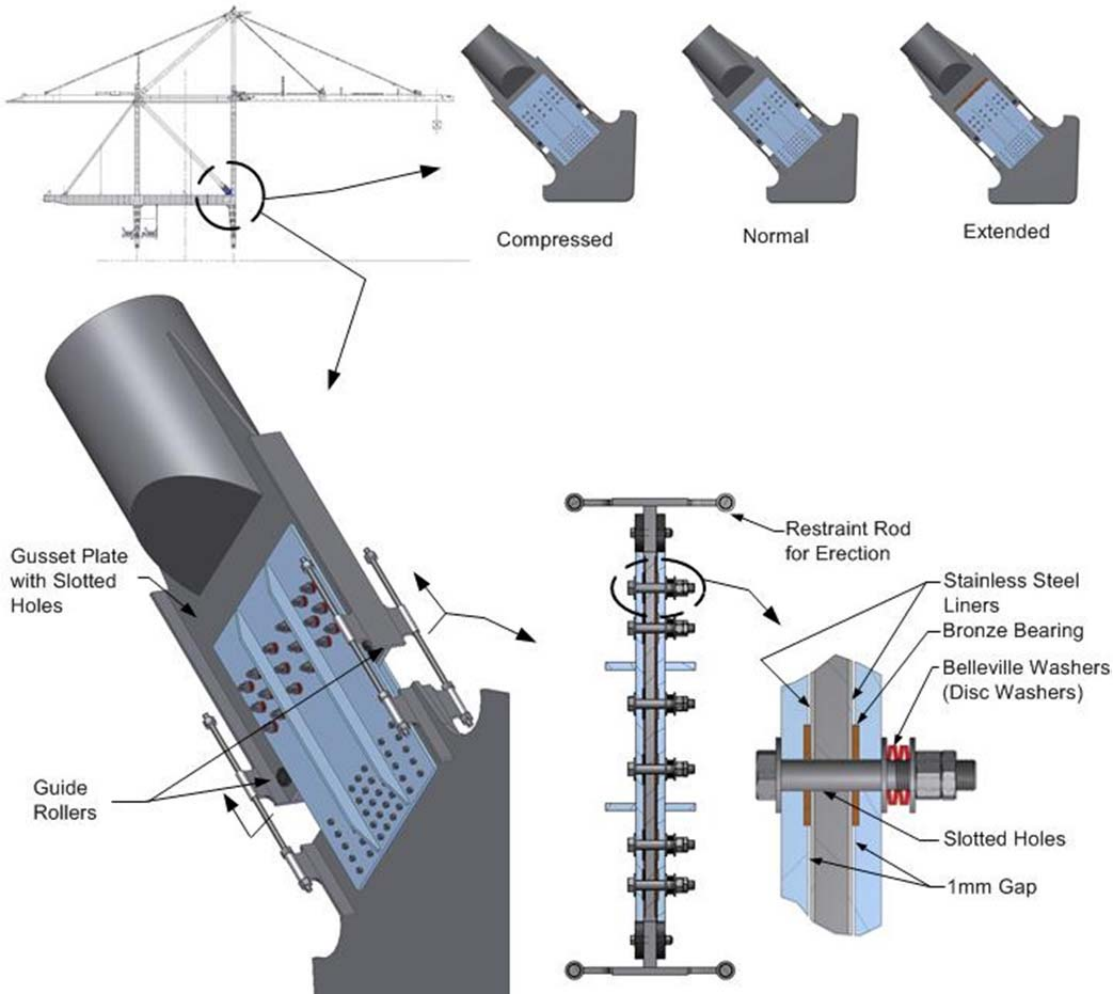

Liftech Seismic Damper

The seismic isolation damper was developed by Liftech to limit the response of the wharf and to protect the crane in earthquakes.

The damper is located at the bottom of each lower diagonal brace and includes a center gusset plate with long slotted holes, lap plates (shown in blue), Belleville (disc) washers, and tensioned bolts. The sliding surfaces are bronze bearings and stainless steel liners. Restraint rods provide added safety, hold the diagonal brace during erection, and can be used to restore the joint to its original geometry after sliding occurs.

Friction developed from the bolt-clamping forces restrains the joint until a predetermined threshold force occurs during a significant earthquake, thus allowing the connection to act as a fuse. Once the threshold is exceeded, the joint slips, increasing the crane's flexibility and dissipating seismic energy as heat. Both phenomena reduce the seismic response and reduce seismic forces. Belleville (disc) washers provide a well-known, nearly constant clamping force as the plates and bearings wear through multiple cycles of relative plate movement.

Since container cranes need to be reasonably stiff to operate properly, the friction joints do not slide during normal operation or in storm wind conditions.

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