

Train Structural Test

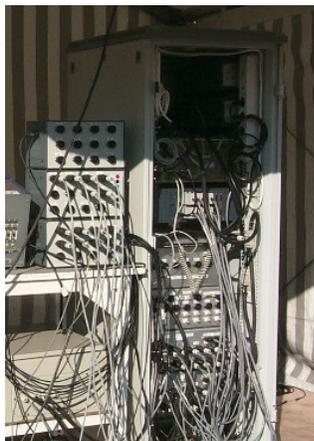
Structural analyses are generally carried out to examine any type of mechanical superstructures. In many applications they are used to measure mechanical values such as the stress applied to a construction. Together with modal or fatigue analysis, measurement values can be evaluated or simply used to compare a computer model against the design reality. Such tests are familiar from the car industry, where hydraulic jack test benches shake complete cars or their parts.

Now for the first time, Bombardier, one of the world's most prestigious manufacturers of trains, has conducted a dynamic structural test on a complete train (consisting of 3 cars). Led by a team of French engineers the test was performed with the help of imc's measurement & control system CRONOS PL.



A car buggy shaken by two load units

In the present case, eight active hydraulic cylinders had to be stimulated and controlled by an imc CRONOS PL. Apart from that, the main job of the imc system was to acquire measurement data from various sources. Foremost of these are strain gauges, force and displacement signals. Towards that end, CRONOS PL is the perfect system. Its high performance data acquisition capabilities, with excellent amplifiers guarantee outstanding measurement results. This is the necessary basis for subsequent



The measurement & control rig

analysis. For example to control the hydraulic jacks. With a maximum deviation of 1mm all of the eight hydraulic actuators have to play their individual roles in order to stimulate the structure of the train.

The basis for the interplay between measurement data and controlled excitation is CRONOS PL's ability to calculate measurement results online and to provide those results for further calculations or output channels. With its over 100 functions, real-time controllers, filters, frequency analyzers and much more can be performed. And Online FAMOS, the user interface to setup the online functions, is as easy to use as an ordinary pocket calculator. Basically, programming language skills are not necessary.

The standard user-interface with its easy-to-access functionality is truly one of the strengths of CRONOS PL. Especially for frequently changing applications where writing a dedicated program for each one would take too long. The imc Device software also includes tools for comprehensive online data display and a built-in report generator. This special tool with its drag & drop functionality is much more than a replacement for a strip chart recorder or a simple printout function. It is a modern tool to create written information and document results instantly, even during the measurement. This functionality is necessary for sharing information and discussing test procedure statuses during the measurement.

Altogether, with the help of the outstanding performance of imc's CRONOS PL, Bombardier's engineers worked out and performed this superlative structural test successfully. Another proof of imc's expertise in measurement & control technology.



The Bombardier test team in Crespin