



BUILDING PANELLED COACHES IN STYRENE

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Part 1: The Basic Box

Peter No 1 started it. "Bring something to Telford to put on the stand," he said. Now, I see myself primarily as a locomotive builder, but because locos need trains to pull I was in the middle of an extended project to build coaches to run behind my latest creation. I say extended because coaches, by their nature, involve lots of repetitive components. Over time I have evolved a number of techniques that ease some of the repetition, but it is undeniable that boredom can take hold in a way that I find it never does with locomotives.

To avoid that, when I build a rake of coaches I start one, get so far with it, then stop and start the next one. I work on this for a while, then either go back to the first or start a third, largely as the mood takes me. The alternative would be to batch-build all the coaches of the rake together, and while that is theoretically more efficient, it does make the whole process even more repetitive. For Telford, I decided that it would be more interesting to show the set of part-built coaches that happened to illustrate various stages of building than a completed model (after all, it was the Technical Committee stand).

Enter Peter No 2, fellow LSWR enthusiast. "Oooh, those look nice," he said, and then proceeded to drop hints the size of house bricks about how he would like a train of six-wheelers, but all that the trade could supply was a brake van. I had to agree that a train composed only of brake vans would not be terribly realistic. At the same time Peter (No 1) was making noises to the effect: "You really ought to write this up for the Gazette". To cut a long story short, and to keep both of them quiet, this is how Peter No 2 got his train and Peter No 1 got his article.

Anyone embarking on scratchbuilding coaches, as I have done, could do no better than to start with a copy of David Jenkinson's *Carriage Modelling Made Easy*, published by Wild Swan, which, to misquote the TV ad, does exactly what it says on the cover. Jenkinson's writings were what first got me started on coach construction, and have remained a primary source of inspiration and guidance. That said, I have not followed his directions slavishly; in some ways I have deviated quite significantly from his methods. Partly this is just personal inclination, partly it is because he has built hundreds of coach models of many different railway companies, whereas I have built a small number of coaches from the SR and

its constituent companies. Whatever else the LSWR did, from the 1880s through to grouping it maintained quite a consistent style of panelling, and that has certainly influenced my approach.

So these articles will not be a blow-by-blow account of coach building. I hope to include everything of importance, but inevitably I won't go into anything like the detail of David Jenkinson, and still less will I cover his scope. I will concentrate on those aspects where my methods have deviated from his. In every case, if you need more detail or more inspiration, obtain a copy of his book and you will find all but the most abstruse questions are answered there.

Let us consider first the most visible part of any coach: the sides. They are so obvious that they have to be right, otherwise the whole project is doomed to failure. Fig 1 is a drawing of part of a panelled side typical of the LSWR and many other companies, with sections through a fixed window and through a droplight. This figure actually shows almost everything about the construction of a side, and we will come back to it. The construction shown here is fairly typical, but prototypes do vary so check carefully. The side is made up of several layers. The panelling is one layer; behind that is the side itself which in my case is divided into an inner and an outer layer; and behind that there are probably features such as droplight frames. On top of the panelling layer, there are likely to be window frames or mouldings, which Jenkinson has taught us to call bolections.

So we have to build our coach sides in layers. The innermost layer is the one that gives the whole model its strength, and I make this from 0.060in styrene sheet. These inner sides are component parts of a basic rectangular box. The other components are the ends, the floor, and as many internal partitions as can be fitted in. The six-wheelers I am describing and that illustrate these articles were compartment coaches and so an internal partition could be fitted for every compartment; this confers a considerable strength to the sides. For saloon coaches it is more difficult. In such cases it may be possible to bond the seat backs on each side of the gangway, or other furniture to the inner sides and strengthen them in that way, or horizontal strengtheners can be run above window level along the length of the sides.

The inner sides must be pierced where windows are placed. For compartment coaches, I do not cut each window, but instead cut an opening for each group of three, comprising the door droplight and the

