

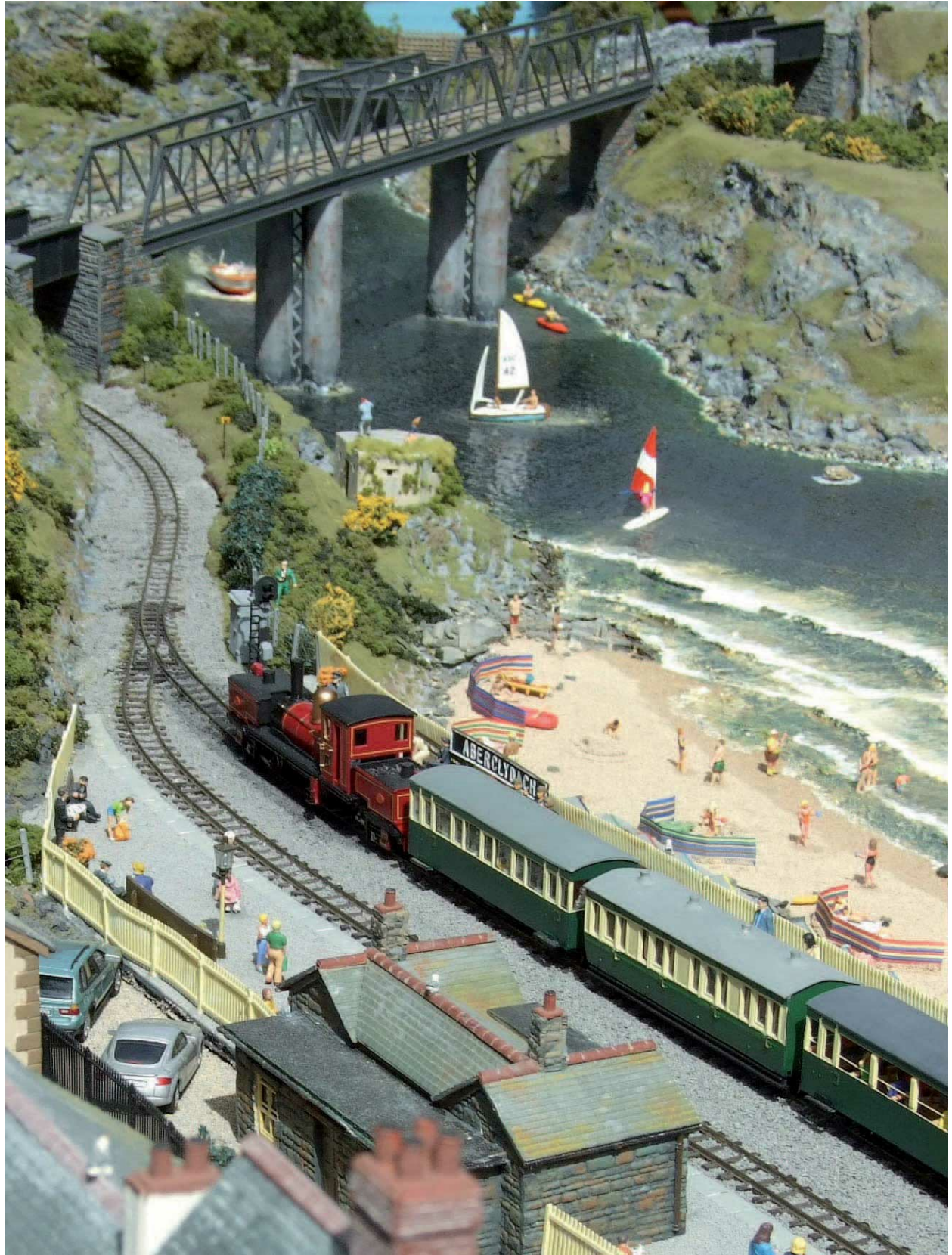


MODELLING The Welsh Narrow Gauge Railways

CHRIS FORD



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Dedication

For Archie

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CHAPTER ONE

INTRODUCTION

Welcome to *Modelling the Welsh Narrow Gauge Railways*. You may well have picked this book up after visiting one of the preserved Welsh narrow gauge lines. You may be an existing modeller who fancies something a little different, or you may already be a modeller of narrow gauge railways who has bought this book to add to your collection. *Modelling the Welsh Narrow Gauge Railways* contains a graduated set of numbered projects, starting with a simple plastic wagon kit through to a series of thoughts and suggestions on how you may wish to build a complete (but quite compact) layout.

There are some historical background notes on each individual item along the way, followed by a set of instructions on how you may wish to build it. These are by no means hard-and-fast rules, and in most cases it would be possible to deviate from the instructions by at least a small amount and to use other techniques that you may be more comfortable with. Those that are included here are very much personal techniques which have been built up over a number of years and are presented only as suggestions. You may well find different ways that suit you better. Allied to this there are 'Tip boxes' scattered throughout the text of each section, adding an idea or two to the fundamental build structure.



Probably most people's mental image of the Welsh narrow gauge: slate wagons, small trains and beautiful scenery.

The overall aim of this book is to inspire those who are just beginning, those who are 'stalled' in their modelling, or these looking for something different. It's often recognized that one of the hardest things in modelling is to decide what to do and then actually to begin. Coupled with this is the fear of messing up during the building process. Hopefully this volume will help to nudge you into breaking through that barrier and making a start.

WHY CHOOSE THE WELSH NARROW GAUGE RAILWAY?

Why narrow gauge and why Wales? Fairly high on the list of reasons for building any model railway layout will come the line's surroundings and atmosphere and the way that this attracts the modeller at a personal and somewhat emotional level. The scenery and landscape

around the Welsh narrow gauge lines is generally accepted to be some of the most beautiful and spectacular in the British Isles. Add to that the cute' element of the comparatively tiny locomotives with compact rolling stock and this makes the area and its lines highly attractive to everyone – not just the ardent rail enthusiast.



The big advantage of narrow gauge is the ability to run in challenging geological surroundings.



The attractive nature of Welsh narrow gauge demonstrated by this view on the Tal-y-llyn Railway.

There is of course a little 'kidology' at work here: most people stumble across the Welsh narrow gauge lines as part of the modern

tourist trail of the area when they are already in relaxed holiday mood and this 'pretty' and 'cute' element can easily mask the often harsh climate and arduous industry that make up the history of the area and its railways. It may look pretty at first glance, but there was – and to a certain extent still is – a gritty postindustrial undercurrent. The lush green mountains may not resemble black satanic mills, but this is a hard-working environment, still inhabited by the sons and daughters of the men and families that worked the hill farms, the unforgiving slate quarries and the railways and shipping that took the grey rock of Wales to all points of the globe. Yes, the little railways are very attractive, but the only reason that they, and many of the old families, are there is because of a heavy industrial base that is all but gone. Where once the railways mainly carried the valuable slivers of cleanly split rock, they now carry children, parents, dogs, buggies and the detritus of the British holiday trade.

A SMALLER DOMESTIC REQUIREMENT

Despite the visually vast surrounding scenery of the Welsh narrow gauge railway, it will soon become apparent that it is possible in model and domestic terms to be able to think somewhat smaller. For the railway modeller, domestic space is always the elephant in the room – no matter how big the layout in your mind's eye, there is always the lack of domestic space to bring your dreams down to earth with a bump. However, Wales, with its rolling hills, its mountains and its deep quarries and mines, is a railway landscape that will surprisingly fit this space in a much more forgiving way. It does this successfully in model form simply because it does it so well in real life. These are railways that fit into their environment, rather than cutting straight across it, bending and weaving among the green hillsides and through small holes in the rock, challenging nature to stop them. The modeller of the

main-line standard gauge railway is always limited in terms of space; possibly to a single station arrangement. The Welsh narrow gauge gives an overwhelming advantage – you can often take the same sort of household space and with a little careful planning and selective compression, model the whole line. So where do you start?

WHAT SCALE AND GAUGE?

This book is designed to take a notional novice or armchair modeller from an almost zero baseline to a point where a Welsh narrow gauge layout is completed. It also aims to offer the more experienced modeller a few different ways of looking at what he or she already does. The text and projects all feature the most popular 4mm scale (OO9) – the same scale as the models mass-produced by Hornby, Bachmann and so on. This means that any of the included projects could be run or placed alongside these OO gauge items if you so wish. This is not to say that the techniques included here and some of the materials could not be used for other modelling scales such as 7mm scale (Gauge O), or one of the slightly more specialist in-between scales such as 5.5mm scale or S scale. In fact, S scale would be a highly recommended upward jump, giving you something which would be very different. In crude terms with S, you would just need to increase any of the building sizes from a scale of 4mm to 1ft to 4.74mm to 1ft. However, the rolling stock would be another matter and would require some very canny thinking and scratch-building (making items from mostly raw materials such as plastic sheet or metal), but it would not be impossible and would create a very individual model railway.



The Baldwin, one of the new high-quality RTR products from Bachmann.

Much of what determines the choice of scale and gauge will often come down to two factors: firstly, a personal desire to model in the scale; and, secondly, the availability of kits/parts/figures produced in that scale. Unless you are a keen scratch- or kit-builder, you may first look to the availability of ready-to-run (RTR) locomotives and rolling stock. The situation in 4mm scale narrow gauge (usually referred to as OO9) has always been good with regard to locomotive and rolling-stock kits and is now seeing a boom time with various RTR items from PECO, HELJAN and Bachmann. The choices in 7mm scale are much more swayed towards kit building, as RTR items for British lines are virtually non-existent. Working outside these two modelling scales does put you very much out on your own. There are societies such as the S Gauge Society and the 5.5 Association which support other scales and help to supply certain parts and kits, but once outside the 4 and 7mm camps, it is frequently the case of having to make your own parts and adapt kits from other scales. For many modellers this is part of the attraction – working on the scale periphery keeps them from spending too much on commercial models and forces them into old-

fashioned model making, rather than model buying. As a breed, modellers – especially narrow gauge modellers – tend to be notoriously careful with their money, opting to make as much as they can in the home workshop for the lowest financial outlay.

THE TRACK GAUGE

Modellers of 4mm-scale narrow gauge lines usually run their trains on 9mm gauge model track. This is usually referred to as OO9, that is, OO scale on 9mm track. It represents an exact prototype gauge of 2ft 3in (686mm), making it perfect for both the Tal-y-llyn and the Corris Railways, a shade under-scale for the Glyn Valley Tramway (2ft 4in [711mm]), a little too wide for the Festiniog Railway's 1ft 11.5in (597mm) gauge and a scale 3in (76mm) too small for the Welshpool and Llanfair's 2ft 6in (762mm). A few pedantic modellers work on 8mm gauge and there is at least one Dutch modeller working on 7.9mm gauge for close to exact scale 1ft 11.5in. Overall, though, most people are happy to accept the compromise between these close, but different, prototype gauges and mix them all on the 9mm gauge OO9 track made by the British track manufacturer PECO.

The situation is very similar with 7mm scale. An exact 2ft (51mm) gauge is represented by 14mm gauge track for an increasing number of modellers, but the vast majority will accept the compromise and use 16.5mm gauge track – the same as the standard OO systems and which is roughly equivalent to the Glyn Valley Tramway's 2ft 4in gauge in 7mm scale. Here again a dedicated track range is also available from PECO with the 0-16.5 labelling.

For those unfamiliar with the terms scale and gauge, the confusion can easily be explained by saying that they are different measurements. Gauge is the fixed distance between the two rails,

either real or model. Scale is the downward measurement from the real thing – for example, in 4mm scale, every foot (305mm) length in the real world is measured as 4mm length on the model, therefore a man who stands 6ft (1,829mm) tall would be 24mm tall in 4mm scale.

WHY A NARROW GAUGE MODEL RAILWAY?

What sort of narrow gauge line do you want? Some of the answers to this will be expanded on later in the book, but here are a few initial ideas. The Welsh narrow gauge was, and still is, surprisingly diverse. The modeller's usual way of representing this is to build a branch terminus station with a platform, a goods shed, an engine shed and possibly a signal box (though this last item was relatively rare on the real thing in pre-preservation days). However, it should be borne in mind that this was far from being a common set-up on the Welsh narrow gauge – the majority of termini did not have engine sheds, some had only rudimentary goods facilities and only a few managed to include a proper raised passenger platform. Most, in fact, didn't have terminal stations as we know them, but started in quarries and ended at a wharf. It is easy to fall into the trap of simply 'scaling down' a standard gauge branch station plan and applying the same set of ideas to a narrow gauge station – historically this has been a much repeated instruction, but in most cases will unfortunately not give a result with the correct narrow gauge atmosphere. Although one or two Welsh narrow gauge stations did exist in a similar way, this is far from representative of the real thing in its working form.



Interchanges were usually with the standard gauge main line or shipping. Here is the wharf at Towyn, where slate was transferred to standard gauge wagons.

The reason for this is that most of the lines which concern us were effectively just industrial conveyor belts either from quarry to port (for

example, the Festiniog Railway), or quarry to main-line railway interchange (for example, the Tal-y-llyn Railway). So an alternative idea for a station model is to ditch the terminus station plan altogether and model a 'through' or 'passing' station on the line. This creates an entirely different set of operational requirements, as nearly all of the traffic is travelling on to somewhere else. Many lines were also originally mineral traffic only, requiring little or no passenger stock aside from a workman's train running at the end of each shift. The locomotives would be small and the accent would be on moving multiple wagons, possibly still with a large degree of horse-worked running – at the very least for some of the yard shunting at each end.



Modelling the Welsh narrow gauge can produce a compact, yet visually pleasing layout with many scenic features.

It's not to say that branch termini did not exist in the accepted way of thinking, but that there are only a few which resemble the modeller's usual stylized idea of what a small terminus station should

look like (for instance, Llanfair on the Welshpool and Llanfair line). In deciding what sort of narrow gauge model layout you want, you have to step outside the usual modeller's track plan clichés and into the shoes of a company that was running a narrow gauge railway carrying a mineral load from a quarry to a transhipment point.

PLANNING YOUR LAYOUT AND YOUR TIME

All of this can involve quite a large degree of planning and careful study for the modeller. You may, of course, just lift a printed plan out of a book or a magazine and run with it exactly as presented. This approach will often work well, but bear in mind that some paper plans do not allow quite enough space, so do check that it will work full size before you start building. Many a layout has been speedily abandoned through not taking the time to build a simple mock-up with a few points and crude card buildings to prove that the plan will actually do what it suggests. The other thing to consider is that most published plans are already physically compressed in some way for the modeller and are often composites of prototype layouts, therefore will probably not take any further reduction in size.

Unless you are very confident, do not overreach at the beginning. A small, fully worked-out layout plan that is able to be finished in a reasonable time is better than a room-filling multi-station epic idea that will never have a chance of getting done. However, thinking in sectional terms and building one small part of your line first with allowances to expand around a room is a well-worn and tested method. The key point is often to work out how much time you realistically have available for modelling during your week, as this is probably more important than the layout plan itself. This nugget of information usually comes as a surprise to many modellers, but is

often the pivotal point of the planning process. It doesn't matter how many plans you dream up in your head during your working or commuting hours, if you only have twenty minutes of spare time a day outside of work and family commitments, then a big layout simply won't get done and you will be staring at a vast area of bare baseboards for years to come. These baseboards will not only collect dust, but will quickly become a repository for all sorts of household and modelling junk. It is a far better policy to start small, pace yourself, and build something that can be regarded as finished within a sensible period of time. A project that is likely to take longer than a year to complete will quickly lose inertia and will become an irritating millstone, rather than a pleasure.

TIP

Give yourself as much time as possible to decide what it is that you want to achieve in terms of scale, period and size of the overall project before you buy too much or start work on a layout. The old maxim 'failing to plan is planning to fail' is appropriate here. Having said that, there is a handful of well-known narrow gauge models that have grown organically over a long period and absolutely ooze atmosphere, so take this tip with as much of a pinch of salt as you dare.

HISTORICAL PROTOTYPE RESEARCH

Unless you are desperate to get started straight away, doing a little prototype research is time very well spent. This could be nothing more than a little casual browsing through some of the mainstream model magazines such as *Railway Modeller*, or you might choose to study something more academic. A very brief general history follows in the next chapter, but as a gentle preamble there are a couple of points to consider. Firstly, the layouts in magazines have a habit of replicating

themselves and relying on modelling clichés. It's unhelpful to criticize other people's modelling work, but it is sometimes hard not to wonder if the builder has looked outside the modelling catalogues and magazines at all, such is the repetition of ideas. The defence for this is that in many ways the Welsh slate industry and the Welsh narrow gauge in general are very much an historical event, so other people's models become the accepted pattern, as the original prototype working is no longer there in real life to view and study.

There are now very few who can remember the pre-World War II era, after which many of the lines closed, so we are reliant on books, historical film footage and photographs to form the bulk of any research and that is where most of the problem lies. We readily accept that everyone carries some sort of camera nowadays, but although relatively low-cost cameras were available in the 1920s they were still very much a luxury item. Add to that the high cost of film compared to the contemporary throw-away digital format and the subject matter chosen by the photographer becomes much more prone to natural selection. The photographing of industrial and narrow gauge railways was right at the bottom of the pile and we have only a few dedicated souls such as Ivo Peters and Henry Casserley to thank for recording these Welsh industrial lines during their height and decline periods.



A modern take on a period scene on the Festiniog Railway.

The suggestion for the novice is to start collecting some of the photo album-type books that refer to either narrow gauge as a whole, or specifically to the line that is being modelled. The second-hand market often turns up narrow gauge albums from the publisher Bradford Barton or The Oakwood Press. The former are very useful as they are comparatively contemporary with the end of narrow gauge working in the UK. However, this does offer up some traps, as the working had often been reduced and possibly dieselized, or in some cases the line was still working but using road vehicles or other types of mechanical handling. The newer versions of the Bradford Bartons are the books from Middleton Press and these deal with the railways almost line by line. They occasionally feature pre-war images, but a lot are very up to date and therefore useless unless you are modelling the post-preservation era. The whole process is one of sifting through material and discarding that which has no relevance. In essence, it is pure historical research.

TIP

Try to study the prototype first, keep your research balanced and do not base your layout purely on other people's models, however tempting a shortcut this may be.

CREATING THE RIGHT ATMOSPHERE

What we want to create in our modelling is atmosphere. This is a slippery beast and often hard to get hold of, but it can be done with a little thought. Again, there are questions to ask. Is the railway/ station site rural or urban? Passenger-driven or freight-heavy? Steam or internal-combustion powered? Not all Welsh narrow gauge ran through glorious green mountainsides and historically much of it was pretty grotty. Is there traffic that needs a specific set of buildings, such as a transhipment shed or possibly a gunpowder store? Are there any passenger platforms and are they long or short, ground-level or raised? Many of the lines had only small flat areas surfaced with slate waste and no proper platforms at all.

These questions need to be asked quite early as they may affect how you approach your model. If you already have a picture in your mind's eye of a tiny tank engine pulling a couple of four-wheel coaches, then something like the Tal-y-llyn Railway or the Corris Railway may be your ideal prototype, but if you want a more sizable feel with longer trains and larger engines, that is going to look ridiculous in the same setting – that would need a much more passenger-driven situation such as the Welshpool and Llanfair Railway or the Welsh Highland Railway. However, it should be carefully noted that the raised platforms that exist on many of these lines today are a product of the modern post-preservation development and more a result of modern health and safety matters

than historical preservation. Generally, though, the railway's traffic and the track layouts and station layout shapes tend to go hand in hand.



Prince at Porthmadog in 1963.

Taking all these factors into account should give you and the casual viewer an instant grab on the railway's function. The oft quoted rule of thumb is always to be able to recognize the place and styling before the trains arrive. Don't just look at the engines and guess the rest; look at the surrounding countryside and building styles and think of the model as a whole.

TAKING INSPIRATION FROM PRESERVED NARROW GAUGE LINES

As indicated earlier, the twenty-first-century narrow gauge modeller is lucky in the respect that there are several well-organized preserved lines in our chosen area. All of them are very welcoming and have a good range of locomotives and rolling stock to study and photograph. That said, these preservation lines, however well run, can only hint at

the sort of operation that would have taken place when the lines were run in an industrial form. There are now no waterborne shipping connections, no sheep being herded across the station sites and no long, slow-moving slate trains clanking through the station. Nevertheless, preservation lines are all fine places for not only an entertaining day out, but also somewhere to do a little research and to gain an insight into line working. The other thing to consider is that this modern preserved line atmosphere may actually give an alternative base for a model rather than the usual pre-World War II historical approach; one that is still a Welsh narrow gauge railway, but set in the present day, using clean and polished preserved and/ or modern rolling stock serving the tourist industry.



The rebuilt Russell on the Welsh Highland Heritage line.



Today's preservation scene features some heavyweight diesel power. Here, Vale of Ffestiniog shunts Porthmadog sidings.

TIP

Always take some sort of camera with you on these trips and record as many small details as you can. Not just the locomotives, but lamps, platform seats, stop blocks and other miscellaneous details. These are rarely recorded by the casual and family holiday visitor, but will help you to generate more reality for the atmosphere of your layout. The understanding and research around such items will all add to the pleasure of building a layout.

WELSH NARROW GAUGE – THE INDEFINABLE GENRE

Trying to explain what narrow gauge is can be quite tricky, especially to the non-railway enthusiast. The basic problem is that there are no hard-and-fast rules to use to illustrate it and no fixed set of measurements. Narrow gauge is often glibly explained as 'being less

than standard gauge'. Though precisely what is standard? The British standard gauge, using its historical imperial measurement, is 4ft 8½in. However, there are other 'standard' gauges in use over huge areas, such as the Russian, Irish and Indian systems, which are wider and in relative terms make the British/ European/American standard gauge appear narrow. And that's without getting into the question of the short-lived nineteenth-century British Brunel broad gauge of 7¼ft. It quickly becomes apparent that the catch-all phrase 'narrower than standard' is after all possibly the best way to describe it.

If the term 'narrow gauge' is tricky, then Wales is somewhat easier to define as the Principality's borders are generally fixed, at least during the period that concerns us. The title of this book therefore refers to a fairly tight geographical base and you would assume a similarly tight subject to match. Unfortunately, this is where it can all start to unravel. The narrow gauge railways of Wales are by no means uniform, having been designed for a number of purposes and to fulfil several job descriptions: one or two were designed as agriculture carriers; some were pure mineral lines; and at least one in the area (the Fairbourne Railway) was, and in fact still is, a line designed just for tourist pleasure trips along the beach. But the overwhelming reason for building the narrow gauge lines, particularly in the northern part of the country, was mineral transport and in particular the carriage of raw and finished slate from the quarries in the north-west. Many of these lines were simply upgraded extensions of the low-quality tracks of iron, stone or wood that ran within the quarries.



Inclines were used to transport wagons down steep sections where a traditional railway would be impossible.

The history of these internal lines is one of crude development, the requirement being a hard surface on which to run wagons, carts or drams around the quarry either pulled by horse or pony, or pushed by manpower. This is a very important point, as it was this simple man- or horsepower that defined the size and shape of vehicles and therefore the lines that extended from them. They had to be small enough to fit physically into the confined spaces of the quarry and also light enough to be pulled by the maximum of one horsepower. The wagons also had to be small enough to be lowered and raised up and down some fearsome vertical drops. This was facilitated by various types of inclines, which were usually worked in a balanced fashion by the full wagons pulling the empties back up. All this necessitated a track gauge of usually less than 1m and vehicles that were fairly short in stature. In most cases, the end result was a track gauge of around 2ft

(610mm) and a wagon size of less than 5ft in length and 3ft in height (1,524 × 914mm).

At the other end of the spectrum was the agricultural line, which was shaped for passengers and carrying produce, cattle and sheep. Agricultural lines were visually much closer to the usual standard gauge branch in general appearance, and yet still Welsh and still narrow gauge. This wide definition can cause some confusion and result in models which somehow do not look quite right if mixed together on the same layout. The geology of the types is different and the rolling-stock styling has variation between the types. Mixing the two together rarely works well on a model and creates an unresearched look that a model of a standard gauge railway would naturally avoid.

If these visual and traffic line differences are the beginning of the story, then the end (or at least the present) is twenty-first-century tourism.

HOLIDAY LINES

It's very likely that most modellers of British narrow gauge prototypes are first introduced to these narrow gauge railways by the group of preserved lines known as the 'Great Little Trains of Wales' a title that was coined by the Welsh tourist organization in 1970. All the members of this group bar one are situated in Mid- and North Wales, and most have at least a tenuous link to the slate-mining industry of the late nineteenth and early twentieth centuries. Those lines whose tracks were not originally built to carry slate often now rely on locomotives that were originally designed for the industry.

These preserved lines are far from being a homogenized group in style or technical characteristics. In fact, in nearly every respect they

are all highly individual both now in their preserved state and when they were originally conceived. The only things that they have in common, apart from their geographical placement, is that they are now all largely powered by steam locomotives and they all have a track gauge of less than the British standard gauge of 4ft 8½in. The odd ones out in the group are the Brecon Mountain Railway, which is in the south of the Principality and has been built on a redundant standard gauge trackbed, and which mostly uses imported European rolling stock. It is included simply because it has been built to a narrow gauge of 1ft 11½in, purely as a tourist line. The other is the Fairbourne Railway, which was built as a tourist line at its inception and though it has changed dramatically, still retains its original character and usage.



Small vertical-boilered 0-4-0 locomotives, built by De Winton, often worked the quarries. A few of these were saved and still exist on preservation lines.

Except for the occasional demonstration freight train, all of these current preserved lines are geared towards carrying passenger traffic and are aimed firmly at the lucrative tourist industry, but that was not how most were conceived after their industrial lives had ended. Most

began the second era of their existence as a way of preserving the line and the rolling stock as it was left in the 1950s and 1960s. At this time, the growth of the leisure industry and travelling on railways as a pleasurable means unto itself, rather than a method of getting from A to B, could not have been thought of. It was the introduction of passenger timetables by these rescued lines as a way to raise revenue that started this trend, with the result that nowadays some of these lines (though not all) are multimillion-pound operations, run with the level of professionalism and efficiency that this requires. Some people may suggest that these lines have become shadows of their former industrial selves and are nothing more than glorified railway theme parks. To some extent this is true, but with the huge rise in visitors and the increase in various governmental safety standards during the last six decades, the Welsh narrow gauge railways have had to adapt to circumstances in order to stay relevant to today's visitor and passenger. No longer would tourists be keen to ride inside dirty slate wagons, even if they were allowed to do so.



The Brecon Mountain Railway operates over a section of defunct standard gauge line.



Most preservation lines run special events which are extremely popular and include a larger than usual stud of locomotives to be seen and studied.



Foreign locomotives feature on many lines – though this South African Garratt running on the Welsh Highland line is of course foreign in that it was built in Manchester, England!

The lines have also gradually moved away from using the original preserved rolling stock. It is still there in most cases, but it was quickly found that it was not viable to rely on just this source of power and fairly soon after the preservation movement began, other non-original

locomotives and rolling stock were sought out and employed. This is still an ongoing process and much of this equipment is either newly built or imported. Not only are there Germanic locomotives on the Brecon Mountain Railway, but mighty (Manchester-built) South African Garratt locomotives power their way northwards from Porthmadog. There is also a regular arrangement of locomotive exchange and visiting, which sees machines from other lines of the same gauge arrive for a short period. This may be regarded as a negative aspect for some hardcore rail enthusiasts who wish to see the original history preserved, but at least by changing and adapting to market forces, the lines have stayed with us and remain the closest link to an industrial railway age that has long gone.

USING THIS BOOK

There are no hard-and-fast rules with any of the included modelling projects and they can be made in any order. All of the techniques are easily transferable to other similar items and, in the main, to other scales as well. Putting a slate wagon kit together in 4mm scale as described here will transfer almost directly to a similar vehicle in 7mm scale. The narrow gauge modelling trade is mostly made up of small cottage industries and these are notorious for suddenly disappearing or taking a product off the market. This means that some of the products used here may not always be available all of the time. It is safe to say, though, that due to the relative popularity of the subject, it is fairly certain that a similar item will become available, or the range of kits/parts will be taken over by someone else in the fullness of time.

TERMS, MEASUREMENTS AND SPELLINGS

The term '4mm scale' should be taken to mean equivalent to OO scale from this point on. The acronym RTR (ready-to-run) may also be used throughout the book from this juncture. Any other acronyms will be explained as they are introduced.

Metric measurements are given where appropriate, but imperial measurements are also used freely, as these are historically what was referred to at the time and have been ingrained in modern common language, for example vehicle chassis lengths are almost always referred to in imperial terms of feet and inches, and it would be churlish to try to fight against this historical standard terminology for the sake of it.

Likewise the spellings used throughout this book of both place names and the railway names reflect the form taken when the railways were at their height and not the more modern Welsh spellings, for example Festiniog and not Ffestiniog. This may be a politically moot point, but is in keeping with the more historical leaning of this text.

TIP

If a product is out of circulation it is often worth searching the internet and/or trying an auction site like eBay for a hard-to-find item. Similarly, model railway exhibitions are a goldmine of older second-hand kits and bits which are all perfectly serviceable and often quite cheap if you are prepared to rummage a little and take a gamble on all the parts being included.

CHAPTER TWO

A BRIEF HISTORY

THE TRAM ROADS AND EARLY NARROW GAUGE LINES

Many of the early lines of the area – most of which have long gone – were not more than a roughly laid pair of rails linking the slate or granite extraction point with an incline or two, taking the wagons down the hillside. In fact, several of these lines were no more than a set of inclines joined by short lengths of level track. These were usually man- or horse-worked on the flatter sections and relied on gravity to travel down the slopes. The lifespan of many of these lines was short, which was typical of most industrial workings. The lines were seen as a temporary arrangement, being quickly abandoned when the extraction point was fully worked out. To add to the confusion, trackbeds were often re-energized by a later working with a new set of tracks, sometimes to a different gauge to the first. This is particularly notable in the spread of lines to the north and east of Porthmadog, which in earlier historical periods was no more than a convenient inland quayside.

With one or two exceptions, the modern railway modeller will find these basic lines of only limited interest as they are logically only tram roads and not what we consider to be fully fledged railways in the

accepted sense. Only two in this particular area (the North Wales Narrow Gauge Railway and the Festiniog and Blaenau Railway) get close to the distinction. The former is now part of the Ffestiniog and Welsh Highland line to Caernarvon, while much of the latter formed part of the standard gauge Bala line. Unless you are a particularly ferocious student of the highly involved history of these early mineral tramways, they can be glossed over quite quickly. Where this history is interesting is the study of the projected lines that were never built. These provide a rich seam of ideas and possibilities for the modeller to work a semi-freelance idea into the area. For our purposes, the story begins with a man named James Spooner.

JAMES SPOONER

Fighting against the contemporary thinking of the time, James Spooner took the concept of the narrow gauge railway moving slate downhill and, in 1832, created a railway without any intermediate inclines through challenging geological conditions to enable slate to be taken from the quarries above Blaenau Festiniog to the ships at the wharves at Porthmadog on a line of 1ft 11½in gauge. The line was originally gravity-worked – full wagons rolling downhill to the port by their own weight and gravity only, the empties drawn back up to the quarries by horses on the return. The horses were transported back down the line in ‘dandy cars’ as part of the gravity train.



Slate trains were often run down to the quaysides by a mix of locomotive power and gravity running, with workers riding on board and operating the brakes.

THE ARRIVAL OF STEAM

By the 1860s, the amount of material being carried had outstripped the speed of transport; the traffic had completely outgrown Spooner's method of working. James Spooner's son Charles therefore introduced steam locomotive power to replace the horse working in 1863, cutting the upward journey by a number of hours. Once this precedent on the Festiniog Railway had been set, the concept of a narrow gauge railway as a full transport system took hold in the area – a railway that would be able to carry both minerals and passengers, and would be suited to conditions otherwise impossible or too expensive for a standard gauge railway.

Thus from the 1860s until the 1920s, narrow gauge railways gently blossomed alongside their bigger standard gauge brothers, mostly in situations where the cost of constructing a standard gauge line would be too expensive, or would be prevented by geological factors. Simply

put, it was far easier to wrap a narrow gauge line around tight bends set on a gradient, saving a small fortune in having to remove rock to allow for a straighter and gentler ascent. While the Spooners neither invented narrow gauge railways nor steam-powered locomotives, their pioneering work in linking the two is accepted as being the point at which the concept of very narrow gauge became commercially viable and useful on a large scale.



The Fairlie double engines were developed to add power without adding width and height.

If the Spooners' work in the north of the country can be seen as the beginning of the narrow gauge steam railway, then two other events were to mark shifts in development: the Light Railways Act of 1896 and World War I.

THE LIGHT RAILWAYS ACT IN WALES

In 1883 the British government passed the Tramways Act for Ireland. This was originally designed to open up depressed rural areas in the wake of the potato famine and to promote growth and repopulation. Unfortunately, there was little or no timescale inserted into these agreements, meaning that the lines could spend many years running without making any profit, while the financial underwriting continued. This translated in the long term into local taxpayers footing the bill for railways that were unlikely to run in anything other than a subsidized state. Despite the way that this arrangement turned out, the system was initially thought of as successful, and in the 1890s the British government passed an act for the British mainland with similar aims, although without the heavy local subsidies of the Irish system. The Light Railways Act was passed in 1896 and a commission was set up to oversee the applications and passing of Light Railway Orders. Initial finance could be made available from the government and the projected line(s) would not need an individual act of Parliament, only a Light Railway Order, thus reducing the cost to the line's promoter. Most of the lines built under the act were of standard gauge, such as the Rother Valley Railway and the East Kent Light Railway, but some builders of narrow gauge lines saw the advantages of railway construction under the act for lines that were built to a narrow gauge, especially if passenger traffic was envisaged from the start.



The light railway period lines are recognizable by the use of timber and corrugated-iron buildings.

The act set out to provide a streamlined path through railway legislation, but with certain provisos: lower maximum speeds (often 25 or 15mph); lower axle loadings for rolling stock; and reduced signalling and safety standards. In a nutshell, a railway that was less likely to cause damage and accidents than the faster, heavier main and branch lines that already existed. This enabled lines to be built with less expense by using lighter construction materials, reduced signalling apparatus, smaller locomotives and without the necessity to build grand station facilities and other expensive infrastructure. This last point produces a definite light railway 'look'. Although other local building materials such as stone were used, the overwhelming architectural style of the light railway age was timber-framed, corrugated-iron sheds. This architectural look is prevalent in the Welsh narrow gauge, particularly with the later built lines such as the Welshpool and Llanfair Railway and The Vale of Rheidol line.



Slate-waste buildings are the mainstay of the ex-quarry lines, as shown here at Dolgoch.

This basic architectural difference means that it is possible to view the lines built or altered under the act in this style as a separate group, at least visually. Most of the original mineral haulers generally used local building material, often in the form of quarry waste, to construct any buildings on the line. As these lines were at least initially independent of any standard gauge company involvement, each line took on a very individual appearance. For instance, it would be difficult to mistake the buildings of the Welshpool and Llanfair Railway with those of the Tal-y-llyn Railway; the former being mostly corrugated iron, the latter mostly slate waste and timber. However, this visual separation is not a hard-and-fast rule on some other lines.

AFTER WORLD WAR I

World War I had an impact on all strands of British life and the Welsh

railways were no exception. Apart from the negative social and military aspects, there was a positive effect after the war in the form of cheap railway rolling stock. It had taken the British military some two years to implement a light narrow gauge system during World War I. The German forces already had narrow gauge systems in place (*Feldbahn*) to move munitions to the Front by rail. It was not until the British took over a French sector which included a 60cm gauge light rail system that the benefits of using a lightly laid narrow gauge railway over rough battle ground were realized. The 60cm gauge (which was remarkably close to Spooner's 1ft 11½in) was quickly adopted to match the existing French lines and the British set to work building an incredible system totalling over 900 miles of lines serving what was, by 1916, an almost static fighting Front. This system was known as the War Department Light Railway (WDLR).

At its inception, the problem for the British military was that while narrow gauge rolling stock could be manufactured and delivered quickly from home builders such as the Gloucester Railway Wagon and Carriage Company, the British locomotive builders were already working at full capacity supplying munitions. Because of this, Hudswell, Clarke & Co., Hunslet and Barclay combined could only produce a total of 257 locomotives. This supply shortfall led the British to look to American locomotive builders, who, by having a more intense production method, were able to fulfil the requirement in a short period of time; the builders Baldwin and Alco (American Locomotive Company) supplied almost 500 side-tank locomotives of largely similar 4-6-0 and 2-6-2 designs to be shipped to France.



This internal-combustion engine was designed to work behind the Front Line, as it would not show smoke or firebox glow to the enemy.



Several internal-combustion engines from World War I found their way on to British narrow gauge lines. This Baldwin tractor has been modified from 0-4-0 to 2-4-0 to improve the ride.



Several internal-combustion engines made it to preservation. Here, Mary Ann shunts at Boston Lodge.

As well as steam locomotives, several hundred internal-combustion-powered 'petrol tractors' were built, largely by Motor Rail of Bedford. These internal-combustion units were favoured for use close to the Front as they produced no glowing fire or smoke that would be easily visible to the German forces, although the power of these machines was substantially less. Smaller numbers of petrol units were also produced by British Westinghouse and Dick, Kerr & Co. (both to a similar design) and again from the American Baldwin company.

The Motor Rail units were built with two engine sizes – 20hp and 40hp – and the larger of these designs was progressively fitted with armour in three styles: 'Open', which had armour front and rear; 'Protected', which had side doors and a canopy roof; and 'Armoured', which was fully enclosed. The latter had a reputation for being highly

uncomfortable to drive, due to the driver being sat in a small enclosed space with a hot, fuming petrol engine.

At the cessation of the war in 1918, much of this locomotive stock was handed to the French and found its way into agricultural and industrial use, sometimes on the very same lines that the Allies had designed to transport munitions. A small amount of stock had either remained in Britain ready for use, or was now shipped back across the Channel, and by 1919 this was offered for sale through the War Stores Surplus Disposal Board. This was a gift for many of the worn-out narrow gauge lines of Wales and this stock either ended up in industry, or was snapped up by at least two of the narrow gauge lines in the Principality. The Glyn Valley Tramway took one locomotive, while the Festiniog and Welsh Highland line took a steam locomotive and a couple of petrol tractors as well as a number of items of freight stock.

This influx of equipment gave the lines replacement stock, but more importantly introduced cheap, lightweight internal-combustion power where only steam had previously existed. However, unfortunately war surplus also presented the public with cheap lorries and men who could now drive them; men and vehicles that would provide a direct competition to the rail network. Although the petrol tractors did not completely replace steam power, the second-hand WDLR stock provided a useful alternative in the yards for shunting.

THE COLONEL STEPHENS EFFECT

Holman Fred Stephens has become legendary among enthusiasts of independent railways. His skills as an engineer would have been enough to set his name into history by being involved in planning many minor lines in England and Wales. However, it was his astute

(some might say reckless) business head in acquiring a group of run-down lines and controlling them from an office in Kent that ties Stephens to the idea of the 'run on a shoe-string' public railway. Stephens engineered and/ or managed four narrow gauge lines including the Festiniog and Welsh Highland (then combined). These and Stephens' other railways were managed in a style that could best be described as 'budget'; but they worked and thrived for many years, albeit with run-down rolling stock, poor safety standards and a low-wage economy. However, Stephens was highly modern and forward thinking; we take for granted the internal-combustion engine in powering trains now, but Stephens was not only planning the use of such power at the turn of the twentieth century, he actively promoted its use on many of his lines at a time when steam was still considered the only viable option. We have Stephens to thank for at least one line in our area of interest that made it into preservation – it's unlikely that the Festiniog would have lasted beyond World War II without Stephens' unorthodox management skills.

THE END OF THE BEGINNING

By the outbreak of World War II the railways serving the slate industry were almost at an end. Many of the quarries were worked out, had proved uneconomical, or had gone over to road transport. The Tal-y-llyn and the Corris Railways clung on until the end of the war, but the Festiniog now lay out of use. Only the lines serving the Penrhyn quarries were still using a steam railway to any great extent. The tourist and passenger lines had made it through the war and the slate railways were about to join them in the quest for passenger traffic. The preservation era was just about to start – one industry was finished and another about to flourish.

This compressed history of the Welsh narrow gauge is somewhat brief and only included here to give some basic background. The serious student of the Welsh narrow gauge may want to dig further for a far more comprehensive history of each line and system, and the volumes by J.I.C. Boyd are recommended. Written in the 1960s and 1970s, they have rarely been equalled in their in-depth analysis of the subject. Any serious student of the subject would be advised to look out for these books.

CHAPTER THREE

GOODS AND MINERAL TRAFFIC

TRANSPORTING SLATE

Think of Welsh narrow gauge railways and you think of slate. The two are inextricably linked and only a couple of the original narrow gauge lines in the area did not have any links to the transport of the material.

Slate had long been quarried in the region, but its heyday came with the post-industrial revolution period in the British Isles and the rapid expansion of the industrial mill towns of the north of England. Slate was relatively cheap to produce, mainly due to a low wage system and poor safety standards, and to some extent was easy to transport due to its neat finished shape. The very early transportation methods of pack horse and shipping were slow and weather-dependent due to the remote situation of many of the quarries, but the introduction of rail systems meant that the material could be cut and finished at the extraction point, and then speedily moved from the quarry to a harbour or main-line railhead and onwards to South Wales, Manchester, Leeds and beyond. Thus entire cities were roofed with a cheap, almost uniform grey material that would last in many cases for nearly 200 years and counting.



Finished slate consisted of sizes with unique names, but could be carried in mixed loads.

The quarry lines that transported this material needed a vehicle that was light, easy to move within the confines of the quarry site and which could transport a ton or more of tightly packed finished slate.

The vehicle designs that emerged were largely similar in approach; the wagon did not need to keep its cargo weatherproof and could be of a very light, semi-open construction. If it were to be designed from scratch today, it would probably look something like an overweight shopping trolley with some sort of lightweight mesh sides. Then, though, iron and wood were the preferred material, so a wood and metal underframe with a wooden upper section with the horizontal sections being separated by wooden 'bobbins' formed the early basic designs. These open slate wagons probably numbered in the thousands and to say that their life was harsh would be understating the obvious, so it was not long before full metal designs became the norm – still a fairly crude design, but with an angle-iron riveted body, something which would have a much longer working life.



An earlier, mainly wooden slate wagon built from a mix of horizontal slats and 'bobbins'.



Later all-metal construction wagon.

As the slate industry declined in the early part of the twentieth century and the quarries began to close, the wagons were burnt, scrapped or just left to rot where they stood. This policy of abandonment means that many survived into preservation and can still be viewed today. The wagons were also converted to fulfil other roles, for instance, as bolster wagons for transporting timber. Tanks sometimes replaced the body section to carry water or fuel, and a number had their sides and ends filled in for the carriage of granite and quarry waste (Dundas Models produces a specific kit for this variant in 4mm scale). The weight of the wagons was usually around 2 tons (2,032kg), though this was increased to 3 tons (3,048kg) on some lines. This upgrade was not universally approved of due to the increased side clearances required.

Methods of moving these wagons from the quarries varied. Some used only inclines (either balanced or rope-worked), while others used gravity running on downhill sections, with the level and uphill sections being worked by horse. The introduction of steam power did not mean

that these methods vanished, only that the horse working was reduced to port and quarry shunting.



The Padarn Railway ran a 4ft gauge line for the last part of the journey using frame wagons to carry not only the smaller slate wagons, but the brake van as well.

Most of the narrow gauge lines either ran the slate wagons in

dedicated trains or added them (at least on the empty return journeys) to passenger trains, thus maximizing locomotive use. The Padarn Railway uniquely used a two-gauge system of transport, by loading slate wagons on to special locomotive-hauled frame wagons running on 4ft gauge track complete with a matching brake van which was transferred from the smaller gauge.

The slate industry gradually tailed off from its peak at the end of the nineteenth century due in large part to a fall in multiple house building, the arrival of new materials and a decline in general industry. Although the slate industry does still exist today in a vastly different form, the majority of lines had lost their slate traffic well before World War II and only a few remained by the 1960s. The modeller who is keen to be prototypically and historically accurate would need to bear this in mind and if a specific line is being modelled, some date-checking will be required to make sure that everything is running in the correct manner.

MODELLING THE SLATE WAGONS

There are a number of choices of slate wagons in the smaller scales. In 4mm scale (OO9), there are now RTR versions from PECO and Bachmann in both braked and unbraked types. Other than that, it is very much the realm of the kit. Dundas Models produces Festiniog Railway slate wagons in 2-ton and 3-ton versions in 4mm scale and Meridian Models/Narrow Planet offers a Penrhyn Railway wagon – all of these are made in injection-moulded plastic. Rodney Stenning produces a small range of suitable kits based on the Tal-y-llyn wagons in white-metal kit form.

Moving to larger scales, both PECO and Langley Models make slate wagons in 7mm scale and Colin Binnie and Slater's offer 16mm

scale kits. There are several other choices available from other small manufacturers which are only either produced in small batches or to order, as well as 3D printed plastic kits from the Shapeways website. The above should get you started in most of the smaller scales, but an internet search will reveal other options should you wish to look further. A safe place to start in 4mm scale is with the well-respected Dundas Models kits.

TIP

The first thing to notice if this is new to you is the size – or rather the lack of it. Slate wagons, for the reasons given above, are tiny, only around 30mm long in 4mm scale. If your heart is totally set on modelling the Welsh narrow gauge, then picking up one of these kits to try may be a smart first step just to make sure that you can ‘get your eye in’ with a particular scale. If you are able to put a slate-wagon kit together comfortably, then everything else will be a breeze!

PROJECT ONE: A 3-TON SLATE WAGON

Not surprisingly, the first modelling project is a 4mm scale slate wagon. Dundas Models produces both 2- and 3-ton versions and the example here is one of the latter. The real things were built in two batches with a total number of some 250 vehicles, a large proportion of which have made it into preservation in some form or another. Several variations existed within these two batches with differences in springing and braking.

MATERIALS AND TOOLS FOR PROJECT ONE

Project materials:

- Dundas Models DM 53 3-ton slate wagon kit
- Dundas Models CV05 slate load (optional)
- transfers for numbering if required

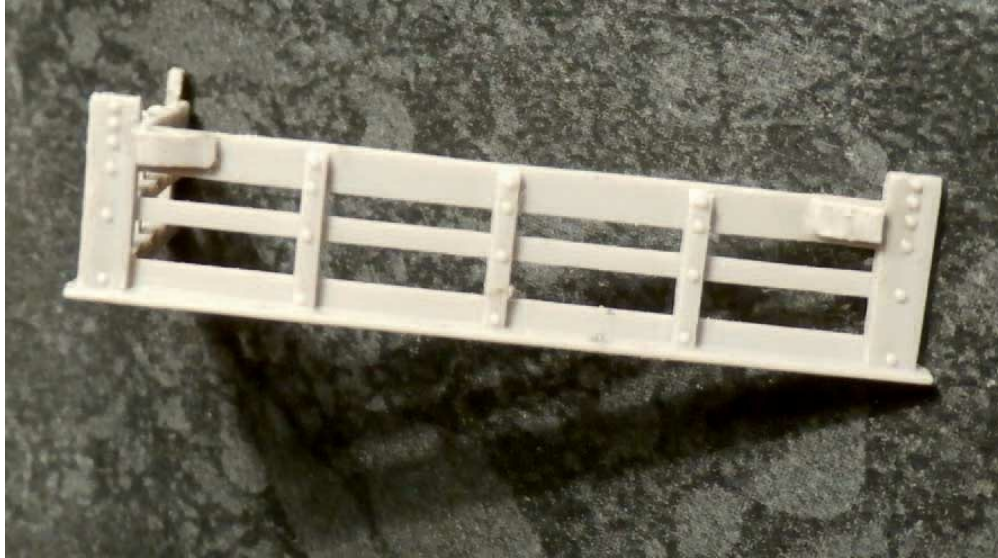
- 20thou plastic sheet for load (optional)
- couplings of choice
- paint (see project).

Build tools and materials:

- craft knife (or scalpel)
- liquid solvent such as Mek-Pak and a small brush to apply it
- superglue
- needle files
- 2mm drill
- sanding stick.

BUILDING THE SLATE WAGON BODY

The slate wagon kit (of any type) is essentially an open-sided box, so the first thing to do is to remove both pairs of sides and ends from the sprue and very gently clean off any mould markings from the parts with a flat needle file. Add the triangular reinforcing pieces to the sides if required, then, taking the parts as pairs, trial-fit one end and one side together. If all is well, run a small brush-full of liquid solvent along the inside of the joint. Repeat this with the second pair of side/ends. Note that the action of the solvent will 'pull' the pair inwards, so as the joint is setting, check to make sure that the parts are fixing at a right angle to each other before the joint becomes solid.

