

## **Modelling the Isle of Wight in Rail3D**

*By Mark Goodspeed*

### **The Isle of Wight**

The Isle of Wight is an island about 24 miles east/west by 12 north/south just off the south coast of England. In Victorian times it was a popular holiday resort area and from the 1860s a number of lines were promoted on the island.

For a small area, the island had quite a lot of railways, and four different companies built parts of the island network. At its peak the network extended to 56 route miles, including a "mainline" down the east coast of the island, a long branch across the island and a north-south line through the middle, as well as a couple of other branches.

The original lines had a variety of rolling stock, but once the lines were absorbed into the Southern Railway in 1923 the loco fleet was reduced to mainly class O2 tank engines (second-hand from London suburban services). Similarly the coaching stock was second-hand items displaced from the mainland.

To bring the story up to date, by the late sixties much of the network had been closed, and only part of the mainline from Ryde to Shanklin was retained and electrified. Again, the stock was secondhand, ex-London Transport tube stock being brought over to the island. On a more positive front, part of the old network is preserved, including one of the O2 tank locos, and now operates as the Isle of Wight Steam railway. (Well worth a visit).

I chose to model the island in approximately the 1950's, with all the routes in place and the O2 tank locos in charge.

Further information, including maps and photos can be found at the excellent Southern E-Group website [http://www.semgroup.co.uk/location/iow/iow\\_01.html](http://www.semgroup.co.uk/location/iow/iow_01.html) and the Isle of Wight steam railway site <http://www.iwsteamrailway.co.uk/>

### **Setting up the model**

The first thing to do was to prepare a map of the island and set this up in *Rail3D* as a digitiser session. The size of the island being relatively small, it is quite feasible to load the *Rail3D* digitiser with a high-resolution map of the whole island.

The map was loaded into the digitiser and two datum points marked to calibrate the digitiser:



This calibration is saved so that the digitiser can be recalled later when required.

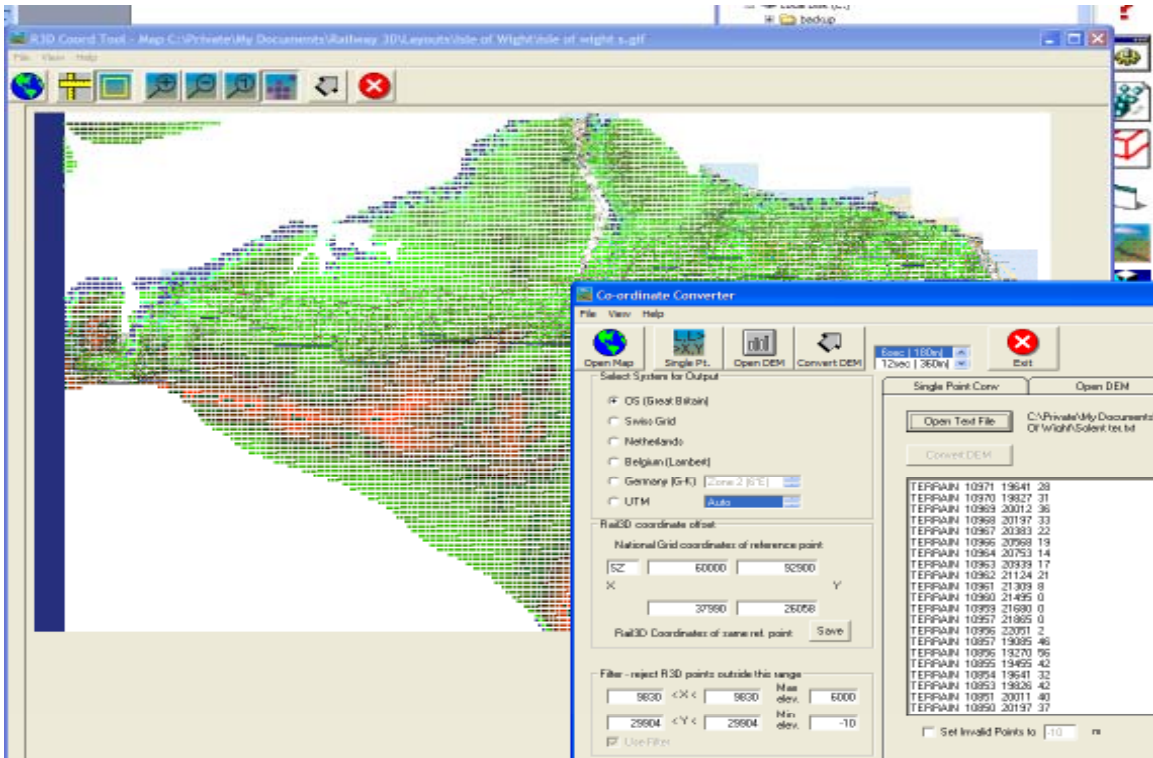
I also like to set up the layout defaults at this stage, so I set the layout defaults to wooden sleeper track, and lower quadrant semaphore signals.

