

Rail 2000 – A Public Transport Network for the Third Millennium

The Swiss population's mobility needs that have drastically increased since 1960 in conjunction with the triumphant advance of private motorization culminated in the first traffic pinch points on rail and road in the early 1970s. Transit corridors on rail through the Swiss Alps were overloaded and the traffic connections in the densely populated Swiss Midlands touched at their limits. The quest for unfettered individual mobility put the railway at a disadvantage and soon led to the first traffic jams on the road. The Swiss citizens realised for the first time that the dream of boundless automotive freedom is not to be realised without serious consequences.

This was the background before which the railway promised new alternatives. The existing rail network that had remained virtually unchanged for over 100 years was to be revitalised. After the Rail 2000 concept was approved at the ballots in 1987, the Swiss population repeatedly voted in favour of further government bills on transport policy, all of which aimed at an increased shift of traffic from road to rail.

At costs of around CHF 30 billion, the railways were to be fundamentally modernised in the course of the ensuing 20 years. Apart from the construction of two new base tunnels at the Gotthard and Lötschberg respectively, the packet includes also the connection of Switzerland to the European high-speed network, noise remediation of the trunk line network, and the two phases of the Rail 2000 concept. On 12 December 2004, the first big milestone of Swiss transport policy will be reached with the launch of the first phase of Rail 2000.

CHF 5.4 billion for Rail 2000, 1st phase

The government message for the vote of 16 December 1987 contained a spending limit of CHF 5.4 billion for the first phase of the Rail 2000 concept (today CHF 7.4 billion, adjusted to cost-of-living increases). Imposition of environmental protection burdens, and the obligation to respect varying regional interests and wishes jeopardized the plans, both financially and in regard to the timescale. Under these conditions, the deadline for the completion of the works, imposed by the very name of the concept, turned out to be too optimistic. By resolutely turning the latest railway technology to use, a technology that is in full development, it was possible to respect the parameters imposed by the Federal Council without seriously cutting down on the future offer of train services, despite these unfavourable influences.

«More frequent, faster, more direct and more comfortable services», these were the unmistakable goals for Rail 2000 in 1987. These simple catchwords are translated into practice by shorter travel times, better connections in the hubs, and the day-long half-hour cadence of train services in long-distance traffic. Although Mr. and Mrs. Swiss have earned the title of European train travel champions since quite long ago, Rail 2000 is intended to attract new customers in Switzerland as patrons of public transport.

Complex timetable system for smoother connections

A sophisticated hub system serves as the methodical approach for the implementation of the concept goals. The system of trains serving the stations always at the same minute every hour or half hour forms the basis for a better accessibility of all the regions of the country. At the hub stations defined as such, the trains and buses arrive either shortly before the full hour or half hour, or at the minutes 15 and 45, and leave shortly afterwards. The ideal connections contribute to making the travel times shorter.

The hub-principle can only be realised by application of the planning triangle involving the sectors train service offer, rolling stock and infrastructure. The latter two constitute the foundation on which the planning of a more extended offer of train services can be based. The modern trains (IC2000, ICN) allow for higher speeds which can be translated into a reduction of travel times only if the infrastructure is upgraded too.

Rail 2000 on the home straight

The 45 km long «Neubaustrecke» between Mattstetten and Rothrist (Line Olten-Bern) is considered the real core part of the 1st phase of Rail 2000. In the future, the trains will run at 200 km/h on this line, bringing travel times between the Swiss political and commercial centres, Bern, Zurich and Basel, down to under one hour – an indispensable requirement for the hub system mentioned earlier. But also a number of other centres will in the future benefit from travel times to Bern which are cut by around 15 minutes.

The «Neubaustrecke» is one of initially more than 130 bigger and smaller construction projects. Only the sum total of all these projects makes up the whole of the 1st phase of Rail 2000. Close to 90% of the concept's constituent parts are realised by now, so Rail 2000 has come into the home straight. The fact that the concept presumably will close accounts CHF 1.5 billion below budget is a more than gratifying side aspect, considering the Confederation's empty coffers.

Another big chunk among the individual projects was taken into service on 15 June 2003, namely the new tunnel between Zurich and Thalwil, the second-largest construction venture in the scope of Rail 2000, 1st phase. Another piece of the jigsaw puzzle is the construction of a third track between Geneva and Coppet along Lake Geneva, over a length of 13.5 km. Both of these projects primarily serve for a disentanglement of the slower regional traffic from the faster long-distance traffic.

Fall-back level in signalling technology

Apart from the bigger projects, the SBB now still has 50 smaller projects under construction. In the whole of Switzerland, 40 new signalboxes are due to be taken into services until 12 December. This constitutes a big challenge for the supplying industry and the specialised services at SBB. Several hundred vehicles are currently retrofitted with the ETM-type train control system (European Transmission Module), a prerequisite for implementing the Rail 2000 timetable.

Originally, the SBB planned to use the new standardised signalling and train control system ETCS (European Train Control System) right from the beginning, because at speeds of over 160 km/h, conventional lineside signals cannot be used any more. ETCS transmits the orders to the drivers directly onto a screen in the locomotive cabin.

