2.5 Custom pointwork drawings

For construction purposes, simple pointwork drawings using a single line to represent each rail (see Figure 2-29) are quite adequate. They can be drawn either by use of a ruler and pre-cut templates or by marking off a series of dimensions derived from the prototype and listed in the data sheet tables. The latter method literally becomes a process of 'joining the dots' using a flexible drawing guide obtainable from most stationers. Although a reasonable degree of accuracy is desirable when drawing the outline of a turnout, its main purpose is to serve as guide to the shape and location of the components during assembly. The success of a custom-built turnout depends on the accuracy of the actual components.

All pointwork consists of up to three basic elements, namely the switch, Figure 2-6; the common crossing, Figure 2-7; and the obtuse crossing, Figure 2-14. A simple turnout has a pair of switches and a common crossing, while a diamond crossing has a pair of common crossings and a pair of obtuse crossings. More complex pieces of trackwork are merely more elaborate combinations of the same three basic elements.

Note: *It is recommended that, before commencing work, a modeller should read Data Sheet D2.2.1.1, which describes the terms used for the various components and sets out the details of turnout geometry and its effect on modelling. This will help the modeller to decide on the degree of authenticity desired, bearing in mind the track and wheel standards adopted and the compromises that these require. Note also - to avoid problems when propelling stock, the tightest turnout radius on the layout should be 1.3 times greater than the minimum curve radius for the layout.*

Ranges of drawings are available from suppliers of components. These, which usually mirror the parts/kits from the particular supplier, generally cover a limited range of radii and crossing angles, albeit those judged to be the most popular. While they offer the simplest approach, there is a lack of variety and flexibility in laying out pointwork with a 'sameness' and loss of 'flow'.

Note: *Some suppliers refer to their drawings as 'templates'. Throughout these notes a template is a profiled length of material used as a guide to form or to draw a curve*

As explained in more detail in Part 7, Section 1, when designing a track layout a greater degree of variety and flexibility can be obtained by drawing the pointwork to suit the location. For example, Photo 2.26 shows a complex junction being laid out at the manufacturer's works. It could be described either as a double junction leading to two single tracks or as a scissors crossover. The two tracks leading off to the left are quite sharp as they have continuous checkrails. Note also that the right hand track of the two has a continuous curve through the diamond and therefore its two crossing angles will not be equal. This would be difficult to reproduce using pre-printed turnout drawings.

To produce drawings to suit an equivalent model location would require them to be custom designed. For those with or having access to a computer, computer-generated drawings can be produced by specially designed programs that cover a variety of standards and formations. A program called 'Templot', specifically related to British practice, is now available and includes the ability to vary the gauge and related dimensions to suit the modeller's requirements. Alternatively, 2D-CAD software is available quite cheaply and in some cases 'cut down' versions are given away with computer magazines.

Of the two hand-drawn methods, the one using pre-cut templates is slightly simpler but not quite so flexible as the derived method (See photo 2.40, page 2-2-58).

The drawing is produced in three stages on a sheet of paper large enough to accommodate the complete turnout. Where more complex track layouts are involved, it is advantageous to draw the complete configuration. Decorator's lining paper is a cheap, yet effective medium since, by

(Balfour Beatty Rail Eng.)
Photo 2.26 Pointwork pre-assembled at manufacturer's works prior to transfer to site.

Compiled by M. Holland, additional material from R. Chown, H. Finch, G. Overton and K. Thomas

using a length off the roll, the adjacent trackwork can also be drawn in. The preliminary drawing can be sketched out in pencil to obtain the best track layout but, for clarity and permanence of line during construction, it is recommended that ink be used as the final drawing medium.

The drawing can now be divided into suitable sections for construction on the workbench.

Generally, construction on the workbench is to be preferred; however, if the baseboard is to be a solid construction, the paper can be fixed to the baseboard and the track built 'in situ' over it.

Alternatively, produce master drawings of switch and crossing units on tracing paper or on transparent sheets as used for overhead projectors. These can be photocopied and the rest of the turnout then drawn in. By using tracing paper, only one hand need be drawn, the opposite hand being obtained by reversing the tracing in the copier.

2.5.1 Making drawings using templates

Some suppliers offer curved templates, often cut to a high degree of accuracy to 32mm or 33mm gauge. The radii, quoted to the centre line, reflect those most popular with modellers, which are not always scale equivalents of full size configurations. Some close correlation is often possible but, where a non-standard crossing angle would result, the insertion of a suitable straight length before the crossing to correct the crossing angle is a solution. While it is possible to draw turnouts directly onto the track base, clearer definition and greater accuracy can be achieved on paper. The three types of switch; straight, semi-curved and fully curved, are described in Data Sheet D2.2.1.1.

Reminder: Because of the constraints of space, the radii and switch lengths used for modelling would, in prototype equivalents, require speeds to be below 20mph.

The simplest turnout to draw is one having straight switches, either of the tongue or the heel type.

2.5.1.1 Straight switches

Straight switches are illustrated in data sheet D2.2.2.1. It also shows the location of the timbers and slide chairs in the switch area. Select a suitable switch length to suit the turnout radius. Suggested lengths are given in the turnout radii table below.

