

# Swiss Section

## Technical Visit to the Waldenburg railway

Report by Chris Glättli



Chris reports on a Swiss Section visit to the Waldenburg railway which was regauged and changed from conventional signalling to Communication Based Train Control (CBTC) at the same time as the introduction of new trains.

### Big Bang approach

The Waldenburg Railway connects Liestal, the capital of Liestal District and the canton of Basel-Landschaft in Switzerland, to Waldenburg 13km further away. The railway was initially opened, in the age of steam, in 1880. SBB's current 1 ½ year overhaul of their Liestal station also gave the opportunity to undergo a 'big bang' change for the Waldenburg railway at the same time.

When planning the rolling stock replacement, it was realised that 750mm gauge trains were more expensive to acquire than 1000mm trains, so the project evolved into full re-gauging. The 13km were split up into seven lots and planning approval was received in November 2020. This is also when construction began and from April 2021 until December 2022 civil works were undertaken.

Street crossing in Station Bubendorf, Bad, light rail rules including a lateral five-dot-control-signal showing a proceed aspect, mounted on the post with the yellow cap. A pedestrian is waiting because of the red signal for him. CBTC Movement Authority (MA) displayed in green on the driver's monitor.

As part of the work, a creek in the valley had to be moved, in some places the creek walls had to be reinforced with posts, but the main problem was the flood protection needed to comply with the new regulation protecting from a one-in-a-100-years flood event, but it was during construction when torrential rain hit! Creek Frenke became a river and flooded the construction site and caused massive damage that took some cleaning up.

After 16 months of heavy construction work, there was a new station Waldenburg. Trial operation of the Waldenburg railway had to start in October 2022 so that everything would be ready for the opening in December 2022.

The big bang approach gave the opportunity to also change the signalling system. The Waldenburg railway was an ideal separated branch to trial a new CBTC system for Switzerland. A framework document had to be written to define the operational concept, the infrastructure including signalling, the rolling stock, and the data preparation rules. The operational concept planned for a train every 15 minutes during peak times, short transfer connections in Liestal for regional or





Above, level crossing closed in Oberdorf (BL), waiting for the opposing train.  
Below, T19 of Waldenburg Bahn (WB) arriving into station Bubendorf, Talhaus.

intercity services, with single and double train sets of 45m or 90m length. The infrastructure operation was for the right-hand side of the route (where normally it is on the left in Switzerland), automatic route setting or route setting which can be triggered by the driver, mixed operational rules with rail rules between the stations and light rail rules in and near stations, and line and interlocking controlled level crossings.

The level crossings had to have the shortest possible blocking times for street traffic to gain acceptance in towns. As there were no operational rules in Switzerland for CBTC, these had to be developed from scratch. The new set of rules were developed, based on the structure of the existing cab signalling rules for ETCS L2 R300.7. Another requirement was for two maintenance area configurations for possessions. The setup of the CBTC system was based on track geometry such as position of the points, RFID tags, platforms, level crossings.

The signalling configuration, including control tables, was set up for compliance with the operational rules by Stadler Signalling. The system had to perform real time positioning of vehicles, with an upgrade path from GoA1 up to GoA4, wayside and onboard SIL 4 standard commercial off the shelf hardware, operating on a wireless network, and providing CBTC moving block, with a speed up to 80km/h.

### Trains

A train set has four bogies, three of them with motors, the fourth has the odometry equipment mounted to avoid slipping causing errors. There is a total of 10 sets of trains. A set has a traction power of 630kW, with a collision detection system recognising persons up to 50m away using a camera and lidar. Objects are categorised into classes as cars, trains, persons, and other things; during both day and night time, including inclement weather e.g., rain.

The Waldenburg railway has been in operation with CBTC since 11 December 2022. Despite some hiccups in the beginning, today the operation is stable using GoA1.

