GBT In Full Commercial Use

On 14 November and 1 December 2016, in readiness for the introduction of full services with the 2017 timetable, SBB held what it described as two „Focus Days", running trains to the latter timetable on the Gotthard Base Tunnel line. This involved 48 IC and EC passenger trains and 40 freights on the first day with 48 passenger and 105 freight trains on the second. These were the first times the tunnel had been used so intensively, and demonstrated that the GBT line is even more reliable than the rest of the SBB network - all trains ran to schedule.

Between early September and 14 November 2016 the GBT (see R 3/16, pp. 26 - 28) was used by around 3,500 out of the 5,000 trains which were to be routed via the Gotthard line by the end of November. Around 90 % of these trains were freights, the remainder scheduled **passenger trains**. Starting in October, a regular feature of Thursdays and Fridays was the routeing of 16 passenger trains, and up to 90 freights, via the GBT.

Then there were the two „Schwerpunktstage" („Focus Days"), on 14 November and 1 December 2016, which involved the implementation of the full timetable and trains running at full speed, with operations being handled by a team of around 160 staff. The IC and EC expresses were formed of SBB's Class RABDe 500 ICN trains and SBB's and Trenitalia's Class ETR 610 Pendolinos, which attained a top speed of 200 km/h beneath the Alps. Since it was of course not really possible to implement the full 2017 timetable (because this would have involved modifying the timings of these trains elsewhere on the network), northbound passenger trains were held at Arth-Goldau for around 20 minutes so that they could regain their normal paths, while southbound expresses were held for a similar length of time at Bellinzona.

Freight operations on the Gotthard route have been transformed. A locomotive rated at 5,600 kW can now haul a 1,600 t freight southbound, and a 1,400 t one northbound, unassisted. Heavier freights, up to 2,000 t, can be handled by a pair of Class Re 4/4s (in the past, over the summit line, it was necessary to double-head with a Class Re 6/6 and a Class Re 4/4, this pairing referred to as an Re 10/10), or a combination of Class 185, 186 and 189 machines. The need for a third locomotive, to provide rear-end banking, has disappeared. During the test period freights were able to traverse the GBT at speeds up to 100 km/h.

Test operation was not entirely without its teething troubles. The new line through the GBT is equipped with **ETCS** Level 2 over a 94 km stretch between Brunnen in the north and Castione in the south, and the on-board ETCS equipment on certain locomotive types had difficulties in communicating with the wayside installations. This sometimes resulted in the brakes being automatically applied, especially during the transition to the second Radio Block Centre. The result was that the on-board computer then required restarting, a procedure taking half an hour or longer, and causing delays to following trains, including on occasions the evacuation from the tunnel of those trains which were immediately following the ones with ETCS problems.

To eliminate these failures, the BAV (Bundesamt für Verkehr - Swiss Federal Transport Office) decided to temporarily prohibit Bombardier's Class Re 486s, and Class 186 and 187 **TRAXXes** belonging to BLS, Crossrail, Railpool and other operators from using the new line. Bombardier then solved the problem by updating the software on these classes, resulting in most of BLS's machines now running without any problems (see box below).

By 11 December 2016 all BLS's Class Re 486 machines had been cleared for the GBT line together with all eight Class 186s on hire from Railpool. Two of the five of the Class 187s were also ready to use the line and the remainder of this class are to receive software upgrades by July 2017.

Test runs realised with the new Class Re 475 **Vectrons** were realised satisfactorily. DB Cargo's Class 185s and Crossrail's Class 186s are also cleared for the GBT. SBB Cargo's Classes Re 4/4 and Re 6/6 never had any ETCS problems. Also SBB Cargo International's Class 189 Eurosprinters on hire from MRCE and ELL's Class 193 Vectrons were ready for the start-up of full commercial operation on 11 December 2016.

The first **„Focus Day"**, 14 November, was a Monday. This meant fewer freights than on Thursdays and Fridays. However 1 December was a Thursday, with around 140 freights anticipated in the 24-hour test period. This is still well below the line's design capacity, which will only be reached after the completion of the Ceneri Base Tunnel in 2020 - a maximum of 260 freights per day. From that point it will be also possible to send trains carrying High Cube containers over the new line, which will be suitable for freights of up to 750 m in length.

Photo: SBB

On 12 April 2016 Pendolino ETR 610 emerges from the southern portal of the GBT.

On 1 December 2016 BLS's TRAXX 187 008, on hire from Railpool, leaves the southern portal of the GBT. This class received a new operating permit from BAV for the GBT line on 28 November 2016, following the upgrading of their on-board EBI Cab 2000 ETCS. Those 187s which have not yet been subjected to the upgrade can still use the tunnel, but not in the position of leading locomotives.