Measuring and marking off the small distances involved directly on the drawing is not easy so the following method should make the task simpler when setting out the drawing.

a) Draw the gauge lines and mark the position of the toe of the turnout (T). Figure 2-32.
b) For the appropriate standard and switch length (see switch length table opposite), mark off a length along the straight stock rail equal to 10α (α - the switch angle ratio 1 in α) at a point A. Through A draw a line at right angles to TA and mark a point B, 10mm from A. Join BT and mark TH equal to the switch length L_H. Check that the heel divergence (h_d) from the stock rail is:

Scale 7 * - 2.62mm	0 Fine * - 3.35mm
0 Coarse * - 3.8mm	0 Coarse ** - 4.55mm

Prototype Switch length	Model Turnout radii			
	Scale 7 *	0 Fine *	0 Coarse *	0 Coarse **
6ft	580 to 2070mm (1ft 11in to 6ft 9in)	550 to 1680mm ‡ (1ft 9in to 5ft 6in)		
9ft	1280 to 3050mm (4ft 3in to 10ft)	730 to 2290mm (2ft 5in to 7ft 6in)	520 to 1830mm ‡ (1ft 8in to 6ft 4in)	
12ft	2250 to 4150mm (7ft 5 in to 13ft 7in)	1190 to 3050mm (3ft 11in to 10ft)	1190 to 3050mm (3ft 11in to 10ft)	730 to 2250m ‡ (2ft 5in to 7ft 5in)
15ft	3630 to 3960mm (11ft 11in to 13ft)	2130 to 3900mm (7ft to 12ft 9in)	1460 to 3420mm (4ft 9in to 11ft 3in)	1190 to 3020mm (3ft 11in to 9ft 11in)

* Assuming either code 124 bullhead rail or code 143 flat bottomed rail, having a rail head width (h_r) of 1.6mm.

** Assuming either code 200 bullhead rail or code 220 flat bottomed rail, having a rail head width (h_r) of 2.35mm.

‡ These switches have a significant angle of deflection at the toe and should only be used where limited space prevents the use of longer turnouts. (See D2.2.1.1, Compromises)

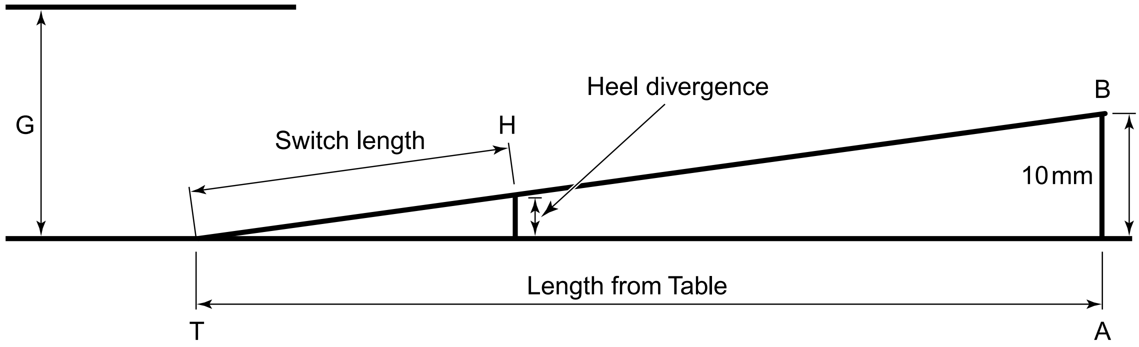


Figure 2-32 Setting out the heel for a straight switch.

Switch length (Prototype)		6ft	9ft	12ft	15ft
Switch length (Model)	TH	42mm	63mm	84mm	105mm
Scale Seven *	TA	160mm	242mm	325mm	401mm
0 Fine *	TA	125mm ‡	188mm	251mm	313mm
0 Coarse *	TA		166mm ‡	221mm	276mm
0 Coarse **	TA			185mm ‡	231mm

* Assuming either code 124 bullhead rail or code 143 flat bottomed rail, having a rail head width (h_r) of 1.6mm.

** Assuming either code 200 bullhead rail or code 220 flat bottomed rail, having a rail head width (h_r) of 2.35mm.

‡ These switches have a significant angle of deflection at the toe and should only be used where limited space prevents the use of longer turnouts. (See D2.2.1.1, Compromises)

c) Either - Place the curved template against the point H and judge by eye when it forms a tangent to the switch rail (TB). (Figure 2-33 inset).
Or - From the switch heel (H), measure along the switch rail angle line a distance of 200mm. (It may be necessary to extend it to do this). Draw a line at right angles. Mark off an offset distance (O) selected from the table below to suit the turnout radius. (If the curve radius is not shown below, data sheet D2.2.1.2 gives the details of the calculations involved).

d) Place the curved template against the points H and O and draw the curved closure rail, extending it until it cuts the other rail at the gauge intersection.

