

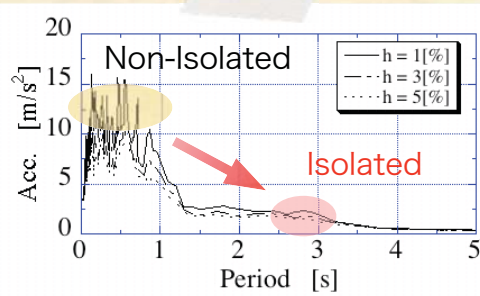
# Intelligent Seismic Isolation System Using EEW

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This study proposes an isolation system having no natural period by using air bearings. The isolation system uses air bearing as an isolation device and EEW system as an activation trigger of isolation. Air bearing is a bearing that can reduce contact friction between floor and the bearing by thin air film produced by compressed air.

## BACKGROUND

### Isolated structures



Typical Non-Isolated Structure  
Natural Period - 1 s

Isolated Structure  
Natural Period 3 s

El Centro NS

### On the other hand

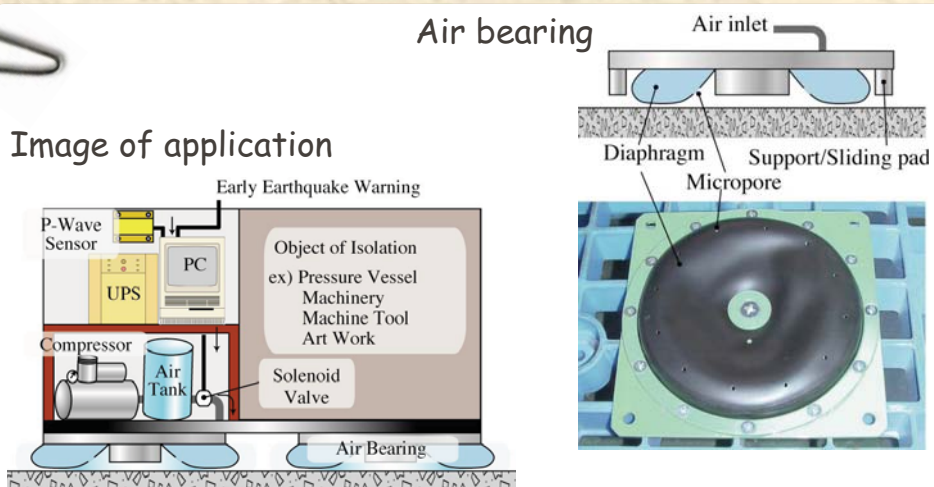
Long Period Seismic Wave

- Tokachi-Oki (2003) - Sloshing of petroleum tank
- Mid-Niigata (2004) - Resonance of high rise building in Tokyo

An isolation system having long natural period or no natural period is needed.

