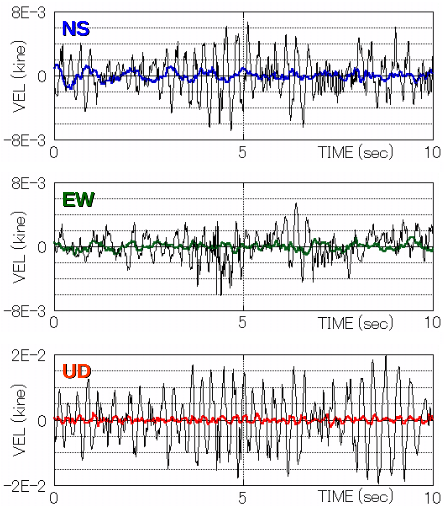

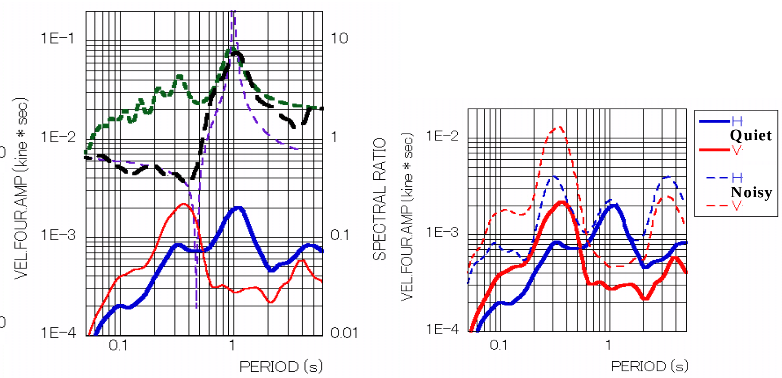

Fig.16 Examination in different amounts of traffic noise in microtremors. Rayleigh waves were affected by heavy traffics (around 0.3s in period) but there was no effect on Love waves or S waves (around 1s in period).

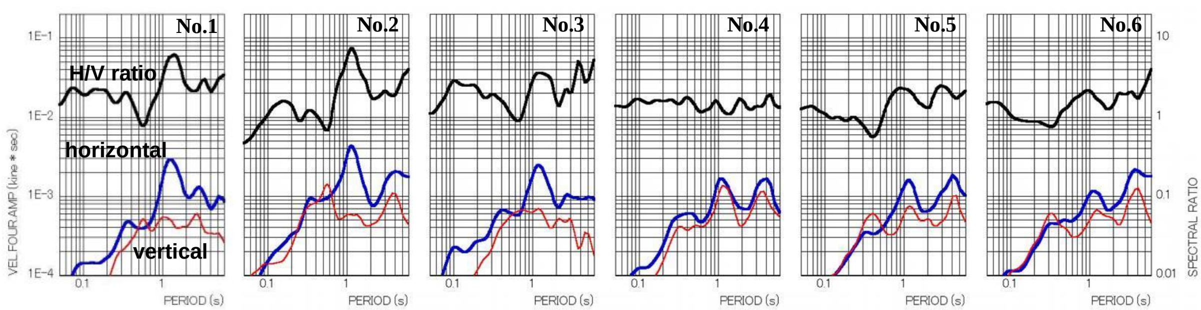

Fig.17 Mobile measurements of microtremors along a rapid slope on the interface between the upper sediments and the lower basement. The site No.1 located on the deepest basement and the site No.6 on the shallowest basement. As results, horizontal peak related with Love or S waves appeared cleary in the area with rather deeper basement, but such predominant peak was going to disappear on H/V ratios toward the shallower basement where the principal component of microtremors would be Rayleigh or SV waves transmitting toward the direction with the deeper basement.

Rayleigh waves but they do not disturb Love waves and SH waves. Then there is no problem to identify the predominant period in microtremors. The H/V spectral ratios of microtremors are usually very stable from daily variation of amplitudes and also from the amount of traffic noises (Fig.16).

4) In spite of the clearness of the interface between the upper layers and the basement, microtremors may not present predominant peaks if the interface holds a rapid slope. Maybe the principal components of microtremors would be transferred toward the thicker sediments along with the manner of 2-D wave propagation (Fig.17).

In conclusion, we will agree with the idea to take H/V spectral ratio of microtremors. But we must be very careful that the peak of H/V spectral ratio sometimes shows the predominant period of Love waves or S waves, and that it means the principal characteristics of Rayleigh waves some another time. They are almost the same thing if the contrast is very clear between the upper layers and the basement.

