



ASEAN IVO Forum 2018



STRUCTURE HEALTH MONITORING SYSTEM OF MULTISTORY BUILDINGS

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Technology**

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BACKGROUND

- After a fairly large earthquake, the building owner usually needs to conduct a security survey of the structure. This process can take from several hours to several days, depending on the size of the building and suspected damage. The cost of the survey and the cost of time lost due to unemployed office workers is a very important consideration
- If the buildings are equipped with structure health monitoring system, it can be immediately concluded whether the building's security level has been exceeded
- It is necessary for the installation of vibration sensors and other sensors in the building. The health changes that occur in the structure can be monitored remotely and simultaneously from several buildings.

FLOW OF INFORMATION

Sensor

Sensor

Sensor

DATA CENTER

Data Analysis System



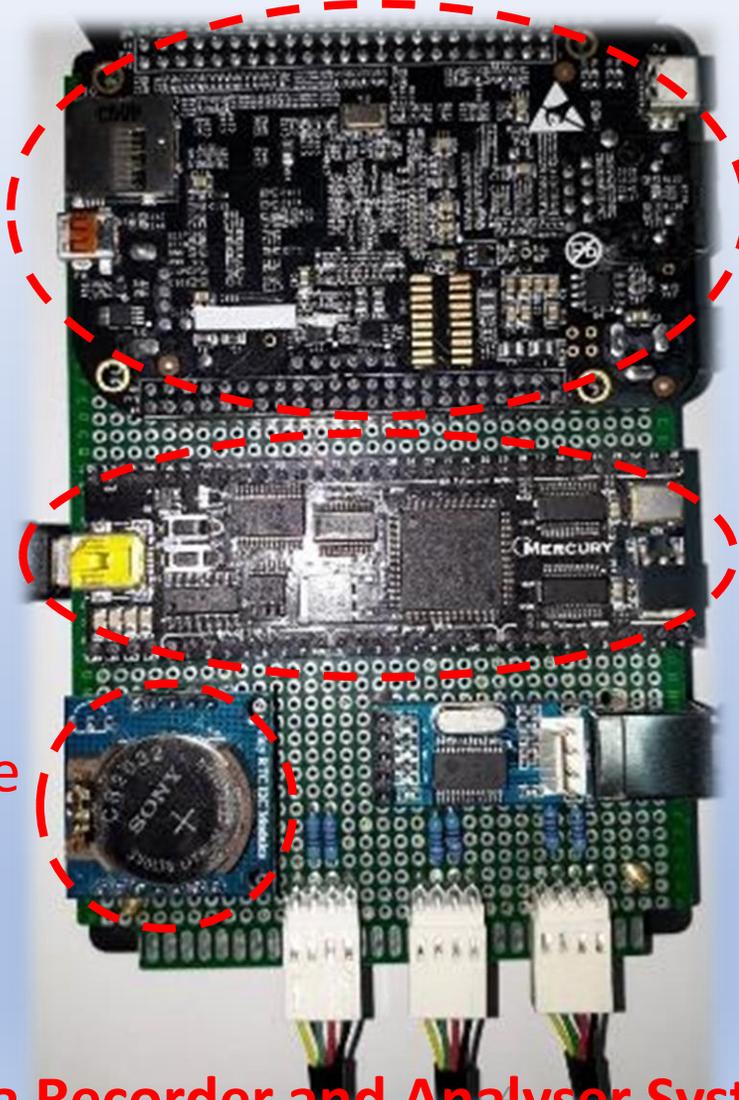
AT DISTANCE LOCATION

AT MONITORING CENTER

HARDWARE and SOFTWARE



Sensor System



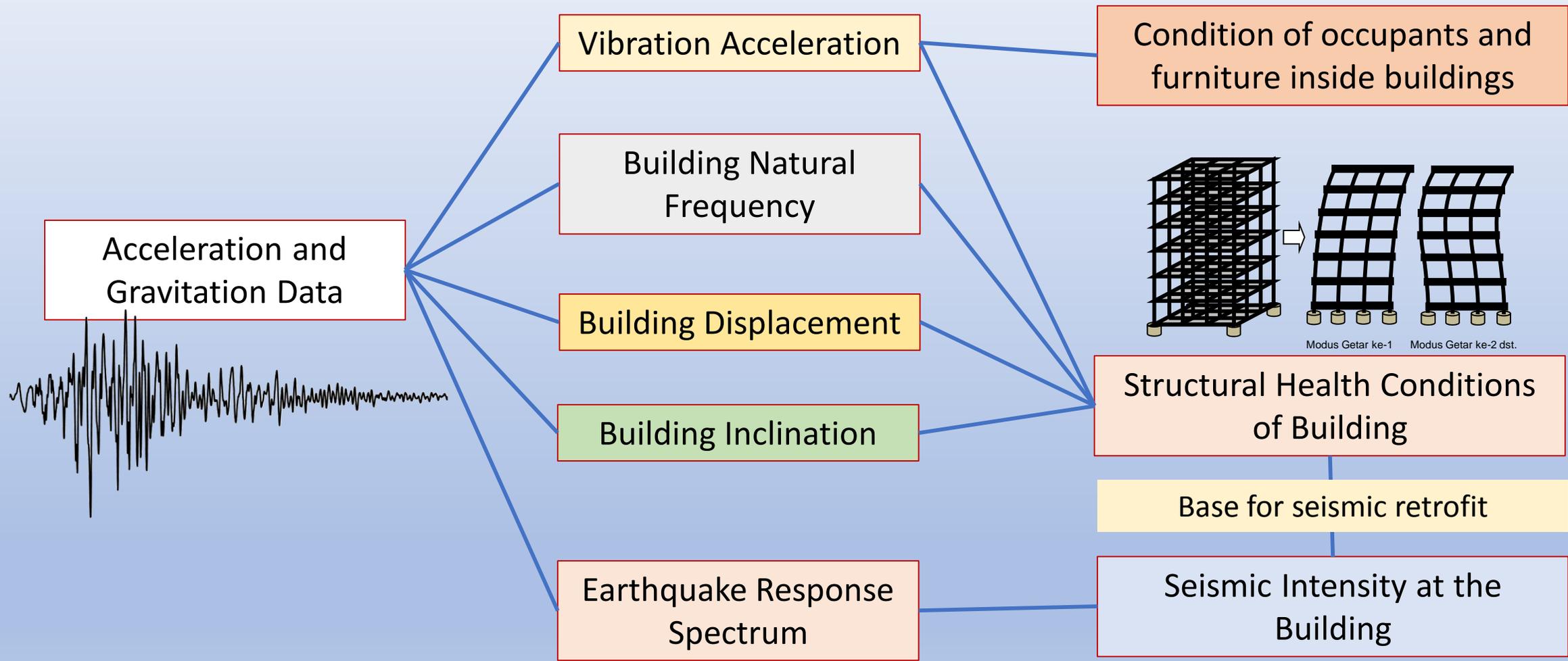
Single Board Computer for Data Analyser

Field Programable Gate Array for time-consistent data acquisition

Real Time Clock

Data Recorder and Analyser System

STRUCTURAL HEALTH MONITORING SYSTEM





Structural Condition based on Inclination Data*

Interstory Inclination (% or °)	Damage and Performance Level	
	Damage	Performance Level
< 1% or < 1.1°	Cracks due to flexure at RC column and beams	<i>Immediate Occupancy</i>
1% or 1.1°	Large cracks. Formation of plastic hinges at ductile RC frames	<i>Life Safety</i>
4% or 2.3°	Spalling of concrete cover at column and beams. Buckling of reinforcement bars.	<i>Collapse Prevention</i>

*Performance Level and Damage of RC Structures (FEMA, 2000)



