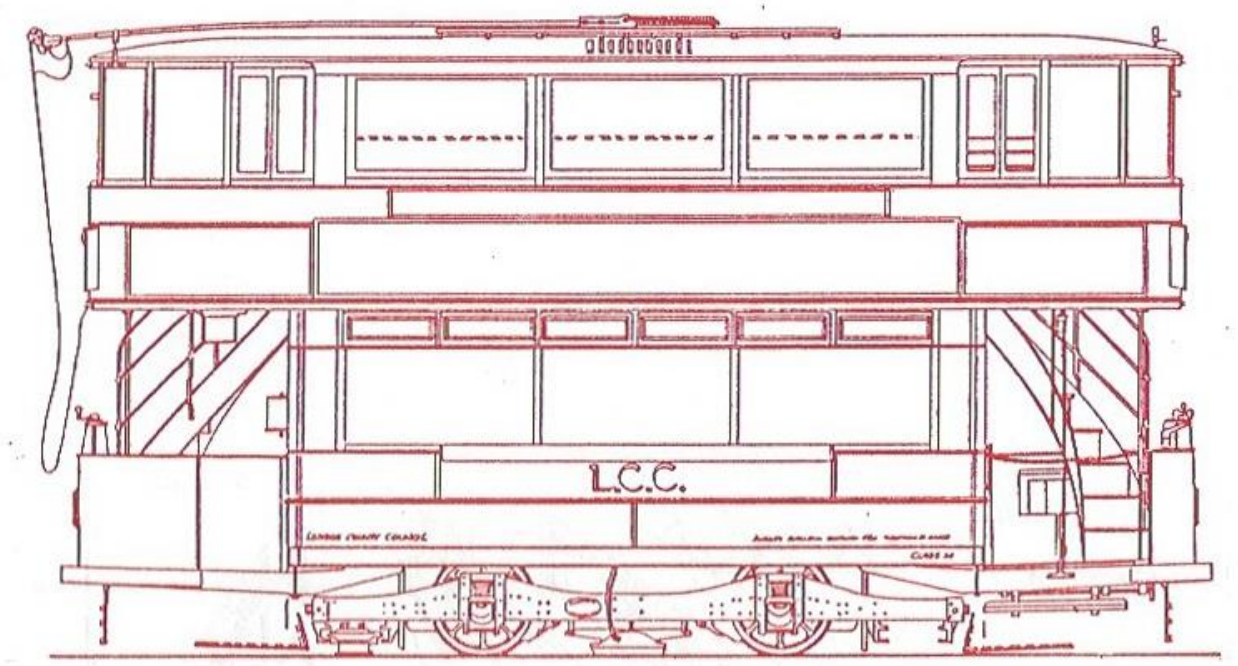
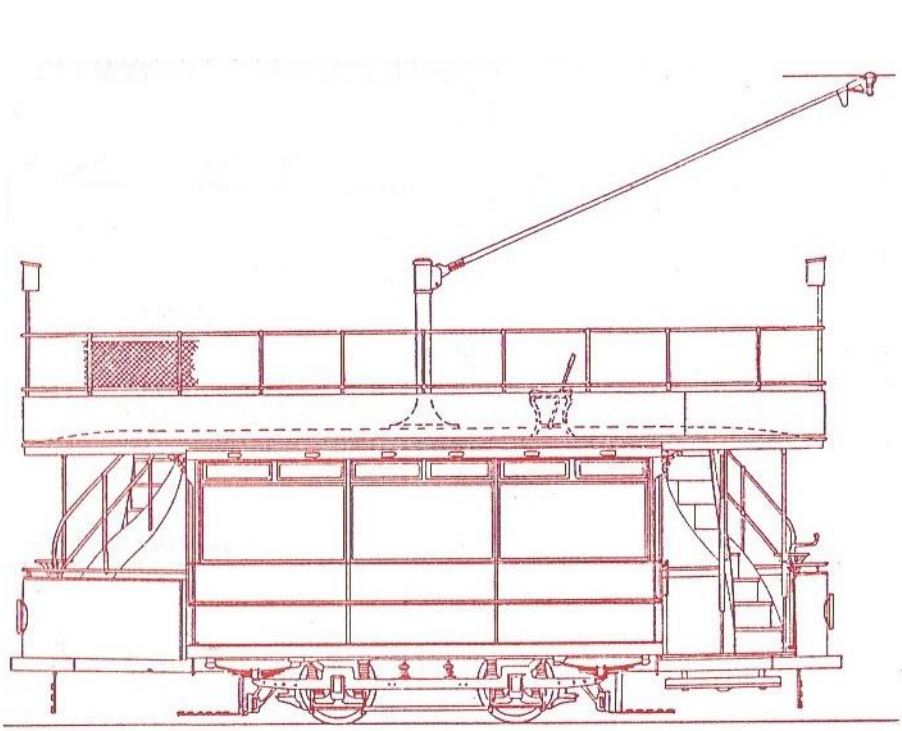