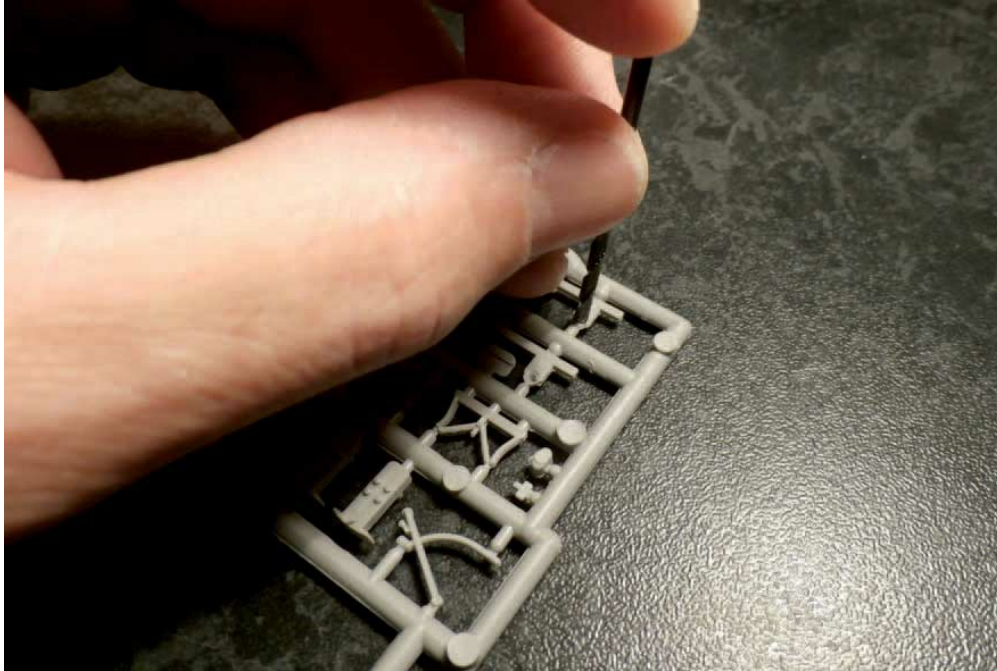


One side and end assembled. Make sure that a right-angled joint is maintained.

CONSTRUCTING THE CHASSIS

Take a 2mm drill and lightly 'dish' the axle-box holes. This only requires a turn or two and is just to take away any snagging edges. Don't overdo it or the wheels will fall out! Note that it is much easier to carry this out while the solebar/axle-box assembly is still attached to the sprue.

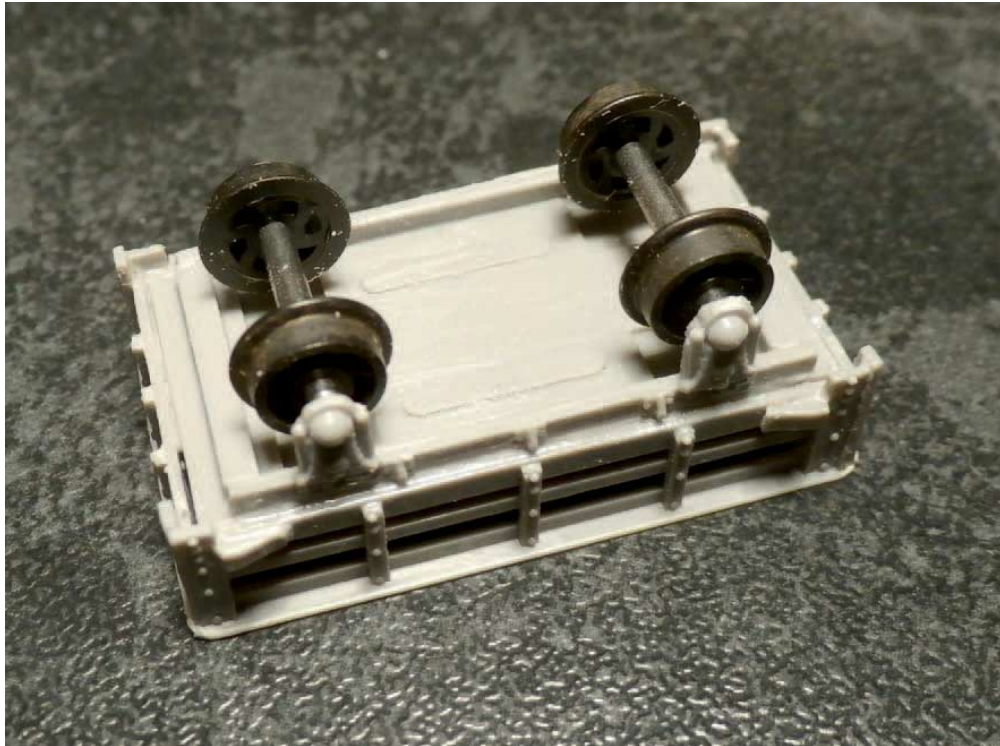
This particular kit has several options on braking parts, so before going any further, decide which one of these options you wish to take. Here, one of the original unbraked versions was selected.



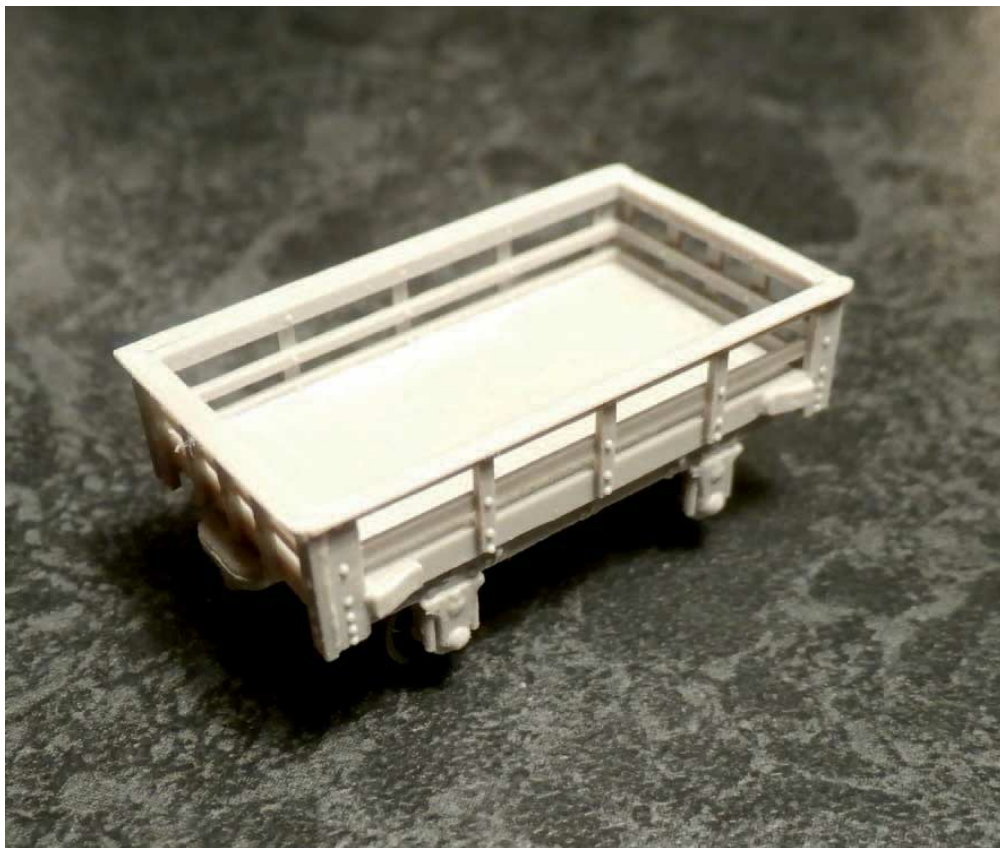
Axle boxes should be lightly 'dished' with a 2mm diameter drill.

Add the solebars to the floor as shown. Once again, it is likely that the solvent will pull the parts inwards, so it's best to add one and make sure that it is straight before letting it fully harden. Then add the second, trapping the wheels in between. Keep checking that the wheels spin freely as the joint sets. It is definitely worth trial-running this part of the build before adding any solvent to make sure that all the parts fit without splaying outwards. Finally, add the floor to the assembled body parts.

The coupling blocks can be added if needed and the top corners of the body can be gently rounded off with a sanding stick.



The assembled floor added to the body.



Finished with coupling pads fitted.



Completed slate wagon.

Any painting can now be carried out with reference to the information on the instruction sheet and numbers added as required. Here, a brick red oxide (Humbrol 70) was used and the numbers from a leftover Ratio Models sheet were added.

THE LOAD

If you wish to run your wagon loaded, a dedicated load casting is available from Dundas Models, but making your own is very straightforward using 20thou plastic sheet, which is built up in 5mm wide strips. This is obviously much more time-consuming, but does mean that you can vary the sizes of the slate carried in your wagons. The finished sizes varied (as illustrated earlier) and several different sizes could be carried in one wagon at the same time.



Slate loads can be easily made from strips of 20thou thickness of plastic sheet.



Short rake of slate wagons. L-R Dundas Models Festiniog 3-ton unbraked; Penrhyn Railway 2-ton supplied by Narrow Planet; Festiniog braked 3-ton fitted with load and Greenwich couplings.

PROJECT TWO: FESTINIOG RAILWAY SLAB WAGON

As well as transporting finished slates for roofing, the railway also required wagons for moving larger items in slab form, such as for gravestones, beds for billiard tables, plinths and so on. Two types of wagon were employed: a flat type (as described here), which varied in length but was generally the same width as the normal roofing-slate type described in the previous project; and the A-frame design, which carried larger out-of-gauge slabs in a near upright position. These wagons were often specially made or modified for a specific type of slab and their numbers were very much fewer than the roofing-slate type.

This project describes the partial scratch-building (built using raw materials) of a medium length flat type of slab wagon that will run with all the slate wagons you will undoubtedly need to construct.



Prototype slab wagon. Note the shape of the retaining rings.

MATERIALS AND TOOLS FOR PROJECT TWO

Project materials:

- PECO N gauge 9ft wheelbase wagon chassis kit
- 20thou plastic sheet

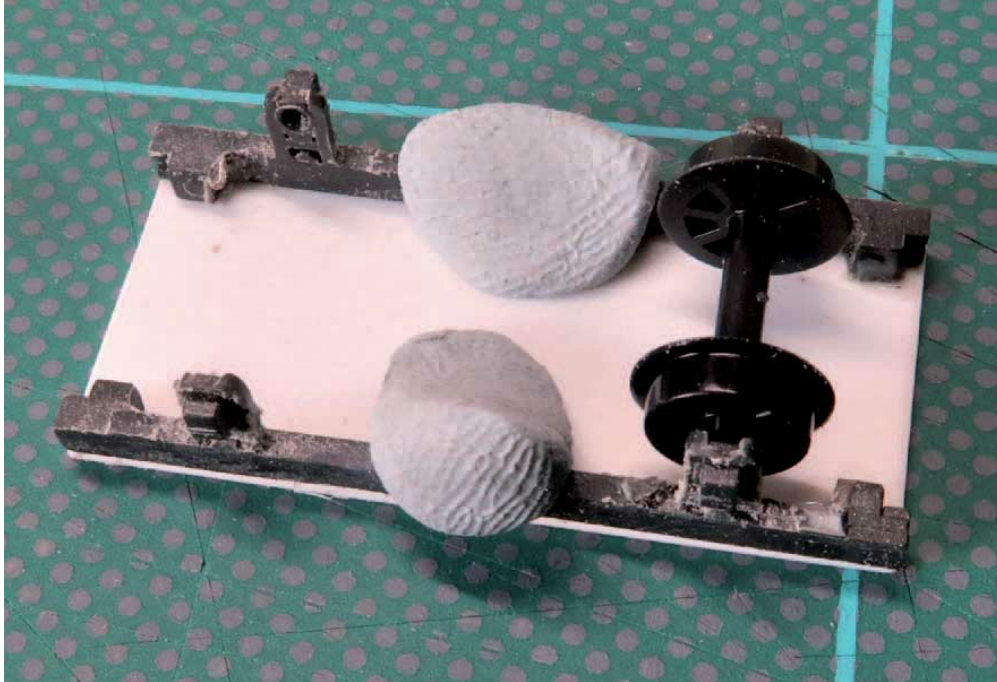
- 60thou square plastic strip
- paint (see project)
- thin wire
- brown or grey cotton.

Build tools and materials:

- craft knife
- needle files
- Blu-tack or plasticine
- liquid solvent such as Mek-Pak and small brush
- superglue
- all-purpose adhesive (such as UHU)
- pin chuck and small drills
- ruler
- household needle
- cutting mat (or similar)
- wire cutters.

MODIFYING THE PECO CHASSIS KIT

In essence, for this project you are taking the chassis kit out of the pack and throwing most of it away. However, it is readily available from most good models shops and is relatively cheap.



The modified solebars are added to the new floor.



The chassis kit parts reduced to form the new model.

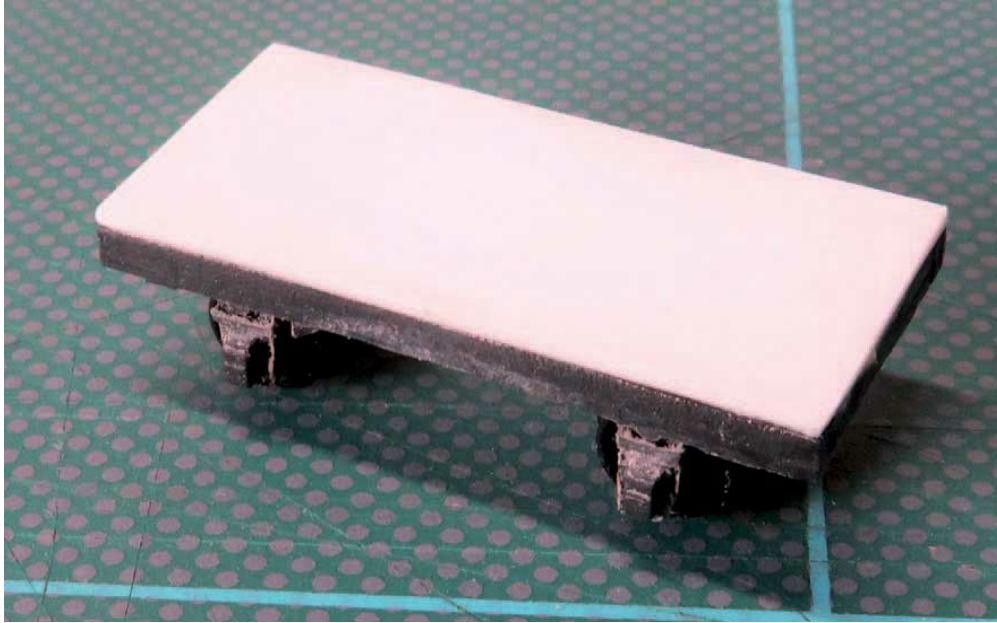
Take the solebar mouldings and carefully remove all of the raised detail using a flat needle file. Remove the brake hanger and lever

mouldings and reduce the axle-box sections to their basic rectangular shape. Then take the chassis end mouldings and remove the buffers. Finally, file this outward face completely flat.

Cut a section of 20thou sheet for the floor. This should be 32mm long and 16mm wide. Add the solebars and hold these in place with a small amount of Blu-tack. Trap one wheel set in between and when you are satisfied that this is free-running and parallel to the ends, tack-fix this end of the solebars with a small amount of solvent. Add the second wheel set and check that all is well before tacking this end as well. Remove the Blu-tack and turn the wagon over and place on a known flat surface such as a kitchen worktop or a piece of glass to make sure that all the wheels are on the ground and that the wagon will roll. When you are happy that all is well, add more solvent along the outside of the joint. Note that unusually the floor of this wagon should not extend beyond the outside face of the solebar. The chassis ends will need trimming slightly and should be fitted at this point.

TOP DETAILS

Cut four lengths of 60thou square strip to the same width as the floor to represent the timber baulks. These not only supported the slabs, but allowed ropes to be easily passed underneath the slabs for securing the load. Add these pieces crossways at 2mm from each end and 11mm from each end.



Test-run on a flat surface. Note that the floor does not overhang the solebars.

Add rivet marks along the outside edge of the floor and drill recessed bolt holes into the baulks 2mm from each end by twisting a 1mm drill on to the top surface to create a small indentation.

TIP

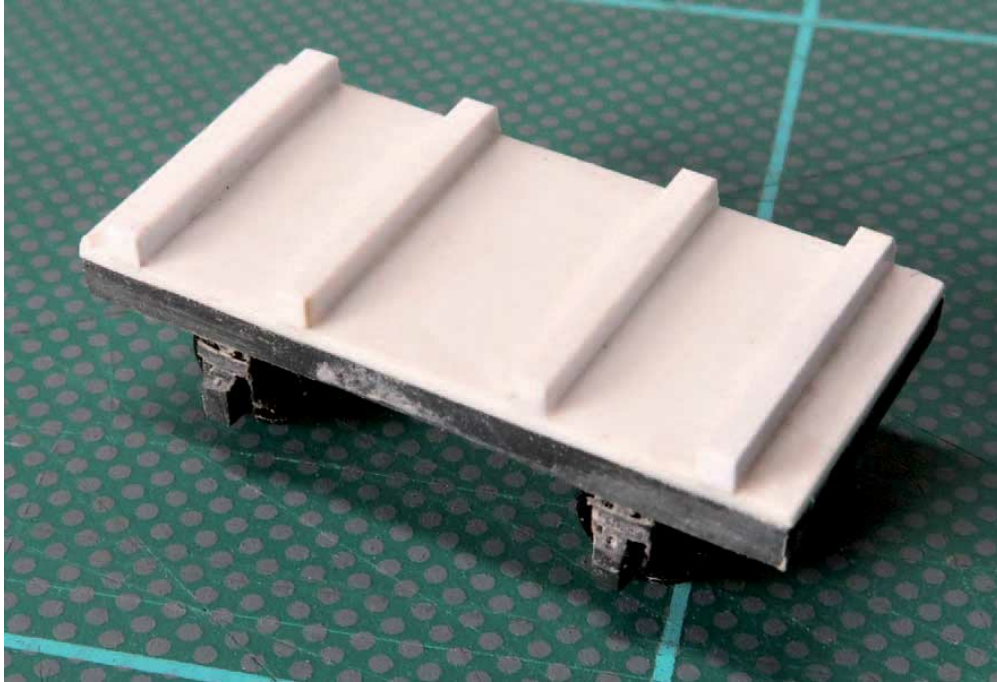
Suggesting rivets in a small-scale plastic model can be done with a normal household needle held in a pin chuck. The needle should be held at approximately 45 degrees and a small hole made with the point. This creates a small raised section of material to appear, forming the rivet head. The small hole will later be filled with paint and will disappear, but the raised part will remain and can be accentuated by running a small amount of different coloured paint across it. Practise on a piece of scrap plastic until you get a feel for the technique.



Dummy rivets can be formed using a needle in a pin chuck.

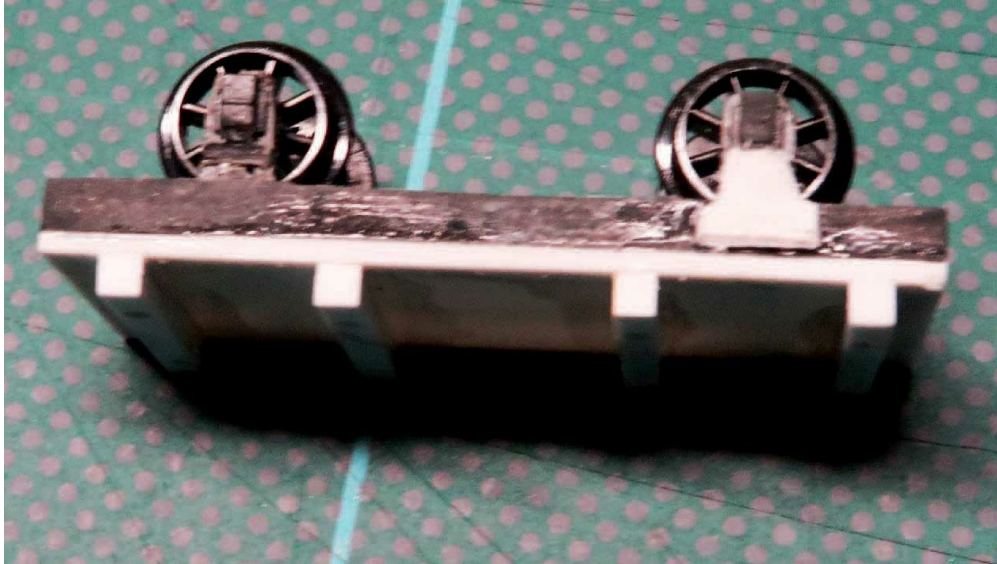
DETAILING THE CHASSIS

The axle boxes need to be fattened up a little and this can be done with a simple set of overlays.



The support timbers added from plastic strip.

Take a sheet of 20thou plastic and cut a 4mm wide strip. Push this down on to the top of the existing N gauge axle box and mark a point just below the joint between the floor and the solebar. Make two marks at the lower end, 1mm from the edge and another two marks 1.5mm up from the edge. Chop out a square section using these two sets of marks, thus removing the lower corners. Round off slightly using an oval needle file, generating a soft 'T' shape. Cut the whole piece off and add it to the top of the existing axle box as shown. When it is hardened off, add three rivet heads – one at the top and two above in an inverted triangle shape. Repeat this for the other three axle boxes.



New axle-box tops made from plastic can be added.

FIXING LOOPS

The wagons feature a set of oval fixing loops – two on each side. These can be made up from thin wire, such as multi-strand layout wire, by wrapping the wire around a small drill or the tip of a pencil, then crossing and twisting the ends of the wire until a loop of the desired size is made. Any excess wire can be trimmed off and the loop squeezed into the required shape. A quartet of small holes can be drilled into the solebars, just inboard of the axle boxes, and the tail of each loop inserted and fixed with all-purpose adhesive or superglue.



The loops for the retaining ropes can be formed from thin wire.

The loop should be bent down if the wagon is running empty, or bent up if you plan to add a slab load. Don't forget to add some miniature lengths of rope from brown or grey cotton.

DRY BRUSHING

Dry brushing is a technique used for picking out raised detail such as rivets or rust patches. Dip the tip of an old brush into the paint and quickly scrub most of this paint off on to a piece of card. Then drag the brush over the surface of the model. Any remaining paint residue on the brush will catch on the raised detail, but not coat the surrounding surface. Practise this on an old model first and don't use a new brush – keep an old worn-out one just for this sort of work.



The finished and painted slab wagon.

PAINTING

The whole wagon should be painted with a pale grey (Humbrol 64), the timber baulks picked out in a light wood colour (Humbrol 29) and the rivet heads and axle boxes dry-brushed with a new rust colour (Humbrol 62).

PROJECT THREE: A PRIVATE QUARRY WAGON

There are a number of choices for narrow gauge open wagons in 4mm scale and to a lesser extent in 7mm scale. Most of these are in kit form made from white metal, plastic or brass, and more recently a large number of items have become available in 3D print form. There are also a handful of RTR items on the market, so the question is why bother to build your own? The answer is twofold: firstly, the ability to produce and run something a little different to all the other open vehicles on narrow gauge layouts; and, secondly, the sense of achievement gained in doing so. There is also a third consideration in

that if you are working to a tight budget, the material cost of the wagon built here is under £5 – less than most comparable kits and a great deal less than the equivalent RTR items. If you want an item of rolling stock fast, RTR or kits are the best option, but if you have the time available to produce something personal and unique, then scratch-building or semi-scratch-building as here is a natural choice.

The subject wagon represents an Oakley Quarry wagon which ran on the Festiniog Railway. Privately owned wagons were not unusual in slate-wagon terms, but something in a more general open style such as this was. Detailed information about this wagon is scarce, but it would seem that quite a number were built with both the usual outside axle bearings and some with inside bearings. In fact, the only surviving wagon that is preserved in the Narrow Gauge Museum at Towyn Wharf Station is so built. The model was made using two slightly conflicting published scale drawings and it cuts a middle ground between the two. As there appear to be prototype differences in the fleet, this would seem to be acceptable.

This model should not present the modeller with any particular problems, only that it is naturally quite small and therefore fiddly. This will not be an issue if you take a little time and don't expect it to be as quick as putting a plastic kit together. The general construction builds on the techniques of Project Two and uses similar materials and tools.



The preserved Oakley wagon at Towyn.

MATERIALS AND TOOLS FOR PROJECT THREE

Project materials:

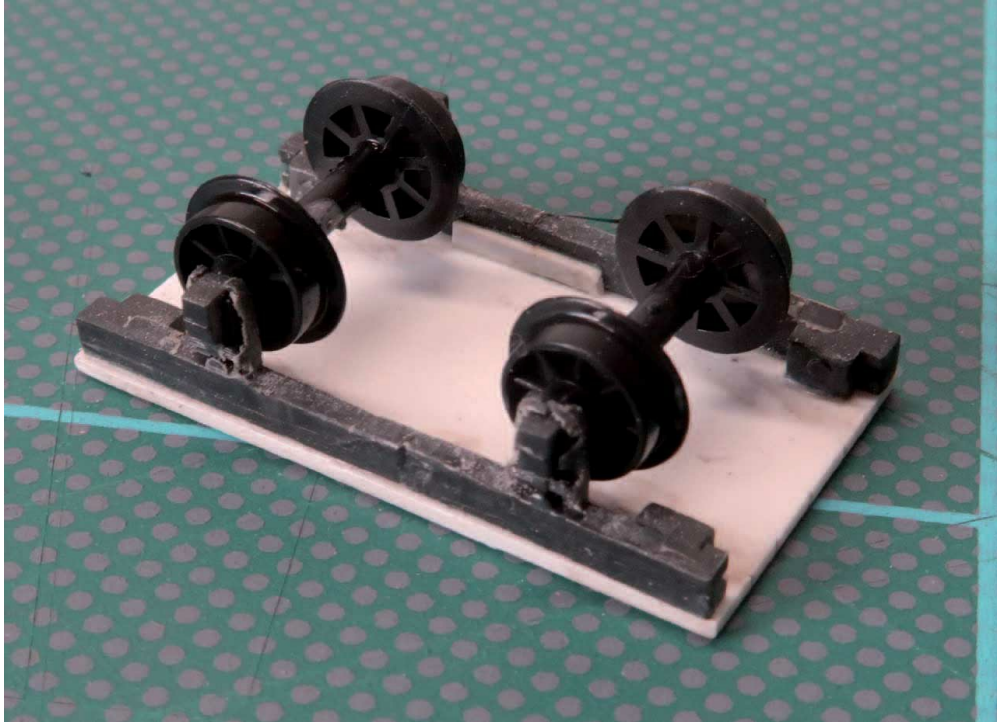
- PECO N gauge 9ft wagon chassis Ref: NR119
- 30thou plastic sheet
- 40 × 40thou plastic strip
- 10 × 20thou plastic strip
- 10thou plastic sheet
- paint (see project).

Build tools and materials:

- craft knife
- cutting mat (or similar)
- liquid solvent such as Mek-Pak
- household needle
- ruler
- sanding stick
- needle files
- Blu-tack or plasticine.

REDUCING THE CHASSIS

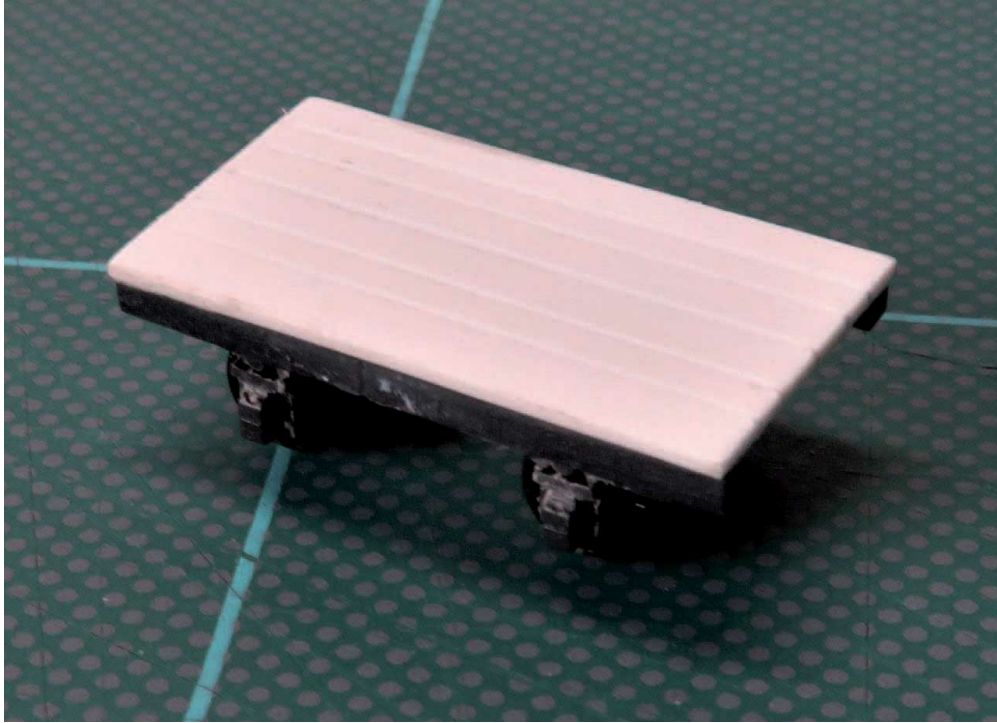
As with the previous slab wagon project, the axle boxes need to be reduced to a minimum. In addition to that, the solebar part needs to be reduced in length from 32mm to 28mm. The order in which you do this is up to you. To reduce the solebar length, select a point in the centre section and cut with a brand new blade at as close to a right angle as you can. Then take the longer of the created two halves and remove a little less than 4mm – a little less to give yourself a bit of wiggle room. Place the two halves together dry without adding any solvent and check the overall length. Lightly clean the new ends and take a little more material off if required. Then add solvent and allow to set, making sure that the parts are straight and true.



The reduced and shortened solebars added to the floor.

It is advisable to alter one solebar and then move on to the floor part. This should be cut from 30thou sheet to a size of 28mm long by 16mm wide. Scribe planks lengthways on one side; these are a mix of widths at 3, 2, 3, 3, 2, 3mm across the width. The odd half a millimetre will easily be lost. Unusually, these planks have their ends exposed on the finished vehicle, so notch the ends of the floor to match.

Add the one finished solebar to the floor and while it is setting make up the second one, ensuring that the axle-box centres line up exactly with the first to avoid skewed axles. Add this second solebar part to the floor, trapping the wheel sets between as in the previous project.



Longitudinal planking is scribed on to the floor.

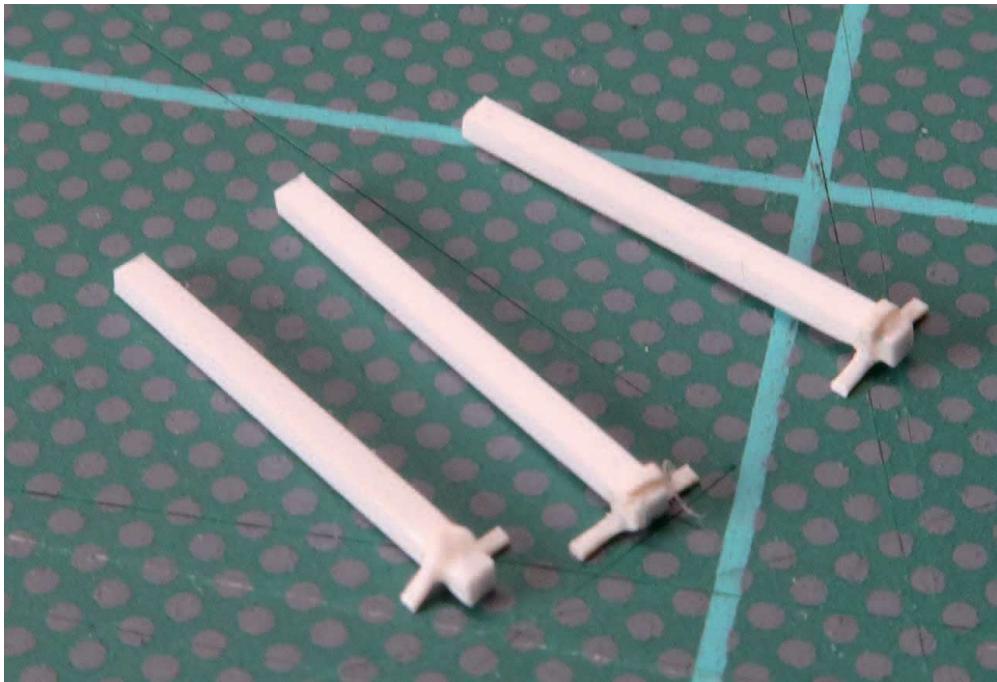
THE VERTICAL BODY STRUTS

The wagon sides were held on by an unusual arrangement of six vertical struts. They are unusual in that: a) they are unequally spaced; and b) this method was usually used if these struts were to be lifted from the holders at their foot and the sides removed – which they can't be as one end and all struts are bolted to the sides. A possible explanation is that they were originally built to be removable from the chassis, but fixed solid at a later date.

The struts themselves are cut from 40 × 40thou strip at a length of 13mm. The holding brackets can be made up from 10 × 20thou strip. This is wrapped around the strut and is a bit of a fiddle as the thinner strip will tend to snap. The most reliable method is to start at the middle, leave plenty of excess and trim to length when the solvent has gone off.

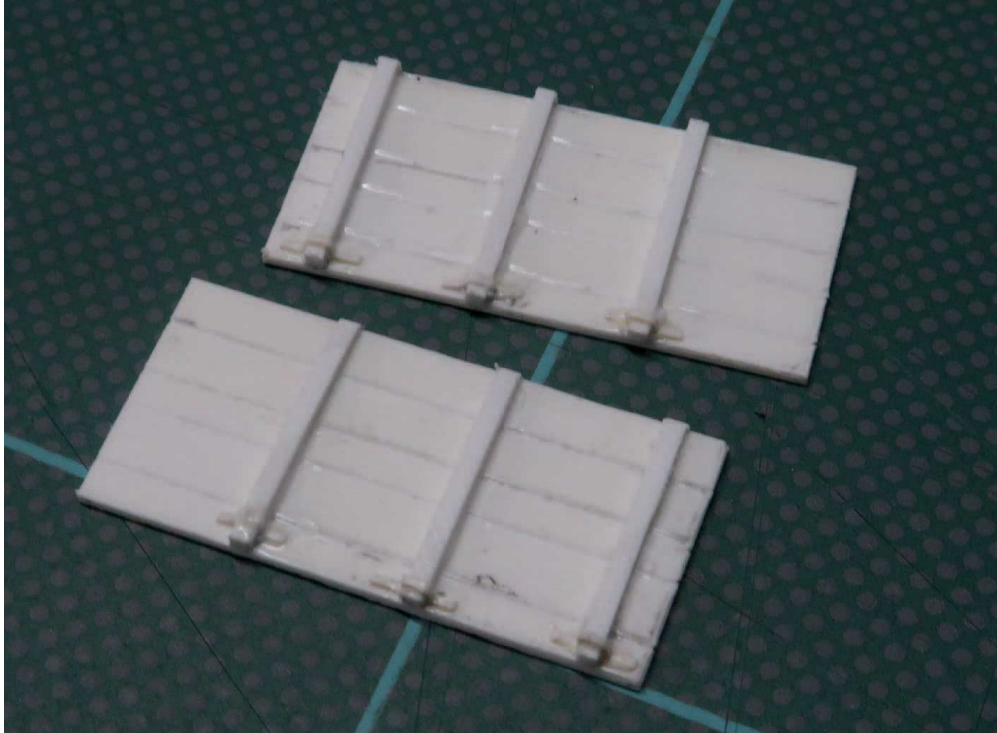
THE WAGON SIDES

The sides should again be cut from 30thou sheet at a size of 28mm long by 13mm high. Once again the planks are unequal and should be scribed at (from the top) 2.5, 3, 2, 3, 2.5mm. It is usually easier to mark out both sides as one long piece, make the scribe marks and then cut each side from the sheet. If your wagon is to be left unloaded, the plank marks need to be added to the inside as well.



Uprights for the sides, along with the tiny iron retainers.

The pre-made struts can now be added, noting that each side is a mirror of the other. The spacings from the ends are 3, 8.5, 8.5mm. The struts have a top-to-bottom taper on them, so when the joint with the side is fully set, sand this taper using a sanding stick, working with an end-to-end motion. Finally, add bolt heads using a needle, as detailed in the previous project. Both sides can now be added to the chassis unit, with the top edge of the bottom plank level with the top edge of the floor.



The uprights fitted to the sides. Note the uneven spacing and the mirror image of the parts.

TIP

Scribing is a method of replicating the lines between planking – properly called ‘wagon bevels’. First mark the line in pencil, then hold a ruler against this line and draw the knife down the line with the blade held at right angles to the ruler. This should scrape a roughly triangular cut into the plastic.

THE WAGON ENDS

The ends are the same size as each other, but are of differing construction. A pair should be cut, each $16 \times 11.25\text{mm}$. The fixed end has horizontal planking set at 2.25, 3, 2, 4mm (from top to bottom), which should be scribed as before. The opposite end is a pair of ‘cupboard’-type doors, which should be scribed vertically at 3.5, 4.5, 4.5, 3.5mm spacing. Fit the two ends *on top of the floor* and between the sides. The door end can be bowed out slightly to give the

impression of well-worn and loose-fitting doors. Note the position of the struts on the sides.

On the closed end add corner plates from 10thou sheet or paper. These should be cut at $11 \times 4.5\text{mm}$ and scored down the centre before folding around the corners and being fixed with a wash of solvent. When set, the bolt heads can be added as before.

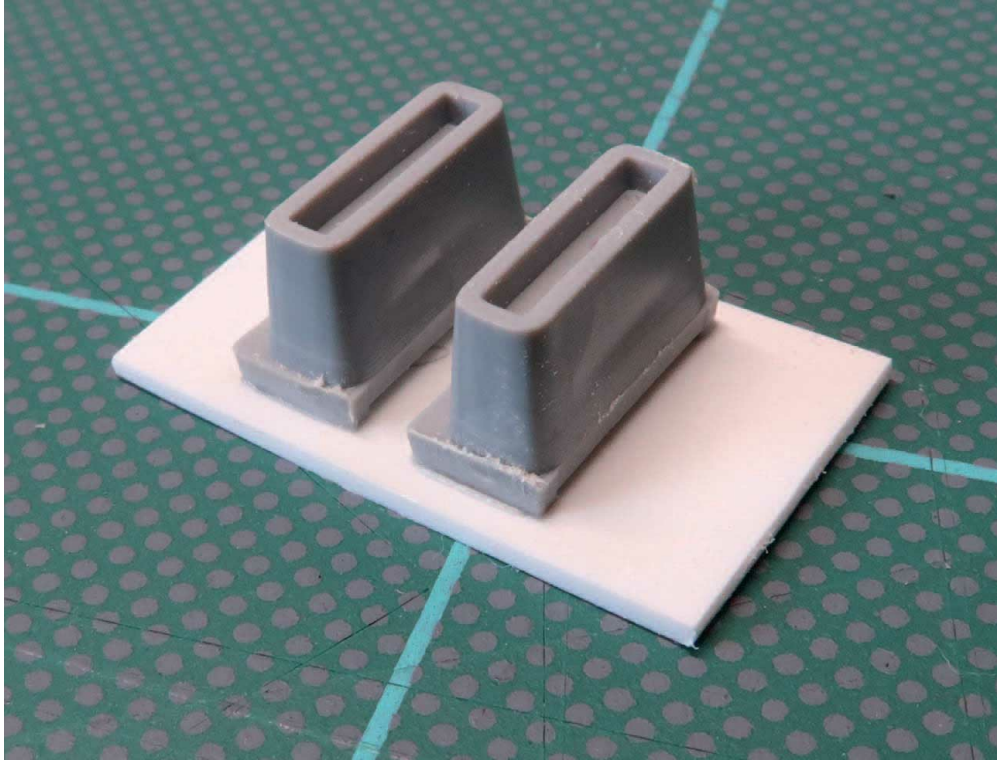


The long hinges are fitted, letting the short end set before bending around the wagon end.



The turning latch plates are added from the same strip material.

Hinges can now be added using 20 × 10thou strip, which is wrapped around the ends as shown. A latch plate can be added on top using the same material. A bufferbeam can be added at each end between the solebars using 30thou sheet at around 1.5mm deep.



A false floor can be made up, using scrap material blocks as spacers.

Adding a raised load can complete your quarry wagon. A false floor should be cut from 30thou sheet at $26 \times 11\text{mm}$ and spacers made from scrap material (here coupling posts from OO gauge wagon kits were used). The new false floor should be painted dark grey or black and covered with suitable crushed stone chippings or similar.



The finished Oakley wagon with false stone load.

The wagon can now be painted to suit. Here Humbrol Brick Red (70) was used, with a couple of planks picked out in Dark Earth (29) and the whole lot weathered with a wash of German Tank grey.

CHAPTER FOUR

BRAKE VANS AND NON-REVENUE VEHICLES

Surprisingly, the addition of a brake van at the end of a train on the Welsh narrow gauge railways was not always mandatory. In the years when mineral traffic was the only thing carried, before the fare-paying public were generously catered for, the line would be regarded as any other industrial concern: horse-worked trains were not moving at any great speed and the gravity-run trains had braked vehicles spaced throughout the rake operated by the worker sitting on top. The more public lines such as the Glyn Valley Tramway, The Vale of Rheidol and the Welshpool and Llanfair were worked under more relaxed rules than the main lines and in any case often ran goods traffic within the passenger timetable as 'mixed' trains. The Welshpool and Llanfair really only made full use of its brake vans in later years when it downgraded to freight-only working.

That aside, as modellers and rail enthusiasts we tend to expect, and more than likely desire, to see a brake van, so even though your rake of slate wagons would likely only carry a 'LAST VEHICLE' sign on the final wagon to indicate to workers that the entire train had passed without breaking apart, a brake van simply looks right, even if it isn't prototypically accurate. And anyway, we all like building the things. So to continue the theme thus far covered, the next project is a

brake based on the small vans built by the Festiniog in the early part of the twentieth century.

PROJECT FOUR: DOUBLE-BALCONY BRAKE VAN

The Festiniog Railway built a batch of double-balconied brake vans in 1908 to work with slate trains, though anecdotally these only appear to have been used as such on the uphill journeys; how they got back down again is not recorded. All bar one had been scrapped before World War II and this remaining van was used for light permanent-way trains up until the 1960s, when the wooden underframe gave up and the body section was used as a signalman's hut. Recently, a replica of this van has been built and runs as FR No7 using one or two of the remaining parts, but differing slightly in detail. This and the earlier vans can be built in 4mm scale from a Dundas Models kit which only needs a small amount of work to build either the early or current versions.



The prototype (rebuilt) FR brake van stands at Porthmadog Harbour behind a demonstration goods train.

MATERIALS AND TOOLS FOR PROJECT FOUR

Project materials:

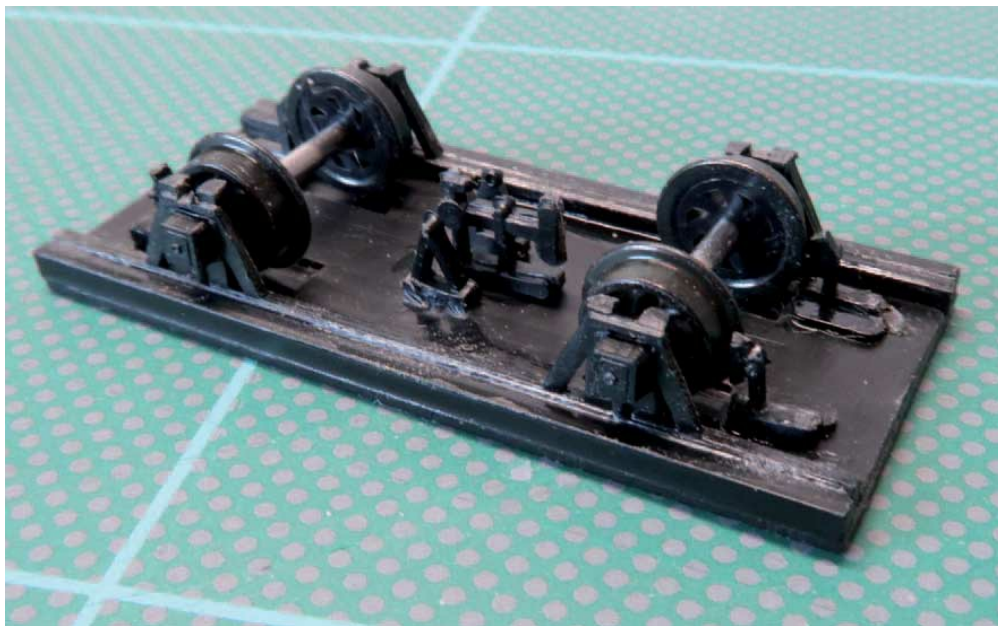
- Dundas Models Festiniog four-wheel rake van Ref DM48
- paint (see project)
- small amount of lead sheet or similar
- vacuum pipes (available from various sources); optional for later version.

Build tools and materials:

- craft knife or scalpel
- needle files
- pin chuck and small drills
- liquid solvent
- sanding stick
- snipe-nosed pliers or tweezers
- all-purpose adhesive
- small steel ruler.

CONSTRUCTING THE CHASSIS

The chassis is a fairly straightforward build, but as there is little room for adjusting the solebars outwards to allow for the slightly overlong axles that are supplied, it is worth using two small drills to open up the axle boxes a little. First, make each one 0.5mm deeper with a very small drill, then 'dish' the hole with a slightly larger one. In both cases just twist the drill with the fingers and apply as little pressure as possible. Add one solebar into the floor slot, add solvent, make sure that it is upright and level with the end of the floor and allow it to set. Add the second, trapping the wheel sets in between, making sure that the axles are parallel and square.



The brake van chassis showing the position of the brake hanger and the brake shoes.

The brake shoes are tiny and hard to position, but make sure that they are not too close to the wheel tyre and are nearer to the outer edge, so as to avoid any jamming of the wheels.

The crank and the V hangers can be positioned in a similar manner. Check that all is well by running the finished chassis through

a point and move on to the upper section.

TIP

A method of positioning small plastic parts is to use the solvent brush dampened with a small amount of solvent to pick them up and place them in position with a mixture of 'stick' and surface tension. With small parts such as the brake shoes used here there is a tendency to use small tweezers, only to squeeze a little harder than intended and to 'ping' the tiny part into the darkest corner of the room where it will never be seen again. The sticky brush method is far safer and easier on the knees.

THE CABIN

Once again, twisting the construction order makes things a little easier. Rather than adding the grab handles at the very end, they can be attached first, enabling the sides to be treated individually without handling the fully constructed vehicle, with a possible risk of damage to the already built parts. Using the drill-through method will result in a stronger end product. First, smooth off the raised pips with a sanding stick and drill through the pair of remaining marks. Most model drill sets only go down to 0.5mm diameter and the wire supplied is 0.3mm, so a little filling with glue and paint will be necessary. Using a pair of snipe-nosed pliers or tweezers, make one bend in the wire approximately 2mm from the end, then add a second bend to match the distance between the two marks on the side. *Do not trim the wire.* Use the long length of remaining wire as a handle, feed the wire through the holes and add two small drops of superglue at the rear.

Put this to one side to harden fully while you do something else such as cleaning up one of the other kit parts. When the glue has 'gone off', trim the excess wire and file the wire flush to the rear of the part. Repeat this process with the other three handles on the sides. This method is a lot less fiddly than trying to cut each handle to the

exact length beforehand and juggle the tiny parts into the holes while covered in glue.

Assemble the sides and ends as indicated. The window bars (added to the late-period original van, but absent from the early vans and the current replica) should be added now, but after any painting and glazing (see below) has been carried out. The seats can now be fitted and a small piece of sheet lead (or alternatively a large steel nut) can be added into a puddle of all-purpose adhesive on the cabin floor. The inside of the cabin can now be painted with a suitable dark cream/light brown shade, and the outer panels painted in either the early brick red or the later and replica period mid-green to suit. The window frames can be carefully touched in with suitable dark red.

THE GLAZING

Gazing can be added either as per the instructions, or by cutting two 17 × 10mm strips and placing them over the pair of end windows, then using the remaining pieces from the glazing supplied to add behind the side windows. Both these strips can be attached using a minimal amount of all-purpose adhesive, taking care not to get it anywhere near the actual window opening as it will ruin the clear surface.



