

Borehole survey and ground structure model at IWTH25 KiK-net station.

Shigeki Senna^{1*}, Shin Aoi¹, Tetsuo Tobita², Takashi Kunugi¹, Hiroyuki Fujiwara¹

¹NIED, ²DPRI

In earthquake hazard assessment studies, the focus is usually on horizontal ground motion. However, records from the 14 June 2008 Iwate-Miyagi earthquake in Japan, a crustal event with a moment magnitude of 6.9, revealed an unprecedented vertical surface acceleration of nearly four times gravity, more than twice its horizontal counterpart. The vertical acceleration was distinctly asymmetric; the waveform envelope was about 2.5 times as large in the upward direction as in the downward direction, which is not explained by existing models of the soil response. The finding of a hitherto-unknown mode of strong ground motion may prompt major progress in near-source shaking assessments (Aoi et al.(2008)). A big, nonlinear characteristics is shown in the frequency domain of 1Hz to 10Hz at the main shock and the main shock of this earthquake and the spectrum ratio of the after shock can be confirmed. Authors first observed the microtremor around the KiK-net IWTH25 observation point that showed the effect of the trampoline to aim at the physics model's construction, and presumed the shallow S wave velocity structure last year (Senna et al. (2009)). In this investigation, it has been understood that there are a S wave velocity structure obtained by the S wave velocity structure and the microtremor array observation in the PS logging executed in the past and a big difference.

In this study, to receive the above-mentioned research result, and to presume a more detailed subsurface structure, the borehole survey was done around the IWTH25 observation point. The investigation executed the uniaxial compression test on the soil test, the PS logging, the formation density logging, and three axes. the velocity structure and the nonlinear character were examined based on the result, and the physical properties value of the subsurface structure was presumed. The result that the result of obtaining by the result of the present study and the microtremor array observation had become small very much compared with the result in the past came out. Moreover, data that proved the nonlinear character was able to be obtained in the section of the terrace deposit in the soil test (examination of three vibration axis). To clarify the amplifying characteristic and Q structure etc. of ground to use the array observation record concerning the seismic ground motion by the hole after the seismograph is set up by the schedule in the future because it is assembled like a more detailed ground model, it is obtained.

Keywords: strong-motion, velocity structure, borehole survey, physical logging, soil survey, nonlinear characteristics