



EASYFLEX

ENGINEERING INDIA



BUILDING & CONSTRUCTION

MECHANICAL
ELECTRICAL
PLUMBING
FIRE FIGHTING

INTERACTION
with People and Structure

AIR BORNE
STRUCTURE BORNE
DUCT BORNE

VIBRATION ISOLATION

- **Vibration Energy from mechanical equipment ->**
- **Transmitted to the Building Structure ->**
- **Radiated as Structure-Borne Noise.**

EQUIPMENTS

DUCTING

PIPING

Vibration isolation is the process of isolating an object, such as a piece of equipment, from the source of vibrations.

By inserting isolators between the machine and supporting structure, the magnitude of transmitted vibration can be reduced.

SEISMIC ISOLATION

The term “Seismic” refers to the forces related to the motions of an Earthquake.

These forces interact with a structure in a random fashion – predominantly horizontal, often with directional emphasis & sometimes with a considerable vertical component.

EQUIPMENTS

DUCTING

PIPING

- **Seismic Isolation** helps protect equipment by not amplifying the seismic input.
- **Seismic Restraint** is designed to keep equipment attached to a building structure so that it does not become a projectile.

NON STRUCTURAL ELEMENTS

For a building to be considered safe during the event of an earthquake, the following conditions need to be fulfilled

- **The people in the building are able to resist the earthquake's ground motions and no loss of life occurs.**
- **The contents of the building, along with all the services and utilities are able to resist the impact of the earthquake as well, without any losses.**

Therefore, it is critical that the Non-Structural Elements (NSE's) - contents of the building and its services & utilities, are adequately equipped to resist damage during an Earthquake.

NON STRUCTURAL ELEMENTS

Negligence to secure non-structural elements in building can lead to multiple negative effects

- Primary hazard : when the damage to the NSE can impair its own functionality and cause a threat to people's lives in the building.
- Secondary hazard : when the NSE can cause an action that may lead to loss of life, property and loss of building functionality.

For instance - damage to piping which leads to leakage of water, flooding the building and eventually shutting down the electricity, thus making the building unusable.



Hanging Light fixtures damaged during Earthquake

NON STRUCTURAL ELEMENTS



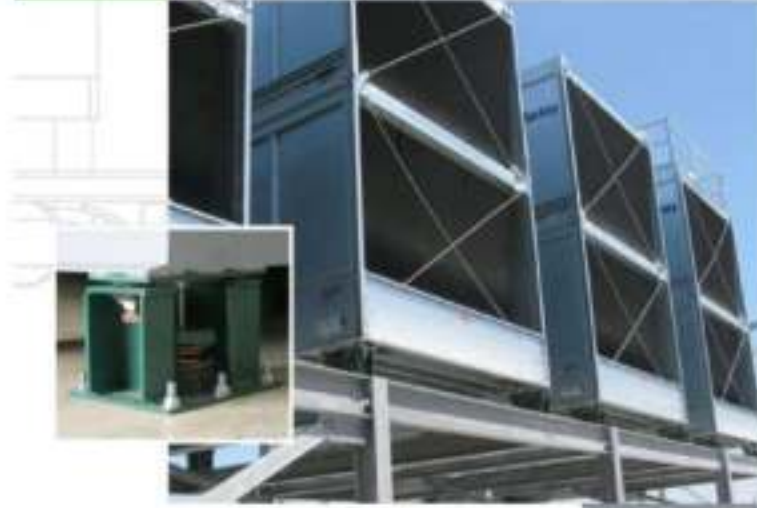
False ceiling collapsed during Earthquake



