THE NORTH STAR CHRONICLES ***– a newsletter primarily for the model railway fraternity***

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Editorial

As has been stated in previous North Star Chronicles, railway modelling is a wide church. That is one of its prime attractions. This month the feature article is (another) narrow, most unusual gauge (3’9”) railway but one very different from the traditional view thereof. The gradient is 1:1.75 (58%!) and the motive power is water! Another distinguishing feature of the railway is that after being in existence for 125 years the company which operates the line is still privately owned.

Lynton & Lynmouth Cliff Railway

The funicular railway joins the two Devon villages of Lynton, formerly the western terminus of the Lynton and Barnstaple Railway, (refer NSC volume 3 no 2 February 2015) and Lynmouth which is located on the coast some 500 feet below.

Brief history of the railway

Prior to the building of the Cliff Railway and subsequently the road, the two villages were supplied by sea. Coal, lime and food came into Lynmouth and were then transported to Lynton and hinterland (Exmoor) by pack horse or in horse drawn carts. The tourism potential of this area of Devon began to be recognized and prior to the building of the L&BR was served by horse drawn coaches. The problem was the severe incline associated with transporting tourists to the coast from Lynton. The scheme evolved to overcome the problem was the Lynton & Lynmouth Cliff Railway. Backed by Sir George Newnes who was also prominent in the promotion of the L&BR and designed by George Marks (a 'disciple' of Isambard Kingdom Brunel?) the line operates under an Act of Parliament passed in 1888. A further Act of Parliament gave the company perpetual rights to water from the Lyn river.

Building commenced in 1887 and the line (rails length 862 feet) opened less than 3 years later in April 1890, no mean feat as the excavation was dug out mainly by hand. The company has operated with an unblemished safety record ever since.

How the railway operates

The 'driving force' as is the case with the cliff railway in Scarborough built in 1875, is water. The two cars are identical in weight but use water to raise and lower them. The water is drawn from the Lyn river more than a mile away and supplied to storage reservoirs via a 5" pipe. Each car has a 700 gallon tank mounted between the wheels plus a 10 gallon tank to operate the braking system of which more later.

The bottom car releases sufficient water (onto the beach – hence the apt description as a total loss system – the only one in the UK) so that the now heavier top car descends pulling the bottom car up. The cars are connected via 4 cables (two hauling and two tail balance cables which counter the weight of

the hauling cables as the car descends and there are 5’6” pulleys top and bottom of the cliff around which the cables rotate.

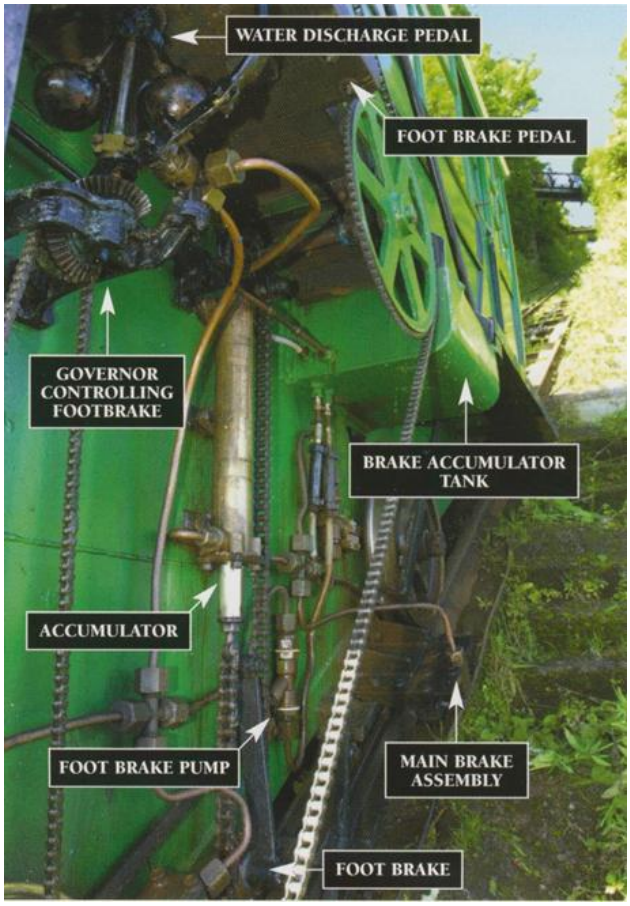
View of rails, cables, cable pulley, two types of brakes and water tank