Equivalent template centreline radius mm	915 (3ft)	1068 (3ft 6in)	1220 (4ft)	1372 (4ft 6in)	1525 (5ft)	1680 (5ft 6in)	1830 (6ft)	1983 (6ft 6in)	2135 (7ft)	2288 (7ft 6in)	2440 (8ft)	2593 (8ft 6in)	2745 (9ft)
Closure rail radius mm	930	1080	1240	1390	1540	1690	1850	2000	2150	2300	2450	2610	2760
Offset mm	21.8	18.6	16.3	14.5	13.0	11.9	10.9	10.0	9.3	8.7	8.2	7.7	7.3

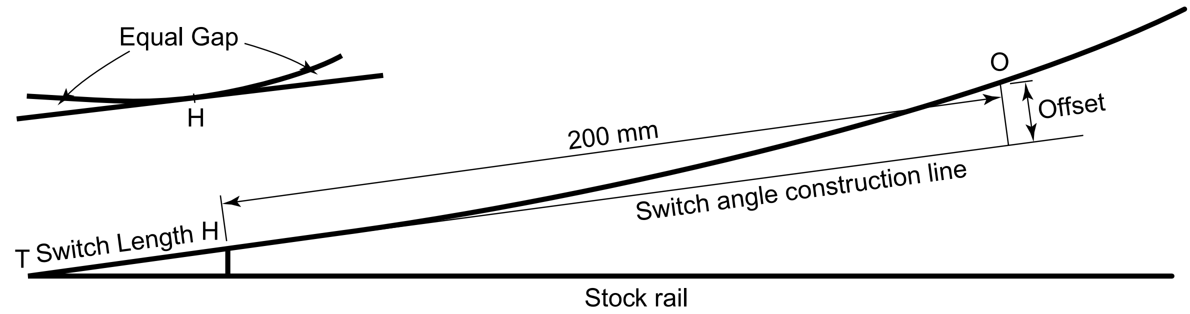


Figure 2-33 Setting out the curved closure rail.

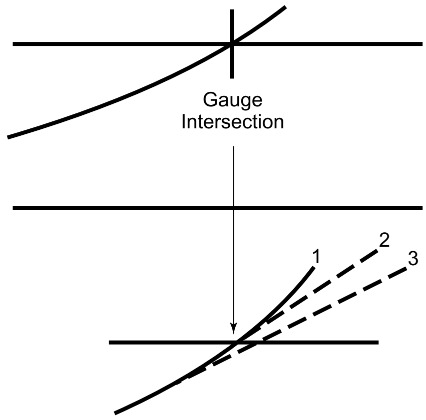


Figure 2-34 Crossing variants.

e) The turnout curve can continue through the crossing as shown in Figure 2-34 by position 1. However, if the turnout forms part of a crossover, to avoid buffer locking, the Vee should be straight from the crossing nose as shown by dotted line 2.
f) If the crossing angle is an odd figure, a standard angle can be drawn in as shown by line 3. This is drawn tangential to the closure rail curve and will increase the full lead of the turnout by a small amount.
g) The straight gauge lines were drawn at the beginning. Along these draw a line at right angles at a distance of 38 mm (5ft 5in) in front of the switch toe. This is the forward end of both stock rails.
(Note that some pre-group companies used a shorter length and the relevant data should be consulted for verification.)
h) If using a prepared switch drawing, then the portion of the curved stock rail adjacent to the switch planing can be traced from it, alternatively it can be prepared from b) above. Mark the position of the toe and draw a straight line parallel to TH, the curved route switch, and measure a distance equal to the switch length. The stock rail curve commences at this position opposite the heel of the straight switch; see also Figure 2-28 on page 2-2-28.
i) Draw the stock rail curve by plotting a number of points at gauge distance from the curved closure rail and joining up. Absolute accuracy here is not essential since when laying the stock rail, it will be gauged from the curved closure rail.

2.5.1.2 Semi-curved switches

Since the switch radius of the A semi-curved switch equates to 3380mm (11ft 1in) in 7mm scale and that of the B semi-curved switch to 4295mm (14ft 1in), it is unlikely that a suitable commercial template will be available and therefore the preparation of drawings for semi-curved switches is better undertaken by the offset method described in section 2.5.2.

