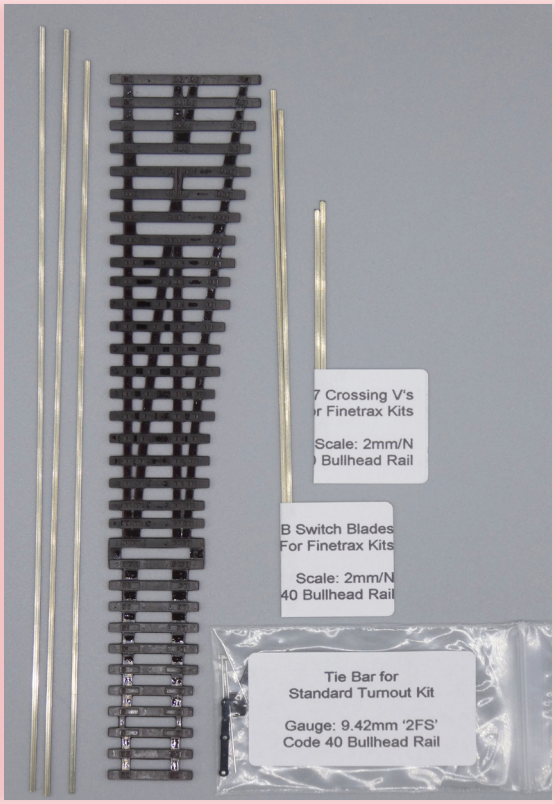
2FS manual 5 — Finetrax Bullhead Turnouts

Finetrax turnout kits are manufactured by British Finescale and sold through the 2mm Scale Association shop.



MATERIALS

Each kit has a 3-D printed resin turnout base with all the chairs moulded on, 3 lengths of plain rail, pre-machined rails for the switch blades and crossing V, and components for the tiebar.

Instructions and templates are available on the 2mm Scale Association web site. The British Finescale web site has videos showing turnouts being built.

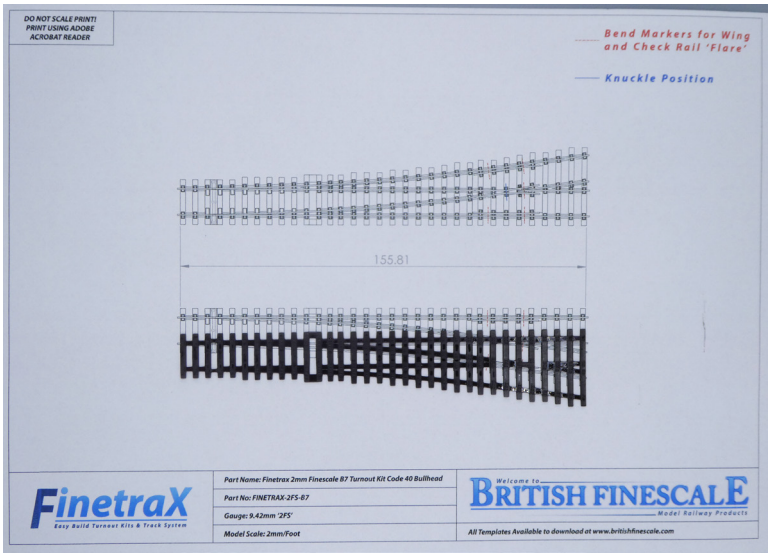
Recommended tools are a pair of track cutters, fine nosed pliers, a small needle file (half round is good), a black marker pen, and a soldering iron. Magnification is useful to identify the top and bottom of the rail, and to help in guiding the rail into chairs when adding the wing and check rails.

NOTES ON CONSTRUCTION

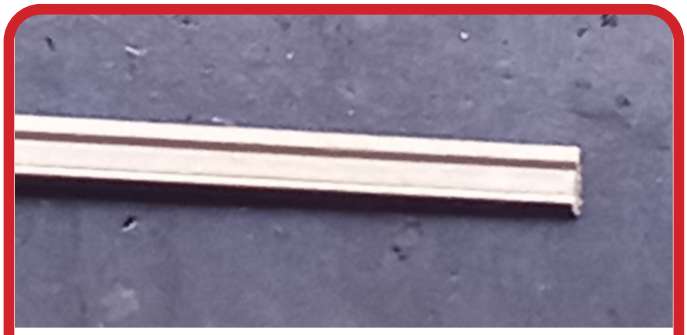
To build a turnout you cut rails to length, dress the ends with a file, slide into position, solder the tie bar to the switches, and solder on wires for electrical connections. It is possible to build a turnout in about 45 minutes.