Fitting hand rails using the 'long tail' method. The excess can be trimmed when fixed.



Weight can be added to the floor in a puddle of UHU adhesive.

FINAL PARTS

When the internal glue has thoroughly hardened, the roof can be added, making sure that the overhang is equal all the way around. Lastly, the end handrail parts can be cleaned up and thinned down slightly with a flat needle file and added to the balcony floor as shown. These and the roof, grab handles and underframe can be painted either black, or, as the illustrated example, a dark grey. If the modern replica van is to be faithfully copied, vacuum brake pipes can be added using a pair of white-metal castings from a range such as 51L Models, or direct from the kit maker, Dundas Models.



The complete brake van kit. Numbering can be added as required.

PROJECT FIVE: SINGLE-BALCONY BRAKE VAN

Another brake van that was originally built in 1908 was this single-balcony vehicle, which was converted from a surplus quarryman's coach. This particular brake van still exists, but has gone through two major rebuilds since the conversion: first in 1967, when the body was reconstructed using plywood sheet; and in more recent years following a damaging rough shunt, when it was rebuilt again using a matchboard style close to the original. It was initially numbered No2, but now runs as No6. There were detail differences over the years, the van running with two, or as pictured, with four brake shoes. A tie-bar now runs between the W-irons, plus vacuum brakes have been fitted in order to comply with modern safety standards.



The quarryman's coach/ brake van conversion standing outside Boston Lodge engine shed.

As Dundas Models produces a suitable quarryman's coach kit in 4mm scale it would seem logical to imitate the prototype conversion and 'kit-bash' this coach kit into a brake. This isn't exactly the way it works out and there is quite a bit of work to do to achieve this, and even then the result isn't completely accurate in prototype terms. However, if you are happy to accept a few inaccuracies and produce a conversion which at least captures the spirit of the original, then this is an interesting project to undertake. The techniques are very similar to the previous projects and only the bodywork differs from Project Four.

MATERIALS AND TOOLS FOR PROJECT FIVE

Project materials:

- Dundas Models Quarryman's Coach Ref: DM45
- 20 × 10thou plastic strip
- 20thou plastic sheet
- 20thou plastic rod

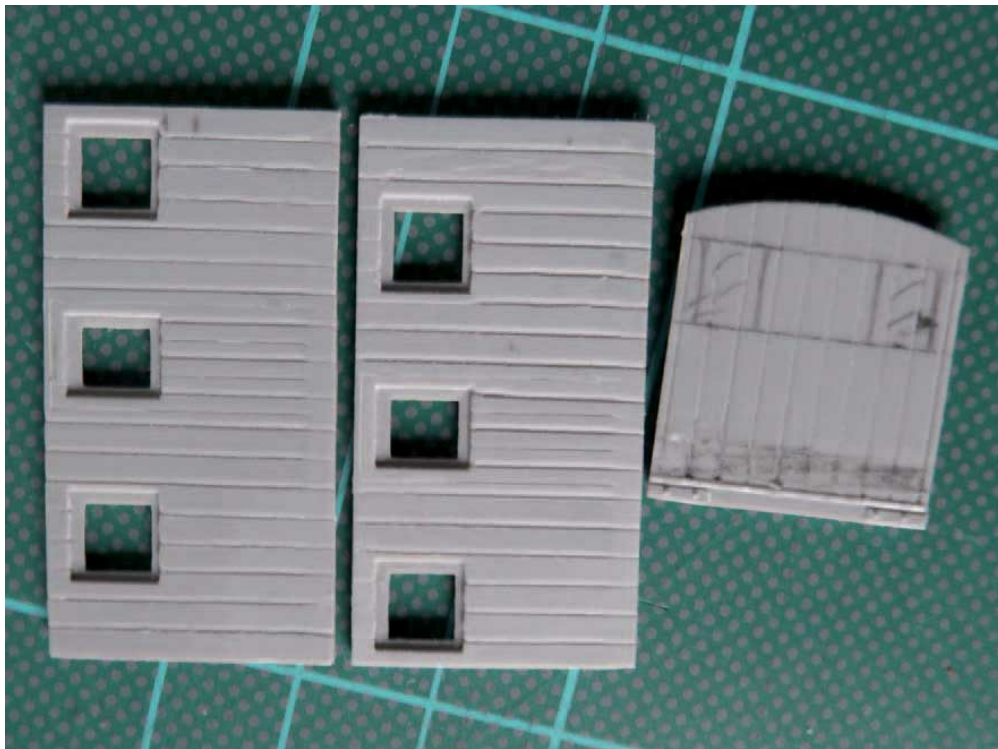
- small amount of extra glazing material (clear plastic packaging is ideal)
- small amount of lead sheet
- vacuum pipes (optional)
- paint (see Project Four).

Build tools and materials:

- as per Project Four.

THE BODYWORK MODIFICATIONS

As the underframe is the same as the van in Project Four, the kit chassis can be built in exactly the same manner. When this has been completed and is checked for correct running qualities, the body modifications can be carried out.



The sides now reduced in length and the end marked out for the extra windows.

First, clean any flash from the body sides and ends, then remove two plank sections from each side. Make sure that these are the

sections from the *opposite* ends, creating two parts of a mirror image. Using a sanding stick, smooth all the raised detail (door louvre, bottom rail, corner plates) and using the scribing technique detailed earlier, extend the plank marks to the bottom of each side. Drill two holes 2mm apart for the grab handles, just below the window at the modified end.

Mark out the window openings in the end – 13mm up from the foot of the part, 6mm deep and 4mm wide. Open up these markings using a chain drill method.

Finally, clean the end piece, removing any raised detail and extending the planking as per the side pieces.

The sides and plain end can now be constructed around the chassis, starting at the plain end. A slight bevel can be sanded into the outside top edge of the sides to enable the roof piece to sit without gaps.

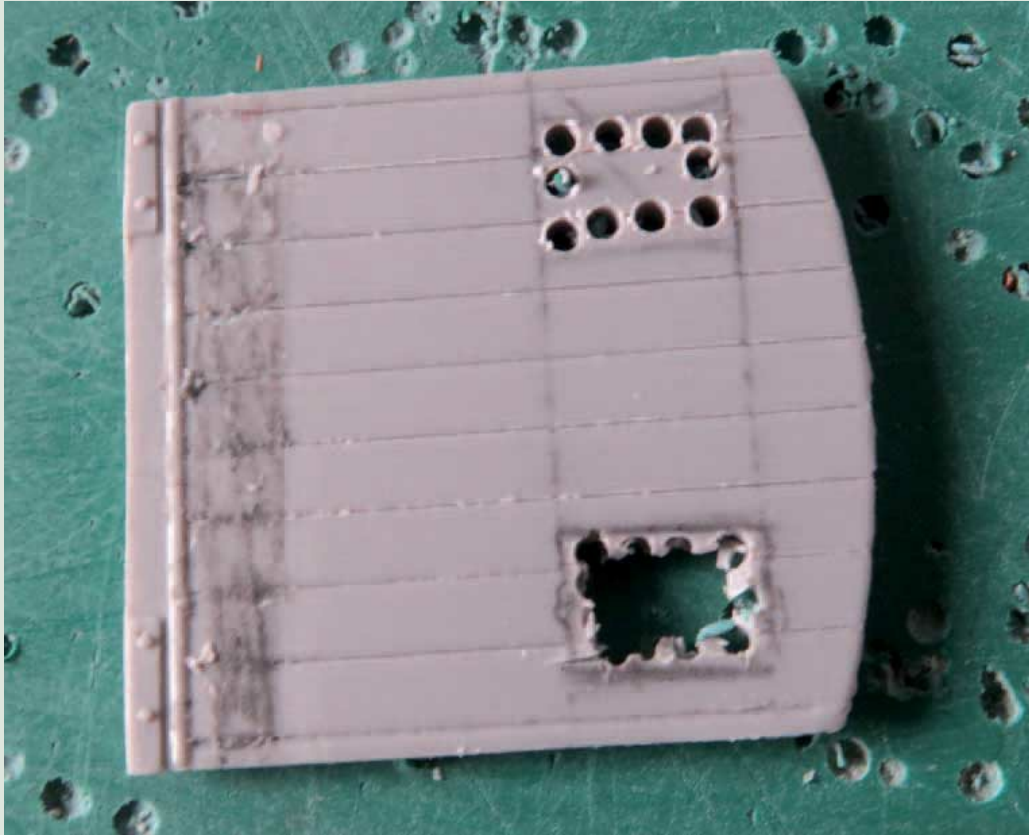
The 'inner', or balcony end can be treated in exactly the same fashion, but first remove approximately 1.5mm from each side edge. Check that this measurement will let it fit snugly between the constructed sides, adjusting as necessary. Finally, remove the lower section level with the bottom of the internal locating lip. The two centre planks can be framed with 20 × 10thou plastic strip to form the doorway to a height of 19mm from the foot, adding a door handle using a cube of the same material. Fit this second end between the sides.

The initial painting should now be carried out both internally and externally after adding some weight to the floor in the same fashion as Project Four.

CHAIN DRILLING

Openings such as windows are hard to cut in plastic sheet. The easiest way to do this is to make a series of holes (here with a 1.5mm drill bit), starting in

the corners and working just inside the marked lines. The small amounts of plastic remaining can be cut through and the waste piece pushed out. The hole can then be cleaned up using a small needle file. This method will be used extensively for the building projects detailed later in the book.



The windows can be opened out using the chain-drill method of lines of small holes that are joined with a knife or scalpel.



The basic completed body.

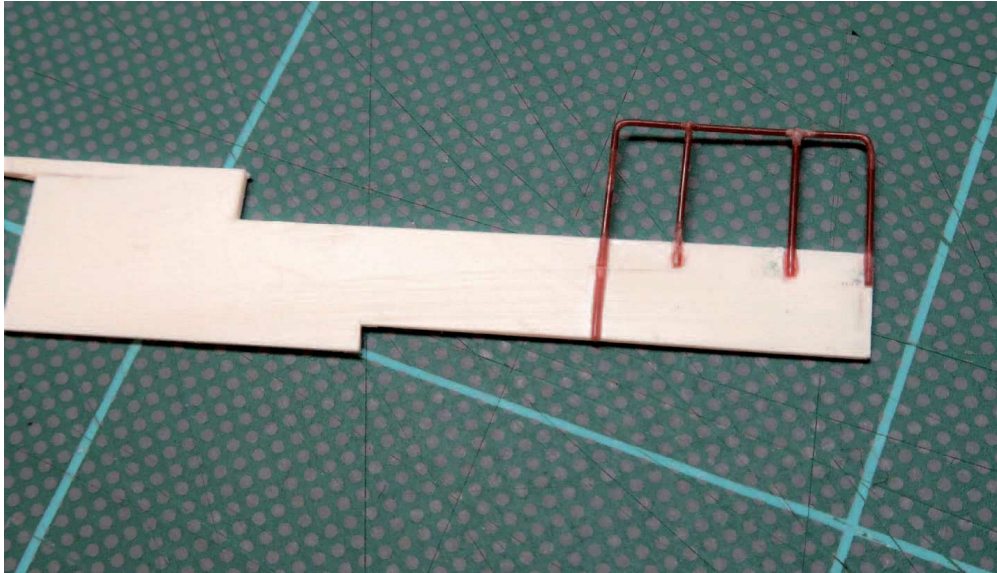
A NEW BALCONY RAIL

At the rear of the van there is a very narrow balcony – just enough space to stand. This needs a new handrail and bufferbeam. The beam material is straightforward enough, being a sheet of 20thou plastic 2 × 18mm. The rail can be made up from 20thou plastic rod. Simply bend it to shape, allowing a 9mm gap from rail to beam, and fix each end to the face of the beam. Note that it is slightly easier to work on a larger sheet and cut the beam to size at the end, which will give you something to hold on to. Lastly, short upright sections can be added and fixed with solvent. After the beam has been cut, sand a slight taper on the lower ends of the rod to represent the flat ‘fixing’ part.

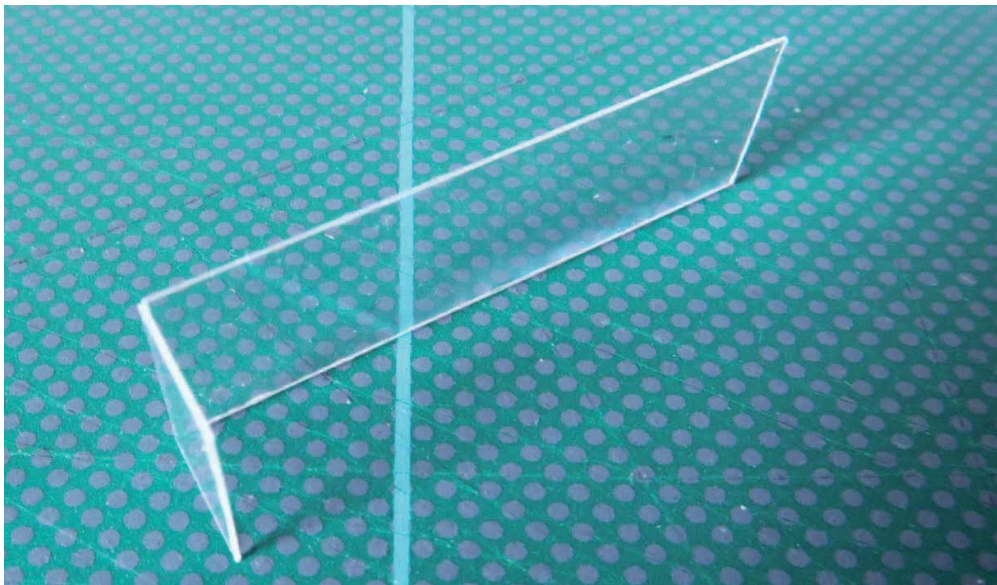
THE GLAZING

A pair of glazing parts can be cut from the supplied sheet. Cut a 40 × 10mm strip and lightly score across this at 7mm from the end.

Carefully bend this at a right angle as shown and repeat with the second part. These will form the side and balcony glazing. Fix with a tiny amount of all-purpose adhesive. The other end requires a 17 × 10mm strip, for which you may need to source more glazing material than is supplied. Fix the balcony handrail section to the end, add the roof, and carry out any final painting as required.



Balcony handrails can be made up from 20thou plastic rod, bending the end uprights and adding the centre pair from separate lengths.



Glazing can be cut to length. It is easier to use a bend for the end windows.



The complete coach-to-brake conversion.

PROJECT SIX: EARLY QUARRYMAN'S COACH

Several of the narrow gauge quarry lines ran very basic vehicles for the transport of workers. These were, to say the least, quite spartan affairs, usually lacking springs or brakes and were only just one step up from riding on a slate wagon, though as some were roofed they did keep at least some of the rain off. In 4mm scale a kit of a more luxurious later style coach is available from Dundas Models and formed the basis for the previous project. A rake of these running in front of a long line of slate wagons would be just the ticket for running through your layout at the beginning and end of each shift.

MATERIALS AND TOOLS FOR PROJECT SIX

Project Materials:

- Worsley Works Festiniog quarryman's coach scratch-aid kit
- Dundas Models 5.5mm (or similar) wheel sets
- 40 × 20thou plastic strip

- 60 × 60thou plastic strip
- paint (see project)
- small amount of lead sheet
- white-metal workmen.

Build tools and materials:

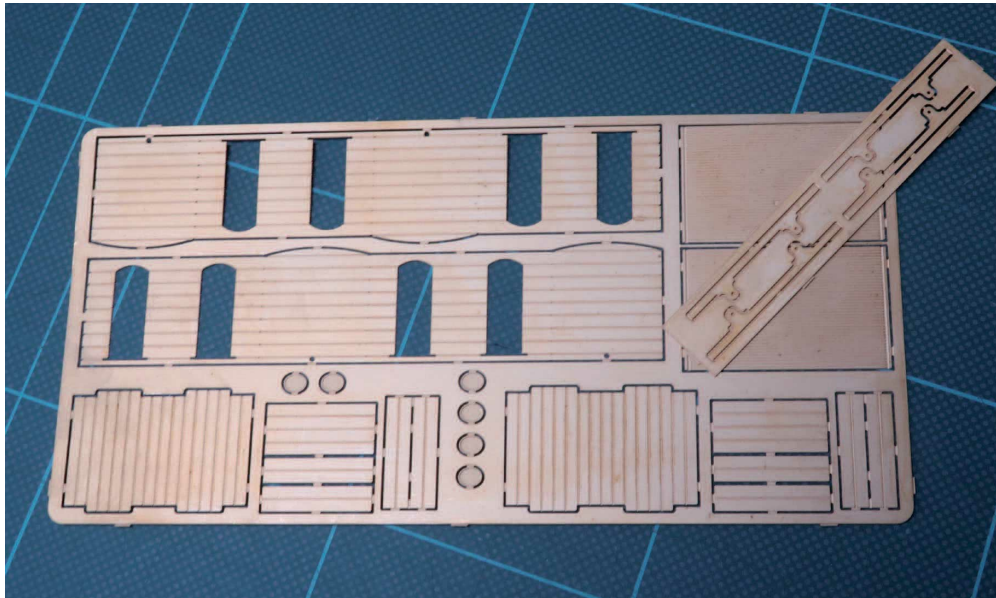
- trimming knife
- small file
- soldering iron (at least 25watt)
- glass-fibre brush – the small propelling type is most suitable in this instance
- 145-degree solder
- liquid flux – Carr's Green Label or similar and a small brush to apply it
- small vice or long-nosed pliers
- superglue
- needle files
- random implements such as small screwdrivers and wooden cocktail sticks to hold parts in place to avoid burning your fingers.

For something from a slightly earlier period you are forced to either scratch-build or use sets of parts. One such set is available from Worsley Works, which produces frets of rolling-stock parts described as 'scratch aids'. These are basic thin brass etches of coach sides and so on, but with no final detailing parts and no instructions. These are not full kits, but do much of the hard work for you, leaving you to add wheels, lamps and the like. They are very reasonably priced and are ideal if you wish to build your skill set for soldering etched-brass kits together.

FACING UP TO THE ETCH

If this is the first time that you have built an etched-brass kit you may be wondering how on earth you are going to turn something which is flat and half a millimetre thick into a three-dimensional coach.

Essentially, it just folds up into an open box and is in this respect no more difficult than the average card building kit. The difference, of course, is that you will be using soft solder for most of the construction rather than glue. All parts should be removed from the fret using a trimming (Stanley) knife and the remaining tags cleaned up with a small file.



The quarryman's coach etch as supplied.

SOLDERING; SOME FIRST PRINCIPLES

There are two main principles for getting a good soldered joint: 1) enough heat at the joint; and 2) absolute cleanliness of the two pieces to be joined (it's also worth cleaning the solder as well). If these two basic rules are followed, there isn't much to go wrong with a simple box such as this. Work on a flat, heat-resistant surface – here, an offcut of melamine shelf is used.

It should go without saying that soldering irons and the brass parts will get very hot, so take all necessary precautions to avoid any singed

fingertips.

TINNING

All joints should be tinned. Heat up the iron (preferably in a proper safety stand) and while this is happening clean the joining surfaces of the seat-back part with a glass-fibre brush. Add a brush-full of liquid flux over the surface and carry a small amount of solder on the tip of the iron to this surface. The flux will fizz as the heat is applied and the solder can be spread thinly over the surface. Here, only one side of the part has been done for clarity. Keep wiping the iron tip on a damp sponge (usually included with the safety stand) throughout the process.



The seat back with one side tinned with solder.



The upright seat back added. Note the use of a piece of melamine shelf as a surface to work on for soldering.

Add more flux to the surface, fold the part over and heat it with the iron working along the surface. Again, the flux will fizz. Tin the seat part and solder the constructed back to it. If it goes wrong, simply unsolder, reclean and start again. When done, clean off the folding tags using a file. This is the main advantage of brass over plastic; you can almost always undo a joint and start again without any damage. With plastic or card, this is usually impossible.

Tin the edge of the underside of the floor section and begin to fold the main body part using a small vice or a pair of long-nosed pliers (using the sharp edge of the shelf offcut or worktop may work just as well). Tin the foot of the part as shown. Finally, wash all soldered parts in warm water to remove any remaining flux and put to one side to dry.

TIP

Washing all the soldered items is important, as not only will any flux residue stop paint adhering to the model, it will also gradually start to corrode the

parts. Cleaning it off as soon as the session's work is complete is a good routine to develop. Do this in an old bowl or in the sink with the plug in place to avoid losing any loose parts down the plughole.

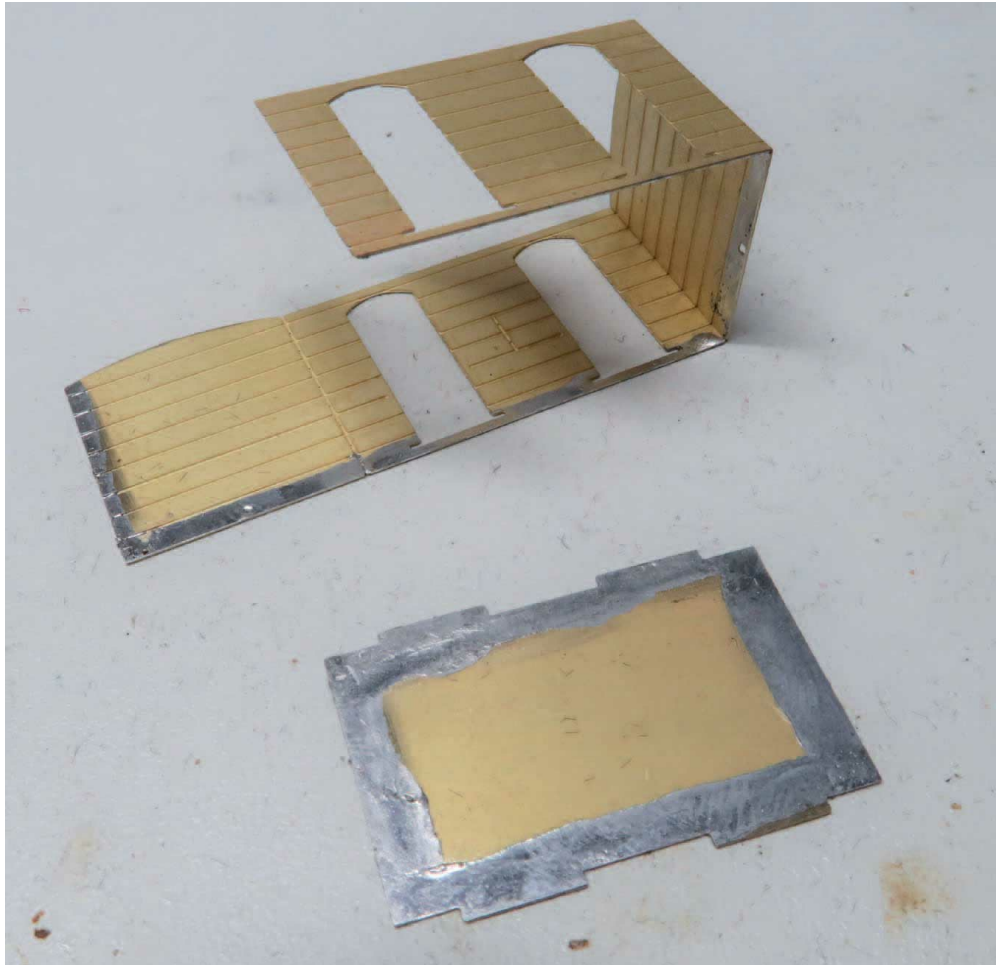
THE UNDERFRAME

While they are still attached to the fret, open the axle holes up to 0.8mm diameter. Strictly speaking, these were inside the framed vehicle with the axle bearing inside the wheels, but the kit as it comes does not initially allow for this.

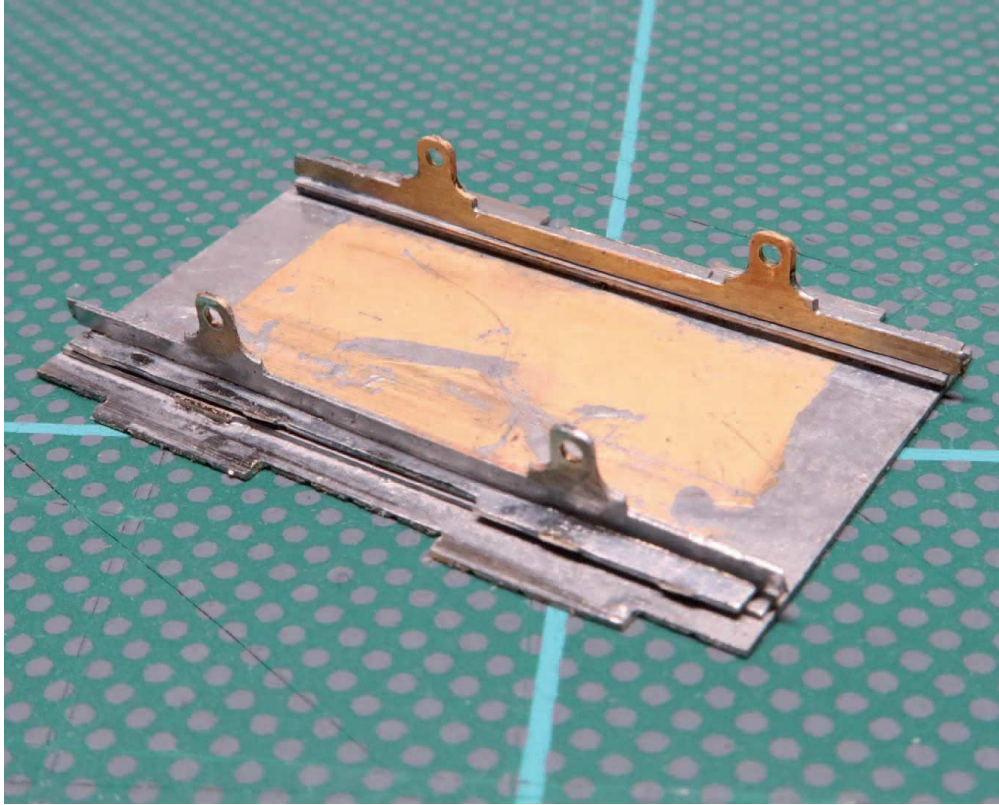
Scribe the centre line of the floor with a suitable pointed implement and then scribe two more lines 6mm out from the centre; these will form the guide lines for the solebars. In this case, the smallest wheels available from stock were 5.5mm diameter; this meant that the solebars required lifting off the floor by 1mm to stop the wheels fouling. This was done by adding two lengths of waste etch along each marked line and the solebar added on top.

THE BODY

The body can now be folded around the floor, lining the steps up with the slots under the doorways and fixing by soldering the joint underneath. The seats can be added either using solder, or, as in this case, superglue. At this point give the entire vehicle a wash to remove any traces of flux. The door guards can be added using 40 × 20thou plastic strip as shown, again with superglue, and the body can now start to be painted. The whole thing can be given a coat of grey primer, then the inside painted a natural wood colour.



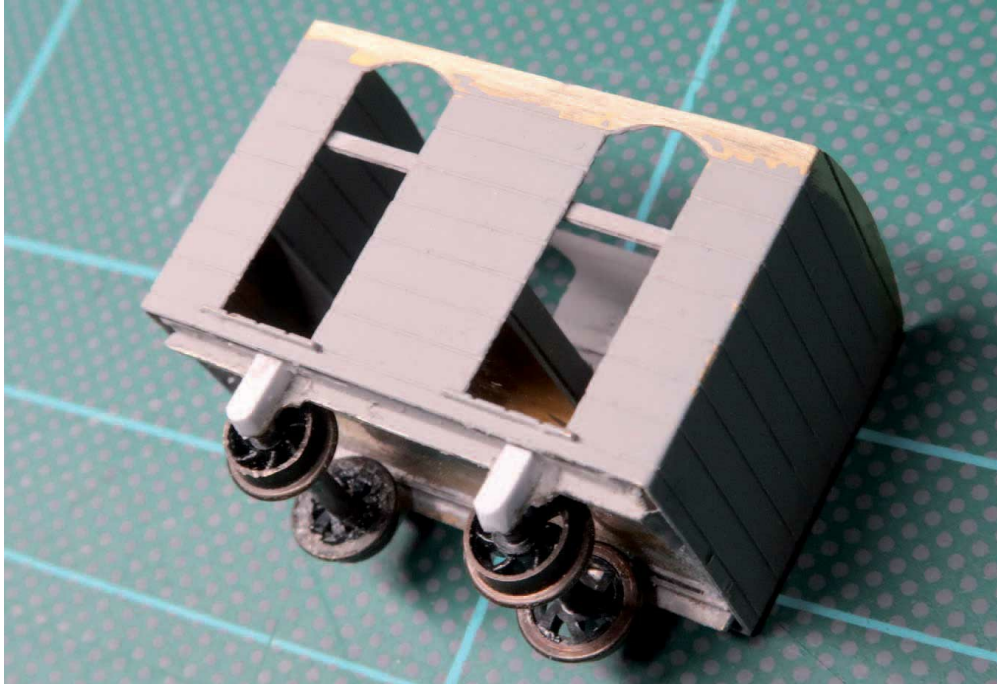
The floor piece and the main body etch have been tinned around the edges prior to assembly.



The compromise. The solebars are subtly jacked up by one millimetre to take a commercial wheelset.



The body, underframe and seating complete.



Another compromise is the fitting of outside axle boxes. These are shaped from plastic strip and stuck on with superglue.

If you have elected (as here) to stay with the outside frames, axle boxes can be made from 60 × 60thou strip plastic with a suitable indent to take the pinpoint of the axle. These can be sanded to shape, once the adhesive has fully set.

TIP

There is not enough depth of metal to make the solebars inside the units. They could, however, be adapted by soldering a scrap of wider waste brass fret behind the hole and redrilling these to 1mm. This would allow them to be mounted further inwards and for the axles to be threaded through and the wheels added on the outside. The pinpoints of the axles would need to be suitably ground off by trapping in a vice and reducing with a file before fitting.

THE ROOF AND FINISHING

The roof piece can be rolled to shape between the thumb and fingers

and soldered in place. The maker's plate can be added using superglue and the finished coach painted in a suitable brown or oxide colour. Despite being made from metal, the coach is still quite light, so will benefit from having a little lead sheet added under the floor and a couple of seated white-metal workmen figures added inside.



The quarryman's coach completed, with the maker's plates added with superglue.

CHAPTER FIVE

WELSH NARROW GAUGE COACHING STOCK

HISTORY

The history of Welsh narrow gauge coaching stock largely follows that of main-line railway practice. On the quarry-based lines, workmen initially travelled on the wagons, with the situation gradually improving for them with the dedicated workman's coaches detailed in the previous chapter. Public passenger carrying was not generally catered for on this type of line, but on the quarry-serving lines that did carry them (Tal-y-llyn Railway, Corris Railway, Festiniog Railway, Glyn Valley Tramway), sets of specific passenger stock were provided by the end of the nineteenth century. And in some, but not all cases this stock was slowly upgraded to match the standard gauge coaches of the age, often made by the same independent coachbuilders (such as Pickering and Ashbury) that supplied the main-line rail companies.



The beautifully restored Tal-y-llyn brake van. Note the ticket office hatch at the far left and the internal seating.

The other turning point was the Light Railways Act of 1896 and lines built under this act mostly used a style of coaching stock that was larger and more luxurious. This styling (and that of the light-railway buildings) has been covered in *Modelling Narrow Gauge Railways in Small Scales*, the companion volume to this (also available from The Crowood Press).

FOUR-WHEEL TO BOGIE COACHES

Most of the quarry-type lines initially ordered small four-wheel passenger stock that was little more than a simple upgrade from the quarryman's coaches with wooden bench seats, but with additional springing and braking. This was later improved upon by introducing longer, slightly more elegant coaches riding on bogies; or in the case of the Corris Railway, by taking two four-wheel coach bodies and

remounting them seamlessly on a bogie underframe. These two types of short and long vehicles were often run in rakes together, creating an interesting train which can provide a lot of the visual attraction to this type of line for the modeller. Only the Tal-y-llyn and Glyn Valley Tramway stuck doggedly to the initial set of four-wheelers, examples of which are still running today on occasion (usually advertised as 'Heritage Train') on the preserved Tal-y-llyn Railway.

WHAT MIGHT BE AVAILABLE

Depending on how you want your layout to look – either prototype or freelance – there is no shortage of choice of model coaches in any of the smaller scales. PECO produces RTR four-wheel coaches in 4mm scale for Festiniog and Glyn Valley Railway prototypes and Bachmann (US) produces a set of Tal-y-llyn lookalike four-wheelers under the 'Thomas' banner. Dundas Models produces a large range of kits of both four-wheelers and bogie stock for The Vale of Rheidol, Festiniog, Glyn Valley Tramway, while Meridian Models/Narrow Planet covers the Tal-y-llyn. There are also the aforementioned scratch-aid kits from Worsley Works and that's just considering 4mm scale. In 7mm scale, the choice is from several small kit manufacturers such as Mercian. What is not achievable is to buy a whole rake or entire range of rolling stock from one manufacturer ... yet. You have to duck and weave a little and buy various items from different places to build up a complete set of stock. The exception would be The Vale of Rheidol coaches, which are all easily made from the Dundas kits.

Naturally, it is impossible to list everything here, as the availability of items is constantly changing with old models disappearing and new ones being introduced. The other factor is the rapidly expanding market in 3D printed models. Some care is needed here, as at the

time of writing it is something of a bull market and while some makers are high quality and very accurate, others can be very poor. Research and checking are therefore required by the buyer before parting with any cash.

PROJECT SEVEN: FESTINIOG AND WELSH HIGHLAND RAILWAY COACH NO23

As outlined earlier, the choice of coaches is both huge and personal to the modeller and as this is a book dealing mostly with making things, the item chosen for this project finds a halfway house between building a kit as per the instructions and jumping straight into scratch-building or using a 'scratch-aid' set of parts. This is therefore for the modeller who is reluctant to attempt any soldering, but who nevertheless does like a slight challenge in the more familiar moulded-plastic medium.



The cut-down Welsh Highland coach standing at Beddgelert station.

This coach was originally built for the North Wales Narrow Gauge Railway in 1894 as an open coach with half-height doors (without droplight windows). It was absorbed into Welsh Highland Railway stock in 1923, then exchanged for wagon stock from the Festiniog Railway during the 1930s. The Festiniog Railway reduced the height to fit its much smaller loading gauge and the coach was later rebuilt with a panelled-style body. It is now preserved on the modern Festiniog Railway/Welsh Highland Railway (FR/WHR), still in a cut-down state but retaining the full-height/droplight doors that were added during its time on the Festiniog Railway. It is therefore ultimately possible to construct some four historical variants of the same coach. The aim here was to convert the easily obtainable Dundas Models Vale of Rheidol Railway (VoR) coach kit into a representation of the cut-down full-height door version that is running today on the WHR.

As always with this sort of work, it would be worth undertaking a little visual research, both to check whether the version fits your chosen time period and if building the coach in this way is the most logical. The following set of instructions is only a suggested route and there are others, including using the Worsley Works etched-brass sides and ends, which would expand on the techniques used for the quarryman's coach detailed in the previous chapter.

TIP

A light word of warning. The real coach ran/runs on what are quite sharp curves in prototype terms, but are not sharp compared to some narrow gauge model layouts. This coach conversion will happily roll through the standard PECO 12in radius point work, but trials may be needed to ascertain whether it will run around the tighter 9in Setrack curves. Some modification of the corners of the bogies may be necessary to give more 'swing' in this situation.

MATERIALS AND TOOLS FOR PROJECT SEVEN

Project materials:

- Dundas Models VoR coach kit, either the original version or the current retooled version
- couplings of choice
- 0.5 or 0.8mm brass handrail wire
- 10 × 20thou plastic strip
- scrap plastic
- 40thou plastic sheet
- paint (see project).

Build tools and materials:

- steel ruler
- sanding stick and needle files
- superglue or nail varnish
- sharp craft knife or scalpel
- pencil
- plastic solvent and brush.

THE UNDERFRAME

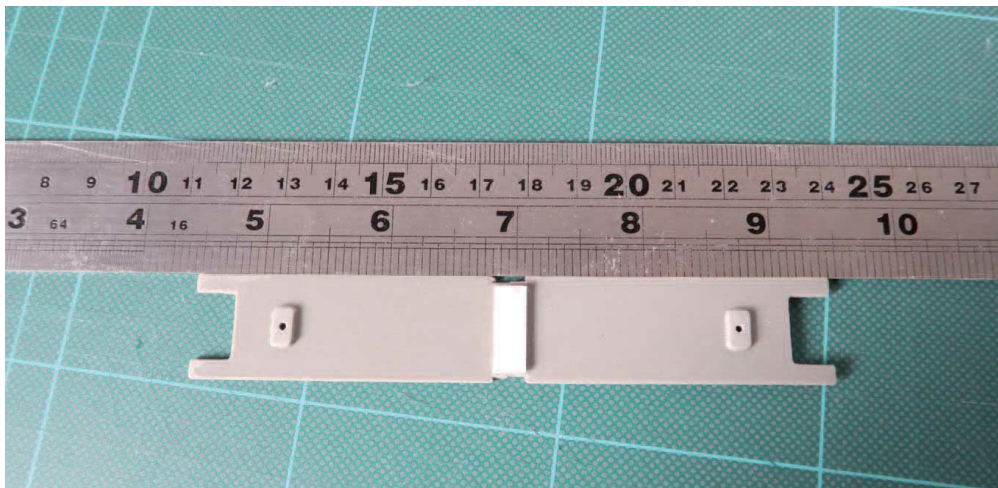
There are two likely versions of this kit: the original that dates from the early 1980s and the more recent retooled version that was marketed from the mid-2000s. The newer is slightly sharper in execution, but due to its long production life there are a lot of the original kits sitting around in shop stockrooms that may be available for a little less money. The main difference between them is the floor; the original is in two parts, while the newer is a single part. This means that the first job may be to join the two halves. Use a ruler to make sure that the joint is square and add a small amount of scrap to reinforce the joint as shown. Also at this point clean any flash off the bogie mounts with a light touch of the sanding stick.

The wheels are a simple push-fit into the bogies and these can be bolted into the floor. The bolt thread may cut into the plastic and this

may be enough to hold, but if the nut supplied is used, add a tiny drop of nail varnish or superglue over the end of it to secure, making sure not to allow any glue to run underneath the bogie.

THE BODY

While the floor may be straightforward, the body requires a little bravery. You will need to raise the floor and cut the sides down, so a very sharp knife is needed and a steady hand to hold it, though first you need to take off all the extraneous mouldings.



The newer kits include a one-piece chassis, but the older models need two halves to be joined on a flat surface.

Firstly, remove the footboards from the side mouldings and place to one side. On the rear face of each side there is a raised strip to locate the floor. Sand this completely flat, as new locators will be added later. Next, very carefully sand off the door handles, door ventilators and all of the lower solebar detail so that the foot of the coach side is flat. When this has been done, continue the match-boarding lines downwards by scribing with the point of a knife or other scribing tool of choice.

Here's the delicate part: to reduce the coach to the Festiniog loading gauge the sides need to be cut down. Make sure that the

whole coach side is square and clean up if necessary, then remove a 2mm strip from the top edge. Do this using a series of light cuts with a new blade and *do not be tempted to snap the excess off in this case*, as it's likely that you will take half of the top part of the window frames with it.

Finally, remove a similar 1mm strip from the bottom edge. Clean the side up and repeat the whole process with the second side. The rest of the build is relatively easy.

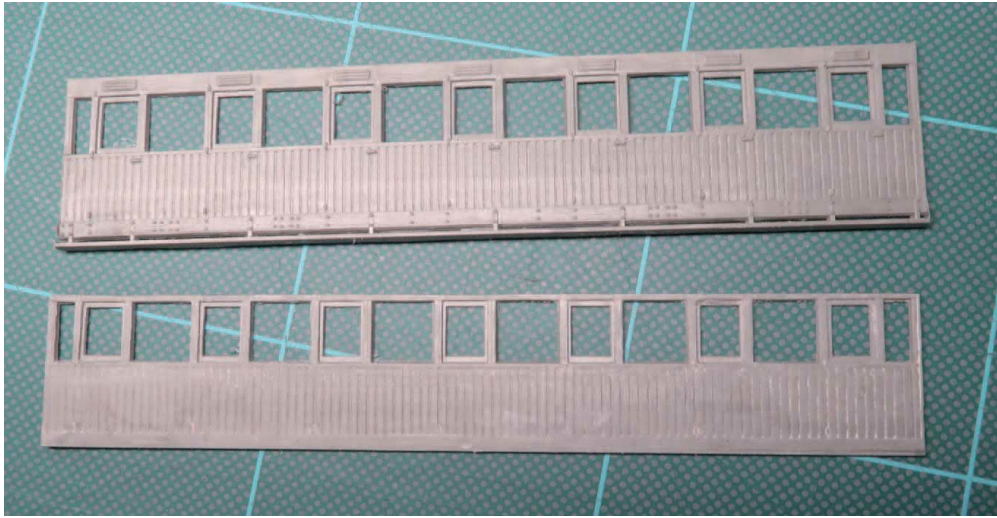
NEW DOORS

The floor on the prototype No23 is comparatively higher than that on the VoR coach, so even though the doors are full height they start at a higher level. Start by marking the vertical door lines with a pencil so that they are clear to see. Then scribe a horizontal line 9mm down from the datum window line across each doorway to create a new lower door line. On the plank to the immediate right of each door make two marks at 1.5mm and 3.5mm down from the window line. Drill a 0.5mm hole through each mark and add a U-shaped length of handrail wire using the 'long-leg' technique as described earlier with the brake van.



The footsteps need to be removed from each side. Here the top section to be

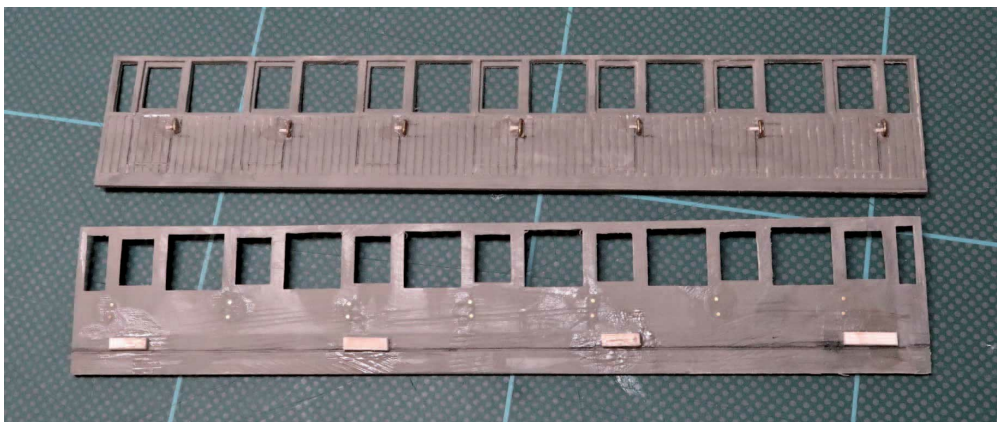
removed is marked in pencil.



Before and after. The original side top and the new reduced-height side at the bottom.

Lastly, add a 2mm length of 10 × 20thou strip just to the left of each of these grab handles to represent and reposition the door handles that were removed earlier.

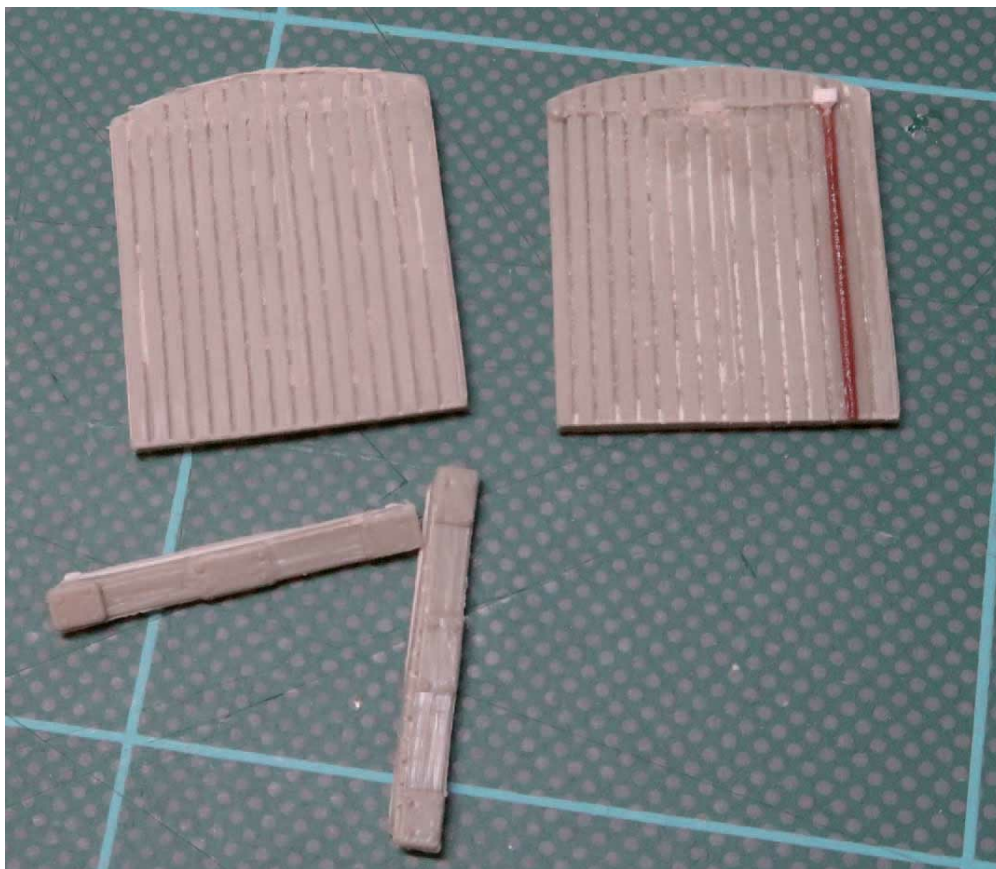
Turn the side over and mark a line 4mm up from the bottom and add scrap plastic strip along this in line with the doors only (this is so that it won't interfere with the seating units to be added later). Repeat all this with the second side.



Here the grab handles have been added and on the lower side, new locating blocks for the raised floor have been stuck on.

ENDS

Take the body end pieces and clean them up. Then remove 3mm strips from the foot of each, checking as you go so that the ends now match the new height of the cut-down sides. Sand one end flat, removing all the pipework. Next, remove the vertical section on the other end. This can be repositioned as shown using a scrap of 0.5mm plastic rod or wire, with a junction box being added with a scrap of plastic strip.



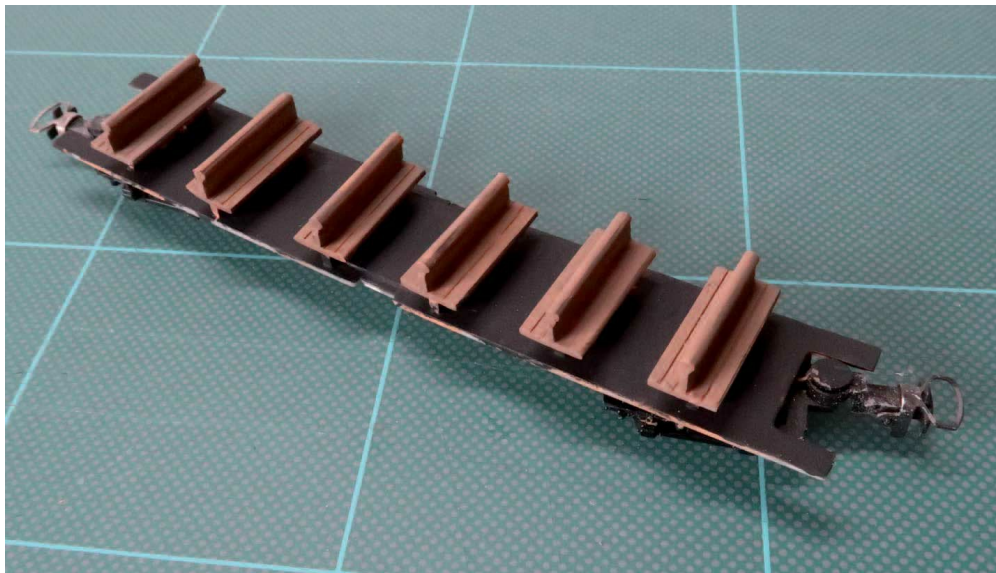
The trimmed and cleaned up ends with the new pipework added.

