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Health Monitoring of a Railway Bridge by Fiber Optic Sensor (SOFO)

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ABSTRACT

In recent years, the number of old concrete bridges has remarkably increased in Japan. A periodic monitoring of them is necessary in order to confirm their security. This monitoring can lead to early warnings and prediction of potential problems and helps in the planning of the necessary maintenance interventions and enables the damage assessment after earthquakes. In many concrete bridges, the deformations are the most relevant parameter to be monitored in both short and long-terms. A degradation of the building materials has an influence on both the static and dynamic behaviors of the bridges and can be detected by deformation sensors. Conventional strain gages give only local information about the material behavior. A complete understanding of the structure's behavior requires the measurement of deformation based on long-gage sensors. Therefore, a long-gage-length fiber optic sensor system, SOFO is suitable for health monitoring of the large-scale structures such as bridges.

The SOFO V system allows the measurement of deformation with a resolution of a few micrometers and an excellent long-term stability.

The SOFO Dynamic system allows the measurement of dynamic deformation (0 to 1kHz) with a resolution of a 0.01 micrometers. We applied SOFO Dynamic system to a reinforced concrete railway bridge focusing on its dynamic behavior. Prior to the test on the bridge, some element tests were conducted in a laboratory.

In this paper, we describe about both the element test results and the field test results.

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Ключевые слова:

Содержание.

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