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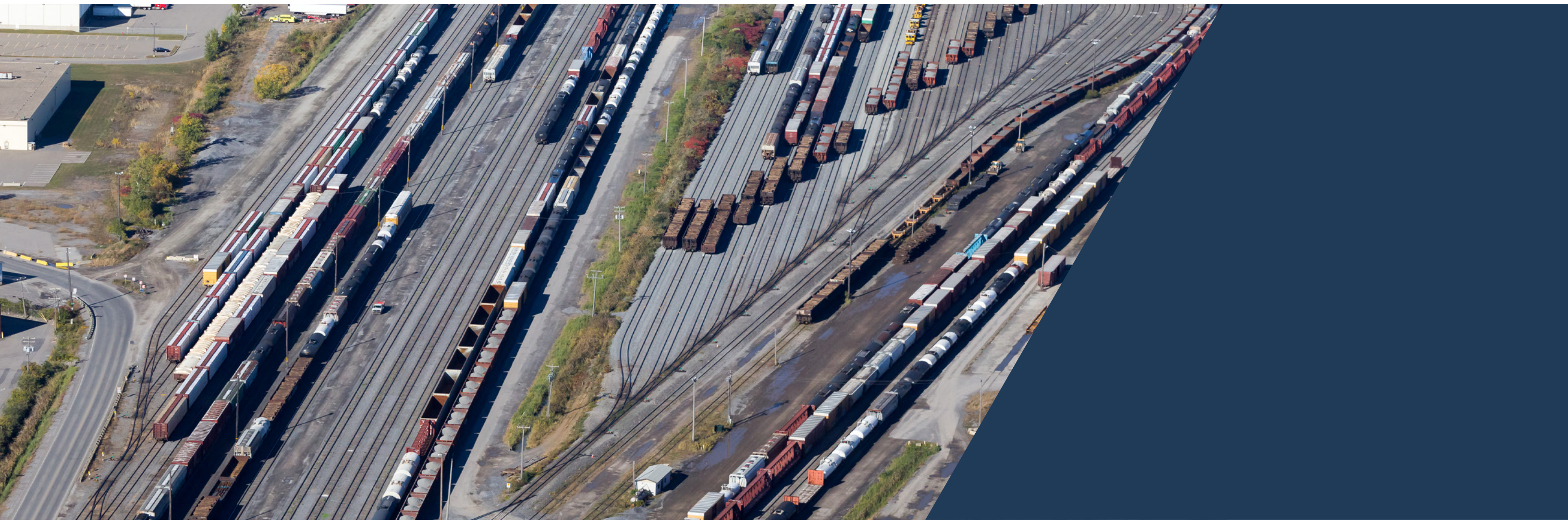

Case Study | US

Frauscher Track Vacancy System FTVS

Product Test | Class 1 Yard Application

Origination of FTVS and test installation

Wheel detection solutions utilizing the Frauscher Wheel Sensor RSR110 and Frauscher Wheel Sensor Signal Converter WSC are successfully utilized by every Class 1 railroad for various wayside triggering applications and for hump yard use. The consistent and precise results provided to railroads using this wheel detection solution sparked other ideas. Through direct feedback and discussion, Frauscher learned that current users of our wheel detection systems have a strong interest in an axle counting solution based on the RSR110. In response to this feedback, Frauscher set out to develop the Frauscher Track Vacancy System FTVS to fill this need. FTVS is appropriate for non-vital train detection, making the technology ideal in yard applications such as for switch point protection. Since on-site testing of the system would provide Frauscher with critical feedback while the product was still in the developmental phase, a few pre-production units were released to be tested. The goal was to measure the level of availability and reliability provided by FTVS in typical yard environments. Other key measurements of the trial would include ease of installation and maintenance, and the ability to easily integrate into yard infrastructure. The focus here will be on one of the Class 1 test locations.

Common track circuit issues in yard environments

Conditions at most Class 1 yards are similar to this test location. Yards typically have a large number of switches, and the installation of track circuits to control these switches requires many joints and bonds as well as their regular maintenance. In addition, track circuits utilized for train detection frequently experience performance issues due to environmental factors such as rain, dirt, extreme temperatures and changing ballast resistance. Axle counters are immune to these factors, making this Class 1 yard an ideal location to assess the improvements available with FTVS. Another issue in yards for track circuits is difficulty in establishing exact fouling points. When using wheel sensors for train detection, the fouling point is simply the exact location of the sensor, a factor that eliminates this issue.

Project details

The proof of concept install began in October of 2022 and was completed by March of 2023. The principal goal of the railroad in testing FTVS was to determine if this system could provide the highest uptime available, be easily installed, and require minimal maintenance effort.