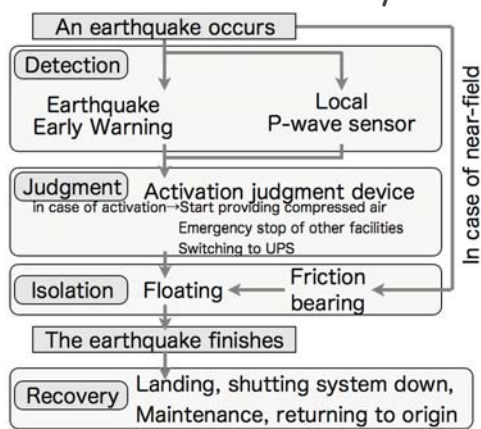
## INTELLIGENT SEISMIC ISOLATION SYSTEM USING EEW

### Concept of the proposed isolation system



### EEW system is applied for activation trigger

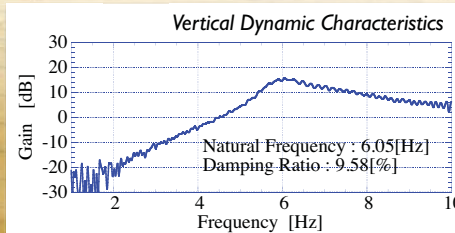
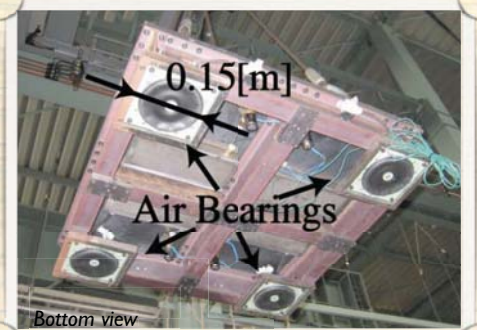
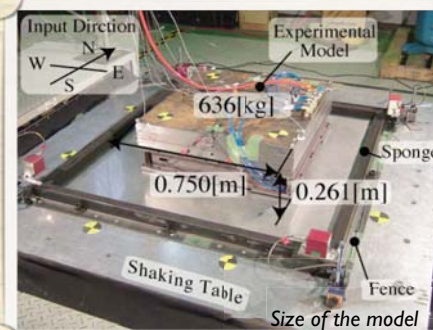
- ex.)
- turning compressor on
- opening solenoid valve
- turning UPS system on



- excellent isolation performance by low frictional bearing
- fail-safe system using UPS and local seismometer
- integrated intelligent disaster prevention system that is able to distribute the information of earthquake to other equipment

## VIBRATION EXPERIMENT

### Experimental model



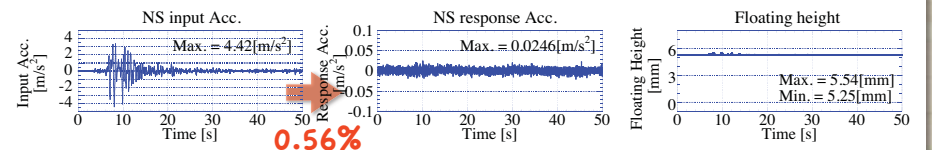
### Friction coefficient

$$\mu = \frac{F}{mg} = 0.000467$$

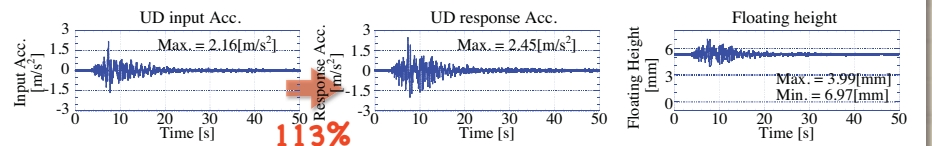


### Basic performance test

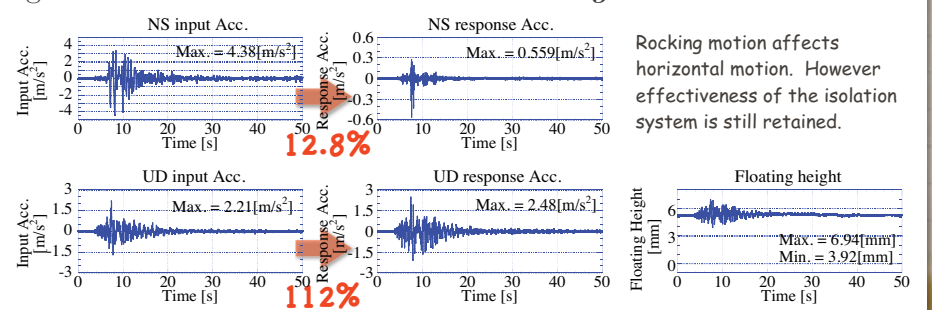
#### Against horizontal wave JMA Kobe NS



#### Against vertical wave JMA Kobe UD



#### Against horizontal and wave vertical wave JMA Kobe NS/UD



Rocking motion affects horizontal motion. However effectiveness of the isolation system is still retained.

### 3D isolation performance test

