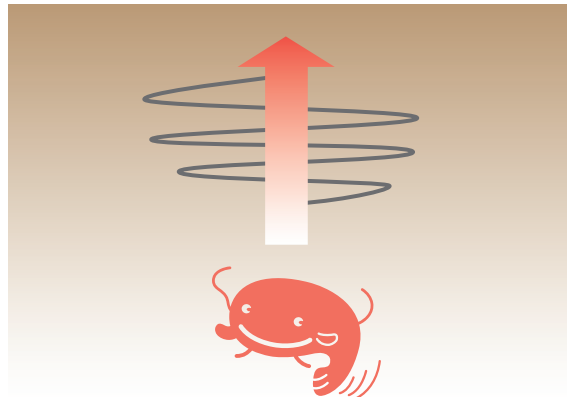
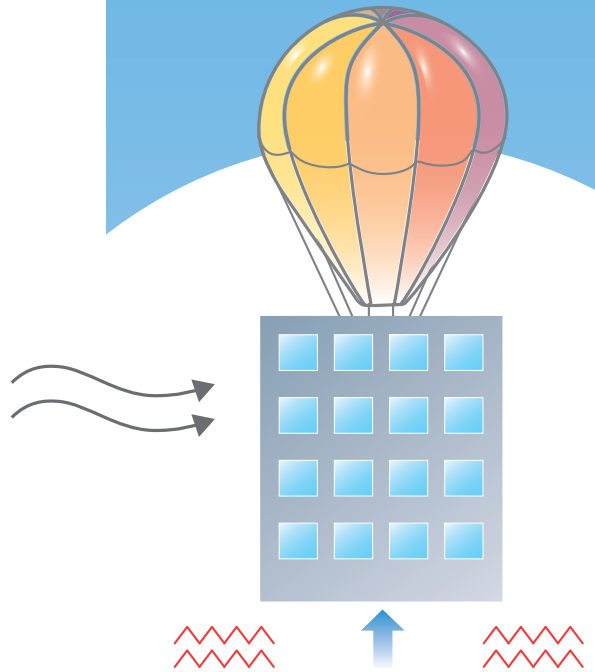




SEISMIC ISOLATION

— Get to know about seismic isolation —



What is seismic isolation?

Protecting human life
and property from earthquakes



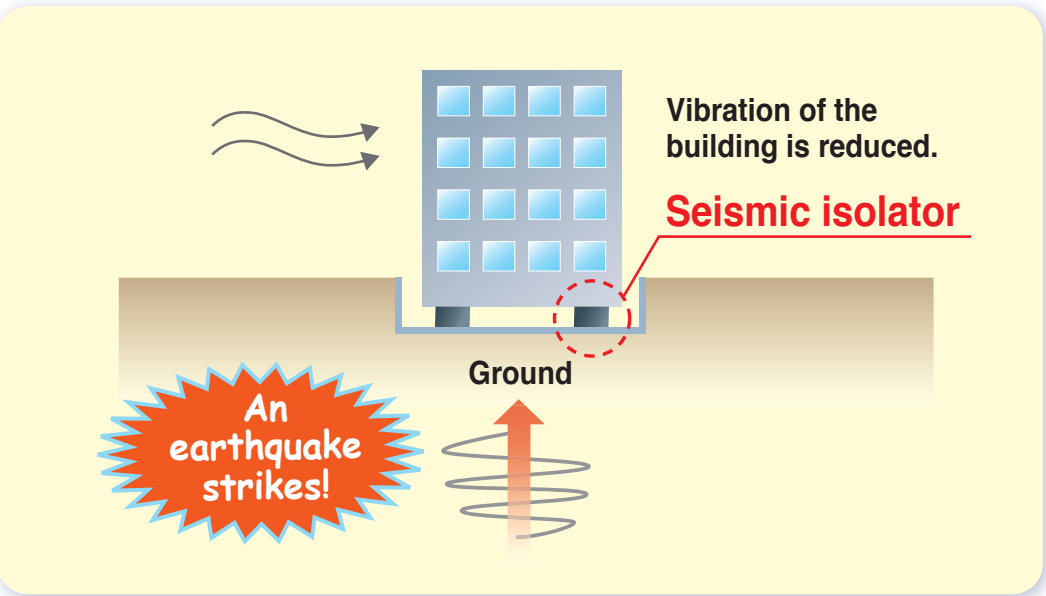
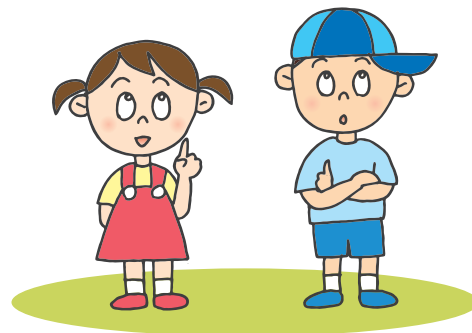
Mechanism of a seismically isolated building

