Education Program

Basic skills Series

Module Two

Scale and Gauge

This module examines scale and gauge combinations readily available and widely used in Australia

- **Scale and gauge**
- **N scale**
- **HO scale**
- **OO scale**
- **On30**
- **G gauge**

Scale & Gauge

The above photo shows the same locomotive modelled in Z ,N, HO, S, O and G scales . The model lengths range from 70 mm for the Z scale model up to the 530 mm long G scale model. Z, S and O scale models are not readily available in Australia and are not discussed in this module.

It helps to understand the difference between scale and gauge. Scale refers to the size of the models as compared to the prototype (e.g. HO scale 1:87) as described in the following pages. Gauge refers to the track and more specifically the distance between the rails. Scale and Gauge are loosely related in model railway as some scales share a common rail gauge (e.g. HO and On30). This is also described in the following pages.

Another term you will hear is rail code. The rail code is the height of the rail in thousandths of an inch. The most readily available 16.5 mm gauge track work uses code 100 rail. In HO scale this rail height represents 155 pounds per yard rail used widely by the Pennsylvania Railroad in the 1950s. In On30 code 100 rail represents 63 pounds per yard rail.

N scale

N scale models are 1/160th full size. Standard gauge N scale models operate on nine millimetre gauge track.

N scale gives you the most model railway in the space available for your model railway.

A twelve metre (forty foot) shipping container in N scale is 76 millimetres long. Models of current North American rolling stock are around 20 mm wide by 37 mm tall. An idea of the size on N scale rolling stock is provided by the photo of Rock Island Alco DL 600 number 7552.

Readily available sectional track allows you to experiment with track laying without the need to cut rails. Peco number three radius curves (298 mm radius) will reliably operate most N scale standard gauge rolling stock. Using Peco number three and four radius track will allow you to lay double track around curves. Using these sectional track curves your layout will need to be around 750 mm wide.

To provide sufficient over head clearance for one train to pass over another train in N scale requires around 60 mm vertical track spacing. Using a reasonable one in fifty gradient the distance required to climb 60 mm is 3,000 mm.

Using N scale allows you to model large scenes without the trains over powering the scene.

The models are relatively tiny. Adding detail to N scale models requires considerable manual dexterity.

Most hobby shops carry N scale track, structures and rolling stock.

Around twenty per cent of Australian NMRA members model in N scale.

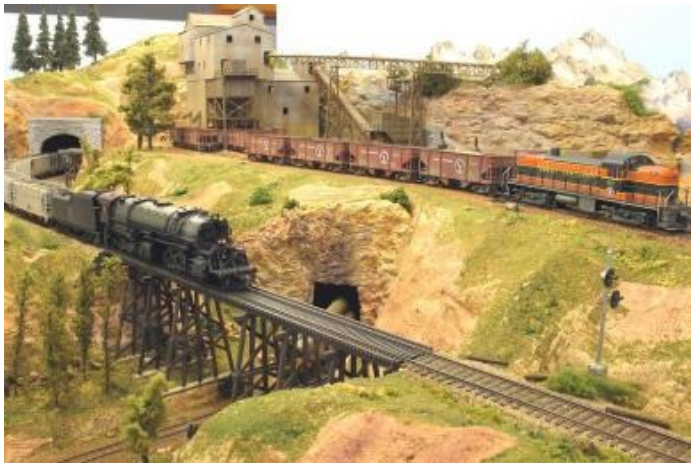
HO Scale

HO scale models are 1/87th full size. Standard gauge HO scale models operate on 16.5 millimetre gauge track.

HO scale gives you around half the model railway in the space available for your model railway as N scale.

A twelve metre (forty foot) shipping container in HO scale is 140 millimetres long. Models of current North American rolling stock are around 35 mm wide by 67 mm tall. The photo of Santa Fe FP45 5947 gives an idea of the size of a HO scale model of a reasonably sized locomotive.

Readily available sectional track allows you to experiment with track laying without the need to cut rails Peco or Hornby number three radius curves (504 mm radius) will reliably operate most HO scale standard gauge rolling stock. Using the number three and four radius curved track will allow you to lay double track around curves. Using these sectional track curves your layout will need to be around 1,200 mm wide.

