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Festiniog Railway Disc Signal Kit for 009

The Festiniog Railway had an unusual signalling system, part of which was the use of these unusual disc signals. Unfortunately it's difficult to locate any definitive details of the system - even J.I.C. Boyd's history of the F.R. states "It has proved extraordinarily difficult to record the signalling with exactitude..." although he does provide signalling diagrams and a reasonably full explanation of how the system worked. I'd recommend his book as a starting point for anyone looking for the information to use these kits to model an FR-style signalling system. Those builders lucky enough to have a copy of the F.R. Heritage Group's Spooner Album and a decent magnifying glass can spend a happy hour or so searching for disc signals in Bleasdale's excellent 1887 views of the line. The disc signals were supplied and presumably installed by Brown Marshall of Birmingham, the same company which built the early FR coaching stock. I am not certain whether they built the signals themselves or merely supplied them - Boyd seems to suggest they may have been produced by McKenzie and Holland. The only intact example which I'm aware of is that standing outside the Old Locomotive Shed at Boston Lodge - I believe there are others, either without their discs or existing just as broken-off posts. Early in 2010 a pair of incomplete signals were recovered from the lineside and moved to Boston Lodge Works for restoration by the Festiniog Railway Heritage Group.

Useful Tools

- Pin chuck
- Drills: 0.3mm, 0.7mm, 1.6mm (and preferably 4.0mm)
- Jeweller's broaches (preferable but not essential)
- Fibreglass brush and/or fine emery paper
- Soldering iron, solder and flux (it's perfectly possible to assemble with superglue but I'd recommend soldering as a neater and stronger job)
- Needle files
- Small engineer's square
- Small pair of needle nosed pliers
- Razor saw

Preparation

Before starting, I should point out that the success or otherwise of your signal kit will depend largely on whether it is assembled squarely and vertically. Any variation in angle is very noticeable in this kit so it's worth taking time to ensure this is correct. I would suggest that you make a simple assembly jig before starting, which can be a block of wood (MDF is ideal) with one 1.6mm hole and one 4.0mm hole drilled in it as squarely as possible. The thicker the wood, the better - mine is a small block of 12mm MDF. This will allow you to clamp parts securely and check for square and alignment at leisure during assembly, rather than trying to hold things square by hand and hoping it's alright.

Base, post and platform assembly

Carefully remove the base, ladder and platform etch from the fret, ensuring that the ladder is not twisted. Treat the ladder with **great** care - the etching produces rungs and sides which are about 0.3mm square, and squeezing these with pliers can easily distort the ladder and lead to alignment problems.

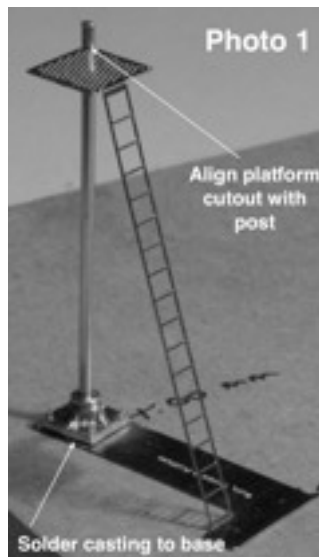
Remove the platform bracket assembly from the fret and fold the two sides up to 90°. Check the square carefully before proceeding and run a fillet of solder into the fold. The lower part of this will eventually be cut away just to leave the delicate brackets.

Turn up the small fillet on the side of the base and run a solder fillet into the fold. This will ensure that the base casting is located at 90° to the ladder/platform assembly.

Open out the large hole in the base etch until the base casting is a smooth fit in the hole. This can be done with a large reamer, but careful use of a round file will suffice. Clamp the base onto your jig (you did make a jig, didn't you?) over the 4.0mm hole and insert the base casting. The jig will ensure that the base is vertical. Solder or glue the base casting into the base (see Photo 1).

Test fit the post by folding the ladder up to an angle of around 60°, fold the platform to the horizontal and then place the tubing in the base casting after threading the platform bracket assembly onto the

post. It's wise to keep the bracket assembly out of the way at this stage by attaching it to the base with Blu-tak or something similar.



