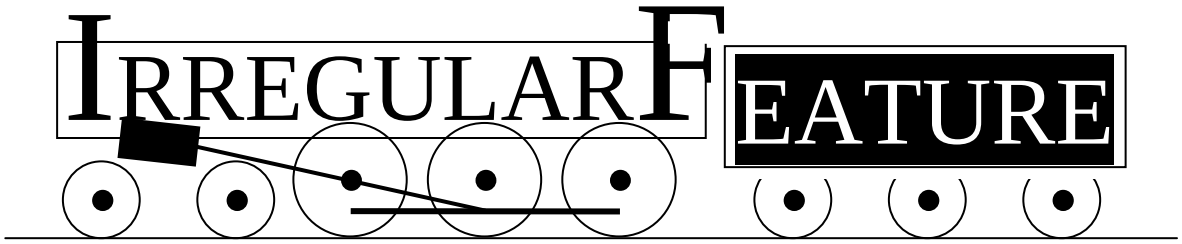

Up Hill and Down Dale

When designing or building a model railway it is often necessary to change the track elevations to help with the scenery, give the illusion of greater distance travelled or just to get more tracks in a given area. Sometimes it may just be to allow one track to pass over another. In doing this it must be remembered that the locomotives have to be able to haul the wagons or coaches up the gradients (often a good excuse for double heading) and hold them back (not really a problem in model form) on the downhill sections, they should also be at a believable rate of climb. The gradients therefore have to be a bit of a compromise, somewhere between what is required and what is realistic. Unless you have masses of space or a very simple layout plan the gradients are nearly always going to be steeper than the prototype. Here are a few methods to help ease the gradient,

- Use a through style of bridge; these require less clearance from the track below.
- Begin the gradient earlier; even a few mm of extra height can make a big difference.
- Lower one rail whilst raising the other; this halves either the distance or steepness required. (or a combination of the two)

Having lessened the required steepness of the gradient the next problem is planning and building it. There are, I feel basically two methods to achieve the desired result,

1. Trial and error, which usually results in plenty of the latter.
2. Calculation, a method that easily gives the desired result.

You have probably guessed by now that I quite enjoy playing with the calculator and this edition of *Irregular Feature* is no exception, so included is a gradient calculation chart.

To calculate a gradient select the relevant amount on the gain in vertical height axis, (say 10mm) and on the distance-travelled axis, (say 500mm) follow across and up to where they intersect, and then diagonally up to find the gradient (2%)

If you have set your maximum grade (say 1.25%) and wish to find the length of track required to gain a set height (say 10mm) then work the chart in the other direction i.e. go down the 1.25% line to the 10mm point on the change in vertical height axis, then down to find the result 800mm.

Of course the chart can also be used to find the height that can be gained in a given distance by reversing the last two operations i.e. down to the 800mm point on the distance travelled axis, then across to find the result 10mm.

The numbers chosen are obviously nice easy ones, but with a little care all those oddball measurements can be calculated as well. If your figures are larger than those in the chart then simply divide by a suitable amount before and multiply after. For those who cannot work out “them new fangled millimetre thingies” simply substitute inches, cubits or whatever instead, as long as each axis is of the same units the chart will still work. As usual with this type of chart it becomes more accurate and easier to use the larger it is drawn. When calculating remember to allow a little extra length than theory would suggest for the vertical transition from one gradient to another.

Catch you down the track...Tony Mikolaj..

Gradient chart