“Seismic isolation” is a method of protecting a building from major earthquakes.

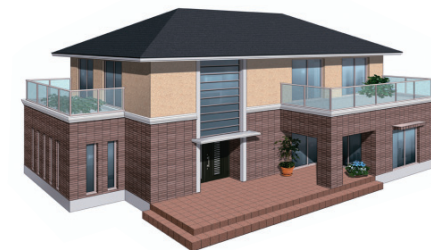
“Isolators” are installed between a building and the ground to reduce vibrations that transmit to a building.

It is as if the building were in a condition of floating in the air above the ground.

This building is called a seismically isolated building.



Seismic isolation can be applied not only to buildings but also to houses.



What is seismic isolation?

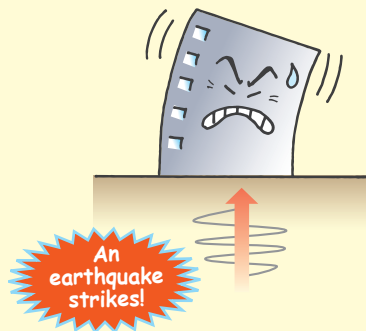
Protecting human life
and property from earthquakes



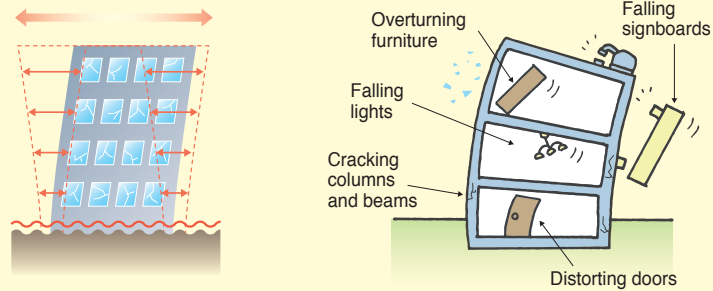
How buildings sway during an earthquake

Ordinary building

Earthquake vibrations transmit directly to a building.



The building sways violently when an earthquake strikes.



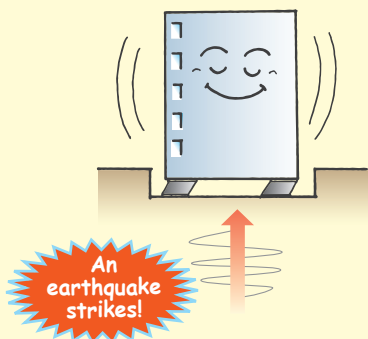
A building sways violently, so that furniture, etc., turn over, posing a danger to human life.

Inside of a room

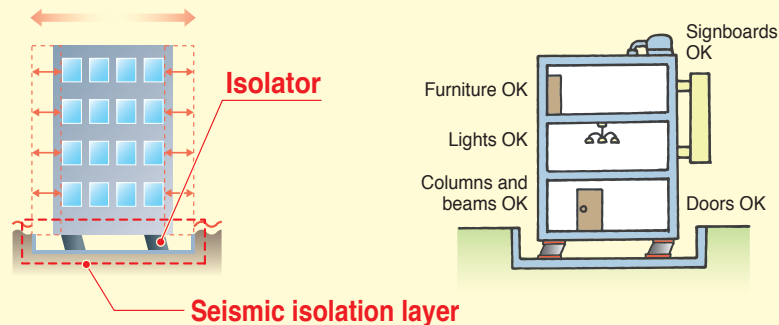


Seismically isolated building

Earthquake vibrations are reduced.



