

Installation of seismic ACROSS transmitter at Morimachi, just above the expected focal region of coming Tokai earthquake

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1. Introduction

In our previous studies, we have analyzed the signals transmitted by the seismic ACROSS at Tono mine observed at telemetry seismic stations such as Hi-net. The results showed that P and S phases are identified by the stacking of about a month long data for stations with the epicentral distance less than 100km. In recent studies [Kunitomo et al. (2005), Yoshida et al. (2005)] showed that temporal variation of transfer functions can be seen at the later part of P and S phases. These results indicate the possibilities of active monitoring of the Earth's structure by the seismic ACROSS.

2. Overview of installation point

We plan the installation of seismic ACROSS transmitter at Western Shizuoka region to monitor temporal change of seismic velocity structure by the budget of MRI in 2005 financial year. Seismic experiment with explosive sources was conducted in 2001 in this region, and found that strong reflection phases can be observed by J5 shot located near Funagira dam at Tenryu river. Idaka et al. (2003) have pointed out that these strong phases correspond to the reflection from the plate boundary between Philippine-Sea plate and Eurasian plate. The new seismic ACROSS transmitter will be installed at the corner of the athletic field of Morimachi, and its location is about 10km SE of J5 shot point, where it's suitable for the test site to verify the possibility of monitoring temporal variation of seismic velocity or reflection coefficient at the plate boundary. The geology of the installation point is Tertiary Kurami group with alternation of sandstone and conglomerate. From the boring survey, it turned out that hard and homogeneous sandstone continues up to 20m depth. This geology is similar to the one at Tono mine (Tertiary Mizunami group), although a little easy to broken, and expected the high wave energy transmission rate.

3. Overview of the new transmitter

The main feature of newly installed seismic ACROSS transmitter is high seismic wave energy release at lower frequency compared to the old transmitters and changeable of eccentric moment. We can select 2 values of eccentric moment whether connecting 2 eccentric masses, having the 1:3 weight ratio, or not. In low frequency use, eccentric moment is set to 91.2kgm connecting 2 masses (frequency range: 3.5 - 7.5Hz, force: 5 - 20tonf). In high frequency use, eccentric moment is set to 22.8kgm using only one mass (frequency range: 7.5 - 15Hz, force: 5 - 20tonf). Remarkable low and wide range of frequency (3.5 - 15Hz) transmission can be achieved using 2 settings. Monitoring of longer distance and deeper part can be expected using the new transmitter because the effect of attenuation and scattering is smaller for lower frequency range.