

Statnamic Testing to Confirm the Safety of Structures



Using USF's unique Statnamic device, which has a 500-ton load capacity and is the first of its kind in the world, **Dr. A. Gray Mullins** has conducted hundreds of full-scale tests in cooperation with industry and the Federal Highway Administration to confirm the safety of important structures like bridges and buildings. Statnamic testing is a relatively new and cost-effective method that confirms foundation capacity after installation yet prior to full construction. The test apparatus uses quickly formed gas pressure that results from burning solid fuel to launch a set of reaction masses upward and away from the foundation. The reaction mass is most commonly made of concrete and steel, but in special instances, such as with USF's device, it can be obtained from empty cans filled with soil, water, or a combination of materials. The thrusting force produced by this combustion is proportional to the product and acceleration of the mass and acts equally and oppositely onto the foundation in a downward direction. The duration of the test classifies it as a *Rapid Load Test* rather than a dynamic test making the analysis of the recorded data less complex.

Dr. Mullins and his research group have developed advanced software packages that have been used to compare these tests with traditional, more expensive test methods thus raising the confidence in structural safety at a lower

cost. Further development and advancements in Statnamic analysis have been afforded through the use of USF's one-of-a-kind laboratory scale device capable of producing 20 tons on small-scale foundation specimens. The latest application of Statnamic loading uses the device oriented laterally to simulate vessel collisions with the piers of water-spanning bridges.