STRUCTURAL HEALTH MONITORING SYSTEM

Appearance on Web

EQ Ready
STRUCTURAL HEALTH MONITORING SYSTEM




- Daftar Gedung
- Data Rekaman Kejadian
- Pencarian Data
- Bantuan
- Log In





Gedung I BPPT

Realtime Akselerometer

Realtime Tiltmeter



Gedung II BPPT

Realtime Akselerometer

Realtime Tiltmeter



Gedung Geostech BPPT

Realtime Akselerometer

Realtime Tiltmeter

EQ Ready adalah portal pemantauan kekuatan gedung bertingkat terhadap bencana gempa bumi.
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STRUCTURAL HEALTH MONITORING SYSTEM

Appearance on Web

EQ Ready

STRUCTURAL HEALTH MONITORING SYSTEM

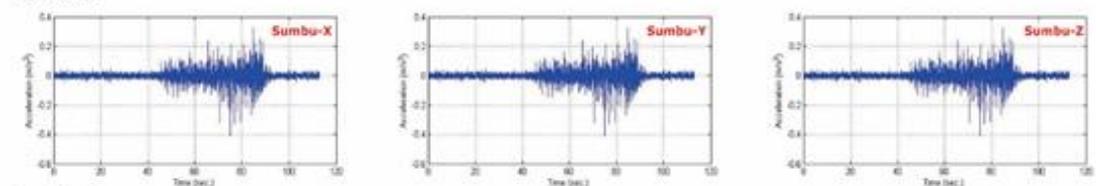


- Daftar Gedung
- Data Rekaman Kejadian
- Pencarian Data
- Bantuan
- Log In

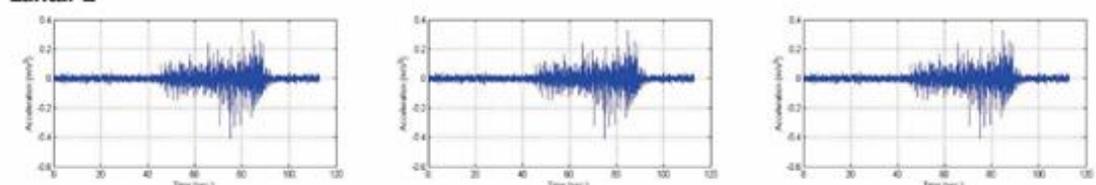
Gedung II BPPT

Data Accelerometer - 2017-04-26 08:59:10

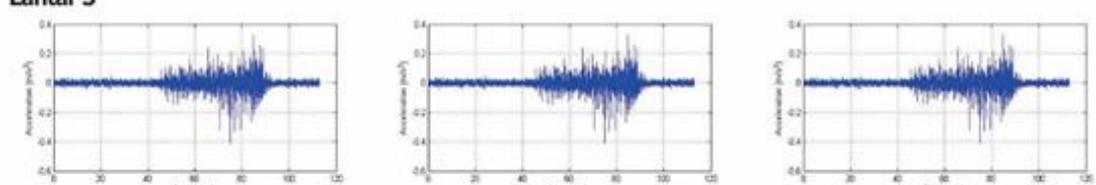
Lantai 1



Lantai 2



Lantai 3



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STRUCTURAL HEALTH MONITORING SYSTEM

Appearance on Web

EQ Ready




- ☐ Daftar Gedung
- ☐ Data Rekaman Kejadian
- ☐ Pencarian Data
- ☐ Bantuan
- ☐ Log In

Gedung II BPPT

Alamat :
 Bentuk :
 Fungsi :
 Tahun Pembuatan :
 Tinggi Lantai :




Data Sensor Terpasang

	NO DAMAGE
	SLIGHT DAMAGE
	MEDIUM DAMAGE
	HEAVY DAMAGE / COLLAPSE

EQ Ready adalah portal pemantauan kekuatan gedung bertingkat terhadap bencana gempa bumi.
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STRUCTURAL HEALTH MONITORING SYSTEM

- To understand the safety level of buildings soon after earthquake
- To understand the change of structural health during the life of buildings
- To understand the seismic intensity at building location
- To seismic retrofit the building based on performance data