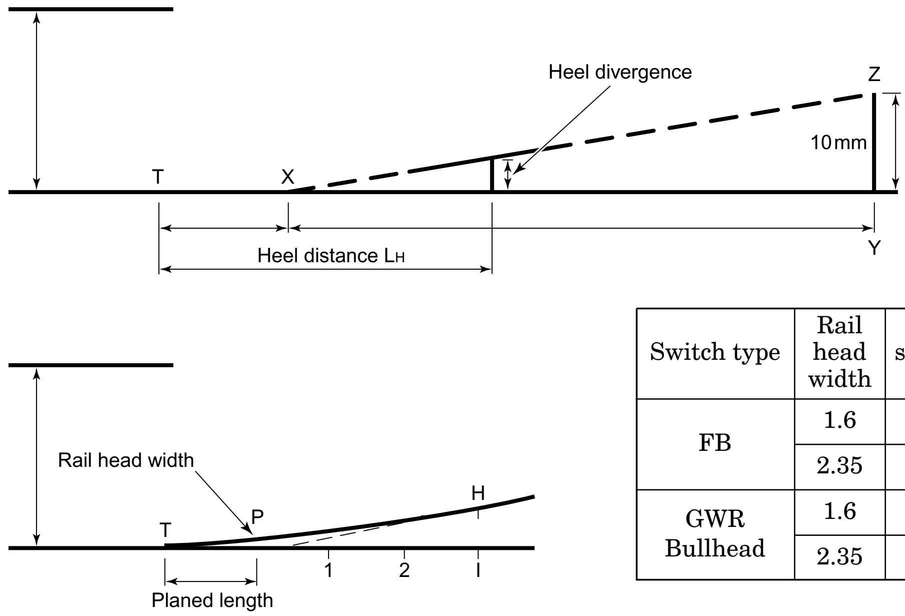
2.5.1.3 Fully-curved switches

For a fully curved switch the template is positioned at the toe so as to be tangential to the gauge lines at that point. In this case, as in step c) above, the offset to the point O, is measured along the straight stock rail from the toe T. The inner and outer curved gauge lines are then simply drawn, with the template as a guide, to a point beyond the gauge intersection. The result is a fully curved turnout, although neither turnout radius nor crossing angle will necessarily be standard. This is the type of switch recommended for 0 Coarse if code 200/220 rail is used. (See D2.2.1.1).

2.5.2 Making drawings using offsets

The sequence is to draw the switch, followed by the crossing and, finally, by the turnout curve. The data sheets for these items are grouped by modelling standard at the end of the pointwork section. If a straight switch is to be used, the procedures described in 2.5.1.1a) and b) above are followed.

Switch type	A switch		B switch	
	TX	TY	TX	TY
Bull head semi-curved	38mm	178mm	46mm	224mm
Bull head fully curved (GWR)			47mm	237mm
Flat bottom semi-curved			61mm	219mm
Flat bottom fully curved	58mm	190mm	78mm	236mm



Switch type	Rail head width	A switch TP	B switch TP
FB	1.6	49.6	69.2
	2.35	60.1	83.9
GWR Bullhead	1.6		59
	2.35		71.5

Figure 2-35 Setting out the heel and drawing a curved switch

2.5.2.1 Drawing a semi-curved or curved switch

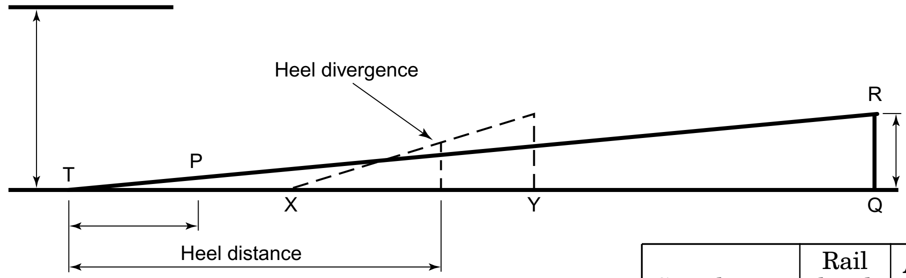
a) Commence by drawing the gauge lines and marking the position of the toe of the turnout (T). (Figure 2-35) Having selected the type of switch to be drawn, from T measure a distance TX taken from the table above. This is the point where the switch angle line cuts the straight gauge line. Measure a second distance TY and draw a line at right angles to the straight gauge line at Y. Mark a point Z, 10mm from Y and join ZX. The line forms a tangent to both switch and turnout curves.

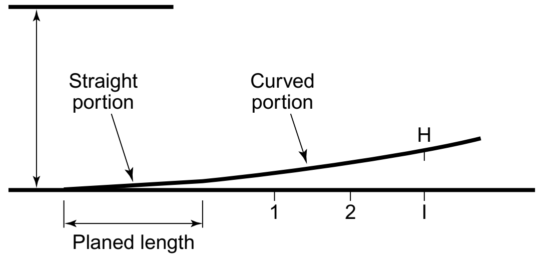
b) Measure the heel distance LH and draw another line at right angles to the gauge lines. Where this line cuts the XZ line is the heel of the switch. Check that the heel divergence dimension, (HD), agrees with the data sheet table. (These dimensions are on data sheets D2.2.2.2/3/4). The point H thus marked lies on the switch curve.

c) For curved switches only - from the data tables, select a number of intermediate switch curve offsets and plot these in the same way. The switch curve can now be drawn by joining up the plotted points.

d) For semi-curved switches the planed length is straight, the curve commencing at the end of the planing. This requires a second triangle to be drawn using a similar method. Mark off TQ from the following table and at Q draw a perpendicular to the straight gauge line 10mm long to R. Join TR. Mark TP, the planed length, and draw another perpendicular PS. This is equal to the rail head width h_r. The switch curve is tangential at S and H. (Figure 2-36).

e) The curved stock rail can be drawn either by repeating the foregoing procedure or by marking the gauge distance from the points already plotted.





Switch type	Rail head width	A switch		B switch	
		TQ	TP	TQ	TP
Bullhead Semi-curved	1.6	243	38.9	322	51.5
	2.35	243	55.9	322	73.7
Flat bottom Semi-curved	1.6			321	51.4
	2.35			321	73.5

Planed length (TP) and offsets (TQ) for semi-curved switches.

