

OO Gauge Geometry

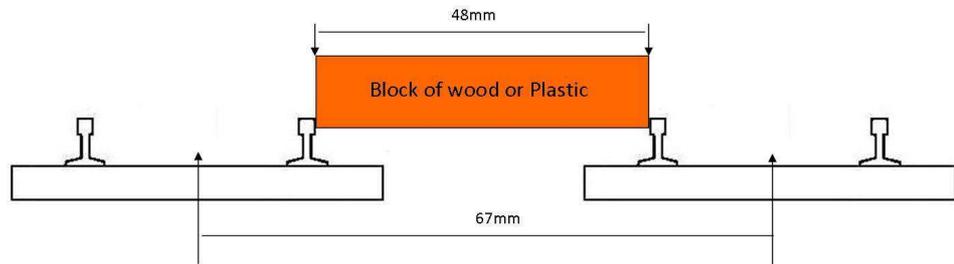
We know that getting started in model railways can be confusing, with so many options available and many unfamiliar terms being used. So let's start with the Geometry. This paper explains the geometry behind the design of your model rail system.

The geometry for Hornby, Peco, & Bachmann are basically the same. Each manufacturer has a slightly different range of track pieces, but they are on the hole all interchangeable. These ranges are based on a standard straight track length of 168mm (6 5/8in), a standard track clearance of 67mm centres, and using the same curve radii.

The scale is **1:76** or 4mm to 12". This is important to remember when you are purchasing ancillary items, such as vehicles, people, buildings etc.

Spacing:

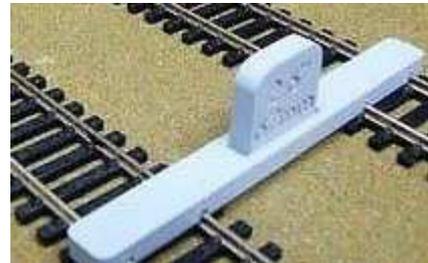
As mentioned above the track spacing is 67mm centre to centre, to keep tracks apart at this centre make a block 48mm long, use this as you fix the rail to the base board.



There are a number of other products on the market which will do the same job



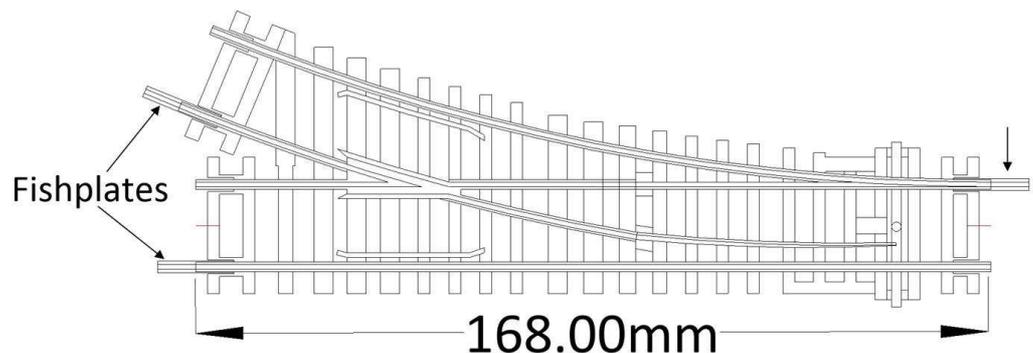
Adjustable Track Setter



Fixed Track Setter

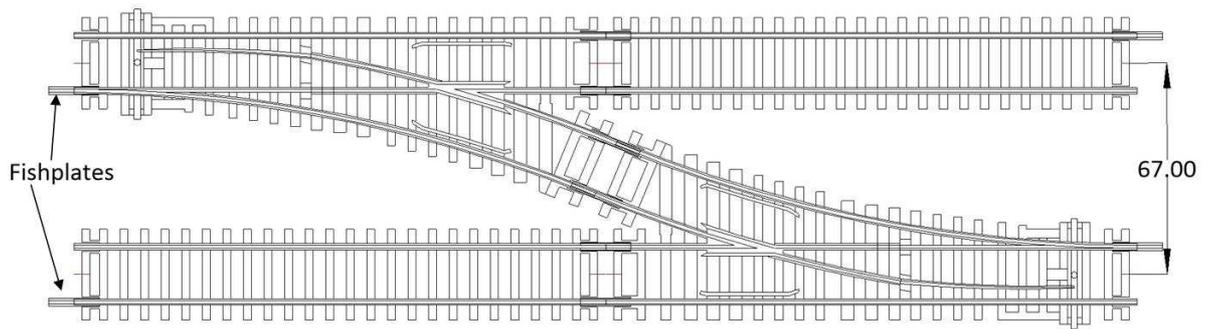
Track Length:

It is important to remember that track length as quoted by the manufacturer/supplier is the TRACK length and does not include the fishplate joiner.