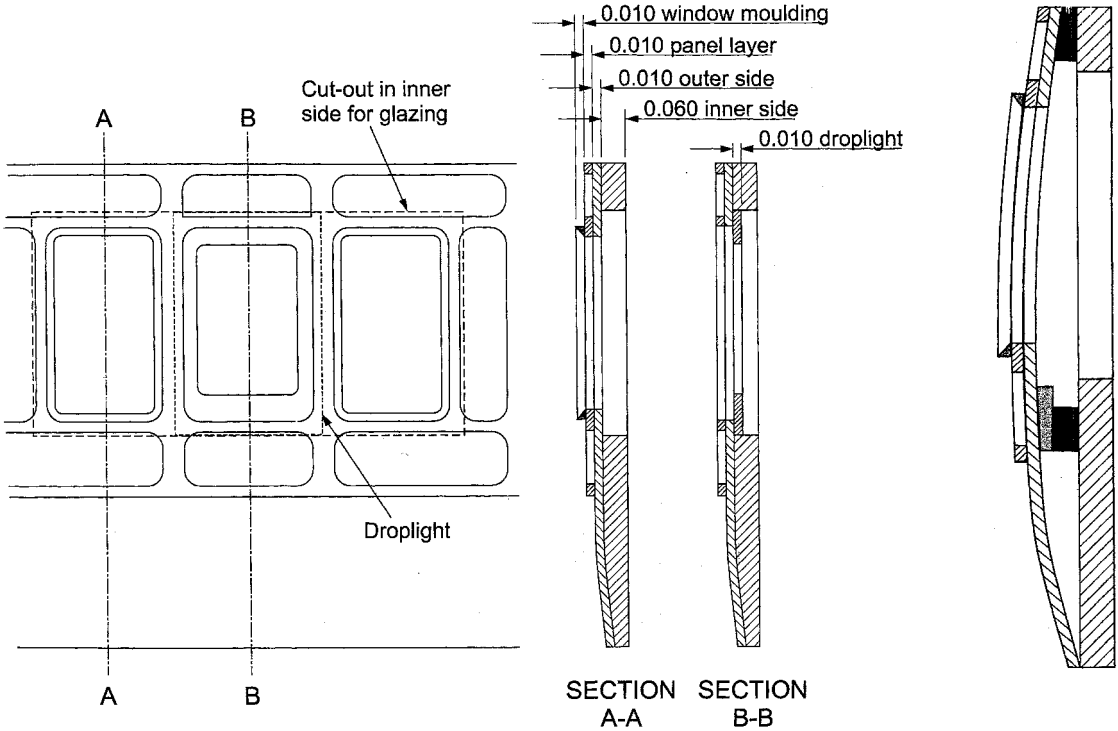


Fig 1

Fig 2

windows on each side of it. The opening is shown as a broken line in Fig 1, and should be approximately 1mm larger than the window dimensions in each direction.

Cutting out the window spaces requires a very sharp knife. I keep a fine oilstone at the side of my workbench, and as soon as the blade shows any sign of dullness, a few strokes on the stone restores the edge. Even on a soft material like styrene sheet it is surprising how quickly this can happen. The blade should cut into the material with almost no pressure, and as soon as you find yourself pushing on the knife, it is time for the oilstone.

Whether the ends fit between the inner sides, or the sides between the ends, is up to you. I have done it both ways and I cannot say that one is necessarily superior to the other in all cases. Sometimes the coach design suggests or dictates a particular assembly. The upper edges of the ends have to be shaped to the roof profile and that might suggest it is better to make the sides fit between the ends. But it is often easier to mark and cut out a complete side without having to worry about making adjustments for the thickness of the ends.

Either way, you should adjust the dimensions of the ends to fit between the sides, or vice versa. The internal partitions of course fit between the sides, and the floor fits between the sides and ends. I make all of these components from 0.060in styrene. When marking out, cutting and assembling, take care to ensure that all edges are straight and all corners are right-angled. The quality of the finished model depends on this.

When you look at a coach end-on, it is apparent that the sides are not flat. The curvature (called tumblehome) varies from one coach and one company to another. Almost always there is some inwards curving below the waistline, and often curvature above the waistline also. The amount of in-curve can vary from an inch or two to several inches.

Jenkinson recommends making the inner sides completely flat, and building up the side using stringers. The outer side is wrapped around these, and by setting the thickness and location of the stringers correctly, the profile of the outer side can be correctly represented. This is shown with the curvature exaggerated for clarity in Fig 2. The stringers are shown as blocks of solid colour and vary with the profile required: the figure just shows the general idea. I had previously tried it with some Southern coaches that had a lot of curvature (something to do with the narrow tunnels on parts of the system, I believe), and frankly found it fiddly to achieve good results, but perhaps I just need some more practice at it. The LSWR coaches I was modelling were flat above the waistline and had quite a small tumblehome below it, and so I decided that an alternative technique was possible.

I set the inner sides so that when the basic box was constructed they were at the maximum width of the coach, less the thickness of the outer sides and the panelling layers. That means that as it stands the coach width is correct above the waist but too wide below. The narrowing below the waist was achieved by thinning the inner layer. Remember that the inner layers started out at 0.060 in thick. They end up about half that thickness at the bottom (Fig 1 again). If the prototype had required any more tumblehome than that, I would have had to revert to stringers and wrapping.

So how do you shape the inner layer? Well, first I tried filing it and the file quickly clogged and I found that I was stopping to clean it all too often. Then I tried abrasive paper and that seemed like it would take forever. Finally I hit upon the idea of scraping. To do this requires a blade that is somewhat more rigid than the usual scalpel, and I found that a traditional penknife was fine for the job. Scraping is an interesting operation. You are not cutting the material directly, but in spite of that, like conventional cutting, the sharper the blade the better it goes. So work your penknife well on the oilstone until you have a razor-sharp edge, and keep it that way. Hold the blade more or less at right angles to the material, apply a slight downwards pressure, and drag it towards you. Like all techniques, it takes a bit of practice to master and if you have never done it before you might want to try it out on some scrap material first. Once you have the knack you will find the styrene sheet peels off in nice thin uniform strips.

