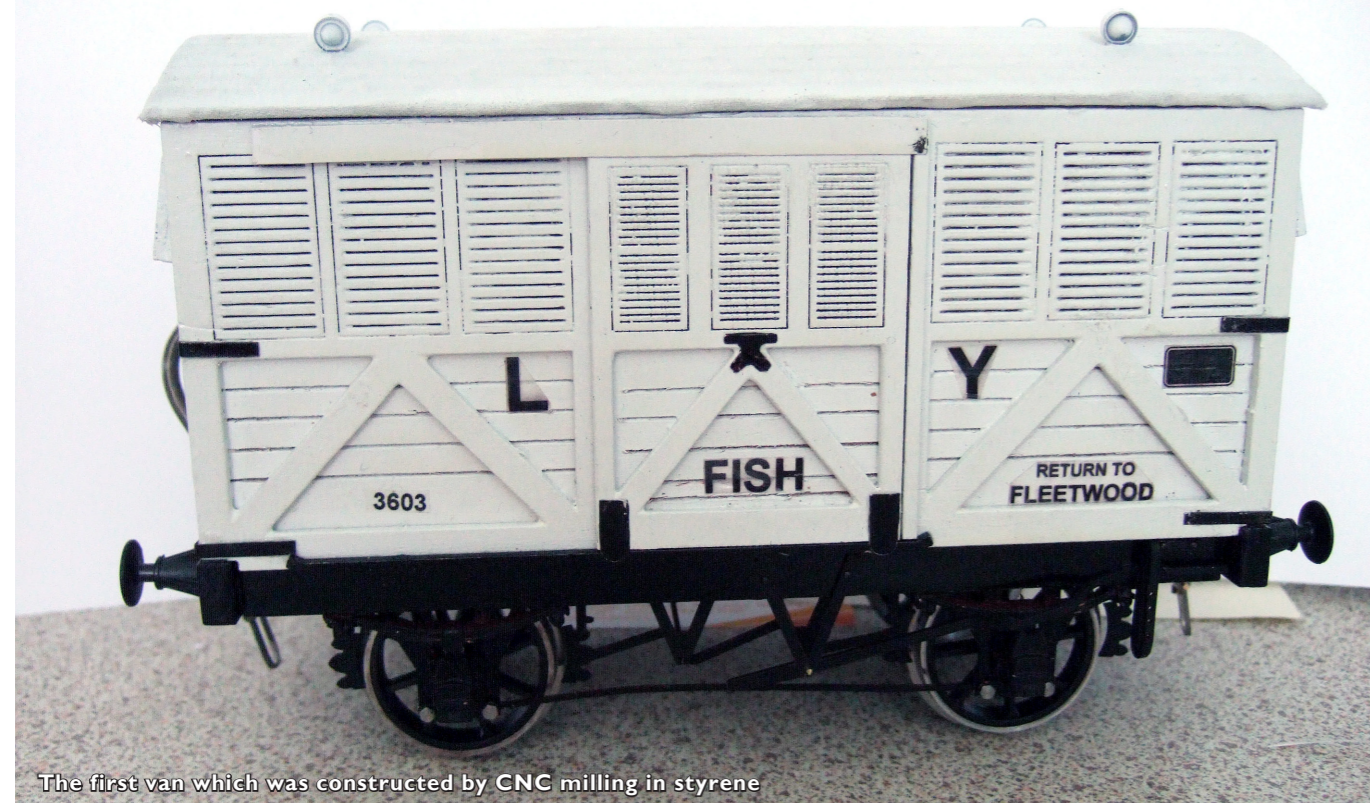


# MODELLER'S WORKSHOP



The first van which was constructed by CNC milling in styrene

## Scratchbuilding by laser

KEITH BUCKLITCH wanted a rake of L&YR fish vans in Gauge 1. He decided the only way to obtain them was to build them as a batch...

I obtained a drawing by e-mail from Noel Coates and set about making my own CAD drawing to 1/32 scale.

