**HIT Method Concept Origin**

**This technique was introduced** in a Vibration Technology seminar where they used high speed digital recordings of tri-axial accelerometer output signals to capture real-world behavior of mechanical systems, and then analyzed it back in the shop.

The example cited was excess breakage on a trucking-route from a porcelain and glass factory to a certain distribution warehouse in another city. Breakage on this one particular route was always higher than the others, even though some of the others were much-longer routes.

The truck-vendor knew what to do. Tri-axial accelerometers were mounted on and around the test-load in the truck's cargo area along with sensors on axles, frame and other data such as ground speed, engine rpm etc. The truck with this instrumentation setup was driven over every route the truck took to deliver product while the recorder captured the data. A washboard-like section of road was identified on the problematic route that was exciting a resonance in the truck's structure that shook the cargo-bed excessively and sometimes porcelain and glass things broke. With this data recording and playback analysis it was a simple *1st- semester-high-school-physics* problem of figuring out a spring, mass damper system's resonant frequency and then snubbing it out. The key of this method is to record everything in the field and then play it back for analysis later.

This method was demonstrated to work for Kaplan hydroelectric turbine index testing as endorsed by Lee's FORWARD to a sales pitch we were working on.

A typical SCADA system has sufficient recording capability to capture the data for the HIT method.

The unit's gates and blades can be exercised manually for off-cam index testing by a qualified equipment operator. Any off-the-shelf PLC will most-likely have a scripting capability to automate this exercise, but this automation is best left to the individual governor-application engineers at the dam.

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