Voralpen-Express's First Traverso EMU Presented

On 6 June 2018 at IBS Erlen Stadler and Schweizerische Südostbahn presented the latter's first new Traverso EMU destined for Voralpen-Express services. The event was attended by around 200 guests, from the rail industry and from political circles.

The first eight-car Traverso EMU, RABe 526 101/201 at IBS Erlen on 6 June 2018, heading towards the main hall prior to its public presentation.

Schweizerische Südostbahn AG (**SOB**) was founded in 2001 as a result of the merger of the Schweizerische Südostbahn and Bodensee-Toggenburg-Bahn. It operates services on a 123 km network situated in central-eastern Switzerland. Apart from local lines, its two longest routes are those between Romanshorn and Nesslau-Neu St. Johann (66 km) and Rapperswil and Arth-Goldau (38 km).

In 2017 SOB trains carried over 13.5 million passengers. The operator has a workforce of around 560. SOB's network includes one notable superlative, the Sitter viaduct, on the stretch of line between St. Gallen and Wattwil. Roughly 365 m long, at 99 m it is the highest railway viaduct in Switzerland.

In December 2013 SOB assumed independent responsibility for operating the hourly Voralpen-Express (**VAE**) between Luzern, Arth-Goldau and St. Gallen (125 km), which it had hitherto operated jointly with SBB. Services since then on this 1,435 mm gauge route have been provided using a mix of ten Class Re 446 and Re 456 electric locomotives topping and tailing rakes of seven carriages and five Class RBDe 561 Type NPZ (Nahverkehrs-Pendelzug - local shuttle service train) powered end cars, one at each end of a rake of six carriages. Most of this stock dates from the 1980s and some carriages are even older, so to replace it on 27 June 2016 SOB placed a 170 million CHF **order** with Stadler for 11 FLIRT EMUs, five four-car and six eight-car trains (see R 4/16, pp. 56 - 59).

During the presentation event Stadler CEO Peter Spuhler observed that his company has had a long **relationship** with SOB: *„When the founder of Stadler, Ernst Stadler, died unexpectedly in 1981 and Irma Stadler had to step in overnight as the new head of the company, it was far from easy for her or for the workforce. SOB was the first customer to place an order with Irma Stadler, for two driving trailers which were rebuilt from existing passenger carriages with baggage compartments. This went a long way to helping us overcome the difficult period after the death of Ernst Stadler."*

Since then the co-operation has continued. Soon after the turn of the millennium SOB placed an order with Stadler for a batch of 11 Class RABe 526 FLIRT EMUs, followed by 12 more of the same type, which entered service in 2013. There were also various examples of co-operation between both companies. For instance, SOB was involved in the production of several vehicles for Stadler. The two companies also jointly

Photo: David Gubler

SOB's Voralpen-Express crossing the Sitter viaduct near St. Gallen on 9 March 2014. The rake of six Revvivo carriages is topped and tailed by two Class RBDe 561 Type NPZ powered end cars.

Among those present at the Traverso presentation were, from left to right, CEO Thomas Küchler and COB Hans Altherr from SOB, CEO Thomas Alburg and COB Peter Spuhler from Stadler, and Rainer Maria Salzgeber, acting as moderator.

The first half of RABe 526 101/201, accompanied by a firework display during its „roll-in" to the IBS Erlen hall for the presentation celebrations.

tested new technologies for existing vehicles. More recently ABB, Stadler and SOB worked together on the prototype modernisation of one of SJ's Class X2 EMUs (see R 1/17, pp. 24 - 27).

The **four-car** FLIRTs are to be designated 94 85 7 526 001 to 94 85 7 526 005. They are 77,100 mm long, have a continuous power rating of 2,000 kW a Bo'2'2'2'Bo' axle arrangement. 175 second class seats (and eight tip-ups) are provided in second class and 22 in first class.

The **eight-car** FLIRTs, exclusively branded Traversos by SOB, will be designated 94 85 7 526 101/201 to 94 85 7 526 106/206. The brand name Traverso, used only for the eight-car EMUs, comes from the Italian verb „traversare" - „io traverso" means „I cross". When they enter service, the trains will cross northeast Switzerland. They are 150,200 mm long, have a continuous power rating of 4,000 kW and a Bo'2'2'2'Bo' + Bo'2'2'2'Bo' axle arrangement. This means that they are essentially two mirror-image four-car formations, each with identical traction

On 6 June 2018 Traverso RABe 526 102/202 being is subjected to testing at IBS Erlen. On the right can be seen part of one of the end cars of Giruno RABe 501 008.

