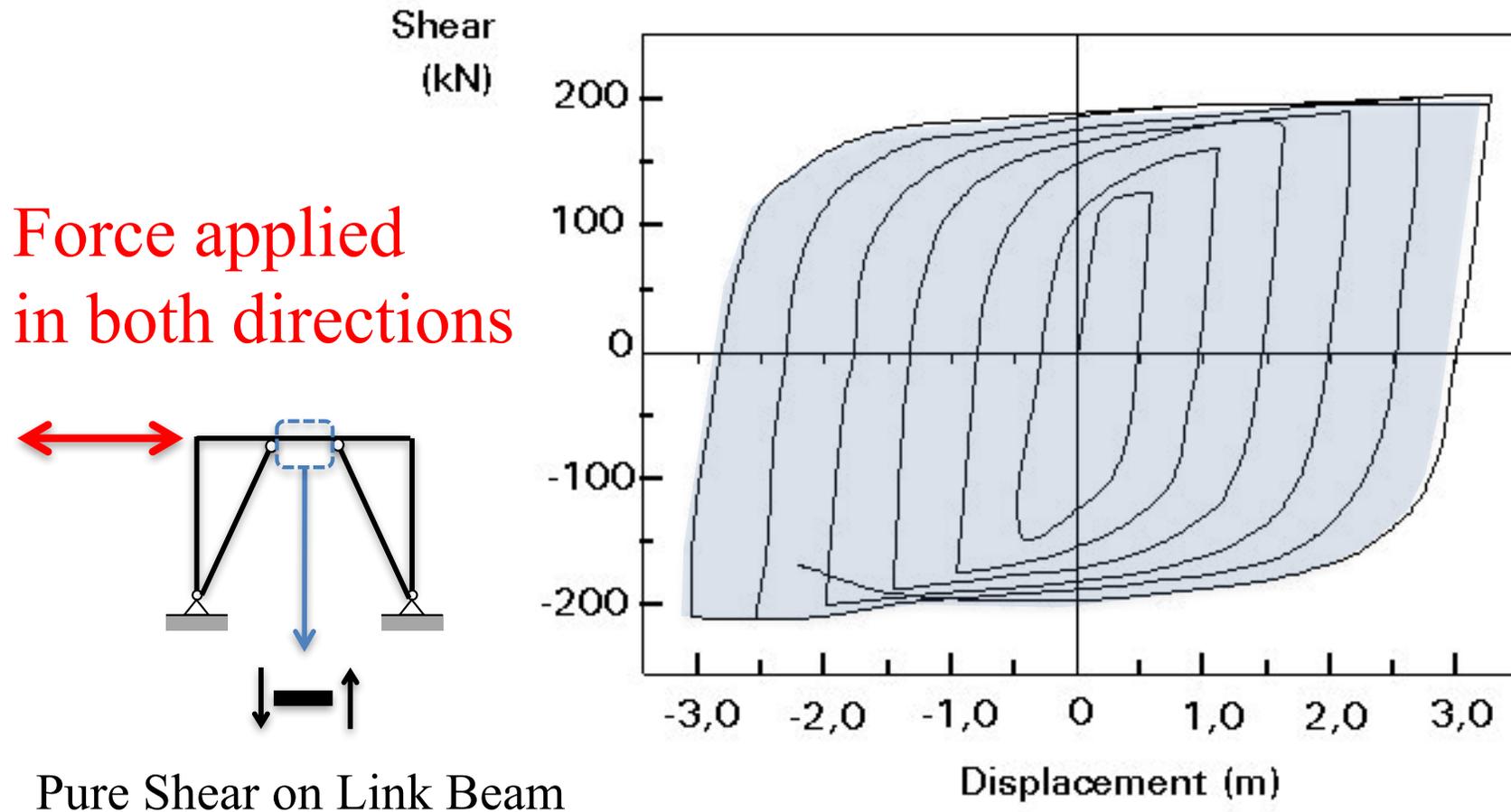


Figure 26 Hysteresis loops of a link