

Earthquake Safety Guide for Home Owners & Corporates

Are you Taylor Protected?

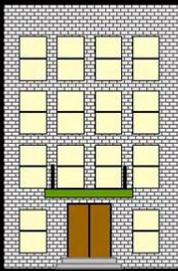
Protect Existing and New Buildings with ease.



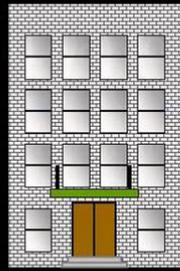
taylor devices inc.

World's Best Earthquake Protection
Since 1955

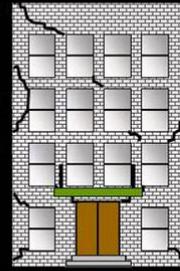




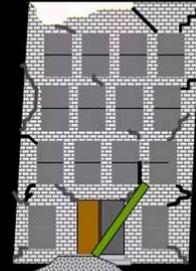
Operational



*Immediate
Occupancy*



*Life
Safety*



*Collapse
Prevention*

Know the Earthquake Resistant Category of your Building.

Earthquake Resistant buildings are of 4 types, their definitions as per National Disaster Management Authority guidelines are given below. Presently buildings in India follow the minimum code standards and therefore are classified as Category-D buildings.

Category-A: Operational:

The building, its contents and utilities are shaken by an earthquake, but no damage occurs in either of the above; the function of the building is not disrupted due to the occurrence of the earthquake.

Category-B: Immediate Occupancy:

The building, its contents and utilities are shaken predominantly in their linear range of behavior and only minor damage may occur in them; the use of prevailing functions of the building and facilities is not restricted after the earthquake so that its functioning can be resumed immediately after the earthquake.

Category-C: Life Safety:

The building, its contents and utilities are shaken severely in their non linear range of behavior. Significant damage occurs in them, but the building remains within its reserve capacity and does not reach the state of imminent collapse. The use of the facility is restricted after the earthquake until detailed structural safety assessment is performed to ascertain the suitability of the building for retrofitting. If found suitable for retrofitting, the building maybe retrofitted.

Category-D: Collapse Prevention:

The building, its contents and utilities are shaken severely in their non linear range of behavior. Major damage occurs in them. The building does not have any additional reserve capacity and is in the state of imminent collapse. The building cannot be used after the earthquake.

FAQS - HIGH PERFORMANCE ENGINEERING

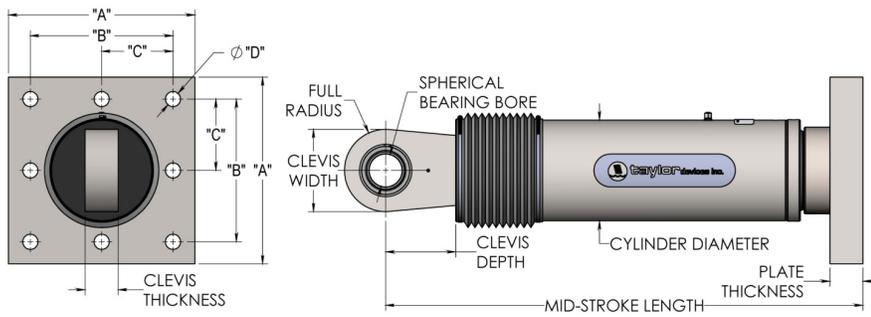
Q: What is High Performance Engineering (HPE)?

A: Using advance structural design techniques along with base isolation/supplementary damping to either design Operational or Immediate Occupancy buildings or upgrade existing Collapse Prevention and Life Safety buildings to Immediate Occupancy standards is called HPE.

Q: What are the cost implications of HPE?

A: The cost implications for different scenarios are:

Type of Building	Cost and Design Implication
New Category-A building	Not possible without HPE.
New Category-B building	HPE is upto 20% economical than a conventionally designed Immediate Occupancy building.
Seismic upgrade of existing building	HPE is upto 40% economical than a conventional seismic upgrade.
Comparison of a new HPE Category-B building and new conventionally designed Category-C building	The initial construction cost is the same. However, life-cycle costs of HPE building is much lower.