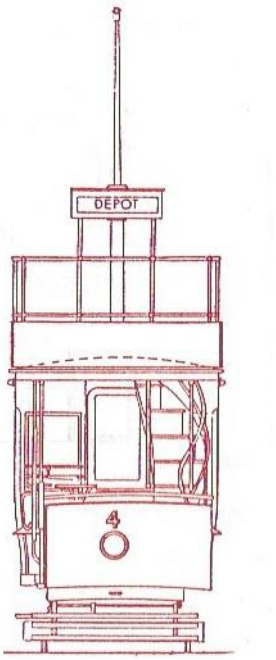
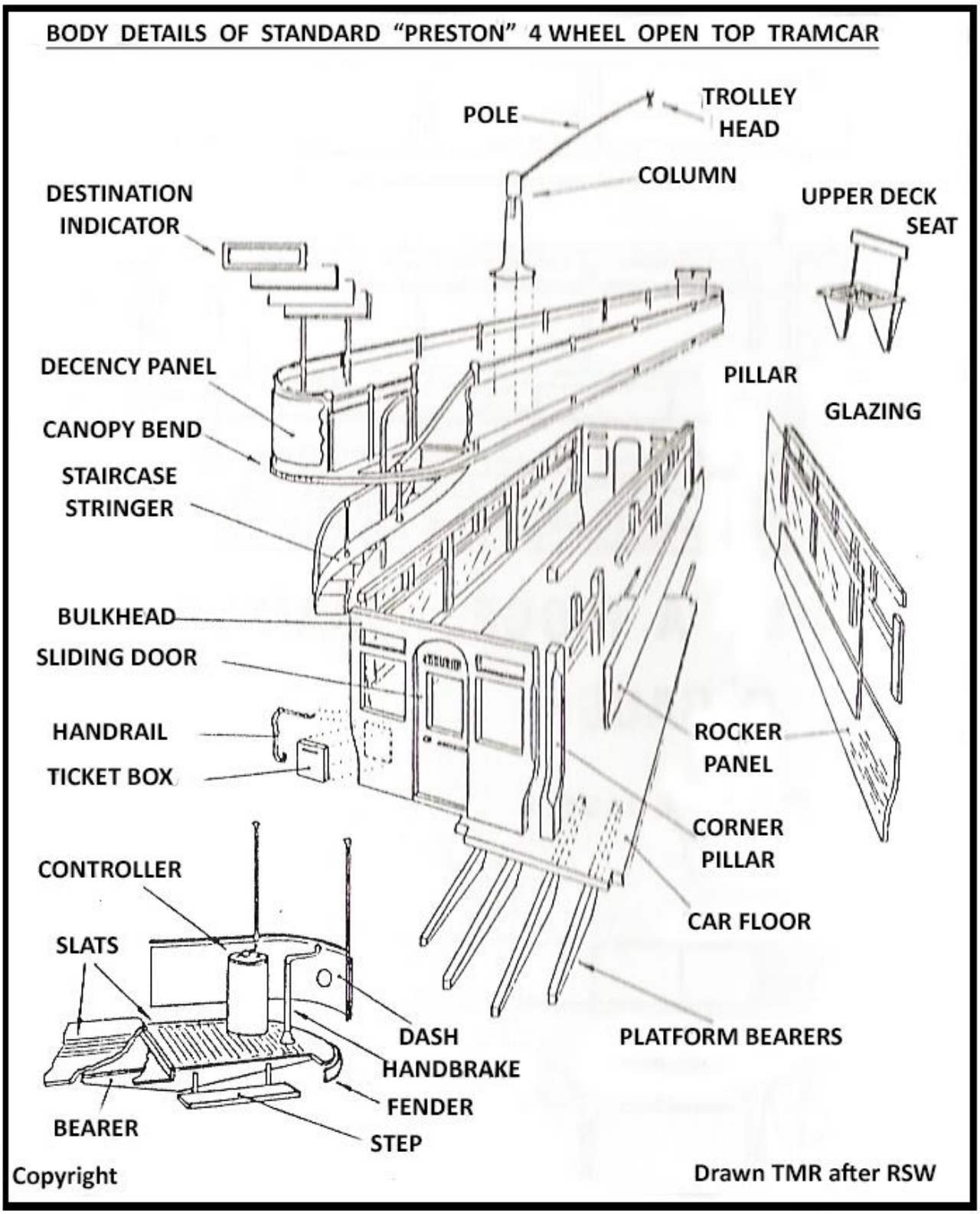