References

Kanai K. & Tanaka T. (1961). On microtremors. VIII, *Bull. Earthq. Res. Inst.,Vol.39, No.1, 97-114.*

Allam A. & Shima E. (1967). An investigation into the nature of microtremors, *Bull. Earthq. Res. Inst.,Vol.45, No.1, 43-59.*

Tanaka T., Kanai K., Osada K., and Leeds D.J. (1968). Observation of microtremors. XII. (Case of the U.S.A.), *Bull. Earthq. Res. Inst.,Vol.46, No.5, 1127-1147.*

Granit

Udwadia F.E. & Trifunac M.D. (1973). Comparison of earthquake and microtremor ground motions in El Centro, California, *Bull. Seism. Soc. Am., Vol.63, No.4, 1227-1253.*

Alcock E.D. (1974). Comments on "Comparison of earthquake and microtremor ground motions in El Centro, California" by F.E. Udwadia and M.D. Trifunac, *Bull. Seism. Soc. Am., Vol.64, No.2, 495.*

Kobayashi H., Seo K., Midorikawa S., and Kataoka S. (1986). Report on seismic microzoning studies of the Mexico earthquake of September 19, 1985. Part 1. Measurement of microtremors in and around Mexico D. F., *Tokyo Inst. Tech., 1-98.*

Kobayashi H., Seo K., and Midorikawa S. (1986). Report on seismic microzoning studies of the Mexico earthquake of September 19, 1985. Part 2. Estimated strong ground motions in Mexico city due to the Michoacan, Mexico earthquake of Sept. 19, 1985 based on characteristics of microtremors, *Tokyo Inst. Tech., 1-34.*

Seo K., Samano T., Yamanaka H., and Yamazaki Y. (1986). Interpretation of strong ground motions in Mexico city during the Mexico earthquake of Sept. 19, 1985, *Proc. 7th Japanese Earthq. Eng. Sym., 307-312.*

Lermo J., Rodriguez M., and Singh S.K. (1988). The Mexico earthquake of September 19, 1985: Natural period of sites in the valley of Mexico from microtremor measurements and from strong motion data, *Earthquake Spectra, Vol.4, No.4, 805-814.*

Seo K. (1989). Microtremors and its application to engineering purposes – Case studies in Mexico and the U.S.A.-, *17th Symposium of Earthquake Ground Motion, AIJ, 83-90. (in Japanese)*

Nakamura Y. (1989). A method for dynamic characteristics estimation of subsurface using microtremor on the ground surface, *Quick Report of Railway Tech. Res. Inst., Vol.30, No.1, 25-33.*

Seo K., Samano T., Yamanaka H., Hao X., Koyama S., Takeuchi M., Fujioka K., Kishino Y., Kawano K., Asano K., Nakajima N., Murai M., Mualchin L., and Hisada Y. (1991). Microtremor measurements in the San Francisco Bay area. Part 1. Fundamental characteristics of microtremors, *Proc. 4th Int'l Conf. On Seismic Zonation, Vol.II, 417-424.*

Seo K., Samano T., Yamanaka H., Hao X., Koyama S., Takeuchi M., Fujioka K., Kishino Y., Kawano K., Asano K., Nakajima N., Murai M., Mualchin L., and Hisada Y. (1991). Microtremor measurements in the San Francisco Bay area. Part 2. Site conditions evaluated from microtremors, *Proc. 4th Int'l Conf. On Seismic Zonation, Vol.II, 425-432.*

Tokimatsu K. & Miyadera Y. (1992). Characteristics of Rayleigh waves in microtremors and their relation to underground structures, *Journal of Struct. Constr. Engng, AIJ, No.439, 81-87.(in Japanese)*

Seo K., Haile M., Moriuchi M., Mori K., Sueoka H., Mualchin L., Sheng L., and Enomoto T. (1994). Microtremor measurements in Los Angeles area – A preliminary study of seismic microzoning -, Technical report by a cooperative investigation team for microtremor measurements in Los Angeles area, *Tokyo Inst. Tech., 1-15, A1-A39.*

Lachet C. & Bard P.Y. (1994). Numerical and theoretical investigations on the possibilities and limitations of the "Nakamura's technique", *J. Phys. Earth, Vol.84, 337-397.*

Seo K. (1996). Application of microtremors to earthquake damage scenarios – Lessons learned from recent damaging earthquakes -, *11th World Conf. on Earthq. Eng., Paper No.2062.*