CONNOISSEUR MODELS

- 0 Gauge Skill Builder Kit -

LNER Toad E, 20 ton Brake Van

The Toad E was the final design of 10'6" wheelbase brake van built by the LNER in large numbers in the early 1930's. They remained a common sight at the end of freight trains into the 1960's.

Wheels, 3'1", 3 Hole Disc (7122) are required to complete, Available from Slater's, Temple Road, Matlock Bath, Derbyshire, DE4 3PG, Telephone 01629 583993.

What's A Skill Builder Kit ?

I am increasingly finding customers who are newcomers to 0 gauge and metal kit building, asking for a suitable wagon kit that will help them to build up their skills and develop construction techniques before moving on to a locomotive. To help achieve this I have produced a set of instructions alongside building a sample model and have tried to describe not only when and where to fit a part but how I did it, detailing the techniques and tools that I used. This text is complemented by, scale drawings, isometric exploded diagrams and illustrations of the finished model. A brake van is probably ideal for this purpose as the variety of small parts; overlays, handrails and varied castings provide the opportunity to develop a wide variety of different building skills and techniques. The quality and fit of all parts in this kit is very good, as good as most and a lot better than some kits that are on the market, but still require a little fitting and fettling at an acceptable level.

To provide a starting point I have made a couple of assumptions about you the modeller. I have assumed that you have done some modelling before and have a basic tool kit. I have assumed that you have mastered basic soldering, perhaps having built some track work and a very simple wagon kit. If this is not the case, all is not lost, but you may find a chat with me about basic techniques and getting started helpful.

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GENERAL INSTRUCTIONS

Please read this section carefully, especially if this is your first etched brass kit. Many modellers fight shy of working in this medium, but the basic skills are relatively easy to acquire. Once you've learned how to form and solder brass, you'll find all kinds of modelling possibilities will open up for you.

Assembling an etched kit involves exactly the same skills that a scratchbuilder uses – the only difference is that the cutting out of the parts is already done for you. Some filing and trimming will, however, be necessary from time to time. Where this is the case, I have highlighted it in the instructions.

The main skill to master is soldering and I would recommend a Weller 40 Watt soldering iron. This has a 6mm diameter, removable copper bit. The bit is shaped like a screwdriver and has a bright coating of solder (tinned). This combination of iron and bit shape is ideal for running fillet joints and has a good reserve of heat, that is necessary for soldering small parts on to large components. Note the shape and condition of a new bit, as this won't last long and will need restoring back to this condition.

It is important to keep the bit clean and in good condition as you work. Get a soldering iron stand containing a damp sponge; old oxidized solder is wiped off on this before picking up fresh solder for each joint. If you haven't made a joint for some time you may find that a hard black crust has formed on the bit. Remove this with a brass wire brush (suede brush) and then feed some multicore solder onto each side of the bit to restore a bright surface (referred to as wetting or tinning the bit). After about 8 hours use you will find the bit is in poor condition, with holes and a ragged edge. File the bit back to its original shape using a hand bastard file and then polish the surfaces on emery cloth. Coat the bit with Fluxite Soldering Paste (traditionally used by plumbers) and this will prevent the bare copper oxidizing as the iron heats up. Then feed multicore solder onto the bit to form a generous coating and leave to bubble away for a couple of minutes before wiping excess off to give a bit almost as good as new.

A smaller Antex 25 Watt iron with a 3.2mm screwdriver bit is very useful for small assemblies and detail work such as handrails, but will have insufficient heat reserve for main assembly work. The Antex has a plated iron bit, after a little use with 145° solder a grey oxide appears on the bit that will prevent you from picking up the solder. Touch the bit to some multicore solder and it will flash over the bit, wetting it so that you can continue picking up 145° solder. I have found no problems with mixing the two solders in this way.

I use 145° solder for virtually all assembly work. I prefer it in wire form, available from Branchlines, but it is also produced in stick form by Carrs. I find that its lower working temperature helps to give a quick clean joint. Limiting the build up of heat in components, which may cause distortion. I find that I can hold parts together with my finger ends and make a joint before heat reaches my fingers or other etched parts drop off.

I use 60/40, tin/lead, fluxed multicore electrical solder (melting point about 190°) mainly to keep the iron bits in good condition. As it gives a slightly stronger joint than 145° I sometimes use it for small spot joints on handrail wire, lamp brackets etc, but still use extra liquid flux.

For all brass and nickel silver work I use Carrs green label liquid flux. You will soon get the feel for how much to use but more problems are caused by too little flux than too much.

Before soldering components together, thoroughly clean both surfaces along the join line with a glass fibre burnishing brush. Using your tweezers or a knife blade etc, hold the parts together in the correct position and, with an old paintbrush, run some flux along the area to be joined. Still keeping the parts correctly aligned, pick up a small quantity of solder on the tip of your iron and carry it to the joint (unlike electrical soldering, when you feed solder into the joint). Hold the iron against the joint just long enough for the solder to flash between the parts. Don't let go of the parts until the solder has cooled – this takes from five to ten seconds. To run a fillet of solder along a joint, wait until the solder flashes between the parts and then pull the molten solder along

the joint with the iron tip. Don't load the iron tip with a lot of extra solder, but work the joint in 1" lengths, bringing in small quantities of solder. Brass is a very forgiving material and if you get something out of alignment, use heat from the iron to desolder the joint before starting again. For complicated assemblies, it is a good idea to only tack solder parts together. You can then make adjustments by desoldering until you are happy with the location of parts and then solder solid.

When you need to laminate two or more layers of brass together, align the parts and carefully clamp them together, either in the vice or by holding them with miniature crocodile clips. Run flux around the edges, and then go around with the soldering iron. Clean up thoroughly afterwards.

To fit small parts and overlays on to a larger assembly, such as strapping to a wagon side, when you need to prevent finely detailed areas such as planking becoming clogged up with solder. Tin the back of the small component first, then hold in place on the model and apply flux. Carefully wipe the tip of your iron on a sponge to remove any solder from it (dry iron), and then touch it against the parts to be joined. After a few seconds you'll see molten solder bubbling from the edges. Remove the iron, still holding the parts in place, and allow the joint to cool. An alternative is to use solder paint (I would recommend Carrs 188 solder paste). As the name suggests, this is a flux and solder in one. Simply apply a thin coat of solder paint to the back of the component instead of tinning. Still apply a small amount of liquid flux before you solder the part into place.

Any surplus solder should be removed using a craft knife, I find No 10 curved scalpel blades ideal, then burnish clean with a glass fibre brush. With practice, you'll learn how to use the minimum amount of solder to do the job. Flux is corrosive so, after each soldering session, give your model a good scrub with washing up liquid or Jif. After a day or two, any remaining flux residues will show as a green film, which should be washed away.

To cut parts from the fret, use a sharp Stanley knife on a piece of hardboard or a pointed scalpel blade on a block of softwood. Remove tags and burrs with a fine file.

Three-dimensional parts are formed by folding. On an etched brass kit, the fold lines are normally half-etched on the inside of the fold. You'll be able to fold most parts using smooth-jawed pliers. For longer parts folding bars are desirable.

Other useful tools include a bench vice, a good pair of tweezers, a set of Swiss files (get a full set of cheap ones and then buy quality replacements for the three that you use the most), a pin vice with a selection of drills from 0.5mm to 2.1mm plus a few larger sizes that you use regularly (2.6mm for axle bearings etc), some square-nosed pliers and some very pointed-nosed ones, preferably with smooth jaws. Buy cheap tools first and duplicate the most used ones with quality.