The resin has a long life without going brittle, and will withstand a soldering iron so there is no danger of melting it when adding the wires.

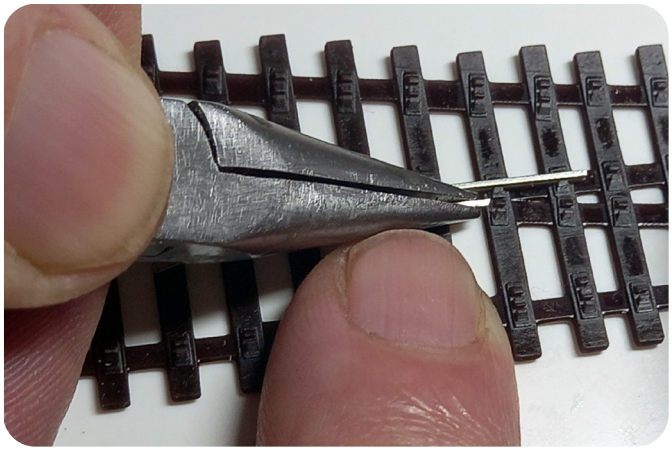
The shortest length of plain rail needs cutting into short lengths to match the lengths of wing and check rails on the template; use the longer ones for the stock rails. Dress one end, hold the rail against the template, mark where it needs to be cut with a pen, cut with track cutters, and dress the cut end.



All rails must have the ends dressed with a small file to make them square, remove any burrs or sharp edges, and create a slight chamfer to help them thread into the chairs. It only needs a few wipes with the file. If the rail won't thread easily into the base don't force it. Check you have the larger head at the top, and re-dress the end of the rail to put more of a chamfer on it.



Viewed from the side with magnification it is fairly easy to tell the thicker head from the thinner base of the rail.



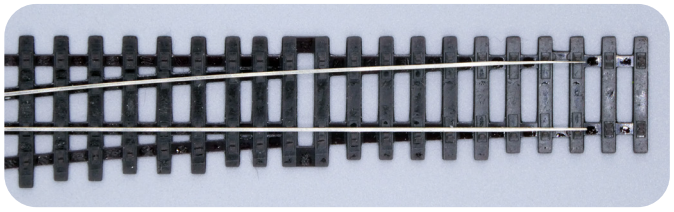
Don't use two short lengths of rail for each wing rail as the instructions tell you. Instead use a single length of rail with a bend. It makes the turnout stronger, it looks better, and you will not need the central electrical connection. Bend the rail to the correct angle to match the template, making sure the bend in the rail is exactly at the knuckle as marked on the template by a black line. Thread carefully using fine nosed pliers to guide the rail into each chair so as not to damage them. The greater the crossing angle, the more care is needed to avoid damage to the chairs, and for A5 turnouts two separate lengths of rail might be better.

You need to bend a flare in the wing rails and both ends of the check rails before adding them. Thin red lines on the template mark where the bends start. Do not over bend, it should be very slight with the end of the rail displaced by about half the rail thickness.

If the bend in the wing rail is not precisely at the knuckle position this will cause a tight spot at the V.

The simple way to check the knuckle position is to sight along the line of the wing rail and V to see if the two rails are exactly in line. If not move the position of the wing rail (and hence knuckle) a little. If not locked in position with glue the rails may move during handling, so recheck before soldering to the tie bar and soldering the electrical connection under the V which locks then in place.

Putting too large a flare in the wing or check rails, or the bend in the wrong place, can cause the gap to the stock rail to become too narrow.