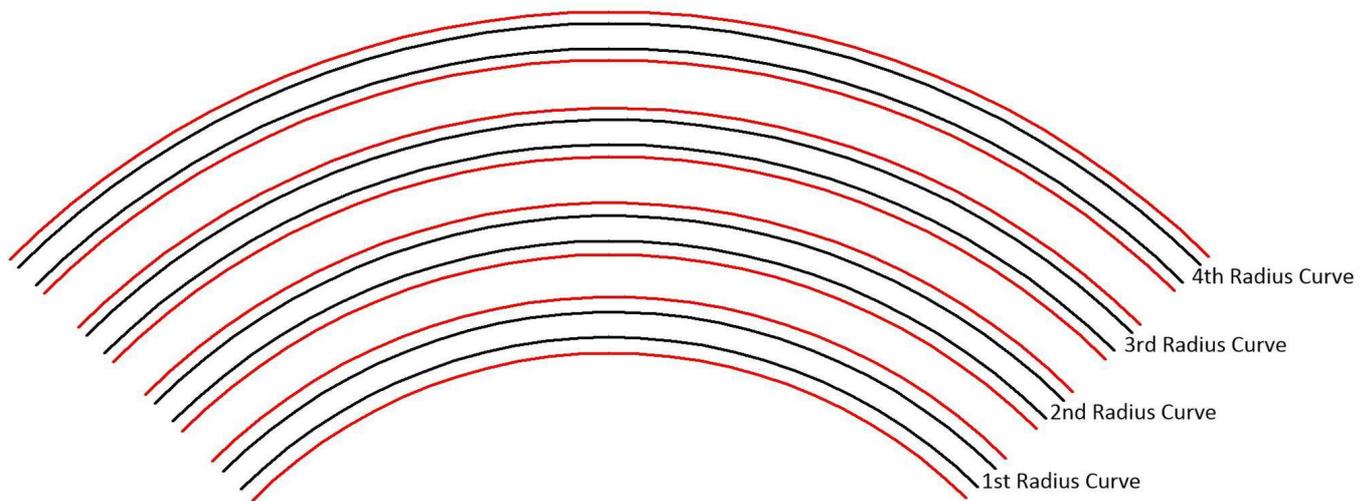
Points;

The Basic set of points are 168mm long and have a turn out of 22.5'. So two sets of points as shown will maintain the 67mm spacing between tracks.



Train & Coach Overhang:

As Locomotives and Coaches go around bends they create overhang. This means that placing structures and objects too close to the track will cause problems. Please bare in mind this is an average, certain Locos may have a greater overhang than the average.



The above drawing shows the Overhang (RED) for each of 4 Curve Radii. The distance from the track is as follows. The Red lines above and below the Black Lines (Tracks) show the extent of the overhang, or underhang. The list below shows the distance in mm

- 4th Radius Curve: Inner 8mm, Outer 7.5mm
- 3rd Radius Curve: Inner 8.5mm Outer 8.0mm
- 2nd Radius Curve: Inner 9.5mm Outer 9.0mm
- 1st Radius Curve: Inner 11.0mm Outer 10.5mm

