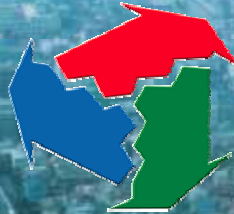


*National research Institute for Earth science and
Disaster prevention*



E-Defense

Background

The Hyogoken Nanbu (Kobe) Earthquake occurred on January 17, 1995. Almost 6,500 citizens of Kobe and surrounding region lost their lives and tens of thousands more lost their houses. The economic consequences have exceeded US\$100 billions, making it the most expensive natural disaster on record.

To make our society more earthquake-resistant

NIED has been constructing "3-D Full-Scale Earthquake Testing Facility" in Miki city which is located on the north of Kobe city.

The World's largest shaking table, which can simulate high level ground motion, is taking shape in Japan. The opportunities and challenges provided through this facility are great. It will be a focus of full scale testing of structures due to high level earthquakes. It is a vehicle through which hope and optimism for improving the behavior of urban regions due to earthquakes will get an added boost.

Photo by Nakanihon air service



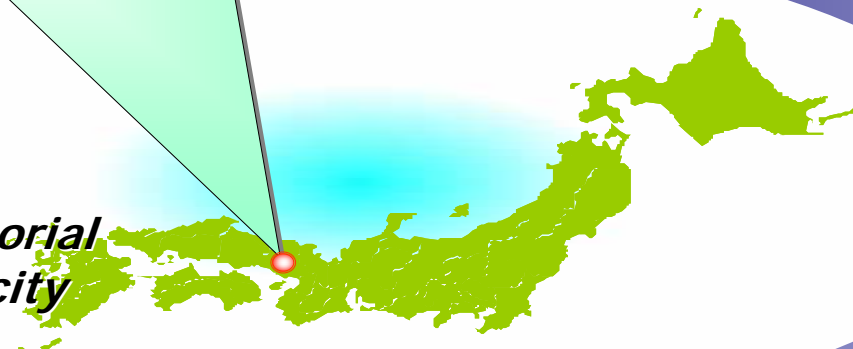
E-Defense

~ The Largest Shake Table in the World ~



Construction of this facility began in 1999 and ends in **2005**. Therefore, this facility will start to work after 10 years from the Hyogo-ken Nanbu (Kobe) Earthquake.

"Miki Earthquake Disaster Memorial Park (tentative name)" in Miki city





Construction of E-Defense



Construction Site
(January, 2000)



Horizontal & Vertical Actuators
(January, 2003)



Experiment Building Foundation
(April, 2001)



770 tonf Table (32 welded blocks)
(May, 2004)



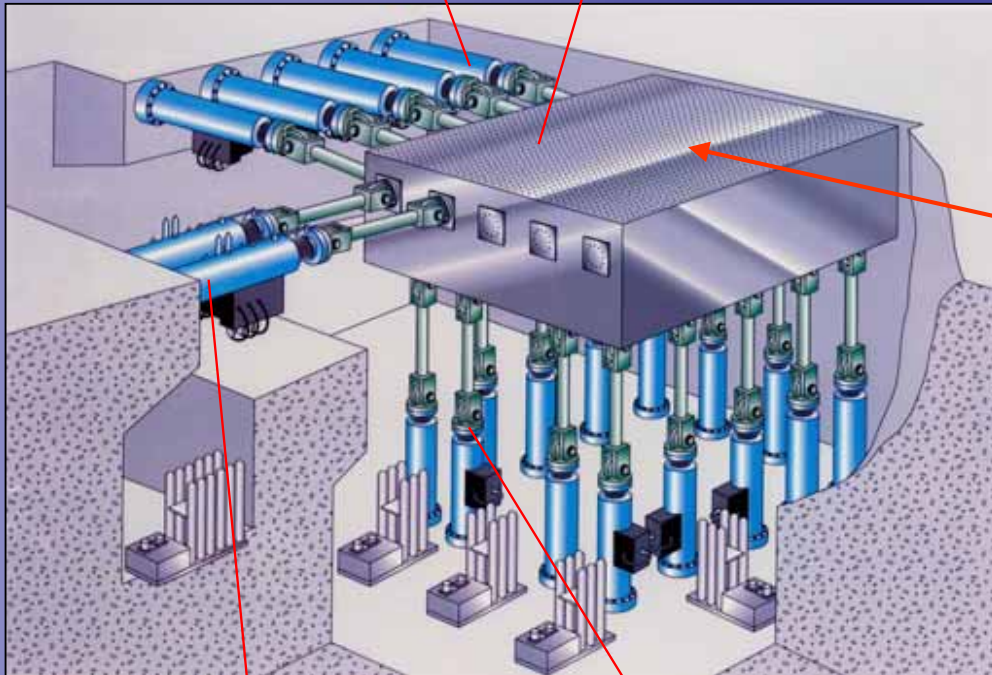
General View of E-Defense

Horizontal
Actuators
(X: 5 units)

Shake Table
15m x 20m
(Height 5.5m)