Try to complete all high-temperature soldering before attaching any of the cast whitemetal parts. These can be attached with two-part epoxy resin such as Devcon or Araldite Rapid. Ensure the surfaces to be glued are clean and free of grease.

A better alternative is to solder your white metal castings using Carrs 70 degree low melt solder and Carrs red label white metal flux. The iron should be run at a much lower heat so that you do not melt the castings. I have a domestic light dimmer switch and plug socket fixed to a piece of wood, wired up with a lead and 3 amp mains plug to the input side of the dimmer switch and the output of the dimmer switch into the plug socket (remember to continue the earth). Plug your 40 Watt iron (25 Watt iron won't work) with a clean and freshly tinned bit into this and experiment with adjusting the switch until you find the range of temperature at which the solder melts, but a scrap casting does not. **Note** as the iron is running at a lower voltage it will take longer to heat up, so when you think the adjustment is correct do check a few minutes later on another scrap casting to see that it doesn't melt. Then scribe a mark on the switch knob to indicate this position.

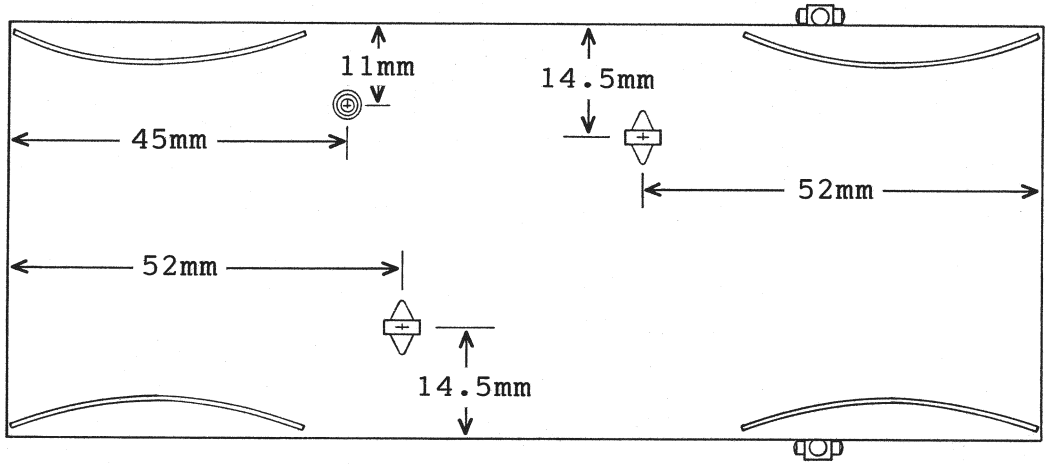
When attaching white metal fittings to brass the surface of the brass must be tinned with 145° solder, to allow the solder to grip. The surface of the casting at the joint should be burnished bright. The casting can then be soldered into place with 70° solder and fillets of solder run into any gaps with no risk of melting the casting.

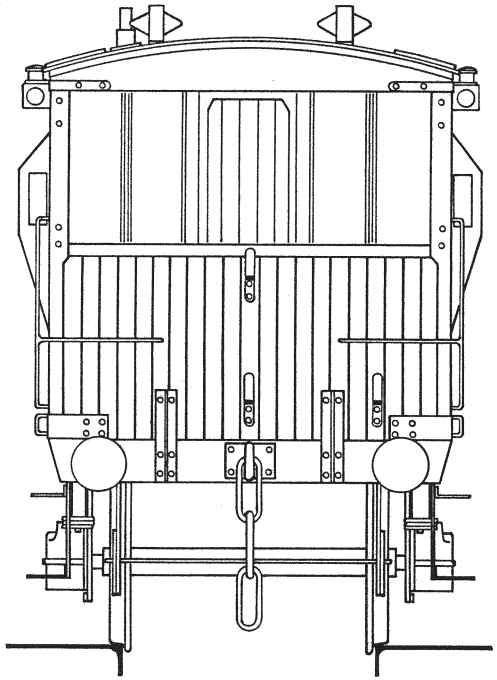
LNER Toad E, 20 ton Brake Van

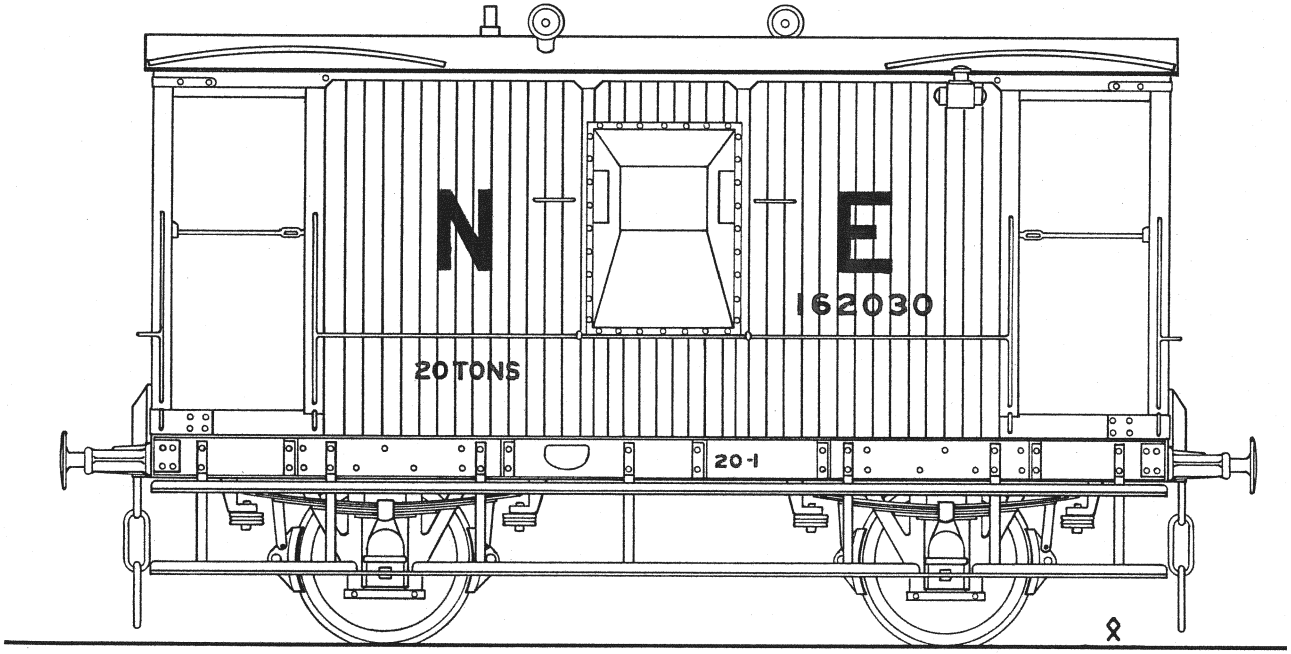
Livery, Bodywork - Red Oxide. Buffer beams, solebars, footboards and running gear - Black. Roof - White lead (probably better as dirty grey). Veranda floor - Dirty wood (Humbrol 110). Lettering - White.

Transfers for lettering are available from the Historical Model Railway Society (HMRS), Voluntary sales officer, 8 Gilpin Green, Harpenden, Herts, AL5 5NR. Send SAE for list and order form. They are also stocked by some specialist 0 gauge retailers. You will require sheet 12, LNER goods vehicle insignia.

