Swiss Section

Technical visit to Signalwerk Wuppertal and Schwebebahn Wuppertal

Report by Chris Glättli

Mid-June the IRSE Swiss Section's technical visit went abroad to Wuppertal, Germany with Deutsche Bahn Intercity Express (ICE) travelling from Basel to Cologne and then to Wuppertal in a bit more than the planned 4.5 hours. On the next day, the close to 20 members saw two railway companies and drove the Schwebebahn from end to end, experiencing the hanging ride, flying over the river Wupper.

The first company, Signalwerk Wuppertal, is a subsidiary of Deutsche Bahn Netz and the internal supplier for all discontinued infrastructure materials, operating since 1938. Signalwerk receives any signalling equipment recovered from railway lines. With their over 700 employees, the equipment is refurbished as required and installed as replacement parts on other lines. DB Netz also buys last-order-materials and Signalwerk holds them in stock with the other 65,000 types of materials stored.

The most frequently supplied items are the point machines with 2,500 overhauled every year and reinstalled. One of the challenges is the record keeping for the items, where origin and destination are recorded, to verify the history of every specific element. Also impressive was the electrical department where relay sets are serviced. For over 650 types of relay-sets, automatic testing is available. For the older types, hardwired test procedures are executed automatically, whereas for newer ones, computers hold the test procedures. A tour around the yard proved the extensive types of materials available, that can be dispatched as emergency replacements within hours.

Schwebebahn in the literal sense would mean 'hovering railway', but suspension railway is by far the better translation as the carriages hang under the rail. The construction of the futuristic overhead monorail began 1897. The empty space above the river Wupper is used and the lines do not take away land from the city. The total length of the Schwebebahn's loop is 13.3km. Only 3km are not over the Wupper, but over the street. End-to-end travel took us around 30 minutes with speeds up to 60km/h and the views on- and off-board were stunning. The engineering of track and stations is impressive and timeless – but not as timeless was the structural integrity and the carriages themselves. The recent refurb included steelwork, stations, carriages, power supply and signalling. The new parts have been in operation since mid-2019.

Wuppertaler Stadt Werke (WSW) is operating the railway for the 360,000 inhabitants of Wuppertal together with the buses providing 90m journeys a year or around 100,000 railway rides per day. The company has 31 trains and one additional train for special rides. The railway operates during peak hours every 4 minutes and serves 20 stations with its 18 trains on the line.

Schwebebahn Wuppertal carriage 20 travelling towards Vohwinkel shortly before Werther Brücke.

Top, IRSE Swiss Section travellers in front of the Schwebebahn.

Left, a train at the depot Oberbarmen making the turning loop. In front of the wheel diagonally is the balise reader (circled).

Above, a train arriving into Werther Brücke.

It is nearly possible to reach a two-minute time gap between two trains if a further six trains are used. The new carriages, of type GTW15, supplied by Vossloh, have 45 seats and can hold up to 86 passengers standing.

The signalling is ETCS Level 2+ from Alstom with balises mounted on top of the monorail, and uses a TETRA radio application. There are no axle counters, but the fixed sections are kept for proper weight distribution. The positioning of the vehicles relies on an odometer, a radar counting the rivets, an acceleration sensor and re-adjustment via balises. The trains can drive in the ETCS full supervision, on-sight, staff responsible and reversing modes. The blocks are delimited by marker boards. The signaller can open the marker boards in these aspects, or the traffic management system ITCS opens them according to the timetable in the full supervision mode.

At each terminal station a depot can be found with facilities to clean the outside of the vehicles and a workshop is at one end of the line. The sliding points of the monorail are impressive where normal and reverse are two parallel parts of the rail and the desired one is slid into the driving position.

Wuppertaler Stadtwerke presented their training facilities, signalling equipment, operation centre and depots with enthusiasm. A big thanks goes out to Dr Kindinger and team for opening the doors of this marvellous Schwebebahn, and Matthias Handschin for organising the visit. ///