### **Importing Terrain Data**

The next step in making the model was to set up the terrain. One of the advantages of *Rail3D's* terrain system is that it allows for fine detail in the terrain where required, and a coarser terrain mesh can be used away from the railways to save memory and processing time.

So, for this model, I chose to import terrain data at approximately 100m resolution for the whole island. Later I would add finer terrain detail where needed close to the tracks.

I downloaded the relevant section of STRM (Shuttle Radar) data from the web and used *MicroDEM* to select the area I wanted and reduce the resolution to 100m. Next I loaded the 100m data into Mark Hodson's DEM tool for *Rail3D*.



This allows me to check the alignment of the terrain points with my digitiser calibration (see above) and then convert the terrain points into *Rail3D* format. While the tool can save the results as a text file ready for input into *Rail3D*, I usually just copy the data and paste into *Rail3D*.

Once in *Rail3D*, I clicked the terrain triangulation and soon I had the terrain surface of the Island ready:



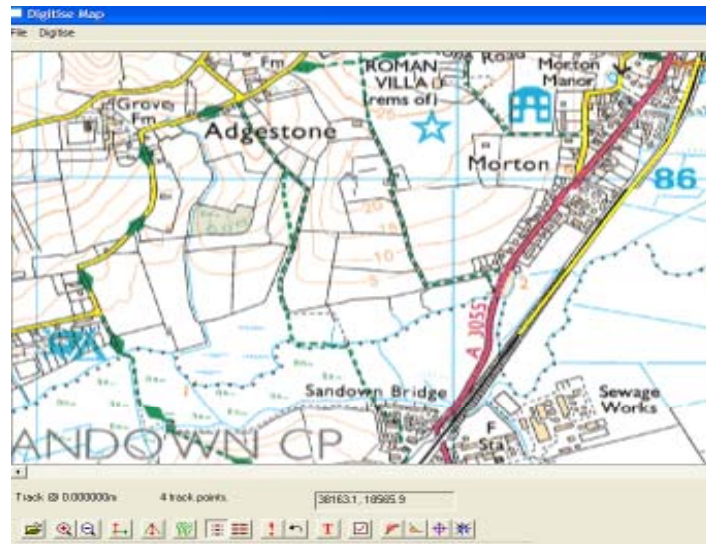
Further details of the terrain import process can be found on the *Rail3D* wiki at [Using SRTM Terrain Data](#) and [SRTM Terrain Step-by-step](#)

## Digitising the Mainline

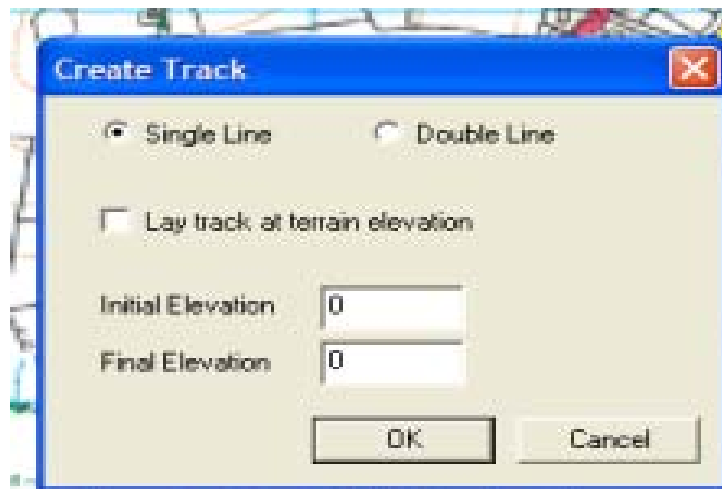
Next, I used the digitiser to create the mainline.