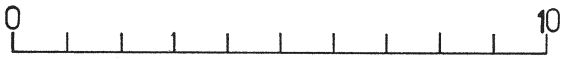
References, A pictorial Record of LNER wagons, By Peter Tatlow, OPC, ISBN 0-92888-92-7.
British Railway Wagons No 5, Cattle and Brake Vans, Cheona Publications, ISBN 1-900298-05-8, two photos of vans in BR livery. Get these books from your local library via their book order system.

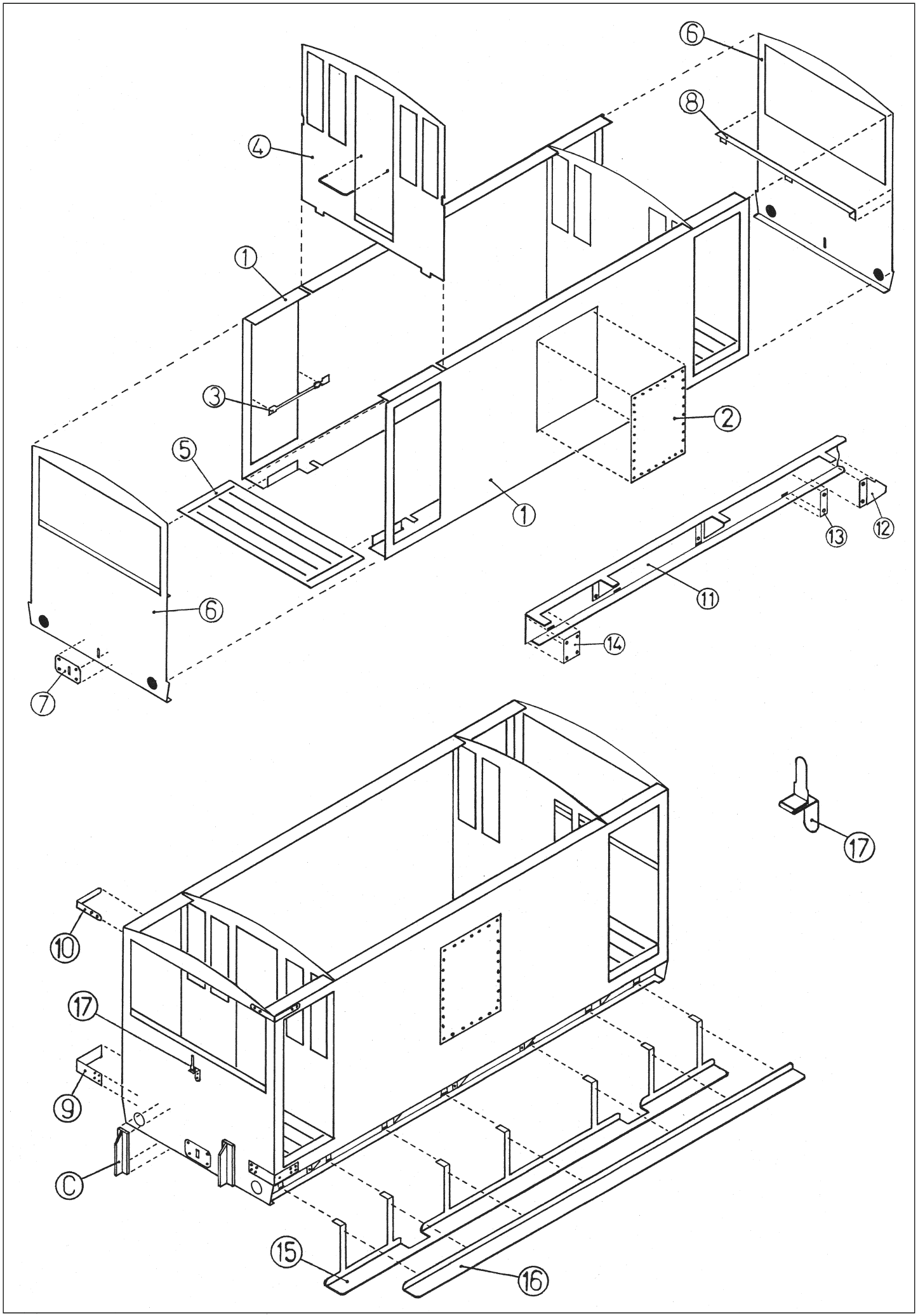






As this is a photocopy the drawing may not be exactly 7mm scale

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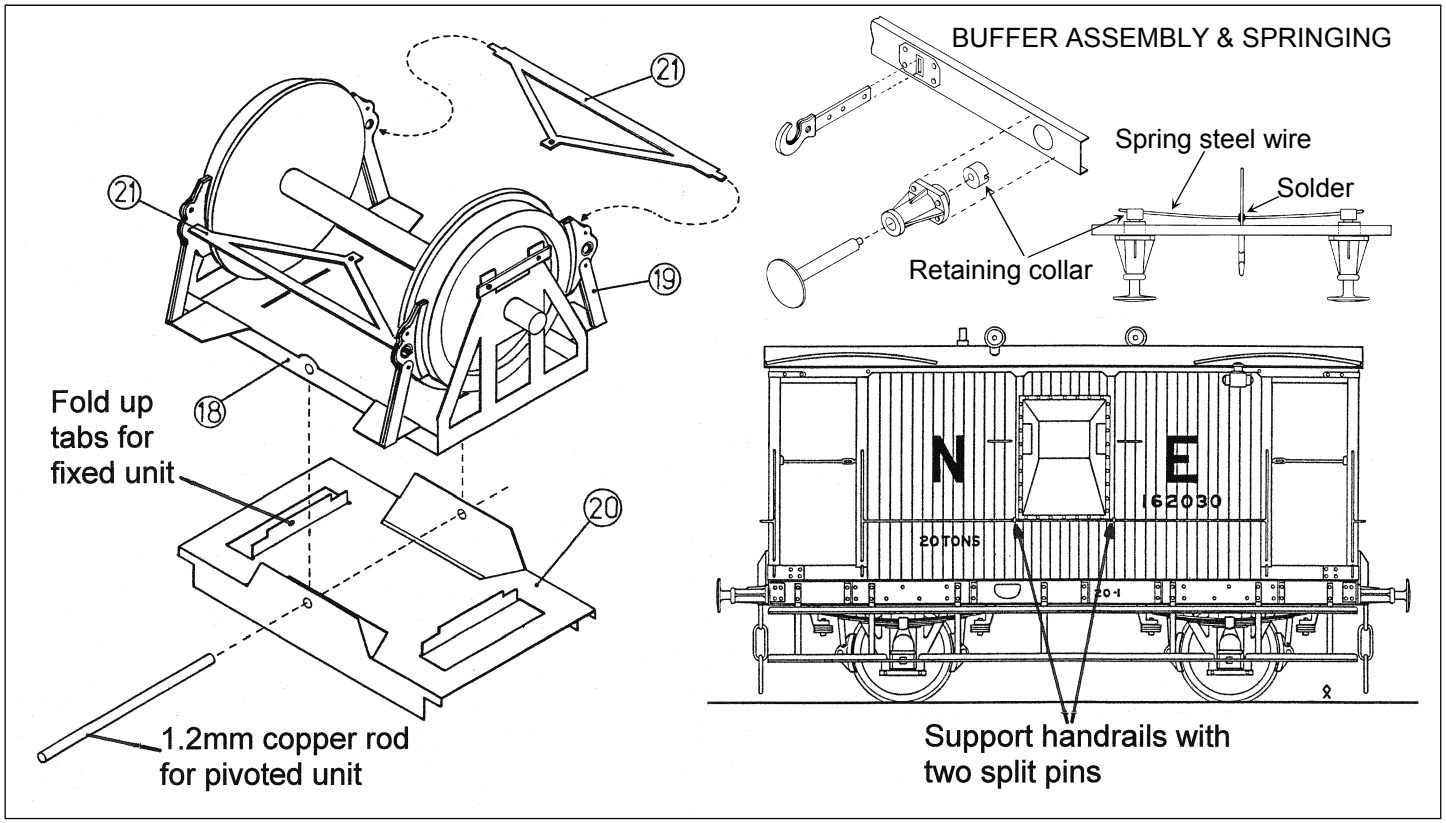
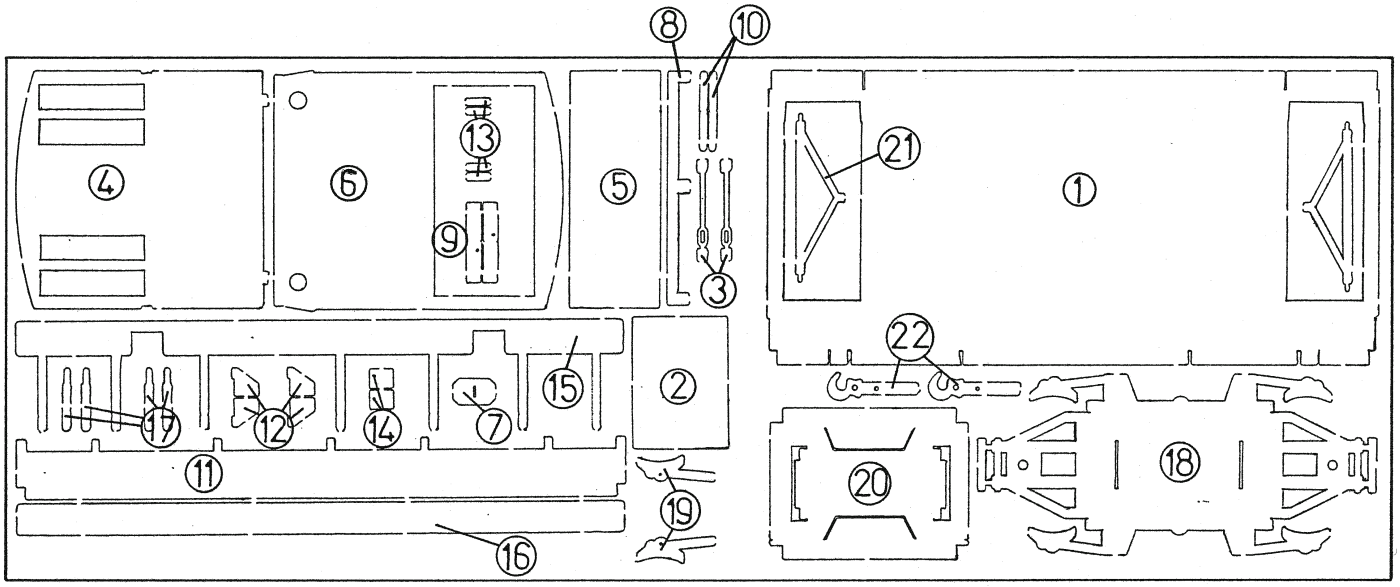




LNER TOAD E BRAKE VAN ASSEMBLY INSTRUCTIONS

1. First remove the sides, parts 1, and the cabin ends, parts 4, from the fret. Then remove the waste containing brake linkage from the doorways and fold the top and bottom of the sides 90°. Solder the bolt head detail plate, part 2, to the side. I tinned the back of the plate, tacked it into place, and then ran around the edges with a hot iron and a small amount of solder to solder it solidly into place. If you use plenty of flux to help the heat transfer, you should find that the iron pulls the solder on the back of the plate towards the edges, giving a neat joint all round.

Solder the four door safety bars, parts 3, across the doorways. There are etched marks to help with location, plus a rebate in the cabin ends to give clearance. Try a cabin end into place to check they are positioned correctly. Fit handrails into the doors on the cabin ends, parts 4, and then fit the cabin ends to one side. You will find a small engineers square useful in fitting the ends to the side. Solder first at the slot and tab joint at the bottom and then run a fillet of solder from the bottom to the top, and then fit the second side.

Check with an engineers square that the outer ends of the body are square and level to each other. If not, push the two sides in opposite directions until they are. It is important that the outer ends are square but if to achieve this the inner cabin ends are slightly out of square this wont be noticed. Now fold up the tabs to support the floors and then fit the floors, parts 5. Once these are fitted everything will be solid, so just keep checking that the body is not twisting as you solder them into place.

2. Now remove the ends, parts 6, from the fret, remove waste and then push out (emboss) the eight bolt heads. This is best achieved with a rivet-forming tool. Alternately, you can use a scriber, with the point rounded off slightly on an oilstone. Place the part face down onto a block of softwood and then firmly press down into the half etched hole. This may distort the part so gently correct this by bending back with finger and thumb pressure. I have shown all the bolt heads on the main drawing, mostly on the solebars, so use this to help you to check that you have not missed any.