### Experimentation

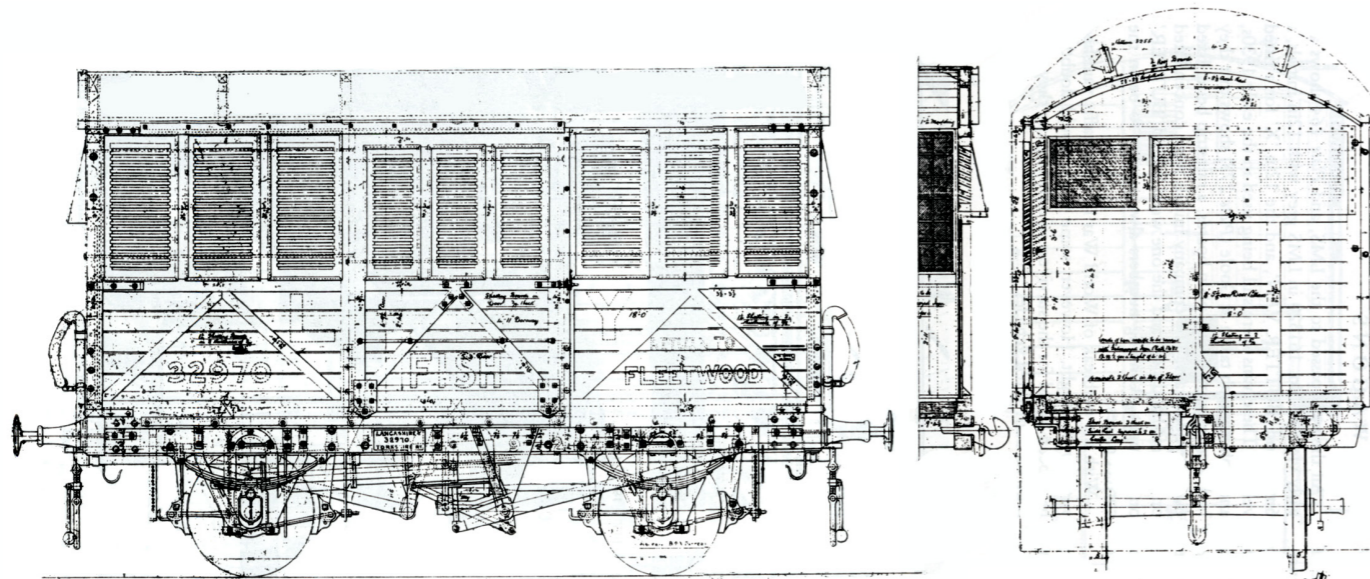
My first experiments were to machine the van body by using a CNC mill, cutting styrene sheet. Using Vectric 'Cut2D' CAM software I soon had the milling pathways determined and commenced cutting the plastic sheet. Initial results were not encouraging, as the styrene melted and then adhered to the cutter which then

snapped. However, once I had discovered that one needed a carbide cutter to mill styrene, it did not take long to cut out the various sides and ends, and particularly the louvre ventilation panels. Using the mill, I eventually made four van bodies, two of which I gave away as Christmas presents and two I kept for myself.

The underframes were assembled using components from Northern Finescale – solebars and buffer stocks, buffers, brake gear, roof vents, vacuum piping and wheelsets. Unfortunately, these

are in 10mm/foot scale and therefore slightly overlarge, but I think the vans are acceptable for all that.

My main criticism of using the milling cutter to form the vans, and particularly the external framing, is that it results in rounded internal corners. This meant one had to file the sharp corners with a Swiss file for improved appearance. I then began to consider laser cutting, as it is possible to obtain nice, acute angles with the thin laser cutter beam. The next decision was what material to use for the



A cleaned up copy of the 10 foot wheelbase L&YR Fish Van drawing No.6647, Order No.P41. Noel Coates collection

van bodies. I considered styrene firstly, as I had previously created a coach in 16mm scale using laser cut plastic sheet. The problem with laser cutting styrene is that it produces noxious fumes, requiring specialised extraction equipment for safety. The firm that I had previously used did not respond to my requests for a quote to produce a dozen sets of parts from my CAD drawings and the only other firm who did reply was too expensive to consider, apart from being some 200 miles away. I then turned to plywood. A small number of Gauge 1 kit manufacturers (and an even larger number of 16mm scale makers) are now using laser cutting to produce their kits, with pleasing results at a very acceptable price (e.g. IP Engineering's Penrhyn coach kit for £35 complete with wheels, etc).

I sought firms in the local area to find one who was prepared to do the work required which entailed laser cutting 1/16 inch plywood. After several fruitless enquiries, I made contact with a member of the 16mm Association who owned a laser cutter, knew the power settings required and was prepared to cut out several sets of van bodies for me at an extremely reasonable price. In fact, our partnership was very useful, as he was able to advise me on the drawing requirements – layers, colours, etc. – as well as methods of reducing the costs by bringing components closer together so that a single cut could apply to two separate components. Now I know that I could (eventually) have made the van bodies by cutting the plywood by hand with craft knife, razor saw and fretsaw, but I did not want to take years over the job, hence my use of modern manufacturing methods.

