

Modelling Narrow Gauge Railways in O Scale



FREE

**A free guide from the
7mm Narrow Gauge
Association**

Welcome to the wonderful world of 7mm narrow gauge railway modelling!

If you have picked up this booklet from the 7mm Narrow Gauge Association, then hopefully you are at least vaguely interested in modelling narrow gauge railways in 7mm, or O, scale. As a free booklet, it will not tell you everything you need to know to create a model narrow gauge railway layout, but it will certainly give you the information you need to get started.

In this booklet, I have tried to cover the essential information the starter will need, from why modelling narrow gauge railways in O scale is a great idea, exactly what a narrow-gauge railway is, and the modelling basics such as track, locos and rolling stock, plus some layout photos to inspire you to have a go yourself.

If you do decide to dip your toe in the world of 7mm narrow gauge modelling, or are looking for more help before doing so, then you should consider joining the Association. One of the main benefits is our quality, full colour bi-monthly magazine, *Narrow Lines*, filled with lots of useful and inspirational articles from our members. If you would like to see a specimen copy of *Narrow Lines*, an issue is available to download from the website via a link on the home page or alternatively please send us an email to books@7mmnga.org.uk for a free copy by post. Members have access to our archive service by which all back issues of the magazine (back to issue number 1!) are available through the

Association's website at www.7mmnga.org.uk.

As well as the magazine, the Association produces a range of Handbooks covering many aspects of narrow-gauge modelling, together with 'Extras' which include information, drawings and plans of many narrow-gauge railways.

The Association has a number of active Area Groups which are a great means of getting to know and meet like-minded people. Members are very willing to help the newcomer with any questions or problems they may come across.

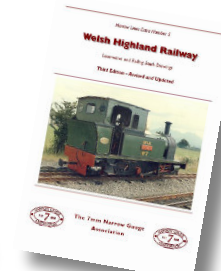
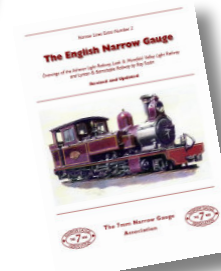
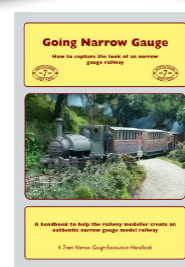
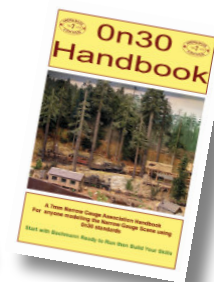
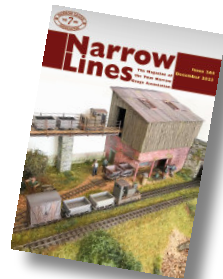
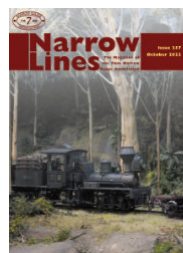
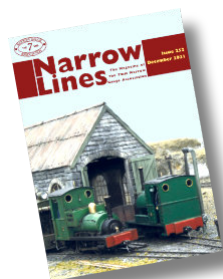
There is also a sales team selling kits, parts and materials, many of which are not available elsewhere in the UK, together with a wide range of second-hand items. Members have a 10% discount on all purchases and no post and packing charges for publications or modelling goods.

Go to www.7mmnga.org.uk for more information or click the QR code below.