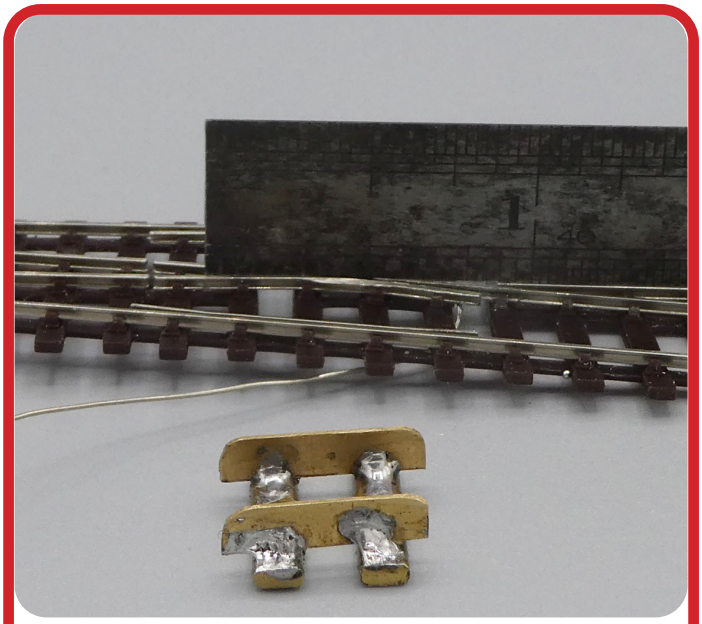


The curved switch blade should be pre-curved so it matches the curve on the template. Pull between fingers and thumb, pressing a little with the thumb. The curve lets it take the correct position over the slide chairs where there are no jaws to hold it. If not curved the gap between stock rail and switch can close up. Take care not to bend the tip of the blade, which is very thin.

Clean the ends of the switch blades and V rails with a fibre brush to remove any glue from the label used to package them.

When measuring where you need to cut the blades so as to leave a small gap to the end of the wing rail, check the wing rail has not slid out of position and the knuckle is still in the correct place. On the prototype the rails end just past the last sleepers on the base. However, if you leave an extra 1 or 2 cm of rail sticking out this will fit in the sleepers on the adjacent track and help line it up.

When the rails are in place test with a 4-wheel wagon. It should run smoothly through under gravity.

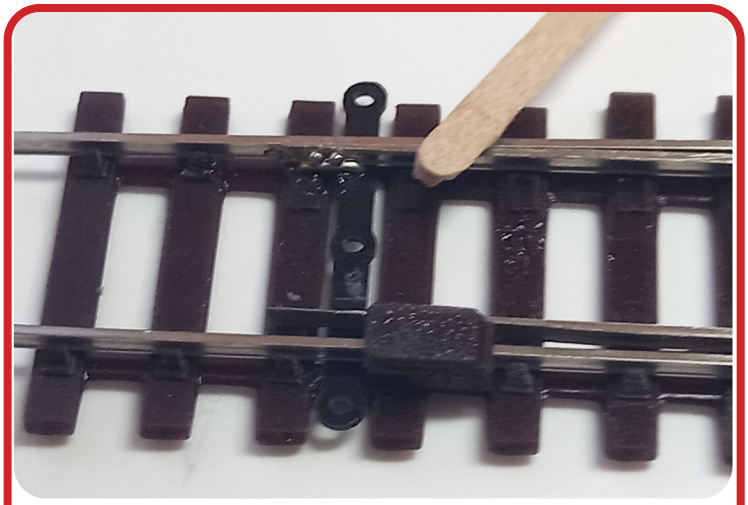


Check the gap at the crossing and check rails with a length of 0.5mm thick brass strip or a steel rule that is 0.5mm thick. It should fit in the check rail gap and slide through the crossing V gaps without needing force, though it may be a little stiff. Even better is to use a sledge gauge as shown in front, the book "Track" describes how to make one.

TIE BAR

Push the pin through the tie bar, hold the head against the bottom of the tie bar with pliers, bend the end over at right angles, then cut off the excess pin.

Before soldering, check the wing rail has not slid out of position, and that there is a small isolation gap between the wing rail and switch rail.



Flux and two solder balls added to the top of the pin. The spacer has been inserted to hold the far blade in position behind the pin on its side, and the blade being soldered is held down with a small wooden stick. Just touch with a clean soldering iron to make the joint.