Now fold the bottom buffer beam channel, fit coupling plate, part 7, and strip, part 8. Now fit the ends to the body. The slightly wider buffer beam (headstock) should help to locate the end in the correct position, but you may find it helpful to fold up a solebar and use this to double check that the end is positioned correctly. Tack solder at the bottom of the ends first and check that they are on squarely (place the assembly on to a flat surface and if the body doesn't rock from corner to corner you should be about right). Run a generous fillet of solder on the outside face, from buffer beam to roofline, working about 1/3 of the joint on alternative sides (this will help prevent distortion from a build up of heat). Once all four corners have fillets of solder, you can dress them with a flat file to blend in the joints and give a clean sharp corner. Clean up with fibreglass brush and hopefully the joints will be invisible after painting (but be careful that you don't remove the embossed bolt heads).

Once the ends were fitted I found that there was a slight gap between the floor and the inside of the ends. I fitted a couple of thin strips of waste etch on the underside of the floor to bridge this gap. If you use plenty of flux and a generous amount of solder, you should find that the solder runs through and neatly fills the gap when viewed from the top.

3. Now fit the bottom corner strapping, parts 9, and top, parts 10. I tin the back of the parts first and then remove them from the fret and clean off the tags. I then hold the part in place with the end of a file (lining up the handrail hole) and apply plenty of flux and a dry iron to the edge of the part until molten solder runs out from all the edges. I then fold the strapping around the end, pressing with a flat file at the corner to form a sharp fold (you may need a few strokes with a square file to remove any solder that has run out onto the back of the strapping and will prevent a sharp corner). Now clean up around the strapping with a knife blade and fibre brush.

If you have not already done so, push out bolt heads and fold up solebars, parts 11, (bending bars will be very helpful for this). Form bolt heads on the triangular reinforcing plates, parts 12, fold up and fit to solebar. Again tin the backs and hold in place with a knifepoint as you solder them using plenty of flux and a minimum of solder on the iron tip. Then fit the tops of the footboard brackets, parts 13, noting that there are half etched marks to help with their location. I prefer to detail the solebars before fitting as I find it is easier at this point to fit parts and then clean off excess solder with a knife blade, dressing the tops of the triangular brackets with a file.