Peter

Peter Jackson, Editor



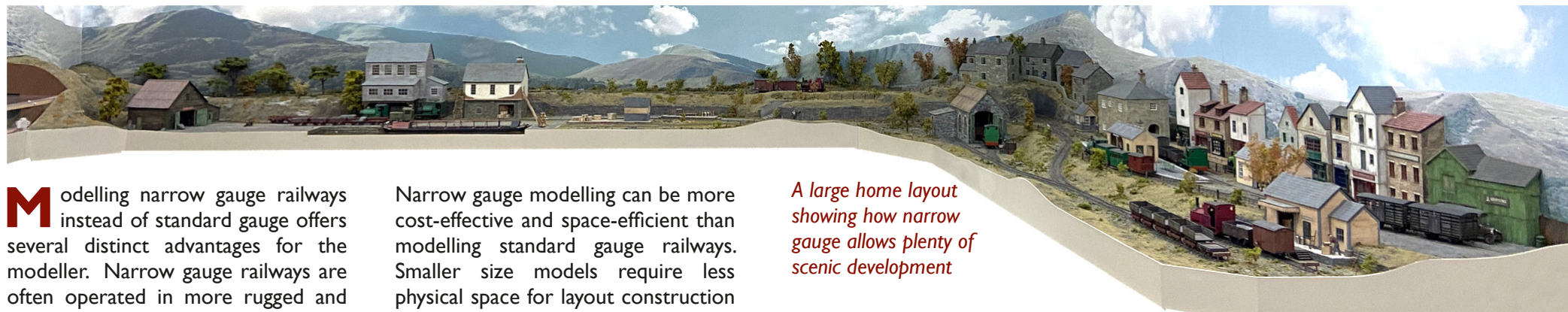
A 7mm Narrow Gauge Association Handbook

Copyright © 2024 - The 7mm Narrow Gauge Association

No part of this work may be reproduced in any medium without the written permission of the Association

The 7mm Narrow Gauge Association, a company limited by guarantee, registered in England and Wales, company number 13210235

Why Model Narrow Gauge Railways?



Modelling narrow gauge railways instead of standard gauge offers several distinct advantages for the modeller. Narrow gauge railways are often operated in more rugged and scenic landscapes and feature sharp curves, steep gradients, and unique track configurations. This provides modellers with opportunities to create interesting layouts in a small space, with the opportunity to be creative in layout design and scenery construction.

Modelling narrow gauge railways also allows for a greater focus on detailing and intricacy. Narrow gauge lines tend to have few locomotives and a limited amount of rolling stock and infrastructure, enabling modellers to incorporate finer details and more realistic weathering techniques, enhancing the overall appeal of the layout. Furthermore, narrow gauge railways typically had more varied and specialised equipment compared to their standard gauge counterparts. This diversity provides modellers with a wider range of opportunities, from quaint rural branch lines to industrial tramways and mountainous logging operations.

Narrow gauge modelling can be more cost-effective and space-efficient than modelling standard gauge railways. Smaller size models require less physical space for layout construction and storage, making them ideal for modellers with limited room or budget. Finally, modelling narrow gauge railways often fosters a sense of nostalgia and charm, as these lines were often associated with unique regional histories and cultures. This aspect can add depth and storytelling potential to model railway layouts, enriching the overall experience for both modellers and viewers alike.

A large home layout showing how narrow gauge allows plenty of scenic development

Why choose O scale?

O scale narrow gauge modelling allows for a higher level of detail and realism compared to scales such as OO, OO-9 or N, but retains the benefits of requiring only modest space for an interesting layout. The larger size of O scale models (1/43

scale) means that finer details such as rivets, bolts, and surface textures can be more accurately reproduced. This attention to detail enhances the realism of the models.



An operationally interesting O scale layout in just 3ft x 1ft!

What is a Narrow Gauge Railway?

What is 'Narrow Gauge'?

Very simply, any railway with a track gauge (the distance between the rails) less than the 4ft 8½in (1435mm) of a standard gauge railway in the UK is known as 'narrow gauge'.

Two key characteristics of narrow gauge railways are:

Flexibility and Manoeuvrability

Narrow gauge railways are known for their ability to navigate tight curves and steep gradients. This makes them suitable for traversing rugged terrain and mountainous regions where the railway can follow the contours of the landscape more closely than a standard gauge railway, and for areas with limited space such as in mining and industrial situations. The trains themselves are generally smaller, also saving space.

Cost-Effectiveness

Narrow gauge railways are often more cost-effective to build and operate than



standard gauge railways. The reduced track gauge requires less material for construction, and the lighter locomotives and rolling stock used on narrow gauge lines are typically cheaper to manufacture and maintain. Additionally, narrow gauge railways can be constructed more quickly and with fewer engineering challenges, making them a practical choice for temporary routes or those with little traffic.



