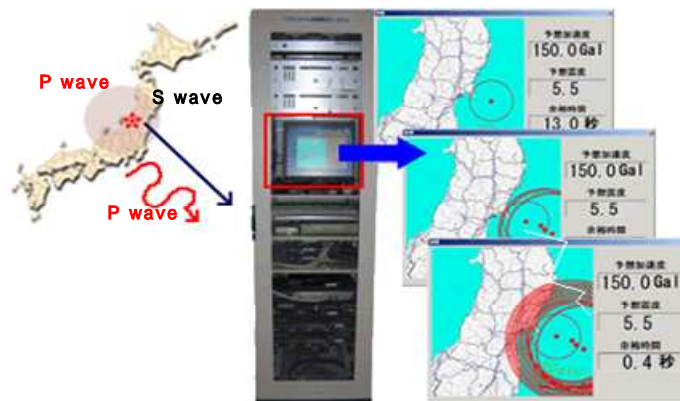


Application of the earthquake early warning system for the OKI semiconductor factory

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The real-time earthquake early warning system instantaneously estimates S wave arrival-time to the place and the seismic intensity from information obtained by the real-time earthquake information and data of locale P wave seismograph. Combination of the information enables the energy shut down, control of equipments etc. and aural warning of early warning system, before a big earthquake reaches the place. Though it depends on the distance from the epicenter, there is a time of a several seconds from receiving the real-time earthquake information and observing locale P wave until S wave attainment. Within this interval, safety can be secured effectively and a lot of secondary disasters can be prevented. In addition, the announcement of the real-time earthquake information might become after a big shake reaches in the vicinity of the hypocenter of the earthquake directly above its epicenter generated in the inland. An attainment seismic intensity estimation of a locale P wave seismograph and a decision by majority judgment of the plural installation of the systems ensure detection of earthquake occurrence and operates immediately the early warning system, before the shake. Even in this case, locale P wave seismograph can obtain the primary wave before a big shake reaches.



Our company sells "Real-time earthquake information", "P wave seismograph" and offers the support as the earthquake early warning system for semiconductors factories etc.

The system predicts accurate attainment seismic intensity and arrival time from initial motion data of the earthquake by hypocenter information collected by "Real-time earthquake information" and "Locale P wave seismograph".

We can confirm with the system the real time waves of an earthquake from hypocenter.

Before a big shake of an earthquake, we can prevent many secondary disaster factors with the function of the real-time earthquake early warning system such as aural warning, equipment emergency stop, energy shut down, etc.

Iwate and Miyagi inland seismic ground motion data by the real-time earthquake early warning system (JBS-01)

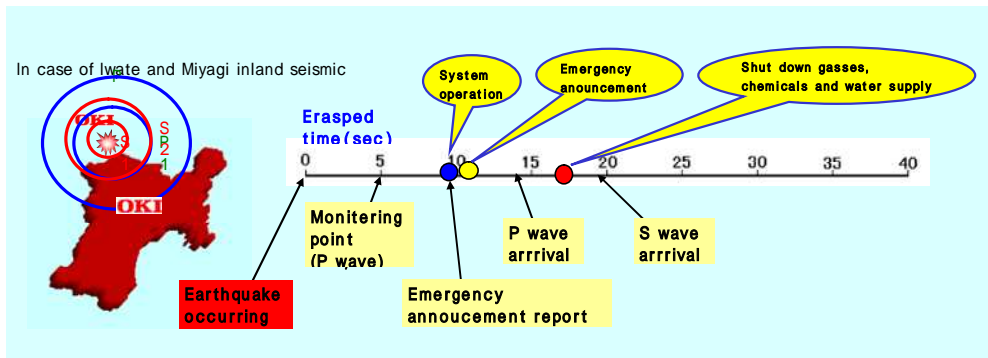
Installed location: Miyagi Oki Electric Industry Co. Ltd. at 1 Okinotaira, Ohhira-murqa, Kurokawa-gun, Miyagi Prefecture

