

# Emergency Response

## Representative Patent 04

- ❖ Title of Invention : **Vibro-impact energy absorbing device using composite crush tube and vibration damping device for building having the same**
- ❖ Application Number : KR2017-0076048

### Application of Technology and Field of Use

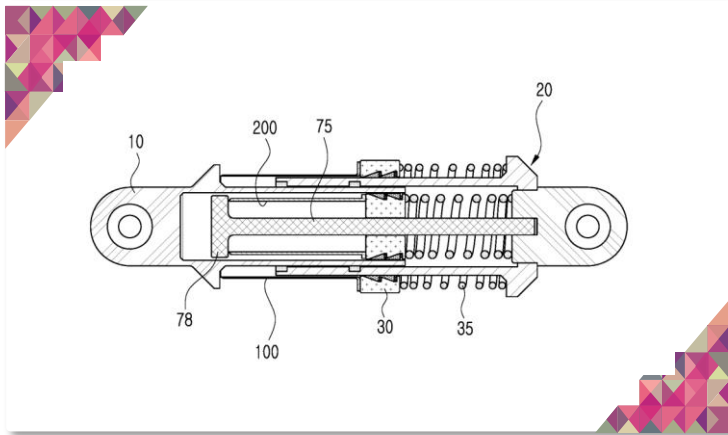
#### ◆ Earthquake preparedness, Seismic design

#### ◆ Limitations of conventional seismic design

- Seismic design by increasing strength is uneconomical, and there is a possibility of large casualties due to sudden brittle fracture.
- Seismic design by increasing ductility is difficult to repair and reinforce after an earthquake, and installation cost is high.

#### ◆ Limitations of Existing Building Vibration Control Systems

- It is possible to absorb one-way impact, but it is difficult to absorb the energy of a large impact that changes or repeats the load direction.



<Representative drawing>

### Features of Technology

- An inner cylinder having a first member having an inner hollow cylindrical shape
- An outer cylinder having a second member for accommodating the first member in an inner hollow
- A compression wedge prepared to be in contact with an outer circumferential surface of the second member of the outer cylinder
- A compression slider prepared in contact with an outer surface of the compression wedge
- A first composite tube and an external spring in contact with one side and the other side of the compression slider, respectively

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### Technical Effects

#### ◆ Effective absorption of impact energy

- It is possible to effectively absorb impact energy according to tensile and compressive impact loads by using a composite tube.

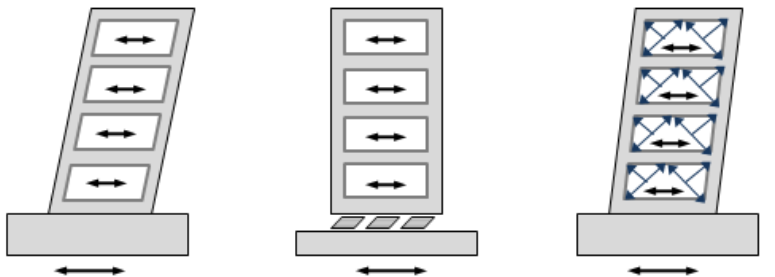
#### ◆ Possible to absorb impact energy occurring over multiple times

- It is possible to absorb the impact energy even in the event of an earthquake with repeated compressive and tensile loads.

#### ◆ Reduced probability of damage to buildings even in the event of earthquake

- Since the tube inside the vibration damper absorbs the impact energy and breaks instead of the building, the probability of damage to the building is reduced compared to the existing seismic design.

### Social, Environmental, Economical Effects



Seismic structure

Seismic isolation  
structure

Vibration damping  
structure

#### ◆ Can be used as vibration damping device in building

- Since it can continuously absorb compressive and tensile shocks occurring multiple times, it can be used as a vibration damping device for buildings in preparation for earthquakes.

#### ◆ Can reduce recovery costs

- When an impact occurs in a building, the vibration damping device, not the building, absorbs the impact energy and is damaged instead of the building, thereby reducing the cost of repair and reinforcement after the earthquake.