

Education Program Basic Skills Series



Module One

Getting Started

The following pages introduce the essential elements of railway modelling

- **Personal safety**
- **Locomotives and Rolling stock**
- **Sourcing models**
- **Train control**
- **Track laying**
- **Learning to operate your model trains**

Personal Safety

Safety in all activities is essential. Railway modelling is no exception. Modelling railways is a pleasant hobby. Following a few basic common sense rules will keep ourselves, our families and visitors to our model railways safe.

240 volt mains powered power supplies need to be treated with respect. Regular inspection of mains powered equipment will allow accidental damage to power supplies to be noted and repaired or replaced. Keep extension cords out of passage ways.

Tools paints and glues need to be securely stored out of reach of small children.



Hand tools can be sharp. Keeping your work bench tidy will prevent accidental injuries.



Power tools need to be treated with respect. Always wear safety glasses while using power tools to prevent eye injuries.

Molten solder can cause eye injuries. Always wear safety glasses



during soldering to protect your eyes.

Operating soldering irons are hot. Using a soldering iron stand can prevent accidental contact with the hot end of the soldering iron



Paints and glues can emit flammable and or toxic fumes during curing. Always paint or glue in a well ventilated location to prevent fume build up.

Superglue in your eye requires medical attention. Always wear glasses or safety goggles while using superglue



Locomotives and Rolling stock



Rolling stock is probably what attracted you to the hobby in the first place. Santa Fe's 3784 looks magnificent but requires practice to get on the track and well laid track to operate. Most railways operate mid sized locomotives for every day duties. You would be well advised to start out with a basic model locomotive. Choosing a model of this type as your first model locomotive will allow you to operate a variety of different trains from main line passenger trains to local freights. As your roster grows your general purpose locomotive can be realistically used for intermediate service.



The EMD GP series locomotives have been the mainstay of intermediate motive power on North American railways since the 1950's. Santa Fe GP 30 3232 was built in the early 1960's initially for main line service. As time went on locomotives like 3232 were utilised for a wide range of services from shunting to main line haulage.

Features to look for on your first model locomotive are; all driving wheels driven, current collection on all powered wheels, free swinging bogies, freely operating couplers and if you intend to use DCC, should be DCC decoder equipped. It is well worth test running your first model locomotive in the hobby shop before taking it home.

Its worth noting a locomotive alone does not constitute a train. A train is a string of coupled freight or passenger cars (rolling stock). Starting off with every day rolling stock provides a sound basis for your rolling stock roster. Multi purpose passenger cars and general purpose freight cars are a good place to start. The British Railways coach



brake composite was used on most of the locomotive hauled passenger services in Britain. The model British Railways Mk1 coach brake shown in the photo can be the entire passenger train or part of a larger passenger train.

The box car was the mainstay of North American railways. The model box car shown in the picture can be shunted into a siding to be loaded or form part of a train.



Things to look for on your first coaches or freight cars are; free spinning wheel sets, metal wheel treads, free swinging bogies, freely operating couplers and a uniform weight per unit length.

Free spinning wheel sets allow your models to run freely. Metal tread wheels stay clean longer than plastic wheel treads.

Free swinging bogies allow your models to

track smoothly through curves. The model in the above photo is fitted with free spinning metal tread wheels mounted in free swinging bogies.

Freely operating couplers allow your models to follow each other through curves and point work. Uniform vehicle weighting helps train operation especially around curves. The coupler type fitted to your locomotive and rolling stock depends on the prototype modelled. HO scale North American and Australian outline and On30 models are usually fitted with knuckle type couplers (Kadee or Kadee compatible) like the one shown in the upper photo. OO scale British outline models are fitted with the hook and loop type coupler like the one shown in the lower photo. Both types work reliably, but are not compatible.

For HO scale, OO scale and On30 a weight of 50 to 60 grams per 100 millimetres of overall vehicle length will give reliable operation.



Sourcing rolling stock

Locomotives, rolling stock, scenery materials and structures can be sourced from your local hobby store. If you have a limited budget or more specific needs there are other sources. For best prices on locomotives and rolling stock you can often get sales from offshore web based hobby stores such as Train World for US prototypes or Hattons for British/European prototypes and Peco track. But the probably the best source for beginners are the local train shows where many of them have bring and buy tables full of pre-loved bargains. Watch for announcements of these in AMRM or our NMRA web site.

You should also try and choose an era and prototype so as not to end up with a European locomotive with American or Australian rolling stock. For example if you choose modern era (post 1980) American you will be looking for larger freight cars or flat cars carrying containers with a diesel locomotive of the same road name e.g Union Pacific. Alternatively you could choose a transition era Australian prototype (1960 – 1980) e.g. NSW Railways and you could purchase steam and early diesel locomotives with smaller rolling stock . If you like steam locomotives you would model steam era and choose only steam locomotives and small rolling stock for a given prototype/ location such as east coast US (Pennsylvania RR) or Australian (VIC Rail) or British.

Model railway magazines, such as Australian Model Railway Magazine, Model Railroader, Railway Modeller and Hornby Magazine available at most newsagents and Model Railroad Hobbist available as a free subscription on the Internet (model-railroad-hobbist.com) are good guides to equipment availability and retailers.