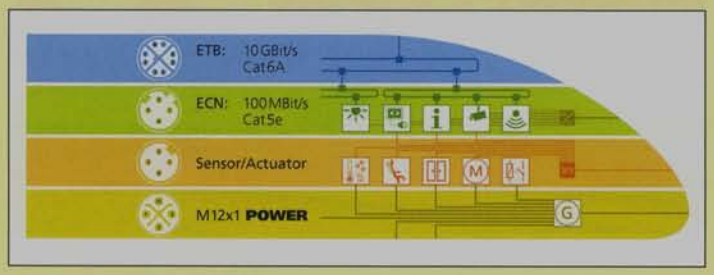
New Connectivity For The Rail Industry

The connectivity specialist ESCHA extends its rail approved product line by new components and displays these for the first time at InnoTrans between 18 and 21 September. In addition to the available rail-specific products for data transmission (ETB and ECN) and sensor/actuator-wiring, ESCHA is also showing overmolded M12x1-connection- and junction cables for power supply as well as sensor/actuator-connectors in M8x1-housing style for the first time. As it is the case with all ESCHA products with the rail approved seal, the new components meet the rail specific and relevant standards DIN EN 45545-2 and DIN EN 50155.

ESCHA connectors stand for industrial connectivity in highest IP-protection classes. The undisputed benefits of this technology can also be passed on to the rail sector. For more than four years, ESCHA has been providing a product range labeled „rail approved" consequently destined for the typical requirements of the rail industry combining the benefits of the dust- and waterproof connectivity with the high safety demands of the rail industry.

The Right Connectivity For Every Level

The current rail approved product line comprises connectivity solutions for three various wiring levels. For the Ethernet-Train-Backbone level (IEC 61375-3-4), ESCHA offers components with data transmission rates up to 10GBit/s (Cat6A). For the second level - the Ethernet Consist Network (ECN) according to IEC 61375-2-5 - components with data transmission rates up to 100Mbit/s (Cat5e)



are used. As to the sensor/actuator wiring on the third level, ESCHA already has M12x1-round connectors on offer. Relevant M8x1-connectors will be on display at InnoTrans.

Moreover, ESCHA is displaying new products for power supply on the fourth-wiring level at the InnoTrans. These are selected connection and junction cables with S-coding out of the „M12x1 POWER" product range. They have been adjusted to the high rail industry requirements and are particularly adapted for alternating current applications (AC applications up to 12 A/630 V).

Industry-Specific Add-On Services

In order to accommodate the individual rail industry requirements, ESCHA does not specify any standard cable lengths in case of rail approved items and supplies inch-perfect. In addition to kitting, labeling, and further services facilitating on-board installations, ESCHA offers, upon request, M12x1 grip bodies with thread. The thread allows a protective hose to be pulled over the cable. The protective hose protects the cable against damage by stone chip and pollution on train exteriors.

Visitors to stand 212 in hall 10.1 of the Berlin fairground can obtain information on these topics and the possibilities of customer-specific individual developments.

Traverso RABe 526 101/201 at IBS Erlen on 6 June 2018 at the presentation event.

equipment and configurations to those of the four-car EMUs, this simplifying maintenance of the whole fleet. They have 291 second class seats (and 25 tip-ups) and 68 first class seats.

Both types of train have aluminium bodyshells, are 2,820 mm wide and 4,120 mm high above rail top. They incorporate a new front end design, this being the new standard design for the FLIRT family. They are all single-voltage (15 kV AC 16.7 Hz) and have a top service speed of 160 km/h. Both four- and eight-car formations are fitted with two pantographs. **Traction equipment** is supplied by ABB, using latest generation BORDLINE CC1500 Compact Converters with water-cooled IGBT semiconductors. Roof-mounted Resibloc cast-resin dry type traction transformers (see R 1/18, p. 7) are installed. TSA is the supplier of the forced ventilated traction motors, which were specifically adapted to meet the requirements of the newly designed bogies.

The trains are equipped with a diagnostic system which sends real-time operating data to their service centres, allowing the latter to monitor performance and prepare for maintenance and any necessary repairs. Multiple operation is possible, with formations of up to three EMUs. Both front ends are fitted with Faiveley-Wabtec-Schwab automatic couplings. Semi-permanent couplings are used between the two four-car sections of the eight-car EMUs.

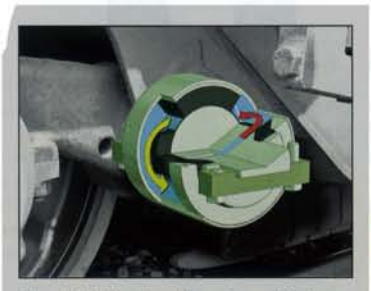
The **bogies** are equipped with pneumatic secondary suspension. Both powered and non-powered bogies have a 2,700 mm wheelbase, the powered wheels having a diameter of 870 mm when new, the non-powered ones 760 mm when new. The non-powered bogies are weight-optimised, being around 10 % lighter than earlier designs. The weight reduction was achieved using new aluminium housings for the secondary suspension.