Three Frauscher Wheel Sensors RSR110 were installed by the railroad at a switch in the yard and connected to the FTVS. During the test period the system was monitored regularly by Frauscher engineers. Data collected showed that an average of 30 vehicles and 3600 axles traversed the test track section daily. For the duration of the trial there were no miscounts, resets or equipment failures recorded.

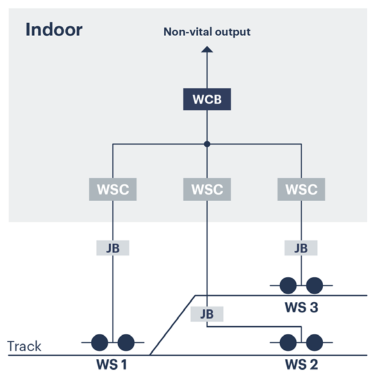

Figure 1: FTVS wayside equipment layout

Components and layout of FTVS

The general layout of the FTVS is depicted in Figure 1. The wheel sensors (WS) are quickly clamped to the rail using the Frauscher Rail Claw. Cables connect each sensor to its own junction box (JB), with a four conductor signaling cable used to connect to the wayside equipment. The wayside equipment is housed in a signal controller where it is installed on a DIN rail, requiring a small footprint of 2 2/3" x 4¾" x 4½". This wayside equipment consists of one Frauscher Wheel Signal Converter WSC per wheel sensor, with each WSC connecting to the Frauscher Wheel Counting Board WCB.
The WSC of the FTVS communicate with the WCB via digital signals sent through cage clamp terminals. The non-vital clear/occupied indication is generated using the discrete dry contact output of the WCB.

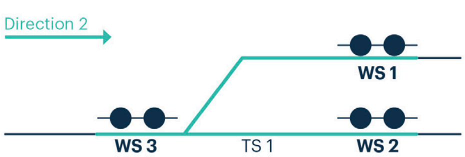

Figure 2: FTVS track layout for trial

Design of the test FTVS

The outdoor equipment of the FTVS is comprised of three RSR110 wheel sensors clamped to the rail at all entry and exit points of the switch. The track layout for the trial site is depicted in Figure 2. Three wheel sensors labeled WS1, WS2, and WS3 create one track section, indicated here as TS1.

If a wheel traverses any of the sensors approaching from either direction, the track section goes into occupied status and will remain occupied until the same number of axles is counted out again and the count equals zero. Only then will the track section return to clear status. Counting in and counting out can occur simultaneously on different sensors.

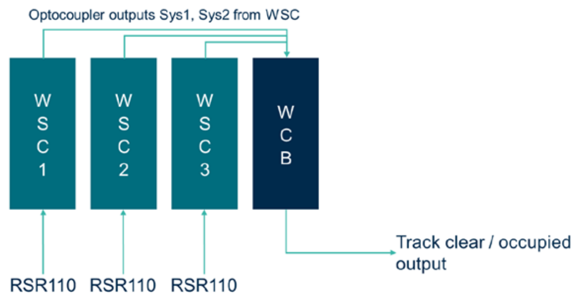

Figure 3: General layout of an FTVS system

The wayside equipment shown in Figure 3 includes three Wheel Signal Converters labeled here as WSC1, WSC2 and WSC3 (each WSC correlates to one wheel sensor). The WSCs all connect to the Wheel Counting Board WCB, which outputs the clear / occupied status of the track section. Image 1 shows the actual equipment at the site.

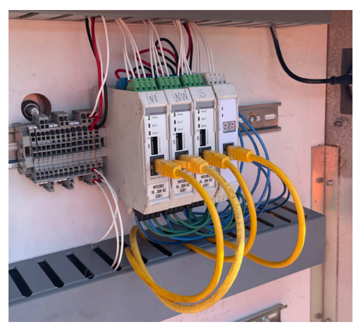

Image 1: Equipment at the site

Conclusion

The trial was deemed a success. As stated earlier, the system ran without a single miscount, reset, or equipment failure for the duration of the trial. The FTVS is suited to provide reliable and robust train detection for this Class 1 Yard where conditions are not favorable to track circuit use. In addition, the railroad was able to assess the ease of installation, integration, and maintenance of the FTVS. As a further testament to the successful implementation of FTVS and the system's ease of use, once the test was completed the railroad decided to move the FTVS equipment from the yard and reinstall it in a different yard without assistance from Frauscher. The system is currently operational in this second yard, with the railroad's goal to confirm and repeat the impressive results seen in the original location. and to further assess the compatibility of FTVS with existing equipment in a different yard.