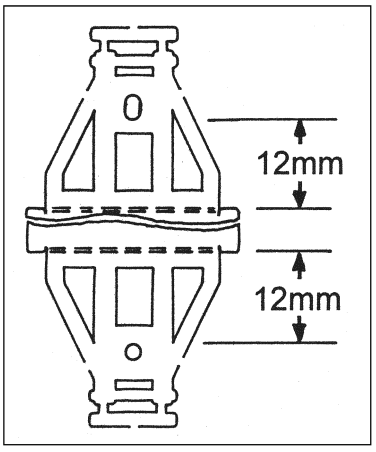
Now fit the solebars to the body. There are fold-down tabs that the rear of the solebar fits against and these help set the solebars at the correct distance apart (43mm). Fold these tabs back into the body once the solebar is positioned or they will prevent the fitting of castings later. Now fit the buffer beam (headstock) to the solebar reinforcing plates, parts 14, which will help to hide any gap between solebar and buffer beam.

I then fitted the handrails, made from 0.7mm brass wire. I find some strips of thin card (0.8mm-1mm thick) useful to help space out the handrails from the body as they are being soldered into place. I fitted all the vertical handrails first (make sure that the ends of the wire doesn't come too far inside) and then the horizontal ones. The horizontal side handrail is supported by two split pins either side of the ducket plate

I spot-soldered the horizontal to vertical handrail joints using 60/40 electrical solder as this gives a stronger joint than using 145° solder. Use plenty of flux and make sure the solder runs all around the joint. The end handrails are the trickiest to do, as the joint with the vertical handrail needs locating by eye (you can lay a rule along the horizontal body side handrail and nick the end vertical handrails with a file to give you a location mark).

4. Now fold by 90° the lower footboard and supports, parts 15, and upper footboards, parts 16. Fold the tops of the footboard supports and fit into slots in the solebar. Then tack solder the rear of the supports to the web of the solebar. Use plenty of flux so the solder flows around all the edges and into the etched fold lines of the supports to give a really strong fixing for the footboards. Then solder the upper footboards into place; there are etched rebates on the back, which locate onto the supports. Then dress back with a file the ends of the footboard supports where they come through the inside face of the solebar (otherwise they may prevent you dropping in the wheel units, parts 18, later in construction).

I then fitted the lamp irons, parts 17. Push out the bolt heads and then fold up. The centre fold is a reverse fold and can be dressed square with a file after fitting. Then, holding the top of the bracket with tweezers, apply a generous blob of flux and touch the side of the lamp iron with the tip of the soldering iron coated with 60/40 electrical solder. The flux should draw the solder off the tip into the fold lines to reinforce them. Then tin the back of the lamp iron with 145° solder. You can then hold the lamp iron in place on the body with a knifepoint and solder into place using plenty of flux and a dry iron tip. There are etched marks to help with the location of the lamp irons, three on the ends of all vans. Positions are also marked on the ends of the sides for side light lamp irons. Photos of early LNER vans and also vans in BR livery have these but the photo of a 1934 van in Peter Tatlow's book on LNER wagons, does not have these lamp irons. I fitted side irons to my model but if you want to leave them off the location marks are easily filled with a little solder.



5. The wheel units are designed as two separate units that can be made up with wheel sets, brake blocks and axle boxes/springs fitted and then dropped into place and soldered to the underside of the body. One unit is made rigid by two fold-up tabs (you can also make the other unit rigid if you wish) the other pivots around a piece of rod to give a three-point compensation. It is on these units that I made the only real design mistake with the kit. One of the bearing holes is about 0.5mm too low, but it is easy to correct. First remove the main unit, part 18, from the fret and open out the bearing holes to take a Slater's brass wheel bearing. Then use a rule to measure from the edge of each bearing hole to the edge of the fold line. One should be about 12mm and this is correct, the other should be about 12.5mm and this is incorrect. Using a round file, extend the offending hole into an oval shape until its edge is 12mm from the fold line (the drawing should make all this clear).

Push out bolt head detail and double over the keeper plate, then fold the sides 90° and fold the brake block carriers back 90°. Laminate the brake block detail overlays, parts 19, into place and fold up the brake blocks by 90°. Then fold up the W irons and fit the wheel set with bearings on the axle ends, by springing between the W irons. Now check by eye that the W irons are folded square, that the axle is parallel with the base (if not, file the incorrect hole a bit more). There should be a minimum of end float on the axle. Once you are happy everything is square and true, solder the four corner joints and the bearings into place. Ensure that the brake blocks are square and an equal distance away from the wheel rim and reinforce the brake block/hanger fold with a generous blob of solder. I left fitting the brake yokes, parts 21, until later as they are vulnerable to bending, but fit the cast axle box/springs now (drill the hole in the casting slightly deeper with a 3.5mm drill, but don't come through the front of the axle box).

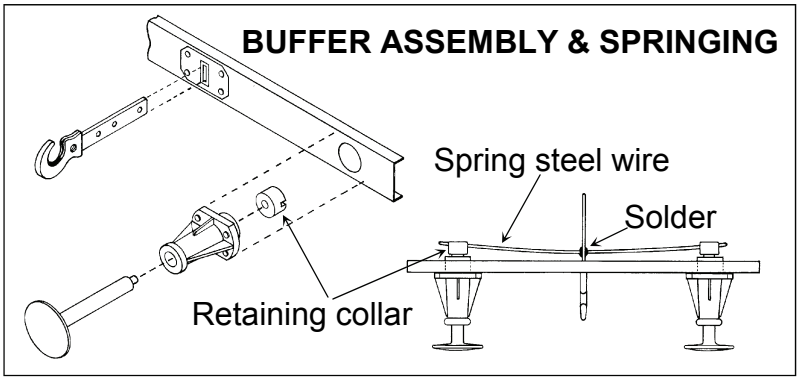
Now fold up the sides of the base unit, part 20, and for the fixed wheel set the two fold-up tabs. Then solder the wheel set unit to these tabs. For the pivoting unit, clear the holes for a piece of 1.2mm copper rod. Now pass the rod through and solder at each end. If you slip some paper between the two units as you pass the rod through, this will prevent the solder creeping down the rod and joining the two units solidly together. Fit the two units to the van and solder into place.

6. Now is a good point to fit the castings. I fitted the spring hangers first. They can be held in place with a knifepoint against the inside face of the solebar and then soldered with low melt solder. The side duckets castings distorted slightly in the mould and the back doesn't sit completely flat. To rectify this, bend the casting slightly so it will sit on a flat surface without rocking or rub the back on a piece of emery paper until it is completely flat. I then tinned all around the edges of the bolt head plate with 145° solder, fitted the ducket casting into place and then, using plenty of flux and with the iron running through a dimmer switch, ran a thin fillet of 70° solder around the edge of the casting. Don't worry about some of the solder running over the bolt head detail. Clean it up with a knife blade and then vigorously scrub with a fibre brush, blending the casting into the brass.

The way I did it, was to put flux onto the fillet of low melt solder and with an iron at full heat, touch it to the other side of the brass on the inside of the body (you may need some flux on the brass and a little solder on the iron tip to help the heat transfer). As the heat transfers through the brass you should find that the low melt solder flashes underneath the casting, giving a very neat joint with no gaps and uncovering the brass bolt head detail. Work one side first, then the top, then the other side and bottom, which will prevent the heat building up to much. This is a very useful technique but it is a fine line between getting it right and melting the casting (I do have some spare ducket castings if you need one). Remember to hold the ducket in place with your thumb (a piece of card between casting and thumb will reduce the pain) to prevent it dropping off. Of course you could just glue the casting on…

Fit the end T stanchions with the edges 9mm either side of the coupling hook slot. Now laminate together both halves of the coupling hook, part 22, and make up the links. I close up the links by holding the curved end in the jaws of a pair of round-nosed pliers in one hand and squeeze the flat parts of the link parallel with long-nosed pliers (angled long-nosed pliers with serrated jaws are even better) held in the other hand. Once you have six even-shaped closed links, you can open each one slightly with long-nosed pliers and thread three together. The last link passes through the hole in the coupling hook. I reinforce the joint of each link with a spot of 60/40 solder.