Date & Time of the Earthquake: Saturday, June 14, 2008 at about 08:43

Epicenter: Southern part of Iwate prefecture

Earthquake size: Depth 10km and magnitude 7.2

Iwate and Miyagi inland seismic ground motion work situation of real-time earthquake early warning system (JBS-01)



Operation situation of the real-time earthquake early warning system (JBS-01) due to Iwate in 2008 (2008) and Miyagi inland earthquake

Time of occurrence	Margin (sec)	Events	Acutually Intensity of S wave	Emergency earthquake information of Japan Meteorological Agency		JBS-01(Phase3) installed in OKI Semiconductor			Remarks
				Emergency Information	Estimated Value(gal)	Acutually Intensity of P wave	Acutually Intensity of S wave	Output	
8:43:45	20	Occurrence of Earthquake							According to the final Information of Japan Meteorological Agency
8:43:54	11	Emergency announcement		1st information	24.567				NO.20080614084350
8:43:55				2nd information	24.429				
8:44:00				3rd information	35.185			announcement >80 gal	P wave detection Start calculation
8:44:01	5	P wave arrival				47.778			According to announcement rufuge from factory
8:44:02	4					47.778	148.748		
8:44:02				4th information	39.495				
8:44:02	3	Control signal output for System shut down				60.877	176.914	Signal output for System shutdown >120gal & before 3sec	Shutdown Scanner,Prover, Transporter,gasses and Chemical
8:44:03						93.706	383.501		
8:44:04				5th information	62.27	93.706	285.002		
8:44:05	0			6th information	62.27				
8:44:05		S wave arrival	251Gal						by Local seismometer

The example to use the real-time earthquake early warning system (JBS-01) in semiconductor plant.

The real-time earthquake early warning system (JBS-01) improves the accuracy using "Emergency earthquake information" of the Meteorological Agency and "Local seismograph", and, the system estimates seismic intensity and a reaching time of a big shake tens of seconds prior to the shake. Effective use of the margin time of an earthquake attempts to reduce disasters resulting from acts of human beings and economical damage.

Example of preventing short-circuit in second transformer of electrical energy board in the factory.

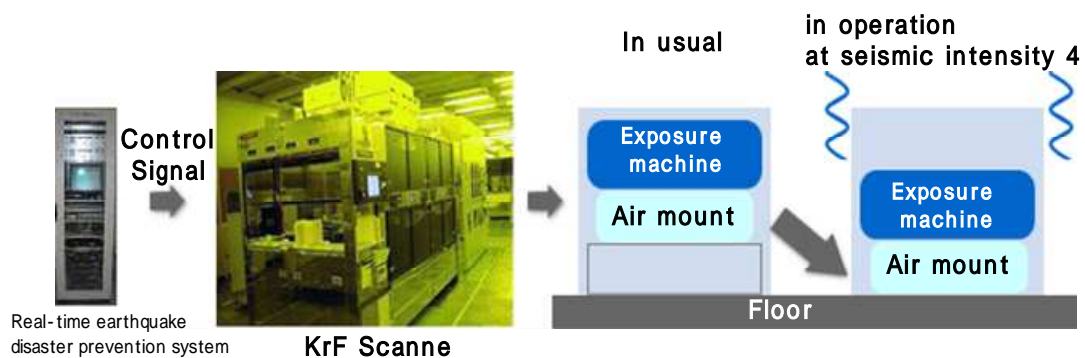
The copper bar trunk line of the switchboard reinforces prevention of short-circuit in the second transformer of electrical energy board in the factory.



Example of preventing short-circuit in second transformer of electrical energy board in the factory.