The powered bogies are of a completely new design, with a reduced installation height, which allows to increase the height of the passenger compartment in the area above the motor bogies, and with a weight less than 11 t. The bogies include HALL (Hydraulisches Achslenkerlager) hydraulic axle guide bearings, produced by Freudenberg Schwab, and also fitted to the trailer bogies, resulting in lower rail wear and also generating less noise when running than do previous designs.

The EMUs are designed for compliance with TSI LOC & PAS, TSI Noise, TSI SRT, and TSI PRM, and are equipped only with on-board ETCS Baseline 3.4. No other ATPs (the older Swiss systems ZUB and Signum) are fitted. This is because since January 2018 the entire Swiss rail network is equipped with wayside ETCS (either Level 1 Limited Supervision or Level 2). Compared with earlier batches, SOB's latest FLIRTs also incorporate a new ethernet-based train control and communications system.

Since the Traversos are to be used on limited-stop services, each carriage has only one pair of double-leaf entrance doors, 1,300 mm wide, and with threshold height 600 mm above rail top, the low floor area extending over 85 % of the interior. The air conditioned **passenger accommodation** design was realised by the Zürich-based Nose studio, the objective being to provide different types of accommodation areas for passengers with diverse requirements. Various organisations representing handicapped travellers, including the Swiss umbrella organisation Inclusion Handicap, were contacted for their opinions, and over 100 suggestions were received.

There is a special zone designed to accommodate families with children,



The HALL hydraulic axle guide bearing was placed on the market in 2010 by Schwab Freudenberg. It consists of two fluid chambers interconnected by a hydraulic system. If the fluid exchange is impeded, the bearing stiffens and the longitudinal stiffness increases to a multiple of the static stiffness.

Image: Schwab Freudenberg

The driving console in one of the Traverso's end cars.

One of the powered bogies of RABe 526 101. These bogies are designed to facilitate easier removal, maintenance and repairs.

One of standard Jakobs bogies, between the sixth and seventh cars.

A second class open saloon. The use of glass for the partition walls and for the overhead luggage racks creates a feeling of spaciousness, and also enables an enhanced natural illumination of the interior.

The interior of one of the first class saloons. The seats here are mounted on the housings above the wheels, this meaning that a 1 + 1 configuration is necessary. In other parts of the saloon a 2 + 1 configuration is possible.

being fitted with 24 second class seats. The second class accommodation is arranged with the **seats** mostly in 2 + 2 bays, while in first class 2 + 1 bays are provided, and the floor is carpeted. The seat units are produced by Stadler's Altenrhein works, the first class seats having black upholstery and reclining mechanisms. The second class seats are upholstered in red. All seats are equipped with standard 230 V power sockets. The seat reservation indication system is fully digital. The glazing, supplied by Flachglas of Wernberg-Köblitz, Germany, ensures a good level of signal transmission and penetration for passengers using mobile phones.

There are stowage areas for skis and up to 12 bikes. Two bistro sections with vending machines are provided in each eight-car train for the sale of a limited range of refreshments. Each carriage has between four and seven information screens, providing real-time travel information. The Traversos have three WC cubicles, one of which is wheelchair-accessible, while in the four-car FLIRTs there is one WC cubicle, which is wheelchair-accessible. SOB chose to have its Traversos painted in a multi-hued copper **livery**, stating that copper would symbolise value and „the historical development of human society".

At the presentation event at IBS Erlen on 6 June the train involved was eight-car Traverso 526 101/201. This is now to be subjected to **testing** on several lines in Switzerland, between July 2018 and March 2019, and will also be an InnoTrans 2018 exhibit. It will then be put into test commercial operation, not only on VAE services, but also on St. Gallen suburban services, starting in the third quarter of 2018. The tests will include all the necessary tests to obtain full BAV authorisation. These will include braking, infotainment, running dynamics and derailment propensity.

SOB's eight-car and four-car FLIRTs are all being **built** simultaneously. At present all 11 trains are under construction, and are at different stages of completion, at Bussnang, with the goal of having all ready for service in time for the introduction of the 2020 timetable on 15 December 2019.

When SOB ordered its 11 Voralpen Express EMUs from Stadler on 27 June 2016, the agreement included the possibility of **options**. One was taken up in December 2017, for 11 more eight-car FLIRT EMUs for services over the Gotthard-Panoramastrecke (the original main line) between Zürich/Basel and Locarno/Lugano. A third batch of FLIRTs is to be ordered for SOB's future long distance service linking Bern, Zürich and Chur (see following article for more details).

Jan Dvořák, using Stadler sources

Photos unless cited, Jürg D. Lüthard

The bistro areas are situated adjacent to the entrance vestibules and are fitted with vending machines, offering a limited range of refreshments.

Final assembly of the third Traverso at Bussnang on 15 June 2018.

One of the multi-purpose areas, situated adjacent to an entrance vestibule (left), and a similar area, together with a standard-sized WC cubicle (right).