*Nb, you could of course create the track before importing the terrain, but there is something quite satisfying about getting the terrain in place first and then laying the track though it.*

Creating the track with the *Rail3D* digitiser is really quick and easy. Assuming the map has been loaded and the digitiser calibrated, all you do is click along the track to create the track links.



Having clicked along the route of the track, the links are committed to the layout, at this point the program needs some information about the elevation of the track:



I chose to lay single track (the "mainline" is mostly single track with a couple of double track sections and it is easier to lay a second track where needed rather than take away the extra track where not needed).

I knew I was going to have to work on the gradients anyway, so it didn't really matter what elevations I used, but I ticked "Lay track at terrain elevation" and then "OK" to create the track.

This very easily and quickly created a single line from Ryde to Ventnor, and of course being human I wanted to see what it looked like, so I placed a train and set it running along the line to see what the layout was starting to look like.

The digitiser is a good way to get the routes down, but the results were not perfect and needed to be tweaked in a few areas:

1. The digitiser rarely (if ever) produces true straight lines, so sections of track that should be straight had to be straightened using the "Straighten track" tool. See [Laying Nice Curves](#) on the wiki for some excellent tips about this and the following point.
2. Curves produced by the digitiser may not be constant, and do not have nice transition approaches, see the above reference.
3. Because I chose "Lay track at terrain level" the track is always on the surface – the digitiser cannot allow for cuttings, embankments and tunnels, and so the resulting line had some unfeasibly steep gradients in places.

It is quite important to get the one line right before creating the passing loops, sidings and doubled track sections. If you start creating other tracks, it is much more work to correct the points above. Despite this, I of course laid in some loops and sidings first before I got the gradients fixed and thus made more work for myself. One of the reasons for this was that I didn't have a decent gradient profile for this line (oddly I do have them for the other island lines, but not for this one), so I put off doing the job in the hope that I could find the missing information.

## Grading the Line

The first thing you need to know is what the gradients and/or elevations are. This information is not as easy to obtain as you might think (when I was in Thailand recently, I noticed that most stations had a signboard with the elevation on it, but we don't have that much in the UK). If you can find a reliable gradient profile it helps, but in this case I only had the following information sources:

1. The map. However, it is surprisingly hard to read track elevations off the map. The contour lines can be hard to follow, particularly in built-up areas, and of course railway tracks are rarely at ground level – they are often in cuttings or on embankments.
2. An old description of the line with comments like "the line falls at 1 in 78 past Brading". However, having gleaned as much as I could from this article it didn't quite add up with other things I knew.
3. A few gradient markings on signal box diagrams

So it was a bit of a challenge, and I spent some time with a spreadsheet trying to fit all these different pieces of the jig-saw together and come up with a satisfactory gradient profile. It's probably not correct, but it's near enough in the key features.

	A	B	C	D	E	F	G	H	I	J	K
1											
2											
3			Ventnor line gradients								
4											
5											
6							map heights				<b>Known info</b>
7			m	Elevation	Grade						Pier is level
8		Pier Head	0	10	LVL		830	0			Down to tunnel
9		Esplanade	830	10	-32		159	-5			
10		Tunnel N	989	5	LVL		359	0			
11		Tunnel S	1348	5	98		685	7			Climb from tunn
12		StJohns	2033	12	367		367	1			St johns to Sm
13		StJohns (sth end)	2400	13	LVL		400	0			
14			2800	13	146		731	5			
15		Smallbrook jct	3531	18	LVL		78	0			Falls at 1 in 79
16			3609	18	210		1681	8			
17		Summit	5290	26	-152		914	-6			
18			6204	20	-74		1114	-15			
19		Brading	7318	5	LVL		396	0			
20		Brading (sth end)	7714	5	LVL		1184	0			From brading is
21			8898	5	328		656	2			
22			9554	7	LVL		446	0			

The good news is once you know the elevations you want, applying them to the model is really easy. So I worked down the line from end to end setting the elevation at my key points. This is where having a train on the line helps, as I like to run the train along the line adjusting things as it goes.

