

APPLICATION OF EARTHQUAKE EARLY WARNING SYSTEMS FOR DISASTER PREVENTION IN SCHOOLS

S05: JAE Special Session
S05-03:
Earthquake Early Warning System

Masato MOTOSAKA (*Tohoku University, Sendai 980-8579, Japan*)



Masato MOTOSAKA
Professor of Disaster Control Research Center
Information
Tohoku University, Sendai 980-8579, Japan

1. OUTLINE OF THE EEWS IN SCHOOL

The early warning system installed in schools has three functions

① Evacuation mode

This mode secures the safety of pupils and teachers and persuades the evacuation when the expected intensity becomes more than a specified intensity e.g. JMA IV, issuing a warning via speakers and showing a warning image on the screen

② Training mode

This mode supplies the function for evacuation drills, issuing early warnings for earthquakes with JMA intensity less than III or a manually set intensity. In both cases, the drill is mainly based on voice broadcast in order to secure the pupils' safety when a teacher is not present.

③ Education mode

This mode provides "Static Screen" and "Dynamic Screen" modes, which show pictures of earthquake damage and animation of human and structural behavior during earthquakes respectively

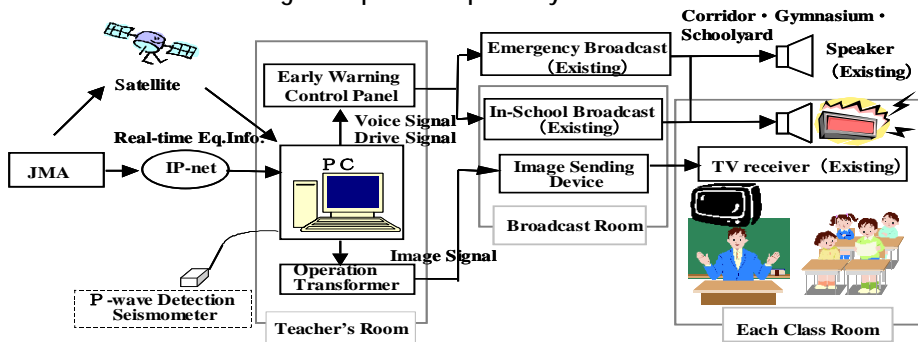


Diagram of the Earthquake Early Warning System in Schools

Pupils can duck under desks within 5s

Effectiveness in evacuation induction

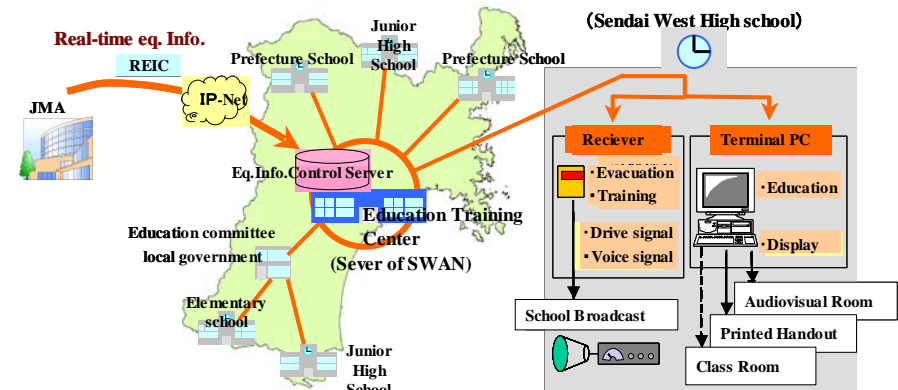


Psychological Surplus in evacuation



2. EEWS FOR A SCHOOL GROUP USING SCHOOLS' WAN AND ITS DEMONSTRATION TEST

Sendai West High School was selected for a demonstration test using the Miyagi-SWAN. A specific receiver having Evacuation and Training Modes and a PC having the Education Mode was installed at the mentioned school and the calculated available time and estimated intensity are transmitted to the school broadcasting system as outputs. The PC has display function for Education Mode



Schematic figure of earthquake early warning system in schools using Miyagi-SWAN

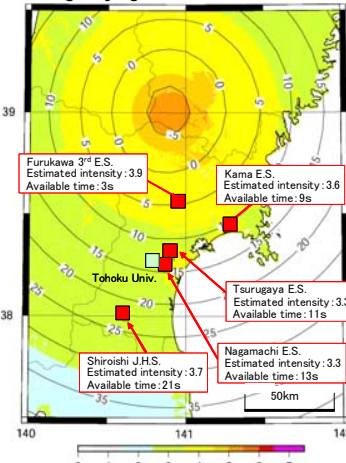
3. EFFICIENCY OF ACTUAL EARTHQUAKE

Iwate-Miyagi Inland earthquake (M7.2) occurred at 8:43 in the morning of Saturday, June 14, 2008. At Shiroishi Junior High School, the broadcasting connection of the RTEI receiver worked efficiently. About 100 students could actually do the drilled evacuation actions, e.g. duck under the desk, cover their head and hold the legs of the desks based on the warning announce issued 21s before S-wave arrival. The RTEI was also received at other 4 schools before S-wave arrival. The available time at Furukawa 3rd E.S. was 3s, at Kama E.S. in Ishinomaki, 9s, at Tsurugaya E.S. in Sendai, 11s, and at Nagamachi E.S. in Sendai, 13s.

4. CONCLUDING REMARKS

The findings obtained through the demonstration tests for promoting, spreading and extending EEWS utilization in schools are as follows:

- 1) Necessity of specification standard for application in schools
- 2) Functions to enhance the additional value of EEWS
- 3) Importance of evacuation drill
- 4) Importance of maintenance of EEWS
- 5) Importance of disaster prevention education



Available time and the estimated seismic JMA intensity at 5 schools for the 3rd issued source information from JMA