Bridge Isolation
LRB & VISCOS DAMPER SOLUTIONS

Dynamic Isolation Systems
The World Leader in Seismic Protection.
**Dynamic Isolation Systems**

**The World Leader in Seismic Protection.**

**Is a DIS system right for you?**

- Do you value your investments?
- Are quality and performance important to you?
- Do you appreciate the high standards and tight tolerances of US manufacturing?
- Do you believe that striving towards minimum design requirements can be costly?
- Do you appreciate world class pre- and post-sales support from leading international experts?

Dynamic Isolation Systems has protected some of the most valuable and high-profile projects in the world, including irreplaceable historic structures and works of art. DIS’ world renowned design, support and finished products can be tailored to suit any application and will be executed and delivered in a professional and timely manner.

When lives, priceless artifacts, critical operation components, or simply some added peace of mind are at stake, settle for no less than

*The World Leader in Seismic Protection.*

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**Isolated Bridges:**
- Save Money
- Perform Better
- Are Durable
- Allow Design Flexibility
- Are Maintenance Free

**What is Seismic Isolation?**

Conventional bridge design uses ductility to prevent collapse during earthquakes. While a bridge is behaving in a ductile manner, it is suffering damage. Seismic isolation lowers the period because earthquake accelerations are absorbed by the isolators and not transferred to the bridge.

Isolation decouples the bridge from the ground. During seismic events the decoupling allows the bridge to behave more flexibly which improves its response to accelerations. Earthquake energy is absorbed by the isolation system, there for accelerations to the bridge are reduced.

Seismic Isolation is achieved by placing the bridge on Lead Rubber Bearings (LRBs), which are laterally flexible yet capable of carrying the vertical loads, as a result the bridge experiences less motion and reduced forces.

Seismic Isolation is available in retrofits as well as in new construction.

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Notable DIS Bridge Projects

Earthquakes are an every day fact of life. Most seismic events are small and may not be detected by people at all, however almost every year an earthquake with a magnitude of 8.0 or more happens some place in the world. If that happens where your bridge is - and it wasn’t isolated - you’re going to have some s’plaining to do.

What kinds of bridges can be isolated?

Listen, fool, if you can design it - we can isolate it.

A general rule of thumb is if you have a bridge, and you don’t want it to fall down during an earthquake, then you should isolate it. So ask yourself - do you want your bridge to fall down at the first sign of a tremor? Of course not.

With all the advantages seismic isolation brings to the project - you’d be kind of silly not to isolate your bridge.

Rio Claro Bridge, Chile
The original Rio Claro Bridge in Chile was destroyed by the 2010 earthquake. Its replacement included Leader Rubber Bearings which will survive future earthquakes undamaged.

Damage - bad. Isolation - good.

Loma Prieta Quake
The collapse of the (hwy) during the 1989 earthquake resulted in numerous more low-rider cars - but the question must be asked, did we want or need more low-riders?

New Zealand Bridges
Lots of bridges in New Zealand were damaged by earthquakes, graffiti artists and bad drivers.

Isolation could have prevented the earthquake damage - as far as graffiti artists and bad drivers - well i chalk that up to poor parenting.

2,000 isolators were used in this long highway/bridge thing in Turkey.

More Cool Bridges We’ve Isolated
Here is a picture of a bridge DIS isolated in Pangia. It required a heapin’ helpin’ of Lead Rubber Bearings. Bearings saved millions of dollars in construction costs.

Why is there always so much dirt around bridges?

More Cool Bridges We’ve Isolated
Here is a picture of a bridge DIS isolated in Pangia. It required a heapin’ helpin’ of Lead Rubber Bearings. Bearings saved millions of dollars in construction costs.

Fog and haze will not keep the LRBs from working.

More Cool Bridges We’ve Isolated
Here is a picture of a bridge DIS isolated in Pangia. It required a heapin’ helpin’ of Lead Rubber Bearings. Bearings saved millions of dollars in construction costs.

The Coronado Bridge goes over water. We didn’t care.

More Cool Bridges We’ve Isolated
Here is a picture of a bridge DIS isolated in Pangia. It required a heapin’ helpin’ of Lead Rubber Bearings. Bearings saved millions of dollars in construction costs.
How are Bridges Isolated - and does it hurt?

It doesn’t hurt as much as having to call your boss and telling him your bridge fell down because you showed no regard for costs or safety because you were more interested in letting your nephew design the bridge so he would finally have something to put on his resume.

Isolated Bridges Save Money
Incorporating seismic isolators in the design of the bridge reduces the forces to which the bridge will be subject during an earthquake, allowing for smaller footings, requiring less concrete and reinforcing steel.