At this juncture it is necessary to decide how the coach will be coupled. The prototype coach is fitted with couplings that are higher than the body-end foot and that run in a wide slot (in common with all FR/WHR stock). It is likely that at least a 2mm deep cut-out will be

needed to allow for model curves and it is easier to remove this now rather than when the body is complete.

SEATING

The seating units can be made up as per the instructions, but it is beneficial to add these to the floor section rather than sticking them to the inside of the body. This also allows them and the floor to be painted before final construction. Cut a length of 30 or 40thou sheet 4mm deep and split into lengths a little less than the seat width and add below the seat as shown. Then file a $0.5 \times 1\text{mm}$ notch in the upper corners of each seat back. This is to locate the glazing strips and reduces the amount of adhesive required to do this.



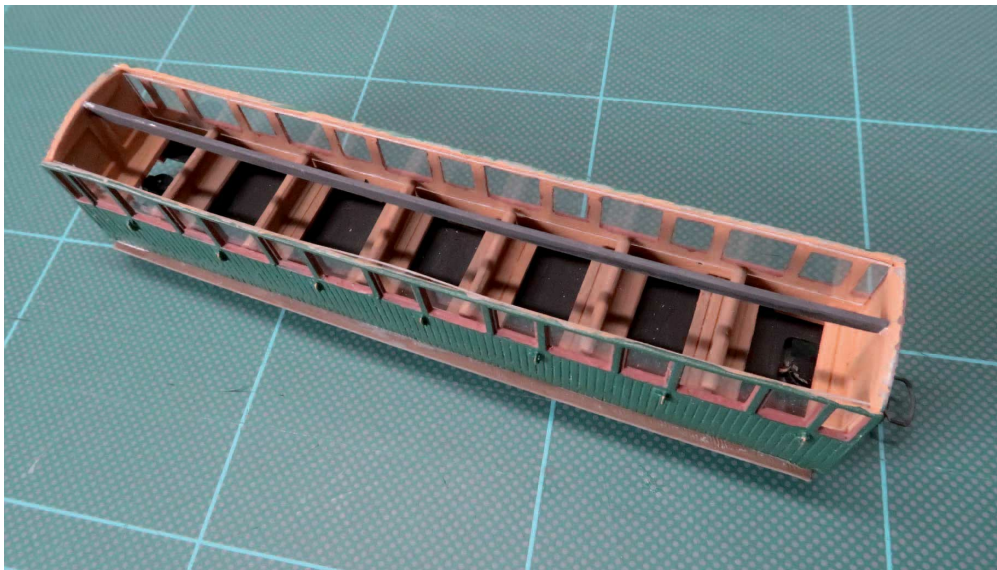
Adding the seats and painting these and the floor before final construction is beneficial.

Using the body side as a guide, make a mark on the floor where the centre line of the larger windows are, then add the completed seat units to the floor in these positions. Note that the seats need to be trimmed a little in width to match the floor width. When all seats have been fitted, paint the floor black and the seats a dark earth/grey/wood

tone.

CONSTRUCTION

Add the side and ends together, noting that the ends sit inside the sides, with the edge of the sides forming the final plank of each end. Make sure that all is square, then trial-fit to the floor. When you are happy that it will all fit together, add the end seats and paint these and the inside of the body.



The coach body finished and painted. Note that the glazing drops in behind the seats. Also note the longitudinal strut running from one end to the other to support the roof and prevent sagging.

Cut a length of 40thou sheet 4mm deep and at a length to fit exactly between the inside/top of the ends (cut slightly over-length and trim slowly until it is exact). Fit in the centre of the ends at the top of, and level with, the top of the curve. This is a belt-and-braces move to prevent any sagging in the roof at a later date. Paint this dark grey or black to help it visually disappear.

PAINTING AND FINISHING

The prototype coach is a bronze green and this can be built up using several thin coats of Humbrol RC409. The ends are an oxide shade which can be represented by using Humbrol 70. The frames and drop lights can be touched in with Humbrol 113.

The glazing strips should be cut exactly to length (there is no room for error) and to a depth to match the top of the seat cut-outs to just below the top of the coach side. You should be able to locate the bottom of the strip into the previously made seat cut-outs and only add glue to the top edge to secure.



The completed coach with roof and vacuum pipes added.

When you are certain these are all firmly stuck, the roof can be cut to size, pre-painted and added. This should be done by working with the coach upside down, first attaching at the tops of the ends and fixing one side at a time using a rocking action and a minimal amount of solvent.

Finally, the vacuum pipes and the footboards should be added and painted. The couplings can be fitted if not already done.

While this conversion is straightforward, there are a couple of tricky sections, but these techniques can be easily transferred to other

vehicles. No23 had a twin (No26), which is different only in detail and obviously could be reproduced using exactly the same method. If your interest is other freelance (but FR/WHR leaning) modelling, then the panelled (bow-sider) coaches can be represented using the same basic technique, with Ratio GWR four-wheel coach sides as a base material combined with the Dundas underframe from this kit, which is available as a separate part.

CHAPTER SIX

WELSH NARROW GAUGE LOCOMOTIVES

HISTORICAL STUDY

The study of the locomotives of the Welsh narrow gauge railways is one that will possibly last a lifetime and there are some who will happily make it so. The interest (or problem, if you wish to see it as one) is the variance of locomotive stocking structure among the lines. The main-line standard gauge companies all followed a technical development path that was vaguely similar and linear; not so our subject. The development and buying (or building) pattern of our lines differed quite dramatically. For instance, the Tal-y-llyn Railway purchased two locomotives at the outset and apart from a couple of early tweaks to improve the running and driver comfort, did not change this power stud throughout the life of the line. It wasn't until the preservation society took over in the late 1940s that new locomotives were acquired for the line. The Welshpool and Llanfair similarly operated with the initial two locomotives into nationalization, only bringing in new machines after preservation. Conversely, the Festiniog Railway presided over a running programme of power upgrading and modernization during a similar period of time.



A Corris Railway train in OO9 scale running on Roger Christian's layout.

These historical buying trends are not particularly important for the modeller, especially if a semi-freelance approach is taken, but it does help to take a little time to study these line histories and gain an understanding of what happened and why. While some of the locomotive buying (or not) reflected traffic changes, much of it was down to natural lifespan replacement, so the railway companies would replace older, worn-out machines with new (or bargain) items as the need arose. Much of this change was financial and the reason that most of the lines hung on to the original machines and simply repaired them was that the money and/or traffic did not warrant the expense of a new purchase.

Building some of these locomotive operational limitations into your modelling can add operating interest and can suggest an entirely different dimension to how you approach your layout design and the running of your layout. For example, loading would be affected, as the

locomotive's hauling power may require loads to be split either up or down the line, or a new locomotive to be introduced.

WHAT TO BUY AND MODEL AVAILABILITY

Where then does the novice modeller start and what is a likely initial model locomotive purchase? Unless you have a very firm idea of where you wish to end up, the choices can be confusing, especially as these choices are not laid out by the model trade in a simple fashion as the equivalent standard gauge models are.

The first problem can be one of availability and this will come at you in two separate strands. Firstly, even though the overall prototype range of machines is quite small, there is a far from comprehensive availability in 4mm scale, let alone 7mm scale. This is compounded by the fact that the majority of this model range is produced by small or cottage industries, which by their very nature tend to come and go over a period of time. Some of the more long-lived items have been around since the 1970s and may not meet the exacting standards of the twenty-first century, so a little research is advised before you buy. Conversely, some of the early models are bombproof and will just keep running, whereas some newer models, though finely detailed, seem to be a little more fickle.

The more up to date 3D print products are generally very good, but the range is so broad that again it is worth asking around to ascertain the accuracy, as some producers are, let's say, a little cavalier in their descriptions.

The second point is that most of these locomotives come as body-only kits using various manufacturing methods and are designed to fit on to an RTR chassis unit. Naturally these power units are made by the larger manufacturers (these days mainly in the Far East), whose

concern is their bigger home market and they do not operate for the relatively small number of secondary-fit narrow gauge modellers. Therefore, these RTR chassis units can also come and go without warning. This is changing slowly and it is not the intent to be negative, only to indicate an honest overview of the situation and that buying and storing some of the chassis units that you may need when you see them is a sound idea. Waiting until you are ready to build the model may result in a scramble for second-hand items that may be showing the signs of a serious price increase due to perceived rarity value.

READY-TO-RUN

What has changed in recent times (possibly due to a flooding of the standard gauge model market) is that one or two of the larger manufacturers have started to take an interest in the 4mm scale narrow gauge and have produced some very high-quality products of a level equal to their standard gauge range. Bachmann (USA) has produced Tal-y-llyn Railway prototypes within the 'Thomas' range and PECO/Kato are producing/planning Festiniog prototypes. Naturally the prices do reflect this, but they are still competitive when this is compared to purchasing a body kit together with a running chassis to fit under it. Bachmann (UK) has produced a locomotive that is of use to our subject and is the company's first offering to the British 4mm narrow gauge modeller.

PROJECT EIGHT: THE BALDWIN 4-6-0T

During World War I, both sides of the conflict made use of narrow gauge railways (mostly 60cm gauge) to carry men and munitions to the front (see Chapter Two). After the conflict, much of the remaining

stock was left in France, but some was shipped back (or had not been sent in the first place) and was offered for sale. Some went to industry, but a few public lines, such as the Ashover Light Railway in Derbyshire, the Glyn Valley Tramway in Mid-Wales and the Welsh Highland Railway, were quick to take advantage of the cheap stock. One such item was Baldwin 4-6-0T 590, which was purchased by the Welsh Highland Railway (WHR).



The as-supplied Bachmann 590 WHR Baldwin 4-6-0T locomotive.

After its return to the UK, the locomotive was overhauled by Bagnalls and arrived on the WHR in 1923. It wasn't universally popular with WHR engine crews due to the rough ride and being prone to slipping in damp conditions, therefore it was more than often demoted to goods trains. It underwent several cab modifications during its time on the WHR, plus an overhaul and a repaint into red livery in 1934, but was worn out before World War II. It last ran in 1936 and was broken up for scrap at Dinas in 1942.

The locomotive in model form has always been a popular one and

a white-metal body kit was produced by GEM for many years. This has now been superseded by an RTR model by Bachmann (UK), which is offered in several variants. This is a generally very accurate model and has proved to be a winner with modellers, but there are a few small additions that you can make to improve and personalize it.

MATERIALS AND TOOLS FOR PROJECT EIGHT

Project materials:

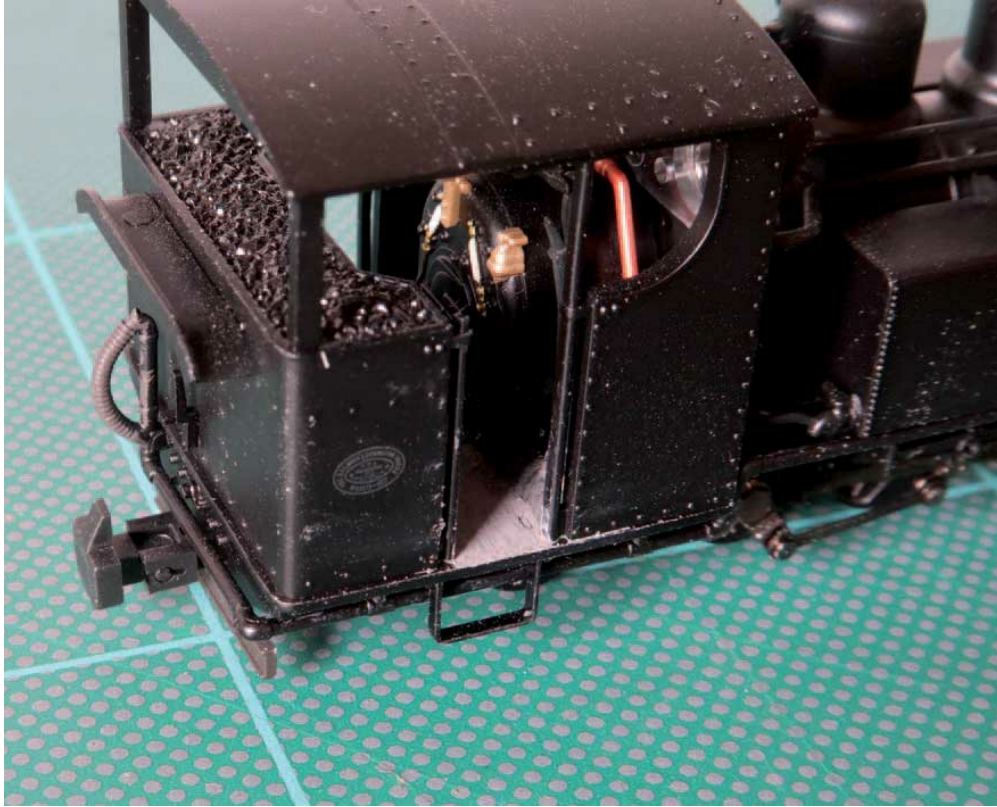
- Bachmann 590 WHR Baldwin 4-6-0T
- paint (see project)
- small amount of wire (0.5mm and 0.3mm diameter)
- coal (preferably real, crushed to a small grade)
- 4mm scale crew (though the cab is small and an HO scale crew may fit better)
- 4mm scale bucket and lamp.

Build tools and materials:

- wire cutters
- 0.5mm drill
- small file
- superglue (preferably a gel type)
- cocktail stick
- PVA glue and small brush
- small spoon or wooden coffee stirrer
- all-purpose adhesive.

SOME INITIAL WORK

Before you do anything, thoroughly test and run in the mechanism, as any further work will invalidate the guarantee. It should also be noted that the mechanism uses a coreless motor, which works best on pure DC. Don't be tempted to use a feedback-type controller as this will harm the motor after a time. If in doubt, discuss this with the retailer that sold the model to you.

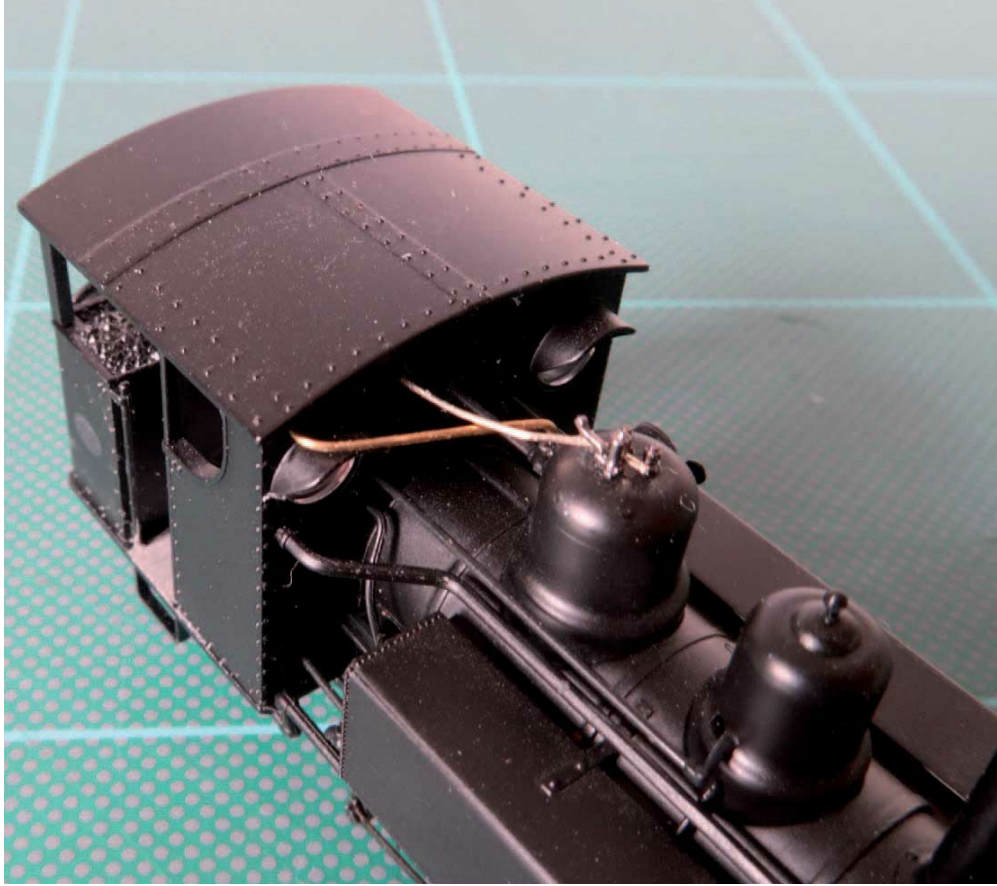


One of the first jobs is to paint the cab floor a dirty pale-grey colour.

To begin, take a little of the black out of the model, as it is almost entirely made from the same pre-coloured plastic. The vacuum pipes can be touched in with Rust (Humbrol 113) and the cab floor can be given a couple of thin coats of Light Grey (Humbrol 64).

MISSING PIPEWORK

Although the detail on the Baldwin is outstanding, for some reason there are a couple of pipes missing, namely the steam runs from the rear of the dome through the cab plate and rearwards. These can be made up from short lengths of wire, though they are a fiddle to do. It is worth looking at as many period photographs of WHR 590 as possible to get an accurate idea of how these look, as there are a couple of bends in each pipe. There are plenty of photos online to choose from.



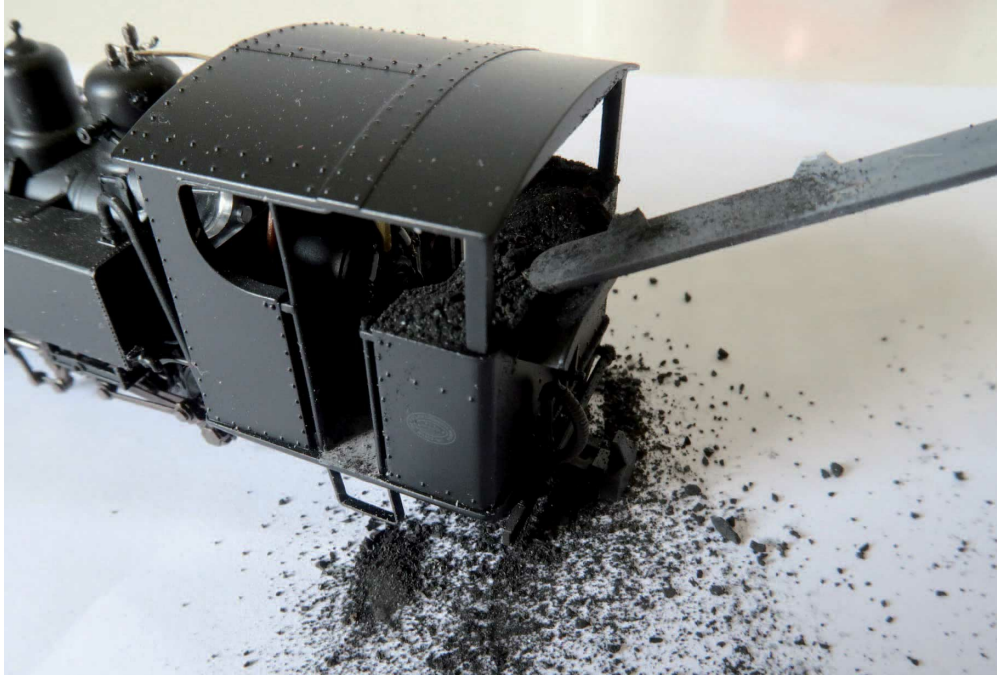
New pipework is added to the front of the cab.

Drill two holes in the cab front sheet with a 0.5mm drill (usually the smallest available in the standard sets). Working from the left-hand edge as you look at it, these should be situated 2mm in from the edge and 2mm down from the top, and 9.5mm in from the edge and 3mm down respectively. Use a 0.5mm wire for the first pipe, which runs to the valve just behind the dome, and a smaller 0.3mm wire which curves across to the top of the dome. Fix both of these with a tiny drop of gel-type superglue applied with a cocktail stick or similar small implement.

COAL

The bunker has a moulded coal load that can be visually improved with a thin coating of the real thing. The moulded coal may have the

correct shape, but it doesn't sparkle like real coal and this is always an easy way to lift any RTR steam locomotive, whether narrow or standard gauge.



Delightfully messy! Real coal can be added to the bunker to get rid of the plastic-y original.

Add a coating of PVA glue to the plastic load, using a small brush and aiming to be as accurate as possible. Let this dry, then add a second coat. Follow this with a generous application of crushed coal, using a small spoon or other implement such as a wooden coffee stirrer. Allow this to dry, then clean off any excess. Be aware that coal is not the most household-friendly substance and will find its way on to everything, so keep any surrounding surfaces covered.

FINAL DETAILING

Add a lamp (here from the Springside Models range) and a small bucket. This would have been for carrying extra sand in an attempt to cure the locomotive's renowned slipping problems and is often shown

in photos in an upturned position on the front footplate. The included works plates can be added on the cab sides with a tiny drop of all-purpose adhesive applied with a cocktail stick.



The finished WHR Baldwin with crew added and a fairly heavy layer of weathering.

Finally, a weathering coat can be added, using various washes of acrylic paint and dry brushing. As the locomotive was not particularly well loved, the crews seemed to be quite lax about cleaning it and period photos show it in rather an unkempt condition. As an alternative, the entire model could be repainted in the post-1934 out-shop livery of deep red.

OTHER LOCOMOTIVE CHOICES – KITS

RTR locomotives for British narrow gauge are a relatively new development. If you travel back in time to the 1970s and the early days of OO9 and 7mm scale narrow gauge modelling, the choices were stark: use the few kits that were around, or build your own. Of

course, many people did neither, but instead adapted the American and European outline models that were available at that time, simply pretending that the differences did not exist. Period layout photos are full of German Egger-Bahns and Minitrains Baldwins masquerading as Welsh slate-quarry locomotives. Narrow gauge layouts from the period all have a certain look about them, with a large amount of cross-scaling and sometimes only a general hint at the prototype. Gradually, kits for more logical prototypes appeared, not always of the highest quality and still running on American or German chassis units, but still – we were getting there.

A lot of the problem in both of the major British narrow gauge modelling scales was the reliance on commercial motorized chassis units. Relatively expensive locomotives from German makers Fleischmann and Arnold were often the favourites and many early locomotive kits for OO9 scale were designed to be fitted to modified chassis. Several decades on and surprisingly little has changed in this respect. The chassis units are different, but the reliance on these, coupled with body kits made from various materials, is usually the default position for the narrow gauge modeller of any prototype.

The problem comes with the realization that the very small-wheeled 0-4-0 and 0-6-0 chassis units simply aren't available to the British modeller. However, help is at hand with several Japanese items. Pre-internet, this route would have been impossible, but there is now a steady stream of highly reliable units from the likes of Kato arriving in the UK on a regular basis. What's more, these are in the main very reasonably priced.

THE TRAM LOCO DODGE

Of course, there is a catch. Many of these chassis units are for diesel

and tram prototypes and only one or two will be even close for the classic Welsh narrow gauge locomotive. There is one dodge, though, which has been around for a long while – the tram locomotive with side skirts that will hide any discrepancies of wheel arrangement.

Many ‘serious’ narrow gauge modellers will now be tutting and shaking their heads. ‘Not prototypical,’ they will say. True, to a point at least, but there is one classic Welsh engine that will fit the bill and which is useful for the novice kit builder – the Glyn Valley Tram.

THE GLYN VALLEY TRAMWAY

The Glyn Valley Tramway ran in the east of Wales close to the Shropshire border. It was almost a common carrier, but the main traffic and reason for its building was granite shipment and a lesser amount of slate. What set it apart from the narrow gauge lines in the west of the Principality was the amount of roadside running; a factor which necessitated the addition of side skirts as a legal requirement to what were otherwise fairly traditional 0-4-2 side-tank engines.

The reasons why this subject is less popular with modellers is that any trace of the line has been all but obliterated over the course of time – the roadside running having the effect of reducing the amount of original earthworks and the lack of any major structures along the route. In addition to this, it didn’t reach the magic finishing-point date of World War II and so failed to be included in the preservation movement of the 1950s. As a result, it has become the poor relation of Welsh narrow gauge railways.

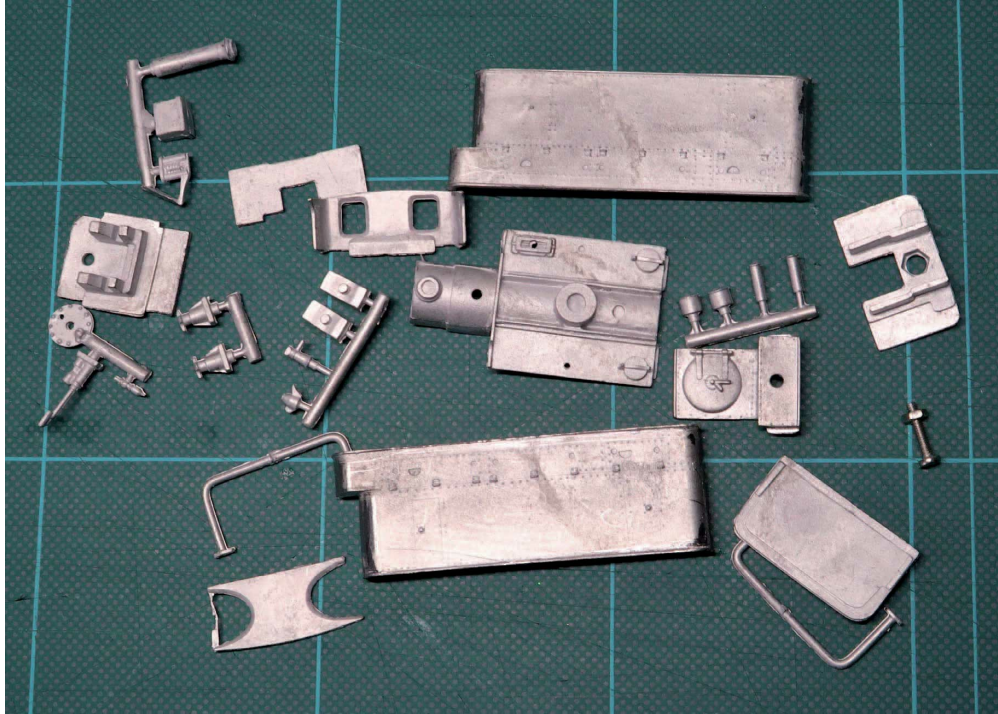
The other downside for the modeller is that the track layouts were either very sprawling and space-hungry, or were attached closely to a standard gauge station, making the line less attractive to the classic space-starved narrow gauge modeller. However, exactly the same

downsides could be levelled at the Festiniog, but that doesn't appear to have dented the Festiniog's popularity in the slightest, so perhaps it is just that the Tramway doesn't get the attention that the preserved lines on the west coast do.

There is certainly no shortage of historical information and there have been a number of excellent books written about the Tramway. This short historical discussion is leading to the construction of one of the most long-lived and readily available OO9 scale locomotive kits, which has proved to be a popular choice for modellers working in 4mm scale. Incidentally, the same model is available from PECO in 7mm scale with exactly the same ease of construction.

PROJECT NINE: THE PECO GLYN VALLEY TRAMWAY LOCOMOTIVE KIT

The PECO Glyn Valley kit has been around for a good number of years, but has remained popular for the reasons given above and because it will (with some imagination) accommodate a wide number of different chassis units. The kit consists of a little under thirty white-metal cast parts and a bolt for fitting the suggested Farish GP tank engine chassis, which has since been replaced in the now Bachmann/Farish range by the finer Jinty model. This new chassis may be adapted to fit with some adjustments, or another commercial chassis may be substituted. Here, the once ubiquitous Kato 103 tram chassis has been used (even this has now been superseded by an upgraded version with a coreless motor ref: Kato 109). The Kato units are regarded as reliable runners and in this case have the advantage of keeping the upper areas (cab/footplate) clear of any visual obstruction.



The PECO white-metal parts as supplied.

WORKING WITH WHITE-METAL KITS

White-metal kits are made from a lead-based material and were once state of the art in model kit terms. Although the material has fallen from favour somewhat, it has a number of advantages. It is cheap to manufacture and as far as rolling-stock kits are concerned it adds very useful weight to the vehicle, aiding the track-holding properties. Its main disadvantage for the modeller is that the castings can be variable and will need a little more care and cleaning up compared to an equivalent plastic kit. It can be soldered with a low-melt solder (sub-70°), but in most cases can be stuck with superglue or a two-part epoxy glue.

There is also the issue of the lead content. This is not a particular problem in normal use, but regular hand washing after using is recommended, as well as keeping the small parts out of the reach of

children. Generally, these issues are far outweighed by the advantages of white-metal's properties.

MATERIALS AND TOOLS FOR PROJECT NINE

Project materials:

- PECO GL-6 tram locomotive body kit
- Kato 103 (or 109) chassis unit (or similar of choice)
- 40thou plastic sheet
- 60thou square plastic strip or similar
- 20thou plastic sheet (optional for new cab sheet)
- 0.5mm diameter wire (optional)
- paint
- Narrow Planet name/works plates
- couplings of choice.

Build tools and materials:

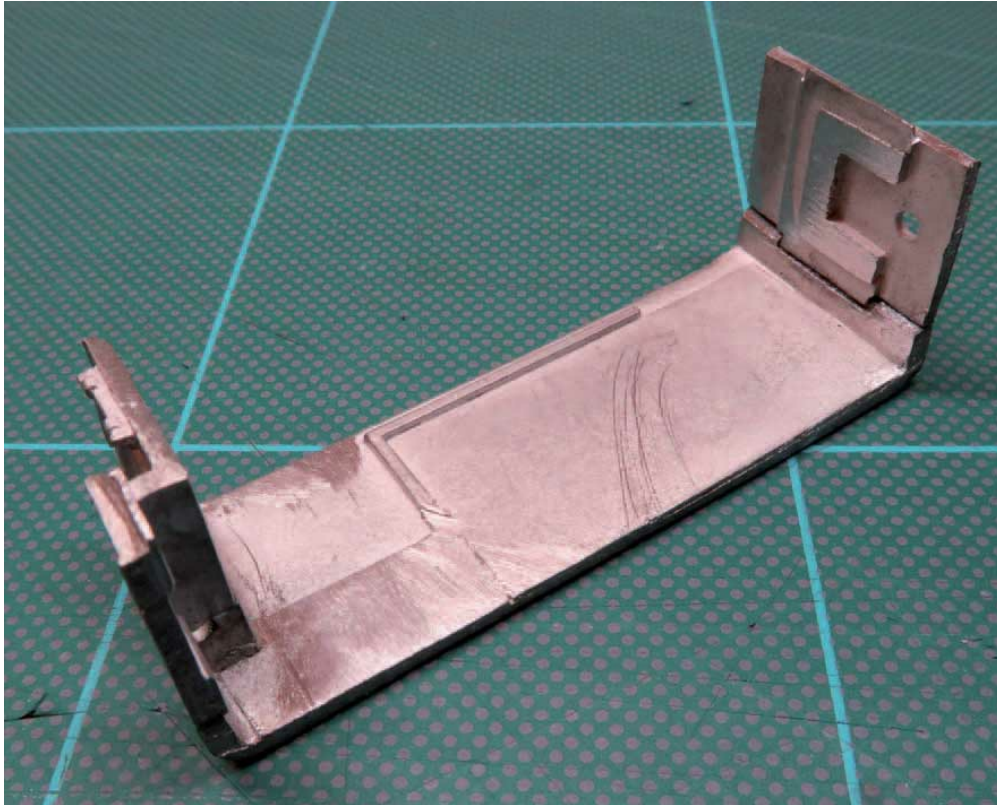
- pair of large side-cutters
- large flat file
- needle files
- sanding stick
- superglue (gel)
- engineer's square (recommended)
- drills
- all-purpose adhesive.

BUILDING THE MAIN BODY

The kit is essentially a long box with a cab and detailing. The first thing to do is to get this box together both square and to allow for the alternative chassis unit.

The parts are reasonably clear of flash, but they will need cleaning up to some degree. The main alteration at this stage is the removal of the stepped section on the inside of the rear piece. This can be done by attacking the lump with a pair of sharp side-cutters, followed by some finishing with a large flat file. The main side and end pieces are

located by tab and recess. This is somewhat vague and a little work is required here – thinning the tabs down on the top face and opening the recess up. The aim is to get the parts to fit with little or no discernible gap on the outside face. Plenty of time taken here will pay off, as these main joints are what will make or break the finished model.



After thoroughly cleaning up and fettling, the main box of the body can be assembled. Note the removal of the large pronged lump from the rear part, originally designed to locate the old Farish 0-6-0 chassis.



The inside locating strips need to be reduced.



The main body parts assembled, with the tank top part being trial-fitted.



The main body parts showing the almost smooth inside surfaces to allow for the new floor and Kato chassis to be fitted.

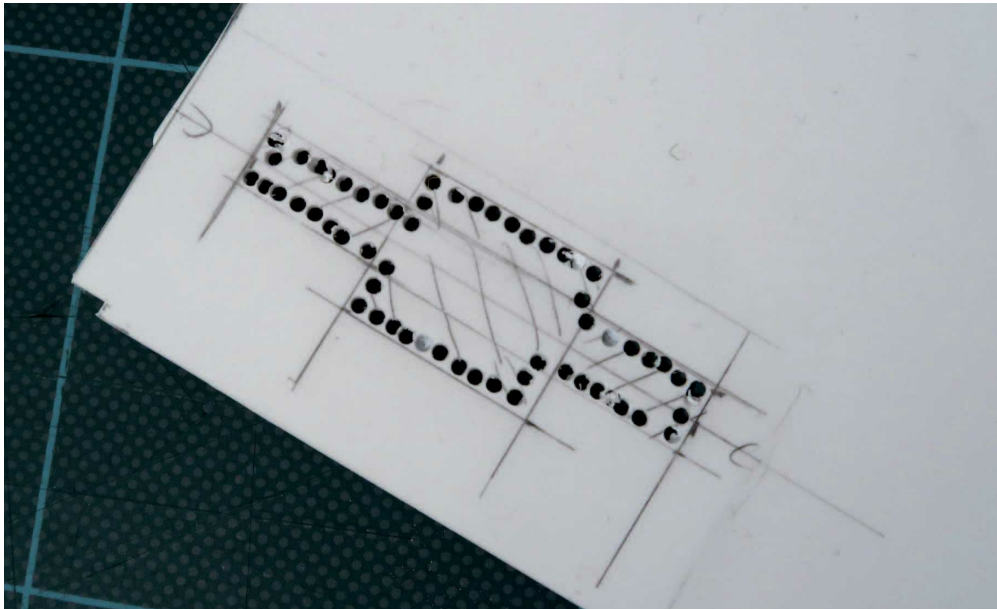
It's also worthwhile cleaning up the boiler/tank top part and trial-fitting this in place before final assembly. Also, before putting the sides and ends together, carefully file away the horizontal raised strip inside the side pieces and a couple of millimetres of the vertical strip to allow for a new footplate and motor unit to be mounted.

Work slowly around the four parts and trial-fit everything before securing with superglue. The use of an engineer's square is recommended so that all parts sit true. This slow and careful checking and fettling is the key to putting any white-metal kit of any prototype together, as they generally don't 'fall together' in the way that plastic kits tend to do.

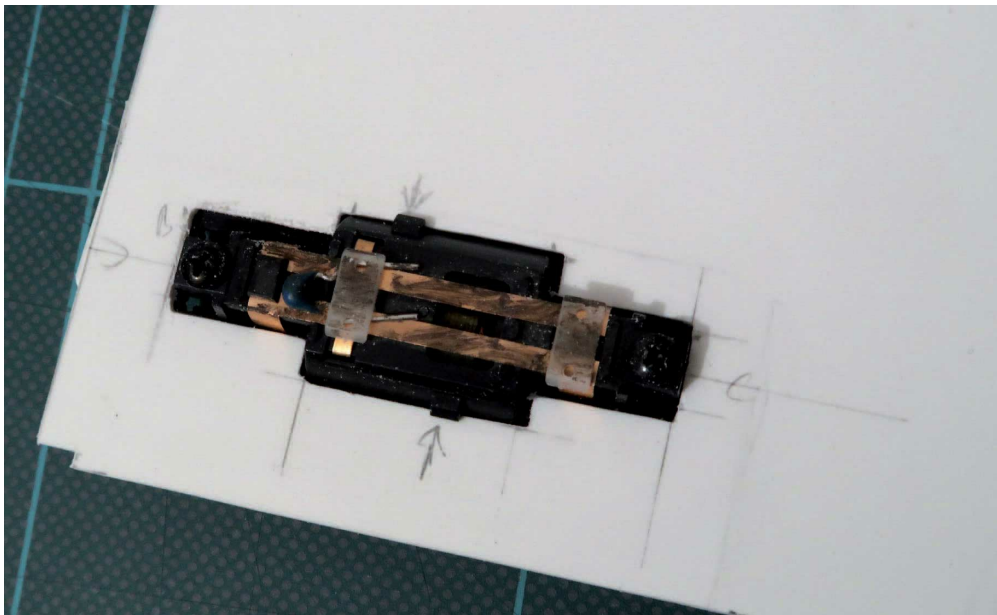
MAKING A NEW FOOTPLATE

The Kato 103 tram chassis has a flat footplate with two locating clips. This means that a new top footplate (or floor) can simply be added on

top and retained by these clips. This new plate should be 40thou in thickness, as this is the measurement of the gap under the clips.



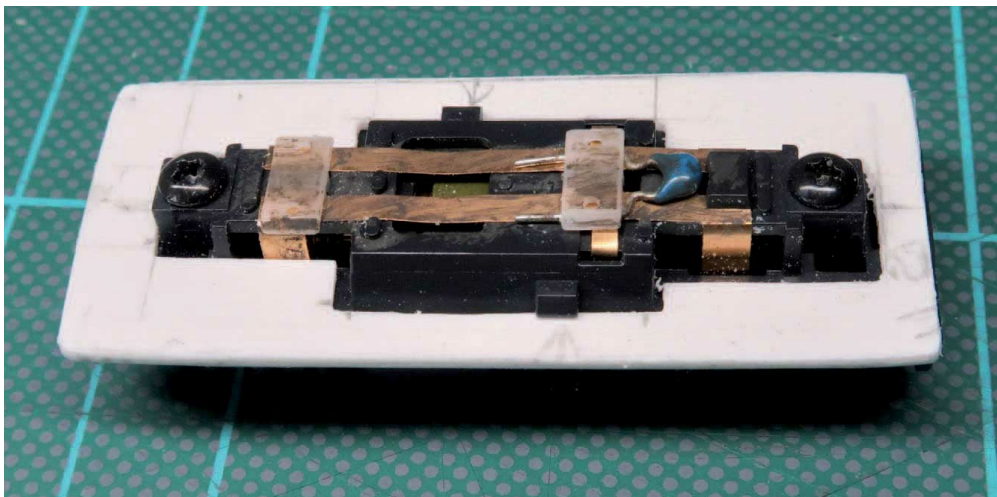
The new floor being chain-drilled to fit the Kato chassis. This is easier to do while on the full sheet.



The chassis should be a clip fit using the pegs on the side of the unit.

Allowing a generous margin all the way around, the new plate can

be marked on a sheet of 40thou plastic sheet, working around a centre line. The length of the new hole should be 41mm, the width of the end sections 9.5mm and the central section no wider than 11mm to fit under the clips. Holes should be drilled all the way around the inside of the new opening, the centre section cut out and only then should a file be used to work outwards up to the marked line. This way there is less chance of overdoing it and making the hole too big. Keep checking against the chassis unit as you go.



The finished floor and chassis. Note that the corners have been rounded to fit the profile of the main body box.

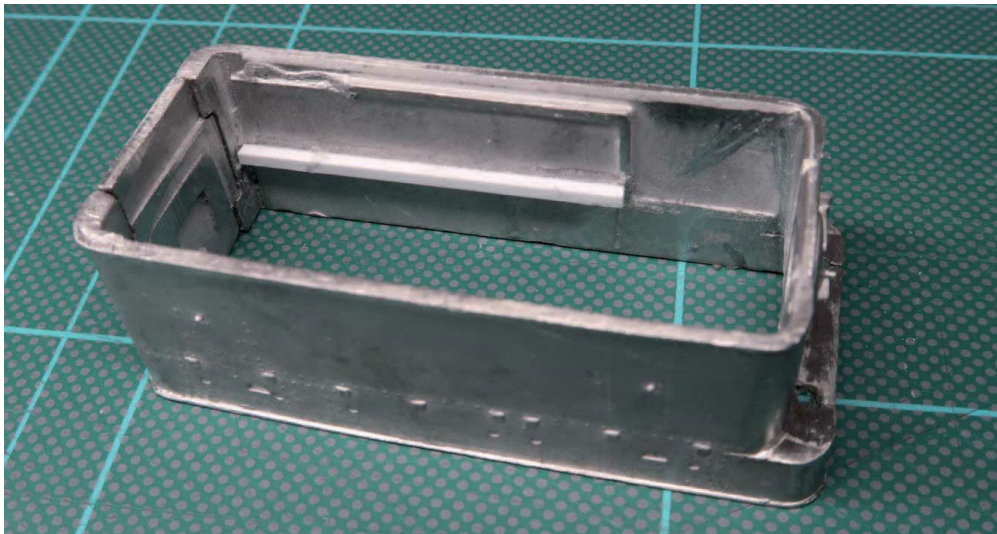
Drop the completed body ends and sides over the new plate and centralize it. Draw a pencil mark around the inner edge and cut the new piece out, leaving at least 3mm of room on the outside of this line. Because the inside of the castings is uneven it is a case of slowly trimming back to your drawn line a little at a time until the new piece is a snug fit. Get the ends cut to length first, then reduce the width. The finished new piece should measure *approximately* 23mm wide by 55mm long.

All this will need some sort of positive location point inside the body. Two strips of 60thou square plastic can be stuck into the inside of the body as shown. Make sure that they are level. The previously

constructed chassis unit can be added either as a push-fit, or by sticking with an all-purpose adhesive.

THE UPPER BODY

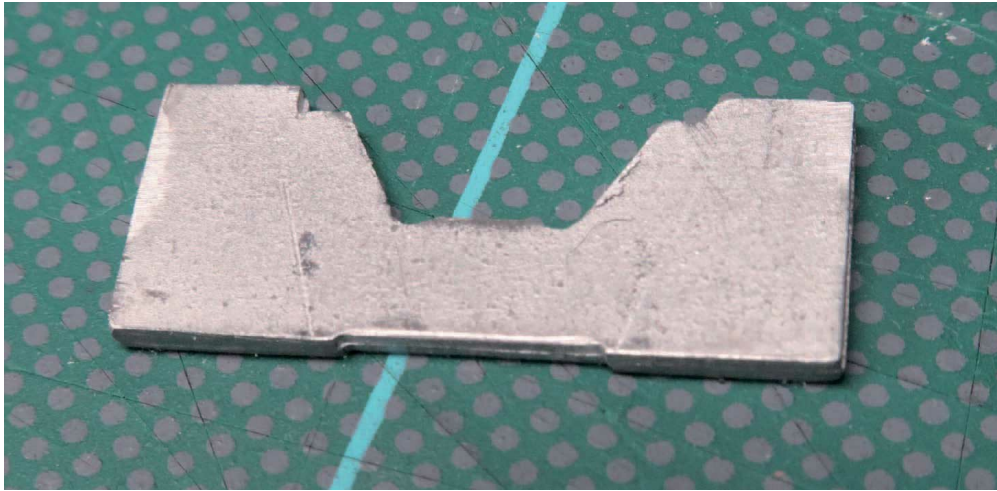
The only part of the rest of the construction that requires any modification other than cleaning up is the vertical tank front. This needs a small amount taken off at an angle at each side of the large recess to clear the top of the Kato motor unit. The tank top/boiler and front piece can now be added as shown.



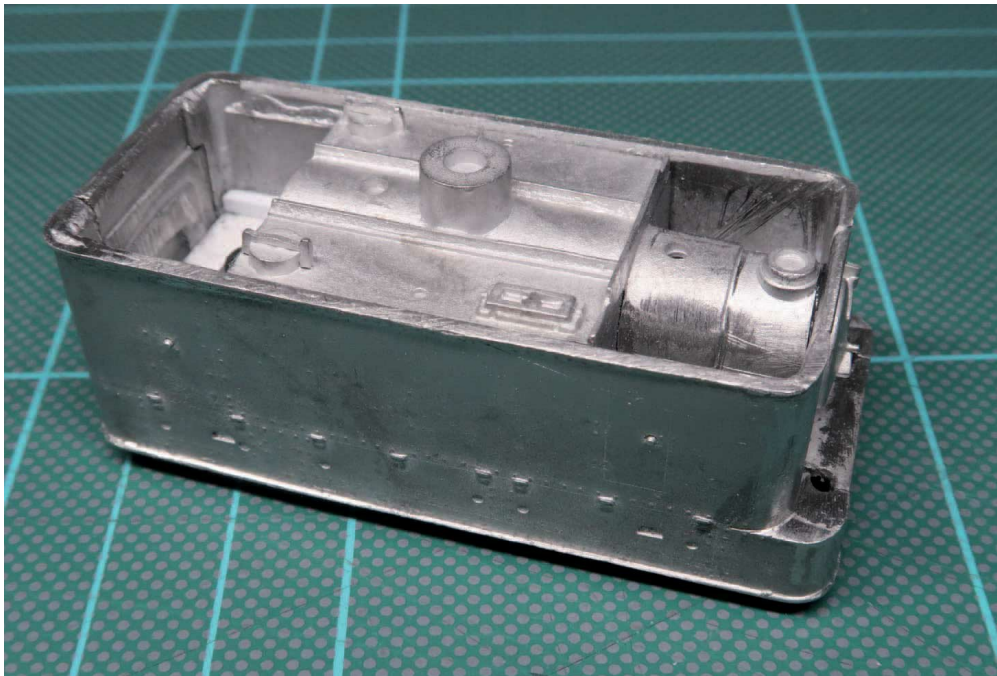
Plastic locating strips are added to the sides using superglue.



The new chassis unit added to the body. The Kato unit should be able to be unclipped from below.



The tank front part needs material removed to clear the new chassis.



Tanks and boiler parts can now be added to the body.

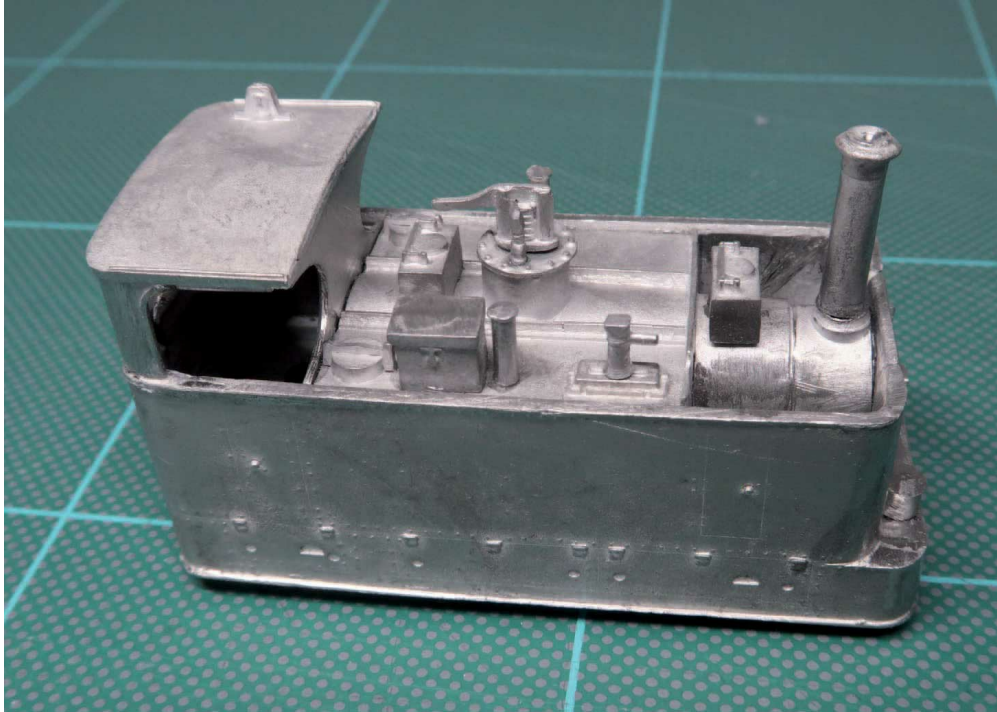
THE CAB

The cab is supplied as three pieces. The only issue is that of the joint between the top of the body end and the cab rear piece. Some metal

will need to be removed from the tab on the cab and some from the inside edge of the body part to make the joint as level and vertical as possible. As usual, trialrun the fit until you are entirely happy and hold a known straight edge against the parts, both during the trial run and the sticking. Any deviation from an upright position will stick out like a sore thumb.