Origins

Most narrow gauge prototypes had their origins either in industry, such as the Festiniog Railway which was built to carry slate, or as lines to provide rail services to sparsely populated rural areas, often as feeders to the main line network, such as the Lynton & Barnstaple, Isle of Man or many of the Irish narrow gauge railways.

This pattern was repeated overseas, with British manufacturers providing much of the infrastructure for numerous narrow gauge railways, as well as locomotives and rolling stock.



Later, tourist lines started to emerge, such as the Groulle Glen line on the Isle of Man.

Narrow gauge railways also played a significant role in the supply systems feeding the trenches on both sides during World War I.

Top Left Devil's Bridge on the Vale of Rheidol Railway taken in 1976

Left Isle of Man Railway

Top Groulle Glen Railway

Right Soldiers oversee the transfer of ammunition from standard gauge (right) to light railway near Ypres in WWI



Scale and Gauge

Scale and gauge can be a bit bewildering at first, but some understanding of the concepts is essential for any railway modeller.

Scale is the term used to describe the ratio between the model and the full size prototype. In a scale of 7mm/ft, 7mm in the model represents one foot in the prototype. This scale can also be written as 1:43.5 which means that one unit in the model represents 43.5 units in full size.

Gauge is a measure of the distance between the two rails of the track. This is the commonest use of the general term 'gauge' in railway modelling, whether on the prototype or in a model. However, many modellers use the term 'gauge' when they really mean 'scale'!

What is 'O Scale'?

O Scale is a name for a set of modelling standards. In the UK it

means a combination of 7mm/ft (1:43.5) scale, while America and Australia use 1/4 inch to the foot (1:48) scale and Continental Europe uses 1:45. O Gauge is the term often used (incorrectly!) to refer to models of standard gauge, main line prototypes. For main line prototypes, a track gauge of 32mm is usually adopted.

For comparison, the most popular modelling scale in the UK, OO, is smaller at 4mm/ft (1:76).

O-16.5

O-16.5 is the most common standard used by modellers of the British narrow gauge scene, where O indicates the scale and 16.5 a track gauge of 16.5mm (conveniently the same as OO scale track). It most closely represents a full size track gauge of 2ft 4in but, with a bit of

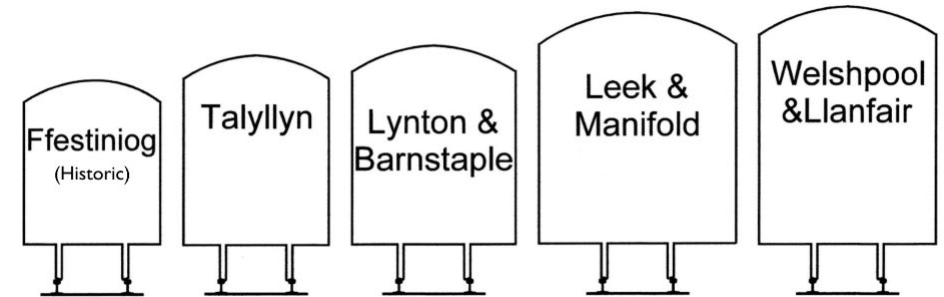


Diagram showing the varying loading gauge of popular British narrow gauge railways (drawn by Leigh Jackson)

modeller's licence, it can be used for models of track gauges between about 1ft 11in and 2ft 6in.

Bachmann have recently adopted NG7 for their ready-to-run, 7mm scale, narrow gauge models running on 16.5mm gauge track; O-16.5 by another name!

On30

Models in American 1:48 scale are described in the form On30. In this case, 'O' indicates O scale, 'n' indicates that the model is narrow gauge and '30' the 30 inch track gauge of the prototype being modelled using 16.5mm gauge track. Other similar scales are On2 and On3 which refer to 2ft and 3ft gauge prototypes respectively, using 1/2in and 3/4in gauge model track.

O-21, O-14 and O-9

These acronyms describe alternative, closer to scale, modelling of various narrow gauges in 7mm scale. O-21 is used for 3ft gauge (using 21mm gauge

track), O-14 for 2ft gauge and O-9 for 15 or 18 inch gauges.

