

**Zeitschrift:** Swiss express : the Swiss Railways Society journal  
**Herausgeber:** Swiss Railways Society  
**Band:** 1 (1986-1987)  
**Heft:** 7

**Artikel:** The Lotschberg Tunnel  
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**DOI:** <https://doi.org/10.5169/seals-853686>

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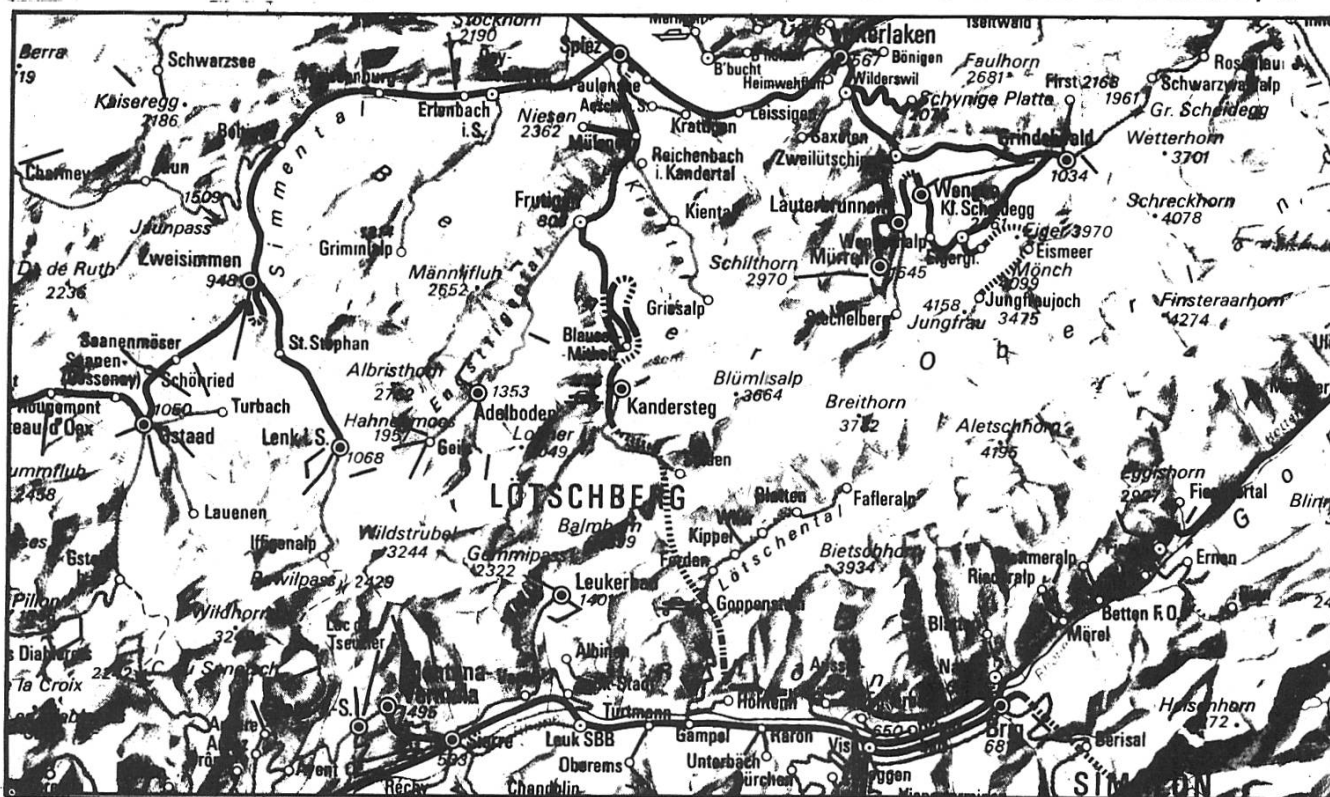
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## THE LOTSCHBERG TUNNEL by G. Della Gana

March 1986 saw the 75th anniversary of the linking of the two headings of the Lotschberg Tunnel. After many years of discussion and the drawing up of several abortive schemes, a French plan for a line linking the Berner Oberland with Valais was adopted in 1906. This called for a straight tunnel between Kandersteg and Goppenstein. The project was to be financed by the Paris bank of Loste & Co. with a large contribution from the Canton of Bern. The contractors were Messrs. Allard, Chagnaud, Coiseau, Couvreur, Dollfus, Duparchy, Prudhomme, and Wiriote. These gentlemen signed the construction contract on 1st October 1906.