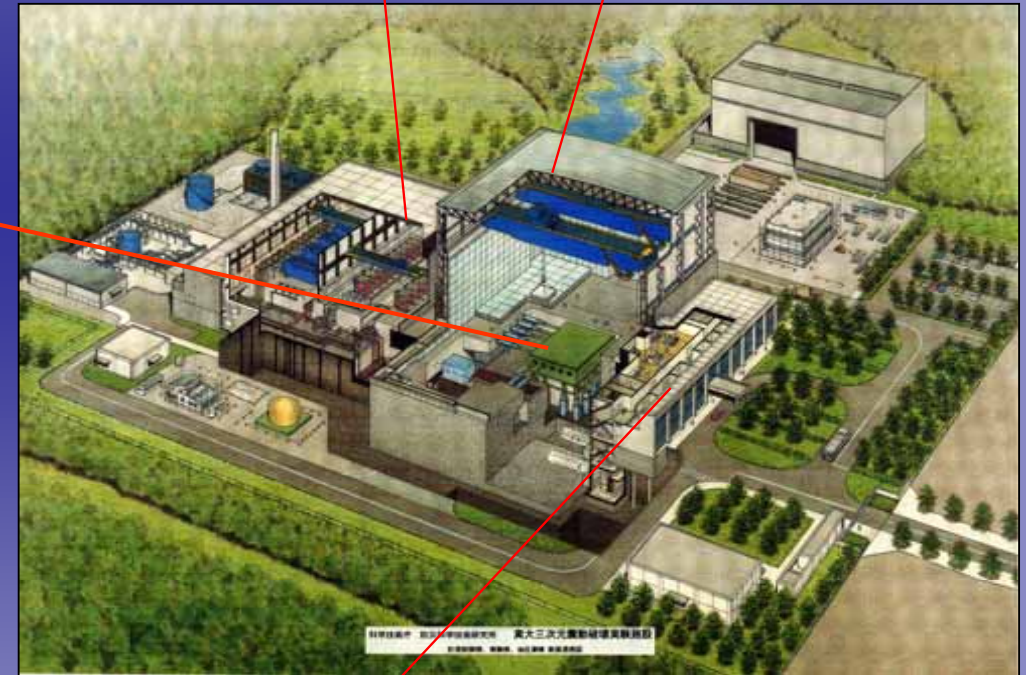
Hydraulic Unit
Building

Experiment
Building



Horizontal
Actuators
(Y: 5 units)

Vertical
Actuators
(Z: 14 units)

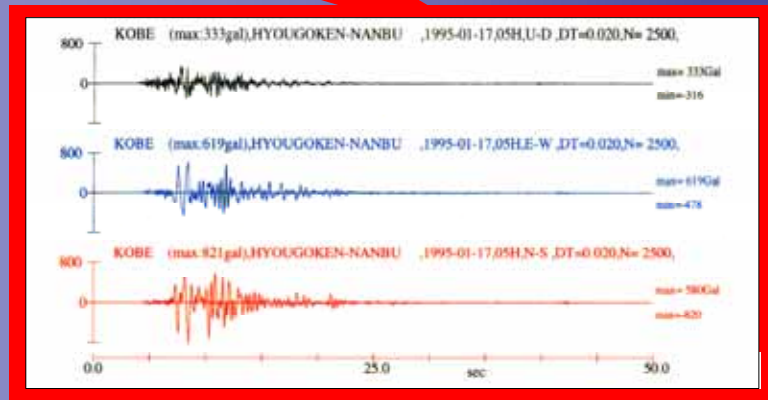
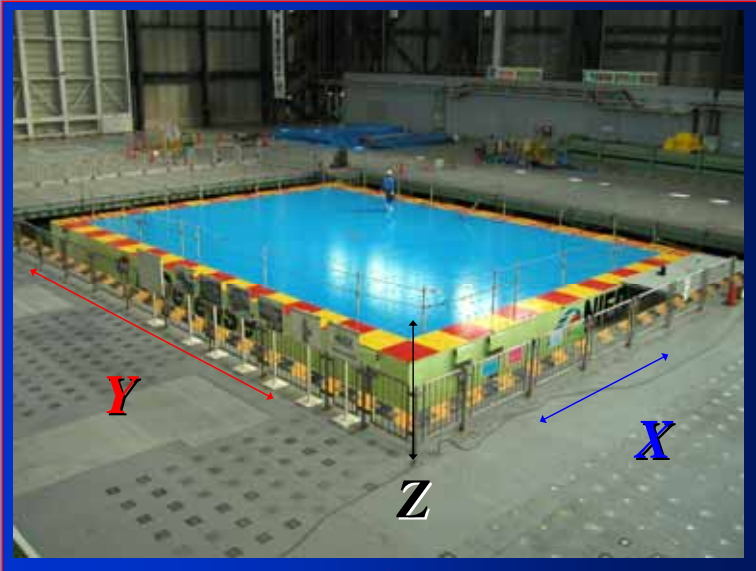


Operation and
Measurement
Building



Specifications of E-Defense ~ shake table ~

Shake table



Recorded actual seismic motion
(Horizontal and vertical direction)