Having set all the key elevation points I used the "Grade between markers" function to smooth out the gradients between these points. Of course it needed a little bit of tweaking and three or four goes before I was happy with the result.

### Adjusting the Terrain

The imported SRTM terrain is fine for the broad shape of the hills, but at 100 metres resolution it often produce anomalies near the track.

For example, there shouldn't be a deep cutting here:



In fact, if anything there ought to be an embankment. So I needed to work along the line checking the terrain relative to the track and adding (and in some cases removing) terrain points to get the terrain right. This may sound like cheating, but

remember the STRM data is relatively poor resolution and where I needed to I could read accurate elevation from the map contours.

I also found that in the low-lying areas of the island, and close to the coast, the SRTM data was particularly poor, so I had to enter terrain points along the coast, and points below sea level just off the coast, to get the coast line right.

I find it quite useful to put in rivers and streams at this stage. It is fairly easy to get the elevations of rivers right from the contour lines and then using the "Stitch terrain to track" tool (nb, in *Rail3D*, rivers are a type of track) fix the terrain down at the river level, this is a good way to get valley shapes right,

This took quite a lot of work, but overall importing the SRTM data to start the terrain was better than doing the whole by hand – particularly for distant hills etc.

### **Station and Track Details**

OK, a lot of hard work getting this far – but now it gets more interesting.

The next job was to start adding the loops, sidings, stations, signals etc and to add the double track sections of the line.

Fortunately, I had plenty of information in books, including photographs, signalling diagrams and track plans. So, next I worked along the line adding pointwork, loops, signals and platforms:



The sections of double track were easy to construct: all I had to do was mark the ends of the double track section and use the "Quick Track" function to lay a line parallel to the original line.

Also at this stage I added features such as tunnels and bridges.



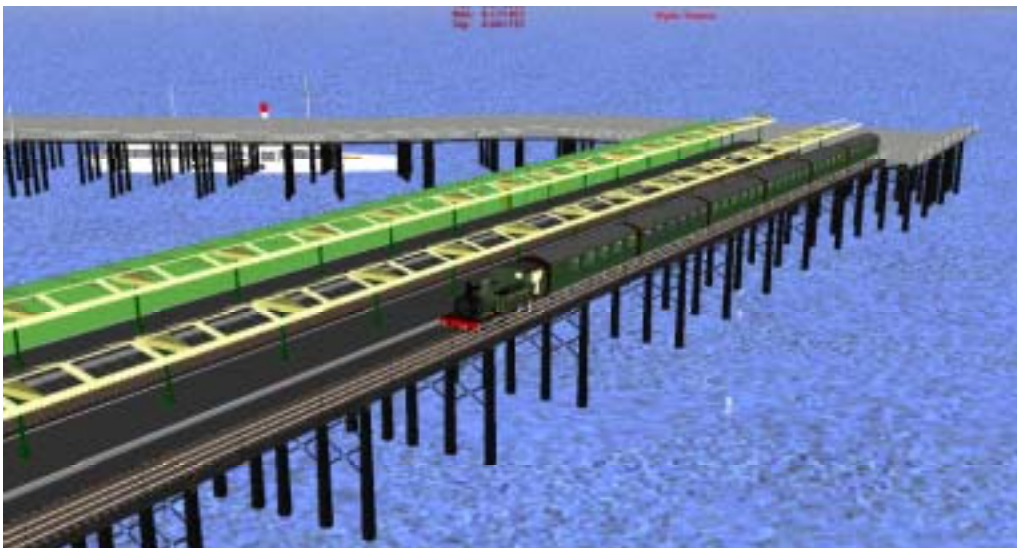
### Modelling Scenery Items

I needed quite a lot of distinctive scenery items for this model.