Figure 2-36 Setting out the heel and drawing a semi-curved switch.

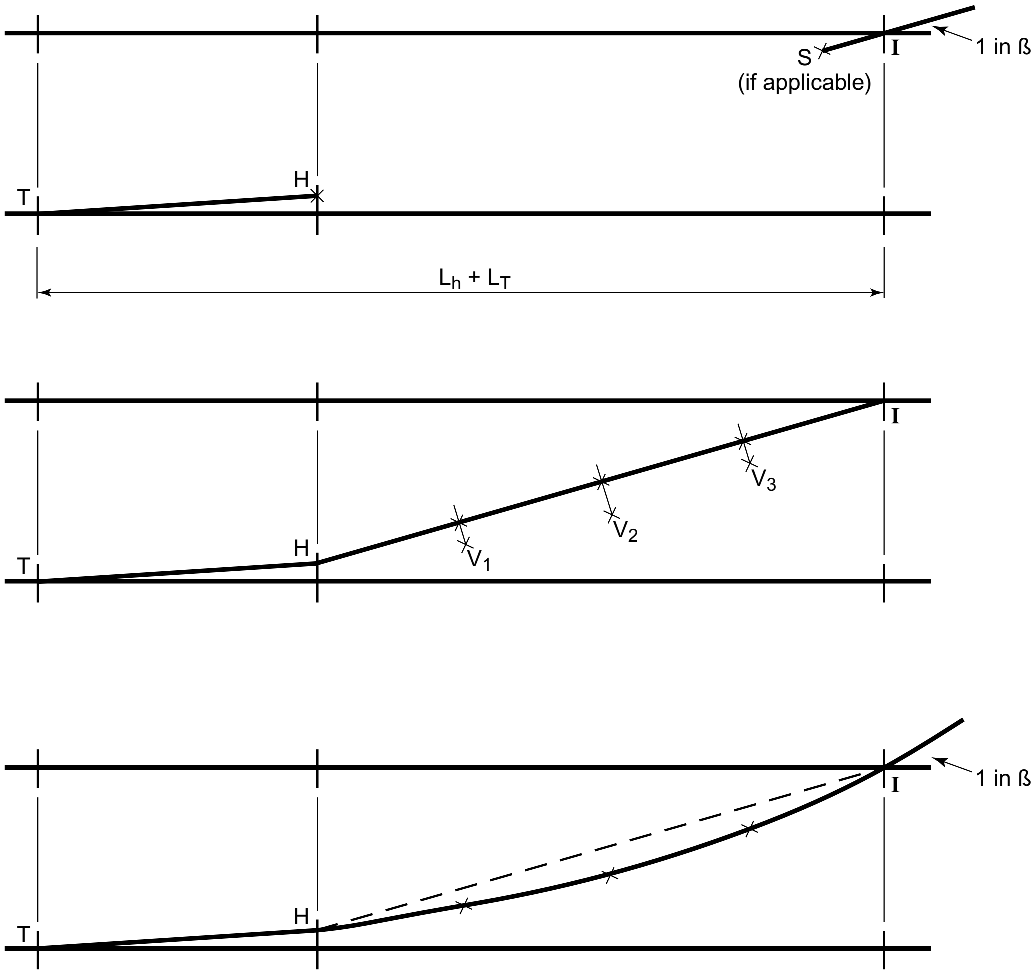


Figure 2-37 Setting out the turnout curve using offsets.

2.5.2.2 Drawing the turnout curve

Once the switch is drawn in, the turnout curve can then be added. Figure 2-37.

f) Obtain the distance L from toe T to gauge intersection I from the appropriate closure rail data sheet and, through I, draw a line at right angles to the straight gauge lines.

g) Through the point of intersection I draw a line inclined to the straight gauge line by the crossing angle. (If a straight crossing is being used then mark a point S along this line towards the toe equal to the straight length required). The technique used to draw the straight switch can be used here to draw the crossing. Measure 10ß along the gauge line and project 10mm to give a point on the line through I at 1 in ß. (Example: measure 50mm along the gauge line to give a crossing of 1 in 5).

h) Draw a straight line from I to H (or S to H) and mark the ¼, ½ and ¾ positions along it, drawing a line at right angles to IH (or IS) through each.

i) Along the mid-point line, mark the offset v_2, obtained from the data tables and along the ¼ and ¾ lines mark the offsets v_1 and v_3 respectively. These are both $0.75v_2$.

j) The turnout curve passes through the three offset points and is tangential to the lines through points H and I (or S). It can be drawn in using a draughtsman's flexible curve or similar.

2.5.2.3 Drawing the crossing

k) The crossing angle has already been drawn in at h) and the next stage is to mark the crossing nose. The nose N is set back 0.44ß mm behind I, the crossing intersection, for a crossing angle 1 in ß.

l) The neck in the wing rail is found by marking a point at a distance ß x F_Y from I towards the toe along the gauge lines. (F_Y is the flangeway width for the standard being modelled and forms the base of a triangle, the long side of which is the distance from the gauge intersection to the neck).

m) For Scaleseven, prototype wing rail dimensions can be used, but for both Fine and Coarse 0 although the overall length is unchanged, due to the greater flangeway widths, the neck has to be further away from I. Crossing dimensions are given in data sheet D2.2.4.

