Rapid Load Non-destructive Testing Of Structures

Valuable information regarding the health and performance of an existing structure can be gained by measuring its response to an applied test load. However, it is often difficult to justify the time and expense associated with full-scale load testing. Rapid load testing is a nondestructive and relatively inexpensive testing procedure that was developed at the University of Missouri - Rolla (UMR) to evaluate the performance of new construction techniques and technologies. In a rapid load test, concentrated loads are applied to a structure using hydraulic jacks. The location and magnitude of these loads are carefully designed to produce critical responses in the structure without doing any permanent damage. Deflections and strains are measured, and the structure's performance is evaluated based upon its measured response. The equipment for the rapid load testing system developed at UMR is portable and includes hydraulic jacks and a remotely controlled hydraulic pump for applying loads; several instruments for measuring deflections, strains, elongations, and slopes; and a digital data acquisition system and portable computer that records the data. Once on site, the system may be installed in 3 to 4 hours depending on the application. Since hydraulic jacks allow the magnitude of the applied loads to be easily varied, the actual test takes less than one hour. The rapid load test is simple to conduct and provides easy-to-understand physical results.

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