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# Swiss Steam Adventure -

## To the Clouds by Steam: Part 1

Paul Russenberger

H2/3 No 15 'Stadt Kanaya' ready for departure at Brienz with old and new coaches. Kanaya was twinned with Brienz in 1996.

The opportunity to experience steam on the Brienzer Rothorn Bahn, advertised in *Swiss Express* in June 2013, was too good to miss. This led to my being met at Brienz station on a rainy September morning by Michael Ellis, who was to show me round and accompany me on a return footplate journey to the summit of the Brienzer Rothorn. He told me something of the history of the BRB as we walked beyond the station platform to the shed.

Opened in June 1882, the line closed during the First World War because of the severe loss of tourist traffic and did

not reopen until 1930. Although it had been 'mothballed' much work was needed to make it operational. Electrification, which had taken Switzerland by storm on the SBB since 1920, was not an option on the grounds of cost, so the improvement in motive power was limited to a new generation of steam locomotives. The next additions to the fleet came in 1975 when, wanting to gain some degree of modernity, the railway purchased three diesel locomotives from Ferdinand Steck of Bowil. However, it soon became apparent that a significant attraction of the railway lay in its steam locomotives. This led to further construction by SLM, taking advantage of the development work done by Roger Waller. The railway is now fully committed to steam.

Apart from carriage sidings, the depot can accommodate all the locomotives under cover. It has a machine shop and carries out all repairs except those to boilers. A traverser gives access to numerous short roads each capable of taking one locomotive. Much of the floor is flat without pits.

The depot interior, showing the flat surface suitable for evening receptions. The locos left to right are Nos. 5, 6, 2 & 12.



This enables the building to be used for drinks receptions among the engines and has led to the provision of appropriate toilet facilities and a bar! Naturally, an SRS calendar hangs in the workshop.

The new steam locomotives are oil-fired and fitted with well-insulated, welded boilers. These features give them an advantage over their earlier forebears and, as will become apparent, make them fully the equal of the diesels on a mountain railway. The welded boiler can withstand the injection of steam to enable it to be brought quickly to working pressure provided it is already warm; the fire can be fully lit up immediately without the need to build up a coal fire and the locomotive available in 14-minutes\*. This enables the BRB to respond to rapidly fluctuating passenger demand. While pre-booked groups are welcomed as they have paid and will come regardless of the weather, half the traffic is Swiss residents who may travel on the spur of the moment. A sudden improvement in the weather can require additional trains to be provided with barely a few hours' warning.

Being mountain locomotives their drive is to the rack rail, the running wheels being solely for weight carrying and guidance. The connecting rods drive a layshaft through a reduction gear. Coupling rods are attached to the ends of the layshaft and drive both the rack wheels, which are mounted on hollow axles. However, the rack rail is higher than the running rail, so the running wheels are mounted on axles that pass through the hollow axles and rotate freely and independently of the rack axles.

Drivers begin their training on the diesel locomotives, moving-on to coal fired ones as firemen before driving oil fired ones and eventually graduating to drive coal fired locomotives. They are limited to making three return journeys per day because of the effect of both the change in altitude (the BRB has the greatest height difference of any Swiss mountain railway) and the vibration of the locomotives.

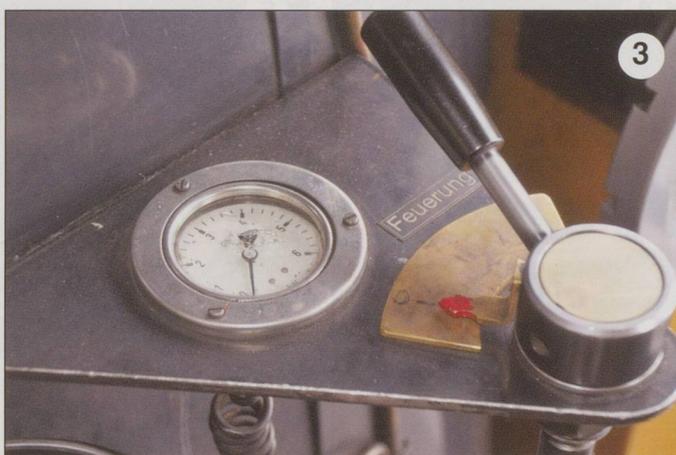
Another feature of the BRB is the age of the track itself. Although the line was closed for a lengthy period, most of the track is the original of 120 years ago. One of the difficulties is temperature changes in the Alpine environment; the resulting expansion and contraction

1. Unusually the traverser runs on rails flush with the floor while the stabling tracks are slightly elevated.

2. Driver's gauges showing left to right: Boiler steam temperature, Boiler pressure, Steam chest pressure, Feed water temperature.

3. The control for the oil feed. Simply moving the lever adjusts the flow rate and therefore the size of the flame.

4. Both water gauges are mounted on the right hand side of the boiler, clearly visible to the driver.





of the rails, can make the track move sideways by up to 10 cm. The earlier sleepers have the ends turned down to prevent this movement, but the ballast has to be packed under them to prevent a bridge being created, which will sag under the weight of a train. A project is now in hand to replace it with new track having metal sleepers in the form of a series of 'Y's. These are laid directly on the ballast and naturally give the necessary lateral stability without the need to pack or lay further ballast. However, this is subject to the money becoming available – replacement track costs CHF1000 per metre.

On the more exposed section above Planalp, it is a battle with nature to keep the line open and maintained in good condition. During the winter of 2011/12 the sheer weight of snow caused the line to be shifted about 50 cm at one location, breaking a section of track which is now on display on the platform at Brienz, and requiring the formation to be rebuilt. That was extreme, but 60,000 cubic metres of snow have to be removed each year before the line can be reopened. The timing of this is critical – too early and there may be further falls or avalanches, too late and there may not be sufficient time to carry out any repairs before reopening. A snow clearing plough similar to those used on skiing pistes is used, but it is brought up by helicopter and has to be secured to the ground and winched backwards and forwards as the hillside is too steep for it to work safely on its own.

Fortunately, the use of steam traction avoids the need for overhead line as this would also be susceptible to damage in winter.

Having seen the depot and discussed the issues of keeping the railway in operation, it is time for a quick walk back to the station through the rain, which doesn't seem so important today, where No.16 is standing on the lead train ready for departure ...

*\*A similar procedure was experimented with, by the LNER at March in 1947. Apparently the noise vibration set up by the hot water reaching cold parts of a boiler was quite alarming. ☠*

To be continued in Part 2.

1. Driver's view of the water gauges.
2. Mechanical lubricators supply the cylinders and steam chests taking their drive from the valve gear.
3. The piston rod, crosshead and valve gear of No.12.
4. The replacement sleepers on display at Brienz.
5. The advantages of oil-firing – the smokebox of No.12 immediately on arrival in the depot, completely free of the ash arising from coal-firing. The superheater elements can be seen behind the blastpipe and petticoat. Note how the superheated steam is passed directly to the steam chests without returning to a superheater header.
6. Track detail showing the original rail still in use.
7. Not really a works plate, but it conveys the necessary information.

All photos: Paul Russenberger