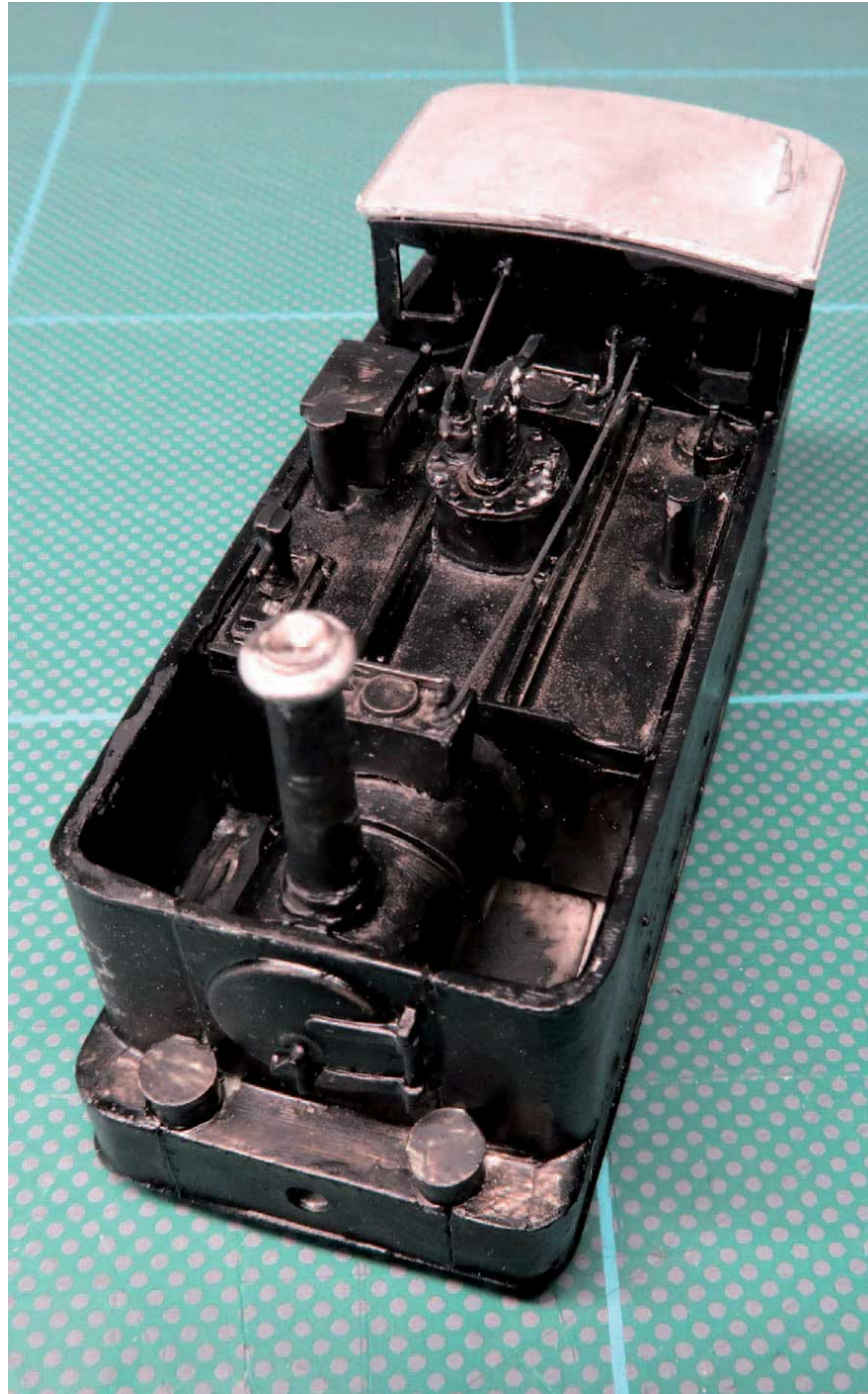
The rear cab sheet and roof can be built up, making sure that the former is vertical and the latter horizontal.



Add the front cab sheet and adjust the lower edge to fit. Losing half a millimetre of this will not notice, but a less than horizontal roof will. This completes the cab for the as-delivered locomotives.

DETAILS

In this particular case, the aim was to replicate the first of the trio of Glyn Valley locomotives, *Sir Theodore*, in its post-1920s state (after it had been returned to its maker Beyer, Peacock & Co. for a full overhaul). The outward changes were the removal of the condensing pipes and speedometer, and a repainting from Holly Green to black. Therefore, for the modeller it is just a case of omitting these parts of the kit and noting the colour change.



The remaining smaller detail parts can now be added and the first coats of paint applied.

All the remaining detail parts were added. Most just require a small amount of cleaning, but a few (the chimney and front sand pots) need some help. The former needs a little more metal taken from the saddle

to enable it to seat properly. This can be done with a 3mm drill, with finger pressure only, working a few turns at a time and offering the chimney part up until a satisfactory fit is achieved. The small sand pots require about half of the locating pegs to be removed so that they will sit anything close to flat.

EXTRA DETAILS

As is nearly always the case, a kit will only take you so far; any manufacturer has to balance what most of the buyers want and are prepared to do against what they are prepared to pay. If you study photos of the Glyn Valley Tramway locomotives you will notice that one of the additions to *Sir Theodore* and *Dennis* was an extra layer on the inside of the front cab sheet, presumably to take away some of the wind and rain if the locomotive was running boiler first. Essentially this will make the cabs visually like a normal locomotive, rather than the quite unique Glyn Valley curved cut-out design. Unusually though, this curved plate was not simply replaced, but a plate (or pair of plates) was added behind, creating a squared-off shape with two rectangular spectacles.

Adding this prototype modification to your model is fairly straightforward. A piece of 20thou plastic sheet should be marked out (26 × 9.5mm) and two holes cut out 2mm from the edges at a size of 4.5mm high by 3.5mm wide. The finished piece can be glued directly on to the inside of the curved front plate (preferably after this has been fitted and before the roof has been added). This modification changes the look of the finished kit quite dramatically and instantly makes it stand out from the majority of PECO Glyn Valley kits for the cost of a relatively small amount of modelling work.

The last piece of extra detailing is to add the control rods to the front of the cab plate. This largely follows the techniques described in the previous Bachmann Baldwin project. The rods are represented by

lengths of 0.5mm wire fixed into holes drilled in the front cab plate and attached to the whistle on the steam dome and the two boiler-mounted sandboxes. Again, doing this before fixing the roof piece will make things easier all round.

PAINTING AND FINISHING

All that there is to do now is to paint the model. As supplied, the original trio of locomotives were painted Holly Green above the footplate and black below, but the demonstration build model was to represent a post-overhaul *Sir Theodore*, so a semigloss black finish to the main body panels is the order of the day. Tamiya X18 black is ideal for this, with the same company's XF1 matt black for the internal surfaces. Humbrol German Tank grey takes care of the other upper areas.



The finished Glyn Valley Tramway locomotive coupled with a PECO RTR coach to match.

Narrow Planet can supply a pack of nameplate/ works plate etches for the kits at a very reasonable cost that just need a wash of red paint and a polish before fixing with all-purpose adhesive. The rear

spectacle plate frames and the chimney cap can be touched in with brass and copper respectively.

CHAPTER SEVEN

WELSH NARROW GAUGE BUILDINGS

Of course, there really is no such thing as a purely Welsh narrow gauge building – they are just buildings, as the mainly human occupants are no different to anywhere else. What is needed if you are making a model of the North Wales area in any gauge is a ‘feel’ of the area and the much mooted idea that it should be possible to gain a sense of place before a train arrives. This is generally good practice and there are a number of ‘ready-to-plonk’ buildings in 4mm scale that are suitable for our subject. These are very good and (at a cost) are a quick way of getting you straight into the correct vibe.

What will improve this, not to mention break away from the identikit layout that using pure commercial items gives, is either building your own or adapting suitable kits. We are quite lucky in this respect in that, unlike many main-line standard gauge railways, quite a large proportion of original buildings survive and are either still being used in their original capacity, or have been adapted for the post-preservation tourist trade. There is, however, one basic trap that many narrow gauge modellers fall into, which is the assumption that all Welsh narrow gauge railway buildings are constructed from slate/slate waste. This is definitely not the case and although in some areas and lines it is the dominant building material, it is by no means the only game in

town.



Many original railway buildings have been retained and repurposed. Here, the old goods shed at Porthmadog is being used for Spooner's Bar. The old double-track doorway is still clear to see.

LOGICAL BUILDING MATERIALS

The other thing to consider is that while the line's own buildings may have used slate waste in large quantities for construction, there is, in addition (depending on the period), a proportion of timber, corrugated iron and asbestos used. Of course, most of the railway lines were largely rooted in industrial concerns and while passengers may have been carried, the accent was not on creating pleasing architectural aesthetics, but more on simple functionality. The people using the line generally had no choice but to do so, therefore there was no real necessity for the railway company to spend large amounts of money on grand and ostentatious buildings to attract the paying customer. Plain and austere was the name of the game – St Pancras they are

not.

USING COMMERCIAL PLASTIC KITS

As is often the case with commercial kits, we have to look beyond what is written on the packets of many items; to get straight into the Welsh narrow gauge feel we are generally talking of stone buildings and this (specifically slate quarry waste) is enormously variable in shape and size and it helps to show this to get the correct feel. We can therefore ignore what scale the model materials are marked for and use the various packs for what they contain, not what they are supposedly intended to do in terms of model scale or function.

PROJECT TEN: A SIMPLE TALLY OR WEIGHBRIDGE HUT

The first of the building projects is inspired by the small hut at the Llanberis National Slate Museum that stands at the foot of the preserved incline. Although there are slight size differences, this building is similar in shape and style to the small coal office kit that is available from Wills as part of its Scenic Series. It's a pocket-money-price kit, so is a natural as a first try at constructing a small building. All the techniques that are used here are fairly straightforward and are transferable to the following building projects in the book.



Hut at the Slate Museum. Typical of office and stores accommodation and built from slate waste slabs.



End view showing the rendered wall. This is a common modification on the weather side of a building, but is rarely modelled. Note the incline in the background.

MATERIALS AND TOOLS FOR PROJECT TEN

Project materials:

- Wills Coal Yard and Hut Ref: SS15
- PECO N gauge Stone Walling Sheets Ref: NB 40 (one sheet)
- 20thou and 30thou plastic sheet
- scrap 30 or 40thou sheet
- household pin
- Wills chimney pot from building pack (optional)
- 20 × 10thou strip
- 40thou plastic sheet
- paint (see project)
- Wills downpipe from building pack (optional).

Build tools and materials:

- craft knife
- ruler
- sanding stick and small files
- drills
- superglue
- sanding board
- model filler
- flat needle file
- plastic solvent and brush.

THE WILLS KIT

The kit is made up of ten parts, plus a set of coal bins that are not required here. The stovepipe chimney and roof sign can be put to one side as they are not used. The moulded walling pattern is almost identical to the pattern on the apparently 2mm scale walling (which demonstrates clearly the idea of ignoring the packet labelling). The main difference to the Llanberis hut is the lack of stone chimney stack,

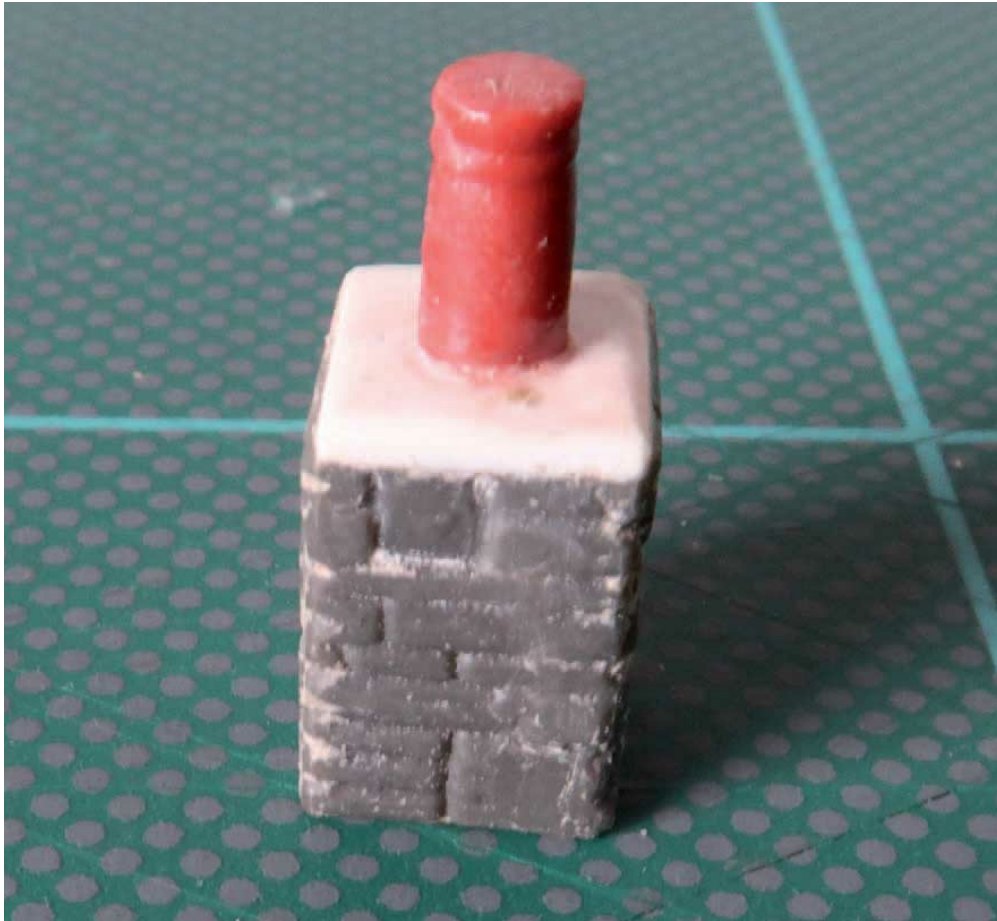
which can be added using the walling sheet material.

MAKING THE NEW CHIMNEY

Cutting sheet material is a technique in itself. The best way is to mark the line to be cut on the reverse and make a series of light cuts a third to halfway through. Then bend the joint so that it opens up, but do not snap. Put the sheet back down flat and cut the remainder of the line with the knife. This way, the cut on the outward face is clean. Snapping will probably split the detail and create a jagged edge on the stonework.



The new chimney parts cut from the N gauge walling sheet.



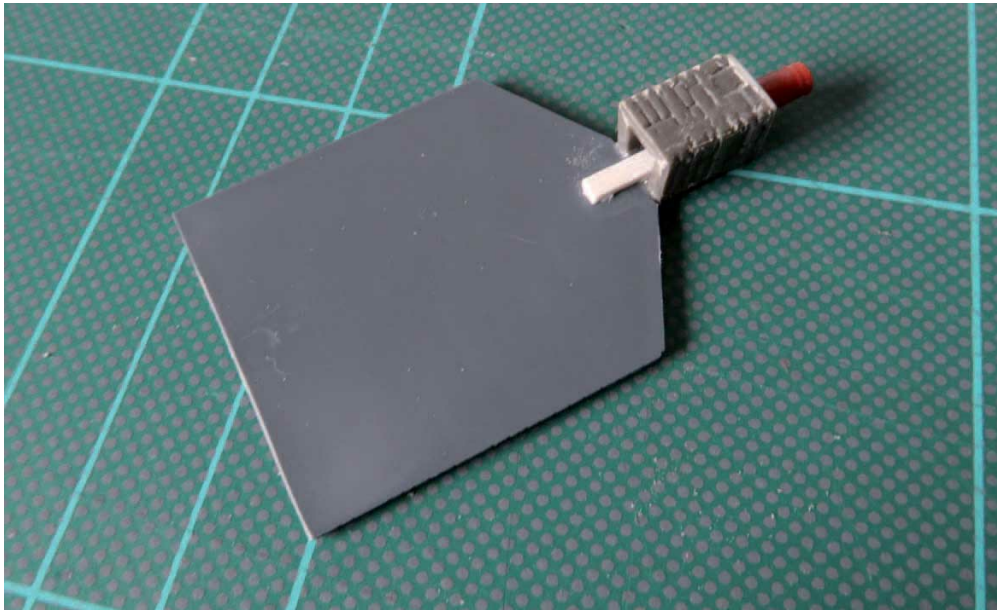
The completed chimney with plastic sheet cap and pot from the Wills range.

The chimney only needs a mere 8mm vertical slice. This may seem a little wasteful, but you will use the rest of the sheet and pack should you move to the next projects. Cut this long slice into four 11mm lengths – aim to line this up with the stone courses. Now come the fiddliest bit of the entire build.

Mitre every edge using the sanding board (as shown further on), or by using a file. Aim for an angle of slightly less than 45 degrees, which will mean that the parts will touch just at the leading edges and not further back on the joint, thus requiring filling.

Construct the chimney parts and, when set, run a triangular or oval file around the corners to extend the mortar courses to make it look all

of a piece. Add a section of scrap 30 or 40thou sheet to the top and round the top edge off to represent the cement bed. Then add a chimney pot either from the Wills building pack or from a length of plastic tube (a biro refill is ideal). If the former is used, use a 2mm drill to open up an indentation on the top.



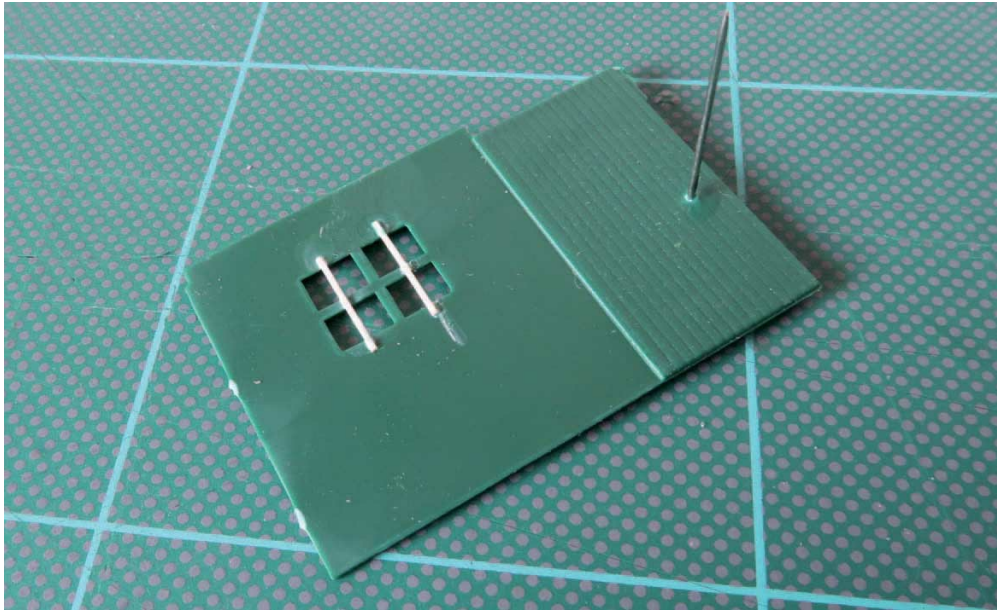
The stack is attached to the top of the end wall and the joint reinforced with scrap plastic.

Place the finished chimney stack on top of one of the end-wall sections and mark where it intersects with the roof angles (probably about two courses). File the excess from the end wall down to this level. With the wall face down, add the chimney to the new top edge, checking that all is level. When set, add a short length of scrap plastic inside the chimney to reinforce the narrow joint.

THE WINDOW AND DOOR

Clean up the green internal part and, noting which is the front and rear, add two strips of 20 × 10thou strip to the rear of the window as shown. This will immediately change the look of the hut and lift it away

from all the thousands of other Wills huts on layouts.



Extra window bars can be fitted and a door handle made from a household pin.



The door can be detached and repositioned in an open position, creating more of a feel of a human presence.

Drill a small hole in the door on the opposite side to the hinge plates, three planks in and 15mm up from the foot. Push a household

pin through the hole from the front so that the head sits 1mm from the front surface and fix it with superglue. When it is fully set, trim the excess at the rear.

Finally, slice the door from the moulding using the raised lip as a guide. Add the window part to the front wall, making sure that it lines up evenly with the aperture. Then add the door on top of this, slightly raised as shown, and add a scrap of plastic below it. This acts as reinforcement and when viewed from the front forms the inside of the step. Having the door slightly ajar adds life and again makes it different from all the other Wills huts. Paint the window frame and door at this juncture.

THE ROOF

Take the roof pieces and feather the sides and lower edges using a sanding board. This can be made simply by sticking a sheet of medium-grade sandpaper to a small offcut of flat medium-density fibreboard (MDF) or chipboard around 150mm square. The sanding angle should be quite shallow to create a sharp edge to the roof.



The roof sections can be thinned at the edges by feathering using a simple sanding board.

Fill the hole in the rear roof section intended for the stovepipe part by adding a backing piece of scrap plastic and backfill the remaining recess with either model filler, or at a push, some original style Tip-ex which will work as a plastic filler on small areas. When this is fully dry, clean up with a flat needle file and re-scribe the slate detail with the point of a knife.

FINAL ASSEMBLY

The four wall sections can now be assembled as per the kit's instructions. When fully set, round the mortar courses at the corners with a needle file as before.



The window and door can be painted before the hut is assembled.

Take the roof sections and (making sure that they are the right way up) remove a section two slate courses deep and 9mm wide from the

top corner of each. Lay them flat on the bench in the correct format while you do this as it's easy to get them the wrong way up. Fit them to the ridge tile piece one at a time and add to the top of the structure, fettling around the chimney if necessary. Don't worry if there is a slight gap at this time – it's more important that they are set evenly on the walls.

Add lead flashing using 1.5mm strips of paper. This will cover any gaps around the chimney base and can be fixed by prodding into place with a brush-full of solvent. Using magazine paper from a dark grey or black printed advert is ideal as it will get you close to the colour before painting.



The completed Wills hut conversion.

A windowsill can be fixed level with the window aperture using a scrap of 30 or 40thou plastic set at a slight downward angle. Gutters are simply strips of 40thou plastic around 2mm deep, which can be

fixed under the roofline and then have their lower face rounded off with a file when completely set.

PAINTING

Painting can now be carried out using a mix of greys and browns. A base coat of Tank Grey (Humbrol 67) can be put on and left to dry. Follow this with very light coats of light greys (Humbrol 64 and 27), wiped diagonally to pick out only some surfaces. Odd stones can be picked out with brown (Dark Earth, Humbrol 29) and dark orange (Leather, Humbrol 62). When this is fully dry, a wash of white can be added one side at a time and allowed to settle into the mortar courses and then gently wiped off the top surface. The roof can be given a coat of dark grey and odd slates picked out in a lighter shade.

Finally, bargeboards can be added from 20thou sheet or thin card and these and the gutters painted. A downpipe can be added from the Wills building pack or from 1mm plastic rod or wire.

PROJECT ELEVEN: TAL-Y-LLYN RAILWAY GUNPOWDER STORE

If the few additions to the Wills coal office have whetted your appetite, then you may wish to try your hand at a simple scratch-built plastic structure. Something without too much fine detail or complication is what is required here, and this particular building certainly has none of that.

The gunpowder store at the Tal-y-llyn's Towyn Wharf station was built in the early years of the twentieth century and still stands today. It has been altered, but not greatly and retains its original character – that is, if you can say that a simple stone box has character. This benefits the modeller who is scratch-building for the first time, as there are no complex shapes to deal with and no window apertures to cut

out. The door(s) on the original building were very narrow, only allowing for the width of the Tal-y-llyn Railway's small wagons to enter. The current building features a much wider opening and the original offset rear doorway (the track runs though at an angle) is now covered by a more modern extension, which almost doubles the size of the original building. The dovecote visible in the photo was an early feature, which was later removed, but has now been reinstated by the preservation company.



The gunpowder store still standing at Towyn Wharf station in 2017.

MATERIALS AND TOOLS FOR PROJECT ELEVEN

Project materials:

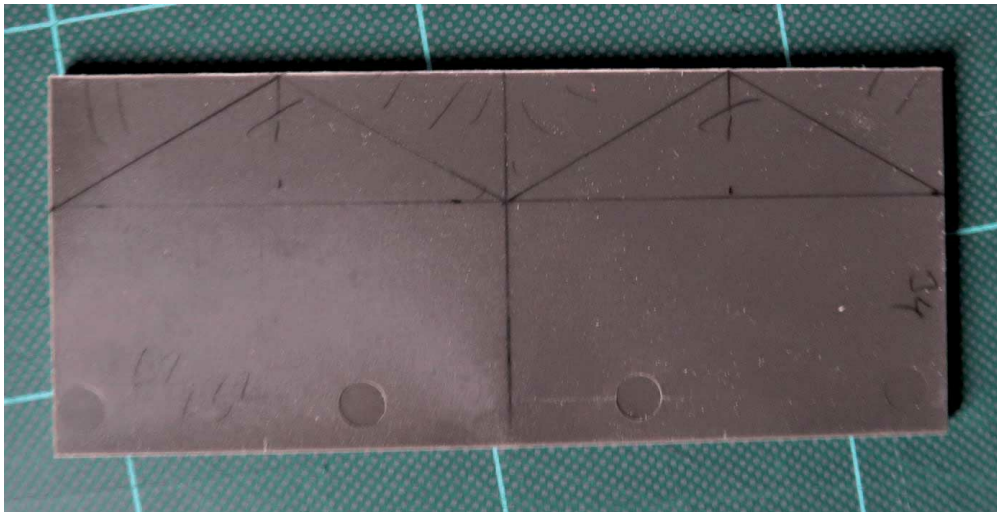
- PECO N gauge Stone Walling Sheets ref: NB 40
- Wills Slate Sheet Ref: SSMP203
- 20 and 30thou plastic sheet
- paint (see project)
- 1mm diameter plastic rod or Wills downpipe
- 40 × 20thou plastic strip
- 20 × 10thou plastic strip (scrap of).

Build tools and materials:

- craft knife
- sanding board
- pin chuck and small drills
- ruler
- sanding stick and small files
- plastic solvent and brush
- superglue.

THE WALLS

The main walls use the Ratio 2mm sheet material that was used for the new chimney in the previous project. The side walls should be cut from two sheets (again, don't worry about the waste material as it can be used in the next project, or as retaining walls on the layout). Each of these wall sections should be 76mm long by 34mm high. Mitre each of the ends as with the chimney stack pieces using the sanding board. Also bevel the *outside* edge of the top of each piece in a similar fashion; this is so that the roof pieces will sit flush with the end profile and not perch on the outer edge of the side wall, thus creating a gap.



The two end walls can just be squeezed out of one walling sheet.



The four finished walls.

The end walls should be 52mm high and 62mm wide with the lower section measuring 34mm to match the height of the side walls. You should just be able to get these two out of one sheet of walling. Mitre the edges using the sanding board as before. Keep the removed waste material from the roof angles for internal corner supports.

THE DOORWAY

The original building had a doorway at each end: one central in the wall at the west end and one offset at the east end. This second door was not needed here, so the rear wall was left plain. If you wish to follow the early prototype it is just a case of repeating the instructions for the centrally placed door, but as the track ran through the store at an angle, the doorway needs to be moved to the right, 6mm from the right-hand edge.



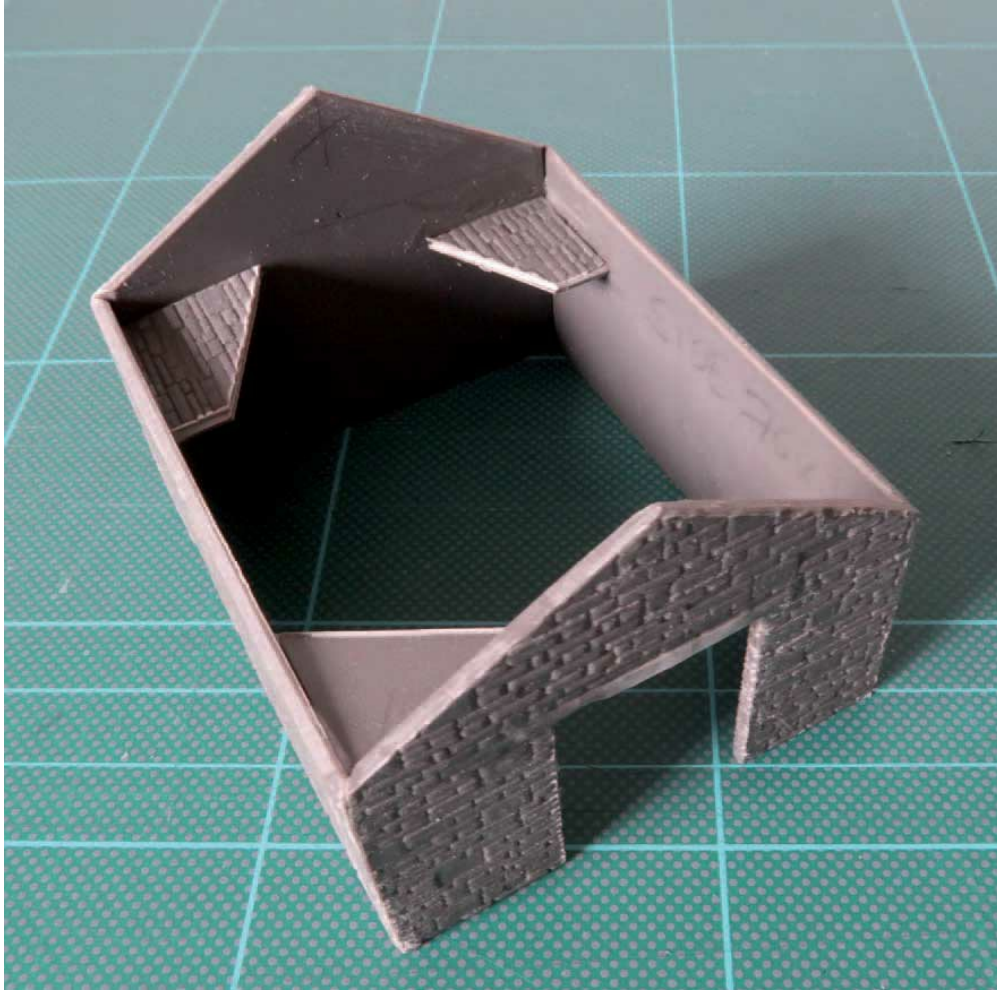
The doorway can be removed by sawing the vertical lines and drilling the horizontal line.

The doorway should be marked out in the centre of the end wall

29mm high by 23mm wide. As mentioned earlier, the doorway only allowed small wagons to enter, so if you wished to use larger wagons or a locomotive, then as per the real thing, you will need to increase these measurements to suit. Mark the opening on the rear of the sheet using a knife blade to make it clear and saw inside the vertical lines. Using a small drill, make a line of holes just inside the horizontal line, then join these holes using a sharp craft knife. The doorway should now be carefully popped out and the edges of the resulting hole cleaned up with a sanding stick and small files until perfectly flat.

As with the corners of the chimney in the previous project, use a small file to draw the mortar joints around the side edges of the doorway. Finally add a strip of 20thou (or thinner) plastic sheet 30 × 2mm above the doorway to represent the wooden lintel (here a piece of the Wills clear packaging material was used). This would, of course, sit in the wall and not on the surface, so blend it in as much as possible using a wash of solvent. Have a dry run to make sure that all the walls fit together and when you are satisfied, fix with solvent.

Use the waste corners put aside earlier to reinforce the joints as shown and once again create the mortar joints at the corners. Painting the main walls can now be carried out using similar techniques to the previous project.



The walls assembled. Note the use of the waste parts as corner bracing and the clear plastic lintel over the doorway.

ROOF

Cut two roof sections from the Wills slate sheet at 78 × 38mm. For safety, note which is the upper edge and mark the letter 'T' on the back to remind you. Using the sanding board, make an angle at this top edge so that both roof pieces fit together cleanly at the ridge. Then feather all of the other three edges to create a thin visible edge on each.



The roof section can be cut to size and the edges feathered to a sharp edge.

Add the roof pieces to the already completed walls, making sure that the fit is equal all the way round. Add a strip of paper along the top of the ridge. Make this over-length and 5mm wide, then lightly score down the centre line to enable it to be easily bent over the plastic slates. Fix with a wash of solvent, but use a non-plastic implement to firm it down and definitely avoid pressing it in place with your fingers. When this is fully set, lightly score the joints with a knife point and paint as before.



The roof has been added here and the main painting finished.

Add a set of bargeboards, of a depth of 4mm, and gutters to both roof sections. Paint these using the same technique as the Wills hut upgrade described earlier.

THE DOORS

As indicated earlier, the current doorway is a bit larger and of a slightly different design to the one visible on period photos. If the store that you are building is to be standing away from any trackwork, the opening measurements of 29 × 23mm can be taken as the size. If, however, you are planning on running a track up to, or into it, then an amount of compromise is required. Here it was assumed that a length of PECO track would tuck under the door, so the overall height needed to be reduced from 29mm to 26mm high to clear this.



The almost completed door with the missing line on the bottom plank!

The door should be cut from either 30 or 40thou plastic sheet (or even card) and scribed as shown with a footplate at 4mm high and vertical planking at 2mm intervals. Hinge plates can be formed by gently sanding the end of a 40 × 20thou strip to almost a point and adding to the door at 1.5mm from the top and in line with the top of the footplate – add these to the door and trim the excess off when set.



The gunpowder store ready to be installed on the layout.

A hasp can be added from a short length of 20 × 10thou strip and a small padlock formed from a cube of 40 × 20thou strip. Don't forget to scribe a line down the centre of the footplate, as was the case here! The door should be painted and weathered and added to the building when dry.

PROJECT TWELVE: A TAL-Y-LLYN RAILWAY PLATFORM SHELTER

One of the most common buildings on the Welsh narrow gauge is the platform shelter with a half-open front wall. Quite a number of these were built from timber (for example, at Towyn Pendre), but the most common material was once again quarry waste. This project tackles a model based on Dolgoch station on the Tal-y-llyn, but very similar structures were used on the Festiniog, The Vale of Rhiedol and the Corris Railways. Essentially, they are a simple box with a pitched roof. However, due to the open nature, there is a little more work involved

than may initially be thought. For a super shortcut to one of these buildings the Wills kit for a small forge is often used; the only downsides are the untypical graduated stone roof tiles and the non-symmetrical roof sizes.



Plas Halt on the Festiniog Railway – a modern take on the classic modern Welsh narrow gauge shelter.

MATERIALS AND TOOLS FOR PROJECT TWELVE

Project materials:

- PECO N gauge Stone Walling Sheets Ref: NB 40
- Wills Slate Sheet Ref: SSMP203
- 60thou square plastic strip or similar
- paint (see project)
- 30thou plastic sheet or Wills guttering
- 1mm diameter plastic rod
- Wills Victoria Stone Paving Sheet Ref: SSMP221 (optional)
- 40 × 20thou plastic strip.

Build tools and materials:

- craft knife
- ruler
- sanding stick and small files
- sanding board
- engineer's square (optional)
- filler
- plastic solvent and brush
- superglue.

THE WALLS

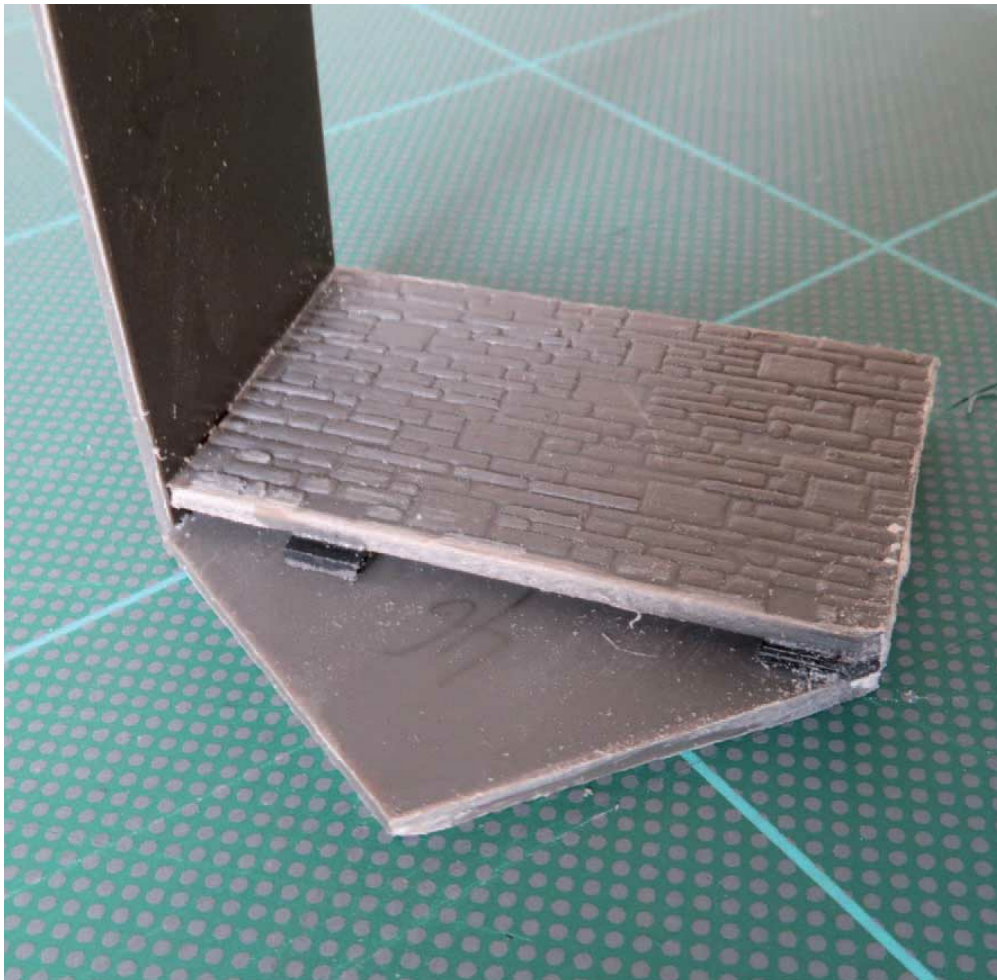
First cut the rear wall 85mm long by 29mm high. Mitre the ends as before and bevel the outside top edge.

Cut the two end walls 46mm wide, 46mm high to the top of the pitch and the lower edges 29mm high to match the rear wall. Mitre both edges of one end (the right hand), *but only the rear of the second left-hand end*. Assemble these three parts and dress the mortar joints with a file as before.

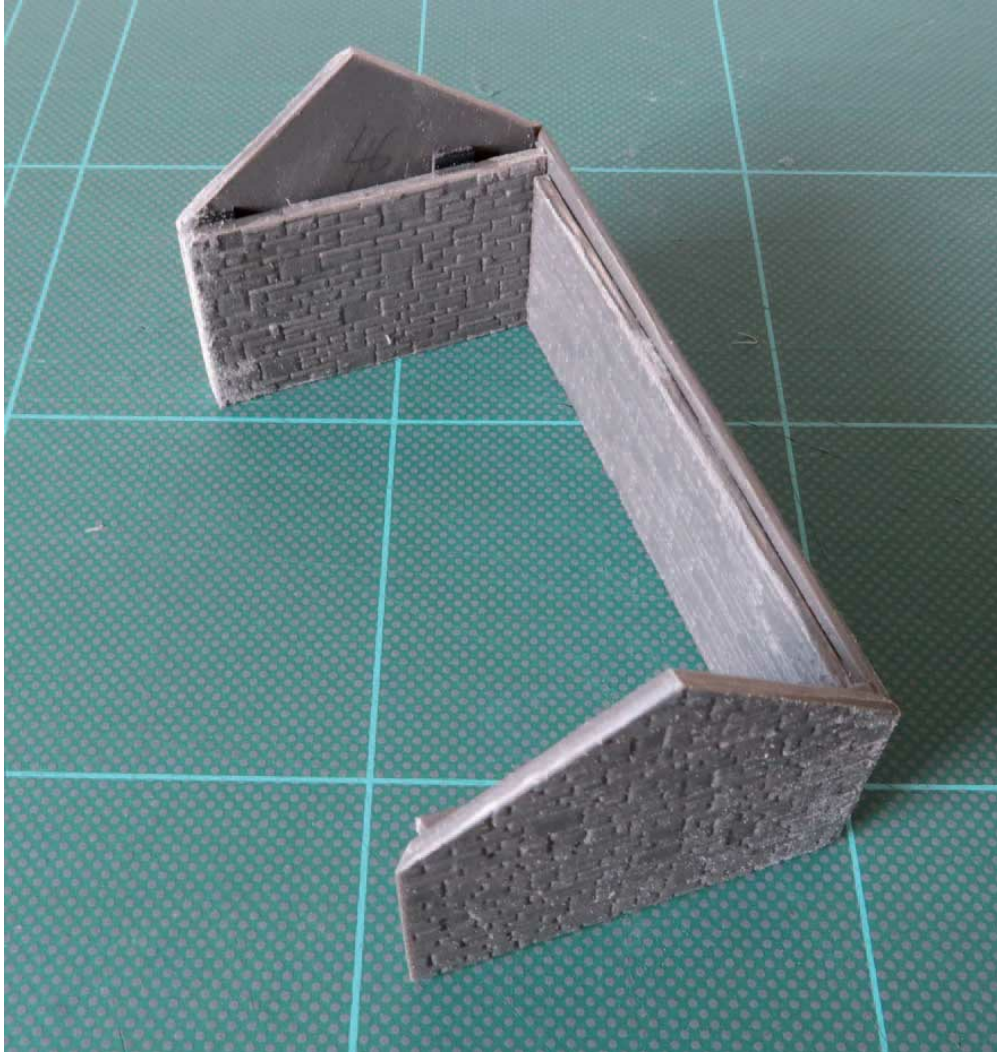
INTERNAL WALLS

As the building is open, it is necessary to model the inside of the walls and also to suggest that the thickness of the walling is more than a

scale 200mm. Further walling sections need to be cut, but first some packing is required and this is where all those offcuts can come in handy. Add a couple of strips of 60thou plastic sheet or offcuts of walling to the left-hand end wall, butting the outer one tight to the edge. Then add a section of wall on top of these as shown. Notice that only the lower part of the end wall needs to be covered, as anything higher will not be visible. Work around the inside of the building in a similar way. While this is important but is of relatively low visibility, you can afford to use scraps of plastic sheet and make sections up as you go.



The internal wall is spaced out from the outer using plastic sheet to create the correct thickness for the visible edge at the right.



The rear and side walls completed. The edge at the top can be scribed to match the stonework.

Cut the front (half) wall 32mm long by 29mm high and mitre the right-hand edge and bevel the outside top edge. Add this section to the right-hand end, making sure that it is square and lined up with the edge of the left-hand end. As the inside of this is out of sight, only the very outer edge of this section needs to be triple thickness.

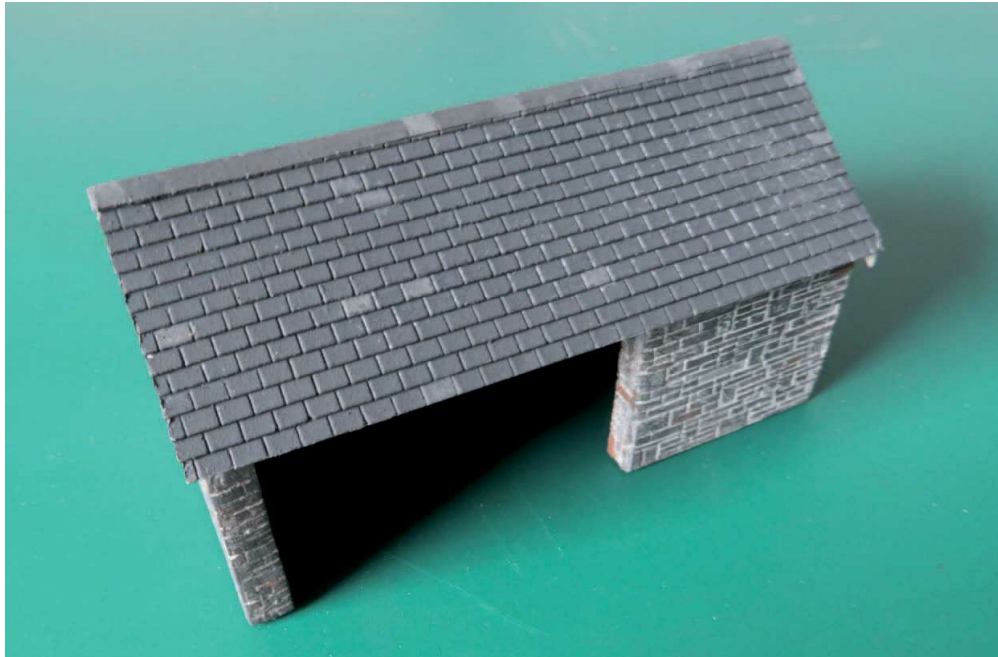
Smooth out any gaps at the triple thickness sections with some filler and scribe mortar courses on to them. At this point, the completed walls can be painted as per the previous two projects.

TIP

Use a small engineer's square or the lines on your cutting mat to ensure that all is true. As this is an open box, it cannot have the corner reinforcing triangles used in the previous project and will be apt to pull out of shape as the joints go off.

ROOF

Cut two roof pieces 88mm long by 32mm deep from the Wills slate sheet and feather the edges as before. Add these centrally to the top of the completed walls and finish with a ridge piece of paper. Gently scribe this to represent the slate pieces when dry. Add pairs of bargeboards to the ends of the roof pieces and make up guttering from strips of 30thou sheet, round off the outer edge and add downpipes from lengths of 1mm plastic rod, then complete any further painting.



The roof has been fitted.

FLOOR

A floor piece can be sized up by drawing around the building on to a piece of Wills flagstone sheet, or alternatively a piece of thick card with stonework scribed into it. This can be cut out and attached to the bottom of the building. The open space at the front should have a vertical roof support added from 60thou square strip or similar, with a small support piece at its foot. Finally, a slatted bench seat can be made up from 40 × 20thou plastic strip just short of the length of the end and fixed to the inside of this wall.



The completed shelter showing the internal seating, floor and central support post.

CHAPTER EIGHT

SIGNALLING

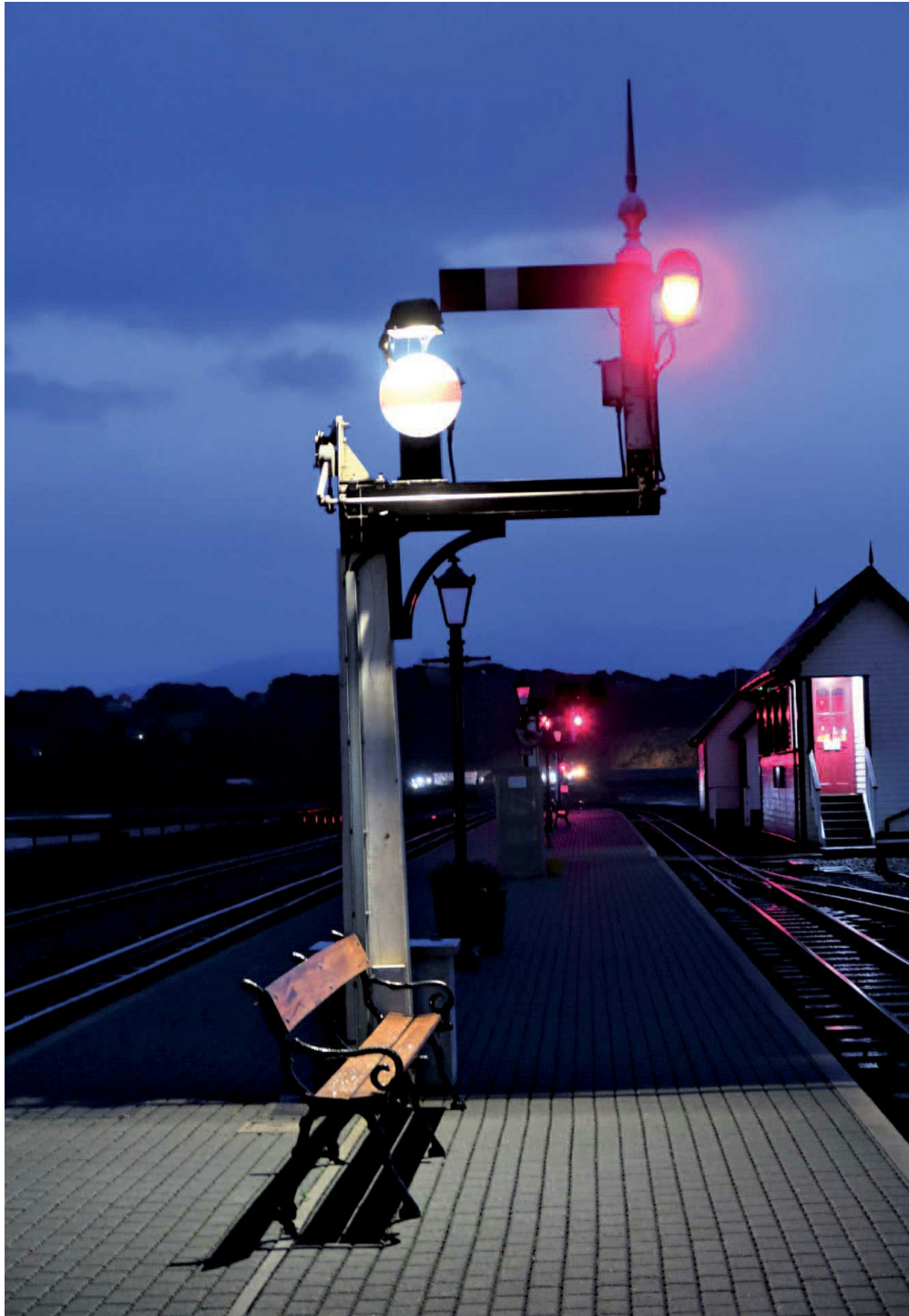
FIRST CONSIDERATIONS

Signalling for any model railway, either standard or narrow gauge, is always going to be like walking through a minefield – however much research you carry out, there will always be a scrap of information that you have missed; information that will be presented to you after the layout is completed, usually by well-meaning ‘experts’ who have studied the subject endlessly (but in many cases rarely produce anything). The only ways around this are either to ignore them, or at least to be satisfied that you have done your best and are only able to improve your signalling as new information comes to light.

