

Proposal for an estimation system immediately applicable for intense ground motions at two observed locations in railway premises

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http://www.rtri.or.jp/rd/openpublic/rd46/rd4640/erthq_index.html

1.Introduction

An Earthquake Early Warning (EEW) system for Shinkansen process and combines the earthquake occurrence estimation by P-wave with the threshold judgment by S-wave now. Among these, the earthquake parameter and the regions where intense ground motions estimated immediately applying the M- Delta method, accordingly the trains are controlled. However, it is necessary to observe the earthquake on silent ground with low the noise level to observe P wave. On the contrary, the threshold judgment by S-wave is applicable as for the earthquake disaster preventive system on Shinkansen and conventional lines for a number of years. As one of the reasons, it is enumerated that it is a situation where the seismograph as installed P-wave detection function is unprovided on conventional lines. Considering such backgrounds, the new preventive system as intended to estimate earthquake disasters immediately at regions where intense ground motion likely when the earthquake occurred on conventional line.

2.The outline of the system

The index that can real time be operated is, for instance, an acceleration value, SI value, and a real-time seismic intensity on the conventional line seismograph. The following three information can estimate in the target immediately when the above-mentioned index is calculated at two points.

(1) Presumption of direction that corresponds to the direction of the vector where the seismic ground motion as propagated from different information obtained at the two points.

(2) The region where intense ground motions occurred corresponds to the length of the vector is estimated from the information obtained from the two points.

(3) Using (1) and (2) method, Estimation of intense-ground-motion region by processing the observed index

Applying the abovementioned (3) method, we will estimate warning judgment immediately around the intense-ground-motion region. The data of the seismograph at three points or more is inapplicable so that this system may perform the warning judgment detecting the earthquake at the target area immediately. Therefore, the operation to the earthquake occurrence of hypocenter decision etc. mechanism is unexecuted.

3.Feature of this system

(1)This system enables to perform warning judgment by chiefly using the seismic ground motion index of S-wave.The handling of the seismograph in the locale is the past unlike the seismograph that has P wave detection function. When two points judge the threshold almost at the same time, it is judged the earthquake occurrence.The earthquake judgment by the seismograph two points does not give erroneous information. Moreover, the basic composition unit of this system is information on the seismograph two points. When the contingency such as interference occurred, we assume that it is possible to cover according to other two point data.

(2) It is necessary to construct the seismograph in respect so that this system may be able to estimate the intense-ground-motion region. Thus, this system is good relationship with conventional line because this system needs a respect network different from Shinkansen. It only has to observe the earthquake at the area adjacent to business districts for the earthquake that occurs in neighborhood outside the business districts. Virtual EEW network construct to use another earthquake-observation system (K-NET etc.).

4.Summary

We proposed the estimation system regarding the intense-ground-motion region where the data of two-point observation point. The system has three merits, namely: the intense ground motion is estimated immediately after the occurrence of earthquake; the seismograph set up so far can be applicable as it is; and durable against erroneous information and information interference because the judgment of warning two points in addition to the warning judgment of one point. Therefore, we believe this system will be an effective EEW in the future.