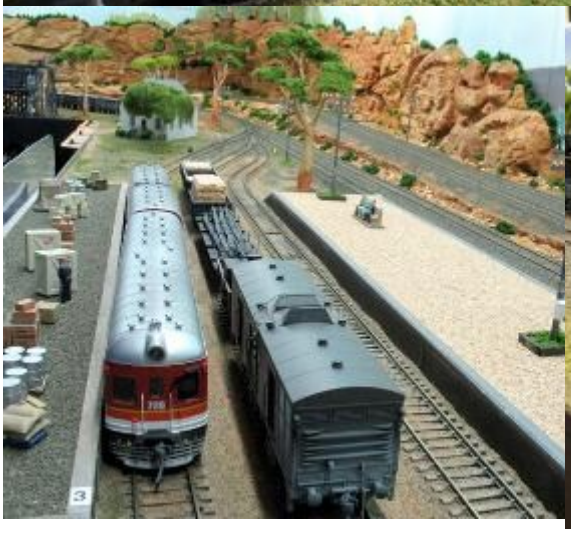


To provide sufficient over head clearance for one train to pass over another train in HO scale requires around 100 mm vertical track spacing. Using a reasonable one in fifty gradient the distance required to climb 100 mm is 5,000 mm

HO scale models are readily hand able. Most of us are capable of adding details and or modelling rolling stock in HO scale

Most hobby shops carry HO scale track, structures and rolling stock.

Around sixty per cent of Australian NMRA members model in HO scale.



OO Scale

OO scale models are 1/76th full size. This scale is primarily used to model British prototype railways. The models operate on the same 16.5 mm gauge track as HO scale standard gauge models. OO scale models operating on HO gauge track originated from the inability many years ago of manufacturers to build drives able to fit into HO scale models of British locomotives.

OO scale gives you around the same model railway in the space available for your model railway as HO scale.

A twelve metre (forty foot) shipping container in OO scale is 160 millimetres long. OO scale models of current British rolling stock are around 36 mm wide by 52 mm tall. The photo of an OO scale model of British Railways 9F class number 92221 gives an idea of the size of OO scale models.

Readily available sectional track allows you to experiment with track laying without the need to cut rails Peco or Hornby number two radius curves (438 mm radius) will reliably operate most OO scale standard gauge rolling stock. Using Peco or Hornby number two and three radius curves will allow you to lay double track around curves. Using these sectional track curves your layout will need to be around 1,100 mm wide.

To provide sufficient over head clearance for one train to pass over another train in OO scale requires around 80 mm vertical track spacing. Using a reasonable one in fifty gradient the distance required to climb 80 mm is 4,000 mm.

OO scale models are readily hand able. Most of us are capable of adding details and or building rolling stock in OO scale.

Most hobby shops carry OO scale structures and rolling stock. OO scale models operate on the same track work as HO scale models.

A reasonable number of Australian NMRA member's model British railways in OO scale.

On30

On30 models are 1/48th full size. This scale and gauge combination is used to model narrow gauge railways. On30 while strictly representing models of 760 mm gauge railways such as the Victorian narrow gauge lines is widely used to model 900 mm gauge railways. The models operate on the same 16.5 mm gauge track as HO scale standard gauge models.

A twelve metre (forty foot) shipping container in On30 scale is 254 millimetres long. The cross section of On30 models depends to some extent on the prototype modelled. Typical North American narrow gauge rolling stock modelled in On30 are 50 mm wide by 80 mm tall

Readily available sectional track allows you to experiment with track laying without the need to cut rails. Peco or Hornby number three radius curves (504 mm radius) will reliably operate most On30 rolling stock. Using these sectional track curves your layout will need to be around 1,200 mm wide.

To provide sufficient over head clearance for one train to pass over another train in On30 scale requires around 120 mm vertical track spacing. Using a reasonable narrow gauge gradient of one in thirty the distance required to climb 120 mm is 3,600 mm

On30 models are easy to handle. Most of us are capable of adding details and or modelling rolling stock in On30.

