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The Simplon Tunnel

Part 1 - The first bore

John Jesson

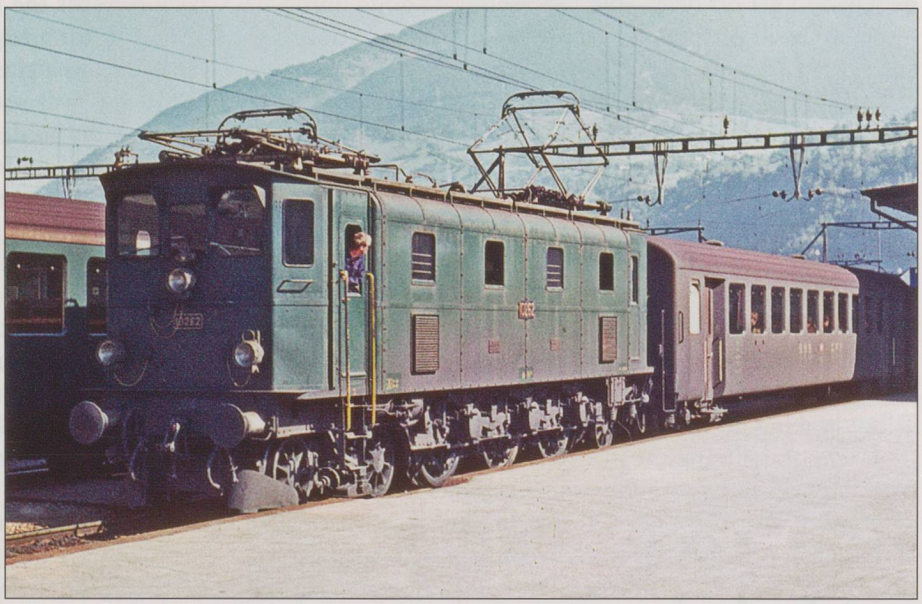
Freights in 1967 were mostly composed of short-wheelbase wagons, as is this example behind a BLS Ae 8/8 a short distance from Brig.

All photos: John Jesson

The piercing of the Simplon Massif was first proposed in 1857, following the proposal to build the Mont Cenis tunnel. This initial proposal fell by the wayside, and Western Switzerland had to be content with the construction of access lines towards the Simplon. These commenced in 1859 with a railway from Bouveret, on Lac Leman, to Martigny. This line was extended, reaching Sion in 1860 and Siders in 1868. This was as far as the route had progressed when the Simplon Railway Company, founded in 1875, took over the lines and extended them to reach Brig on 1st July 1878. The incorporation of the JS (Compagnie de Chemin du Fer du Jura et Simplon) in 1889, by which time the Gotthard tunnel had been completed for 7 years, led finally to serious consideration being given to plans for a Simplon tunnel.

The scheme finally adopted ,attracted worldwide attention eclipsing the Gotthard and Mont Cenis tunnels, while it was to be nearly twice as long as the Arlberg tunnel. The designs called for a tunnel having a maximum clear width of 4.5m at rail level, enlarging to 5m at a height of 2m above rail level, and with a maximum height of 5.5m. The tunnel was to be single track, but with provision for driving a second bore at a later date, the cost of this second bore being fixed in the original contract. Alongside the main tunnel, at a distance of 17m from it, was to be a 2.5m auxiliary tunnel. Connected to the main tunnel at intervals of 200m it was to provide ventilation and assist in the construction. This auxiliary tunnel would be opened out, at a later date, to form the second bore. It was contended that widening the bore to full dimensions would be a simpler task than cutting a completely new tunnel, hence the fixed price in the contract.

The Swiss portal, about 1.5km beyond Brig station, is at an altitude of 686m. A rising gradient in the tunnel, for drainage, takes the elevation to 705m before dropping to 633m at the Italian portal located just under 1km from



Local train, 1967 style. Ae 3/6III 10262 awaits the rightaway at Brig.