Loading Gauge

Loading gauge is the maximum cross section of locomotives and rolling stock. Knowing this, items along the railway such as tunnels, bridges, platform edges and so on can be built with confidence that trains will not knock into them.

Standard gauge railways within a particular country will have a common loading gauge so that trains can safely travel along from line to line if need be. Trains on narrow gauge lines, however, do not travel on any other lines, so builders of narrow gauge railways can choose not only what track gauge they want, but also the loading gauge they want to use. This has led to very significant differences between the loading gauge of narrow gauge lines within the UK as can be seen from the diagram above.



A comparison of Scale and Gauge. From left to right: standard O scale van on 32mm track; O-16.5 van on 16.5mm PECO narrow gauge track; On30 van on the same PECO track; a standard OO scale van on 16.5mm gauge OO scale PECO track.

Narrow Gauge Railways

Choosing what to model is the same as for any other scale - first decide what you want to include in the model, then work it into the space available. Study of the prototype is an essential part of the design of a narrow gauge layout. A huge range of books about the real thing is available, and it is almost impossible to read them without gaining inspiration.

To have a purpose for the trains you want to run is key. Narrow gauge railways can carry a wide variety of traffic, either exclusively or as a general carrier. This will then lead to the facilities depicted on the layout and the types of rolling stock to run.

Shown here are just a few examples.

The Main Line Feeder

The Welshpool and Llanfair Light Railway is an example of a public 'common carrier' line, meeting the main line at Welshpool, where agricultural traffic was important.



Minerals

Examples include slate, coal, limestone, bauxite, roadstone, clay, sand and gravel. Railways serving extractive industries often also cater for their workers.



The Tourist Attraction

Heritage railways such as those in the Isle of Man and in Wales nowadays are run with tourism as the revenue earner.



Industry

Many industries had narrow gauge railways for moving products and materials. Examples include railway works, gas works, breweries, cement works, and brick and tile works.

Timber/Logging

And from further afield, logging is a common theme for North American layouts, typically modelled in On30 scale.



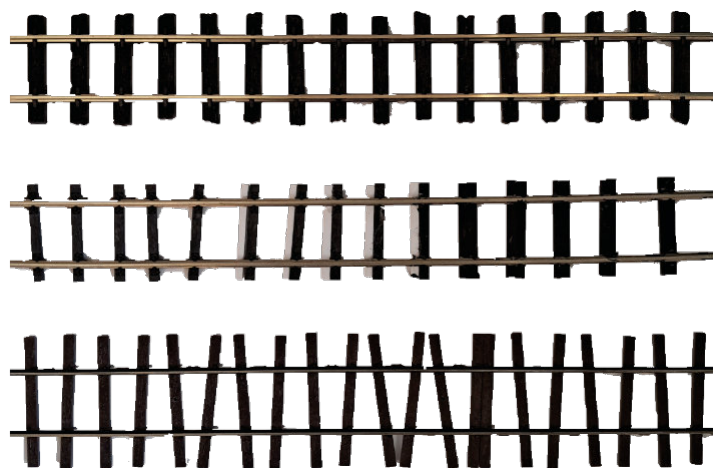
Narrow Gauge Track

If you are modelling a railway, then whatever type of layout you are planning, you will need to model track. Most people modelling 7mm narrow gauge railways will immediately turn to PECO who produce O-16.5 Streamline narrow gauge track and points. You will see this track on many layouts where, when installed and ballasted, it looks absolutely fine.

However, the code 100 rail equates to real life track weighing around 56lbs/ft, very much on the heavy side even for railways with 2 - 3ft gauges. The sleepers too are a little on the heavy side (although rail and sleeper sizes make for a robust product). PECO OO scale Code 75 Streamline track is a better rail size, but now the sleepers are too small! Before PECO introduced their narrow gauge track, modellers often used the then readily

available OO scale track, cutting the webs joining the sleepers so that they could be spaced wider apart and gluing microstrip to each sleeper to make them the correct width. This did put the chair (which attaches the rail to the sleeper) at one edge of the sleeper rather than in the middle, but you had to look very hard indeed to spot it. The photo of the different track options shows how effective this approach can be.