Build a Model Tramcar in O Gauge

by Terry Russell







The following of tramcar modelling in O gauge (7mm to the foot) has never been stronger than it is today. This is surprising as there are 4mm and H0 scale models in kit form available to the would-be modeller and enthusiast. It seems that having made up a few whitemetal kits or cardboard models,

the enthusiast feels that he would like to create something of his own, albeit an inferior model when compared with the kits, but never-the-less, his own creation. The smaller scales do not appeal to the scratch build tramcar modeller, due to the complexity of the prototype, and the lack of piece parts to help him along the road to a successfully finished model. This is where '0' gauge scores as the size is more workable, a large range of 7mm scale drawings are available and I can supply a large range of whitemetal castings and motored trucks to make the job a little easier. The ready to run trucks ensure that the model, no matter to what standard it is constructed, will run and give the modeller pleasure, which I consider to be the most important, thus stimulating him into further projects.

TERRY RUSSELL

I am often asked "How do you build your models?" and to answer this question I previously produced three booklets on building models of London and Glasgow cars. These have been long out of print and the methods detailed in them have been improved upon over the years. So I have decided it is time to put pen to paper again.

Having decided which car to build, the primary requirement is a scale drawing, and to help modellers I have produced over 50 different car types in 7mm scale. I have also produced 17 ready to run motored trucks and whitemetal castings of seats, stairs, handbrakes, controllers and lifeguards to make tramcar modelling easier for the scratch builder. Trolley poles for closed and open top cars are also available.

A selection of external and internal photographs must also be obtained. My main building materials are balsawood, sheet Bristol Board in 3 sheet thickness and acetate sheet 1mm thick. Care must be taken to ensure that the Acetate sheet is not PVC sheet as this, like plastic card will warp with the passage of time. For cutting the Bristol Board I use single sided razor blades rather than craft knives as the blade is thinner. A Stanley knife No. 199A with a No. 1991 or 1992 blade is useful for the balsa and acetate sheets. Bristol Board is available from Artists or Drawing Office Stationery Suppliers.

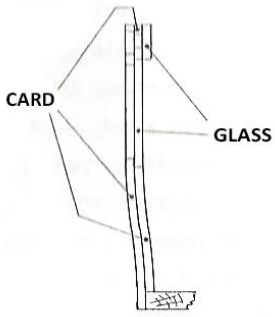
First, transfer the details of the outer car sides, bulkheads (inside and outside faces) and the outer-faces of the driver’s screen and upper deck ends to the Bristol Board. This can be done by drawing, but I place the drawing where possible over the card and cut through both the drawing and the card. The ends must be drawn out in an extended-flattened form using the plan and elevation views on the drawing.

It will he noticed that the cut edges of the card have a burr to them, raised by the cutting blade. The thicker the blade, the greater the burr. This must be flattened using a smooth piece of material such as a teaspoon handle. Window edges have posed a problem over the years as they are difficult to paint without getting paint on the glass, so I have evolved the following method. Paint the cut edges, outside pillar face and 2mm all round the cut-outs outside with a sparingly applied coat of white or cream emulsion paint. This dries quickly and may need thinning with water before use. Too great an application will warp the card, so take care. The inside faces of the card should be painted with matt paint in accordance with the interior colour scheme of the car. when dry, use flour paper to carefully sand the remaining burrs away. Use a sharp blade to clean out the cut-outs. Clean corners can be obtained this way. All the window areas can be constructed using this method. Interior bulkheads can be stained with wood dye, to the correct shade if desired.

