

The rail-traffic volumes on the Syrjäsalmi bridge, in North Karelia, are high.

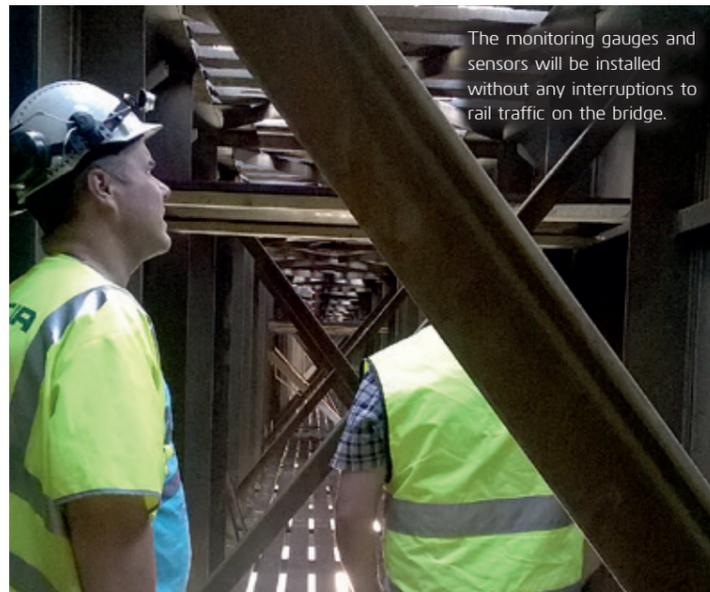
PRECISE DATA ON RAILROAD BRIDGE STRESS THROUGH MONITORING

Photos: VR ja VR Track

Savcor is implementing an important pilot project in the structural monitoring of railroad bridges. The Finnish Transport agency has selected VR Track Oy to supply the monitoring solution for the bridge over North Karelia's Syrjäsalmi sound. VR Track Oy is the principal designer of the monitoring solution, while Savcor Oy is in charge of its practical implementation. Responsible for building and maintaining Finland's railroad tracks, the Finnish Transport Agency is interested in obtaining information on how the steel structures of the bridge behave under the actual load.

The measurements will be conducted from December 2016 through the following spring. Among the values to be measured for the bridge are torsion, the impact of eccentricity of loads on the bridge, and the bridge's movement under various loads. Engineers will carefully analyze the measurement data, to determine the condition and behavior of the structures. An inspection of the bridge was last carried out in summer 2015.

The Syrjäsalmi bridge, in the Kesälahti area, is a three-span continuous steel-girder bridge that was built in 1964. Thirty strain gauges and four temperature sensors will be installed for one-week stretches of monitoring. These will be attached to the bottom flanges of the longitudinal main girders, diagonals, and horizontal beams.



The monitoring gauges and sensors will be installed without any interruptions to rail traffic on the bridge.

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JANNE WUORENJUURI
VR Track's Head of Bridges

REMOTE MONITORING IN REAL TIME

The railroad bridge is in a location where relying on the electrical grid is not an option, so a battery-operated Savcor Mobile OHM monitoring system will be used in the measurements. At the same time, the monitoring plan and monitoring procedures will form a pilot project subject to the bridge monitoring guidelines of the Finnish Transport Agency.

Pekka Toivola, an expert with Savcor, explains that installing the gauges and sensors while the bridge is open to train traffic has posed a unique challenge in the project. Before being permitted to work underneath the bridge, the Savcor installation crew will complete a training course on track work safety. Also, a separate safety plan will be drawn up before the installation work.

– The remote connection enables us to receive real-time data. All data obtained will be stored in a database and used to determine the bridge's remaining service life and to assess how the bridge behaves under the trains' current axle weights and speeds, Toivola says.

BRIDGES DUE FOR REPAIRS

The Finnish Transport Agency manages 2,417 railroad bridges. Construction of bridges has been fairly lively in Finland ever since the 1960s, when there was nearly three times as much

bridge construction as in the previous decade, as measured by total area of bridges. Finland's bridge-construction boom continued until the late 1990s.

Experience has shown that a new bridge begins to require basic repairs after 30–40 years. Needs for bridge repairs have grown considerably since the 1990s and will remain significant over the coming years.

MORE ANSWERS THAN QUESTIONS

VR Track's Head of Bridges **Janne Wuorenjuuri**, who is also the service manager for rail-asset services, says that VR Track actively seeks projects related to digital operations and monitoring technology, along with suitable partners in this field.

– This will be an important project for VR Track as well, since we want to be among the top experts in the field in utilization of new technologies. Thus far, monitoring projects have consisted mainly of research projects or involved testing of monitoring equipment. This time, in accordance with the monitoring plan, VR Track Oy expects the cooperation to yield data of increasing use for providing answers to questions, rather than generating additional questions, Wuorenjuuri says.

He adds that the goal is joint provision of clear recommendations pertaining to further measures for the Finnish Transport Agency, which is the primary buyer in the project.



The Savcor Mobile OHM monitoring system enables real-time monitoring even on tracks that aren't connected to an electrical system.