The other 'ready to run' track options are that produced by Micro Engineering in the USA and O-14 Flex Track, both available from EDM Models. Whilst the Micro Engineering track is marketed as On30 track, it is to 16.5mm gauge and, depending on the railway you are modelling, might be an option for you. It has code 83 rail so is lighter than the PECO



Examples of ready to run narrow gauge track:

Top - PECO O-16.5 code 100 track

Middle - PECO OO scale code 75 track with left the sleepers re-spaced, middle with microstrip added, and right painted.

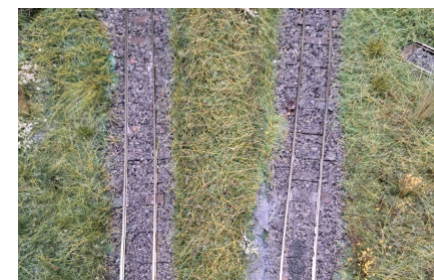
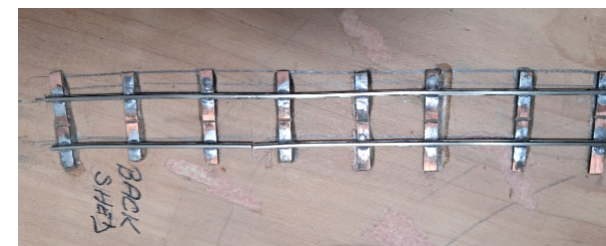
Bottom - Micro Engineering On30 track

A re-sleepered PECO point

offering. Micro Engineering also have a range of points to go with the track.

If none of the above meets your needs, either for its looks, or because you want to have a prototypical gauge, then building your own track is the only option. Sleepers made of PCB or wood are widely available as are things you might need such as track gauges, certainly for 16.5mm or 14mm gauge track. Whilst many modellers are happy to have a go at building plain track, some may consider that building points is a step too far! Several modellers have overcome this by adapting PECO points to match their hand built track or by going further and re-sleepering them completely with impressive results as can be seen from the photos.

Once your track is laid, it then needs to be ballasted. The techniques for doing this are exactly the same as for standard gauge track as described in



*Hand built track: **Top** - showing how the rail is soldered to PCB sleepers and **Below** the finished track in situ.*

numerous model railway books and magazines. Remember though that narrow gauge railway's ballast was generally of poorer quality than that used on the main line railways (often local waste products were used) and likely to be less neatly laid and maintained. There was also likely to be less of it without well-defined shoulders.

Narrow Gauge Locos

A reason often quoted for not modelling narrow gauge railways in 7mm scale is 'that there is nothing ready to run', a statement that was not quite true then and is certainly not the case now. For very many years Bachmann have produced a large



Bachmann On30 0-4-2 Porter

range of On30 American outline narrow gauge locos, along with an extensive range of rolling stock. Narrow gauge modelling is very big in the US and Canada and many other manufacturers produce just about anything the modeller is likely to want. Quite a lot is available from retailers in the UK.

In Europe, Fleischmann produced the Magic Train range of locos, rolling stock and accessories, and although Fleischmann is no more and Magic Trains have become harder to find, Roco are manufacturing a few items. The locos in particular are popular



Fleischmann 0-4-0 Steam Loco

with modellers due to their excellent running.

What was true is that there has been no British outline ready to run, narrow gauge locos, but this too is no longer true. In 2023, Dapol Lionheart



Top - Lionheart L&B rtr loco

Bottom - One of the Bachmann NG7 rtr locos



produced their stunning Lynton & Barnstaple locos in a number of liveries, along with a range of carriages. In 2024 Bachmann released four variants of the Quarry Hunslet locos, along with slate wagons and buildings for the modeller to create a complete ready to run layout.