Look for “Taylor Protected” branding in buildings.



Taylor Devices' Seismic Dampers and our President, Douglas Taylor, were inducted into the Space Technology Hall of Fame in 2015. Our Vice-President, Richard Hill, received the Corporate Award.

World's Best Platinum Grade Earthquake Resistance using aerospace technology shock absorbers with 35 years warranty. Taylor Protected buildings will be safe for occupation and use even after a major earthquake thus protecting life and investment.

The earthquake tremors of Nepal have not only caused extensive damage to the reinforced concrete multi-story buildings in Kathmandu, but have also shaken the confidence of people in India and ignited the fear of a magnitude 8 or higher earthquake striking North India which will cause 8 to 9 lakh casualties as per statements made by the National Disaster Management Authority (NDMA).

The prohibitively high repair costs for buildings designed and built as per the building code earthquake standards has prompted Taylor Devices India to launch a unique and one-of-its-kind solution for the Indian realty market. Taylor Devices India has launched its brand certified earthquake resistance by the name of “Taylor Protected”, which far exceeds the minimum code criteria. Buildings vying for this certification will need to comply with extremely strict and high international standards. These buildings will have giant shock absorbers installed which will stay hidden in walls and these will act just like the shock absorbers in a car absorbing the earthquake shocks so that the building structure remains unharmed.

India has yet not seen this premier earthquake protection which is extremely popular in countries like US and Japan. The brand certification marks will enable the consumers in India to be rest assured that the apartment they are purchasing contains premier earthquake protection which is much ahead of its times and much higher than the minimum protection as spelt out by the building codes.

Presently there is no way to identify if a building is earthquake resistant, other than take the word of the seller that the building he is selling is earthquake resistant. The difference between their earthquake performances is so huge that merely saying that the building is earthquake resistant has no meaning. Category A and category B buildings stay operational even after a major earthquake whereas category C and category D buildings need to be abandoned/vacated and structurally repaired before being reoccupied.

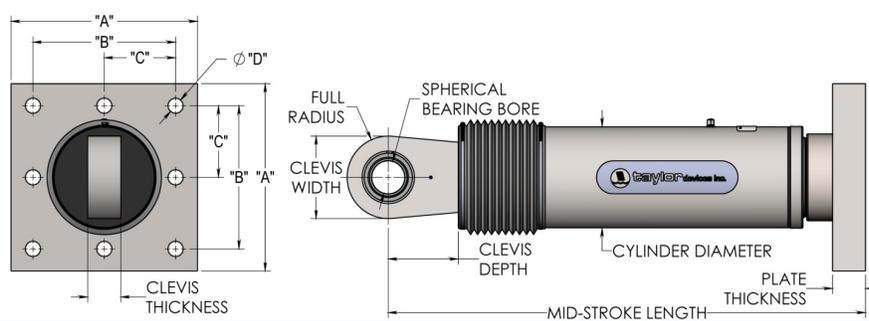
The building code in India requires a minimum compliance to category D standard, which is “collapse prevention”. “Taylor Protected” brand certification will only be given to Category A and B buildings (Operational and Immediate Occupancy buildings).

To get this state-of-the-art brand certification the building will need to meet numerous stringent earthquake resistant criteria, firstly it would need to be designed to Category B or above seismic performance standard (operational or immediate occupancy) and will have to have Taylor Devices aerospace technology dampers, that are maintenance free and come with a 35 years warranty.

Proactively divulging the earthquake resistance category of the buildings will also set precedence in upholding the two most important consumer rights i.e. “Right to Complete Knowledge” and the “Right to Awareness”.



More than
650 buildings
and bridges
are now using
Taylor Dampers



Frequently asked Ques - what makes us the world's best?