Only use the minimum of solder; you don't want to solder the blade to the stock rail. Solder balls are easiest, two 0.65mm balls is about right, or you can cut about 1 mm off solder wire. I recommend using a separate flux such as Telux, but it needs washing off afterwards. After soldering check the blade moves freely, there is the correct sized isolation gap, and the top of the blade at the tip is level with the stock rail.

The instructions show the pins in the tie bar pointing towards the tip of the blade which helps strengthen the tip. If building a slip have the pins pointing away from the blade tip instead as clearances are very tight and this allows a little more space.

The tie bar has extensions at the ends for connecting the operating wire at the side. If you intend operating using the central hole from underneath, cut of the circular part on each end to make it less obtrusive. This is best done before fitting. Cut off the ends so that 5.8mm remains each side of the central hole.

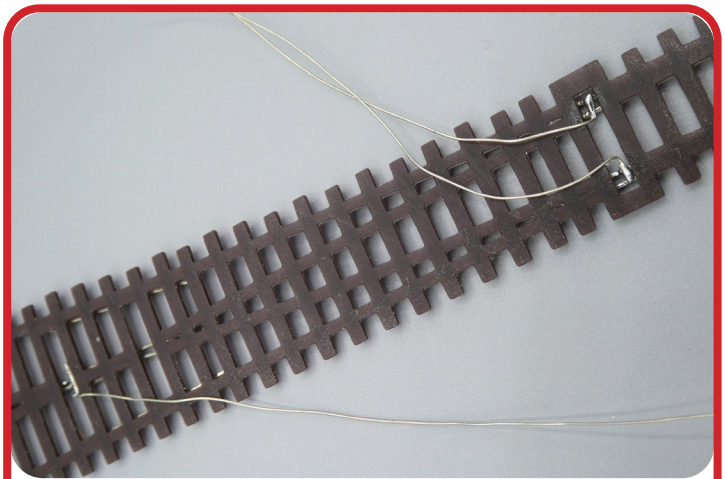
ELECTRICAL CONNECTIONS

Finally you need to solder electrical connections on from underneath then lock the rails in position with cyanoacrylate glue on a few chairs. Solder before gluing, as heat damages the glue.

There are gaps in the base where you need to solder, so it is easy to get an iron in. The heat will not melt the base but it will soften the resin, so do the soldering with the turnout face down on a flat surface to support the rails. If you made the wing rails from single lengths of rail there are only three connections to make.

Clean the underside of the rails with a fibre brush then tin with electrical solder. Tin the end of the wire, then holding it in position solder to the rails. Check the wire is securely soldered to all the rails, if not repeat. It is easier to get a good joint if you use plumber's flux such as Telux, but you need to wash the residue off afterwards with warm water.

After soldering check for electrical continuity between one of the crossing V rails and each of the other three rails, and between each stock rail and the adjacent blade. Also check the crossing is isolated from both switch blades. If not the gap to the wing rail has closed up; put the soldering iron on the tie bar pin to allow you to move the switch rail a little.



I prefer single strand tinned copper wire, about 28 SWG, to the decoder wire suggested in the instructions. Its stiffness and lack of multiple strands makes it easier to position. I bend the end of the wire double so there are two wires under the rail, it makes the connection a little more visible but it gives a more secure joint, and it will be difficult to resolder if it fails after installation.

TURNOUT OPERATION

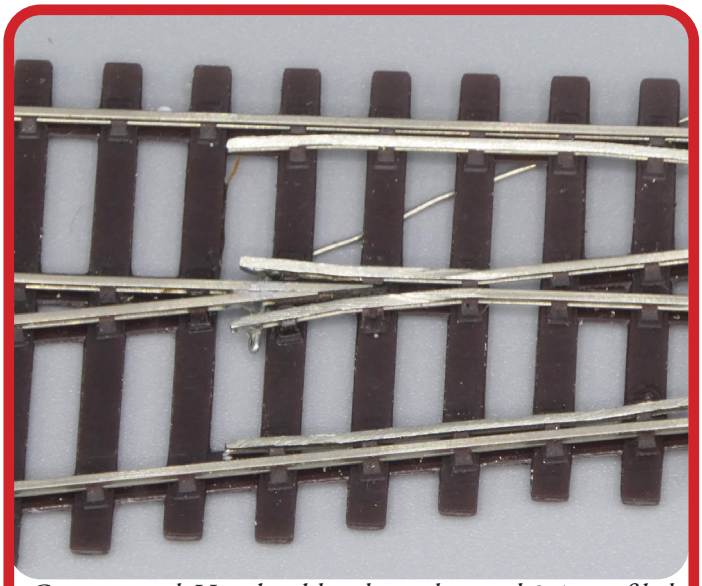
The operating mechanism has to hold the switch in place against the stock rail, and should to take up excess movement without damaging the turnout, for example by using an omega loop. A solenoid motor is no use unless it incorporates a spring, and in any case their action is rather violent. A slow motion point motor is recommended, or a switch or lever for manual operation. See "Track" for a more detail.