Invert the signal and insert the **top** of the signal post into the 1.6mm hole in the jig until the perforated platform rests on the jig surface. Adjust the ladder and platform until the platform meets the inside of the quarter-round cutout in the corner of the platform. You should now have an inverted signal with the platform and base at 90° to the vertical post. Thread the bracket assembly which you folded up earlier onto the post with the edges of the brackets aligned to the edges of the platform (see Photo 2). Check with a square and when all looks OK, solder the inside of the quarter-round recess in the platform to the tube and solder the end of the tube to the base casting at the bottom of the plug which will fit into the baseboard. Cut and file to bottom end of the tube flush with the plug.

Clean up the edges of the brackets and lightly tin them with solder

ensuring that you don't get any in the bracket detail. Solder the top face of the bracket to the bottom of the platform and the side to the post, ensuring that it is aligned with the platform edge. Once the brackets are firmly located, cut away the disposable holding section, i.e. the square base of the assembly and the two quarter circles on either brackets. This is best done by snipping away the ring surrounding the post with side cutters - you can encourage it with a cutting disc in a mini-drill but be careful not to damage the post. Once this is free, cut through the three tiny connectors on each side, working from one end to the other.



The 1.5mm brass bearing represents the boss on the top of the post and will take the ends of

the two handrails. The post tube is 1.56mm while the bearing is actually 1.50mm, so open up the bearing with a reamer or round file until it's a smooth fit on the tube. Using a razor saw, cut two slots across the flange of the bearing at 90° to each other - these will take the ends of the handrails.

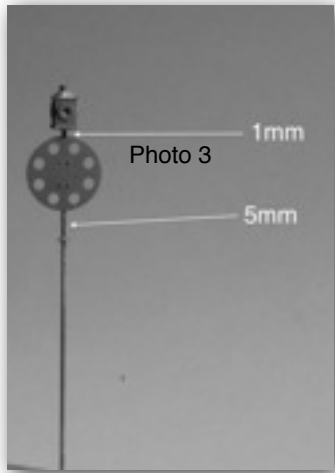
Thread the bearing onto the post tubing, with the flange at the top and slide it down to the platform. Align the slots which you cut in the flange with the two edges of the platform which meet the post and solder in place. Cut off the excess tube and file flush with the bearing flange.

Handrails

The handrails are possibly the most awkward part of the kit, in that each is bent to curve around the bottom of the disc and one bends in three planes. Drill the two tiny handrails holes in the corners of the platform out to 0.30mm and bend up the two rails after studying the drawing and handrail diagram below. The other ends are fixed in the slots cut in the flange of the 1.5mm bush on the post. Fixing in place is best achieved with a supporting piece of card fixed with Blu-tak or similar.

Disc/board and operating rod

Assembly is the same in the following sections whether you are using the signal disc or the rectangular tunnel board - i.e. where I say "disc" assume that you can do the same with the board. Remove the disc from the fret and clean up the back with a fibreglass brush, making sure that you clean into the half-etched line on the back. Tidy up the ends of the 0.7mm wire to ensure there are no burrs. Tin a length of about 10.0mm with solder, spaced about 10.0mm from one end of the wire. This will be the operating rod which holds the disc. Lay the wire onto the back of the signal disc and run a small fillet of solder along the rod to attach the disc. The best way is to just tin the rod and make sure the disc is 100% clean and has plenty of flux in the half-etched line - just heating the two together will give a nice clean joint. Cut a tiny slice - about 1.0mm is OK - of the 1.5mm post tubing and clean up the ends to make a thick washer. Thread it onto the long section of the operating rod and measure 5.0mm from the bottom of the disc. Solder the washer on at this location, i.e. there should be 5.0mm between the **bottom** of the disc and the **bottom** of the washer (see Photo 3).