Drill out 2.1mm the buffer bodies to take the cast head/shank. I hold the drill bit in a pin vice (chuck) and grip the buffer body between finger and thumb. Drill through the body from each end so that the hole breaks through in the middle. Use a little spot of spit on the end of the drill (some more technical people have a block of furniture polisher's bees wax that they smear on the drill end). This will prevent the drill wandering in the white metal and breaking through the side of the buffer (a little lubrication on the drill will make drilling holes in any white metal casting more accurate). The prototype brake van had quite long buffer shanks, so I filed about 1mm from the back of each buffer body (this is a standard casting and I didn't want to damage the master by modifying it) so that the heads will stick out further from the body.



Then fit the shanks through the buffer body, snip off some of the narrow end of the shank to leave just over 1mm from the step and solder a retaining collar onto the shank. Now solder the buffers into the buffer beam and pass the coupling hook through the slot and retain it with a length of spring wire. Polish the centre of this wire with emery cloth first so that you can solder it to the coupling hook shank once you are happy that the buffers spring freely. You can now fit the brake yokes, parts 21, by springing them between the brake blocks.

7. Now for the roof. I have pre-rolled this in my rolling bars but you may have to work it a little with finger and thumb to get it to the exact profile. Mark out and drill holes for the chimney and ventilators, making the ventilator holes slightly undersize so the casting will be a tight push fit into the hole. Mark with a pencil the position and centre point of the rain strips, measured off the main drawing. The rain strips are made from soft wire by gently pulling the wire through finger and thumb to curve it (offer the curved wire up to the drawing to check radius) and then spot soldered to the roof at the centre point. Trim square the two ends of the wire with side cutters and then holding the wire down with a knifepoint, solder the two ends to the roof. Apply plenty of flux and solder again at the centre point with the iron tip on the inside of the curve. The solder should flash along the wire, soldering it solid to the roof. The wire will tend to expand with the heat but by soldering on the inside it should still keep an even curve. Clean up with knife and fibre brush. It is intended that after painting the roof is glued into place with Evostick, used as a contact adhesive (follow the instructions on the tube) but if you wish to have a removable roof, solder four tabs made from waste etch to the underside of the roof so that they will clip inside the cabin body.

Now tin the roof with 145° solder around the holes for chimney and ventilators. If you tin both sides of the roof and then solder with low melt from the underside, the solder will run through and form a neat ring around the part on the top side, hiding any gaps. The ventilators need to be a tight push fit into the hole so you can square them up and then turn the roof upside down to solder on the underside without them moving position or falling out. You should find that the base (peg) of the ventilator is slightly oval and if you file two slightly tapering flats onto the widest sides, they should push and stick in the hole.

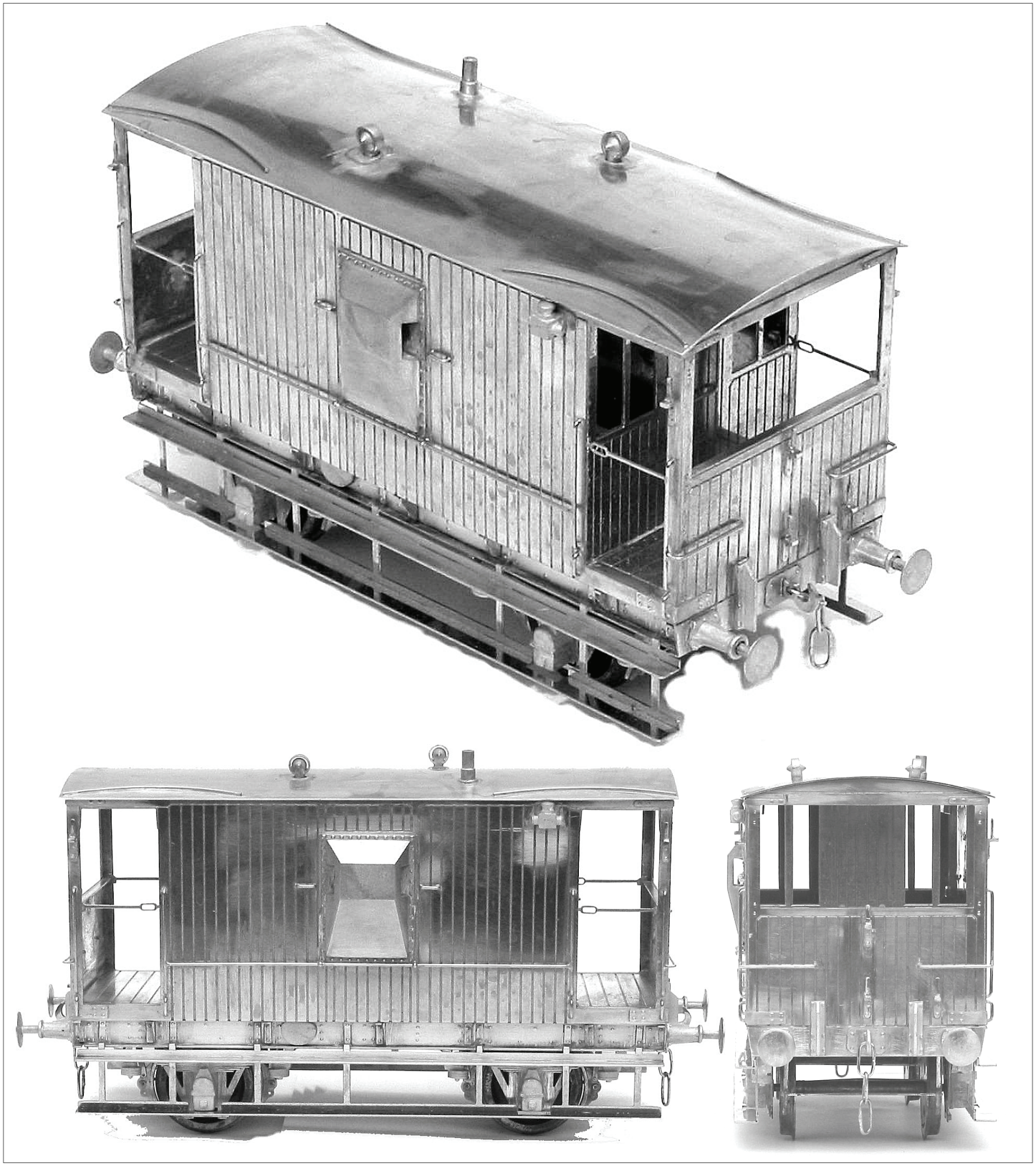
Now fit the side lamp casting so that it tucks in just below the roof. Note that these lamps were later removed on most vans. Also there is the sandbox casting fitted inside the veranda, which were fitted to the earlier toad B's but removed during the early 1930's. It is uncertain if any of the first builds of toad E's had them fitted for a short time. As I had the casting, it was easier to include it in the mould than to find out later that some vans had them. I didn't fit them to my model but if you have information that they were fitted to some vans, the castings are there for you. The final jobs are to glue the cast wagon plates to the solebars and square off the ends of the lamp irons if you wish to. That should now be the metalwork construction completed.