Power has to be fed to the crossing according to which way the turnout is switched. This is usually done using a single pole 2-way switch mounted on the turnout operating mechanism. On DCC systems it is possible to use a 'frog juicer' instead.

FURTHER REFINEMENTS

Soldering the two rails of the crossing V together makes them stronger and less liable to move out of position, and looks better. Use a couple of solder balls and flux on top of the V after assembly. Remove any solder from the top of the rails with a scalpel and file.

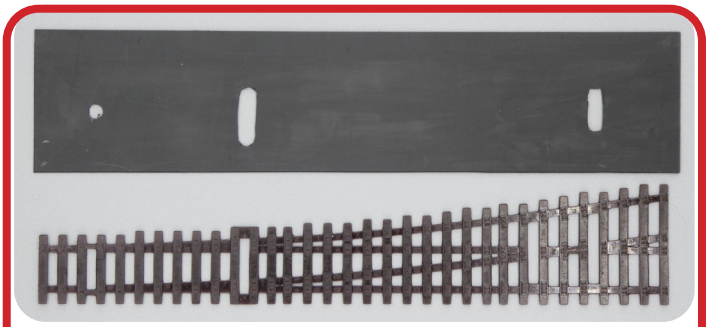
The check rails and parts of the wing rails ought to be rust coloured rather than shiny. However, any paint or blackening will get removed whenever the track is cleaned. To avoid this, file down the parts that should be rusty by about 0.1mm before assembly. The topic is covered in more detail in "Track".



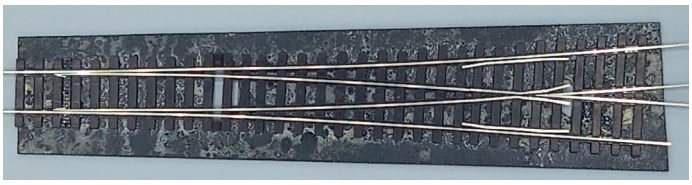
Crossing with V rails soldered together and 0.1mm filed off the top of the wing and check rails where they should be rusty.

CURVED TURNOUTS AND PLASTIC BASES

While there are no curved turnouts in the range, the resin base is flexible and can be bent. The flexibility of the resin varies varies according to atmospheric conditions, it is more rigid when very dry, but it can usually be bent up to 3 ft radius without cutting any ties, you may need to cut some of the ties cutting to bend more. The resin base needs to be stuck down in the curved position before starting assembly else it will spring back. Measure the blade lengths against the curved base rather than the template. I use a 0.75 or 1mm plastic sheet as a base and stick the resin base to this. I use the same base under all the track to represent the height of the ballast. I have separate bases for each turnout, this should make removing them easier if it ever becomes necessary.



Holes are needed in the plastic base for the tie bar and where the electrical connections are to be soldered as in the photo. Ultratape spray adhesive on the plastic base holds the resin very firmly. You only have one chance to press the base down in the correct curved position. Mark where the ends of the curved base should go before gluing, press one end of the resin base down then curve it so the other end is in position before pressing the whole base down.



A B7 turnout that has been curved almost to a symmetrical Y without cutting any ties.

CORRECTING MISTAKES

The most likely mistake is to cut a rail too short. If it is a switch blade you could make a new blade by filing a taper on plain rail, but easier is to move the isolation gap between wing rail and switch a sleeper nearer the tip, and replace the wing rail with a longer length to match.

ACKNOWLEDGEMENTS:

Text and photos by Noel Leaver. Suggested corrections or additions welcomed at publications@2mm.org.uk