

Project Note

Rail safety is measurable

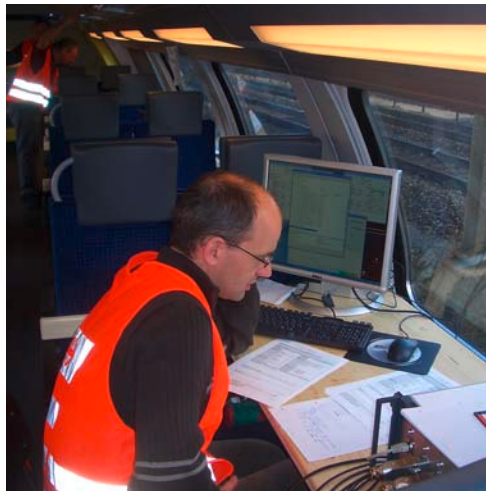
SBB (Swiss Federal Railways) has a measuring system to test the dynamic travel behaviour of trains for safety and comfort. Zühlke developed a new system to replace and expand the functionality of the existing system.

Task

To obtain an operating permit, new or modified rolling stock is checked for travel safety and travel comfort by the measurement and diagnosis engineering department of SBB. To this end, sensors are used on measurement trips to record, process and evaluate a number of mechanical parameters, such as wheel/rail forces and accelerations. These tests are part of homologation procedures for vehicles for different operating conditions (high-speed, type of route, etc.). The project involved replacing the existing system technologically in order to carry out the tests more efficiently in the future. The new measurement system was to have additional functions, be flexible in configuration and easy to install and operate. In addition, SBB wanted the system to be expandable, as fail-safe as possible, and easy to maintain.

Implementation

Zühlke undertook the turnkey implementation of the product based on the extensive SBB design specifications. Working together closely with SBB measurement engineers in an iterative process, Zühlke ensured that the system would perform as envisioned by the end users. The measurement system consists of several connection boxes for the sensors that are linked to an optical field bus for simple distribution along the entire length of the measurement train. This approach eliminates the need for the expensive individual wiring of all sensors throughout the train up to the data processing system. The system consists of several modules. As a result, it can process data in real time distributed over several computers and is expandable. The measurement engineer can configure and calibrate the entire system centrally from the computer in the measurement wagon.



From these data, the measurement software compiles statistics on each section of the route tested. For this purpose, the software continuously determines the current position with the aid of position measuring devices and magnetic synchronisation points along the route. Finally, the measurement engineer uses an analysis application to produce extensive reports in pdf format with numerous diagrams in compliance with the relevant standards. They present the calculated statistics on the recorded forces and movement parameters. Zühlke implemented further modules for the output of measured data on analogue line recorders and for further processing.

Technical Data

Development with RUP
Java, C++
XML, XSL, FOP
MySQL, Hibernate
Swing, JFreeChart
Embedded Platform:
Intel Control
Platform: Windows XP
Tools: MagicDraw UML,
Eclipse, Subversion,
Maven, CruiseControl,
QA Center, Dev Partner,
Mantis, Matlab,
DIAdem, XML Spy,
Excel

Customer benefits

- **Innovative software and hardware:** Thanks to Zühlke's extensive experience, the customer obtained a first-rate solution with hardware and software from a single firm.
- **Flexibility:** The iterative development process that was employed allowed the Zühlke team to respond flexibly to changes in customer requirements.
- **Know-how transfer:** Applying the training they received during the project, the customer's team members can now develop extensions for the software on their own.



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