

Statnamic Lateral Testing Of Dynamic Loading

Lateral Statnamic Testing was developed to model dynamic loads, such as those caused by earthquakes, ship impacts, wind, and etc., on structures and foundations. Lateral Statnamic Testing can be performed on any type of foundation and provides a measured dynamic response from which a derived static response can also be calculated. This full scale testing system allows the foundation designer to prepare a design tailored to the controlling load on the foundation. It also allows comparisons to be made to traditional design methods. The method only requires one foundation since the needed lateral force is generated by an accelerating mass. The Statnamic device consists of three main parts, a piston, a cylinder/silencer, and reaction masses. The piston contains a load cell for measuring force and a laser sensor to measure displacement. The piston is mounted horizontally on the foundation being measured and uses a hemispherical bearing to minimize eccentricities in the load. A solid propellant is burned inside the piston and generates gas pressure, and the cylinder/silencer, which fits over the piston, is accelerated by the expanding gas to over 15 g's. A sled holding the reaction masses and cylinder/silencer separates from the piston and slides along a track. The accelerated masses generate a force equal to the mass times acceleration. A patented system of motion sensors placed horizontally in inclinometer casings embedded in the foundation measures the lateral acceleration of the foundation at various depths. Also, strain gages embedded in the foundation measure the strain at those same depths. These measurements permit the calculation of soil response which then can be used to create computer models of the soil and foundation.

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