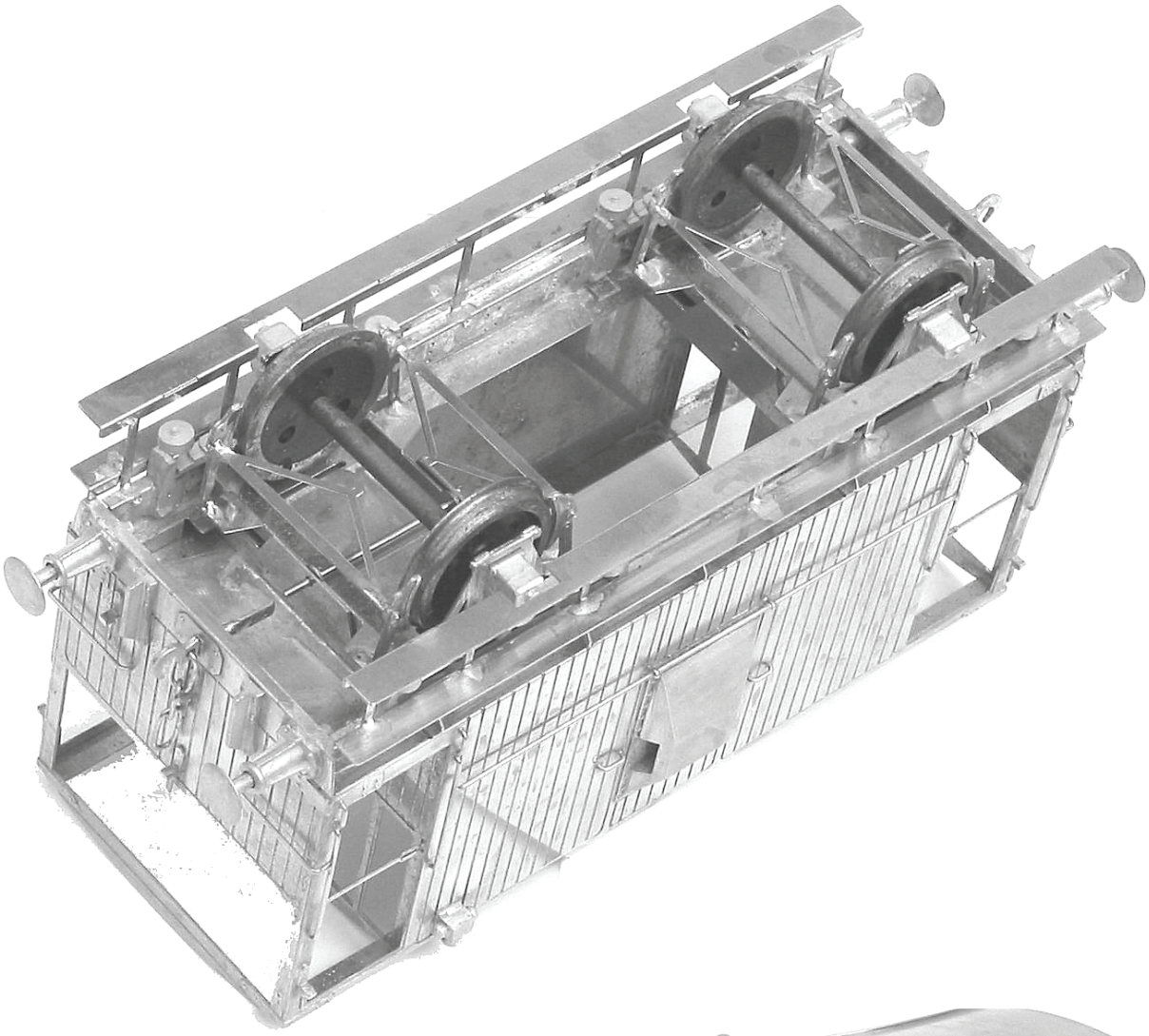
8. Painting is a vast subject that cannot be covered fully here. The important thing with a metal model is to get a good base coat of primer. Hopefully you have been cleaning up and washing the model at the end of each modelling session, but it will still need thoroughly cleaning before painting. I give my models a good scrub with a stiff-bristled paint brush in a sink full of hot (as hot as your hands can bear) water and cheap washing up liquid (the expensive stuff that's kind to your hands has an oil in it that will stop the paint keying to the metal). If you know somebody who works in catering and can scrounge you some industrial-strength liquid, this is better still. Then rinse the model a couple of times in clean warm water and place in a dust-free box to dry. I use car aerosol primer and Halfords grey primer is one of the best. For the best results you want to spray at room temperature (25°C) on a dry (avoid cold, damp or humid) day. I find it helps to warm the model to about 30°C (put it in the airing cupboard overnight) and I warm up the paint tin by putting it onto a radiator (about 40°C, but use your common sense as I don't want anybody blowing themselves up). I find it best to prime the model in two light coats, about 15 minutes apart and then leave for 48 hours to harden off (in the airing cupboard in a dust-free box).

