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# BRIENZ ROTHORN BAHN

A Swiss Heritage Railway goes searching for old skills

Michael Ellis



Loco N°7's boiler seen here following removal from the frames in 2014. The structure was sandblasted and the smokebox removed prior to shipment.

All photos: Michael Ellis

I'm sure that readers of *Swiss Express* require very little introduction to the Brienz Rothorn Bahn (BRB). So, with that assumption confidently behind me I'll get directly to business and elaborate on the subject of my title. The BRB like all heritage railways maintains an ever ageing fleet of rolling stock. Thanks to the over-engineering principles of the Victorian and Edwardian eras, this maintenance philosophy is often still a viable option to pursue without compromising today's safety and business cases. However it's not always that simple; modern engineering, experience, testing and insurance no longer sit comfortably with methodology from the 1800s. In short, we are highly dependent upon skills, knowledge and experience, which is disappearing at an ever increasing rate, and it's a real problem!

The BRB's loco H2/3 No.7 has been out of traffic for a long time; a major overhaul was due some 10-years ago and boiler problems were known to exist. The BRB are able to handle most overhauls themselves, but major boiler work is one item well outside our abilities. Searches throughout Switzerland, once a world leader in such engineering, reveals that today not one single company exists that will undertake this type of work. A company in Germany would supply an all-new welded boiler but would not work on an 85 year old component. As a heritage railway with interest to maintain its assets as near to original as possible, a new design boiler was not a solution that Daniel Schlosser, our Technical Operations Manager, wanted to consider. There were therefore no options open when the predicament came to my hearing in 2013. Being a 'Brit' with interest and knowledge of the UK railway heritage scene, I naturally suggested we enquire within the UK to ascertain whether or not any

company would be prepared to undertake such a project for a 'foreign' railway. Following a fact-finding tour in early 2014 we decided to engage the London & North Western Railway Heritage Company (L&NWRH) in Crewe. This company exhibited a competence and engagement that gave us confidence to move in this completely new direction regarding boiler work for our locomotives.

L&NWRH despatched Works Manager Steven Latham and Richard Watkins, his 'encyclopaedic' Boilersmith, to Brienz. The visit enabled them to undertake ultrasound tests and initially assess the boiler in order to advise us of what hidden horrors existed beneath the surface. This visit concluded with a meeting to which the Swiss Boiler Inspector was also invited, as his OK to the project was paramount.

For the technically minded the work was to include: removal of the 'new' welded firebox installed in the 70's; removal and replacement of all boiler tubes; replacement of the steam pipe; renovation of the foundation ring; replacement of the inner firebox with a new copper (riveted) firebox as per original design circa 1932; new front tube plate and sundry other work. All in all a major rebuild to an old component. Would the Swiss Inspector, accept the plan? Richard and Steven were maybe a little too confident. Daniel and Mike were maybe a little too nervous and one poor translation between the English and Swiss German could screw it all up... Towards the end of the meeting Herr Kehrli, the Inspector, turned to me as the meeting translator. He clarified: We wanted to take an 85 year old boiler to England, dismantle it, replace and rebuild 60% of the construction, and, that with riveted not welded joints! And, to a design from 1932...? Were we serious? As calmly as I could, I said

'Yes, Crewe have done this as routine, since the 1800s'. 'OK', he said, it was a great idea – we had his support and approval !!!

Since that meeting much has happened. The boiler was shipped to Crewe in December 2014 and then dismantled for our visit in February 2015. This next meeting was to understand what had been discovered and what would have to be done, in detail. Following agreements at this meeting, copper was ordered and the boiler was prepared for rebuilding. One clause we included in the contract was for a 'hands-on' participation at some point in the rebuilding phase. This was duly planned for August 2015 and was to be a special activity for the BRB Team to gain a better understanding of boiler work. Richard and I set up the 'surprise' work experience, which resulted in Daniel, Bruno and Kurt (and me) getting the chance to hammer out the front and rear walls for the inner firebox. Believe me, bending 13mm copper plate takes some doing but the result is immensely satisfying, although it's too hot to touch for hours afterwards! During Autumn 2015 the inner firebox had been completed; the foundation ring re-installed; steam pipe renewed; tube plate replaced; boiler tubes renewed; stays, plum-stays, crown-stays renewed; all fitting mountings re-threaded, and, and, and... It may be a small boiler in railway engineering terms but it has just as many components as a large one.

The plan is to have Loco No.7 back in traffic during 2016. It's a tight schedule and was dependant upon the boiler returning by February 2016. L&NWRH responded in style and during the Christmas period brought the work to a close. The cold hydraulic test was made and passed on the 18th January and on the 21st the BRB team returned to Crewe to witness the steam test. With the boiler held to the smokebox with two temporary bolts, and the whole sitting on an old trolley, it only required 4 of old GWR signal post to serve as a chimney and get a good fire going. Three hours later the first valve lifted and the job was done! From the perspective of one involved in the centre of all communications and decisions between Brienz and Crewe, it has been a well-delivered contract. It looks as though we will be on budget, on time and with a quality of work that reflects the immense amount of experience and engagement that the team at L&NWRH brought to the project. The documented project and experience gained will also enable the BRB to provide future consulting support to other similar projects within Switzerland, whilst future BRB projects are already planned. My personal thanks go to all concerned, whether mentioned or not, for assistance during the project and for information used in this article. For further information on the project email [Michael.ellis@brb.ch](mailto:Michael.ellis@brb.ch)

*It will be a very special event when Loco No.7 re-enters service and it will be reported in a follow-up article. 🇨🇭*



**TOP:** A great view taken inside the boiler. Here we see that the tubes have been cut away leaving only the ends to remove. The inner firebox construction (not original) is held in position at the top by the anchor brackets which allow for expansion movement. The steam pipe mentioned in the main text is the tube positioned top right. This connects the steam cavity in the dome to the regulator.

**MIDDLE:** Steven Latham from L&NWRH is seen here conducting the ultra sonic measurement of the outer firebox wall thickness. In places 85 years use had resulted in 0.7 mm erosion of 13 mm thick steel plate, still well within acceptable limits. L – R Richard Watkins, Steven Latham, Mike Ellis.

**BOTTOM:** Looking like an artefact from the next Mad Max movie the boiler of N°7 reaches test pressure. The lighter platework clearly shows the outer work undertaken by L&NWRH.