

SNCF

Catenary Systems: Inspections on the line

SNCF is developing a rapid and safe solution to inspect catenary systems in order to avoid any risk of interrupting TGV (high speed rail) traffic. The prototype includes an ultrasonic sensor integrated to an equipment that moves at 5 km/h along the catenary system.



Cetim's asset

Ultrasonic imagery of the catenary system during movement is an innovative NDT solution on long products. The 3D view of the defects on the Cetim x-ray scanner helps to validate the ultrasonic detection of real defects.



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OUR CLIENT

Corporate name
SNCF, engineering system and projects division, electric traction department

Activity
Engineering assignments related to supply of current to the electric traction unit

Turnover
18,7 million Euros in 2012

The TGV's pantograph bow rubs against a copper alloy contact wire, which is subject to fatigue after 20 to 25 years of service. The phenomenon may lead to fracture and the wire may hang out in front of the train. When the pantograph reaches a catenary system that has thus been slackened, there is a risk of tearing that may take hours to repair. "We called on Cetim as it possesses necessary NDT expertise and test instruments", explains Alain Hego, expert in processing experience feedback at the projects and engineering systems division. "The first studies carried out in 2004 on the Paris-Lyon line, led to a manual ultrasonic

inspection system in localised areas on connectors of the contact wires."

Semi-Continuous inspection

In 2009, the fatigue phenomenon was observed on the "TGV Atlantique" line and required inspections over much longer distances. The defect may be found on the side where the pantograph rubs on the wire plate or of course on the drawbar of the contact wire. "In conjunction with Cetim, we developed a semi-continuous method for ultrasonic inspection of the contact wire over a length of 100 to 150 m", continues Alain Hego. "It led to a preliminary

design of a trolley that moves along the contact wire bearing a local ultrasonic immersion sensor."

A dual sensor

Given that defects are not necessarily located in a favorable direction for Ultrasonic detection, a dual sensor is used which allows inspection information to be saved in real time in the form of B-scan imagery. The preliminary design allows SNCF to develop a fully self-contained trolley that may be placed on the track with a reduced team of three or four persons. It should be able to perform continuous inspection of the contact wire on each section over a catenary system length of 1,400 m.