For example, Ryde pier: here the trains ran (indeed still run) out along the pier to meet the ferries from the mainland. There used to be a pier tramway as well.

I knew that a model of Southend pier had already been created for *Rail3D*, so I planned to adapt some of these model objects for this purpose. I used the pier components to make a new model object for a standard gauge pier and, although the Ryde pier trams were standard gauge, decided I would make do for the time being with the narrow gauge Southend pier models. Maybe one day I'll replace them. Also on the todo list – at least for the time being – will be the ferry steamers, as I'll make do with the existing paddle steamer model (which was Swiss I think).

So, using these components, I was able to put the model Ryde pier in place:





## Modelling Stock

When I started I thought that stock wouldn't be a problem. I knew there was an O2 in the library – and although it was an old model lacking most of the latest features, I thought it would be fairly easy to update. I also knew there was a good looking model of an LSWR coach of a suitable vintage and planned to use that.

However.

Once I started looking at it, the O2 loco model was not very satisfactory and I decided I needed to build a new one from scratch. At least this would allow me to take advantage of the latest code features and optimise the model for *DirectX* rendering.

I also found when I used them that the coaches were built in the old style using lots of individual panels, rather than the preferred method of using a texture skin. Whilst they looked terrific, all the detail in the panelling meant that they rendered very slowly, so I decided I needed to make a new coach model as well.

### **The Loco.**

Again, I was fortunate in being able to find plenty of photos of the original, although dimensions were few and hard to find. I still haven't been able to find a good line drawing, so I had to estimate many dimensions from the photograph and from the known dimensions.



O2 "Calbourne" preserved on the Isle of Wight Steam railway  
*Photo, J Goodspeed*

I still haven't completed the model, particularly the back-end and the cab (which lacks any internal detail at the moment), and it needs some work on the frames and running gear, but this is as far as it's got:



### **The Coaches**

The coach model was based on a photograph of an LBSCR first class saloon and modified to produce brake, composite and second class versions. There was a variety of old coaches on the island, so I'm only attempting to represent them in general terms.

You can see the coaches in the earlier pictures.

These new models run quite nicely and at very acceptable frame rates in most parts of the layout, although the Ryde area is quite slow, probably due to the complexity of the layout and the detail in the pier components. I shall be looking at improving this in due course.

