The 2mm Scale Association
Part Ref 2-534
LNER 20 Ton Toad 'E' Brake Van

To complete this kit you will also require:

2 axles	2-209	6mm Dia 8-Spoke Wheels (12.25mm Axles) or 3-Hole disc
4 No	2-041	Brass Top Hat Bearings (*only sold in packs of 50*)
1 Set	2-443	Turned Brass Buffers (or cast whitemetal ones to choice)
2 No	2-452	Whitemetal Torpedo Vents (*only Sold in packs of 25*) or plastic Ultima ones.
1 Length		0.3mm Dia Straight Nickel Silver or Brass Wire
1 Length		0.8mm Dia Straight Nickel Silver or Brass Wire

Plus couplings, paint and transfers to choice.

The Underframe:

1. Carefully remove the main underframe/axleguard unit from the etch.
2. Using a suitable broach ream out the axle holes until turned brass top-hat bearings (2-041) are a push fit.
3. Bend down to 90 degrees the axleguard/solebar sides using a pair of bending bars or a small vice. As usual the half-etched fold lines go on the inside of the bend. Bend down the buffer beams using a small pair of smooth flat pliers.
4. Carefully solder in the top-hat bearings ensuring that they are fully seated into the half-etched recesses. Test fit a pair of wheels (on 12.25mm axles) and check for free running. Carefully adjust the axleguards if required. The wheelsets should spin freely for 10 or 15 seconds when flicked, but should not be so loose as to fall out easily.
5. The cosmetic solebar/footboard units fold over to form a double thickness piece. Pre-tin with solder the two inner mating surfaces before removing from the etch. Remove from the etch but be careful not cut the two 'hinge' tabs connecting the two halves, or the footboard support lugs. Fold over and then sweat together, ensuring the two halves are accurately aligned. Carefully file off the two 'hinge' tabs from each solebar.
6. Check that the five slots on each solebar are clear of solder and are wide enough to accept the etched solebar gusset plates. If tight they can be eased by resting on a cutting mat and carefully pressing into the slot with the point of a scalpel.
7. Pre-tin both the underframe unit and rear of the solebars, then sweat the solebars to the main underframe unit ensuring that the top edges are parallel and that the springs/axleboxes fit neatly over the top hat bearings.
8. One at a time solder the solebar gussets into the slots on the solebars. The full thickness portion on each gusset goes in the slot and the half-etched triangular gusset points down. Try and keep the tops level. Take your time – there are spares on the etch to replace the ones that will invariably get lost !
9. The etch includes axlebox covers. You can use these or separate cast whitemetal ones. The etched ones are formed by folding together the three layers using the etched tabs as hinges. Again pre-tin the mating surfaces before sweating together. Carefully file off the hinge tabs after soldering. Solder to the spring units.
10. With a pair of fine point tweezers carefully fold up to 90 degrees the footboard support lugs. There are five lower and four upper ones on each side. Remove and clean up the footboards. Starting with the upper boards, locate them onto the support lugs using the tab and slot alignment provided and solder from underneath.
11. Remove the brake units and locate into the u/frame using the tabs and slots provided. Ensure that they detail side faces outwards. If you wish to fit brake shoe cross rods (from 0.3mm dia wire) you should ream out the brake shoe holes to accept the wire before removing from the etch.
12. There are coupling hooks provided for detailing the buffer beam but be aware that these may foul your coupling latches if using DG's or BB's. If to be utilised they are best left off until the body has been fitted.
13. Now put the chassis to one side whilst you construct the body.

The Body

To assist with body construction it is a good idea to have a small off-cut of ply or MDF with some dead-square strips pinned to it. The strips should form an accurate 90 degree L-shape to give you both an inside and outside corner. Optimum strip height is about 12mm. Use pins to hold body sides and ends in place during corner soldering.