Seismic restraint of Services & Ceiling

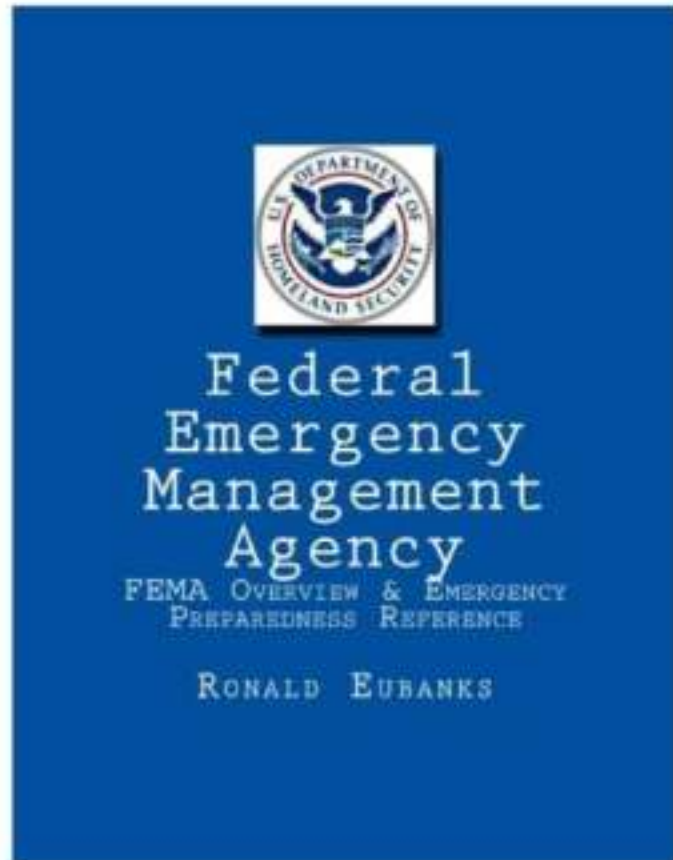
COMPLIANCES

Installing Seismic Restraints
for Mechanical Equipment



VISCOMA
VIBRATION ISOLATION & SEISMIC CONTROL
MANUFACTURERS ASSOCIATION

412



