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VERIFICATION OF THE RESPONSE REDUCTION OF BASE ISOLATION SYSTEM USING SLIDING BEARING

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SUMMARY

The base isolation system using sliding bearings has been applied for various buildings. Sliding bearing has features such as no restoring mechanism and no natural period. Sliding bearings are generally used with rubber bearings or with curved sliding plate in order to control residual displacement after earthquake. The frictional coefficients of sliding bearings are usually about 0.1 or less than 0.1.

Authors have been studying for practical application of a sliding bearing which removes the restoring mechanism with the aim of low cost structure. As a result of the earthquake response analysis and the experiment with a small model, it was found that even if frictional coefficient is about 0.2, it may be effective for a large earthquake (max. acceleration > 200cm/s^2).

In this report, three dimensional shaking table test of sliding bearing made of surface-treated steel plates without restoring mechanism was conducted under different conditions with a surface pressure, an eccentricity and others. The reduction effect of response was examined. Acceleration time history is shown in Fig.1 as one example of the experimental results. The frictional coefficients were identified with experimental results, and response analysis by using these coefficients was almost same as experimental results. Comparison of time history between experiment and analysis is shown in Fig.2. In addition, the analysis of the different models was done to confirm the effectiveness of sliding bearing without restoring mechanism.

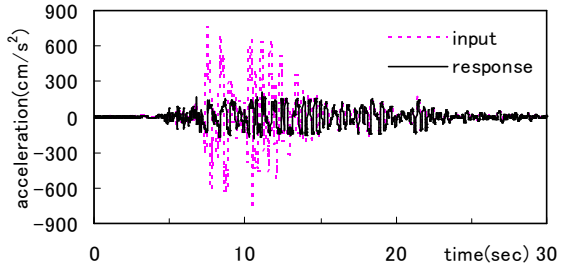

Fig.1 Time history of acceleration
(Experimental result)

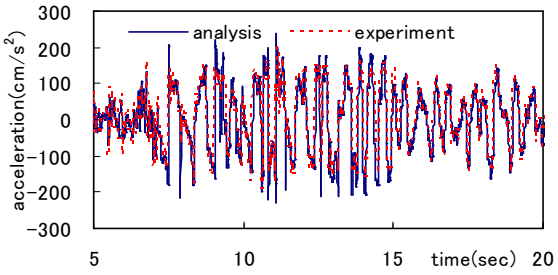

Fig.2 Time history of acceleration
(Comparison between experiment and analysis)