For this exercise we will assume that the body sides have a 'tumblehome' as on horse drawn vehicles. Originally this was to clear the wheels of the wagon and for some obscure reason, became tramcar building practice. A very useful property of Bristol Board can be exploited here. If you

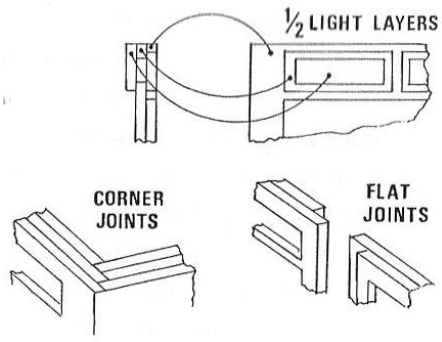
dampen one face, and I mean a lick of the tongue rather than a run under the tap! you can roll the card into a curve and it will remain in that form after drying out. As an example, for the dashes, cut a strip of card to the exact width, but over the length. Dampen the outside face and roll it round a piece of 1/2" diameter wood dowelling. When it has dried out, it will be nicely curved but without any kinks or creases.

The side tumblehome can he constructed in the same way as the dash. First, dampen the outside, below the window cut-out, down to the halfway point and roll over the dowelling. Repeat with the inside face for the lower half. Cut a strip of card 2mm less than the distance from the lower edge of the window cut-out, to the upper edge of the floor. Form this to the same profile as the outer panel tumblehome. The length of this strip is 4mm less than the overall body length. Stain the inner strip and stick it in position, 2mm down from the window cut-out and 2mm in from each end. Use Evostick Impact Adhesive to fix card to card, by applying a thin coat to each face and placing together after 10 minutes drying time. Great care must be taken, as once placed together these pieces cannot be separated. The reason for the double layer tumblehome is that when the two are stuck together, the card cannot straighten out. You may evolve your own technique with the inner layer of card - I make it longer and wider than necessary and only apply the glue to the required area and trim the inner card to size after it has been stuck, taking care not to cut through the outer sheet as well.



Next come the windows. Cut the glass 4mm shorter than the body length and 3mm wider than the distance from the top of the inner card to the top of the body side. As with all window areas, apply Evostick to the rear - face of the outer card making sure there are no globules. Immediately apply the glass to the glued face 2mm in from each end and butted up to the upper face of the inner card Press firmly into place all around the framing of the windows and trim off surplus at the top. The internal face needs no further attention as the lower face is stained and the painted framework shows through the glass on the inside. If you wish to elaborate on this, you are of course at liberty to do so, but I do not consider it necessary.

If the car has fanlights above the side windows, this introduces a second layer of card at the top and the main side glass only reaches the centre of the cant rail. The overall body side contains the cut-outs for the complete half-light casement. A second piece of card containing the cut-outs for the casement glass and cut at the centre of the cant rail, is stuck behind the top of the outer skin, butted against the main glass. The half-light glass is then fixed to the rear of the upper second layer of card.

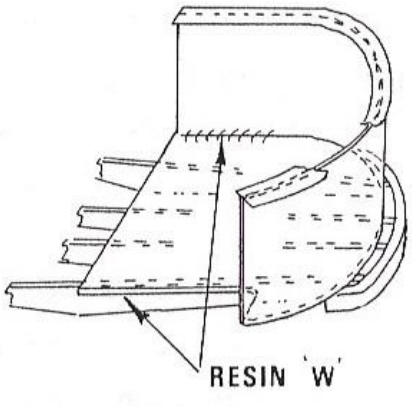


Bulkheads are a card/glass/card sandwich with the relative cut-outs made in the outer and inner card faces. The outer face is given the emulsion treatment and the inner face stained. The doorway opening is cut out of the inner and outer pieces of card, but the glass extends right across. Cut the door out of a piece of card, complete with windows and panels and stain it. Carefully split the Bristol Board door into two layers. As the card consists of compressed layers of paper, this can be done with a little care. Experiment with an odd piece first. This enables you to stick those thin doors on each side of the glass in the opening. You can do this for both ends of the car if you like, but I always have one door closed and one open. At the open end the glass extends right across for strength and to keep dust out of the lower saloon.

The upper saloon sides and bulkheads may be made in the same way as the lower saloon. The upper deck ends involve some constructional drawing work (see page 11) before building can begin, but once the flattened drawing has been made this can then be cut out of the card as before. Care must be taken as the pillars will be very thin. After the deburring, emulsion and clean-up procedure, roll the end in the appropriate area. Normally there is a flat section between the body end and the start of the upper deck end or dash curve begins. For the upper deck ends, make a strip of card longer than required and 2mm less than the distance between the lower edge of the window cut-out and the bottom of the panel. Roll it, stain it and stick it behind the outer skin, 2mm below the lower edge of the window cut-out, but with the surplus length protruding at both ends. Trim this projecting edge to 2mm. Cut a strip of glass equal in width to the distance from the top of the inner layer of card, to the top of the complete end. This must then be cut to 0.5mm less than the individual widths of the windows round the end. The edges must be deburred by scraping with a sharp blade. Fit these individual window glasses using Evostick sparingly applied to the inside of the outer skin and the side edges of the glasses. As the panel and pillars are round and the glass is flat, they will only touch at the pillar centres. To give added strength, a small amount of Evostick woodwork glue may be applied from the inside as a filler along the bottom edge of the glass and from the top of the upper edge. If the framing is to be flat then it must be cut and stuck to the window itself. The gap between the outer skin and the glass may be filled with segments cut from the edge of a disc of card, whose radius is equal to the radius of the car ends.