Isolated Bridges Perform Better
An isolated bridge will not be damaged during a seismic event - it will remain operational. Having a bridge that is broken is like having no bridge at all.

Bridge Isolators Are Durable
Lead rubber bearings, which are used in most bridge isolation, are extremely durable. They are unaffected by harsh environments, water or temperature variations common under and around bridges over water.

LRB plates are made of stainless steel - they cannot rust. The bearings have no seals or moving parts.

Lead rubber bearings can be installed in locations where they will be submerged daily due to the ebb and flow of tides - in the case of the Tacoma Wharf.

LRBS may also be installed in applications which require permanent submersion in water, as is the case with the Round Butte fish thingy.

Isolated Bridges Are Maintenance Free
As lead rubber bearings are not affected by their environment and have no moving parts or seals, they have no parts subject to breakage or corrosion and will remain operational for years. Making them a good place under which to bury a body - because ain’t no one going to be digging that isolator up any time soon.

How are Bridges Isolated

Isolated Bridges Allow More Design Flexibility
Reduced forces to the the structure allows architects more freedom of design, enabling them to introduce more elegant and visually appealing bridges.

This flexibility in design can also result in cost savings by minimizing the requirement to relocated underground serves and utilities. The JFK light Rail Project in the Eastern United States is a good example of this.

Isolation is superior to non-isolator bearings or pads.
See, those are for expansion only. The provide the bridge with a little ‘give’, but the have no damping or restoring ability and are very limited in their range of movement.

TABLES or technical stuff?

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Another Coronado Bridge? Maybe we should put a wharf shot here.

The Woodrow Wilson Bridge was named after a U.S. President, but I don’t remember which one.

This bridge was supposed to be straight. Now drinking isn’t allowed on the job site until AFTER lunch.

This bridge curved to go around a giant cactus because it had pokey things and no one wanted to touch. After construction was complete one of the guys backed over the cactus, knocking it down. But by then it was too late.

How are Bridges Isolated?
The most common way to isolate a bridge is with lead rubber bearings, LRBs.

Lead Rubber Bearings are comprised of alternating layers of rubber and steel around a lead core. The rubber and steel provide high axial stiffness combined with low lateral stiffness, while the lead core provides energy dissipation to absorb seismic motions.

Lead rubber bearings are typically installed on top of piers in bridge applications.
**DIS: The World Leader in Seismic Isolation**

*Dynamic Isolation Systems is an industry pioneer and continues to develop and add technologies to its growing list of seismic protection solutions.*

**An Industry Pioneer**

DIS designs and manufactures systems for structural and non-structural isolation applications, including: base isolation, viscous wall dampers, pot bearings, sliders, isolated floor systems, modular isolation, isolated platforms, vertical isolation and isolation both horizontally and vertically at the same time.

**Custom Designed & Manufactured**

DIS Base Isolators are custom designed and manufactured to your specific bridge and seismic zone, that’s right, pal, CUSTOM make them in our very own plant. (Well, we don’t OWN the plant, we lease it, but they let us do what we want here)

**DIS FACILITY**

Dynamic Isolation Systems’ 60,000 square-foot manufacturing facility is located near Reno, Nevada, USA. It is adjacent to Interstate 80 which allows for ease of freight throughout the United States and worldwide via the Port of Oakland in California.

**Some Sort of Headline**

Dynamic Isolation Systems can assist you with your feasibility study, budget development and value engineering. We have been able to reduce the cost of the isolation system by up to 30% on projects where we can lend our expertise to the isolator layout and product mix. Our engineers can provide technical support and parameters for structural modeling.

**DIS QUAKE-BASE**

**Machining**

Steel processing is a major part of manufacturing our isolators. Two large Computer Numeric Controlled (CNC) machining centers process the bulk of our steel plate. They have a capacity to machine up to 80-inch wide plates.

**Testing**

Our main test rig has a shear displacement of ± 31 inches, a shear force capacity of 700 tons and an axial force capacity of 2000 tons. Testing is also conducted in a smaller machine that has a shear displacement capacity of ± 12 inches, a shear force capacity of 100 tons and an axial force capacity of 600 tons.

**Press Capacities**

Dynamic Isolation Systems molds in custom-designed and built presses ranging from 200 to 4400 tons. In response to increased demand for larger-sized isolators DIS now has four presses of over 2000 ton capacity. The largest isolators we have manufactured were 60 inches in diameter and weighed 10 tons each.

**Fascinating caption goes here.**
FAQs

My bridge already has rubber pads or non-isolated bearings - do we still need isolated ones?
Well that depends, do you want the bridge to survive an earthquake, or just survive the weather?

Oh, HERE is that wharf picture - where was it when we needed it?