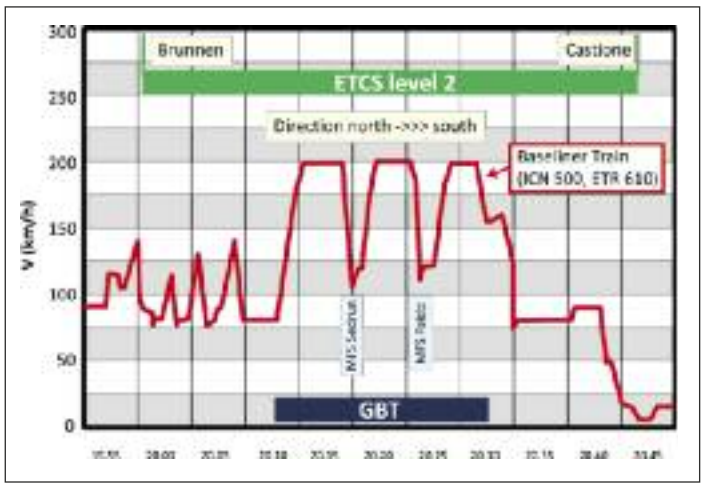
On 8 September 2016 the **BAV** issued a measure to ensure that there would be no operational hiccups when the Gotthard Base Tunnel was opened for regular traffic on 11 December 2016. This involved not allowing certain freight locomotive classes to use the tunnel, on account of the discovery that their on-board ETCS Level 2 equipment had malfunctioned (a lack of communication with the wayside ETCS equipment), causing some serious problems.

Four types of locomotive were **involved**, the Class 486 and 186 (TRAXX F140 MS) electrics operated by BLS Cargo and Crossrail, and Class 187 and 487 (TRAXX F140 AC3 and TRAXX F140 AC3 LM) locomotives, used by, for instance, BLS Cargo, Captrain and SRT (see R 1/16, pp. 56 - 57). The BAV stated that the restrictions were imposed since the type of ETCS equipment with which these locomotives were fitted did not provide the required reliability for them to use the GBT. These four TRAXX classes had their operation permits for the GBT valid only until November 2016, and these permits were not to be renewed until the problem was solved. To help speed this up the BAV offered its assistance to Bombardier.

Already in July 2016 Bombardier specialists met the BAV and infrastructure manager SBB Infra to discuss the possibility and the measures necessary for providing an extension for the use of the above-mentioned software version installed on the for locomotive classes. As a result the verification period for the software started on 5 September and continued until November. On **28 November 2016** Bombardier announced that the operating permit for the four classes of TRAXXes had been duly extended, provided that the software of their EBI Cab 2000 ETCS on-board equipment had been upgraded to the latest version. The other concession was that those machines which had not yet been subjected to software upgrades were only to be used on double-headed freights, and not in the position of the leading locomotive. According to these provisions, the existing licence for the P5cMR4/MR5 software was duly extended until 30 June 2017.

The problem was a specific one involving the GBT, since all four of these TRAXX classes are and were still allowed to work through the Lötschberg Base Tunnel, where ETCS Level 2 is also installed.

Jan Dvořák



A graph showing the progress of IC services (red line) through the 57 km Gotthard Base Tunnel. On 4 November 2016 over the high speed pointwork at the crossovers at Sedrun and at Faido (15 km from the southern portal) it was necessary to reduce speed to 120 km/h while authorisation of the pointwork at these locations was in progress. By mid-November the limit was raised to 160 km/h, and immediately before authorisation on 5 December 2016 it was lifted to the line speed of 200 km/h.

During the late autumn **testing** took place on pointwork designed for high speeds, to ensure that this was fully authorised for 200 km/h running. Last minute installations of various infrastructure components took place, together with staff training. Various special purpose tests were also realised. By default maintenance takes place during the nights of Saturday, Sunday and Monday. Prior to the introduction of the 2017 timetable it was also necessary to revise train pathing to the north and south of the new line, to ensure that services ran without unnecessary waits for paths. The paperwork generated from the 5,000 test trains also had to be processed.

On 5 December 2016 the BAV granted SBB **final approval** for starting up a full service through the GBT line. Only a few minor limitations remained, to be cleared up later. One of these involves the sidings situated at Rynächt, to the north of the new line. Here a speed limit of 80 km/h remains in force.

Between 2 August and 27 November 2016 a special train ran once per day to Sedrun, the multifunction and emergency crossover station, situated deep under the Alps and 21 km from the northern portal of the GBT, where an exhibition was provided. Close on 50,000 people visited this exhibition. To move them a Class Re 460 with a rake of five single deck carriages was used, operating in push-pull mode. Such was the popularity of these events that the trains had a load factor of 99.5 % - a figure most operators could only dream of achieving! ***This photo shows a special train hauled by Re 460 098 on 31 August 2016.***

On the first day of the **new timetable** all services ran to schedule. On 11 and 12 December the line through the GBT was used by 102 passenger trains and 58 freights. There was only one incident, on the 11th. This involved a locomotive failing in the northern part of the GBT, requiring a following passenger service to be diverted to opposite track at the multifunction and crossover station at Sedrun, 21 km into the tunnel from the northern portal. Another passenger service had to be diverted via the summit tunnel. All services maintained their top scheduled speeds - passenger trains 200 km/h and freights 100 km/h. That meant timekeeping was perfect.

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Photos, unless cited, by author