A building sways slowly when an earthquake strikes.



Isolators absorb vibrations, so that vibrations hardly transmit to a building. Furniture, fixtures, etc., are as usual.

Inside of a room



Functions of seismic isolation devices



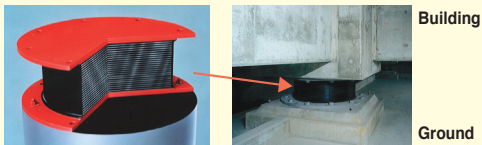
Family of seismic isolation devices

1 Function of reducing and inhibiting transmission of vibrations and supporting a building

2 Function of putting a building back into position

● Elastomeric isolator

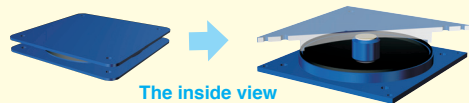
It always supports a building, and when an earthquake strikes, it functions to change slow vibrations.



Elastomeric isolator supporting a building

● Slider

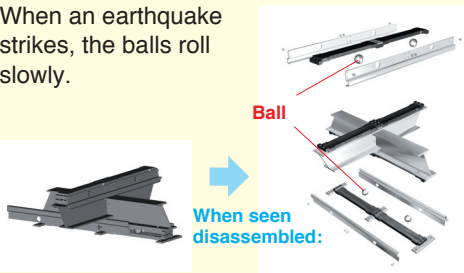
The smoothed plate moves slowly during earthquake.



The inside view

● Rotating ball bearing

When an earthquake strikes, the balls roll slowly.



When seen disassembled:

While lateral earthquake vibrations sway slowly, a building is securely supported in the vertical direction (1). For example, it is like this house constructed on balls.



With this alone, the house will crash into the house next door. So, a function of putting a house back into position (2) is necessary.



For that purpose, methods of putting a house back into position have been devised, such as inserting rubber, and making spherical dish under the balls.



3 Function of suppressing building vibrations

● Lead damper

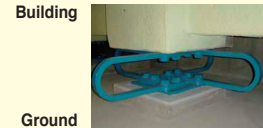
The lead shaped as shown in the photograph deforms to absorb the energy of vibrations, and reduce vibrations.



Deformed lead damper

● Steel damper

The U-shape steel rod bends to absorb the energy of earthquake vibrations, and reduce them.



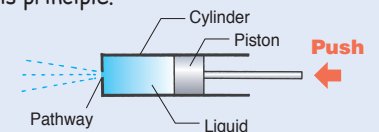
Bent Steel damper

● Oil damper

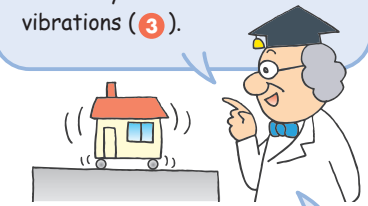
This damper suppresses earthquake vibrations by the force of liquid contained in it: hydraulic oil.



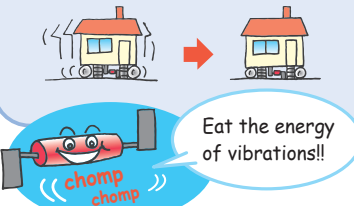
If you push a water pistol quickly, you will need a great deal of power, but if you push it slowly, you don't need that much power. The oil damper adopts this principle.



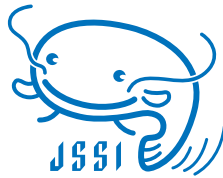
But, if nothing is done, when an earthquake strikes, a building will keep swaying. So, it is necessary to reduce vibrations (3).



The dampers function to absorb the energy of vibrations, and reduce them.



For a seismically isolated building, these are effectively used in combination.



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