Narrow gauge railways are especially fun in this respect (and often baffle the ‘experts’), as the commonly accepted rules and regulations were often either flouted, or not implemented in the first place. Part of this drift from expected practice is down to the way that the lines were initially designated by the authorities (or not, in some cases). If you read a few of the line histories, it becomes apparent that the unofficial overriding plan for the owning companies was not to have any signalling at all, as it was seen as an unnecessary expense. Therefore, playing fast and loose with the lines’ official terminology became a way of getting around the expected legal requirements.

SIGNAL PLANNING FOR THE MODELLER

How does this affect the modeller? Firstly, it depends very much on where your line preferences lie. If, for instance, you are using the Tal-y-llyn as a basis, then congratulations, you're completely off the hook. Signals were only deemed to be required to protect some of the road level crossings ... the Tal-y-llyn Railway mainly built bridges. The net result was that the pre-preservation Tal-y-llyn Railway was a signal-free zone.



A night-time view of a semaphore signal at Porthmadog.

It's near neighbour, the Corris Railway, was a little more complex and even ran to small signal boxes (in reality these could only be called ground frame huts). If this suggests to you that this was a fully

controlled line, then think again. The line installed signals around the time of passenger working, but the system was of a very basic nature and if period photographs are an indication, the simple single- and double-arm units that were installed soon fell into disrepair. Most post-World War I photos suggest that they were all but gone; either rotted away, removed or both. So depending on your modelling period you could add as little or as few signal posts as you think necessary, with the get-out clause that they may either not be used, or be derelict.

The lines built under the Light Railways Act fared slightly better. The general instruction for signalling on these was 'reduced'. In other words, not up to the complexities of that needed for main lines running at higher speeds, but enough to cover basic safety considerations such as protecting road crossings, entry to stations (home signals) and starters (to release the train from the platform). If you are still unsure where to begin with all this, but wish to have some operating signals on your layout without too much of a challenge, then one of the Light Railways Act lines may be your best bet. They lack the twee, cute vibe of the smaller quarry-based lines, but are closer in signalling operation to a minor standard gauge line in this particular respect, which is a feature that many narrow gauge modellers want.

TIP

Make a point of studying period photos of your chosen line or lines and establish if and where signals were sited and if they lasted into the period that you are modelling.

THE HANGERS-ON

As is often the case, the final awkward player was the Festiniog Railway. As it was the early starter, it felt the full force of Victorian

railway safety standards and was initially quite heavily signalled, though how well some of these signals were obeyed or functioned in the middle of the nineteenth century is open to question. What is documented is that the first flush of signal designs used on the Festiniog Railway were not replaced in a hurry, meaning that while the later-built Light Railways Act lines sported what we would consider to be a standard type of semaphore signal, the Festiniog Railway clung on (operating or not) to its disc, banner and split-post signal varieties, dating from the mid-nineteenth century.



Double-arm, split-post semaphore at Tan-y-Bwlch station.



Detail of operating handles for the split-post signal.

These were only replaced with the more standard semaphore arm and colour-light varieties in relatively modern times, as once the Festiniog Railway was redesignated a 'light railway' in the 1920s, it appears that all notions of signalling were quietly consigned to the bin. This means that luckily for the student of signalling history, a number of these early signal types from the Festiniog Railway have been

preserved, as they were still hanging on over 150 years after the Victorians had replaced them just about everywhere else in the British Isles.

As you may have gathered, this is only the very lightest of signalling overviews and some sensible concentrated reading by the serious student of narrow gauge signalling is required.

MODELLING THE SIGNALS

So, taking all of the above into consideration, where do you begin with modelling the signals for your line? The best route as always is to do as much research as possible. If you are modelling one of the lines in as close to prototype fashion as possible, then you can sit back as the planning work has been done for you. It's just a case of examining period photographs and looking carefully at the layout and signalling diagrams that have been published for a particular line, then producing the signals required in model form.

If you are moving one step away from this and using one of the lines as a loose basis for your layout (or even combining the general feel of two or three of them), then the research is the same, but you can add your own linked signalling history, either plus or minus – more signals or fewer depending on what you wish to do. The danger point is building a layout that is based closely around the visual shape and feel of the Tal-y-llyn and then swamping it with forests of semaphore arms, as it will just look wrong to anyone familiar with the line. As with all modelling, suggesting certain things and compressing others is the route to something visually believable.

USING KITS

Most of the lines in our chosen area bought the signalling equipment in from outside companies in similar fashion to the main-line companies. This means that (in 4mm scale at least) it is possible to adapt the range of plastic kits that are available. In some cases, all that needs to be done is a simple reduction in post height, as platform starters will not need to be quite as high due to the locomotive crew not being so raised. Though don't think that this is a wholesale reason for chopping everything down – it isn't. Signals were very much positioned and built to be seen from as far away as possible by the crews and a relatively small change in footplate height becomes irrelevant over a few hundred metres. The post heights are far from standard on any line and each arm was positioned and raised to a point where its visibility was greatest.

If you are working in 4mm scale (OO9), the Ratio Models kits for LNWR semaphores are a useful starting point, as although they differ in detail, they contain sets of square tapered posts which are likely to be the most useful for our prototype. Extra to this, the etched-brass signal manufacturers such as Model Signal Engineering produce full kits and a handy range of parts that can be combined with the Ratio Models parts to make up a range of units to fit any likely situation that you may wish to develop.

Some of the more antiquated designs will need a little more thought. The disc or banner type built for the Festiniog are a case in point, though there is a kit available for a basic model of these in 4mm scale.

PROJECT THIRTEEN: AN EARLY FESTINIOG DISC SIGNAL

The development of railway signalling in the British Isles is fascinating and some people get so engrossed in the subject that

other aspects of railways and railway modelling cease to become important. The instantly recognizable semaphore arm on a post which was introduced in the early Victorian era is regarded as one of the most iconic symbols of railways, and as such is used as a visual clue on thousands of printed items to inform the reader exactly what they are about. Before these, there were one or two different methods of controlling trains and one of these was the disc system, which was essentially a plate of metal swivelling on a post with an accompanying lamp. The disc facing flat on to the train indicated stop; the disc turned with the edge facing the train indicated proceed.



Preserved disc signal at Boston Lodge showing the rear face of the disc. The front face is painted red.

Disc signals (with holes to lessen wind resistance) were introduced in the 1840s, but were quickly superseded by semaphores, which were used on railways as early as 1841 (London and Croydon Railway). It is not obvious why the Festiniog adopted the disc system with such gusto, especially as it also installed some semaphore types at a similar time. These were probably the last disc signals ever used (or at least standing) on a working passenger line in the British Isles.

For those modellers building a layout of (or representing) the Festiniog Railway, disc signals are almost a compulsory item, as they immediately create not only a sense of place, but a sense of time as well. They are not the easiest items to produce in any scale and the operation of them needs a little more thought and planning than the more standard semaphore post item. Commercial kits do exist, though, and this project uses the brass/copper/nickel silver product designed by Chris Veitch. Note that this does require a certain amount of soldering confidence – not skill, but confidence, and a reasonable amount of practice is required for what is a very delicate kit. That said, if you have built the quarryman's coach detailed earlier in this book, there should be no real difficulty here.

MATERIALS AND TOOLS FOR PROJECT THIRTEEN

Project materials:

- ARB Modelcraft FR Disc Signal kit (Chris Veitch)
- paint (see project).

Build tools and materials:

- reamer (optional)
- soldering iron
- 145° solder and suitable flux
- steel ruler
- selection of small files
- small side cutters
- small drills and pin chuck
- superglue
- razor or hacksaw
- snipe-nose pliers or similar
- glass-fibre brush for cleaning parts
- Blu-tack or similar for temporarily holding parts.

Note: Working on an offcut of melamine shelving as pictured here gives not only a fairly heatresistant surface, but also a movable lip to work over, as is shown in some of the photos. The jig holes mentioned in the instructions

can also be drilled directly into this piece. The whole thing can be washed down to remove all the muck and flux after each session or at the end of the build.

THE BASE PLATE

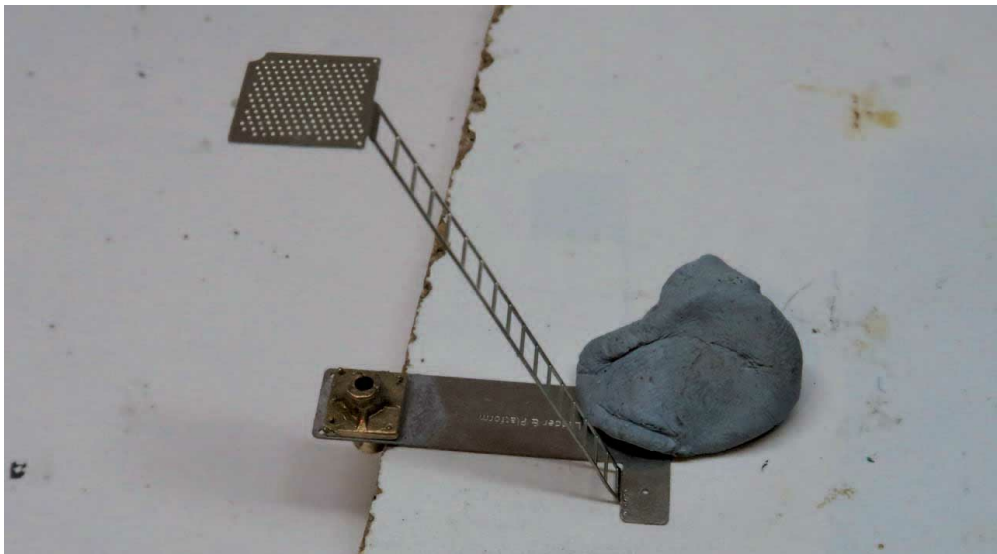
The kit's instructions are extremely well written and accurate (there are a couple of deviations here in the order of the build). In other words, follow the instructions slowly and carefully and not much will go wrong.



The hole in the base required opening out with a large file or, as here, a tapered reamer.



The brass casting for the foot of the post can be soldered, letting it find the centre of the hole as the solder becomes molten.



The double bend in the ladder requires a careful touch and use of a straight edge such as a small steel ruler or pencil to support it.

The base plate has a large hole that needs to be eased very slightly (about 1mm on the diameter). The ideal tool for this is a broach or a tapered reamer as shown here. These are more specialist tools that may not be in the modeller's toolbox, so slowly working around the hole with a round file and constantly checking with the brass base part will probably work just as well.

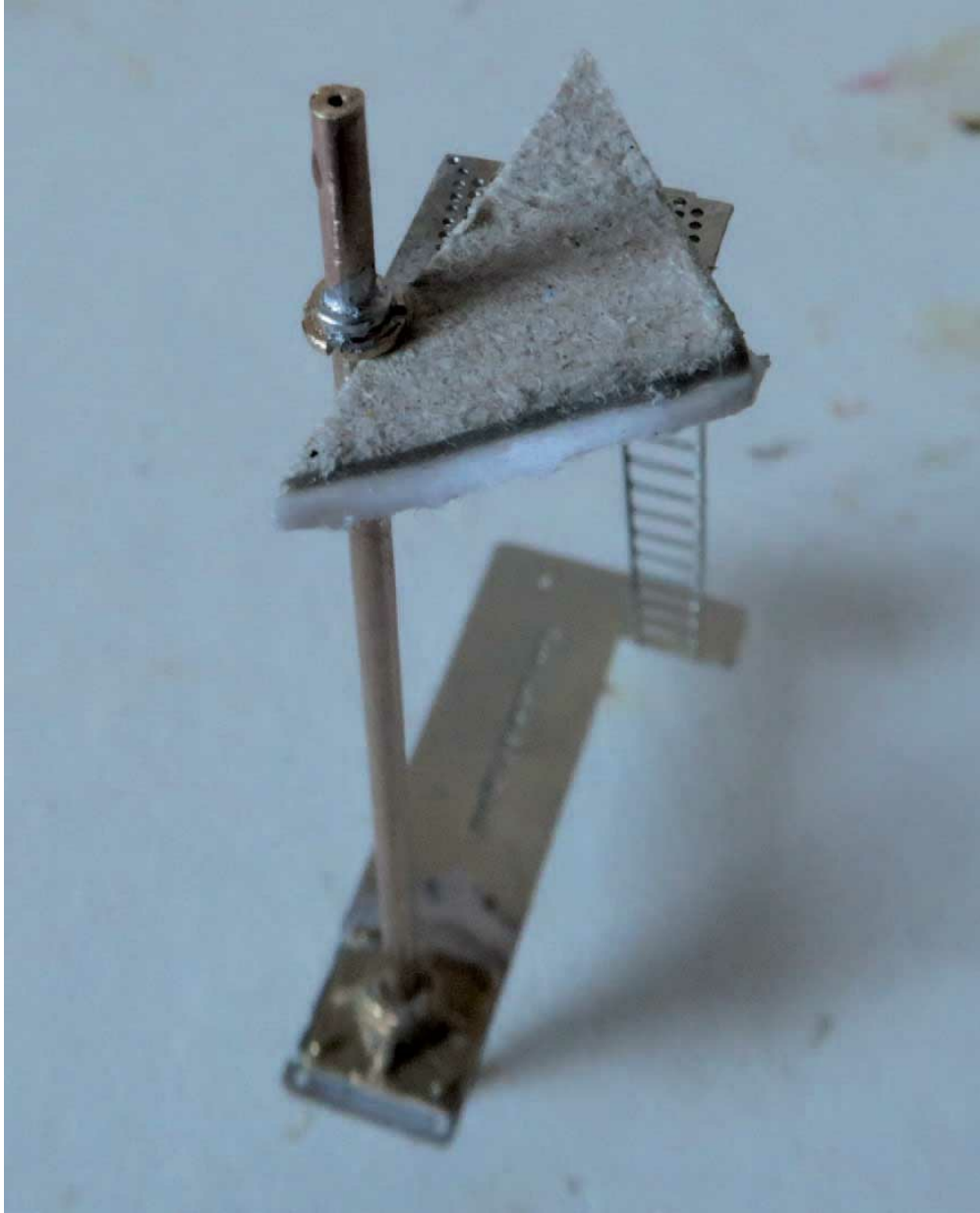
The joint can be made by tinning both parts and adding heat all the way round so that the brass base 'floats' into the centre of the hole. (Incidentally, the same technique can be used for adding brass bearings into locomotive chassis.)



The bracket mounting piece should be threaded on to the post before the platform corner is soldered on to it.



When the brackets are soldered on, the mounting section can be cut away.



The washer below the disc is set using a card spacer.

The ladder and platform can be bent up. The ladder is very thin and flimsy and until the post is soldered on is very susceptible to damage. Use a small steel ruler or lolly stick to support the length of the ladder while you bend it; don't do it freehand or there will be tears. Start with the bend at the foot, establish the angle, then using your support the other way round, bend the platform down to horizontal. This is very much a trial-and-error operation as there is nothing fixed.

A school-type plastic protractor may be helpful here to get the angles right.

THE BRACKETS

Establish the post height and tack solder to the underside of the brass base. Thread the bracket 'cube' on to the post and solder the post to the small recess in the corner of the platform. This should tension the ladder and prevent it bending too much.

Solder the brackets on and remove the cube part.

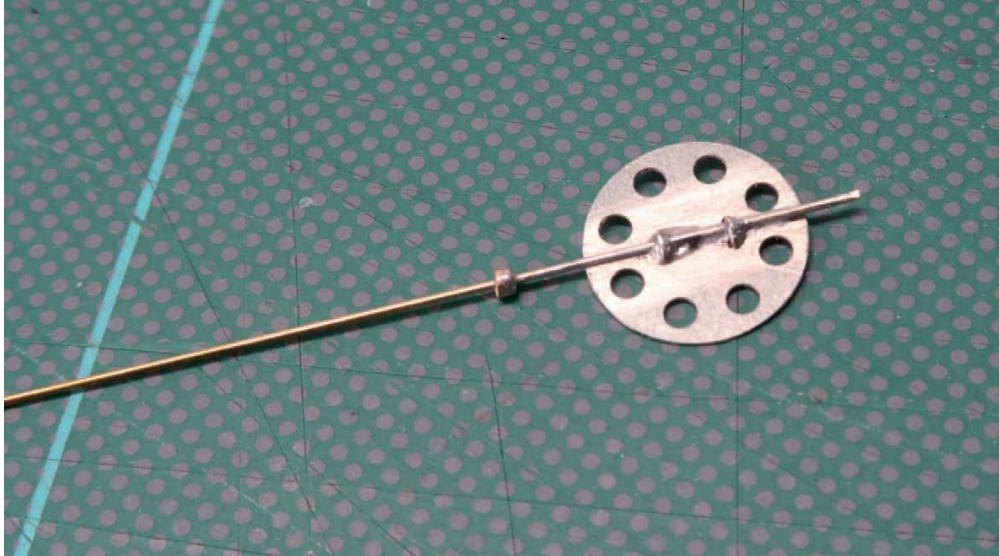
Cut the slots in the washer with a saw and fit to the top of the post using a 1mm thick piece of card as a spacer.

TIP

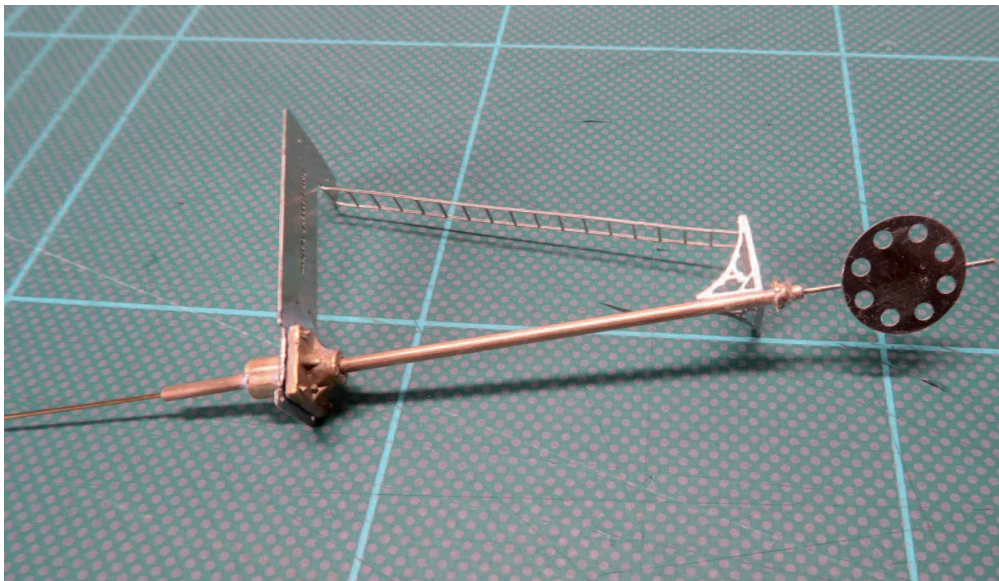
Following the instructions, as was the case here, works well, though removing the cube once the brackets are fixed is overly tricky without a very fine pair of side cutters. A suggestion is to make a home-made chisel from a small electrical screwdriver (by filing the tip to a sharp flat cutting edge) and chop the tags away with the fitted cube laid flat on a cutting mat. Alternatively, removing the brackets from the fret and fitting them loose is, while fiddly, probably no less problematic.

THE DISC

Make up the disc. Here the suggested cheat was employed by using the thin wire to replace the tiny etched brackets. It's worth drilling the small holes in the disc before you cut it from the fret to give you more to hold on to. (Another dodge was to use a larger 0.6mm drill with little effect on the join.) Add the small collar from a length of tube. Here it was left rough and then cleaned up once it had been soldered to the wire, which was easier than trying to do this while holding the tiny washer between the fingers.



The cheat was employed here and the disc fixing plates were made using the wire supplied.

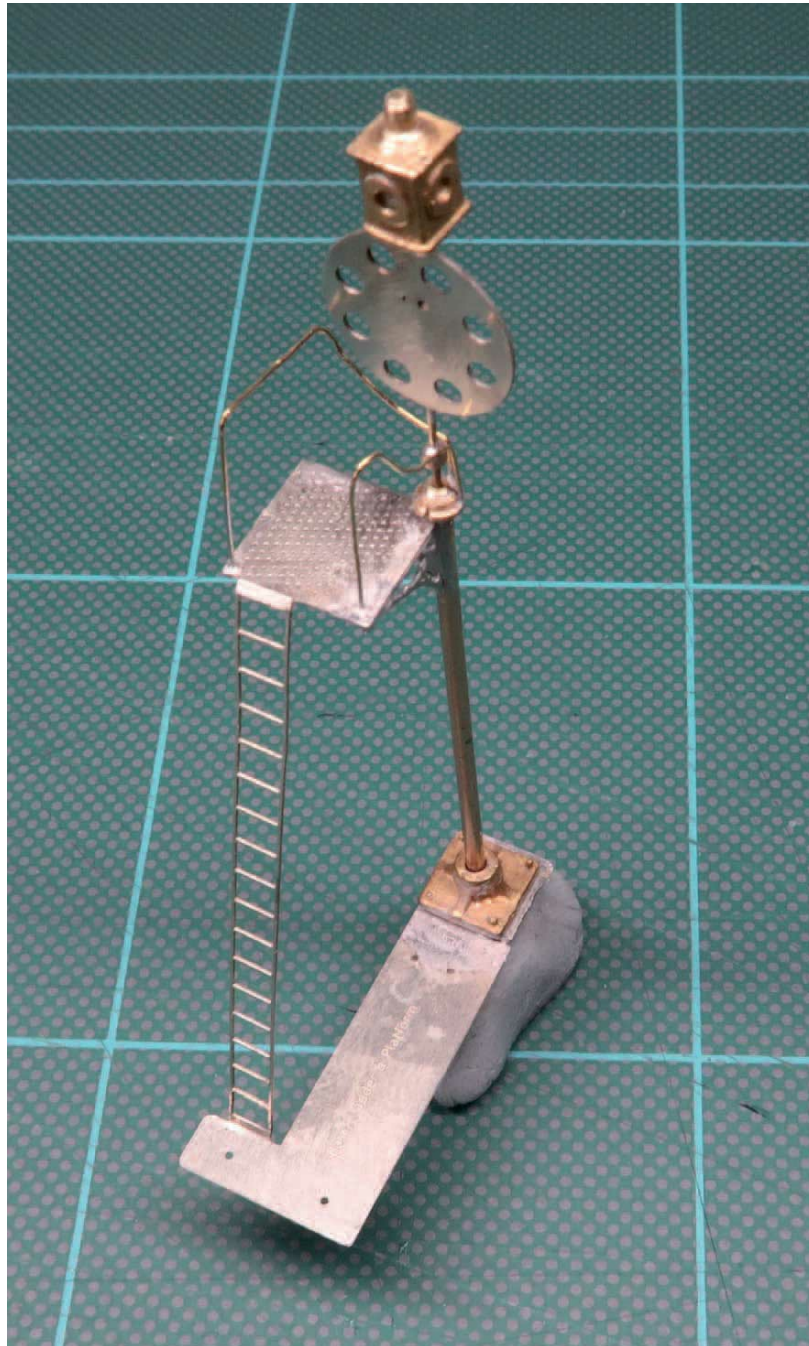


The disc and wire can be threaded into the post and tested for spin.

The wire and disc can now be threaded through the post and all movement checked. Note the generous amount of spare material of both post and wire left at the bottom. It's easier to trim it later than not to have enough to play with when fitting it to the baseboard.

FINISHING OFF

The lamp casting can be drilled and added to the top of the wire. Superglue was found to be perfectly adequate for this.



The construction completed with the lamp fixed with superglue.

The handrails were left to the end as they need to be of a shape which matches the spin of the disc. The instructions are confusing

here, so the advice is to refer to prototype photos if possible, as the shape is quite unusual.

Finally, carefully wash all parts in warm water to remove any traces of flux.

CHAPTER NINE

WHAT SORT OF LINE?

WHAT IS A WELSH NARROW GAUGE LAYOUT?

In the opening chapter the things that make the Welsh narrow gauge railways attractive and worth modelling were discussed. Much of this attractiveness can be put down to the surrounding landscape, or can it? What exactly is the typical landscape for a Welsh narrow gauge railway? The answer is that this perceived typical doesn't really exist, or, more specifically, there isn't a one-size-fits-all approach, as this landscape consists of a few unexpected types. The default position for most modellers of the narrow gauge (especially the newcomers) is to head straight for the hills.

WHAT LANDSCAPE?

Ask any non-narrow gauge modeller or a novice what the landscape should look like for a Welsh narrow gauge line and it is probable that the description would include phrases such as mountainous, rocky, slate tips, line running on a narrow shelf and through tunnels. In other words, the expected default position is a composite of the top end of the Festiniog as it is today and the Aberglaslyn Pass on the Welsh Highland Railway; that is, the more vertically arranged spectacular

parts of the area. And yet the lower part of the same Welsh Highland line runs for quite a distance across low-lying flood plain and in the main this is conveniently ignored, because, of course, that's boring isn't it? Much of this can be levelled at the fact that many modellers are guilty of basing their work on other people's models with scant reference to the actual prototype. This is common enough with standard gauge modellers, but is absolutely rife among narrow gaugers.



Diesel Upnor Castle with mountainous scenery in the background.

HUNTING FOR RABBITS

A lot of this problem is historical: in the early days of commercial narrow gauge models, production was firmly skewed towards getting as much track as possible into a small space and around as tight a curve as possible. This, linked with the then newly designed Dduallt loop on the Festiniog as inspiration, spawned hundreds of tightly

spiralled layouts with these new tiny trains blasting in and out of tunnels, round impossible curves and up and down improbable gradients, with the excuse that in one or two places this could happen in the real world.

This style of modelling took hold so firmly that it quickly became a cliché and was soon regarded with derision, though there is even now, some fifty years later than these early models, a school of modellers still producing this type of layout which has become unkindly known as the 'rabbit warren'. Some of these layouts can be extremely clever and are far from beginner's essays as you do need a fair amount of baseboard-building and track-laying skills to make them work well. This means that the novice can mistake this for the 'correct' way to proceed and will fall at the first hurdle due to the extra complication that they generate. This is not to say that the rabbit warren is a bad choice; in fact, as an exhibition layout or shop display it has a lot to offer. What it is not, however, is the only way to model the Welsh narrow gauge lines and probably isn't the best place to start. What we need to do is stand in the area that we are dealing with, pause, and look around at what it actually does and how we can capture those characteristics in model form.

SOME LANDSCAPE TYPES

What we are looking at here are visual situations that could be representative of the real thing and not taking the default position discussed earlier without thinking about it. Most Welsh narrow gauge lines go from point A to point B to overcome a problem either geographical or financial, but along the way they usually change landscape types during the journey.

TYPE ONE: RIVERSIDE OR FLOOD PLAIN

Many of the lines in our area start at either sea or river level and use the natural lie of the land to get as close as possible to the objective with as little upward gradient as possible:

- The Festiniog: Porthmadog to Boston Lodge crosses and skirts the estuary with a large portion over an embankment (The Cob).
- The Welsh Highland Railway: similar in the opposite direction across estuary flood plain on the level.
- The Corris Railway: the lower part of the line crossed the River Dovey and across flood plain until reaching Ffridd Gate, from where it climbed.
- The Welshpool and Llanfair Light Railway: follows the river on the level where possible between short climbs.
- The Fairbourne Railway: more or less level throughout along the estuary mouth.
- The Vale of Rheidol Light Railway: follows the river level for the lower portion from Aberystwyth.



Dolgoch station set in rolling hillside. Note the old and new water towers.

TYPE TWO: ROLLING HILLSIDE

- Tal-y-llyn Railway: although it starts to climb almost straight away from Towyn Wharf station, the lower part of the line is gentle rolling countryside with no major earthworks.
- Glyn Valley Tramway: although not exactly flat, the line did not run through what might be termed as mountainous countryside, but still had a 1:50 ruling gradient throughout its length; steeper than the Tal-y-llyn.

TYPE THREE: MOUNTAINOUS

- The top part of both the Festiniog and The Vale of Rheidol hug the side of what are quite steep-sided mountains partly on shelves cut into the sides. The earthworks on both these lines are quite major, with large amounts of rock having been removed and the track curvature is tight.
- The upper two-thirds of the Welsh Highland (historical or current) can only be described as mountainous, with little of this section running anywhere near level.
- The Corris Railway climbs almost continuously once it leaves the flood plain, with long sections on a narrow shelf cut into the hillside, with tight curvature of the track following the natural geology to minimize earthwork.
- * The Brecon Mountain Railway speaks for itself, although of course it runs on an old standard gauge trackbed.



The Festiniog Railway around Penrhyn is set on a narrow shelf.

So although a sizeable portion of the Welsh lines, both current and historical, do fall into the modeller's ideal of steep gradients and tight curves, that is far from being the whole picture. In fact, when you consider that most modellers will construct stand-alone single-station sites, this reduces even further as, prototypically speaking, the obvious choice is to place these, with all their possible loops and sidings, on ground that is as level as possible, either natural or flattened out by the line's builders.

THE LOCOMOTIVE SIZE ISSUE

Quite a few years ago, Miles Bevan wrote a magazine piece outlining British narrow gauge railway types. This came down to relative sizes and geographical positions, though it was pointed out within the piece that there was an amount of crossover. His designation pertaining to

our subject was 'Large Welsh and Small Welsh': the Welshpool and Llanfair, The Vale of Rheidol and the Welsh Highland would come under the former tag; and the Tal-y-llyn, Corris and Glyn Valley under the latter. The Festiniog started as the latter and partially morphed into the former.

It works like this: lines that have a predominance of 0-4-0 and 0-4-2 locomotives and four-wheel coaches are 'Small', while those that started with larger engines and more expansive bogie coaching stock are 'Large'. Naturally, the designations are quite flexible, but it's useful to see and understand where your preferences may lie. Why does this matter? It all comes down to visual compatibility. Whereas the standard gauge railways of the British Isles are more or less built to a fixed loading gauge throughout (although there are a number of exceptions) and therefore are outwardly similar in general size terms, narrow gauge rolling stock can vary wildly in overall general size, even when the two types run on the same track gauge.



Angus Watkins' Bryn-y-Felin is based on Beddgelert and stands on level ground.



The different loading gauges are apparent here, with both locomotives running on 1ft 11½in track despite the obvious size difference.

This theoretical size split is by no means set in stone and many narrow gauge modellers will quite happily ignore it, but deciding which of the two designations you want to aim for at the beginning will not only be helpful, but will possibly save you a little angst at a later date. Here's a for instance: if you start your narrow gauge modelling based around one of the 'Small' prototypes, say it's the Tal-y-llyn, it will stand to reason that your layout will reflect the look of this type of line. The stock will be Tal-y-llyn Railway four-wheeled coaches and the locomotives the smaller 0-4-0 and 0-4-2 types. The buildings that serve the line (station shelters and so on) will also reflect a low passenger traffic, ex-quarry-line style. Even more important is that in order to continue this visual completeness, the clearances under bridges and beside platform faces/ loading docks and the like will match the 'Small' rolling stock. So far, so good.

However, a few months or years later, your dream epic layout is nearing completion and you have filled a room with lovely Welsh

narrow gauge, only for disaster to strike. You buy a kit for a Vale of Rheidol locomotive – a scale 8ft wide and firmly in the ‘Large’ designation. You now have a problem, as once it is built, it won’t go under the bridges and scrapes every fixed object on your line. It would, of course, be possible to allow for this kind of event and open all these clearances up during the layout building, but then your Corris or Tal-y-llyn locomotive will look silly going under bridges that would clear the *Flying Scotsman*, as part of the charm of building a model of these quarry-based lines is these tight clearances.

Of course, there is historical prototype precedent for this problem. The Festiniog started as ‘Small’, with very low-height passenger stock and locomotives. One of the reasons that the Farlie locomotives were adopted was that a need for a motive power upgrade was required, but the physical locomotive size could not be increased up and outwards due to tunnel clearances. The Farlies solved this by being longer – a central fire heating two boilers mounted on a pair of bogies, but, critically, not wider or taller. When the Festiniog and Welsh Highland merged, Festiniog locos could work on the WHR, but not vice versa, resulting in one or two WHR locomotives having their cabs cut down to match the Festiniog’s small loading gauge.



Matthew Kean's model of the WHR Russell, which was cut down in height to fit the Festiniog's tight loading gauge.



A selection of original Festiniog Railway goods stock.

What all this means is that regardless of the modelling scale that

you are working to, you will need to consider the question of 'Large' or 'Small' fairly early on, as it will only be a matter of time before it considers you. Of course, there is a simple answer to all of this ... build two layouts.

PLANNING YOUR LAYOUT'S OPERATION

While a few modellers are happy just to sit at the workbench for years constructing long rakes of rolling stock to a stunning standard that will probably never turn a wheel, the majority of modellers of any persuasion will want to run trains. However, operation can be a sticky word: to some it can mean a completely random set of moves decided upon a split second before they are carried out; for others, absolute prototype fidelity is the only way to do it.

There are a couple of basic principles that are worth mentioning. These aren't necessarily specific to Welsh narrow gauge, but to any minor railway line. Firstly, the traffic rate is usually a lot lower. We are now surrounded by modern main lines in our daily lives, with slick, fast trains running at regular intervals and it is easy for the newcomer to narrow gauge to imagine that this is the case with the smaller lines. Naturally, this was not the reality and although with a personal layout there is always the 'it's your railway' argument, if you wish to run a realistic intense train service on a model railway, your first choice is probably not going to be a sleepy line tucked in amongst the hills of Wales. Those lines that did have a 'timetabled' passenger service usually only ran a few trains a day and even then the service could be described as hopeful rather than regular. The lines were often run on a shoe-string with regard to rolling-stock repairs. Only one engine would be kept in steam during any given day, so if there was a failure of any critical part, then that was it; no trains until tomorrow or even

beyond. An instantly available back-up service simply did not exist.

The second point is that in truth the quarry-based lines were not much more than conveyor belts: empties up, full down, repeat. In addition, as the slate or granite traffic faded there were not even separate trains run for this, wagons being tacked on to the rear of a friendly passenger train. The common carrier lines such as the Welshpool and Llanfair did run separate goods trains, especially towards the end of the line's life, but the expected 'different trains for different traffics' approach that many modellers expect is not strictly prototypical. So if you want a busy model operation, the reality has to be stretched somewhat.

DIFFERENT PASSENGER WORKINGS

Stocking the railway could also vary. Most of the lines had a small, fixed amount of passenger stock; it simply wasn't possible to draw on spare, extra or replacement items in the case of failure or at peak times in the way that the main lines could. Therefore, the original ideas that defined the stock's initial purpose could get a little blurred as and when it suited the railways. The quarry-based lines were originally designed for full- or part-gravity working of mineral trains, but human nature being what it is, this was seen as a benefit to a more unofficial use of the downhill qualities of these items of rolling stock. Empty wagons stored at the top of the line were often released and used to ride down upon. In fact, in some cases this was even sanctioned by the railway and charged for accordingly. Whole families riding to an event on a Sunday would leave the wagon at the limit of the gravity run for it to be drawn back up again by the railway the next day behind a suitable train.



The ultimate in gravity-powered transport – Spooner's 'boat'.

Within a more timetabled situation the railway could press open mineral traffic wagons into use as makeshift passenger vehicles (indeed, this was usually the preferred mode of transport for quarry workers). Crude seats could be made by adding planks between the horizontal bars of slate wagons, which are almost designed for this modification, and any overflow passenger numbers could be carried this way. It was no doubt a popular way to travel on a warm summer's day.

THE ADAPTATION OF WAGONS

Not only were wagons built for mineral traffic turned into passenger coaches, but as they were essentially open-topped boxes any number of different goods items could be carried – barrels of beer, timber, foodstuffs and even livestock could be carried in this way either for public consumption, or for transportation to the quarry working. This does open up a few extra avenues for the modeller as once this traffic

flexibility has been grasped, it is only a short mental hop to modifying a completely separate set of mineral or slate wagons for use other than slate and granite traffic. And yet the modeller running a short rake of slate wagons with plank seats full of seated passengers, or a quarry-waste wagon carrying a large barrel on a layout, is rare, despite the many period photographs which show these things happening. In addition, with some of the tiny Japanese motor units that are now available it's even possible to motorize a slate wagon or two to run independently to represent the official or unofficial passenger gravity-riding.

This means that the average narrow gauge modeller can conveniently ignore all the usual prescribed and expected main-line ways of operating, by running several trains with various traffics and different locomotives on the front of each one. With a little research and imagination, it is possible to find all sorts of unexpected and out-of-the-ordinary trains to run. However, if you display your layout in public, it's a good idea to have a few photos to hand to explain these quirks to those who might question these as being 'not prototypical'.

TRACK SHAPES

Most modellers are notorious for having a fixation with track plans. From the 1990s onwards there poured forth a torrent of books and magazine articles saying why this was not a smart move and that it was a hang-up from the days of train-set track planning using fixed length and radii track pieces. In our area of interest, and to a great extent in any narrow gauge modelling, this post-1990s theorizing is largely correct – that is, if your desire is to go at least some way towards a layout that is representative of the real thing. While there are no hard rules as such, there are some basic points which are

worth noting, even if you go on to ignore all of them.

POINT ONE

Any prototype track planning starts with the traffic (or possibly more accurately the expected traffic), not the track plan. This is really the key to making your layout look right. No railway company is going to not have enough track to get the job done, but conversely is not going to prepare the bed and lay miles of track that is not justified by the anticipated traffic. If you just want as much train movement as possible, you can comfortably ignore this, but if you want something that visually convinces, this needs to be your first consideration. What will, and did, happen was that the likely operation of the line was noted and the track laid to facilitate this in as efficient a manner as possible, with as little wasted time and materials to keep the building costs to a minimum. No extra sidings would be put in just because there was space to do so and no loop created for running round where gravity would do.

The classic prototype for this last point was Towyn Wharf on the Tal-y-llyn Railway (the original rather than the current layout). The vast majority of stock running into the site did so by gravity, even the passenger stock (passengers were 'encouraged' to leave the train at Towyn Pendre station). All that was needed at Wharf was a fan of sidings linked across the ends by an opposing track and wagon turntables. Any locomotive would follow a light engine to be attached at the uphill end for return towards the quarry. Shunting could be achieved by this, by horse, or by manpower.

POINT TWO

If goods do not take more than a few minutes to unload is there any need for a dedicated siding? Mineral traffic aside, most of the general traffic carried on the smaller lines of the group could be handled on to

the passenger platform. Any mail, poultry, foodstuffs and parcels and so on could be (and were) carried in a spare carriage compartment or the guard's van and unloaded at the same time that the passengers were leaving or boarding.

This working practice does spoil much of the fun for the modeller, as it is something that cannot so far be replicated in model form. What the modeller would prefer is if all of this light goods traffic was to be carried in a separate vehicle and for this to be detached and shunted into a siding, thus creating more operational interest. Yet why would you detach and shunt a van for the delivery of a few boxes of eggs, especially with a timetable of only a handful of trains in a day and therefore more than enough time to unload on to the platform? Where sidings were used, it was for the storage of wagons for gravity working as described earlier. The points could be changed, the brake released and the vehicle would be on its way.

POINT THREE

Using a standard gauge plan that has been reduced in linear fashion doesn't really work. This is an old chestnut that still crops up and is often quoted as a good starting point. Namely, to take a standard gauge plan from a book or magazine, reduce it in size by a third and, hey presto, you have a perfect narrow gauge track layout. The only thing is, that's generally what you end up with – a smaller standard gauge plan. There are a couple in our group of railway lines that this will just about work for visually: The Vale of Rheidol terminus at Devils Bridge and the Welshpool and Llanfair terminus at Llanfair Caereinion. The former especially is just about as clichéd a model terminus as you could get. In both cases they do resemble a small standard gauge branch-line terminus. The Welshpool and Llanfair is in many ways a standard gauge branch that just happens to be narrow gauge, and the working and history of the line echoes many of the similar standard

gauge lines that are contemporary with it. Both of these termini follow accepted procedure and have all the expected features and structures: platform, run-round loop, goods shed, ground frame and a fan of sidings for goods stock. If this sort of quasi-standard gauge/light railway operation is what you are looking for, then either of these would be a good place to start your thinking.



Almost the bare minimum in station facilities – Sylfaen on the Welshpool and Llanfair.



Slightly reduced now, but Devil's Bridge is possibly the most popular modellers' track layout with a run-round loop and a small fan of sidings serving a goods yard.

The three points above are simply ideas to take you away from the probable traditional train-set/ standard gauge mindset and illustrate that while at first glance the Welsh narrow gauge just looks like a smaller relation, there were ways of working that either would not occur on a standard gauge branch (though many did) and without them you lose some of the flavour. None of the above ideas are by any means compulsory, more just trigger points to encourage the modeller to look a little more closely than is sometimes the case.

TIP

Unless you have a very defined idea of how you wish to proceed, using the same thinking as the railway companies and looking at the traffic first is a good idea. Working out how you want your railway to run and the likely traffic flows and types will often suggest what you need to include in the track layout and surrounding infrastructure. The negative side of this is not doing any traffic planning and ending up scrapping the layout and wasting your work, as you find that the track layout does not match your desired operation, or is insufficient for it. Undertaking a little 'push-along' train playing on some paper plans is often a good way of finding the glitches in the track layouts long before you actually build the baseboards.

THE FOUR BASIC SHAPES

There are four basic station track shapes that are used. Although specific sites may have more or less going on with regard to structures and track, the root can be linked to these four. They are, in order of size: plain, augmented, loop and fan. There is a fifth, a junction, but this more often than not links into one of the first four.

PLAIN

This is possibly the least attractive to the modeller as far as operation

is concerned, but it can be a useful plan for a small exhibition layout. The classic example of the plain type is Dolgoch on the Tal-y-llyn, which was pictured earlier. Others may be Sylfaen on the Welshpool and Llanfair, Ffridd Gate on the Corris, or the current Plas Halt on the Festiniog. The facilities typically consist of a platform, or at least a flat area beside the track plus a shelter, but also possibly just a seat and name board. In the main, these types served farms or tiny dwelling groups, were not expected to attract much traffic and were often (as in the case of Dolgoch) simply a convenient place for the locomotives to take water.

Operationally, these don't look terribly interesting. However, shunting rakes of slate wagons, especially in 4mm scale, is an acquired taste. They much prefer being towed by a smooth-running locomotive. At which point having a small layout with a pretty small station scene with various suitable trains running through to somewhere else suddenly has its attractions, as they don't need to have a reason to be there; they are only passing through to their destination. Wrapping the track around at each end to a set of storage sidings at the rear can make a steadily moving exhibition layout that is fun to operate and also a crowd-pleaser at public exhibitions. Cover the exits with small bridges and keep the track to scenery ratio swayed towards the scenic and you will have produced a very popular layout.

AUGMENTED

The augmented shape can be treated in much the same fashion. The difference is one of operation, in that there are now some sidings in place. And, more importantly in our case, one of these could be the link (or junction to) a quarry or similar industrial site. The approach in build and operation can be very similar to the plain idea. With possibly a pair of opposing sidings and no loop, the operation becomes one of

picking up on the way up the line and dropping off on the way back, although in reality there would be an element of rope-working, gravity or hand-shunting brought into play in this case. Plus of course even if the sidings are there, you don't have to use them all of the time and the operation then becomes similar to that of the plain track layout.

LOOP

With the addition of a loop the plan moves more towards what most modellers will have in their heads. This can be either a passing station or a passenger terminus, though don't discount a freight scenario with the loop (or loops) set out to hold wagons. This could be rakes of slate wagons, or indeed simply a siding that can be worked from either end. Alternatively, it could be a loop on a long siding or junction spur to a quarry. The loop situated there could be to hold full or empty wagons to be moved to the quarry (an exchange siding). This is a device which is little used by the modeller, but one that adds drama. The fulls are dropped off by the quarry locomotive and the empties withdrawn. The locomotive for the running line then picks up the fulls either as a separate train, or to be added to another train standing on the running line. We have become hardwired to think of loops as a way to run around passenger stock, but of course in very general terms there were as many, if not more, loop lines in the world holding rakes of wagon of one type or another.



Towyn Wharf station showing the gradient from Towyn Pendre station that allowed gravity running into the site in pre-war days.

Placement of passenger loops varied slightly. The modeller's standard approach of the loop in front of the passenger platform is relevant in a couple of sites, for example Llanfair Caereinion and Devil's Bridge, but there are others. The loop can be set beyond or before the platform, as with Aberllefenni on the Corris Railway, or not anywhere near a passenger platform, such as the coal yard at Glyn Ceiriog on the Glyn Valley Tramway. The trap is often that the modeller will assume that the standard gauge track plan cliché of the loop combined with a platform is the only way to do it (in fact, this is far from a compulsory shape on a standard gauge line either, but we have seen it done on models so often that it has become a default position). With our particular subject, this may not necessarily be the best way forward. Indeed, moving away from this shape will lift a model away from the norm, as it will not pander to the viewer's expectation.

The other plus in moving the loop to another position is that

operationally it creates a secondary stock move, as the rake of coaches and so on have to be shunted forward or back to complete the run-round manoeuvre, as opposed to leaving them in the platform to do this. You would, though, be advised to think why it would actually be done this way. In the case of Aberllefenni, the loop is arrived at before reaching the platform and instead of it lying opposite the platform face, it sat on the platform side of the running line, essentially extending the same physical space as the platform. This was almost certainly due to the fact that the station site sat on a narrow shelf – the standard arrangement of platform/running line/loop would have required more rock to be removed, but tucking the loop before the platform did not.

As with all these initial planning considerations, looking at the whole picture of traffic and likely geology as one will provide the most realistic scene. The passenger train would reach the platform, unload, then the coaches would be run back into the loop before running round. Then the rake would be pushed back into the platform. This is the legally correct set of moves, though you may suspect that certain shortcuts were employed such as the passengers joining the train in the loop to avoid the extra shunt.

FAN

The last is the fan shape as described earlier – the most well-known being Towyn Wharf station on the Tal-y-llyn Railway. This is probably the most awkward operational possibility to the modeller, as the prototype working often utilized power modes other than locomotives. If you are particularly skilled, the gravity aspect may be workable, especially in some larger scales, but wagons pushed by men or hauled by horses is one step of technological animation that is not yet with us. This is not saying that it's a bad idea, only that it may not be a good first choice.

Where it may work well is as part of a larger layout, or as an add-on to a smaller one. In essence, this is what Wharf station did. Towyn Pendre was the passenger station for the town and Wharf was the 'goods' station (the current track layout is firmly skewed towards tourist passenger working). This add-on arrangement will work, but on a level baseboard only with two locomotives – one hauling the train in and a second removing it and shunting. Alternatively, the train could be run round in the passenger station and propelled onwards to the fan-shape baseboard. However, note the earlier comment about the ease of propelling slate wagons in 4mm scale.

