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# SBB CHOOSES BOMBARDIER

Der Beobachter



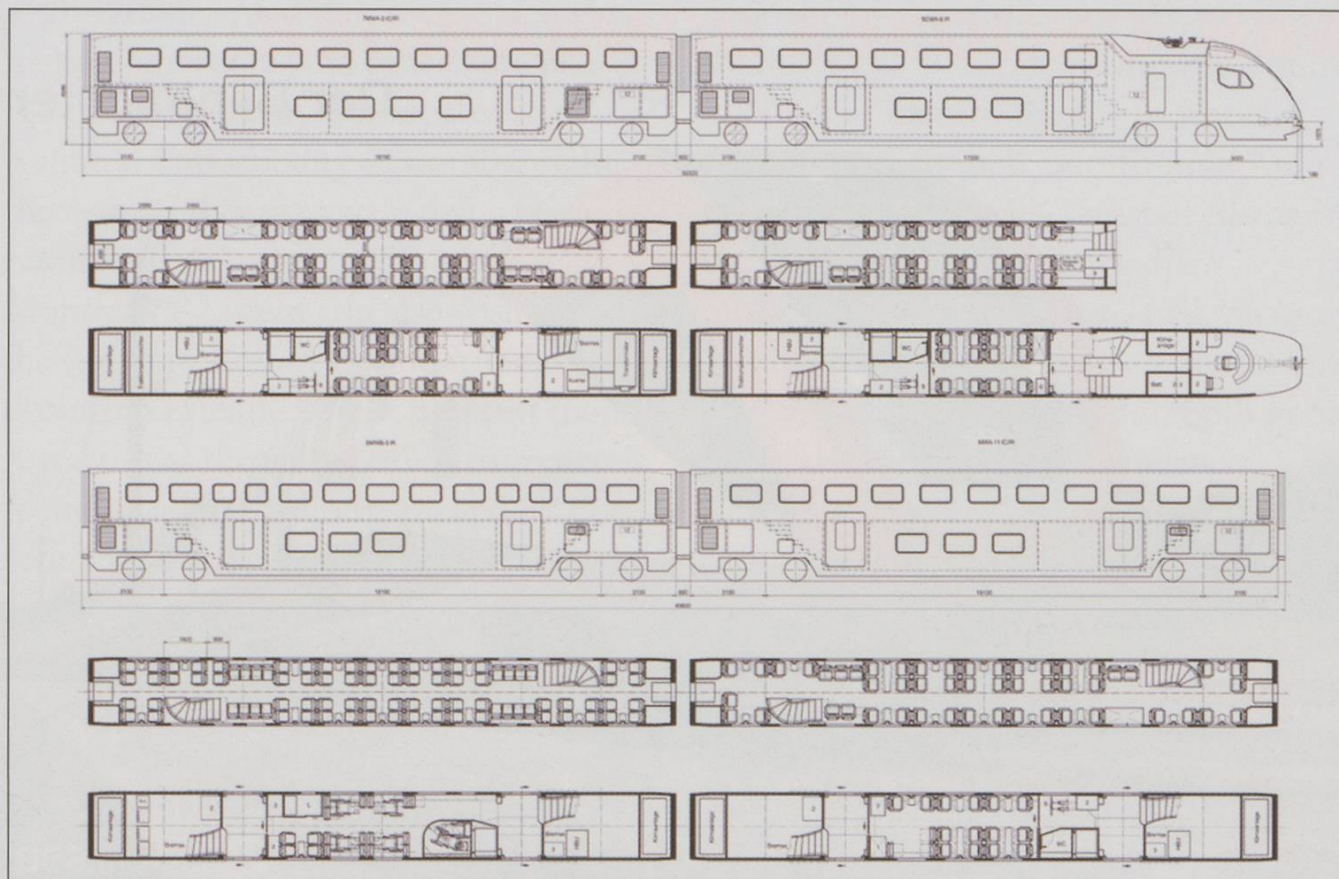
Images from SBB.

In April 2009 the SBB invited tenders for what would be its biggest-ever order of main-line passenger train stock – 59 double-deck EMU train sets, with an option for a further 53. The first 59 would comprise three versions; 20 8-car IC trains, 200m long with 621 seats including restaurant car; 30 8-car Inter-Regio sets, 200m long with 696 seats but no restaurant car; and 9 4-car trains, 100m long with 340 seats intended as strengthening units. The specification was very complex, but also left considerable scope for bidders to propose their own solutions to the various problem areas; the objective was clear – an increase in comfort and capacity on Inter-City and inter-regional journeys. These are the services on the main lines of SBB which have been so successful with the regular interval Taktfahrplan, and which also account for the success of the Half-Price Card, owned by 3m Swiss, and the GA Card of which some 400,000 are held.