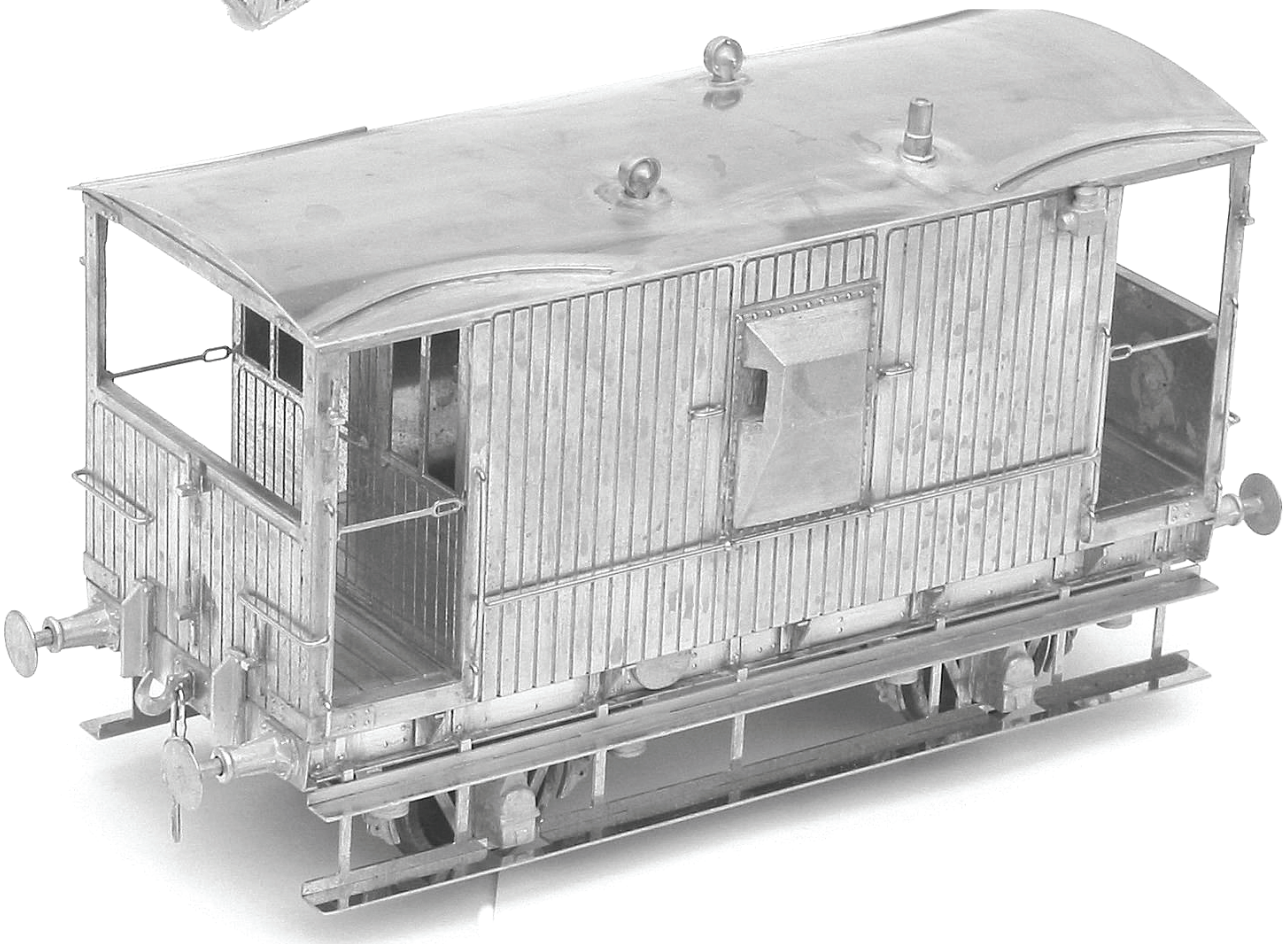
I brush-paint my models with Humbrol enamel. For years I just stirred it up and painted straight from the tin but I was never completely happy with the results. Recently two things have transformed my painting. The first was a copy of Martyn Welch's book, The Art of Weathering, Wild Swan Publications, ISBN 1 874103 11 9. Martyh's basic techniques are very useful and almost foolproof. Martyn's method of mixing course talcum powder into the paint to give a textured roof is particularly effective. The second thing is to mix the paint in the tin and then transfer it to a palette (a sheet of clean plasticard) with blobs of lighter and darker shades of paint surrounding the main colour. Then work the paint with the brush on the palette, slightly varying the tones of the paint. This seems to totally change the texture of the paint and the way it goes on and covers on the model.

9. Make a floor from the quality card that the etch was packed onto and glue inside the cabin with Evostick. I prefer a card floor as this helps to deaden the rattling empty box noise that you can get when the wagon is running on a layout. For glazing the end windows, you can use clear plasticard, but I prefer to cut flat sheets from the clear blister packs that many items are packaged in nowadays. This has a textured surface probably caused by the moulding process, which gives it a slightly opaque quality that I think represents dirty windows just right.

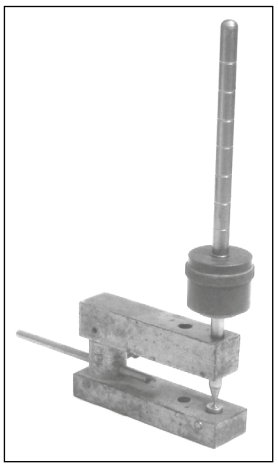
I hope that you have found these instructions and description of my building techniques helpful. Hopefully they have pointed you in the right direction but please remember that no two people build a model in exactly the same way. The key is to experiment as you build more models and develop a set of techniques that suit you. I am always happy to help with advice particularly when I am at a show with my sales stand.







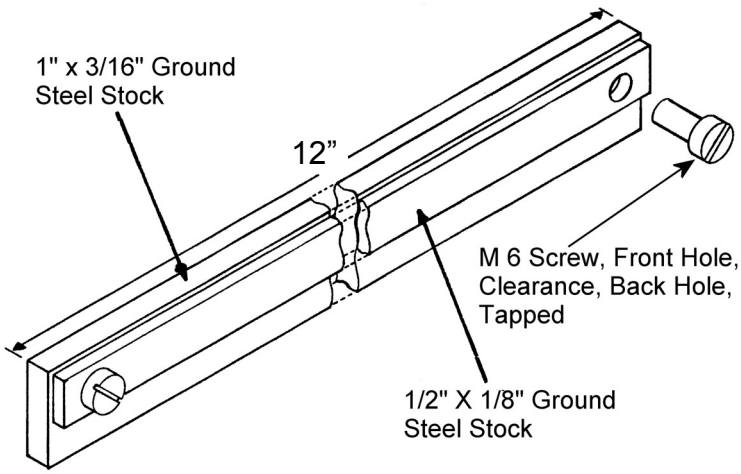
Bolt Head and Rivet Forming Tool



Although a very reasonable job can be done with a scriber point, a rivet forming tool is very desirable if you are going to do a lot of kit building. These are produced by a number of different people but I use and would recommend the one produced by Dick Ganderton, Graskop, Dewlands Road, Verwood, Dorset, BH31 6PN, Tel 01202 822701. It is available with a number of different sized punches and anvils but if you were only going to get one size then I would recommend the 7mm scale 1½" diameter. I have got ten years hard use out of mine so far so this is an ideal tool to put onto your Christmas present list.

Fibreglass Scratch Brush

The use of this tool is mentioned in the instructions. This is like a propelling pencil holder into which a fibreglass refill is fitted and which will give a vigorous abrasive action. I find this tool indispensable for cleaning up and removing solder. One very useful tip is to soak the refills in dilute PVA glue (Evostick resin W wood glue let down 50/50 with water and a spot of washing up liquid) and then drill holes in a block of wood and stick the ends of the refills in the holes while they harden off. This will make the refills much more abrasive and longer lasting, and also stops the fibres breaking off and ending up in your fingers. You will need to give the refill a good rub to get it started but if you use green label flux you will soon have plenty of rusty tools that need cleaning. These and most other general modelling tools can be obtained from Squires Model and Craft Tools, 100 London Rd, Bognor Regis, West Sussex, PO21 1DD, Tel 01243 842424. They do a free catalogue and a very good mail order service.



Folding Bars

You will find a set of these very useful and here are details of the set that I have made for myself, in fact I have made three sets of different sizes. The dimensions or materials are not critical so make yourself a set to suit the materials you can get hold of. The important thing is that you can clamp the part along its entire length, with the etched fold line just above the front bar. Then clamp the bars in the jaws of your vice, a couple of 1" G clamps are also useful for long folds, and laying a steel rule at the back of the part to help transfer the pressure from your fingers evenly, pull forward to make the fold. Once the fold is close to 90° you can finish by pressing down on it with a block of wood and moving the block along the fold with a stroking action or by giving gentle taps with a small hammer on the wood block. Occasionally it is necessary to emboss bolt heads onto a part before folding, by lining the face of one of the bars with two or three layers of masking tape, you can still clamp the part without crushing the bolt heads but you wont get such a tight fold, so deepen the fold line with a triangular file.

Can You Help Me?

If you have enjoyed building this kit and have been satisfied with the quality, I would be most grateful if you could recommend it to your friends and fellow modellers. Although my kits are not perfect, I try to put a lot of time and effort into producing them. If I can get extra sales of a kit through customer's personal recommendation and I find that word of mouth is the best form of advertising. This will help me to put extra time and money into developing the next kit. Hopefully this will give me more satisfied customer to recommend my kits to their friends.

If you are not happy with this kit then please tell me. Hopefully I will then be able to help and sort out any problem.

Best Regards And Happy Modelling

Jim McGeown