Bearing in mind these minor reservations, any of the above track shapes will work as a first exercise in small-scale narrow gauge modelling, though for pure operational width, the loop shape will give more movement either as a terminus or a passing station, with the latter providing the greater and more varied flow. There is always the oft-quoted maxim: if in doubt, copy the real thing.

CHAPTER TEN

LOOKING AT THE PRESERVATION PERIOD

THE TIMESCALE

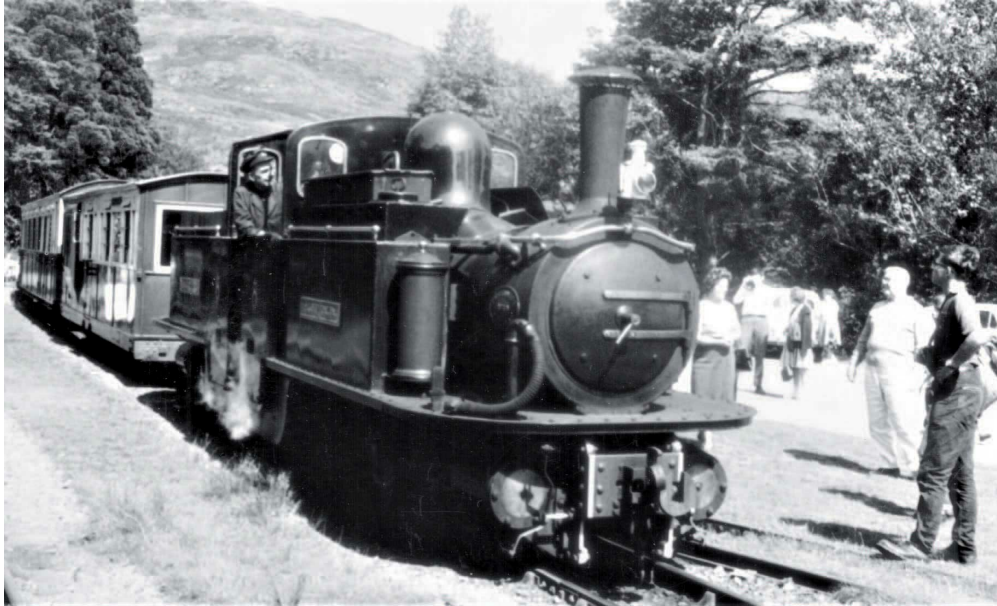
Up until this point, the accent has been on how the Welsh narrow gauge looked and operated in its working historical period, which is where most modellers' preference is more than likely to sit. We are often so engrossed in the replication of the historical detail that it is easy to overlook the fact that we are almost at the time where some of the lines in our group of railways have been in preservation for as long as they were in their traditional working mode. This is, of course, not a clear-cut line, but in general terms the railways began in the 1860s and the preservation movement started in the British Isles in the late 1940s with the Tal-y-llyn Railway.

How does this affect us as railway modellers? You could say that we almost reject this more modern period out of hand – the true faith is seemingly only the historical pre-war or even nineteenth-century eras. The modern is a dirty word. The original pioneer preservationists may be a dying breed, but to them this is a valuable part of the history and it has as much variance and interest as the period before the war. The memoirs of people such as Tom Rolt or John Snell are full of as

much anecdotal narrow gauge railway fascination as for what came before. And in some ways this can be more interesting, since whereas many of the lines operated in much the same way from birth to closure, the post-war preservation period had many more obstacles to overcome, legal, financial and physical. As a result, things could get quite bizarre at times.

THE AMATEUR RAILWAY MEN

There was an element of schoolboy fun and bravado in much of this. During these early years, safety concerns were often brushed aside and it's easy to form an opinion that there was much of a 'homemade wooden go-kart' thinking behind many of the decisions made about the rolling stock. Much of it was made up on the fly with, on occasion, comparatively little real engineering knowledge to back it up. Of course, these early days were not what we would consider to be railway preservation today. New locomotive power was often built around redundant road or marine power plants – none of which tended to last very long, but were adequate for hauling a few slate wagons up the line, carrying the working party and tools.



Merddin Emrys leaving Tan-y-Bwlch in the 1960s.

This was a period of history where anything was possible and no one took much notice of a few grown men who wanted to play at running a railway – and to some extent that is what they were doing. The initial motive was to save the line as a living thing, not to build a tourist attraction. At the time, the idea of paying to ride on a train that went there and back and to nowhere in particular was an unusual one. Only when hard cash to fund the project was required was the thought of charging passengers to ride on the railway begrudgingly considered.

These pioneer preservationists were largely free to do as they pleased with what were mainly now private concerns running on private land with little official interference. There were also one or two well-heeled and well-connected individuals who could provide a little quiet cash or introductions to friendly engineering firms that would offer discounted work rates. This was also a generation that had just fought in a war and had acquired an attitude of getting the job done, relying on teamwork and with as little material equipment as possible. They were people who were used to digging, building and overcoming

nature's obstacles in life or death situations. A few hundred yards of flooded railway line wasn't going to stop them. More to the point, despite what looks today to be a very amateurish attitude, they formed the building blocks of an entire tourist industry with little help from official bodies. Without a doubt, we have to be very grateful to these ex-servicemen of the 1940s and 1950s, because, without them, nearly all would have been lost.

BRITISH RAILWAYS TAKES OVER

There are exceptions to this. Not all 'preserved' railways actually spring from this immediate post-war period. It may seem surprising now, but the fledgling British Railways (BR) (as it was then called) happily absorbed some of the Welsh narrow gauge at the 1948 Nationalization without too much question. The Welshpool and Llanfair had been swallowed up by the Great Western Railway and was thus drawn into the programme straight away. As with many branch lines, British Railways was not overly enthusiastic about its long-term continuation and virtually condemned it in a cost report in 1955. Latterly it was run only as a freight line, but even this was seen as uneconomic and the final official train under its new government ownership ran in 1956. The acquisition of the line was discussed with BR and work to run it as a tourist line was begun in 1959.

Stranger still was the long retention by BR of another ex-Great Western line, The Vale of Rheidol. The line was not discarded like the Welshpool, but seen as a working viable line with full BR funding. The locomotives and stock even carried the corporate livery of BR blue after 1968. The line was sold to a private company in 1989, the first part of BR to be privatized and it remains largely in this state today, now owned by a trust company.

The loser in this post-war scramble was the Corris Railway. British Railways closed it almost immediately in 1948, the locomotives and remaining stock moving to the Tal-y-llyn. A preservation society was not mooted until 1966, too late to save it as a working concern, as the line was by now largely lost, or the land sold in the interim. It has been a long, hard climb to reinstate part of the line and limited passenger services did not run on the Corris until 2002.

THE YOUTHFUL INTERLOPERS

Alongside the preservation of the original Welsh lines are a handful of younger gate-crashers to the party. As the preservation movement grew and more interest in running tourist lines gathered pace, some looked to expand into other venues of operation. There are essentially three in the current group; the Bala Lake Railway; the Llanberis Lake Railway; and the Brecon Mountain Railway. The 2ft gauge Bala Lake Railway was opened in 1972 and runs on a section of trackbed of the closed Ruabon to Barmouth standard gauge line. The mainstay of the motive power is a brace of ex-Welsh-quarry Hunslet 0-4-0s hauling modern purpose-built rolling stock.



Prince of Wales receiving some attention at Devil's Bridge on the preserved The Vale of Rheidol line.



Dolbadarn at Llanberis – a new line laid on an old trackbed.

The Llanberis Lake Railway runs on part of the trackbed of the

closed 4ft gauge Padarn Railway, which originally connected the quarries with Port Dinorwic. The Padarn Railway closed in October 1961 and this tourist line, which has a similar feel to the Bala Lake, opened in 1971. The use of exquarry locomotives gives the impression of being a preserved narrow gauge line, though unless you consider the trackbed as preserved, this is not strictly the case.

The third of the trio is the 2ft gauge Brecon Mountain Railway. This also utilizes a redundant standard gauge trackbed, originally built for the Brecon and Merthyr Railway between Pant and Torpantau. The new railway opened in 1980 and once again initially used ex-quarry locomotives, but is now more known for its impressive stud of American Baldwin and European locomotives hauling purpose-built stock. Therefore, aside from the geographical distance from the other railways in the group, it also has a very different visual feel and plays against the 'preserved slate railway' ideal that the others have.

THE PURE TOURIST LINES

These tend not to figure very highly on wish lists and models of them are rare. The first of these lines is the Snowdon Mountain Railway, which, as its name suggests, is a line that runs up Mount Snowdon. The 2ft 7in gauge line was opened in 1896 and is worked using the rack and pinion system. Coaches are propelled up the line to the summit (the locomotive at the rear for safety reasons) and drawn down in the same way, these days using a mix of diesel and steam locomotives. The lack of operational variety, coupled with the complication of modelling the rack and pinion, means that this is rarely tackled as a modelling subject, which is surprising considering its longevity and attractiveness.



The Great Orme tramway car enters the station at Llandudno.

Similarly, the 3ft 6in gauge Great Orme Tramway in Llandudno suffers from just going 'up and back' despite it technically falling within the scope of this book, being both Welsh and narrow gauge. Fully opened in 1903, it is the last remaining cable-hauled line in the UK. Technically, it is a funicular due to it being hauled up and lowered down and not independently powered. It was originally steam-driven, but converted to electric power in 1932. It has now been fully refurbished using £1m of European Union money and a similar amount from the National Lottery. The gauge of 3ft 6in was common among British street tramways, but rarely used on railways. It could be modelled quite accurately using 14mm gauge in 4mm scale, but once again the simplicity of operation renders it unpopular with modellers.

The final pure tourist line is the Fairbourne Railway on the West coast. Running from Fairbourne to Penrhyn Point, it was opened as a 2ft gauge horse tramway in 1895. The history is a tortuous one, with

several changes of ownership and two gauge changes: first to 15in in 1916, then to 12¼in gauge in 1986, which in the strictest sense has turned it from 'narrow gauge' to 'miniature' (sub-15in is generally accepted to be the break point in terminology). Oddly though, considering its age and the fact that it has a preservation society, it is closer to the slate quarry lines like the Festiniog and the Corris than the younger tourist lines like the Bala Lake.

MODELLING THE PRESERVATION SCENE

Where then does this leave the modeller with the expected fixation on matters historical, but looking for a different angle on the subject? Actually, in a very good position. There are a number of advantages to modelling the post-1950s period and even these can be subdivided to a degree.

The first period to consider is from the late 1940s into the 1960s. A little research is needed and Tom Rolt's book *Railway Adventure* may be a good starting point, as it describes these early days, the mistakes and the mishaps. Although it is short on real technical detail, it will get you straight into the attitude of those early preservationists. There is also an amount of cine footage available on the internet taken by these same people that will give you more information than you can ever glean from a book. This early period is a rich one: rolling stock is wide-ranging, from the dull to the outrageous. Compare this to the fact that most of the working lines possibly only had two or three locomotives. This post-war preservation period suddenly naturally opens up the choice.



Alf is a National Coal Board locomotive built in 1950 and saved from the scrap merchant. Now preserved and modified to work as one of the Tal-y-llyn Railway's works fleet.

There is also the emergence of internal-combustion locomotives. Although they had been used before, the preservationists employed them more enthusiastically, especially for working parties. This immediately widens the modeller's scope of motive power from the historical period.

If you are a fan of vintage cars, this early period also allows the modelling of these in more profusion than the pre-war years. While the poorer working-class quarry workers were not over-blessed with motor vehicles, the fairly well-heeled English businessmen with a passion for narrow gauge railways were, so this gives the modeller plenty of scope to factor these in on a layout. The 1950s and 1960s are popular with modellers of all persuasions and in scenic terms you can have the best of both worlds by representing a freed-up society with more money to spend, with the feel of a 1920s narrow gauge railway.

THE FLARED ERA AND BEYOND

The next period to consider is the 1970s and on towards today. By this time, the idea of preserved railways had solidified with the general public and a trip on one was seen as a natural choice for any family holiday. For the modeller, this changes the outlook dramatically. We have moved right away from the root point of running a Welsh narrow gauge railway for the transportation of slate and shifted full-scale into the transportation of people – not just a few local residents and quarry workers, but numbering into the thousands.



Richard Holder's impressive layout Clydach represents a preserved line set in modern times.



Riding in pre-preservation rolling stock is always popular.

This shift not only alters the way the railway is run, but how it looks. The general scenery is still the same, but as time moved on so the demands of the modern holidaymaker changed. Coupled with this, the railways needed to generate as much income as possible to fund the existing line and, in many cases, expand. These two things added together mean that much of the original building infrastructure has been redesigned, at least internally. Where a building was used for goods, a café now sits. A building originally used for stabling shunting horses is now a toilet block and so on. The rolling stock is larger, more luxurious and there is much more of it, meaning that the old engine and carriage sheds are insufficient for the task.

This shift in building styles is probably the biggest change and one that may well put off the traditional narrow gauge modeller. What this means in visual terms is a move away from the very first point of attraction: the cute and pretty combined with rundown stone buildings. Modern railway companies have steadily erected new buildings; some

of these follow the old ways, but increasingly the old materials for this are more expensive and if you need a large, secure shed in which to store valuable new coaches, a stone structure is not the most financially viable option. As the late Victorian railway companies looked to timber and corrugated iron as a cheaper building method, so it is that our post-1970s railway companies have looked to extruded steel and composite sheets over a preformed steel frame. Efficient and cost-effective, yes, but to a modeller they have all the romantic charm of an out-of-town retail park. The plus in this case is the excuse to run a more varied set of trains, for example the newer, swisher stock with picture windows and smooth sides juxtaposed with a vintage train that has stepped straight out of the 1870s. In fact, it is usual for the rail enthusiast to make a beeline for these and they are often over-subscribed.

The main thrust of this section is to suggest that you look past the closing door of the middle of the 1940s, to the in some ways more varied and instant feel of the modern era. You are free to run any locomotive (within reason), as no one can say that it is not prototypical – running a Southern liveried Lynton and Barnstaple locomotive with a set of Festiniog and Welsh Highland coaches is perfectly reasonable. The rate of locomotive exchanges and weekend visitors is such that (especially with the 2ft gauge lines) nearly anything is possible.



Richard Holder's Clydach again, showing the infrequently modelled mix of Welsh narrow gauge and modern tourism.

There are also more people. Gone is the argument that the line would only run three trains a day as there was only Mrs Pugh and her dog to get on board. With the post-1970s passenger numbers, the rate of trains can be almost better than the main lines.

The last and most important advantage is that you don't need to pore over books looking for that irritatingly hidden detail. You just have to turn up with your phone, watch what is going on, take photos and film everything. All that you need to know is staring you in the face.

POSSIBILITIES FOR PRESERVED LINE MODELLING

So how do we approach a model of this post-war period? There are three distinct possibilities, in visual terms at least.

LAYOUT ONE

This layout could be an early period model based on the Tal-y-llyn or the Festiniog (or even a just-supposing model of a quickly rescued 1950 Corris Railway). The overall vibe would be one of vague dereliction, overgrown in places and with stacks of newly acquired second-hand standard gauge sleepers, along with rail and piles of spikes. There would be the original workable steam locomotive and possibly one or two more home-made creations using internal-combustion engines. Rolling stock would be the original pieces, but slate/mineral wagons would have been altered to fit new uses as working party transport or temporary passenger vehicles. The track plan(s) would be largely unaltered from the original working railway design.

A temporary mobile ticket office (and even a mobile tea van as per the Tal-y-llyn) could be accompanied by gentlemen in long raincoats and trilby or homburg hats, or alternatively in boiler suits, but definitely dressed on the formal side despite the dirty conditions. Only a small number of passengers would be present and would be equally well attired, but less constrained in terms of where they were allowed to stand in safety terms.

On view could be a few carefully chosen road vehicles, bearing in mind that the MoT did not come into use until the late 1950s, therefore many late 1930s cars would still be on the road. The motorcycle would also be more prevalent.

LAYOUT TWO

This could be a mid-period model of the 1970s. Generally, it would be much tidier than the first layout, with a slightly improved track plan that would be more geared to passenger use with fewer sidings in station areas, but now at least one passing loop. A mix of rolling stock would

be present, with older and new carriages randomly diagrammed and freshly painted. Locomotives would be very well turned out, with a 50/50 mix of new diesel designs and steam power. Some of the latter could be quite exotic, in that they may have been imported from overseas lines of the same gauge. This could mean a heavier feel, possibly with spark-arresting chimneys and being more brightly coloured than the home stock.



Modelling an up-to-date scene allows the use of some varied motive power, such as this diesel on the Tal-y-llyn.

A larger number of passengers would be present, with an increase in facilities such as toilets and a café/ gift shop. Passengers would show a shift in attire to a less formal look, many in jeans (flared), no hats and long hair styles. There would be a much more regimented feel in comparison with the first period, with passengers kept fairly firmly to certain areas.

The road vehicles would again pin the period down, with a selection of 1960s models and Ford Cortinas and Vauxhall Vivas from

the early 1970s. It's worth noting that any period is defined by a mix of cars that contain models from the previous fifteen years and not just the current production. If you pick 1975 as your nominated date, there will a few cars from 1960 at least and, unlike today, a few with different colours of paint on one or two panels.

LAYOUT THREE

This layout could be the early 2000s. There is a vast change to our hypothetical station compared to period one. The station site will have expanded due to land purchase. The original station buildings will have either been demolished or redesigned to suit new usage to museum, gift shop and restaurant areas with outdoor seating. There are likely to be new buildings constructed from modern materials that will possibly dominate the scene. A footbridge may have been added to keep visitors away from the track areas, but wheelchair ramps will have been placed where needed. The accent is on pure tourism and the engagement of young families. The passengers in this late period will be very brightly coloured; the flared jeans will have gone, but white trainers and baseball caps will have arrived, as well as the dreaded rucksacks and water bottles carried by holidaying families – something to fill the profusion of large litter bins that now line the platform areas.



The original buildings can be repurposed as gift shops and cafés on a modern preserved line layout.

This is no longer just about preserving the historical railway as it once was; this is impossible, although it is firmly a part of the thinking. It is now more about creating a clean and profit-driven visitor experience. Goods yard areas will have been cleared for increased car parking and buildings, fencing and signage; platform furniture will be highly polished. The carriage stock will probably have a single corporate livery, but there will be a rake of 'vintage' stock marshalled into a separate train. The locomotives will be a mix of the restored and rebuilt vintage items, alongside a new generation of specially designed steam and diesel stock to cover the various traffic flows and, in addition, there will be visiting and on-loan locomotives. The cars will again fix the period, but due to the tightening of testing, the fifteen-year spread is now the outside in terms of age.



Phil Savage's Tal-y-nog. One of the more ingenious layouts of the 'rabbit warren' type.

The final consideration here is to model a brand new station, one not linked to the original passenger line at all, but one which is the terminus to a new line extension. Two or three of these exist either as new stations on part of the old working, or as completely new sections of line. Choosing one of these enables the gloves to come right off and the modeller can be as fanciful as he or she wishes, with edifices of concrete and steel, or new building shapes built from traditional materials.

So, as you can see, modelling a Welsh narrow gauge line in preservation mode takes a little more thought than you may have first envisaged. On the one hand, you are far freer with stock and locomotive types, but the social aspects are more defined, as fashions and road transport have changed at a faster rate in the last seventy years than they did in the previous seventy, making it more important

to choose your date carefully. As a modelling choice, it has a lot to offer and will allow you to do something that is a little different, but with no less detailed research and attention than modelling the pre-war periods.

CHAPTER ELEVEN

SOME FURTHER LAYOUT PRE-BUILDING SUGGESTIONS

LOOKING AT SOME DESIGN FACTORS

If you asked ten different modellers how they would build a model railway, you would without a doubt get ten different replies – there is no right or wrong way. We need to look at all the likely features discussed thus far and decide not only what to add to the mix, but, possibly more importantly, what to leave out. Building a model railway, especially if it is not a model of a real place, is a matter of careful selection. Even if you are building a model of a prototype, there could still be questions around these items. Over time, things get added and removed and if you wanted to represent a spread of time periods, choices would need to be made. Even if you weren't, you may wish to add a certain feature that was not there at the chosen time.

In effect, we are visually composing in much the same way that a painter would. Just because something is built exactly as the prototype does not automatically make it a good model; in many cases, taking elements from one or more prototype situations and combining them attractively will give a better-looking result. The real railway companies build track and buildings to serve a working

purpose, not to form an artistically balanced scene. One example of this would be the southern end of Chirk station on the Glyn Valley Tramway. It consisted of a platform, a track loop, a handy scenic break in the form of a bridge to the south and a goods yard to the north. Perfect in many ways, until you become aware of the Great Western standard gauge station jammed up against the platform and interlacing with the goods yard, making it impossibly large in model layout terms. Taking the initial narrow gauge elements in isolation, though, may make an ideal model in OO9 or 7mm scale.



The less-modelled view. The rear of Dolgoch station building.



A scene on Martin Collins' stunning recreation of a slate wharf on his layout Llandecwyn.

However, discarding something like this out of hand is not a good idea; we have to be subtly selective in the balance between what we see and what we actually need to build. To use the painting analogy once more: a landscape artist will freely take elements from the scene that is being painted, but feel no shame in leaving out an ugly element that will spoil the finished image that is being created. We can easily adopt the same style of thinking.

Changing the angle from which the model is viewed could also alter things dramatically; that is, with a station scene the usual point of view is for the station platform to be facing the viewer. However, this need not be the case and some other geographical or compositional factor may suggest that this is reversed. For example, Dolgoch on the Tal-y-llyn Railway has traditionally been photographed from the side or from the front, but the land falls away sharply behind the station building and this would form a more pleasing viewpoint; looking up to the station, rather than having the rising ground in the way and having

to drop the track level to look down. Having a gently falling front edge to the layout, enabling the viewer's eye to follow the path up to the rear of the station, possibly through trees, would look very attractive. This would also put the rising ground at the rear of the model, which in most cases is beneficial. The downside is that if you want to photograph your trains, this will become difficult, so leaving at least one clear view through the trees and buildings is a good idea.

This particular geographical aspect applies to three of the Tal-y-llyn Railway stations and in several other situations in our given area. There is a school of thought that says that this reversed platform viewpoint only underlines that there is a lack of human movement, whereas, if this lack of animation is hidden behind coaches standing at the platform, it is reduced or eliminated. Naturally, this lack of movement and the issue of whether it bothers you or not is an entirely personal one.

INSIDE OR OUT?

This question of viewpoint is drawn into sharp focus when the decision is made as to whether the layout is to be publicly exhibited at a future point, or is to be a purely domestic beast. This throws in the added complication of choosing front or rear operation as well, but, before looking at that, the viewpoint aspect of the plan should be considered. If, for example, the line runs along one wall of a room and is not to be moved, there is only you – the builder – and possible visitors to the room to consider. If the layout is to be taken out of the home, the viewpoint of the potential audience is paramount. At this point we are entering the world of theatrical display, not to mention trying to be entertaining.

The home layout could be built around the walls of a room and be

viewed from the inside by the viewer/builder. This means that all controls (and uncoupling operations) will be carried out from this inside position. This does make things a lot easier, as the viewing and operation can be considered as one. If the same layout were to be exhibited (and therefore viewed from the outside), the builder/operator no longer has the optimum viewpoint, but still needs to get into the layout at some point for uncoupling and adjustments, though now with the possibility of a line of trees and a hard, fixed back scene in the way. Although these points could be applied to any model railway, they are particularly pertinent to us as the footprint of the line is narrower and more linear than most standard gauge situations.



The classic bridge at Tan-y-Bwlch. This item is easily reproduced in 4mm or S scales using the Wills Victorian Bridge plastic kit.

Many modellers will take a published track plan (or even hopefully take the time to look at the prototype), but the consideration of this ease of operation will be secondary – with often a problematic end

result. The ideal arrangement would be to consider the track plan, operating and viewing positions as one exercise, preferably on paper before the baseboards are even started. The accent is very much on the landscape and visual angle, rather than an operational level that is heavy and intense. Generally, we want to be drawn into the scene in a much more visual way than the standard gauge main-line modeller, who will probably be demanding more in the way of a high level of traffic. This is not to suggest that the standard gauge modeller doesn't like lush green scenery, but more that the narrow gauge modeller will tend to put it higher up on the desirable wants list.

AVOIDING VISUAL FAILURE

This time spent planning a layout, both on the track plan as well as on the way in which the layout will be viewed, will be time well spent. It is more often the major difference between a layout that will convince both you and the prospective viewer, as opposed to one that is a random jumble of ideas that simply copies previous unconvincing layouts. Much of this is down to wanting to get something running as quickly and as simply as possible. In terms of being convincing, the prototype that we are basing our model on is already quite stripped down, which means that the novice builder will tend to add features to increase the operation, thus ruining the illusion of reality.

It is possible to build any of the usual 'model railway plan' track shapes and make them convince the viewer, but thought and subterfuge need to be employed both in terms of operation and visual attractiveness.

CHAPTER TWELVE

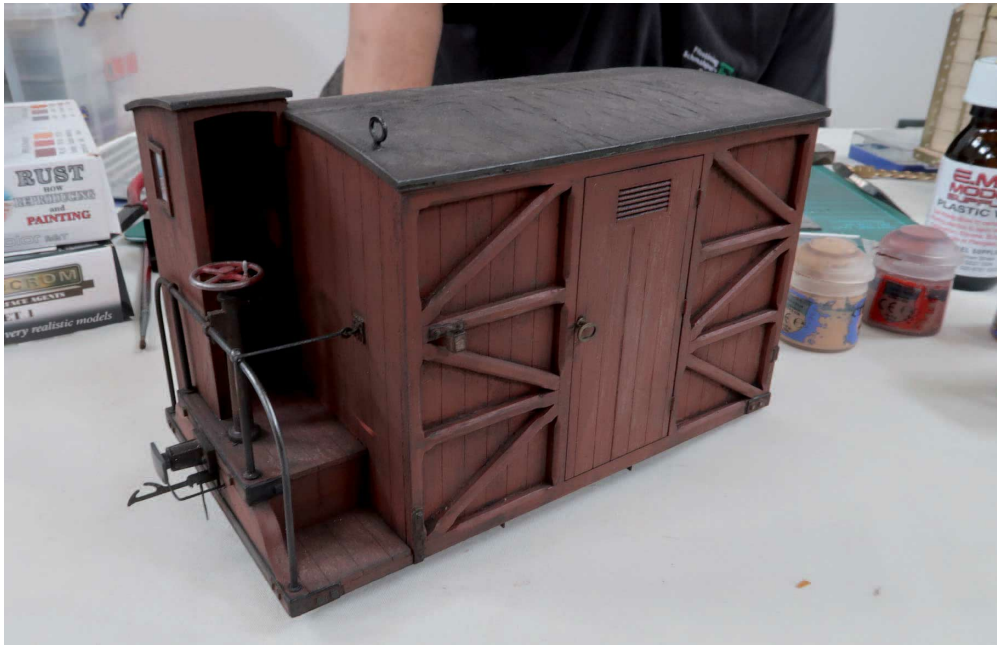
CONSTRUCTING A WELSH NARROW GAUGE LAYOUT

CHOICE OF SCALE

Building any model railway layout is always a set of choices and compromises, from the particular subject matter and how this is presented, through to the materials used and, most importantly, the scale to which it is built. Much of the first and last of these points has already been covered earlier in the book; this chapter covers how this may be achieved in model form. A lot of the decisions will have already been made, most probably before you picked up this book. Choices of scale and gauge are often made at the time of the modeller's initial steps into the hobby and generally stay throughout, though there can also be a desire to do something a little different.

There are three major commercial narrow gauge scales (covered in Chapter One): OO9 (4mm scale); 7mm scale; and 16mm scale. The former is probably the most popular and is still the scale with the most commercial support. The second is almost equal in this respect, but with less RTR equipment available. The last is usually thought of as an outdoor steam-driven scale, but indoor electric layouts do exist. They each have a support society: The OO9 Society; The 7mm

Narrow Gauge Association; and the Association of 16mm Narrow Gauge Modellers.



Large-scale modelling allows you to get into the detail, here showing one of the original Festiniog brake vans.



A scene on Wood End, the author's 'U' shaped layout.

The first choice is often OO9. This will give a high track-to-scenery

ratio and allow for a bigger layout in a domestic space. That said, don't make this a reason to discount the larger scales – if it is the actual building of things that attracts you more than creating a huge narrow gauge empire, the larger scales will allow a little more detail to be added and with 16mm there is the added bonus of live steam and more than likely moving outside into a more natural environment.

The in-between scales may also be considered if hand-building models attracts you. Looking to S scale (the last imperial measurement scale at $\frac{3}{16}$ in to the foot), we have a scale that works out a little larger than OO9 and gets you away from all those commercial kits and RTR. At a metric conversion of 4.74mm to the foot, there is enough of an upward size shift to make some serious scratch-building possible, while taking up little more space than OO9. Also consider that because many 4mm scale scenic items are slightly over-scale, the transition to S scale is not too challenging. Staying with the OO9's 9mm gauge track also works out a lot closer to the Festiniog/Welsh Highland/1ft 11½in gauge than using the same in OO9/4mm.

The 5.5mm scale has roots reaching back to the 1960s and there is a small but enthusiastic society that will supply a small range of kits. Most of the comments about S gauge apply here, with the general difference that the 1ft11½in/2ft prototypes are represented on 12mm gauge track (also commercially available from PECO).

Lastly, if you really wish to go out on a limb there is a small band of modellers working to scales around 1:24 (approximately ½in to the foot). Historically, narrow gauge modellers are an awkward, free-thinking bunch and there has probably been a Welsh narrow gauge layout built in most scales from 2mm upward in half-millimetre increments. So whatever you decide to do, you will be far from the first and far from alone. Someone, somewhere will be doing the same.

BEGINNINGS AND FOUNDATIONS

Once all the layout planning has been done, it really is time to make a start. This can be one of the biggest hurdles for some modellers, as the lure of even more armchair research, even more planning and even more decision-making drags them down a rabbit hole of never getting started. The long-lived piece of advice is just to do something – pick a small thing to make and build up your skill level. This need not be your final piece of work; in fact, don't expect it to be. Just pick up a saw and begin.

The following is only a suggested route through the maze. There are other choices that will be mentioned and many others that will not. This is just one set of ways to get to the end result and is definitely not the only way. This last section explores the construction of a small demonstration layout in OO9 scale; one which is easy to build and easy to complete. It will get you started and is simple to expand, as well as including one or two items that have been built and described earlier on. It is also small enough to scale up directly to 7mm scale, S or 5.5mm without becoming too unwieldy. For instance, taking the largest of these, 7mm scale, the basic board would size out at 1,960mm long by 445mm wide – split across two boards this would still not be a particularly large layout. The plan is based around the 'augmented' track shapes discussed earlier. It consists of a wayside station with a short siding and small engine shed and has Glyn Valley/Tal-y-llyn overtones.

BASEBOARDS

Due to education changes we have now lost an entire generation of people who feel confident handling woodworking tasks. This in itself is

a sad state of affairs and explains the rise in companies providing flat-pack and bespoke baseboards at quite a cost compared to making them yourself. This ready-made route is, of course, an alternative way to this first section and adverts for such companies can be found in model magazines and via the internet. Building your own simple boards from plywood or MDF is fairly straightforward and only requires a handful of basic tools.

MATERIALS AND TOOLS FOR MAKING BASEBOARDS

Materials:

- two sheets of 6mm thick MDF 1,200 × 600mm (or equivalent plywood)
- wood glue
- small wood screws (4 × 25mm) if required later on
- scrap blocks of 50 × 25mm batten timber or similar.

Tools:

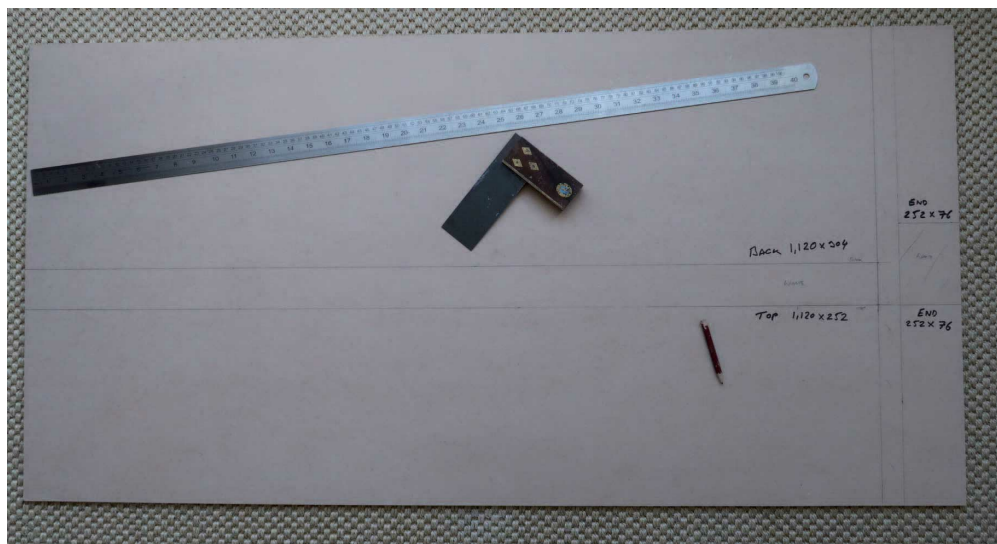
- hand saw
- long straight edge (preferably a 1m rule)
- pencil
- carpenter's square (preferable, but not critical)
- hand drill and bits
- screwdriver
- small hand clamps (often available in discount stores) are helpful for fixing corner blocks.

MARKING AND CUTTING

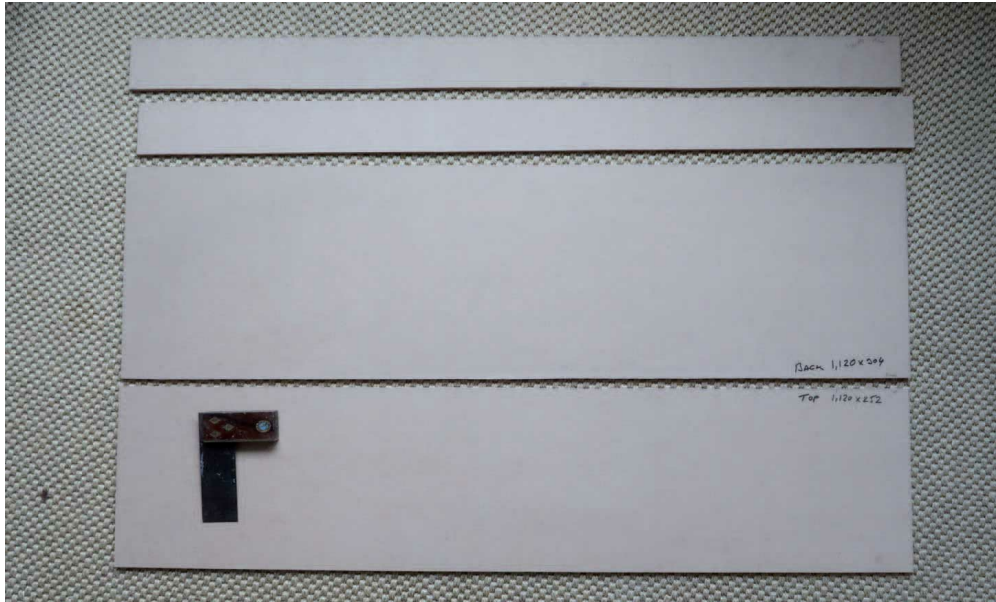
In this case, the baseboard was made from 6mm-thick MDF and was designed to bolt on to an existing section of a OO9 layout. This gave a fixed width of the top of 252mm (10in). Further to this, to make a pair of boards that could be bolted together face to face for transit, the length was also matched to the existing board at 1,120mm (44in). This set of measurements makes it relatively easy to build from sheets of

MDF that are available from DIY stores at a size of 1,200 × 600mm (4 × 2ft).

For the more confident and budget-conscious, a more cost-effective method is to get a larger standard building sheet cut into four of this size by a good timber merchant. The photo shows how the initial parts are marked on a sheet. The back-scene piece at the top of the sheet is the overall length by 304mm high. The end pieces are 240mm wide by 76mm deep. Note that the ends are reduced in length by 12mm to fit inside the side pieces. A further similar sheet is needed for the sides (76 × 1,120mm), front fascia (1,120 × 100mm) and internal braces, which are cut to fit during the build. All joints can be made with a wood glue such as Resin W.



The baseboard pieces can be marked out on an easily available sheet of 6mm MDF.



The baseboard top, the back-scene board and the two long sides (front and back).



The sides, ends and top can be assembled into a simple tray using a wood adhesive. Two supporting cross-pieces can be cut to fit.



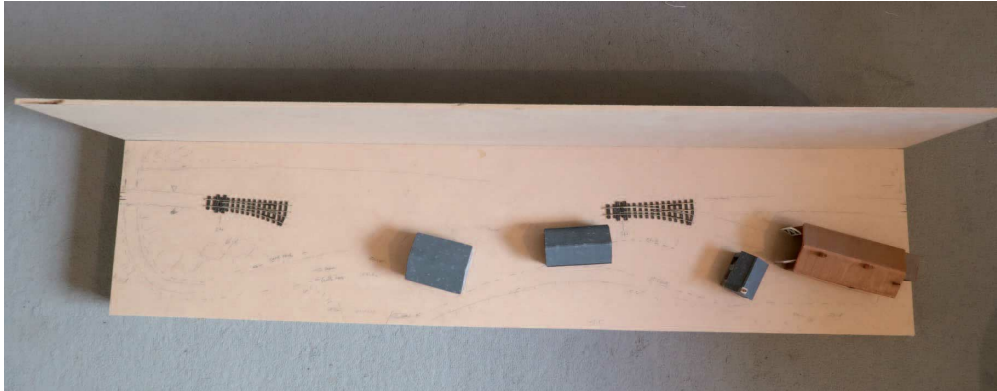
Corner blocks can be stuck on to reinforce the joint. If exhibiting, they can have 25mm screws added for extra strength.

The sides and ends can be constructed on top of the main section as shown. Two further pieces can be cut for the central cross-braces. These should ideally be a little shallower than the ends and have a simple 'V' cut out of them on the edge that goes against the main section. This is to allow for, and to tidy, any wiring. It's easier to cut these out before fitting than it is to drill new holes when the board has been built.

The back-scene board can now be added to the rear if required. The height of this could be less, but the 304mm size does give a firm background and is useful if you are going to be photographing your models.

A rough plan had already been made in this case with the 'augmented' track shape, but there was some time spent moving buildings and track around to see if less or more would improve things. Even if things have been meticulously planned out on paper beforehand, getting the board made adds the third dimension and things can suddenly look a lot different. Here, the buildings made for

the previous projects were put in likely positions, moved around and viewed from different angles. Notably, the arrangement shown here did not become the final one. Be prepared to change a few things to get a better end result. This is not failure, but progress.



When the board is complete, final trials can be done using points and finished buildings or cardboard mock-ups, or even small food boxes to indicate rough shapes and sight lines. This is usually quite a fluid process and will probably go through several versions.

If the board (or boards) are to be used for a fixed home layout, then no further work needs to be done except drilling holes for bolts at the ends to attach to another board. If, however you are anticipating taking it to exhibitions, then it is well worth added some internal reinforcement blocks from 50 × 25mm battening, which are glued into each corner.

This project is, of course, only for demonstration purposes and the board size could be increased by any amount, or even be a little smaller. However, moving beyond a 1,200mm single board length makes it more awkward to move around and the width should not be more than you can comfortably reach across without demolishing the scenic details in the foreground.

This simple MDF inverted tray system will be more than adequate for most small-scale model railways and is robust enough to be taken to exhibitions. There are other methods and materials that you could

use: substituting plywood for the MDF is the first, but anything from a bought-in custom board to an old internal door will work, although the latter does need more work with the wiring, which tends to negate the lack of woodwork. The main thing to avoid is an uneven, twisted foundation and this basic tray design will work for anything up to 1,200 × 450mm without any extra woodwork.

TIP

If you are buying ply or MDF from one of the retail park-type DIY stores, be absolutely ruthless when picking your sheet material. It's generally aimed at people putting backs on to cupboards where a 100 per cent flat board is not essential. Therefore, the quality can be variable. Look down the edges of the boards to make sure that they are flat and have no twists – go through the entire rack if need be to obtain one good board. Trying to build a layout on a wiggly piece of board is asking for trouble. Conversely, the corner blocks are so small that they can usually be made from any scrap piece of battening.

TRACK LAYING



Trackwork at the top of the Tal-y-llyn. Aside from the scenic details, there are several things to note: the colour of the fairly new rail; the point rodding (right); the lighter rail on the disused siding; and the mix of rail spikes and tang bolts used.

MATERIALS AND TOOLS FOR TRACK LAYING

Materials:

- PECO track and points to suit
- track pins
- all-purpose adhesive
- copper-clad sleeper strip (optional)
- solder
- materials for point switching:
 - wire-in tube materials
 - small Double Pole, Double Throw (DPDT) switches
 - alternatively, PECO point motors or similar depending on preference
- layout wire (more than you think you will need!)
- paint of choice, either pots of enamel or acrylic, or aerosol spray cans (see project).

Tools:

- small hammer
- hand drill and drill bits

- pin chuck for small drills
- side cutters (optional)
- soldering iron
- file
- small or snipe-nosed pliers (optional)
- needle files (optional)
- hacksaw or rail cutters.

Laying track for narrow gauge isn't particularly different from any other model track. The prototype is very subtly different, as the photo taken at the top of the Tal-y-llyn Railway shows. The flat bottom rail is/was commonplace with the original lines, as is/was the spiking of the rail to the sleepers as opposed to using chairs and bolts. Other than that, track has to do three things: stay stable; stay in gauge; and diverge at point work without causing the train to lurch or derail. With their higher centre of gravity, narrow gauge railways don't always manage the first (that's part of the charm), but they still must make every effort not to do the second. Some of the Welsh slate quarry lines had truly appalling track-work, with the expected results. The lack of care and maintenance here was to an extent forgivable in a very rough industrial setting, although the passenger-carrying lines did, and do, have to take this track care more seriously, even more so on modern lines with the ever-present health and safety regulations.

Some lines, particularly the Festiniog, have upgraded their track since World War II and run on main-line quality rail, but others, where possible, take a lighter approach. One of the more recent upgrades is the shift to composite (plastic) sleepers. These have been experimented with for a while in order to combat the rotting of the traditional wood sleepers in very damp conditions. This has been successful and while it's unlikely to be a wholesale conversion, they do provide a useful alternative. Ironically, they ape model railway track by imitating wood with plastic.



A mix of sleeper types on the Festiniog. Composite type at the lower and wood in the upper. Also note the use of rail chairs and a generally heavier feel to that of the previous photo.

As with the real thing, laying model track should be done slowly and carefully, while checking with a known free-running vehicle at every stage. Any tendency to rush and cut corners will doubtless come back and bite you later on. 'Smooth and flat' are the ultimate watchwords. Most people will use PECO track for all the narrow gauge scales. All the ranges are good, but there are one or two small differences and it is essential to read the instruction sheets that come with the point units. All the points except the Setrack are Electrofrog and as long as the basic rule of only feeding power in from the blade end is followed and opposing current from the frog end is not allowed, all will be well.

Notes: Only basic 12V wiring is dealt with in the following section. The control by Digital Command Control (DCC) is a much more complex

issue and outside the remit of this book. If you already use the DCC system, or intend to do so, please refer to your operating system manual to see how it can be used for the scale/gauge that you are modelling in.

In this case, the plain track was not being bent around tight curves; in fact, quite the opposite, so pins were only used for the point work. The plain track was simply stuck down with all-purpose adhesive.

TIP

If you wish to include tighter curves – essentially this includes anything under a 250mm radius – then pre-bending of the rail is advantageous. This can be achieved by removing one (or both) rails from the length of track and carefully forming it into a curved shape before threading it back into the plastic chairs. This will take some of the ‘spring’ out of the rail, which if not pre-bent will try to force itself back straight again. Bending while in the sleeper base is possible, but treating each piece of rail individually is easier, especially if very tight curvature is required.

Note, though, that many of the RTR locomotives and stock are really only designed to run round a curve of greater than 230mm, and in some cases greater than 300mm. It is best to refer to the manufacturer’s instructions or check the online reviews of a particular item before you start cranking track down to 150mm radius and then buying an expensive RTR locomotive with a long fixed wheelbase – there will be tears.

TRACK AT BASEBOARD ENDS

If your layout is to be a permanent fixture, simply following the track maker’s instructions will be perfectly adequate. If, however, you think there may be a possibility that it will be moved around, creating a more robust fixing for the track at the board ends is a good idea – while the plastic rail clips are more than adequate for holding the rail on the board, a side-swipe at the rail end will rip the rail out. This is almost impossible to refit. Soldering the rail ends to brass screws is

one method; here though, the copper-clad sleeper strip method was employed.

This involves adding two or three strips as shown, packed out with card to raise the height to match the PECO track. First stick them with all-purpose adhesive and then, as belt and braces, add track pins into pre-drilled holes.



If the layout is likely to be moved, some sort of positive fixing of the rail ends is advised. Here, copper-clad sleeper strip is pinned and glued to the board for the rail to be soldered to. Notice the card spacer to bring the thickness of the strip up to match the PECO plastic sleepers.

Once the copper-clad strip is stuck down and pinned, the track can then be soldered to it (refer to the earlier chapters with regard to soldering techniques). The last part of this is to gap the sleeper strip to avoid a short circuit, as the strip and both rails are now electrically bonded. This is just a case of running an oval or triangular file across the centre of the strip until the copper coating is broken, thus electrically separating the rails. Make sure any traces of flux are wiped away with a damp cloth before painting.

TIP

Cut all track pins in half with a pair of side cutters to avoid them bending – they will still be sharp enough to cut into the MDF, especially if they are fitted into small starter holes. PECO pins are recommended here as they are thinner and therefore neater than some other more obese makes.

FITTING POINTS

The PECO point unit range is long-lived and robust. The company supplies not only downloadable point plans that will help with track planning, but also includes a comprehensive set of instructions with each unit. Although it is possible simply to lay the points on to the baseboard and operate them by hand, most modellers like to back up the power being transferred through the point blades with some sort of switch. This is because the act of changing the point causes the blade to touch the main (stock) rail and transfers the power to the left or right outgoing track at the other end. In time, the blades will get dirty – or are painted – and this power transfer can become intermittent.

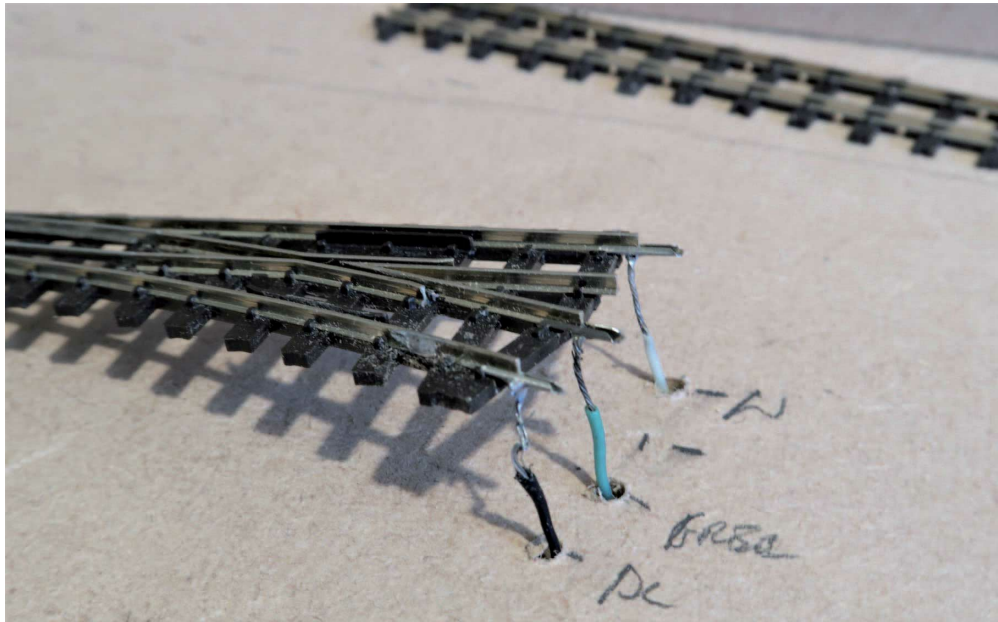
Adding a simple switch, either within some point motors, or externally, reduces this problem. Here, the cheap and simple method of using a DPDT slide switch has been used. This can easily be attached to a wire (or a wire running in a tube), which will also throw the point blades across; changing the point and backing up the power transfer at the same time.