The same technique is used to draw an obtuse crossing and dimensions are given in data sheet D2.2.5.

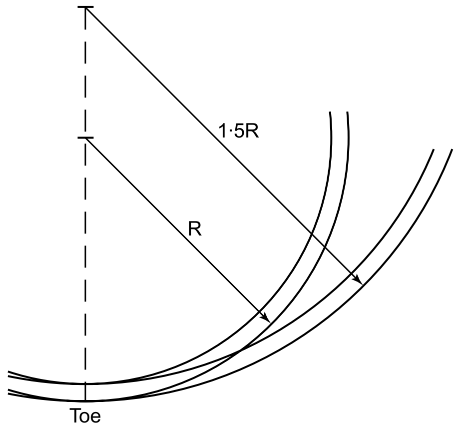


Figure 2-38 Minimum ratio between curves for a curved turn out.

2.5.3 Turnouts on Curves

The drawing methods described so far assume that the turnout has the configuration of a 'curve' leading out of a 'straight'. Occasionally it is advantageous, and sometimes unavoidable, for the turnout to be a 'curve' out of a 'curve'. The two variants are where the two roads curve in the same direction or curve in the opposite direction. Either variant can be drawn using pre-cut templates as described in section 2.5.1 but where the roads curve in the same direction; for 0 Fine standard the crossing angle should be limited to 1 in 8 to avoid excessive drop in and very long leads. A rough guide is to ensure that the larger radius is a minimum of 1½ times the radius of the diverging road. See Figure 2-38. The end result could well produce non-standard crossing angles and switch lengths. Straight switches would not be suitable unless the radii involved were very large and outside the range usually modelled. Semi-curved and fully curved switches would suit most applications except where code 200/220 rail is used where fully curved switches would be more suitable.

2.5.3.1 Using offsets

When producing a drawing using the offset method it is necessary to determine the full lead and crossing angle. These are obtained using a very simple calculation known as the 'Principle of Equivalent Radius'. Simply, one route is regarded as straight and the equivalent radius is that which the other route would follow to give the same lead and crossing angle as the actual formation. Although the results are not strictly accurate, the mathematical error on the prototype is insignificant and is acceptable as the actual turnout radius is not critical in model form.

Let R_{T1} and R_{T2} be the turnout radii of the two routes with R_{T1} being the larger radius.

When both curves are in the same direction the equivalent turnout radius, R_{TE}, is:

$$R_{TE} = \frac{R_{T1} \times R_{T2}}{R_{T1} - R_{T2}}$$

When both curves are in opposite directions, i.e. a wye turnout, R_{TE} can be found from:

$$R_{TE} = \frac{R_{T1} \times R_{T2}}{R_{T1} + R_{T2}}$$

These formulae can be used in two ways. Where a preliminary design has been sketched they can be used to find the turnout with the 'best fit' to suit the location. Alternatively, if a turnout with a known crossing angle is to be inserted into a curve, the radius of the second curve can be calculated. In the former case, when the equivalent radius has been calculated, consult the turnout curve data sheet of the appropriate modelling standard and find the nearest value of turnout radius R_T in the table. If there is not a precise match use the nearest value, preferably above, and use this as the equivalent radius, R_{TE}, and adjust R_{T1} and/or R_{T2} to make use of a

Example 1: A preliminary design for an 0 Fine layout has a main line with a 4880mm (16ft) radius curve and a 1830mm (6ft) radius branch leading off to a group of sidings. Which semi-curved switch and crossing combination would suit and, if it is not a precise match, which curve would need to be adjusted?

$$R_{TE} = \frac{4880 \times 1830}{4880 - 1830} = \frac{8930400}{3050} = 2928\text{mm} \qquad \text{or} \qquad R_{TE} = \frac{16 \times 6}{16 - 6} = \frac{96}{10} = 9.6\text{ft}$$

Checking the table for semi-curved switches on Data Sheet D2.2.3.2 (0 Fine Standard) shows that there is no exact match but the B7 combination is very close with a radius of 2985mm (9.8ft). Substituting back into the original formula, the effect of altering the main or secondary route can be assessed.

Retaining the main line at 4880mm (16ft) radius:

$$2985 = \frac{4880 \times R_{T2}}{4880 - R_{T2}} \qquad 2985\,(4880 - R_{T2}) = 4880R_{T2} \qquad R_{T2} = \frac{14566800}{7865} = 1852\text{mm}$$

or

$$9.8 = \frac{16 \times R_{T2}}{16 - R_{T2}} \qquad 9.8\,(16 - R_{T2}) = 16R_{T2} \qquad R_{T2} = \frac{156.8}{25.8} = 6.08\text{ft or 6ft } \tfrac{1}{2}\text{ in}$$

Retaining the branch line at 1830mm (6ft) radius:

$$2985 = \frac{R_{T1} \times 1830}{R_{T1} - 1830} \qquad 2985\,(R_{T1} - 1830) = 1830R_{T1} \qquad R_{T1} = \frac{5462550}{1155} = 4730\text{mm}$$

or

$$9.8 = \frac{R_{T1} \times 6}{R_{T1} - 6} \qquad 9.8\,(R_{T1} - 6) = 6R_{T1} \qquad R_{T1} = \frac{58.8}{3.8} = 15.47\text{ft or 15ft } 5\tfrac{1}{2}\text{in}$$

This suggests that to use the B7 turnout data, only a minor adjustment to the secondary route is needed, whereas the main line would need to have its radius reduced by 150mm (6½in), which would probably be unacceptable.

