

Non-contact Vibration and Displacement Measurement Technology Using Laser Light

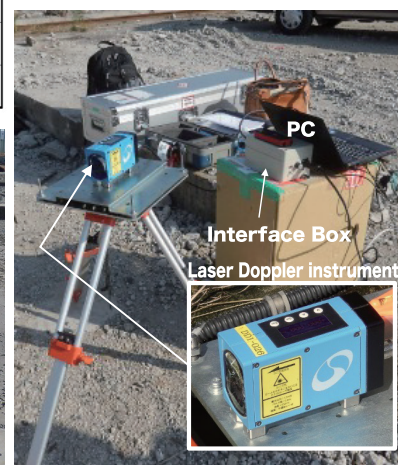
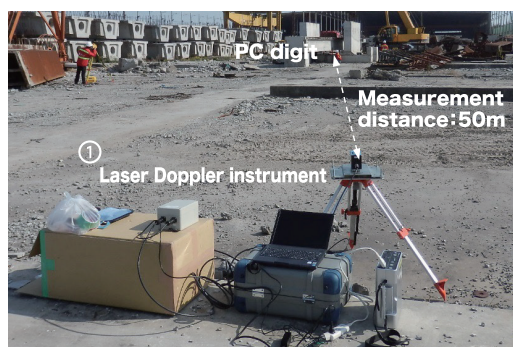
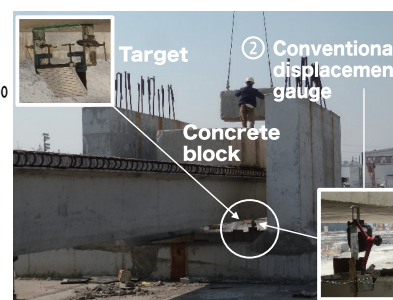
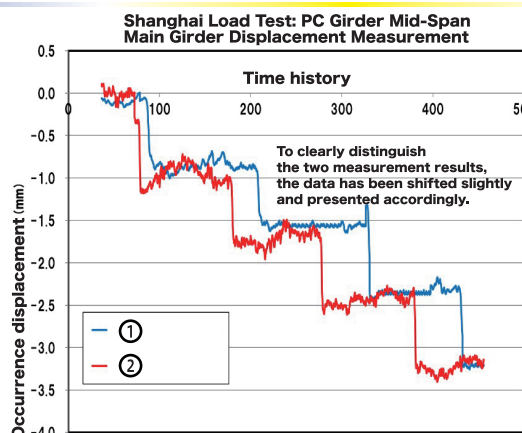
Non-contact Vibration and Displacement Measurement System for Structures Using Laser Light



Actual stiffness of bridge girders and similar beam structures: To evaluate EI, methods such as ① calculating natural periods from vibration measurements or ② measuring displacements generated during loading tests are implemented. At Kamiharu, we simultaneously measure both items (① and ②) using a medium-range laser Doppler measurement device, without causing local community impacts such as traffic restrictions or work stoppages.

Verification of Displacement Measurement Using a PC Girder Test Specimen with Mid-Range Laser Doppler Vision (Shanghai)

Prior to domestic adoption, displacement measurements were conducted in Shanghai when loading concrete blocks onto PC girders, verifying and confirming comparisons with conventional strain-conversion displacement transducers. The graph on the right shows the displacement measurement results when four concrete blocks were loaded. A tendency for the measurement results from the laser Doppler measuring device and the conventional displacement gauge to match can be confirmed. Although targets were used in this measurement, they are generally unnecessary in environments where sufficient space is available beneath the girder. Furthermore, with a distance of approximately 50m between the target and the measuring device, measurements are feasible even at a considerable distance



Currently active in the field !!

Based on these verification results, we conduct displacement measurements on bridges both domestically and internationally. Furthermore, with a sampling frequency of 500Hz, it possesses sufficient measurement capability. The video on the right shows displacement measurement on a monorail girder. Not only does it measure displacement during vehicle passage, but by performing frequency analysis on the free vibration waveform after passage, it is possible to determine the girder's own natural period.

