Interstory Isolation For Buildings

(With Viscoelastic Hysteretic Dampers)

Executive Summary

Current structural practice mobilizes the ductility of a structure to withstand severe earthquake loading. Thus, the structure does not collapse, but it may sustain damage beyond repair.

A new isolator utilizing interlocking steel/confined elastomer technology offers a sensible, economical long-term solution to this risk. Its use produces predictable structural behavior while minimizing the damaging effects caused by earthquakes. It provides earthquake safety and saves money.

Just as nature uses cartilage (a natural, living elastomer) between bones to reduce forces and attenuate motion, the viscoelastic hysteretic damper is designed to provide connections within a structure which reduce dynamic force transmission, while eliminating unfavorable stress concentrations in the connections. It can be installed in both new and existing structures economically.

This new damper is a structural connection with interlocking steel teeth that are separated by a viscoelastomeric layer as illustrated. This layer functions in a fashion similar to the cartilage lining the human body's hip joint. It is highly confined and configured to be compressed when subject to dynamic loading. The interlocking nature of the bones which make up the hip joint are similar to the interlocking steel teeth of this damper. This unique arrangement results in a moment connection that also provides superior damping and isolation.

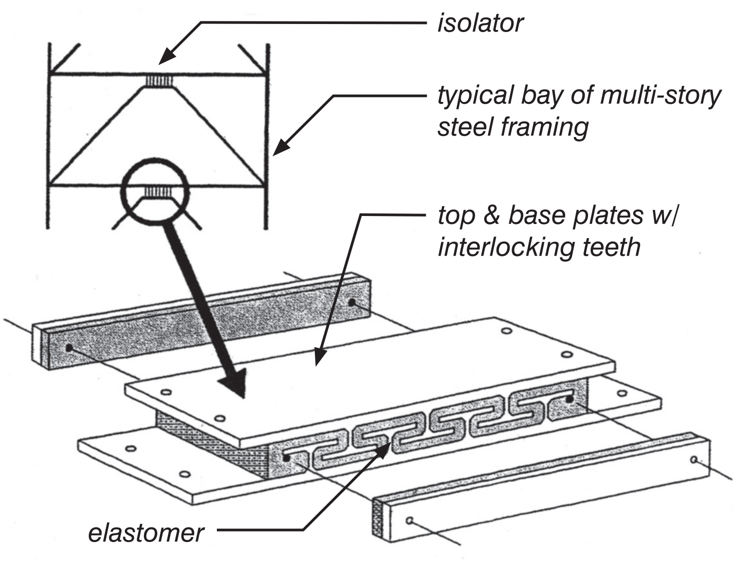
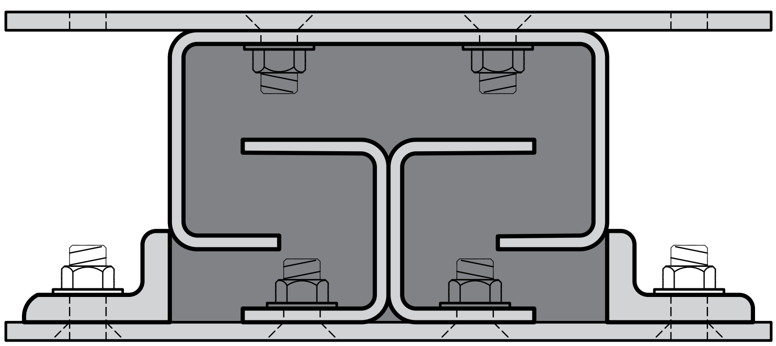


Figure A - Typical brace application

Patented, other patents pending.

Vibration isolation and damping in a structural system are dramatically improved when numerous shock absorbers are used throughout the structure. The human body provides an analogy with the bone structure of the hands, feet or spine. Each individual joint is lined with cartilage which cushions the joint. This redundancy makes the system less sensitive to failure (the accidental failure of one element will not cause the immediate failure of the whole system). It also avoids stress concentrations of a system relying on a few, large components to provide isolation and damping. Accordingly, this type of damper dispersed throughout the structure, provides greater safety, redundancy and ultimately, economy. It localizes the plastic deformation to the dampers.

Small motions (caused by wind or moderate earthquake) mobilize the elastomer only; strong motion mobilizes steel yielding of the damper and the plastic damper deformation is essentially restored by the elastomer. In other words, structural damage is avoided and safety is enhanced.



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Lorant Group, Inc.

is a research and development company in the field of architecture, structural design and product development.
The Company is managed by professionals, knowledgeable about construction and structures. Jan Lorant, AIA is President. The Company has developed energy dissipative devices which are capable of reducing the dynamic impact of earthquakes or high wind on tall buildings or on any structures (bridges, towers, storage tanks, power switch gears, transformers, pumps, motors, etc.). It can also reduce fatigue and wear on structures caused by vibration, wave motion or other dynamic forces acting on machine foundations, vessel frames, rigs, railroads, pipelines, etc.

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