AXIAL FLOW FANS



Lateral & vertical movement of the equipment needs to be minimized so that equipment remains in place during a seismic event.

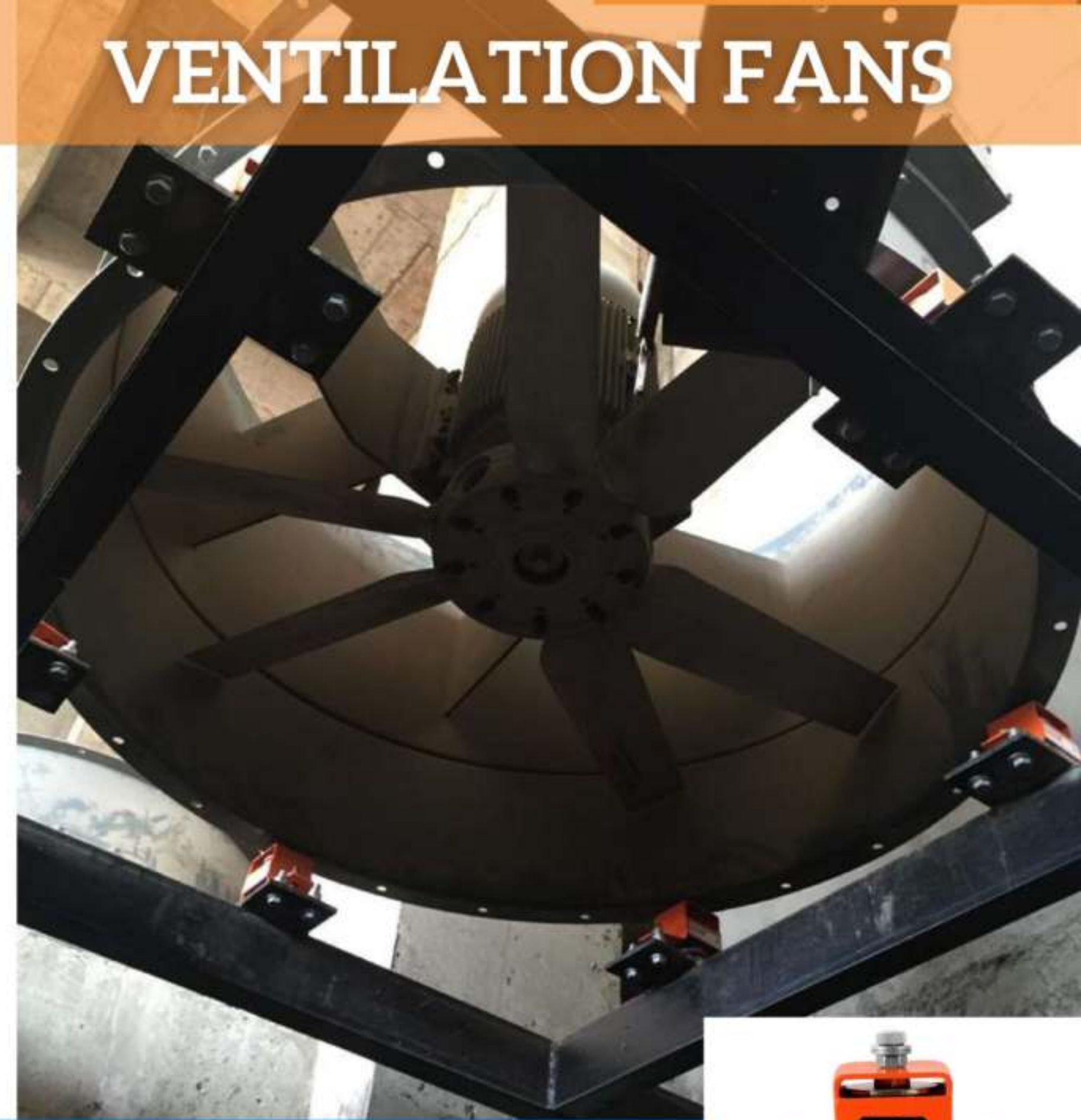
Holding down the equipment can be achieved in two ways