Train control

Your model locomotives pick up their power from the rails. The motors powering your model locomotives are twelve volt direct current permanent magnet motors. Varying the voltage across the motor varies the motor speed. Reversing the polarity of the power to the motor changes the direction of rotation. Control of your model locomotive can be either direct current (DC) or digital command control (DCC)

Direct current

Direct current controls the voltage and polarity of the rails the locomotive is running on. The model locomotive travel direction and speed responds to the polarity of the track power and the voltage between the rails. Each controller can control one locomotive independently. Operating multiple locomotives independently with direct current control requires the layout be electrically divided into sections and the use of multiple DC controllers.



A wide range of direct current controllers are available locally. Even basic DC controllers provide good speed control of your models.

Around a third of Australian NMRA members use direct current train control.

Digital Command Control

Digital command control has a constant voltage across the rails. Individual locomotive control is by electronically coded signals from the command centre to the locomotive. The system does not require complex wiring or switches to control multiple trains on the one track.



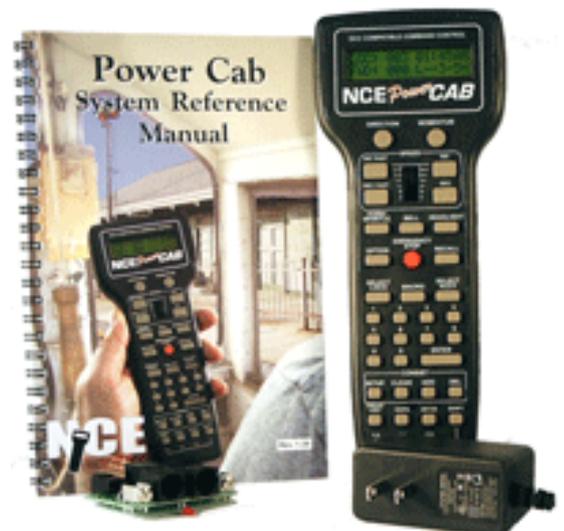
DCC requires each locomotive to be fitted with a decoder. The locomotive decoder has a unique user selectable address. The control system direction and speed instructions to the decoder in the locomotive varies the polarity and voltage of the direct current power to the motor controlling the locomotive travel and speed. The decoder may have auxiliary outputs to control headlight operation. Sound decoders are available allowing the model locomotive sound to match the locomotive power output. These decoders allow separate operator control of the whistle independently of locomotive speed.

The NMRA DCC standards used by most DCC system suppliers allow any manufacturers DCC command station system to control any other manufacturers locomotive decoder. This means you are not restricted to one brand of control system and decoders.

A reasonable range of model locomotives are available ready to run with DCC decoders installed. Most currently manufactured model locomotives are delivered DCC ready. This feature allows you to simply plug a decoder into the model for DCC operation.

A range of manufacturers offer DCC systems and decoders. Most manufacturers offer a basic system to get you going. These basic systems are easy to learn to use. The basic systems can be upgraded as your needs expand.

Around two thirds of Australian NMRA members use Digital Command Control.



Setting up your trains

It's a good idea to read the instructions packed with your trains or train set before you try to operate your trains. As you unpack your trains you can check each item is intact and ready to go.

Most model locomotives are delivered pre lubricated so they are ready to operate.

Track laying

Following the track laying instructions in the train set you bought will get you going. You can trial set up your track on a table. Avoid laying your track on the floor. Operating your trains on the floor is hard on your back and knees. Especially avoid operating your trains on the carpet, carpet fibres can jam the drive mechanism of your model locomotive causing serious damage.

Two simple checks can help you get started laying track. Run your fingernail along the inside of the rail head at a joint. If there are no bumps it is a smooth rail joint. Sight along your track as you lay it. If the track looks smooth your track will operate reliably.

A more extensive guide to track laying is included in a later module in this series.

Wiring

Connecting the power supply to the rails requires electrically connecting the power supply leads to the rails. You can use the commercially made power connector track sections supplied with most train sets. As your model railway develops you will find it more convenient to solder the power supply leads directly to the rails. This technique is explained in a later module in this series.

At this stage avoid reversing loops as they require additional wiring and switch gear. Wiring reversing loops is explained in a later module in this series.

Learning to operate your trains

Like most new things you need to practice driving your train. The oval track formation included in most train sets lets you experiment controlling your model train without running out of space. An oval track layout is not Le Mans. While your model trains can run at a good clip most real trains travel at a moderate pace. A HO scale model running at 300 mm per second is travelling at about 100 scale kilometres per hour. A heavy freight crossing the Nullarbor plain these days is limited to 80 kph.

Start out running your locomotive without a train at a medium speed to break in the mechanism. After a few laps of the oval run your locomotive in reverse for a few laps then turn the model around and repeat the process.

Once you are familiar with operating your model locomotive, start operating a train. Gradually build up the length of your train as you get used to operating it. Operating your train smoothly contributes considerably to keeping your train on the track. Smooth starts and stops prevent the couplers over running and jamming leading to derailments.