On30 gives you roughly the same the model railway in the space available for your model railway as HO scale. This is due to the rolling stock being similarly sized to HO scale models and having similar curve radius requirements.

On30 models are available in a number of Australian hobby shops. While On30 models operate on the same track work as HO scale models, 16.5 mm gauge track is available with sleeper spacing's to suit narrow gauge track work.

Around twenty per cent of Australian NMRA members model On30.

G Gauge

G gauge models run on 45 millimetre gauge track. G gauge is used to model a variety of real track gauges from standard gauge (1,435 mm) using 1/32nd scale through 1,060 mm gauge using 1/24th scale, 1,000 mm gauge using 1/22.5th scale and 912 mm gauge using 1/20th scale.

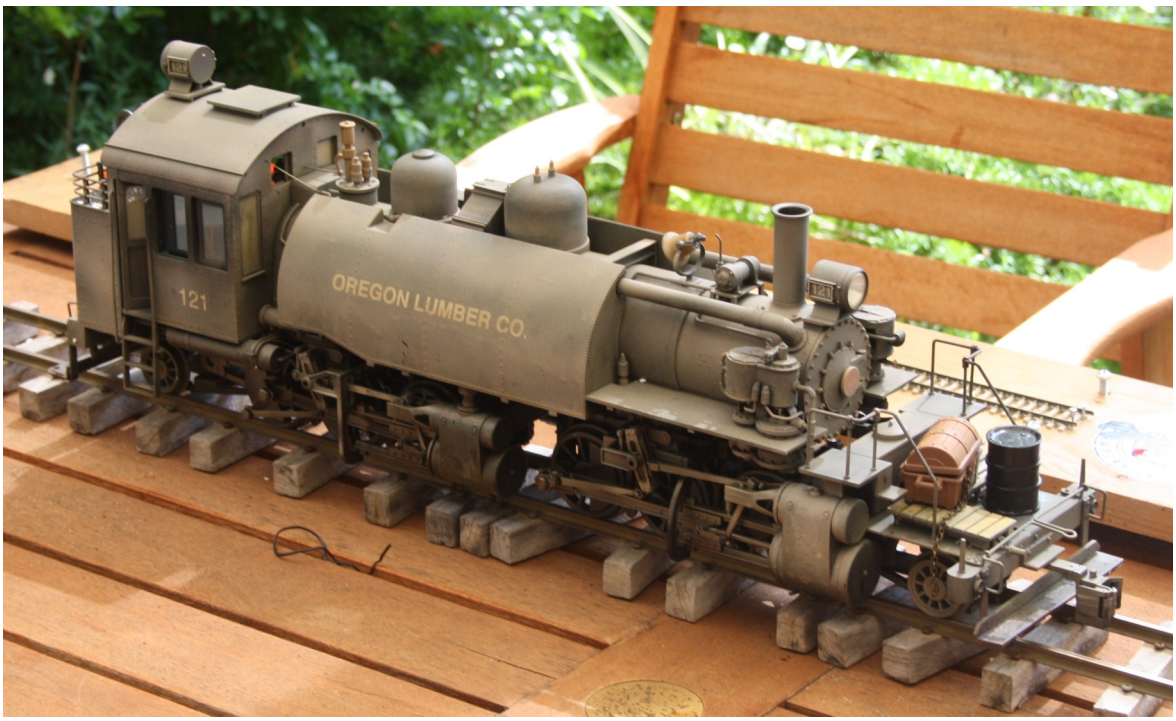
The size of G gauge models and the curve radius they require to operate make indoor layouts rather limited. The track work is weather resistant making fixed outdoor layouts practical in our climate.

The size of the models encourages adding detail to commercially manufactured models and building your own. The business card in the photo gives an indication of the size of a G gauge model.

The size of G gauge models offer plenty of scope for detailing and weathering models.

Some hobby shops carry G gauge rolling stock and components.

A reasonable number of Australian NMRA members model in G gauge.



Further Reading

Kalmbach Books – Getting Started Series

Worlds Greatest Hobby – on line articles