### Laser cutting

Only a few days after e-mailing the drawings, a parcel arrived containing the laser cut body parts.

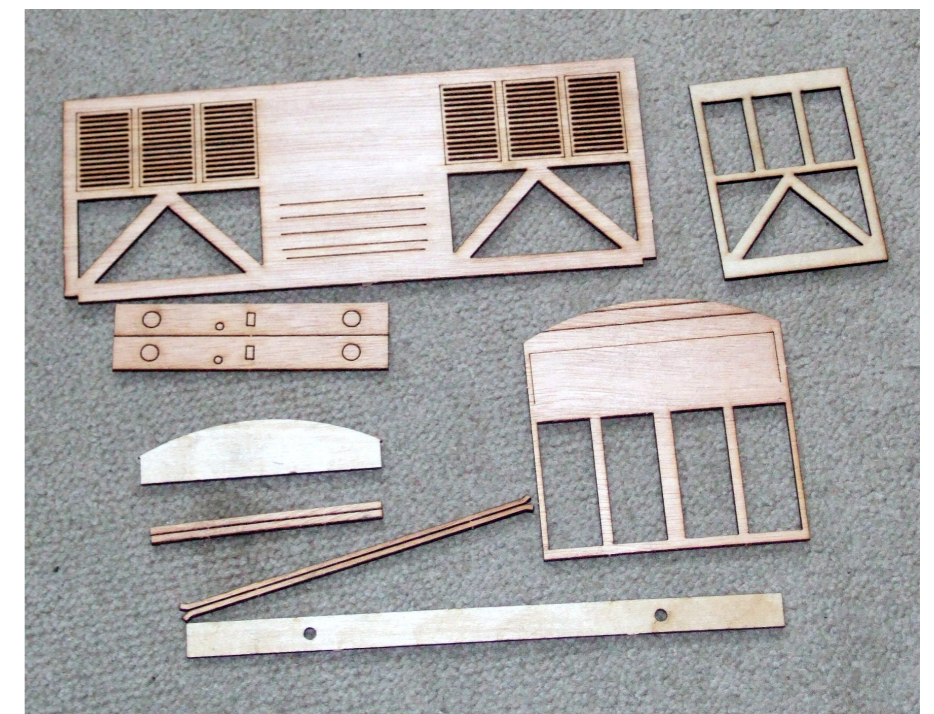
The components seen here are mainly the outer visible parts. The van body is constructed by laminating two layers of 1/16 inch plywood with added details such as doors, door slides, etc. forming a third partial layer.

Briefly, the two layers for the ends were glued together and then the outer side panels were added to make the basic box.

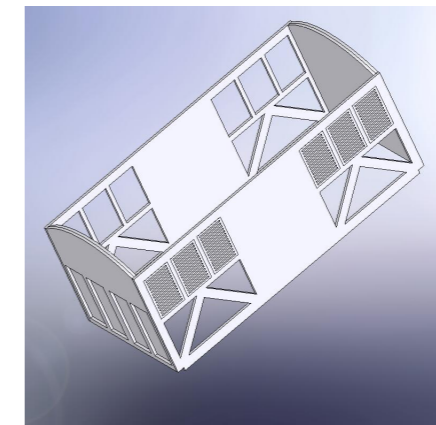
The floor was fitted, then the inner panels checked and glued behind the outer framing. The door was then glued over the outer panel.

Details such as the end vents, the door sliding gear, etc. were then added. The buffer beams were laminated from three pieces of ply to give the required thickness, then glued in place followed by the solebars, also laminated from three pieces. The roof supports were laminated together and fitted in place to produce the almost complete van body, seen here temporarily mounted on a pair of Peter Korzelius' underframe components.

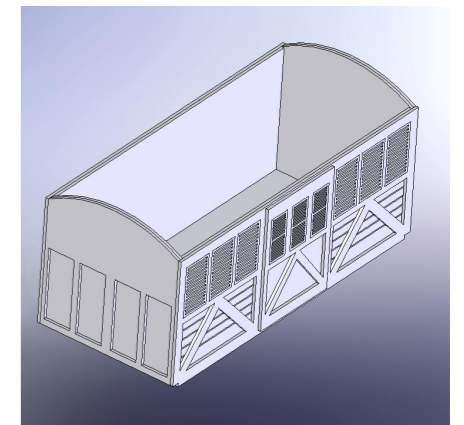
For the additional components, again I used Northern Finescale buffers, vacuum gear, roof vents and wheels, but decided that I wanted a more accurate



Examples of laser cut parts.



3D drawing of the initial assembly – basic box.



3D drawing of the inner panels and floor in place.



Almost completed body.