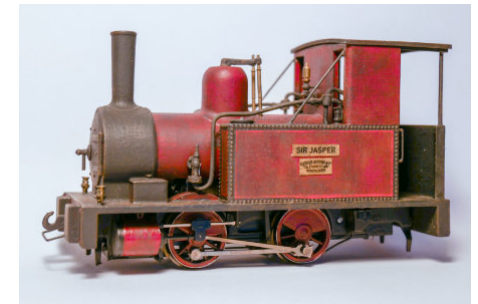
For the freelance modeller, the Bachmann On30 locos are very similar to some colonial locos and can be easily converted to look the part. The On30 Porter locos in particular can also be anglicised by changing the cab



Anglicised versions of the rtr locos on the previous page: Top - Bachmann 0-4-2 Porter and Below - Fleischmann Magic Train

and chimney, something well within the average modeller's capabilities. Similarly, the Magic Trains locos can be anglicised by the simple removal of lights and other European appendages not seen on British locos.

The other beginner's option is to start with an OO scale chassis and add a 7mm scale loco body. There are a



The EDM Models Townsend Hook Body Kit. The main body, roof, firebox and smokebox door are all 3D printed with additional brass detail parts. The kit is designed to fit directly onto the Dapol B4 OO scale chassis.

range of mainly resin loco body kits made up of relatively few parts specifically designed for OO chassis. With the advent of 3D printing, there are also almost one-piece bodies that simply clip onto an OO chassis and need only fittings to be added to produce the finished loco.

For those wishing to model specific locos, there is a wide range of kits covering most of the UK narrow gauge railways.

Rolling Stock

As with locos, until recently the main ready to run options were the Bachmann On30 range for American or colonial wagons and coaches or the Fleischmann Magic Trains for European prototypes. Dapol Lionheart now have Lynton & Barnstaple coaches available and the

generally very straightforward to build, especially the injected plastic kits from the likes of PECO and Chivers Finelines which have very few parts. With the advent of 3D printing, several companies produce 7mm narrow gauge rolling stock which need little in the way of building. PECO also



Dapol Lionheart Lynton & Barnstaple coach

Bachmann NG7 range includes a variety of slate and quarry style wagons. In addition, EDM Models import the Haskell wagons, a range of flat and mineral wagons which are marketed as On30 but are quite appropriate for UK layouts.

Many modellers use kits for their rolling stock needs. Whilst many modellers feel unable to build a locomotive kit, rolling stock kits are



Three of the new Bachmann NG7 ready to run wagons

capabilities of the average railway modeller.

All the above plastic kits make very good-looking items of rolling stock, but there are slightly more complex kits – especially for coaches - that add a lot of detail compared to the more basic offerings.



Above and Left - PECO van and wagon kits

As with locos, another option is to start with an OO scale wagon or coach and use the chassis as the basis for a scratch built, kit or 3D printed body.



Two of the Haskell ready to run wagons

All rolling stock requires couplings. There are a variety of options for the narrow-gauge modeller including OO scale tension lock couplings (particularly if you are using OO scale loco or rolling stock chassis as the basis for your models) or the Kadee range of knuckle couplers that allow remote uncoupling and are used by many narrow-gauge modellers. If you want something slightly more prototypical, a number of manufacturers have, usually brass etched, kits of different styles of couplers.



A bogie coach conversion based on Fleischmann Magic Train coaches

Some Layout Inspiration



A selection of layouts in different scale / gauge combinations showing the wide variety of narrow gauge railways that can be built in O scale. Having read this guide, why not have a go yourself?



**Modelling narrow gauge railways in scales around
7mm/ft?**

Then join

The 7mm Narrow Gauge Association

for support and encouragement.

**We cater for those who model in O-16.5 / NG7, On30,
O-9, O-14, On2, On3, Oe, Om**
and many similar scale/gauge combinations.

We provide:

- **Full colour bi-monthly magazine, Narrow Lines**
- **Books of drawings of narrow gauge prototypes**
- **Modelling handbooks**
- **Modelling goods sales for some hard to find items**
- **Area Groups in many parts of the UK**
- **Online access to all past issues of Narrow Lines**
- **10% discount on all Association purchases and free P&P on modelling goods and publications**
- **Access to the 'members only' Facebook Group**

**For information about the Association and full details
of membership and current benefits, visit
www.7mmnga.org.uk**