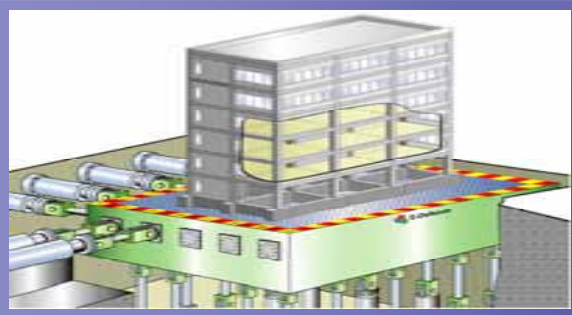
Table Size	20m x 15m	
Payload	12MN(1200tonf)	
Driving Type	Accumulator Charged/Electro-Hydraulic Servo Control	
Shaking Direction	X, Y - Horizontal	Z - Vertical
Max. Acceleration (at Max. Loading)	900cm/s²	1500cm/s²
Max. Velocity	200cm/s	70cm/s
Max. Displacement	± 100cm	± 70cm
Max. Allowable Moment	Overturning : 150MN-m	Yawing : 40MN-m



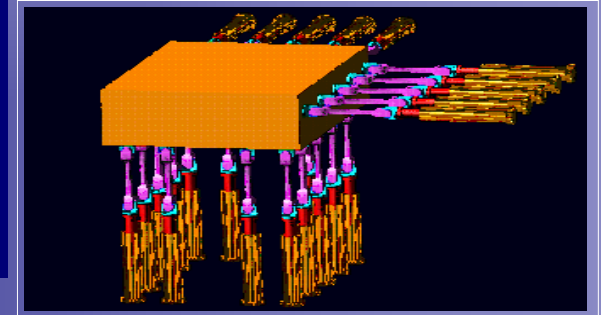
Utilization and Operation of E-Defense

E-defense will be open to the world. Furthermore, such a major facility will require coordination and collaboration of many participants, including academic institutions, government researchers, general public, private and industrial organizations.

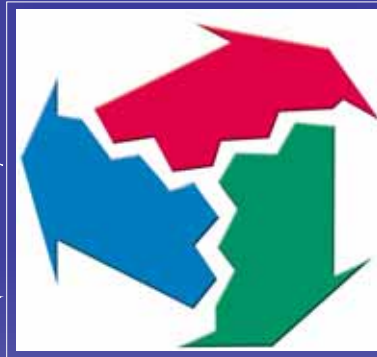
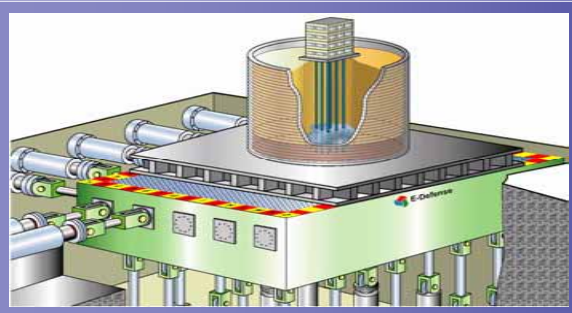
RC structures



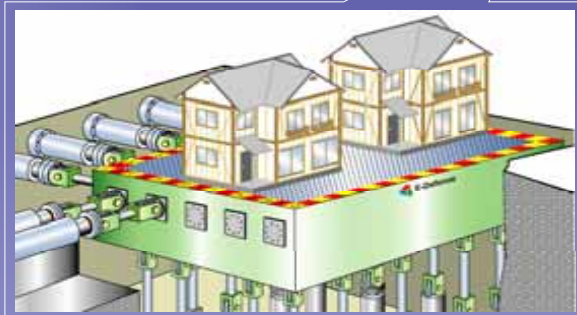
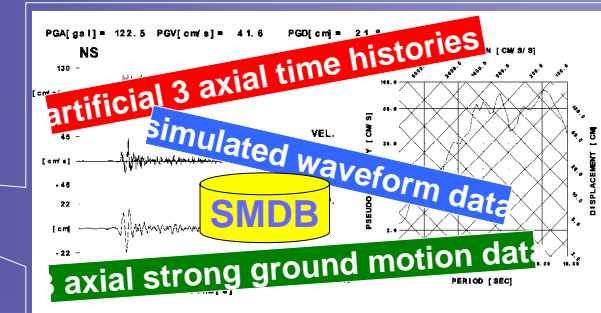
Advanced control system



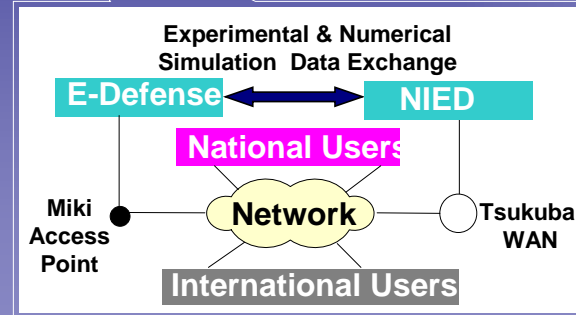
Soil-pile-structure



Input motion database



Wooden structures



E-Defense Network (E-D Net)