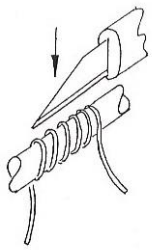
The end windows must be 2mm wider than the outer skin and will correspond with the inner skin. If this end section has cut-outs for indicator boxes, it is best to leave these until the car body is nearly completely assembled. If the cut-outs are made when the windows are cut, then the curved end panel will flatten out in these areas.

The next part to tackle is the driver's platform. Cut the floor from slightly thicker card than the sides, (4 sheet rather than 3 sheet thickness Bristol Board). The outside curved edge is cut 0.5mm inside the dash plate. Cut strips of card and stick them to the upper face of the platform, to represent wooden non-slip slats. Cut a strip of card for the dash plate and roll it. The platform is supported on 4 hardwood bearers which are fixed to the underside of the body end. In the model these are made of 1.5mm thick hardwood as balsawood is not strong enough. These are fixed to the underside of the platform at this stage. The bumper is attached to the ends of these bearers, so they must be trimmed to length so that the bumper follows the correct profile. The dash is stuck to the edge of the floor and rests on top of the bearers. Entrance steps are made of card and can be fixed to the platform at this stage. Thin strips of metal are best for the step supports. All this construction should have been made using Evostick, but to give added strength a fillet of woodwork glue should be applied to the join between the dash and floor on the upper surface, and the bearers and floor on the underside. This glue soaks in, and is hardly visible when dry, but very effective.



Controllers and handbrakes are available from me and should be painted to completion before fitting. Headlamps can be made by winding a piece of 22 SWG solder or soft wire round a drill or bar

slightly smaller than the internal diameter of the headlight. Wind several turns, close together and cut along the drill length-ways with a blade. You will then have perfect circles which can be flattened and tacked to the front of the car with Evostick. A fillet of woodwork glue can be applied round the inside edge. This will fix it permanently and give quite an authentic appearance.



If the tram has platform screens, the next operation is to cut the piece of card on which the window framing will rest. The shape is derived from the plan view of the platform on the drawing. The inner radius is 2mm less than the inside face of the dash. The outer radius is 1.5mm greater than the outer face of the dash. The outside may need trimming after final assembly. Stick this to the top edge of the dash plate with Evostick and, when dry, reinforce the join with woodwork glue.

The glass framing is constructed in the same manner as the upper deck ends. The section behind the stairs adjacent to the bulkhead, will be card instead of glass if the car has a panel rather than a window. Stick this assembly onto the top of the dash sill. There will probably be a canopy over the screen. This must be cut from wood as it will need to be shaped to allow the rain to run off. I fix this piece to the lower face of the upper deck floor and make the joint with the screen top when the upper and lower decks come together at the final assembly stage. The platforms should be painted to completion at this stage using the method detailed later.

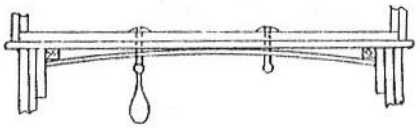
Now we seem to have missed the construction of the floors. The lower deck floor is made from 3mm and 1.5mm thick balsawood. Cut a piece of 3mm thick balsa with the width 2mm less than the car width at floor level and length, 3mm less than the car body length. This is because the sides and end bulkheads are stuck to the outside of the floor. In my models I make a box over the powered truck as a plain hole would allow oil and dust to enter the lower saloon. For a bogie car cut a hole at the motor truck end 65mm long, leaving 3mm at each side and 10mm at the bulkhead end. For a four wheel car a similar hole must be cut, centrally placed and 20mm longer than the truck wheelbase.

