Wayside train monitoring systems.
Uncompromising safety.

World’s number one.
SBB operates and maintains the world’s most heavily used rail network. Passenger and freight trains run on the same tracks at short intervals. Any service disruption can adversely impact timetable stability within just a short time. Such risks are minimised by monitoring trains and higher-risk parts of the network.

Short response times.
Wayside train monitoring systems facilitate extensively automated surveillance of trains at normal line speed. This equipment permits detection of irregularities that can jeopardise rail operations before they cause actual disruption. All wayside train monitoring devices are networked with a central Intervention Centre that is staffed around the clock. Irregularities and nonconformities are reported in screen-based displays and alarms and analysed by specialists. Decisions are made immediately on any action to be taken by or for the train(s) concerned.

More components, a single integrated system.
Wayside train monitoring systems serve to provide safety-relevant functions for loading-gauge (profile clearance) and aerial detection, fire and chemical detection, hot box and brake-locking detection, detection of load displacement, overloading and serious wheel defects, and for observation of natural hazards. Contact wire uplift measurements, pantograph monitoring and interference measurements are also performed. All alarms and interventions are recorded in a database. This information is forwarded to all other railway companies concerned to enable optimisation of maintenance.

Overview of system types.

*Hot box and brake-locking detectors*
Hot box and brake-locking detectors use passive infrared sensors to identify hot boxes and blocked brakes. Timely detection prevents derailments as well as axle and wheel failures.
Wheel load checkpoints
Wheel load checkpoints use strain gauges to measure maximum axle load, load displacement (left and right) and severe wheel defects. They help to avoid derailments and damage to rail infrastructure.

Fire and chemical detection
Twelve installations are in operation on the network of SBB Infrastructure for detecting fire and chemicals. Highly sensitive multi-component gas analysers measure the concentrations of gases such as CO, CO\(_2\), CH\(_4\) and C\(_n\)H\(_m\). Analysis of this data enables conclusions to be drawn regarding potential events, such as a possible fire given a rise in CO or CO\(_2\) concentration.

Profile clearance and aerial detection
The laser scanners of the loading-gauge and aerial detection systems generate 3D displays of passing trains. When detectors reveal that the safety envelope (profile) is violated – due, for example, to unsecured tarpaulins or protruding vehicle aerials – corrective action can be taken to prevent contact with the catenary.

Uplift measurement and pantograph monitoring
Contact wire uplift is measured using an electrically isolated potentiometer. The pantograph monitoring system uses optical systems to search for defects on pantographs.

Interference measurement
Interference measuring systems are used to monitor electrical fields to prevent malfunction of track-release systems.

Natural disaster alarm systems
These systems serve to prevent collisions with obstructions in the event of rockfall, landslide, mudslide or avalanche. If an alarm is actuated, countermeasures can be quickly implemented, such as closure of line sections, stopping trains, or mobilising geologists.

Our experts will be happy to advise you!

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