Work was to start on the tunnel by 1st March 1907. Thus they had five months, most of them winter ones, to make preparations. It is difficult today to realise that the B.L.S. was built through what was then some of the most remote and wild country in Switzerland. Two temporary townships, one at Kandersteg, the other at Goppenstein, were set up. The construction sites were linked to the outside world by a



narrow-gauge railway. While the engineers, under Dr. Alphons Zollinger, were Swiss, their 'navvies' were Italians who had moved into the 'towns' complete with their wives and children.

So swift were the preparations that work on the tunnel was started early on 15th October 1906 at Kandersteg and 28th October at Goppenstein. In view of what was to come this was fortunate. The first work was done by hand, compressed air drills being brought into use at the northern end on 7th March 1907 and the southern end on 8th April. Several types of drill were tried, those of Meyer and Ingersoll giving the best results. The engineers were able to profit from the bitter experience of those who had built the previous great Alpine tunnels.

The tunnel was driven from the two ends in the following manner. A pilot heading, 3.5 metres wide by 2.2 metres high, was driven at what was to be the finished tunnel's floor level. This was followed by a second heading, 2.4 by 2.4 metres, excavated up to what was to be the final roof level. This upper gallery was connected to the lower level by a series of holes down through which spoil was dumped into wagons at the final floor

level. These wagons ran on a narrow gauge railway that served all transport purposes. Trains were hauled by compressed air powered locomotives underground being relieved by conventional steam locos when they reached the open-air. As the pilot tunnels advanced, other gangs of miners followed, breaking-out the headings from roof level downwards to the floor.

Thus good progress was being made when, at 02.30 hrs. on 24th July 1908, disaster struck. Following a routine blast the northern heading was inundated by glacial debris which overwhelmed 25 workmen and filled the workings with 7000 cubic metres of material. The charge had broken the thin layer of rock and let in the river-bed. On investigation it was found that the glacial deposits forming the bed of the river Kander on its journey down from the Gasterntal to Kandersteg extended to within a few feet of the tunnel, far closer than had been anticipated.

There were several suggestions for dealing with the emergency. One was to drive the tunnel under higher than atmospheric air pressure using a shield as has been done on 'wet' sections of the London Underground system. Another idea was to freeze the ground thus stabilising it for excavation. After much discussion the contractors' plan to divert the tunnel to the east around the effected area and well clear of the river was accepted. Some 1472 metres of work had to be abandoned, sealed off by a 10 metre thick masonry wall, a curve being introduced into the tunnel at this point. The actual area where the river intruded is emphasised by a saucer-shaped depression in the woodland of the Kander valley.

Those working at the southern end did not have an easy time. Though spared the calamity inside the tunnel, disaster hit the township at Goppenstein. On the night of 29th February 1908 an avalanche struck the canteen, sending parts of it into the river Lonza and killing a large number of people. This was the culmination of a number of slides to affect the area and so the massive defensive walls to be seen today were built. The miners met a zone of hot rock, the temperature, which reached 90 defrees F., proved exhausting to work in but did not get up to the 127 degrees F. encountered in the Simplon tunnel. Water was also a problem but more by way of a nuisance than a hazard.

By early 1911 those working in one heading could hear the explosions set off in the other. In the early hours of 31st March the drill of a miner on the southern side failed to bite in the hole he was boring. This was because it had reached the northern heading. At 03.55 hrs. a blast formed a hole large enough to be crawled through and M.Moro, chief engineer on the southern side, was able to pass into the northern heading. In spite of all the difficulties, the Lotschberg had been penetrated. The error in the meeting of the two headings' centre lines was no more than 257 millimetres horizontally and 102 millimetres vertically.

The completion of the lining and the installation of the track, etc. lasted until February 1913. Two ventilation plants, one at each end of the tunnel, were provided but the use of electric traction rendered them superfluous. The finished tunnel, 8 metres high by 6 metres wide, turned out to be 14,612 metres long, an increase of 800 metres over the straight bore originally planned. It passes through three geological zones on its way, approximately 4 kms. of limestone, 7 kms. of Gastern granite and 3.5 kms. of Lotschental crystalline slate. Today the modern signalling divides each running line into five block-sections, thus allowing ten trains in the tunnel at the same time. Smooth operation is assisted by a set of cross-overs at the mid-point. Passenger trains now take less than twelve minutes to pass through the tunnel it took so long to build.

Publications consulted:- Lotschberg Transit by Verena Gurtner. Railways Through The Mountains of Europe by Ascanio Schneider. Railway Wonders Of The World by Frederick A. Talbot. Simplon-Lotschberg by Franz Marti & Walter Trub. Switzerland's Amazing Railways by Cecil J. Allen.