- Placing a mechanical **"Snubbing Device"** in **conjunction with "standard" spring isolators**
- Spring isolators with "built in" snubbing devices can be used. **These are what we refer to as seismic isolators.**



SEISMIC ISOLATORS
FLOOR MOUNTED EQUIPMENT | RESTRAINED SPRING MOUNTINGS

VENTILATION FANS



SEISMIC ISOLATORS

PROJECT : SEAWOODS - NAVI MUMBAI | RESTRAINED SPRING MOUNTS



CHILLERS



SEISMIC ISOLATION

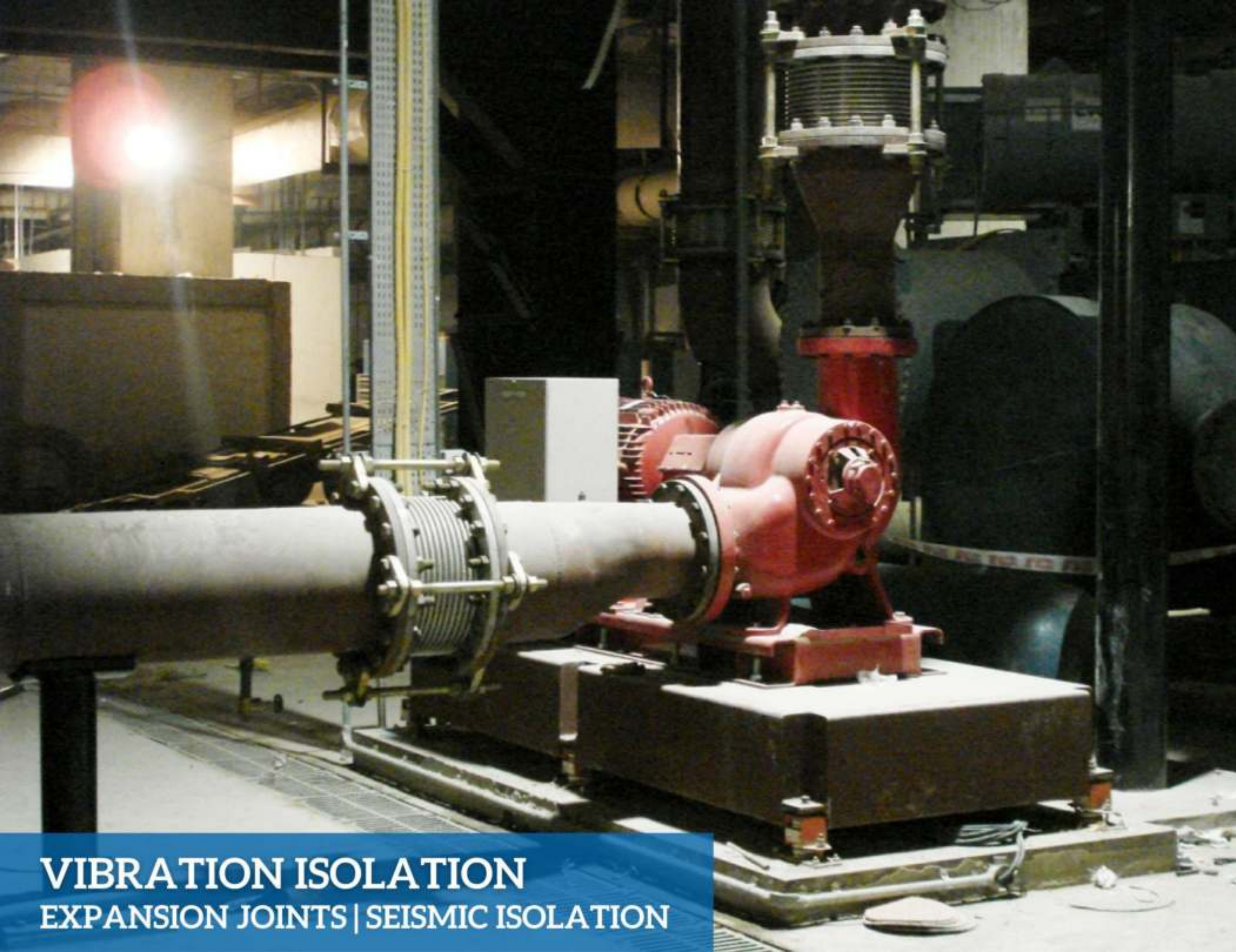
FLOOR MOUNTED | RESTRAINED SPRING ISOLATOR | 9 SPRING MODEL | 10 TON POINT LOAD

PUMPS

In a seismic application where vibration isolation of the mechanical equipment is required, this movement for proper isolation is still necessary.

However, in these installations, the lateral & vertical movement of the equipment needs to be minimized so that equipment remains in place during a seismic event.

VIBRATION ISOLATION
EXPANSION JOINTS | SEISMIC ISOLATION



Building Codes in many areas require components to be capable of resisting forces created during a Seismic Event.

Resilient Snubbers used while installation can limit the motion experienced by equipment and ensure it remains in place.

Easyflex Seismic Snubber series is suitable for 250 Kg to 11500 Kg Point Load.



SEISMIC ISOLATION
SEISMIC SNUBBERS | RESTRAINED ISOLATORS

PIPING



The random motion common to earthquakes requires that Seismic Expansion Joints be capable of movement in any direction.

The unique "EFSVC" design places the flexible leg at 45 degree angles to the pipe run, even allowing up and down movements.

FLEXIBLE CONNECTORS

SEISMIC ISOLATION | V CONNECTORS | MOVEMENT IN 6 DIRECTIONS

PIPING



With the loops extreme flexibility and low force to move, the loop absorbs the seismic energy and imposes minimal loads on the adjacent pipe hangers, supports or nozzle loads on major equipment.



Unique to the loop is the incredibly low amount of force required to bend its legs, minimizing anchor loads, guiding and installation costs.