Clean up the lamp casting and drill a 0.7mm hole in the bottom of the lamp, taking care to ensure that it is square to the base of the lamp. Fit the lamp to the top of the operating rod and check the distance between the base of the lamp and the top of the disc (which will obviously vary dependent on how deep you've drilled the hole). Keep trimming the rod carefully until this distance is 1.0mm. Attach the lamp, with the side square to the face of the disc - a drop of superglue is fine if you don't want to solder. The lamp had red lenses ("danger") on the sides in line with

the disc, and colourless ("proceed") on the other two sides. On the prototype, the disc is held to the rod with two clamps and these are represented by two very small etched clamps in the kit. The "correct" way to represent these is to drill the four half-etched holes in the disc to 0.3mm and bend up a couple of lengths of 0.3mm wire into "U" shapes, with the arms of the U about 1.0mm apart. Thread one of these through each pair of holes in the disc from the **front** and slide a tiny clamp onto each pair on the **back** of the disc. Solder the clamp in place and cut back the wire on front and back to about 0.5mm long to represent the ends of a bolt. The "cheat" (and a far easier way) is to discard the clamp and thread the wires from the back with the "U" wrapping around the rod to represent the clamp. Solder in place, and trim off at the front to about 0.5mm.

Tunnel Board Version

The Moelwyn Tunnel signals were different in two respects - the head of the signal was a rectangular board and the height of the platform was lower to accommodate the board which could not rotate inside shaped handrails like the disc. Unfortunately we don't have a drawing to show the exact dimensions so we have to take an educated guess. I'd suggest that the height of the top of the post is left at the standard 48mm and the platform set to around 40mm.

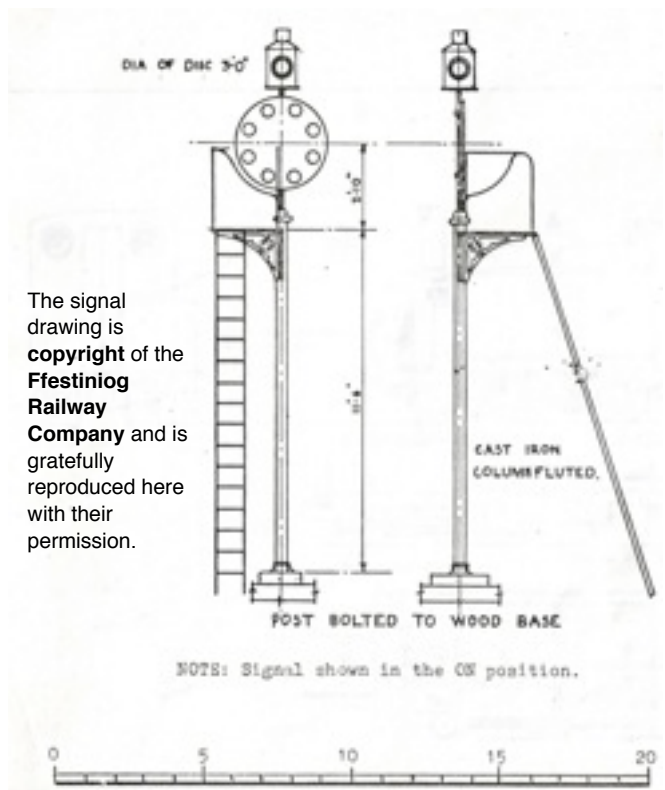
Assemble the platform and brackets as described above but then - before securing the post into the base casting - cut the ladder and shorten the assembly to ensure that the board is at the same height as the standard disc but that the board can still allow enough clearance for handrails beneath it.

Final Assembly

The signal base can now be installed by locating in a 4.0mm hole in the baseboard. The rod is passed through the base and the crank provided can be used to provide a suitable connection to an operating mechanism which can be wire in tube, a point motor or whatever else you choose. The rod is passed through the crank and a "U" shape bent on the end at 4mm centres, which will engage positively with the crank.

Painting

There doesn't appear to be much conclusive evidence of how these signals were painted during their original service. The best guide is probably the colour scheme of the existing signal at Boston Lodge, which is black with the exception of the post (white above the top of the base casting), the platform brackets (white) and the disc (signal red on the side away from the operating rod). A quick spray with matt varnish will give the whole thing a much more realistic look.



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Parts List

- 1 x Nickel silver fret
- 1 x 1.5mm bush
- 100mm 0.3mm brass wire
- 150mm 0.7mm brass wire
- 70mm 1.5mm brass tube
- 1 x lamp casting