This objective was clear, but the SBB also has some incompatible policies. Cutting journey times is not only commercially desirable, but also essential to make the

Taktfahrplan function everywhere reliably. The main difficulties with the hourly Takt are at Lausanne and St Gallen where several routes meet, and where journey times are too long to fit the concept. Apart from Zürich – Olten – Bern, this national backbone of SBB is still not suitable for 200 km/h running, Heavy track engineering is out, but as the route is sinuous with heavy gradients a tilt-train might help. However, the present trains at peak times are also reaching very un-Swiss levels of overcrowding, as shorter journey times, road congestion, and reduced fares are encouraging a greater volume of travel, with more and more long-distance commuters. Full tilting trains do not have room in the loading gauge for the double-deck capacity necessary to handle the crowds. Unit trains with high installed power can help with acceleration performance, but an effective compromise of capacity, acceleration, high-speed performance and ride quality was at the heart of the specification for 200 km/h maximum speed. Although double deck did not permit full tilt clearances, some deflection for high speed curvature was





expected. Finally, passengers are to be handled where possible without costly platform lengthening, though some extensions for 16-car trains will be planned. Much work is to be done on improving station access and passenger flow, as rising numbers are causing increased congestion. It is recognized that failing to improve passenger flow management can offset the investments made in shorter journey times.

The specification was unusually complex and very challenging, but on May 12th SBB announced that the first order for 59 trains would go to Bombardier. Siemens and Stadler, the other bidders, have made clear they will not submit protests but Stadler, who let their disappointment show, did not hesitate to stress that they are the Swiss bidder, and they questioned Bombardier's claim of energy efficiency. The Federal Council had however already endorsed SBB's decision. It appears that Stadler had the lowest price, however SBB have made clear that they decided on the basis of the best solution and the best value to customers within the offer. The Bombardier bid

included a claimed 7% energy reduction with newly developed motors; offered a higher standard of passenger accommodation with disproportionately more seats; accommodation for overhead and under seat baggage; greater leg and headroom; and bicycle space in each car (an important market in Switzerland). Door spacing has been optimized to permit rapid joining and alighting. The trains are to be fitted throughout with power points and will offer wi-fi Internet access. The design has larger toilet space; CCTV surveillance; plus electronic information and reservation systems. In practice few Swiss passengers make reservations, as the Taktfahrplan enables you to arrive at the station, get on and go; but the facility will be built in.

The order is worth CHF1.86 billion, a record in Swiss railway orders. The 2013 first delivery date is very tight. The design is new, but draws upon experience with the 500-class ICN tilting multiple-unit trains and the double-deck IC 2000 trains, built in large numbers and usually powered by 460-class locomotives. The new trains are EMUs with



installed power of 7.5 MW on the 200 m trains, distributed over 12 of the 32 axles, or 3.75 MW on the short trains.

The first routes to see the new stock in service will be St Gallen-Zürich-Bern-Lausanne-Genève, and Romanshorn-Zürich-Bern-Brig as both of these routes require shorter journey times. Some improvements in the infrastructure are possible, but higher speeds also require better performance in curves. The WAKO compensation of curving forces by limited tilt requires a 2° displacement from vertical, (normal tilt up to 8°), and allows between 10 and 15 km/h faster running through curves. SBB is satisfied that it can cut running times in the critical sections, St Gallen – Zürich and Bern – Lausanne, by 10%. Simulations for SBB in April, with a 500 class ICN, have confirmed these predictions.

Bombardier claims the system to be reliable and gentle, a necessary claim when the ailing Pendolini gave tilting trains a bad name, and even the exemplary 500-class has caused discomfort to some passengers. The installation cost of the system for the first order is about CHF100m. Infrastructure improvements to give the same time-saving advantages were estimated to cost over CHF1,000m. This is an interesting illustration of the need, in such high performance systems, to design trains and track as complementary parts of a single dynamic system although at the risk of causing complications in open access and with competing track users.

Although non-business preferences are legally excluded from tendering and decisions, Bombardier, based in Canada, has been at pains to make clear that some 60% of the contract cost will be spent in Switzerland for components and technical skills, with final assembly taking place in its plant at Villeneuve, near Vevey. Overall it seems clear that the experience of Bombardier, together with the success and popularity of the two train types it currently has in Swiss service

today, has created confidence in the concept chosen by SBB.

SBB has been caught out by its own success. The measure of this is that over the next two years, as part of an ongoing refurbishment programme, a further 300 Inter-City single-deck passenger coaches, many over 30 years old, are to be brought up to 200 km/h capability to assist with the need for more capacity on the network. The passenger facilities will be much improved with automatic doors, air conditioning, new seats, retention toilets (without which they cannot run on the new high speed lines), etc. The work is to be undertaken in-house at SBB's Olten and Bellinzona repair shops.

In addition to the massive Bombardier project, and the refurbishment programme that also involves refitting the DPZ Zürich S-Bahn units, SBB have ordered 24 new 337-seat double-deck trains from Stadler, at a cost of about CHF14 million each. This in fact was taking up an option, following 50 similar trains already ordered. They will initially run on Geneva-Lausanne and Zürich-Schaffhausen commuter services where overcrowding is already chronic. BLS has also ordered new stock following a 43% growth in passenger-km travelled over the last five years leaving them facing the need to take urgent action. Their order, also from Stadler, is for 28 double-deck commuter trains at a cost of CHF493m.

All this means that the two major Swiss operators will be receiving around 1,000 new passenger vehicles in the next 3 to 5 years, plus hundreds of refurbished ones (a number have been through the works already). Other Swiss operators are also investing heavily in new equipment. Compare this with the UK where the 2006 Government plan for 1,300 new vehicles for a far larger network (with an older age-profile fleet) has subsequently been dramatically scaled-down, and may well disappear altogether as funds are scraped together to bankroll the HS2 project.