

Accurate Load Ratings for County Bridges

County Engineers constantly need to prioritize their bridge rehabilitation/replacement projects. Often, it's clear when a bridge is near the end of its useful life either because of deterioration or functionality requirements. In these cases, the decision can be made to go forward with the required rehab/replacement program. However, there are many bridges that are "borderline" because of load rating restrictions. The predicament with these structures is that an analysis indicates that the load rating is low, but the actual structure appears to be in very good condition. If the engineer had something more "solid" to back up his or her visual observation and a higher load rating could be justified, these structures could remain in service for a longer period of time. One solution to this problem is to run a truck-load test on the structure and use the field data to develop a more realistic load rating.

HOW ARE RATINGS OBTAINED FROM A LOAD TEST?

First, the bridge structural members are instrumented with re-useable strain sensors. Next, a loaded dump truck crosses the bridge at crawl speed and data is recorded with our BDI Structural Testing System. After the truck makes several passes, the instrumentation is removed, leaving no damage to the structural members. Usually, we run a field test on a typical county bridge in under eight hours, depending on the field conditions. The data is then taken back to our offices where it is used to "calibrate" a computer model of the bridge. Once this model "behaves" the same as the actual structure, rating loads or permit overloads are applied to the computer model and rating values are determined. This approach follows the AASHTO load rating specifications, with the advantage that a "field calibrated" computer model is being used, rather than assumed load distribution factors and other inaccurate assumptions. Usually, but not always, the load ratings improve with this approach.

WHAT TYPE OF BRIDGES CAN BE TESTED?

Since 1989, the personnel at BDI have tested and evaluated approximately 350 structures all over the country and overseas. We have used our approach successfully on all types of bridges fabricated from steel, pre-stressed concrete, reinforced concrete, timber, and even the new FRP composite materials. We've evaluated slabs, T-beams, girder bridges, box beam bridges, trusses, and many more.

WHAT DOES A LOAD TEST COST?

We have shown that structures can be tested on a routine basis and for relatively small cost. For example, a typical short span bridge can usually be tested, analyzed, and load rated for between \$18,000 to \$25,000 plus travel expenses. Larger and/or more complex bridges will require more time and would therefore cost a little more. If a county (or group of counties) own several bridges that are to be tested, the cost per bridge will go down. This is an ideal solution for bridge owners who must provide adequate ratings for their structures but operate on a tight budget. It should be noted that we rely on the sponsoring agency to provide traffic control, a loaded vehicle with known axle weights, and access to the superstructure. If you have any questions, please don't hesitate to contact us!