

**Prediction of Ultimate Performance of Civil Infrastructure
using Dense Vibration Monitoring**

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【Outline of survey】

Based upon various techniques developed by the principal investigator, this project aims at clarifying ultimate performance of civil infrastructure such as bridges, using the data from highly dense vibration monitoring. It also attempts to include prediction of unexpected failure modes of infrastructure. The main focuses are:

- 1) Development of a structural health monitoring system utilizing data from sensor -installed moving objects (e.g. trains and automobiles)
- 2) Development of identification of external disturbance as well as structural system
- 3) Development of prediction methods of structural performance under extreme events from the vibration monitoring under moderate events.

【Expected results】

The traditional approach of assessing performance of civil infrastructure based on many assumptions will be replaced, at least partly, with evidence from the data from the sensors and the reliability and safety of existing civil structures will be greatly increased. Various monitoring systems using wireless sensors and sensing data from moving objects are also to be developed

【References by the principal investigator】

- Fujino, Y. and T. Noguchi: Sustainability of Urban Stock, Goho-Do Publisher, pp.1-356, 2007
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- M. Siringoringo, Y. Fujino: Observed dynamic performance of the Yokohama- Bay Bridge from system identification using seismic records, J. of Structural. Control and Health Monitoring. **13**, 1, pp 226-244, 2006.
- Nagayama, T., Abe, M., Fujino, Y. and Ikeda, K.: Structural identification of non-proportionally damped system and its application to a full-scale suspension bridge, J. of Structural. Engineering, ASCE, Vol. **131**, No. 10, pp. 1536-1545, 2005

【Term of project】 FY2008—2012

【Budget allocation】

75,100,000 yen (direct cost)

【Homepage address】

<http://www.bridge.t.u-tokyo.ac.jp/>