The 100% Availability Challenge

Proven and Hardened Redundant Axle Counter Application with Az LM

The reliable detection of trains is fundamental to the safe operation of modern railways. This puts a great demand on the availability of modern train detection systems, because availability is a precondition for the reliable and safe detection of trains.

Since the reliability of any system is limited by the given MTBF values of the individual components within the system, only redundancy can improve the availability of the overall system. In areas with a high impact on operations, a 100%-availability is indispensable, e.g. on lines with a high traffic density, on operational bottlenecks or in tunnels, where the site access is limited or a train forced to come to a standstill causes major congestion.

The availability of a train detection system can drastically be increased by redundancy. The ultimate train detection system is fully duplicated to allow any component to fail but the signaling circuit remains functional. This arrangement provides highest availability, provided that both systems are of SIL-4 type and the failed systems can be restored within a reasonable period of time.

Where the indoor equipment already provides some redundancy (e.g. a 2-out-of-3 system), only the outdoor components need to be duplicated (including cabling) to achieve full redundancy.
The redundant configuration of a single 2-out-of-2 system uses the complete duplication of indoor and outdoor components. This redundant system concept has been applied and successfully proven with Thales Axle Counter System Az LM on various projects.

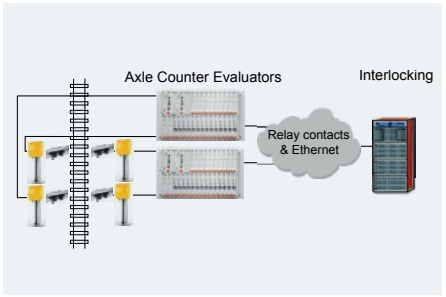
Thales Az LM with duplicated systems have been in service since 2005 making Thales the frontrunner in this technology worldwide.

In Switzerland two lines are using a full redundant design: The new double line between Bern and Zürich and the Lötschberg tunnel with a mixed traffic of 110 trains a day (international passenger trains, national InterCitys and heavy cargo trains) at a maximum speed of 250 km/h with a headway of 180 seconds.

The train detection system for the ongoing Gotthard tunnel project in Switzerland is designed in a similar way by using a redundant fibre optic backbone to connect Detection Points, Axle Counter Evaluator and Interlockings. In Netherlands, the double track high speed line HSL-Zuid with trains running at a maximum speed of 300 km/h creates a high demand on the availability of the system.
Since non-availability of the track infrastructure very often causes compensation payments from the owner of the infrastructure to operations, the additional investment reduces the overall Life Cycle Cost and enhances safety by a 100% availability.

HSL Zuid high speed line, The Netherlands

Lötschberg tunnel, Switzerland



Full redundant 2-out-of-2 configuration