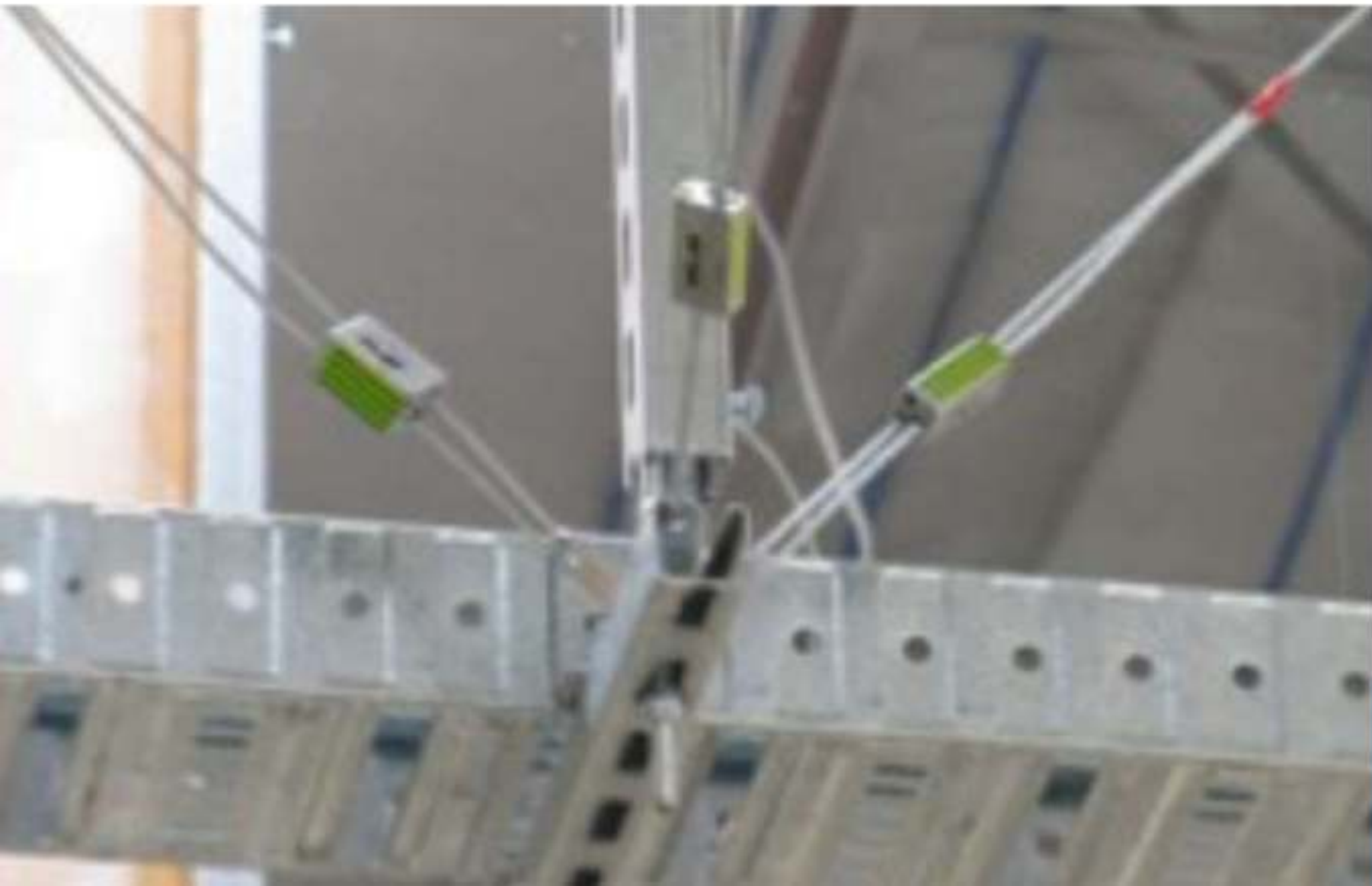
FLEXIBLE CONNECTORS

SEISMIC ISOLATION | MOVEMENT IN 6 DIRECTIONS | FOR FIRE PIPING AT BUILDING EXPANSION JOINT

PIPING / DUCTING / CABLE TRAY

Seismic forces act horizontally upon the structure itself, as well as the Piping, Cable trays, Duct work, and other building systems within.

Typical supports for piping, trays and other equipment are designed for Gravity or vertical loads but do not account for the horizontal loading caused by earthquakes.



Seismic Restraints (i.e. braces) resist the horizontal forces and keep systems in place and secure.

**SEISMIC ISOLATION
WIRE BRACING SYSTEMS**

PIPING / DUCTING

Seismic Bracing Systems are designed and engineered to **Brace and Secure Non-Structural Equipment** (Architectural elements, Mechanical and Electrical equipment and supplies and other building furniture and services) within a building or structure **to minimise Earthquake damage** to suspended services.

The Easyflex Seismic Bracing Kit

- **Pre-determined length of wire**
- **Seismic Rod Bracket**
- **Seismic Bracket End**



SEISMIC ISOLATION

WIRE BRACING SYSTEMS | PIPING / DUCTING | ADJUSTABLE LOCK



Easyflex

- **VERTICAL RISE PIPE ANALYSIS**
- **SEISMIC DESIGN & ENGINEERING**
- **SHOCK ISOLATION DESIGN**

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