Example 2: It is proposed to insert a B8 turnout into a 1500mm (4ft 11in) radius curve. What will the major curve radius be?

Substituting, the first formula above becomes:

$$R_{T1} = \frac{R_{TE} \times R_{T2}}{R_{TE} - R_{T2}} \qquad \textit{(Note 1)}$$

From Table D2.2.3.2, R_T for a B8 turnout is 4129mm (13.5ft)

$$R_{T1} = \frac{4129 \times 1500}{4129 - 1500} = \frac{6193500}{2629} = 2356\text{mm (7ft 9in)} \qquad \textit{(Note 2)}$$

Note 1: If R_{TE} is less than R_{T2}, then R_{T1} is negative, which means that the major curve is the opposite hand to the minor curve, i.e. a wye turnout. If R_{TE} and R_{T2} are equal then the major curve is a straight.
Note 2: As a B8 turnout is about the limit suggested for 0 Fine standard; the minor and major radii of 1500mm and 2356mm conform roughly to the recommended ratio of 1 to 1½.

Example 3: A design calls for a wye turnout with arms of about 1830mm (6ft) radius and 2440mm (8ft) radius. What is the nearest equivalent to suit the location?

$$R_{TE} = \frac{2440 \times 1830}{2440 + 1830} = \frac{4465200}{4070} = 1097\text{mm}$$

or

$$R_{TE} = \frac{8 \times 6}{8 + 6} = \frac{48}{14} = 3.43\text{ft}$$

The nearest match in the 0F semi-curved switch table gives an A4.5 turnout with an R_{TE} of 1115mm (3.7ft). Substituting back into the formula, as in example 1, gives the following results:

Retaining the 2440mm (8ft) radius requires the other leg to increase to 2220mm (6.88ft).
or
Retaining the 1830mm (6ft) radius requires the other leg to increase to 2854mm (9.65ft)

If these increases are too great for the design, an alternative is to adjust both legs. To maintain the proportions the larger radius needs to be approximately 1.3 times the smaller, i.e., $R_{T1} = 1.3R_{T2}$.

$$1115 = \frac{1.3R_{T2} \times R_{T2}}{1.3R_{T2} + R_{T2}} = \frac{1.3R_{T2}^2}{2.3R_{T2}} = \frac{1.3R_{T2}}{2.3}$$

$$R_{T2} = \frac{2564.5}{1.3} = 1973\text{mm (6.55ft)}$$

$$R_{T1} = 1.3 \times 1973 = 2630\text{mm (8.7ft)}$$

If instead of using the A4.5 turnout data it were decided to go to the next lower size, the A4, the result of adjusting both legs would be radii of 1508mm (4.95ft) and 2005mm (6.58ft). These curves may be considered too sharp for the application.

standard crossing angle. The rest of the information can then be taken from the tables and the formation drawn using the larger curved stock rail as the base line.

2.5.4 Three-way turnouts

These can be great space savers, especially in the limited space normally available to modellers. Drawing them is basically a matter of superimposing one turnout over another. Although two of the crossing angles can be specified it is not always possible for the third to be a standard angle and it will need to be determined by drawing.

One strong recommendation is that any three-way turnout be drawn as a tandem turnout and not as a three throw. Although feasible in Scale 7 it becomes more difficult in 0 Fine and 0 Coarse and can create problems in the construction stage. Referring back to Figure 2-11 (Page 2-2-10) and Photo 2.3 (Page 2-2-11) shows that in the case of symmetrical three-way turnouts the blade tips are staggered between the inner and outer blades by approximately one sleeper centre distance. Figure 2-39 shows the general layout. Moving the second turnout back avoids the need to stagger the blades and simplifies their operation in a model. (Photo 2.27).

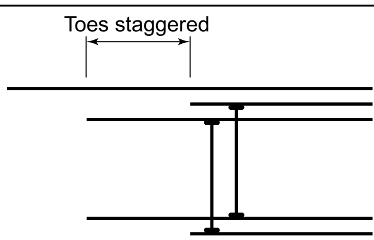


Figure 2-39 Stretcher bars shown to link the staggered blade toes of a 3-way trunout.

2.5.5 Timbering

The timbering of the switches and crossings is determined by the switch type and crossing angle but practices varied between companies. Generally timbers were either set at right angles to the straight stock rail or, as in modern practice, progressively angled to form a right angle to a line through the crossing nose. With the exception of the four straight switches (Data Sheet D2.2.2.1), the timber centrelines shown on the switch data sheets, D2.2.2.2 and D2.2.2.3 are based on post group practice. The various types of timbering are described in greater detail in data sheet D2.2.6.

