

are fitted with automatic couplings. In this case, uncoupling is possible from the driver's cab at the touch of a button, and switching between the two operating modes is effected pneumatically.

Finally, there are also some transition cars with the new automatic coupling on one side and the conventional screw coupling on the other. They mainly serve as a reserve in case no locomotive with hybrid coupling system is available.

Coupling occurs automatically when the vehicles drive together; only a single hand movement is required to separate the wagons. The coupling process is purely mechanical. Electrical connections, common with passenger trains, do not exist; if necessary, they can be retrofitted at a later date. SBB Cargo says it has deliberately opted for a step-by-step

approach. It remains to be seen whether the unheated Scharfenberg couplers will function reliably even in harsh winter conditions.

The operational test now launched concerns a longstanding fast overnight connection network of combined domestic transport running between the trans-shipment terminals in Dietikon, Oensingen, Renens, Cadenazzo, Lugano-Veduggio and Stabio. The wagon groups loaded with swap bodies, containers and semi-trailers join each other at the hub in Dottikon (on the Lenzburg – Rotkreuz SBB line) and are re-assembled there, which results in quick connections between all terminals.

Already the very first week after the introduction of automatic couplers, transport operations were stable, said Jasmin Bigdon, SBB Cargo's Head of Asset Management, at the media event at the Limmattal marshalling

yard on 14 May. She also announced that approximately 200 employees had been trained in advance for operations with automatic coupling.

No mention was made at the media event of the considerable restrictions on train formation that had to be imposed for safety reasons: Because the diameter of the main brake pipe is smaller than with the conventional coupling, the hauled load is limited to 1200 tons. On the Ceneri mountain route, which has to be used to serve Lugano-Veduggio and Stabio, only 500 tons can be transported due to the steep gradient.

Automatic brake test

SBB Cargo's explicit aim is to increasingly handle the delivery and pick-up of the wagons, known as the "last mile", in one-man operation. Indeed this is already possible today and is also practiced, yet the circumstances frequently necessitate the use of a second or even third staff member, since it simply takes too long for one person to handle all the tasks alone considering the distances covered on foot and the many manual processes.

On the way towards partial automation, SBB Cargo is thus focusing on two other important components besides the automatic coupling: the automatic brake test and a collision warning system. Jointly, these three elements are designed to enable the large-scale introduction of one-man operation. SBB Cargo states that all new systems operate reliably even in difficult climatic conditions, as tests in the climate chamber have demonstrated.

All wagons that have received automatic couplings for the operational test are also fitted with a system for the automatic implementation of the brake test. In principle the locomotive driver can perform the entire process from the driver's cab via his tablet computer; it is only in the event of an irregularity that he has to be present on site.

Sensors mounted to the wagon measure the pressure in the brake cylinder and brake rigging. Communication between the wagon and the end user device functions via mobile radio. Wheel hub generators are installed on the wagon as a power source. The storage batteries should still provide sufficient power even when a wagon is standing idle once over a period of several weeks.

The system has been undergoing testing since the summer of 2017, and SBB Cargo is aiming for a comprehensive approval in mid-2020. The time required for the brake test on a 500-metre-long train is then expected to be cut from between 30 and 40 to just 10 minutes. Nicolas Perrin is convinced that such a time saving could be crucial, especially on the short traffic distances in Switzerland. However, even if this step succeeds, an employee will still have to walk the length of the train and check the condition of the wagons and their load. For the time being at least, it is not possible to automate this technical inspection nor to produce the brake calculation. The correct brake position (P or G) is not part of the automatic brake test either. According to SBB Cargo, no wagons fitted with a load-dependent braking system are deployed for the operational test.

Collision warning system

For the third automation component, the collision warning system, the traction unit is

Lightweight freight wagons with a reduced service life

In January 2017 SBB Cargo presented a collection of ideas for the continued development of container wagons under the title "5L-Train – Freight Wagon of the Future". An innovative carrier wagon with a modular lightweight structure in a truss design is the result, which has been worked on in cooperation with German industrial group Hörmann, itself experienced in the manufacture of road vehicles. Here the sole bars are partially welded and partially riveted. At the media meeting at the Limmattal marshalling yard, SBB Cargo representatives said that it is very easy to manufacture wagons of various lengths. What appears to be some-

what revolutionary is the approach of using "disposable components", which are not revised beyond the vehicle's intended service life of only 20 years (!) or at most once. The project's promoters are convinced that this concept is better suited to technical progress than today's design, intended to last 40 years or more. The fact that the wagons have to be depreciated over half the period of time by halving their service life has allegedly been taken into account. Emphasis was placed on the fact that when developing all components, co-operation between at least two manufacturers ensures the best possible solution. (mr)



At the Transport Logistic 2019 trade fair in Munich in early June, SBB Cargo showcased a Sgnss freight wagon with a riveted and bolted rather than welded middle segment and radially adjustable wheelsets. The tare weight of the wagon is 15.6 t, according to its markings. The company is working together with VTG and Hupac on this project (photos: J. Lüthard).