Example of countermeasures for KrF scanner

KrF (krypton fluoride) light source is a kind of a laser light source which wavelength is 248 nm, and it is used to transcribe the circuit pattern on a silicon wafers. of 100 nm or less in ASML. KrF scanner, which is high center of gravity, increases the possibility to get damaged by generating large misalignment of the lens due to a shake of earthquake. KrF Scanner improves its damage protection, when an earthquake occurs (at the level of vibration level 4), by minimizing the equipment movement by a shake, using air mounting technic to land the equipment softly. A reinforced plan of KrF scanner from current earthquake-proof acceleration 100gal. to the acceleration 400gal. or more can be executed.



Flow of air-mount soft-landing of KrF scanner

The device damage situation (Before installing the earthquake early warning system):

In the latest KrF scanner (with vibration insulation mechanism), a large misalignment of the lens and the partial damage is generated. Local procurements of parts such as the damage electronic parts and lenses are impossible. It requires a long restoration period about three months and sending the parts to manufacturer for repair. Even though four KrF latest scanner can be operated, it is obliged to stop the operation for several months due to the measures unexecution,

Content of countermeasures:

The control trigger of real-time earthquake early warning system (JBS01) is received, and the air-mount soft-landing of the KrF scanner is executed.

Earthquake system P wave operation time 1.3s

Signal transmission speed 0.1s

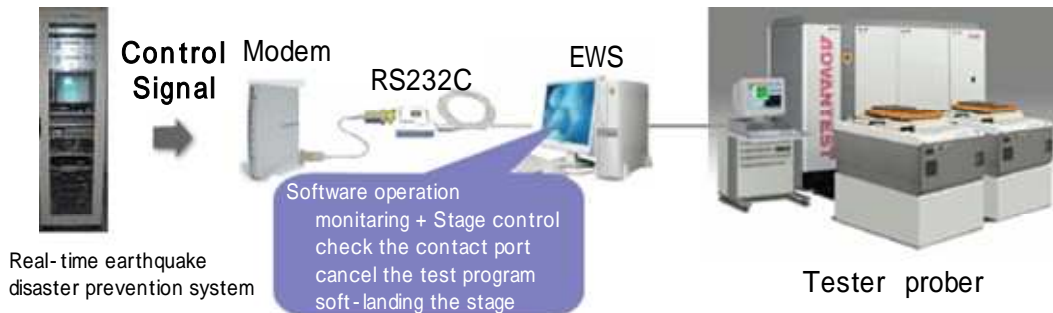
Device soft landing mechanism operation time 1.0 ~ 3.0s

Effect of countermeasures execution:

P wave control minimize damages by air-mount soft-landing, and the damages can be recovered by local procurement of parts.

Example of tester prober countermeasures

A tester prober is to connect a tester with device pins through needles (probes) to provide electricity to the wafer. Antiearthquake procedures of tester probers receive the control trigger signal from the real-time earthquake early warning system(JBS01), cancel the test by monitoring signal, move stage of a probe card to a safe position before the main shock reaches (The instruction that lowers the stage of the prober by the separates about 10+mm is transmitted to the prober), and evade the contact of the chip and the probe pin.



Cancel the tester prober program flow

The device damage situation (Before installing the earthquake early warning system):

When an earthquake of the intensity 5 or more arrived, a probe card damage can be assumed. A probe card cannot be in stocked because it is customized, and about 100 million yen and the maximum lead time of 2-months are required (manufacturing period) are required.

Content of countermeasures:

Control trigger of the real-time earthquake early warning system (JBS01) is executed and the signal is received. And, the forced ending of tests is executed by monitor+descending-stage-program before a main shock reaches.

Earthquake system P wave operation time 1.3s

Signal transmission speed 0.1s .

The test cancellation, and move of the stage to separates position: a sewerl msec

Descends the stage for 10+mm: 1.0 ~ 3.0sec

Effect of measures execution:

Because the stage of a probe card is moved to a safe position before the main shock reaches, the contact of a chip and a probe pin can be evaded. It doesn't cost a damage repair expense, nor a loss of the lead time, makes it possible to minimize an earthquake damage.