The braking system

The system used, patented in 1888, explains the operation’s unblemished safety record. In fact there are two braking systems incorporating 4 sets of brakes. The first involves water driven pistons pressing “shoes” down on the top of the rail (refer photo above).The second also water piston driven have calipers which grab the sides of the rail (also visible in above photo). These brakes are permanently ‘on’ that is until the driver releases them by winding a wheel on the driver’s platform held closed with 120 lbs of lead weight. So the system operates and was indeed the forerunner of the ‘deadman’s handle’. Should at any time the driver release the wheel the weights return it to the closed position and within a second the brakes automatically clamp to the rails.

Driver, winding wheel/dead man's handle

View of the braking system from below. Photo courtesy Lynton and Lynmouth Cliff Railway



'Passing loop' just visible on far side of bridge

The View from the bottom

Not just people! 'Passing loop' visible under the bridge

The photo, courtesy Lynton and Lynmouth Cliff Railway, was taken circa 1900 when the railway was used to transport cars between the two villages. After the disastrous floods in 1952 when 31 people died and the road was severely damaged, the railway was again used for this purpose.

Carriage refurbishment (source company website - http://www.cliffrailwaylynton.co.uk/carriage-refurbisment/)

The winter of 2011-12 saw the start of an extensive refurbishment of the Cliff Railway carriages undertaken by Watts's Design of Bratton Flemming. It was a major task not only to rebuild but also to source the materials required, as the cars were originally constructed with pitch pine not readily available today. The first one to be refurbished was the North carriage. On arrival at Watts design workshops the car was unloaded from the trailer and positioned outside the entrance to the workshops so that a purpose made marquee could be erected to completely cover the carriage.

The fibreglass roof was removed first to reveal the original slatted roof timbers, (until 1973 these were covered with canvas tensioned to make a waterproof cover). Some deterioration was found in a small number of the timbers, which had to be removed and replaced. Next the windows and the ply sides of the carriage were removed which revealed all sorts of problems. In particular the deterioration of some of the timbers was far worse than anticipated. Detailed repairs were necessary cutting timbers back and scarfing in new pieces, some of which were very small.

Many painstaking hours were spent preserving the interior of the carriage most of which is original. Most of the exterior parts of the timber window frames were replaced, care being taken not to damage the interior woodwork. The tension wires that help to hold the carriage timber car case and joints from distorting run the full length on each side of the cars were replaced using new stainless steel wires and turnbuckles as the old steel assemblies were in poor condition.

Two new doors were made for the front and rear of each carriage, as the old ones had seen many years of use. All the windows were fitted with laminated safety glass, some of which

had to be specially made due to their shape. All of the bolts securing the carriage to its steel frame were checked and replaced as required with stainless steel. These frames retain the leaf springs on which the carriages both sit, replaced only a few years ago in anticipation of the refurbishment.
With most of the hidden work completed the carriage could start being reconstructed. New certified ply sides were fitted and the roof could be fibreglassed.
All new mouldings were formed ready to be fitted after all bare wood had been primed. A new breathable paint was used to help preserve the woodwork by allowing it to breath. This required many coats of paint to build up a protective layer against the elements.
The refurbishment of the south carriage was very much the same as the North. Some timbers were affected in slightly different places, but in the main the same work had to be carried out. Both cars are now in tip top condition.

Institute of Mechanical Engineers award

In September last year the IMecE recognized the Cliff Railway with an Engineering Heritage Award. Refer photo below of current engineer Ashley Clarke, holding the plaque. Photo courtesy L&LCR.

The plaque reads:

"The oldest total loss water powered funicular railway in the UK. Designed by George Marks, it has been in operation since 1890. Using the potential energy of water from the West Lyn River and incorporating innovations such as a Dead Man's handle and fail-safe braking, the railway is an integral part of the local economy."

Modelling opportunities

A search of the net revealed only one model of the cliff railway – built by schoolchildren as a science project. I find this strange as the prototype is an unusual and interesting one to replicate in miniature. Granted it would involve a lot of scratchbuilding but what a fascinating subject for an exhibition! With the 13th National Model Railway Convention taking place in September who is going to take on the challenge?!?

Next month's North Star Chronicles will be late as I will be away until the second week in May.