FRAUSCHER

Track more with less.

Case Study | Spain

Three-rail Castellbisbal – Tarragona

Challenges

Standard UIC gauge, "Iberian" gauge – or both of them together? The modern Spanish railway network is characterized by two different gauges: On the one hand, there's the 1,668 millimetres wide, traditional 'Iberian Gauge'. It makes up around three-fourth of the more than 16 000 kilometres long railway system of Spain.

Since the 1990s, a rail network with standard UIC gauge (1,435 millimetres) has been developed – mainly for high-speed passenger services. It is over 3 000 kilometres long today and since 2010 it comprises cross-border corridors to France.[1]

On network sections that are shared by both gauges, there are often dual-gauge installations to be found. These make operation easier. They consist of three rails: a common rail on one side and two rails for standard as well as broad gauge on the other.

The number of such track sections in Spain is growing. One example is the connection between Castellbisbal (northwest of Barcelona) and Tarragona (about 100 kilometres to the west, close to the sea). It is part of the so called "Mediterranean Corridor" that runs from Sevilla (Spain) through France and Italy into Slovenia, Croatia and Hungary.[2]

On dual-gauge sections, track vacancy detection is quite challenging. That is because wheel sensors must be installed on two rails next to each other in tight spaces and have to detect axles reliably on the respective rail. Also, either of both installations must be able to reset the complete physical track section.

[1] www.uic.org
[2] ec.europa.eu

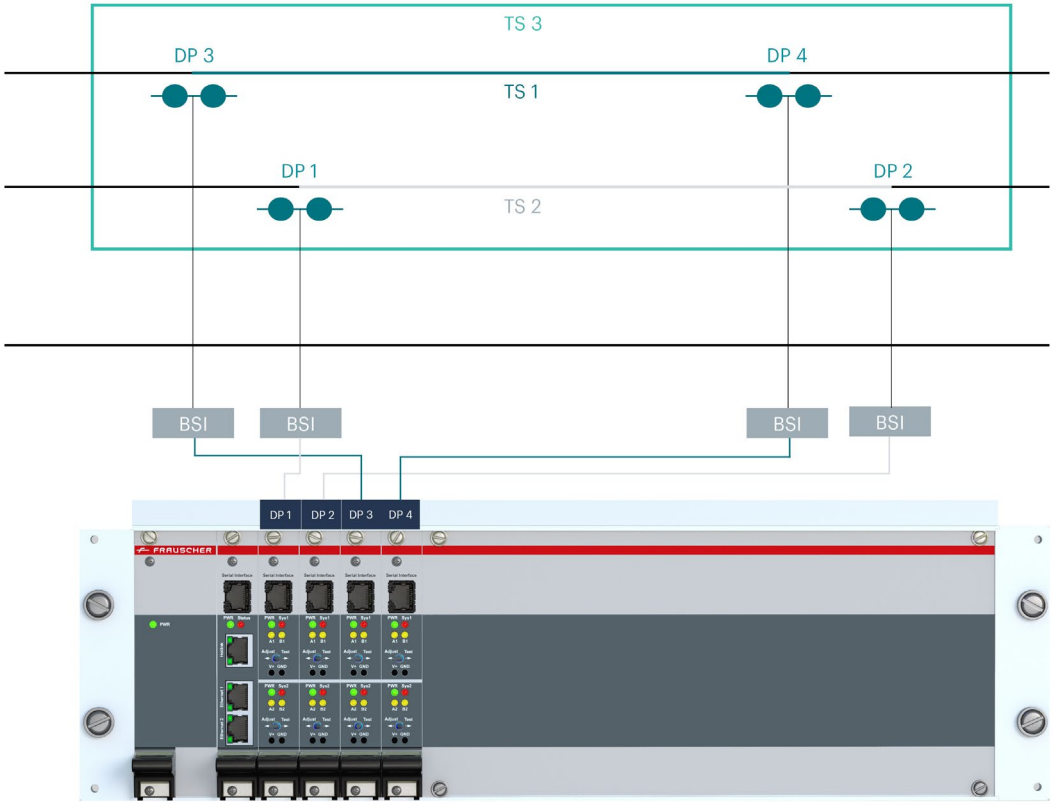
Solution

For this task, Frauscher developed a three-rail solution for track vacancy detection, that fulfilled all requirements of ADIF, the Spanish railway infrastructure manager (Administrador de Infraestructuras Ferroviarias).[3] The project started in march 2020. It comprised altogether 920 detection points in 19 stations: nine by Siemens and ten by Bombardier. In contrast to other track vacancy detection systems, the FAdC three-rail solution provides not only clear/occupied information of a track section, but also detects on which gauge the train is running.

The Frauscher solution is based on the Frauscher Advanced Counter FAdC together with Frauscher Wheel Sensors RSR123 and a specially developed type of the Frauscher Rail Claw SK150.

It works with three track sections (TS): TS1 describes the broad gauge track, TS2 the standard gauge track. In the FAdC, both track sections are combined into TS3, a so called supervisor track section. This is a virtual track section which requires no additional hardware and controls the operation in TS1 and TS2. It is used to reset both track sections by only one reset-command. After performing the reset, a single train – independent of its gauge – is sufficient to clear both track sections TS1 and TS2.

Frauscher wheel sensors are mounted on the inner side of the rail only. For comparison, wheel sensors of other made require hardware on both sides of a rail. So with the RSR123 it would be possible to mount two sensors on the neighbouring rails of both gauges and fully parallel in the same sleeper space, if required by the customer.



FAdC sample-layout for 3-rail application

[3] www.railtech.com

Frauscher Advanced Counter FAdC

Frauscher Wheel Sensor RSR123

What added to the project's complexity, was the use of different interlocking technology in the 19 stations along the line: Whilst for Siemens installations the customer-specific protocol WNC was used as interface, for the Bombardier installations Frauscher Safe Ethernet FSE was used.

Here the FAdC proved its flexibility and versatility as an optimal solution for complex installations: It provides the FSE interface and complies with customer-specific protocols as well as with standard protocols such as EULYNX.

Key Facts

Operator	Administrador de Infraestructuras Ferroviarias (ADIF)	**Country**	Spain
Partner	UTE Cormed (Joint Venture Siemens – Bombardier)	**Segment**	Main line
Scope of Supply	Axle Counter: Frauscher Advanced Counter FAdC Serial interface: Frauscher Safe Ethernet FSE Customer-specific protocol: WNC Wheel Sensor: RSR123 with Rail Claw SK150	**Application**	Track vacancy detection
Scope of project	920 detection points; 19 stations	**Project start**	March 2020