On account of the teething troubles of ETCS in pilot operation between Olten and Lucerne, SBB decided already in December 2002 to install conventional signals on the «Neubau-strecke» as a fall-back level in signalling, although the new line is equipped with components of ETCS. The accumulation of technical risks and the risks that deadlines cannot be kept, in pair with the strain of the biggest timetable change ever, was deemed too high. With a normal timetable change, around 10% of the trains' schedules change. With Rail 2000, exactly the opposite is true: 90% of the trains will run with changed times of departure and arrival.

Nevertheless, SBB continues to lay claim to a pioneer role in the development of the new signalling system. As soon as the tests give strong reason to expect that ETCS will be working very reliably, SBB shall switch to this system. But this will presumably not happen before the year 2005.

The country needs new trains

Already in the late 1980s, SBB started with a major renewal of its partly superannuated fleet of passenger cars. The goals of the purchase and deployment strategy for the new trains are completely in line with the strategy of the train services' offer of Rail 2000, 1st phase. SBB has to finance the total investments of around CHF 2.3 billion for a modern train travel comfort out of its own resources.

In domestic long-distance traffic, push-pull trains with a driver's cabin at both ends are used nearly exclusively. This renders the time and capacity-consuming locomotive changes at reversing stations unnecessary.

The basic fleet of Rail 2000 is composed of push-pull trains with a «Bahn 2000» locomotive Re 460, standard cars and driving trailers Mark EW IV. On lines with great demand for seats, IC2000 double-decker trains are used which have a seating capacity of up to 1400. Until the end of 2004, the fleet of IC2000 cars will have grown to 340 units. Tilting trains are used on lines with many curves. Thanks to the tilting technology, these trains can achieve travel times that are as much as 15% shorter than with conventional stock. The number of these emus, composed of 7 elements each, will have grown to 44 units until the end of 2004.

Regional traffic is planned and operated jointly with the cantons, regional bodies and transport companies, and expanded in the scope of Rail 2000 first phase. Also the cantons as the orderers of regional traffic are investing into the Rail 2000 offer, for example into S-Bahn systems, into the coverage of rural areas with public transport, or into urban transport systems on rail.

In regional traffic today, mostly trains of the type «Nahverkehr-Pendelzüge (NPZ)» are in use (push-pull trains for agglomeration traffic). Since the summer of 2002, modern comfortable articulated trainsets with level entry and equipped with passenger information systems have been replacing the somewhat aged NPZ units. In agglomeration traffic with high passenger numbers – for example at the S-Bahn Zurich – locomotive-hauled double-decker push-pull trains are used. Up to three four-piece consists can be coupled together to bring the number of seats up to 1200 overall.

The offer of timetabled train services grows by 14%

As everybody knows, time is a scarce commodity. With the help of new lines, faster and more comfortable trains, more frequent services and more through connections, Switzerland intends to further consolidate its reputation as the railway country par excellence. Despite the fact that the public transport network of Switzerland is the most heavily used in Europe today, its offer is further expanded. With the first phase of Rail 2000, the average train-kilometres per day are stepped-up further by 14 percent to reach a total of 337,000 kilometres.

The hub system, as mentioned earlier, brought travel time reductions which are quite massive in some instances. Here some examples:

- Bern–Zurich, newly in 58 minutes instead of 69 up to now.
- Bern–Basel, newly in 55 minutes instead of 67 up to now.
- Lausanne–Luzern, newly in 140 instead of 157 up to now.
- Bern–Chur, newly in 133 minutes instead of 177 up to now.
- Baar–Zurich, newly in 22 minutes instead of 36 up to now.
- Zofingen–Bern, newly in 30 minutes instead of 66 up to now (no change of trains any more).

Many more examples could be mentioned. So for instance, popular excursion destinations can be reached in less time, like the Mystery Park in Interlaken that is 2 hours away from Zurich or Basel, and without a change of trains. Or to mention those visitors to the Swiss Transport Museum in Lucerne who come from western Switzerland who gain between 15 and 30 minutes.

Just imagine: the meeting takes a little longer than expected, yet the train does not wait and the next is an hour away. With Rail 2000, this nerve-racking scenario will be a thing of the past because on the busy lines, the half-hour interval between trains will be standard. Travel schedules can be handled more flexibly and more spontaneously, and in many instances, studying the good old official timetable can be dispensed with.

Lines where the half-hour cadence newly applies as from December 2004:

- Geneva–Lausanne (Intercity)
- Bern–Basel (Intercity)
- Zurich–Weinfelden (Intercity tilting train/Interregio)
- Zurich–Chur (Intercity/Interregio)
- Geneva/Lausanne–Zurich (Intercity/Intercity tilting train)
- Chiasso–Bellinzona (regional train)
- Winterthur–Bülach (S-Bahn)

In the big agglomerations, the S-Bahn networks form the ideal link between long-distance and urban traffic. As from 2005, the half-hour cadence of train services will be standard on most of the S-Bahn lines. On certain lines and at peak traffic periods, the trains will follow each other even more often.

All the SBB's efforts are aimed at satisfying customer needs. This persistent strategy guarantees the success of the SBB – also in the future.