WIRING THE POINT TO A SWITCH

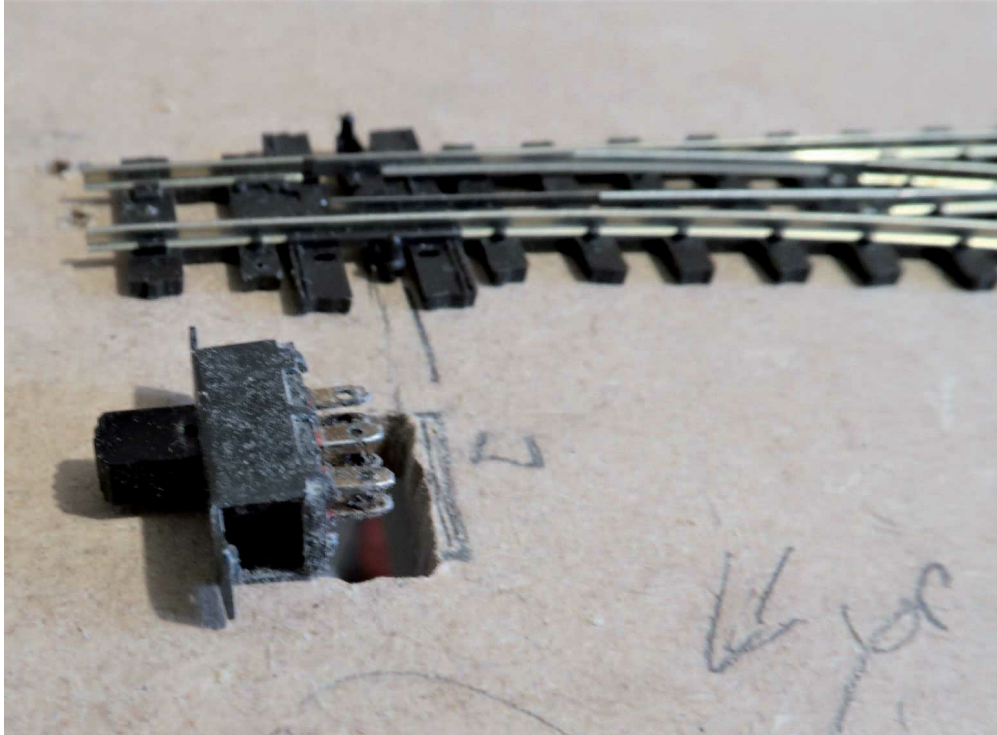
Wiring the point to a switch transfers the power going into the nose (frog), which will be either + or –, and moves it to one or other of the stock rails. We need to run three wires from these three rails to the switch – preferably using colour coding so that they are easy to separate visually. The photo shows this carried out with the wires

passed through holes in the baseboard at the position of the end of the rails. (Note that some PECO points already have a wire fitted to the underside of the frog, meaning that the hole for this requires a hole to be made directly below it. An extension wire can be soldered to this to reach the switch.) Here the switch is mounted up against the point for clarity, but using a wire in a tube would mean that the switch could be mounted much further away at the front or rear of the board.

A hole to match the size of the switch body can be marked and cut (using the chain drill method described in earlier chapters). Then drill a small hole through the 'handle' of the switch to allow the operating wire to pass through.



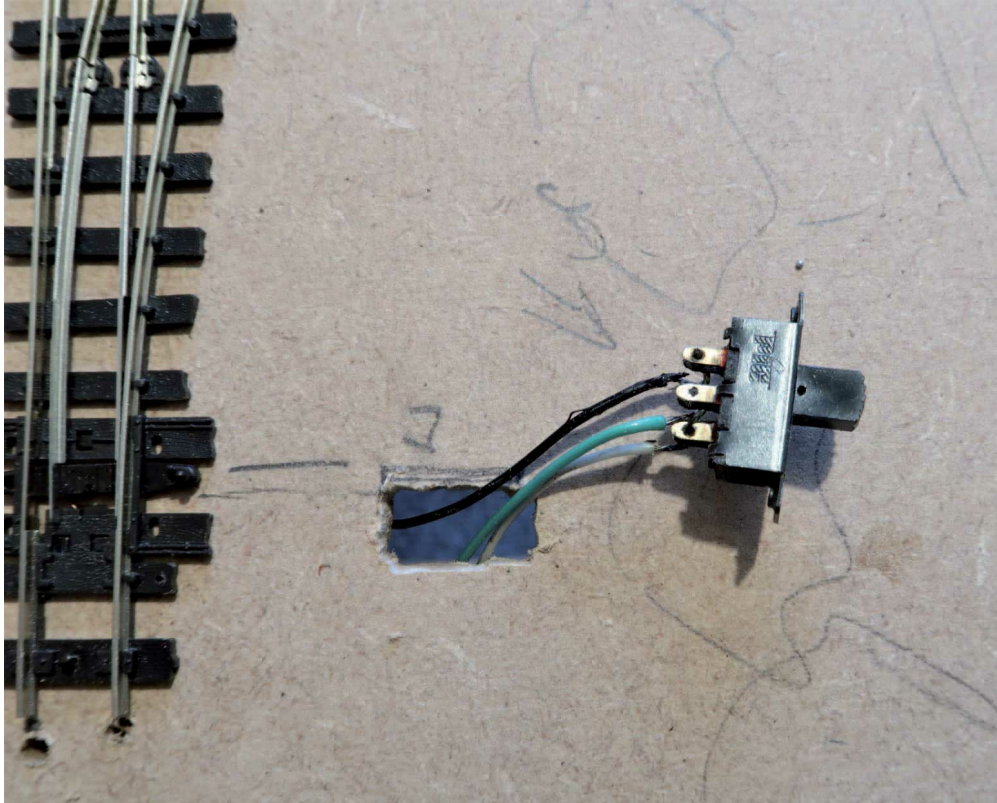
Wires are soldered to the fishplates at three rail ends – both the outer stock rails and one of the rails leaving the frog (nose). Make sure that these are colour-coded.



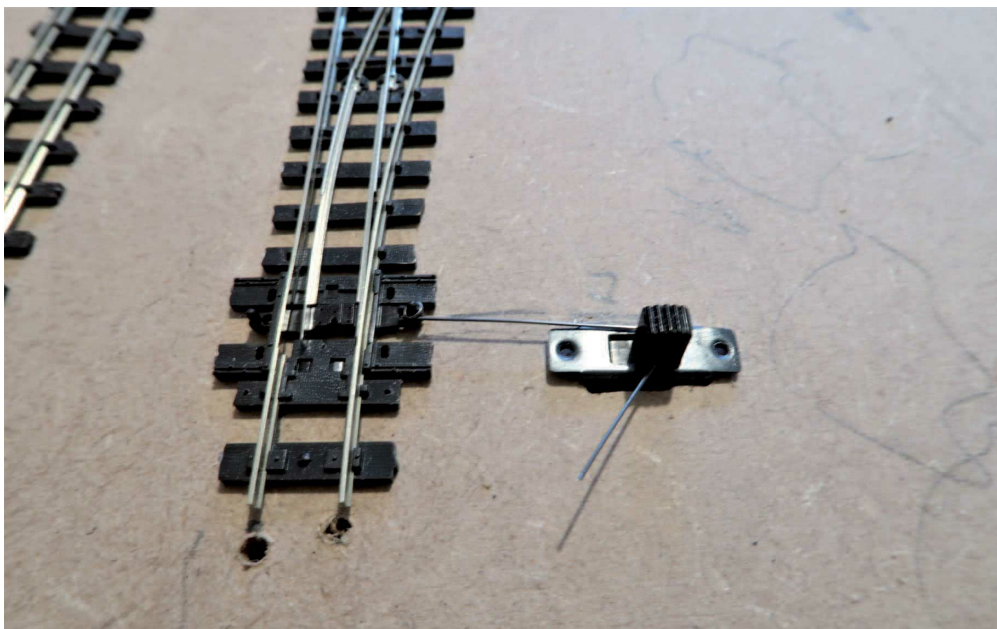
A hole should be opened up to be a snug fit around the DPDT switch. Line the edge of this up with the tie-bar if you are working this closely.

The wires previously soldered to the heel of the point can now be passed through the baseboard and soldered to the three poles on one side of the switch. Using the colour-coded wiring, establish which way round the switch has to go (that is, that it matches the order at the point) and fit it into the hole. If the opening is snug enough, no further fixing may be needed, but small screws can be added.

Test the point electrically at this juncture. Add power to the toe of the point and move the switch and point blades back and forth. They should work when the position is the same and should cause the controller's short-circuit cut-out to activate when they are opposing. If this is wrong, turn the switch around and test again. If it causes a short circuit in either direction, the problem is likely to be two wires touching underneath the switch. Fix this and run the whole test again.



The wires from the point can be soldered to the three tags on one side of the switch.



The connecting wire can be attached to the tie-bar and threaded through a hole in the switch handle. For more remote mounting of the switch run the

wire through a tube that is fixed either on top or below the baseboard to suit.

Finally, add an operating wire from the tie-bar on the point to the switch handle, passing the wire through the hole. The PECO points for 9mm gauge match the throw of the smaller commercially available DPDT switches and the 16.5mm gauge track (for 7mm scale narrow gauge and so on) matches the larger switches, although some tweaking is usually needed. There is not normally any need to add an Omega loop into the wire in this instance, though this will take up any slack. Suitable 'piano' type wire and tube to match is available from most of the major tool sellers such as Squires or Eileen's Emporium, or through good-quality model shops.

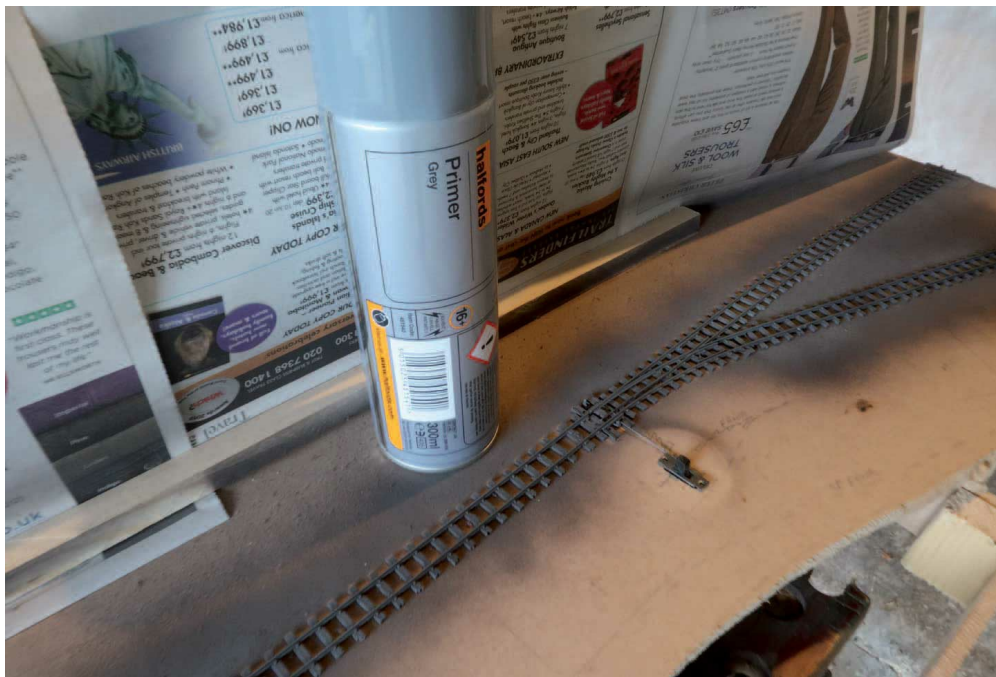
OTHER OPTIONS

This is not the only way of doing it. The use of solenoid motors to drive points is another tried and tested method. These are made by PECO, SEEP and Gaugemaster among others. The former is designed to use with their points, but does require a large hole to be cut or a further extension kit to be used. There are also 'slow motion' point motors, which have a small motor and gear set mounted inside a plastic box. These, such as Tortoise and Cobalt, are bulkier and more expensive than the solenoid type.

PAINTING THE TRACK

One thing that can set a model railway apart from a 'train set' is the track. The smaller narrow gauge scales often suffer from adapting the track from a smaller scale, with the result that there is something visually wrong. Much of this is down to rail height, as traditionally the rail section has been a little overscale for all scales and gauges. This is an improving situation, but narrow gauge modelling still seems stuck with it and often the only way to get away from this is to build your

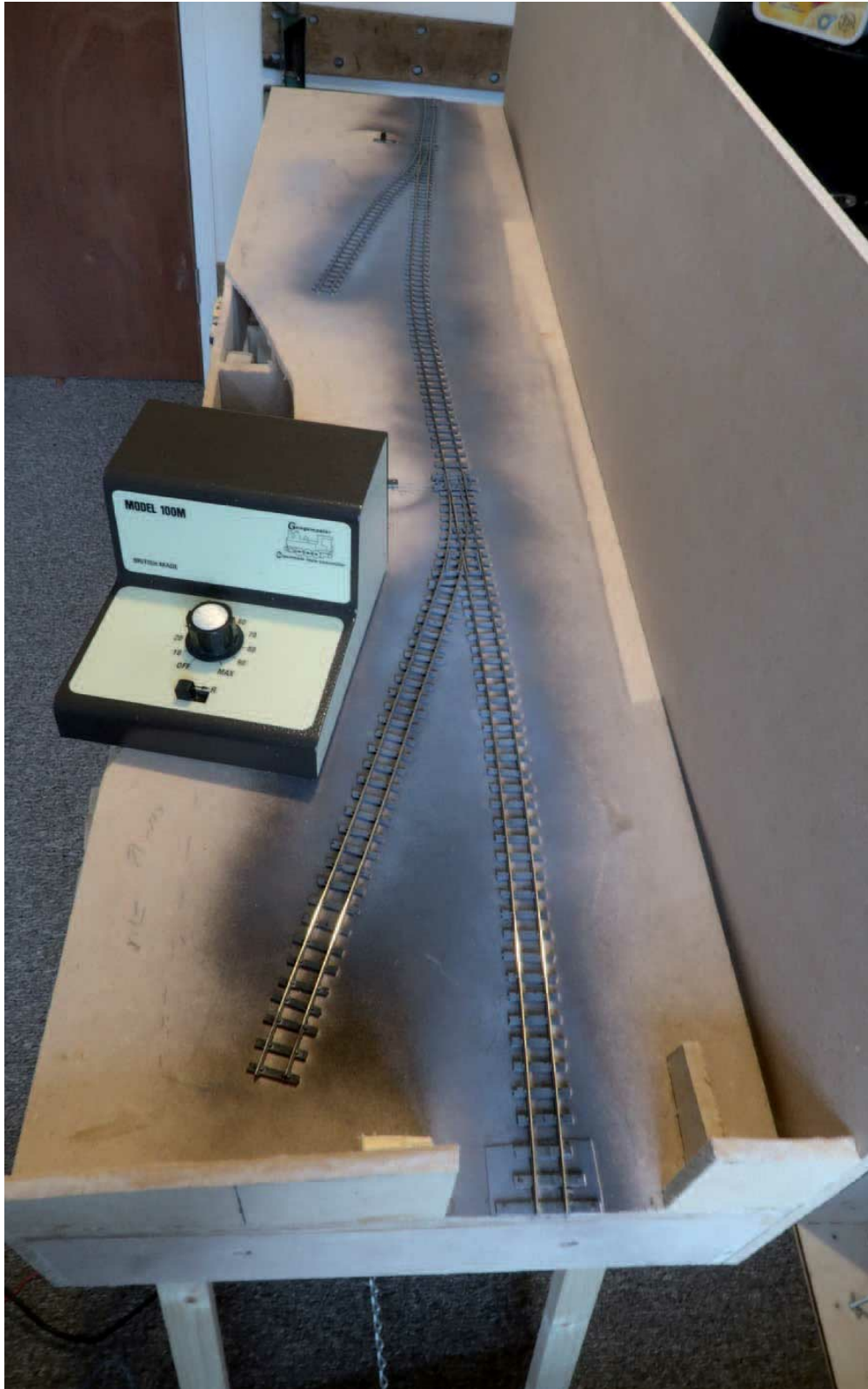
own. The percentage of people who are happy to do this is still relatively small and the vast majority will be content to use the commercial products. As the problem is a visual one and not really linked to a technical issue, a little sleight of hand can be brought into play. The fact that we usually have a brown plastic track base with a gleaming piece of nickel silver on top accentuates the over-height rail. Drawing these two material colours together will improve things somewhat. You simply paint the track.



The track can be painted with auto spray paints.

BRUSH OR SPRAY?

The old way was to open a tin of grey-brown paint and set to work with a brush – not a quick job by any means. Putting aside any ecological arguments, spraying is a lot faster. Car paints are quite cheap and readily available, and the model companies will supply ‘track colour’ in aerosol cans, though at a slightly greater unit cost. Mixing a few of these will give a non-uniform finish.



Test the track thoroughly before proceeding with anything else.

The usual health warnings are applicable here: the work is best done outside and do follow the warning instructions on the can. Other than that, it is a simple technique and, compared to the brush method, very fast. Here, two automotive colours were used from the Halfords range: Camouflage Brown and a grey primer. Any non-paint areas should be masked off with newspaper and the track should be given a couple of light passes with the can of brown from the sides, followed by a light misting of the grey from above. This will leave the bulk of the track with the first colour and the tops of the sleepers with a sun-bleached silvering effect.

Let the paint dry fully and clean the rail tops off with a track rubber or a cloth dampened with paint thinners. Make sure that the contact point between the point blades and the stock rail is clean, though this is less important with the switch fitted. Leave the paint for twenty-four hours to harden fully and test thoroughly with a controller, removing any traces of stray paint if there are any dead spots.

GENERAL SCENIC WORK

MATERIALS FOR SCENIC WORK

Materials:

- cardboard – scrap material and mounting card as sold in art shops
- paper towels
- newspaper
- emulsion tester pots and artist's acrylics (see project)
- PVA glue
- all-purpose adhesive.

Getting the landscape correct can be tricky, as has been discussed in earlier chapters. The general vibe aimed for here on the

demonstration layout was a rolling landscape with two scenes in mind – the coal yard on the Glyn Valley Tramway and Abergynolwyn on the Tal-y-llyn. Not so they would be recognized directly as such, but more as root inspiration. The choice of basic land-form construction was paper towels over cardboard formers, which is a simple and low-cost choice.

The shape of the ground is made using the card with the spaces in between filled with scrunched-up newspaper. Strips of paper towel are brushed with a slightly dilute PVA glue and laid across. The first layer of this will look awful, but after two to three layers the formation will smooth out.



The back board can be given a couple of coats of primer, or be covered in a commercial back scene.

Allow each layer to dry overnight. The first layer of this was added to the baseboard before painting the back scene using a cheap white

primer for a fairly neutral base. Adding a little blue emulsion to this afterwards is a little less stark than adding white clouds to a blue background. These are far from being the only ways to achieve this and other methods are discussed at length in other titles by The Crowood Press.

The paper-towel method provides a paper landscape with a surface that is firm enough to hold scenic material without adding any weight to the baseboard – critical if the layout is to be moved around. The finished landscaping can be covered in a gloop of green or brown paint to give a base colour. Here, emulsion tester pot Magnolia was tinted with various artist's acrylic paint.

PLATFORM BASE

MATERIALS FOR PLATFORM BASE

Materials:

- artist's mount board
- household filler
- 20thou plastic sheet
- all-purpose adhesive
- paint (see project)
- PVA glue
- Noch black ballast
- ash
- green ground foam.

Narrow gauge platforms vary from the relatively low to the non-existent. The pre-preservation stations often made do with an area of flat earth, but post-preservation raised platforms have become the norm. As the inspiration was the low platforms of the Tal-y-llyn only a thin base was required. This needed a layer of artist's mount board to

be fitted around the track. A simple road surface was also added around it using household filler. The platform edging stones were cut from 20thou plastic sheet stuck on with all-purpose adhesive and painted slate grey. Thin card would work equally well, but stuck with PVA.



Here, basic paper-towel scenery has been put in and painted with a rough mix of artist's acrylics and household emulsion from a tester pot.



A simple card platform can be added and edged with roughly 4mm square pieces of plastic sheet.



The platform surface can be coated with fine cinder ballast.

The whole platform area up to the edging slabs can be coated with a slightly dilute PVA and covered with a ballast or ash mix with a tiny sprinkle of green ground foam to represent some weed growth. The main material used here is Noch black ballast, which, when toned

down with a little ash, looks fairly close to fine slate and cinder chippings. Ensure that this mix is firmly tamped down to make good contact with the glue and be prepared to go over it again, as there will always be one or two places where it hasn't bonded.

SLATE FENCING

MATERIALS AND TOOLS FOR SLATE FENCING

Materials:

- 20thou black plastic sheet
- wooden cocktail sticks or pins
- all-purpose adhesive
- grey cotton
- grey and brown paint (see project).

Tools:

- sanding stick
- small drill

Up until this point the scenic works have more or less been what would be applicable to any rural model railway. What we need to do is add some signature elements. This is the critical part and achieves the often repeated mantra that a layout should have an essence of place before any trains appear. One of the most natural ways to do this is to replicate the slab walling and slate fencing. The latter is easy to make and only needs a few items to do it.

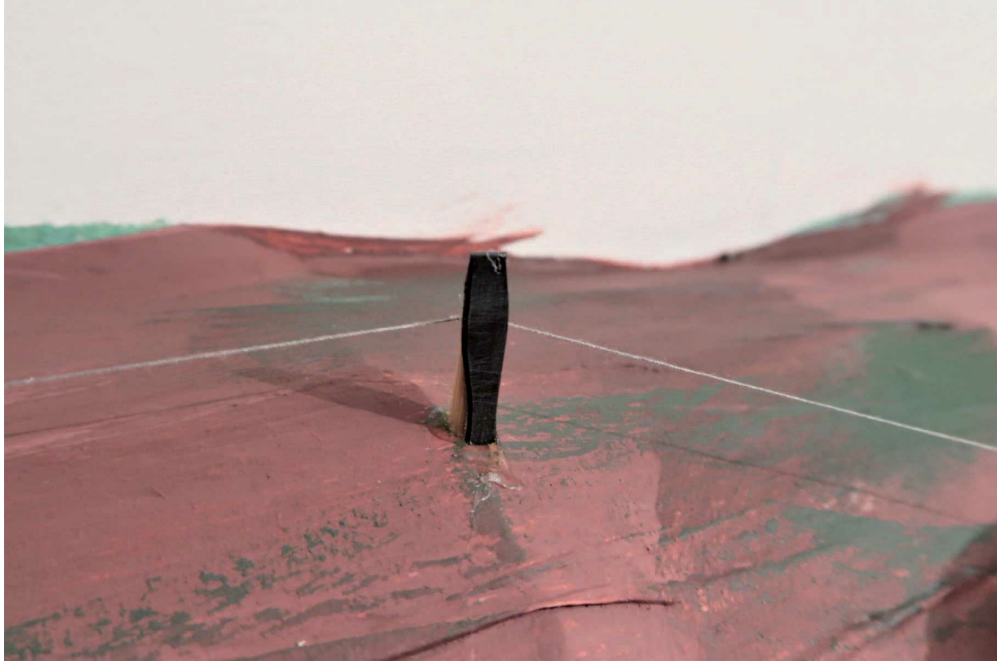
Cut a strip of black 20thou thick plastic sheet 18mm wide. Using a sanding stick or a file, roughen the surface slightly so that it has a texture. The odd small nick can be added as well. Then cut the strip into smaller pieces approximately 4mm wide. Do this freehand to obtain a random effect. Some slate fencing can be quite regimented,

but much of the more rural sections are just rough-cut slabs with no uniform shape.



Slate slab fencing still remains in more rural areas.

Glue panel pins or lengths of cocktail sticks into holes in the scenic base. These can be at around 150–180mm intervals for relatively straight fencing lines, but need to be closer if the line is curved. Allow the glue to set firm, then knot and glue cotton to the first in the line. Allow this to set again, then move to the next stick and repeat, keeping the cotton tensioned. Work all the way along the fencing line in the same fashion.



The slate pieces are stuck to the cocktail-stick posts and then added to the tensioned cotton.



When all the slate pieces have been fixed a wash of grey/brown paint can be applied.

Add one of the pieces of fencing to a stick and work along the cotton line, sticking the 'slate' pieces to the ground and to the cotton.

You will probably only be able to do around 40mm at a time before it starts to get soggy and droops. A little of this is visually good, but making up a section at a time and pausing is best. When you have a completed section of fencing and the glue has fully set, add a wash of Dark Earth (Humbrol 29) and Tank Grey (Humbrol 67). The finish should not be too even, so let the colours mix a little as you do it.

ADDING SOME GROUND COVER

A glance through some of the earlier photos in this book will suggest that much of the lineside vegetation of the area could be described as 'wild'. This is certainly not the tight-clipped pastures of the South Downs. The problem for the modeller – in particular one who is short of space – is that the lineside area on the layout can be quite restrictive. There may be no room for expansive rock faces and large trees with tangled branches. However, all is not lost, as you can create at least an impression of a wide expanse of overgrown mountainside on a small area of baseboard. The range of commercial scenic materials now available is vast and a visit to a few shops and model railway exhibitions will gather some weird and wonderful packets of stuff to use.

We are aiming for a landscape with short, stunted trees, hawthorn bushes, bracken and unkempt grass. Yes, there are areas of sheep-cropped grassland, but somehow even though these do exist, reproducing them plays against us somewhat in the relatively small areas that we have at our disposal. We need to get a visual hold on the sort of ground cover that screams 'North Wales lineside' and this means mixed colours and textures, quite a bit of brown and certainly not too smooth.

START WITH SOME GREEN

Even though there is much rough texture, the base will be something green. The techniques used on the demonstration layout are quite 'old school' now. The reason they were used was to match up to the earlier build baseboard. That said, all of these materials are still much in evidence in the shops, emphasizing the fact that there are several choices for completing this part of the layout.



This autumn scene above Tan-y-Bwlch shows the amount of wild-growing undergrowth that can build up along the lineside.

Scrubby bushes can be formed from either rubberized horsehair or rubberized lichen. This second material has been used for decades and some more 'serious' modellers will avoid it, but it is still useful as a base structure. The former is slightly harder to find – look for the more specialist scenic material stands at exhibitions. Either of these two materials can be torn or cut into small pieces and teased out a little before sticking to the ground surface with neat PVA.



Rock faces contain large amounts of red/orange/oxide colour (compared to the slate wall above in this shot) and the strata are almost vertical.



A selection of ground-covering materials will give a more random natural look.



The ground material can be sprinkled over a dilute PVA mix. A couple of applications may be required.

A point worth making here is that of historical period. Most of the prototype shots included in the book are reasonably contemporary; that is, taken in the last thirty years. Early images of these lines suggest a much less overgrown trackside, because: a) the land was cleared by the railway; and b) there was probably a greater reliance on wood for fuel. These two things combined would make the areas much clearer. However, post-war, things have been allowed to grow more freely. It is a minor consideration, but if you are going for an early feel to your layout, very overgrown trackside will spoil the illusion.

Begin with a palette of colours and textures and start filling in between the clumps of bushes. Use a mid-green as a base and add both lighter and darker colours and thicker textures to suit. The use of home-produced browns is prevalent; tea leaves, both the ordinary and the green varieties, can be dried thoroughly and stored for this use. All of these materials can be stuck down with a dilute PVA mix applied

with a medium-sized brush. The flat type (Chinese) that are found in discount art shops are ideal for this kind of work.

The earlier laid bush material can also be brushed with the glue mix and covered with darker-coloured scatter material. There are several other base materials that can be used, such as wig-maker's postiche and foliage material from makers such as Woodland Scenics. The choice is very much up to the modeller, both in what is readily available and what they find easiest to use. The only advice here is to avoid colours that are unduly bright.

TIP

When deciding on the model's time period, study positively dated photos and take note of the surrounding landscape as much as the rolling stock. Anything pre-war will certainly be cleaner and if you stretch back to the early days of the nineteenth century, the area around the line may well be completely devoid of vegetation. It would have initially been cleared to build the line and would have taken a good thirty plus years for mature trees to establish in any number.

PATHWAYS AND ROADS

Depending on the time period modelled, roadway and paths can be viewed from the same standpoint as the platform surface. Modern roads would, of course, be tarmacked, but even now there are quite a few unsurfaced roads in the areas around our lines. The tarmac is only a result of the increased use of private motor vehicles since the 1960s and should be treated with caution for earlier times. A good starting point for these earlier unmade roads is a coating of a textured exterior paint such as Sandtex or the cheaper DIY store alternative. The colour of this can be modified before or after application with various acrylics or tester pot emulsions.



Pathways can be made with a grey ballast and grey/brown scatter material coating.

Pathways directly linked to the railway were, and are, often lightly surfaced with either old ballast, clinker from locomotive fireboxes, or a mix of the two. The clinker is a useless by-product, so using it to provide a cheap, well-drained walking surface was a logical solution.

The previous platform mix of dark ballast and some ash will work well here, but the addition of dyed sawdust in a grey colour creates a finer, softer feel to the mix. Adding a tiny amount of brown tea leaves gives the impression of the surface fading and mud appearing. All of the approaches to your model station could be treated with various combinations of these materials, or even a painted household filler with sand added as an alternative.

TIP

Keep an eye out for end-of-range tester pots in DIY stores for this sort of

work. Many of the redundant and slow-moving lines can be in the brown or grey tone ranges and therefore more useful to us than to the majority of home decorators.

ADDING SELECT DETAILS – HUMANS

‘Rule One’ is a phrase often used by railway modellers of all persuasions – Rule One being ‘It’s my railway and I can do what I want.’ Fair enough. We are, though, trying to evoke something. Yes, we know it isn’t the real thing, and yes, the steam engines are powered by electricity and so on, but there can be a tendency (and OO9 modellers are guiltier than most in this respect) of overdoing the details. There is often a balance to be found in what we think will be there, what should be there, and what may actually be there. The term ‘selective compression’ is regularly used when discussing model railway layout design; this usually refers to things like leaving a siding out (or similar tactic) to reduce the overall size of the baseboards without compromising the general feel of the scene that we are trying to capture. If we are doing this with track and station sizes, then it stands to reason that we should also apply the same selective compression logic to everything else.

This attitude of compression is quite an emotive one and some serious modellers will say that any compression steers you away from what could be called scale modelling and straight back into the arms of the train set. Perhaps this is true, perhaps not, but if we do selectively compress in this way, the amount of detail, or, more accurately, groups of details, also need to be trimmed. Much of this is down to things like train lengths, which are also linked to the scale you are working in; what we are talking about here is scenic items. The phrase in this regard should be not so much little and often, as

carefully minimal.

The part that the modelling scale plays here is that firstly your eyes will take in a scene of a rough linear width of around 1,200mm: in 2mm scale this will likely be the whole station; in 4mm scale, around two-thirds of the station; and in 7mm less than half. This means that the eye will move along the scene in chunks as the scale goes up. The same set of rules applies to train length. This is not so critical in narrow gauge as trains are usually fairly short, but even so the concept of compressing scenes to fit within this 1,200mm viewpoint is one worth taking into consideration whether you react to it or not.

LOOK AT OLD PHOTOS

A close study of period photos will reinforce this minimal approach; looking at other modellers' layouts in the main will not. One thing that is very noticeable in period photos is the lack of human presence. The most popular period modelled is the interwar years, but this was a time of decline and the possible uplift in passenger traffic to replace the mineral business never really materialized. Crowding your platforms with happy tourists on a model of an ultra-modern preserved line may look right, but taking this same approach and informing your viewer that your layout is set in 1929 will simply appear ridiculous. It is a trap that many modellers fall into, composing beautifully written histories stating that their model is a 'run-down line set in 1929 which is almost on its last legs now that the mineral traffic has gone', then filling the platform with miniature figures of willing passengers complete with hatboxes and suitcases and a couple of children in tow. Your run-down post-slate Welsh backwater illusion is shattered at a stroke.



Even in the current era platforms can be deserted between trains.



A single lonely figure can best represent the interwar period.

This is one reason why the preserved-line concept discussed

earlier is well worth considering if this is the way that you wish to proceed. If your line is to represent something that is somewhat run-down, these little details that we all love to add should clearly represent this. It's surprising how little needs to be added to bring some human activity to a layout and a single passenger waiting on the platform may be all that is required. Likewise, a busy slate wharf with a number of workmen transferring finished slate to standard gauge wagons, or shipping set between 1890 and 1914 may be appropriate; by the 1920s the scene would be very much quieter.

INANIMATE DETAILS

When reading layout-building articles in magazines, the phrase 'adding clutter' will often appear towards the end of the text in the same way that a cake-baking instruction would add decoration. Do we need to do this on a Welsh narrow gauge layout? Subtlety is again the name of the game. Many modellers will add platform barrows, weighing machines and the like to period scenes, but the reality is that they are just not there in the photos. Even modern views are devoid of such items and only the modern tourist necessity, the plastic litter bin, is in evidence.



The platform at Penryn – no passengers, no barrows or other platform furniture, only modern litter bins. Even though the platform is a modern addition, the view is much the same in Edwardian period photos of the station.



Track boarding made from lengths of wooden coffee stirrer.

The reason for this is obvious – theft. With lightly manned, open-site stations, any easily movable item of even low value would soon be removed. Likewise, the modeller’s popular stacks of coal sacks are unusual in photos. Even now, the preserved lines have had to switch back to piles of coal in bins, as the loose item is far harder to steal than something which is bagged up and ready to move overnight. The same will apply to trackside tools. Unless these items are part of a working-party scene, they would be locked up and not left in the open, inviting removal. Even ladders, which are hard to take inside, tend to be tied or chained up.

This is not to say that all these little details should be omitted. Point rodding and/or point throws are almost always absent from small-scale models and yet are all too obvious on the real thing during any historical period. Yes, some minor sidings and quarry point blades could be kicked over to change the road, but this was less prevalent on the sort of lines that we tend to model.

Timber boarding across the lines is also something which is

conveniently ignored and yet this infilling of the track is commonplace. The more modern scenes will use tarmac or concrete, but heavy wooden planks are traditional. This is an easy detail to add, especially since the rise in popularity of the ubiquitous wooden coffee stirrer, which could almost be specifically designed for the job.

Here on the demonstration layout a single section has been scored to suggest a two-plank infill and a section removed from one end. Slivers of the same wood have been used to fill the small gap between the further rail and the platform surface. The wood has been fixed with all-purpose adhesive and washed with acrylic paint (Humbrol 63 and 67). The real boarding tends to sit slightly proud of the rail head, but this is one area where we need to compromise as this would impede track cleaning. Here, the 'planks' have been bevelled slightly along the outer edges so as to sit tightly up against the rail clips on the PECO track and therefore rest just under rail level.

ENGINE-SHED AREAS

Engine sheds are one area that can be treated slightly differently. Although in modern times these have become increasingly health and safety conscious, which means that there is zero unwanted clutter, they are nevertheless working areas and there is, and always has been, a necessary number of bins, tools, lifting equipment and so on that can make for an interesting scene. The more modern will include nylon safety tapes and barriers, not just to keep the public away, but to discourage the volunteers and staff from injuring themselves. Making a small, but relatively tidy area of working clutter just outside a shed will work very well and is easy to achieve.



A small area of engine-shed clutter at Llanberis. Note the pile of ash hemmed in between two walls of redundant sleepers.



A small coal bin has been made up from various bits of scrap and washed with brown and pale grey paint.



The engine-shed flooring from Wills sheet, along with a few strategically

placed items just inside the doorway.



The as yet unfixed engine shed placed on the layout showing the reduced angle of view to the inside.



Hunslet Winifred under restoration at the Bala Lake Railway.

Engine sheds tend towards having their doors open during working hours, so at least suggesting that something is going on inside is a good idea. This can be a simple pile of items just inside the door as shown here. This will stop the eye and indicates that an area is busier than it really is. Similarly, a maintenance pit can be hinted at, not by digging a hole in the baseboard, but by flooring the visible part of the shed interior and stopping this flooring between the tracks just inside the door. The shadows caused by this, coupled with the viewer's assumption, will make the pit seem as if it actually exists. Of course, you could also detail the shed's interior to a very high standard and allow the roof to be removable to show off your work. As always, the choice is yours.

TIP

Don't just study the locomotive and rolling-stock histories. The surrounding items also have a historical root. Depending on your chosen period, be careful with container types around shed areas. Most materials were carried in wooden barrels and chests during the early periods. Although lubrication oil was transported in tin cans, usually of a squarish shape, the use of large oil drums is datable. The standard 55gal drum was introduced in America in the very early twentieth century, but they only reached Europe after World War I and were not widespread until after World War II. Although models of oil drums are readily available, the Welsh narrow gauge railways would have had limited use for them, so to be historically accurate, use them sparingly.

BALLASTING AT LAST

There are two schools of thought with regard to when ballast should be placed on the model: either before the scenery goes in or afterwards. The eagle-eyed will have noticed that the demo layout falls into the latter camp. The reason for this is simple: unlike the modern main-line standard gauge railway with its neatly profiled ballast shoulder, our prototype subject has a rather more cavalier approach to keeping the track in place. In fact, many period photos seem to suggest that the only thing doing this is a luxurious growth of weeds. The ballast has no set shape and runs to a point where it is stopped by another item of trackside equipment, or it will just disappear into the vegetation. In modelling terms, this means that putting the ballast down after other scenic items such as platforms and bridges are installed makes perfect sense, as you can ballast the track and run up to these hard edges in one application.

The modern lines use the same granite chips that the main lines do, but the further back you go it starts to drift into a mix of mud,

stone, slate waste and cinders. We need to try to replicate one or more of those. For the mud version, an application of DAS modelling clay over a pre-laid and set ballast works well; the cinder/ash/slate version can use a mix of commercial ballast materials.

TIP

Use smaller ballast. This is true of most period model railways, but is particularly relevant with our subject. Always favour the commercial ballast mixes that are marked for the scale smaller than you are working in. The manufacturers tend to over-egg the sizing and you can end up with over-scale lumps that make it look far too main-line. If you are working in OO9 scale head for the packets marked 'fine' and 'N gauge', rather than the medium and OO gauge varieties.

APPLYING THE BALLAST

The technique for putting ballast down has been described many times before, but as there are always a few who may have missed this, it's worth running through again.



The ballast can be levelled and tamped down with a fingertip.



The dilute PVA will soak through the ballast.

Mix up a dilute PVA/water solution – to about the consistency of milk – and add a tiny drop of washing-up liquid to this. Leave it for a few hours to bond. While that is happening, lay the ballast. Pre-mix small amounts of two or three types to get an uneven finish. Here, mid-brown and dark cinders have been used. Sprinkle the mix on to the track and level and tamp down with the fingertip. Yes, this is tedious and there are commercial ballast spreaders which may or may not speed the process.

When this is complete, use a small mister to damp the area with water. Adding the tiniest drop of washing-up liquid to this will help it spread by breaking the surface tension in the water. Then, using a dropper or small syringe, drop the PVA/water mix on to the edge of the ballast and let it soak through. Some bits will annoyingly float out of place and will need tidying up later.

Leave overnight and check that the ballast has stuck. It may be

necessary to repeat the PVA/water application to make sure. When all is dry, tidy up those stray bits of ballast and clean the rail tops.

At this point, if it is possible, turn the whole baseboard upside down over some sheets of newspaper and give it a couple of thumps. There will doubtless be an amount of ground cover and ballast that hasn't stuck and will need a further coating. Better to do this now while there is time to fix it than at your first exhibition when you find that the car journey has generated a back seat full of grey chippings and ground green foam.

CHAPTER THIRTEEN

CONCLUSIONS

A LIFETIME OF HISTORICAL STUDY

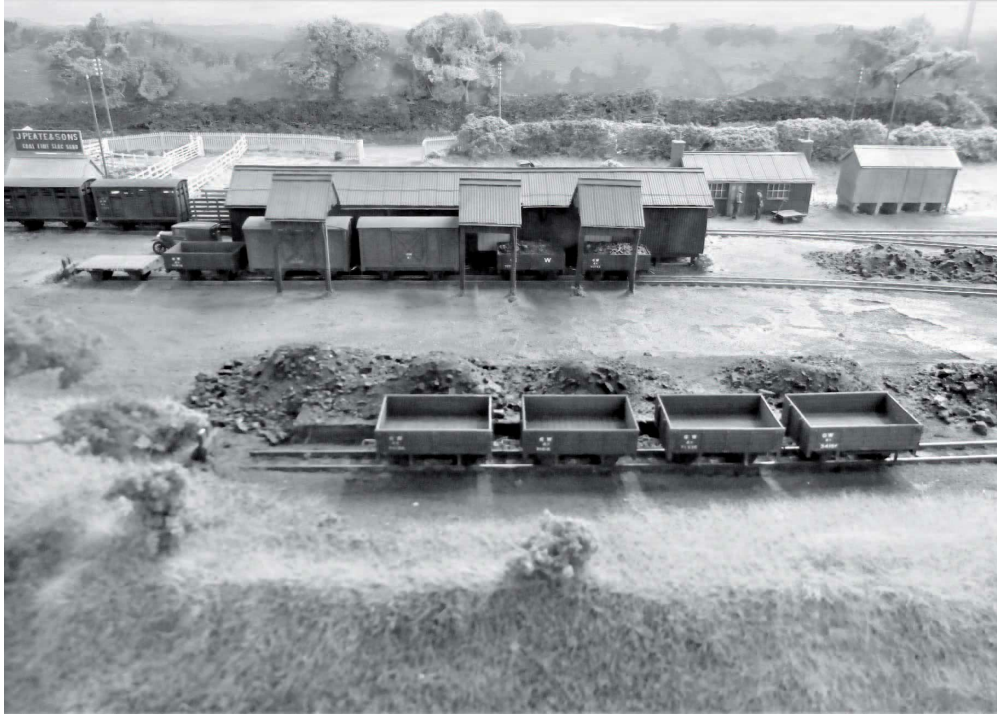
This has very much been an amble through a few basic ideas about modelling the Welsh narrow gauge railways. The overall aim has been firstly to inspire and secondly to point the reader in a few different directions, and possibly also to encourage him or her to think slightly differently. This has mainly been aimed at the novice, or at least at a modeller who is unfamiliar with the subject matter. This doesn't mean that the long-term modeller will not get anything from the book; indeed, much of the surprise on the earlier release of the sister volume *Modelling Narrow Gauge Railways in Small Scales* has been the positive comments from old-hand modellers. The aim has been to create a spark of enthusiasm for a familiar item, or a particular line – either built or proposed – or perhaps lead to a different way of looking at an already well-mined idea. If any or all the above are achieved, the writing of this book will have been worthwhile.

The subject (either modelling or the prototype) is never-ending. In fact, what initially looks to be quite a shallow and small area of British railway history can lead to a lifetime's study. The minutiae of historical detail simply goes on and on, and you will most likely never get to the end of it. And if you think you have, then a box of photos will quietly

appear from someone's loft and end up published in a new book, which will throw doubt on some hitherto cast-iron fact, or alternatively lead you to another long thread of study. This is suggesting that this study is deeply historical – it is, but history starts yesterday.



Gravity train rumbles through Tan-y-Bwlch.



Andy Cundick's Llanfair.

Even the preservation-period lines have gaping holes in their written and photographic records, and as modellers move towards looking upon this era of the subject as more viable and acceptable, this too becomes a subject for study and research. Now the question is to find specific details of preserved and acquired locomotive modification, line extensions and the dates that these happened. The 1950s may not seem that long ago, but it was a time when, unlike now, every person on the planet did not walk around with some sort of camera in their pocket, so much has been missed. The derisory 'geek cloak' is often cruelly thrown over railway enthusiasts in general, but there is a very large grain of truth in this, and they (we) along with other mechanical enthusiasts demand to know the most intricate detail so it can be regurgitated at will. This is unlikely to end any time soon, so the only way to treat the affliction is to provide more and more new and upgraded information.

COPYING OTHER PEOPLE'S LAYOUTS?

Of course, the above assumes that the modeller is interested in delving into the complex history of the lines that we have dealt with. This is not always the case and many people are content just to copy the work of modellers who have come before them. There is nothing wrong with this approach and what often happens is that this in itself becomes its own historical research. While this system of copying can be looked down upon in some circles, it's an honest and fulfilling way to get a good result, in effect using an idea that has been tried and tested. The phrase 'copying other people's models' is often used as an insult, but the methodology of this can work very well. We have to be honest here; there is no track plan that hasn't been built before and all the general layout shapes have likewise already been covered. So being totally original isn't really possible any more. You can take an idea (or ideas) and make it your own, or take selective elements from several layouts and combine them, thus making something which, while not totally original, is different.



Beddgelert Junction by Adam Saunders and Thomas Ashcroft-Domoney.

There are also the ever-present elements of skill, technique and available materials. Railway modelling is expanding all the time and new products to do an old job are appearing almost weekly – so fast, indeed, that it is hard to stay abreast of them all. You could, therefore, copy a well-known layout plan exactly, but use a whole host of newer modelling materials and end up with something which, although fundamentally a copy, is entirely unique. The reverse would also be true by copying a current layout but using techniques and materials that date back to the 1950s – a method that is strangely gaining in popularity.

Any of these approaches will work well. Just because a layout is well regarded, famous and published, doesn't mean that you couldn't better it in one or more aspects. Your skill level (plus or minus) will be different to the builder's and so the final result will always be at least different, possibly an improvement, but undoubtedly your own. Just

because it's been done before, does not mean that you can't do it again.

DOING YOUR OWN RESEARCH

Despite there being a mountain of information out there in books, there is nothing like getting your hands dirty and making your own notes and sketches. The preserved lines of our chosen area are all very welcoming (more so than many of the standard gauge heritage lines) and a quiet word in the right ear at the right time (not at the height of the busy summer passenger season) will often gain you access to an item of stock that is stored out of the way of the public. Measurements can be made and photographs taken, which can be used to make your own model.



Ex-Padarn Railway brake van tucked away in a shed at the Bala Lake Railway.

Although much of the Welsh narrow gauge stock has already been measured, drawn and published, quite a lot of this was released decades ago and is now hard to access; and even if you can root it out, there are still going to be gaps. Further to that, and despite popular opinion, you are unlikely to be able to track down the

information easily on the internet, which is often the worst place to find drawings and dimensions of rolling stock. There is nothing that beats measuring an item of stock, preparing a drawing and making a model that can be said to be entirely your own work from start to finish.

TIP

Even if you forget a tape measure, there is a crude, but useful, way around this. Simply lay a known item such as a bank card on the piece of rolling stock to be measured and photograph the elevation with this in view. The card length can then be multiplied across the photo later to ascertain the vehicle's size. A similar technique can be used with buildings, with a person of known height standing tight up against the structure while you photograph it.

Buildings are notoriously hard to size even with a tape measure, so a photographic measuring stick can be used. This sounds complicated, but is nothing of the sort – it is simply a short length of timber with black and white stripes painted at, say, 1ft (305mm) intervals. This can be stood up against a building, or laid on a window ledge when the building is photographed. This gives an instant scale to the image that can be used to make a sketch plan for model making.

GETTING SUPPORT

Along with many aspects of railway modelling (and rail in general), there are many societies to support this historical research and of course there are the preservation societies themselves. Even if the line has not been preserved, there are often fairly loose (and sometimes transient) interest groups that may hold the information you require. Over the last decade most of these groups have become rooted on the internet in some form or another, whereas before they usually existed via some sort of quarterly news-sheet. Some time ago, the discovery that Facebook was not the preserve of teenage girls and

could be used effectively by interest groups has meant that this is often the cheapest and most effective contact point and will draw in people in greater numbers. The downside is that these new Facebook groups can be quite fickle and be closed down almost overnight when someone takes offence at something that has been said. The upside is the ability to share instantly that 'hoard of photos found in my uncle's loft', something that would have been impossible using the previous news-sheet format.

Most of the preserved lines have some sort of research group covering their line and other associated subjects, or at the very least an archivist who holds photo collections and paper documentation. The Festiniog Railway is particularly good at this with a very active history group, not to mention a Wikipedia-style website called 'Festipedia', which is beyond comprehensive in listing all the rolling stock, with details down to painting dates, as well as many other things that you didn't realize you wanted to know until the information was presented.

THE END OR THE BEGINNING?

Whether you are planning on making this a life-time's study, or just a casual bout of modelling fun; whether you are approaching it as something highly detailed and fine scale, or are happy to use purely RTR rolling stock; or whether you are building a home layout or one for exhibitions, it is probable that the interest will never completely leave you, even if you are not actively modelling at all. If reading this book has been the first step, it will certainly not be the last. Make modelling improvement your goal no matter how small the steps are and it will surely last you a lifetime.

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