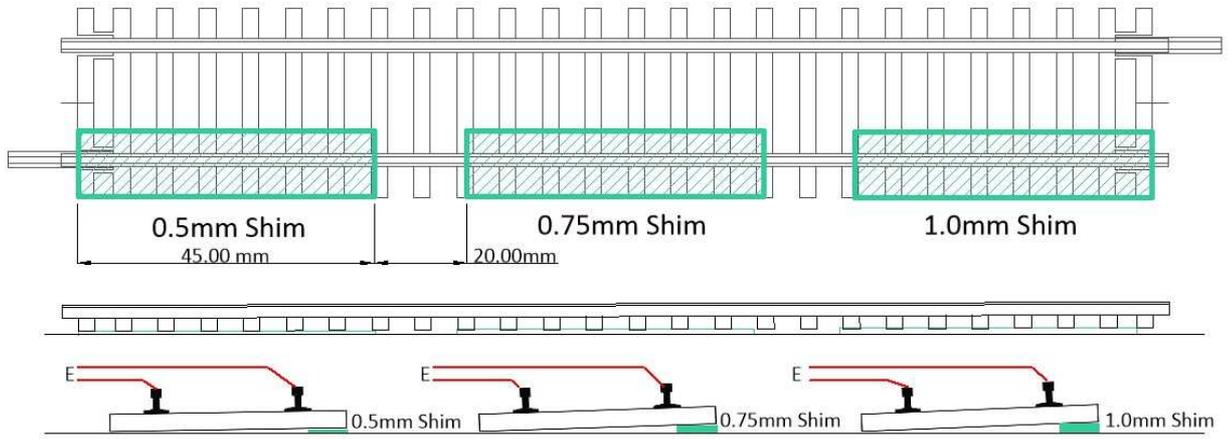
Banking, Tilt,

On a model, superelevation serves no functional purpose: the weights and forces just don't work the same way as on the real thing. It's purely there for visual appeal.

Elevation (E) between rails will be slightly less than Shim height if the shim is directly below rail, but consistency of placement is more important.

Shims should be increased by 0.25mm up to a max of 2.5mm, anything above that could cause problems with stationary trains on the curve. Shims should not be used on 1st & 2nd Radius curves.





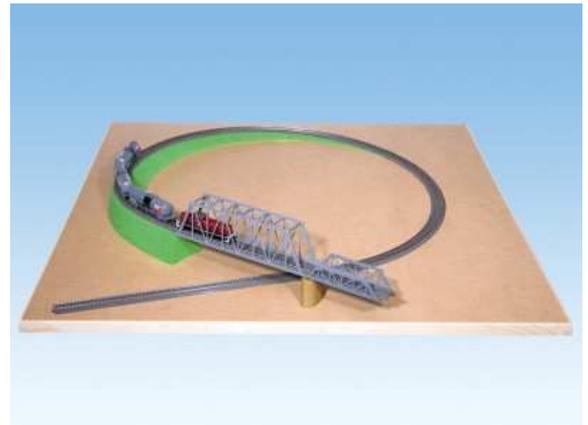
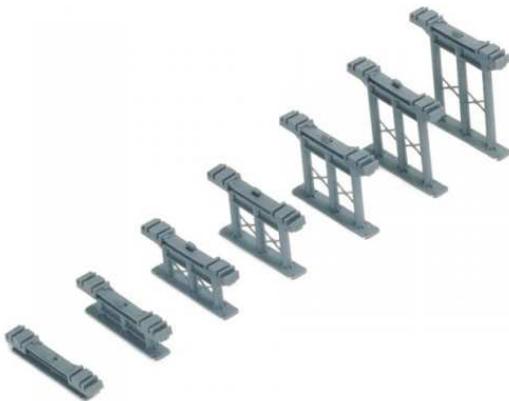
Ramps:

If you are thinking of having dual level tracks then you will need to create up & down ramps. The main problem here is the ability of the train to go up the ramp and with how many coaches, the weight of the train is all important as it needs to create friction with the track, the lighter it is the more chance you will get wheel spin and go nowhere.

A steep rise to 80mm will take up 1344mm, but should work for most modern made locomotives, whereas a better ramp length would be 1680mm. Using a curved ramp will take up less space but will require a slower ascent and descent.

Keeping track gradients at 2% or below is a good rule of thumb. It can also look more realistic (as long as you have the space) than a really steep gradient.

Most Manufacturers have their own ramp systems.



This drawing below shows the range of track available with their Curve Name and which Radius they work on. You should not mix 4th Track Radius with say 3rd Track Radius curves and so on, as this will mess up your track spacing. As you become more experienced you will find you can mix arcs, but care needs to be taken on clearance of trains on points and curves due to the overhang of trains and coaches on curves.