Iselle di Trasquera station. The contract for the project was signed with the specially formed firm of Brandt, Brandau Co., of Hamburg, on 15th April 1898. Later that year boring ommenced, on the Swiss side on 13th August and on the Italian side on 16th August. The auxiliary tunnel was driven slightly in advance of the main tunnel, and considerable use was made of it to ease construction. Narrow-gauge tracks were laid in both tunnels, with men and materials being brought to the heading along them. After the wagons had been off-loaded, they were filled with the spoil from the blasting. Water entering the works was diverted to the auxiliary bore, from where it ran to the entrance. A large fan at the tunnel entrance drove a continuous stream of fresh air into the auxiliary bore. The air was directed through the transverse gallery nearest the face, the other galleries being closed by doors. Foul air, dust and gases from the blasting were driven down the main tunnel by the flow of fresh air to be expelled into the open at the tunnel mouth. It was planned that the final breakthrough would be in November 1903 and, at first, progress was so rapid as to lead to expectations that the tunnel would be completed well ahead of time. It was not to be.

Naturally, it was expected that temperatures would rise as progress was made into the heart of the mountain, with a maximum of about 36° C expected at around 8.0km from the entrance. However, at 6.4km the temperature had already started to soar at an alarming rate and reached 45° C. Thinking that this must be a local phenomenon, the workmen were urged to greater effort in order to get through the high-temperature zone. To everyone's surprise the temperature continued to rise until, at a point 8.5km from the entrance, it reached a maximum of 52° C. To try to make conditions less exhausting at the working face, more powerful ventilating plant was installed, but proved inadequate. It was only by bringing in icy water, drawn from a mountain stream, and spraying it in the tunnel near the working face to cool the incoming fresh air, that conditions could be made tolerable. In the southern bore, a heat zone was not encountered, but problems of a different kind turned up. One day, blasting at the face provided a vent for a seemingly inexhaustible underground stream, which increased in volume and extent until cascades of hot and cold water rendered the face unapproachable. It was estimated that water

TOP: During the 70s, the TEE 'Lemano' was formed of Italian stock, shown here about to leave Brig for Genève behind Re 4/4II No. 11184.
MIDDLE: SBB Re 4/4IV No. 10101 'Vallée de Joux' awaits its next duty at Brig.
BOTTOM: The unreliability of the Class 470 units led to the use of multi-voltage Re 484 locos and hauled stock on some Cisalpino workings. 484.017, heading for Milano, with Ee 3/3 No. 16460 alongside, during the station stop at Brig.

was entering the tunnel at a rate of 950 litres/second, and it was some time before remedial measures were successful and drilling could continue. Water was not the only problem in the southern bore. In one area, "living rock" was encountered, where it seemed that the dense granite was imbedded in a thick, viscous substance, allowing the rock to move. In reality, the movement was due to the intense pressure. Timber baulks were snapped and splintered by the rock, and even iron supports were badly bent. The movement of the rock was only stopped by the use of huge concrete blocks and the toughest steel that could be made at the time.

In the face of such difficulties the workmen struggled forward, and it was not until 24th February 1905 that the two bores met, with a difference of 20 cm in the horizontal plane and 9 cm in the vertical. In completing their task, the 4,000 men had removed nearly 1m cubic metres of rock. Four million shot holes had been bored, and 1.37m kg. of dynamite, and 5,250km of fuse, used. The undertaking had cost around £3 million.

The ceremonial opening took place on 17th May 1906 in the presence of King Victor Emmanuel III of Italy and the Swiss President, Ludwig Forrer. On a cold, miserable day, the King of Italy, in a special train hauled by two Swiss steam locomotives, traversed the tunnel to a reception and lunch at Brig. In the evening, the Swiss party were guests of the Italian King at Domodossola. Ten days later, great festivities got underway on both sides of the border. Lake Genève was lit up; artillery salvos were fired from the lakeside; the bells of Genève cathedral were rung and hundreds of air balloons released. Just about every community alongside the lake, and onwards towards the tunnel, joined in the celebrations. A special music festival was held at La Scala, Milan, at which the Swiss President was present. Finally, on 1st June, the Swiss guests were entertained by the Italian Navy at Genoa, where the ships were dressed overall and flew the Swiss flag at their mastheads. More salvos were fired, and the celebrations brought to an end with a banquet on board the ship '*Regina Margherita*'.

This is the first of three articles by John Jesson that first appeared in Swiss Express *over 20 years ago. With many new members having joined the SRS since then we have decided to re-run them.*

TOP: A trio of BLS Re 465 locos approaches the entrance to the Simplon tunnel.
MIDDLE: SBB Re 4/4II No. 11112 emerges from the original tunnel at the head of the Iselle car shuttle. To the right is the second bore, at that time (2012) closed for repairs.
BOTTOM: A BLS Re 4/4 approaches Brig in 1967, when double track was still a very long way away.