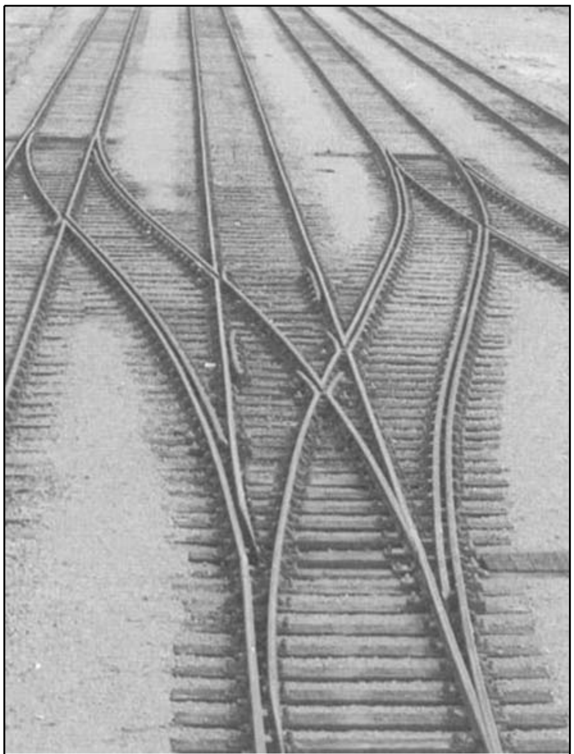
2.5.6 Stretcher bars

Most of the switches likely to be modelled have two stretcher bars, the first being 13in (7.6mm) from the switch toe with the second 3ft (21mm) beyond that. Modern stretchers are of 2.5in x 7/16in flat bar but many pre-group companies used a circular section; the Midland's, for example, having a diameter of 11/4in. In Photo 2.16 on page 2-2-20 the turnout has a very large radius and there are no less than four stretcher bars (the first forming part of the facing point lock) compared with the single stretcher bar in the sharp radius turnout shown in Photo 2.23 on page 2-2-24.

2.5.7 Check rails

For most modelling applications, the check rails will be 91mm in length and extend over the same five timbers as the wing rail, although there were variations between the companies. Generally, the check rail should be made 5mm longer than the wing rail, with the extra length at the closure rail end.

For bullhead track, 11mm at each end is bent to increase the prototype flangeway by 1mm, while for flat bottom rail, the lead into the check and wing rail is planed instead. To be strictly correct, the next 12.8mm of a bullhead check rail should be bent to a radius of 220mm, but most modellers will be content to merely bend the end.



(Howard Finch)

Photo 2.27
Tandem three-way turnout. Note that the second set of switch blades are located behind the heel of the first set. Note also the timbers square to the main road and the continuous check rails suggesting a curve of less than 10 chains radius.

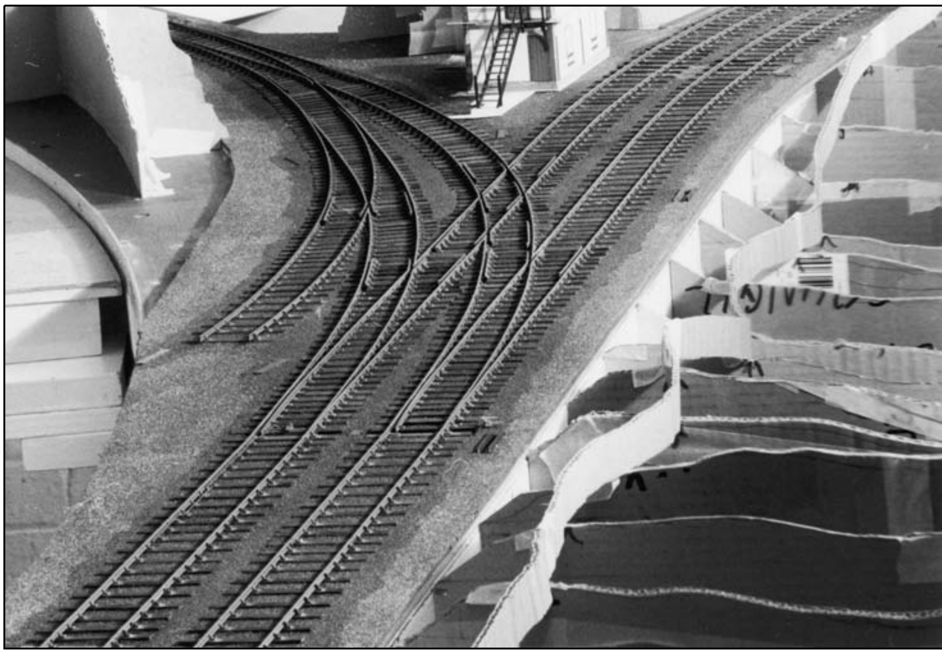


Photo 2.28 Moorwood Junction – Derby Museum layout. Note the similarity to the Balfour Beatty formation (Photo 2.26) with a continuous curve through the diamond. The treadle for the facing point lock is just visible in the left hand line. The actual lock has not been modelled as its protective cover will hide its location when the scenic work is completed.

(D. Farnsworth)