Q *What are the benefits of using Taylor Devices' Seismic Dampers in a structure?*

A Since dampers resist dynamic motion and remove energy from a structure during wind or seismic events, the resulting structural stress and deflection will always be mitigated in an efficient and reliable manner. This enables the structure to withstand the harsh input energy associated with these events and allows for a simple retrofit of existing structures without costly foundation work.

Q *Why do Taylor Dampers offer a better solution than other devices?*

A Since damping force in a Taylor Damper is dependent on velocity, this force is out-of-phase with the normal structural stresses during a dynamic event such as an earthquake.

When a structure moves, the maximum structural stress occurs at the point of maximum deflection. At this point the velocity is zero, and the damping force is therefore zero. Then, the maximum damping force occurs when the structural stress is lowest, because this is the precise instant in time that the velocity is the highest. This results in the ability of the damper to precisely remove energy from the structure at optimal points of deflection, while not needing any additional structural strength to withstand damping forces.

The result: forces and accelerations are reduced simultaneously with deflection reductions, thereby allowing the structure to protect not only the structural frame, but contents and occupants as well.

Q *How reliable are Taylor Dampers?*

A Our structural dampers have been tested to provide completely leak-free operation for millions of cycles. We use our own proprietary seals manufactured from structural plastic combined with high strength stainless steel piston rods polished to a mirror-like finish. These products have been successfully used in thousands of applications, benefiting buildings, bridges, steel mills, chemical plants, military ships, submarines, aircraft and missiles.

Taylor Dampers do not degrade with age, do not utilize any moving parts for fluid flow orifices and are completely maintenance-free. These units do not need service or even inspection after a seismic event and maintain their required characteristics for the life of the structure.

Q *Why are Taylor Fluid Dampers better than other solutions such as Buckling Restrained Braces (BRB's)?*

A Taylor Fluid Dampers are reliable, predictable, reusable and have been proven through decades of use. Our dampers allow perfect re-centering of the structure due to near-zero resistance force at near-zero velocities. In fact they are instantly ready for the next aftershock. Automobile suspensions converged to viscous

damping-type shock absorbers over 100 years ago for the same reason: to be instantly ready for the next bump.

There are several reasons our dampers are superior to BRBs:

- Taylor Dampers allow the relief of forces that could otherwise build up in BRB's as a result of creep and shrinkage as a building ages.
- BRB's are yielding members, and their characteristics and life are unpredictable after use.
- BRB's need to be replaced after a significant seismic event.
- BRB's cannot provide energy dissipation for low-level earthquakes. A BRB functions only as a brace until a larger earthquake strikes, when they may or may not yield.
- BRBs increase acceleration levels in the structure.

Q *What types of materials are used for dampers?*

A All materials used are corrosion-protected, usually with a combination of plating and paint. Special paints and colors are used if requested. Stainless steel is used exclusively in the piston rod. Stainless steel is also available for any external part if needed.

Q *What type of fluid is used in a damper?*

A Silicone fluid. It is non-toxic and is cosmetically inert. This fluid is thermally stable, does not experience viscosity breakdown and will not settle out. Its flashpoint is greater than 600°F and is non-flammable and non-combustible. The fluid is manufactured and certified in accordance with U.S. Federal standards.

Q *How much damping is usually needed to protect structures?*

A Structures have different requirements. Sometimes the structure calls for a reduction in deflection, stress, or acceleration (or a combination thereof). Typical structures can experience a dramatic improvement with 10 to 30 percent of critical damping added. A dynamic analysis demonstrates the best solution through a relatively simple iterative approach.

Q *How can I be sure that Taylor Fluid Dampers will operate as required during an earthquake or wind event?*

A To ensure exact performance, prior to shipment, each and every Taylor Devices structural damper is dynamically tested to maximum rated force at maximum velocity using our world-class in-plant test machines with instrumentation certified to exact U.S. government standards. Each damper is proof-pressure-tested to ensure the integrity of its parts and assembly. A test report on each damper is provided with every shipment.



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