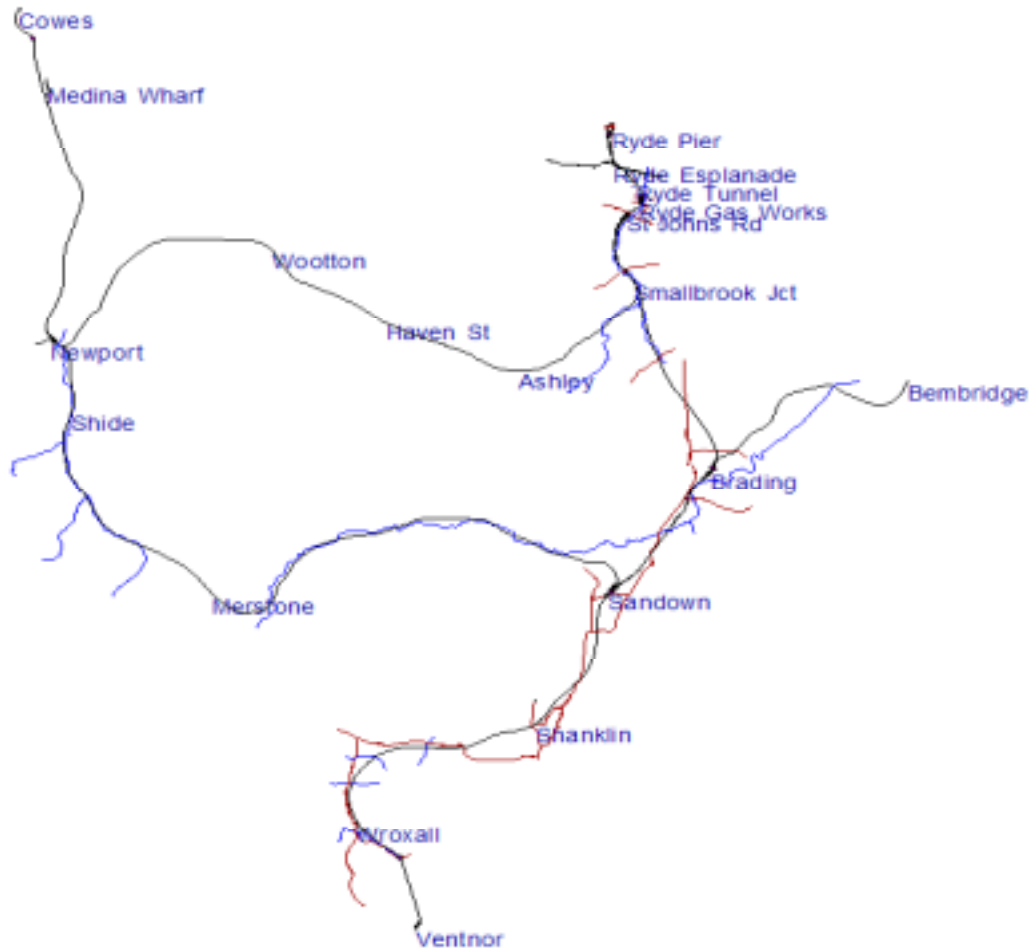
### **Moving Scenery**

Finally, I decided I needed something to run on the roads and there were no road vehicles of a suitable vintage available, so I made a quick and simple model of a suitable bus:



### **So Far**

Well, so far I've got the "mainline" from Ryde to Ventnor and all the stations and signalling are in place on this line.



The branch to Bembridge is in place as is the line across to Newport and Cowes, and I've recently added the cross-island line from Sandown to Newport. Apart from the Ryde to Ventnor line, these other lines are only sketched out and lack most of the points and signaling. Smallbrook Jct to Newport and Newport to Sandown need a lot of work on gradients and cuttings etc.

You will notice from the above map that I've put some of the roads in place where they cross the railways, and added quite a lot of rivers and streams. Rivers and streams are useful as they help to define the terrain and get the terrain shaped correctly.

There are two more lines to add in due course, the Ventnor West branch, which ran south from Merstone, and a long branch west from Newport to Freshwater.

At the moment, I have an intensive train service (every fifteen minutes) between Ryde and Ventnor – this is not unreasonable, in the peak summer service there were 12 trains an hour passing Smallbrook Jct, and it was claimed to be the busiest single-track junction in the country. I also have one train shuttling between Ryde and Cowes via Newport and one between Sandown and Cowes. I also have a coal train running between Medina Wharf and Ryde: coal was imported to the island at

Medina Wharf and distributed by rail, particularly to Ryde loco depot and Ryde gas works.

### **Next Steps**

This was only meant to be a holiday diversion over the Christmas break, but it's grown and growing. What's next to do?

- Grade the Smallbrook to Newport line and sort out the earthworks. Add stations (etc) at Wooton and Ashley, and do Haven St station properly.
- Correct some gradients on the Sandown to Newport line and model stations at Merstone, Shide etc
- Quite a lot of work to get the low-lying terrain right on the Bembridge branch, including the harbour and sidings.
- Lots of sidings (etc) to sort out around Newport, and features such as the bridge over the Medina.
- Cowes and Medina wharf are only present in very rough form at the moment and need expansion and sorting out of terrain levels etc.
- Ventnor West branch.
- Freshwater branch.
- Besides the O2s there were two other loco classes on the island – A1x terriers and E2s, and it would be nice to have models of them as well.
- New model of the ferry, pier tram etc
- Need buildings for the towns and villages – and we don't really have much in the way of building models at the moment.

And so on ...

You can find *Rail3D* at <http://www.rail3d.net>

If you have questions about this layout, please contact the author via the *Rail3D* eGroup at <http://groups.yahoo.com/group/railway3d/>

This model will shortly be available for download from [www.rail3d.net](http://www.rail3d.net)

## ***M Goodspeed***

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