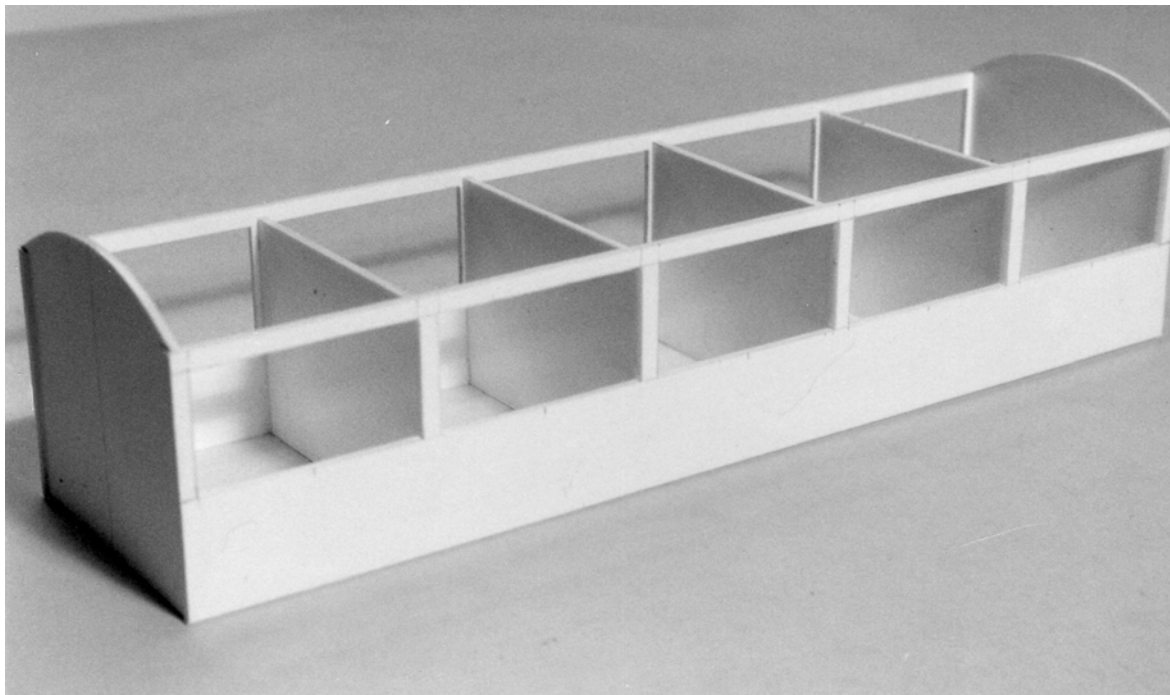
Start scraping at the bottom edge of the side, and when that is nicely bevelled, move up and down the side, scraping away until the correct profile is achieved. Only a very thin sliver of material is removed with each scrape, and so there is little danger of going too far as long as you stop and check every now and again. Finally give the side a rub with abrasive paper to get rid of any last ridges and bumps.

You should now have a nice rigid box on which to build the outer layers. The sides of the box are shaped to the correct profile (or will have the stringers over which the outer layers can be wrapped), and the ends are shaped to the roof profile, be that circular, arc, elliptical, or whatever. At some point you

will have to decide how much interior detail to include. Some people build the interior as a separate subassembly that can be dropped into the box. I find that difficult to do because my compartment partitions, or seat backs in saloon coaches, are part of the strength of the sides. You might be able to do it piece-by-piece, for example by making each compartment interior a separate subassembly. I find that I can build and then paint the basic structure of seats, tables, and so on in situ. Seat cushions, carpets, and other upholstery can be finished separately and added later. Ultimately, it depends on how much interior detail you decide to add.

If your prototype has prominent gutters these can be added as strips along the tops of the sides, and that will also give something to align the outer sides when we get to that stage. We won't be adding the roof for a while yet, but it is worth mentioning. David Jenkinson recommends a roof based on timber milled to the correct profile, which is fine if you have access to the necessary equipment. Failing that, you might find that the trade can supply an aluminium extrusion or a styrene moulding of the correct profile. I make roofs by carving balsa wood to the correct profile, and then covering it with a layer of cartridge paper to simulate the canvas finish of the prototype. If you can, search through the stock in the shop for the best balsa. It should be straight-grained and as hard as possible. An easy way to tell is that hard balsa is heavier than soft. For carving hard balsa, I find a very small wood plane with the blade set very fine to be the best tool. For soft and cross-grained wood, the plane just hacks it about and you have to resort to sandpaper to get the right profile. When carving I hold the balsa along the edge of the bench with one hand and use the plane in the other hand. Stop and check the profile often. Need I say that the blade of the plane should be razor-sharp? I think you've got the idea by now.

Well, that is enough for one instalment. Clearly you need to plan the project before putting knife to styrene, and in particular decide how to shape the profile of the sides: whether to scrape away to achieve the tumblehome or to add stringers to the inner sides. That will affect the size of the floor, ends, and the inner partitions. Next we will move on to the really visible parts, the outer sides and the panelling.



The basic box prepared