1. Remove the body sides from the etch and clean up the edges to remove all traces of the tabs you have cut. Using a pair of bending bars or a small vice, bend over the top edge roof supports to match the body end roof profile. Make sure the narrow strips over each verandah entrance aperture are very tightly gripped or they may be deformed during the bending process (It is essential that your bars or vice have sharp, square corners).
2. The verandah ends are formed from two thicknesses, one plain and one planked. Pre-tin the mating surfaces before removing from the etch. Remove from the etch and clean up. Do not remove the alignment tabs that will locate into the slots on the ends of the body sides, or the bottom edge alignment tabs/dimples that will locate onto the underframe ends. Sweat the inner and outer layers together. Accurate alignment of these can be achieved by temporarily fixing to your wooden jig with two diagonally opposing pins through the end apertures. An alternative alignment method is also suggested on the assembly diagram. Positions for three lamp irons at each end are etched into the inner ends. Drill these right through both layers with a 0.3mm drill if you wish to fit lamp irons at a later stage.

3. Now solder a side to an end, using the wooden jig mentioned above. To allow the ends to seat down neatly into the jig make two depressions for the bottom alignment tabs by pressing into the jig with the blade of a suitably sized jewellers screwdriver. Repeat for the other side and end. Make sure both assemblies are square and then solder together into one unit.
4. Remove and clean up the cabin ends. Slide in from the underside and locate into the slots on the body side roof support strips. Solder in place from the inside, ensuring it is kept vertical and flush with the verandah side entrance apertures.
5. Carefully fold out to about 45 degrees the ducket window sections from the main body. Remove the ducket side pieces and bends to shape. Keep adjusting the window sections and side pieces until a near perfect fit is achieved. Solder in place. Take care not to flood the plank lines with excess solder. Any slight gaps can be filled with solder from the inside of the body.
6. The body may now be offered up to the chassis. The tabs on the bottom of cabin ends locate into slots on the u/frame unit and the dimples on the bottom of the verandah ends locate into small recesses on the top corner edge of the buffer beams. Solder up once happy with the fit. Solder the two packing pieces inside the cabin lower body edges. These fill the daylight gap between the underframe and body and strengthen the hole assembly.
7. Remove the roof and clean up the edges. Pre-tin the underside on all four sides. Roll the roof to match the body end profile. This can be achieved by firm but careful rolling with a piece of dowelling or metal bar 8-12mm in diameter. Work on a thickish pad of Kleenex tissue or kitchen paper towelling. Keep offering it up to the body until you achieve the desired profile. Do not press too hard when rolling or you may crease the roof. If you get it badly wrong the roof can be annealed (softened) by heating it to dull cherry red in a gas ring and allowing it to cool naturally. This will make the metal easily workable again.
8. You may elect to fit the roof with adhesive after painting & glazing the model. If you are not bothered about glazing, pre-tin the body side roof support top flaps and top curved edges of the body ends. Working upside down, position the body over the roof and align it to give equal overhang all round. Tack solder on the centre line at each end from the inside and check alignment. If okay solder up fully making sure the roof is pressed down firmly as you go around. The hole nearest the edge is for the stove chimney pipe. Open out for 0.8mm wire to represent this. The other two holes are for the torpedo vents.
9. The verandah planked floors may need slight trimming to fit. Solder in place on top of the verandah entrance thresholds.
10. One at a time remove the short end angle irons and slotted backing plates from the etch and solder into the body end and bufferbeam slots. If the slots in the backing plates are tight they can be eased by gently pressing in a scalpel blade whilst resting on a cutting mat.
11. Open out all handrail fixing holes with a drill or broach as appropriate (some will be fouled with solder after body assembly). The etch includes correctly shaped handrails but these are very fragile and may be prone to damage on a working model. Use 0.3mm dia straight brass or nickel silver wire if preferred. Use pieces of thin card to space the handrails evenly off the body. Fit lamp irons to previously drilled end holes if required. Later vans had lamp irons in different positions – work to a photograph if possible.

Useful References:

LNER Wagons – An Illustrated Overview (Peter Tatlow, Pendragon 1998) pages 166 & 167
Pre-Nationalisation Freight Wagons On BR – A Pictorial Survey (David Larkin, D Bradford Barton 1977) page 61
Railways In Profile Series, No 5 BR Cattle & Brake Vans (Geoff Gamble, Cheona 1997) pages 37 & 38

Etch Artwork & Diagram by Bob Jones 2001. Instructions & Notes by Edward Sissling 2002.