Construct a box around the outer edge of this hole, using 3mm thick Balsa for the sides and 1.5mm thick for the top. This top surface should coincide with the underside of the lower saloon seats. Make card slats and stick them to the remaining part of the lower saloon floor. Stain all the woodwork and slats. On bogie cars, holes for the truck king pins must be made in the top of the box for the power truck and in the floor for the unmotorised truck. For the sake of this exercise, I am assuming that your trucks will be bought, ready-to-run from me, as truck construction is complex and beyond most modellers. In order to earth both trucks of a bogie car and avoid a joining wire, I stick two thin brass plates, with king pin holes in them, one in the box and the other on the underside of the floor. These plates are joined electrically by a piece of wire fixed to the underside of the body, and soldered to each plate. I have found that no matter how thin and flexible the earth wire joining the two trucks may be, it can still impair the truck movement and thus cause derailment.

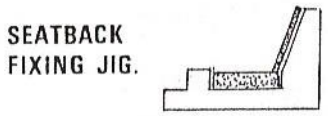
It may be necessary to trim a little material away from the floor to clear the tops of the wheels. This is best done with a sharp blade when the trucks are fitted.

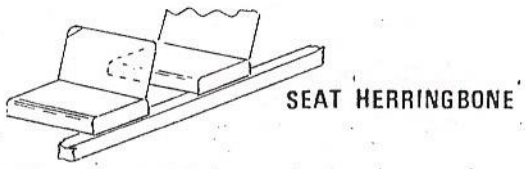
The upper deck floor is not so complicated. This is cut from card and the outer edges represent the floor edge on the prototype, which usually protrudes beyond the outer panels. A second piece of card is cut 3mm less than the overall upper deck panel dimension. This is stuck on top of the floor with an equal margin left all around the edge. This gives the upper deck ends and sides a surface to butt up against, and also adds strength to the floor. Cut Slats from the card and stick them to the

upper surface. To provide a surface for the lower deck sides to locate against, a strip of balsa 1.5mm square is stuck along the underside between bulkhead positions and 2.5mm in from the side edge (3mm if the car has fanlights). Stain or paint the floor. I cut the lower saloon ceiling from glazed white card and stick it to the centre of the floor and to each side location strip. This gives the ceiling a slight curve. Grab handles and rails are fixed into the ceiling. Upper deck bulkheads are constructed in the same way as those on the lower deck.



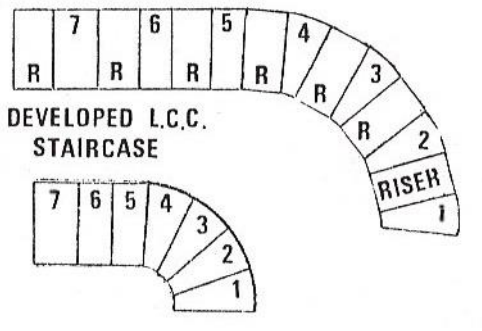
Seats may be made from 3mm balsa for the bases and card for the backs. For open top cars, cast whitemetal seats with working tip-over backs can he purchased from me. End seats must be cut to the shape of the car body. I have made a jig for sticking the backs to the bases with woodwork glue. To ensure that the seat backs are all in line when viewed through the front of the tram, I have evolved my own method. Stick the required number of seats for one side of the car, to a piece of 3mm square Balsa, making sure that the seat end does not protrude past the strip. When dry, this assembly can be painted to-completion, ready to be stuck to the inner face of the upper deck side. By doing this all the seats are at the same height and level which improves the appearance of the completed model considerably. It is also easier than sticking individual seats in position.





On the prototype tramcar there would be a hole in each end of the upper deck floor for the stairway. On an open top or balcony car, this must be cut out. The end of the floor may then be strengthened by sticking a 2mm wide strip of card, on its edge round the end on the underside, 1mm in from the edge of the canopy circle. Use Evostick and reinforce on the inside with woodwork glue. On a fully enclosed car I do not cut out the stairwell holes as I have found that the very thin portion which is left can be distorted by the upper deck ends when they have been fitted. Instead, I paint the section which should be cut out with a black paint and no-one has spotted it yet. A cheat I know, but I would rather have a nice straight upper deck end.

If you do not use the whitemetal cast stairs which I produce, they can be constructed from card. Draw out the treads and risers in an extended form on a piece of card, but reduce each riser height by 0.5mm to allow for the thickness of the card when the assembly is bent up. Starting at the bottom, score the card on the outside face at the top of each riser and on the rear face at the bottom of each riser. You can then bend each joint at 90 degrees, forward and back alternately and you have the beginnings of a staircase. Cut pieces of card for the side stringer but much greater than the final required width. Coat the inside face of the outer stringer and the staircase edge with Evostick. When ready, carefully bring them together bonding the treads and risers as you go. Start at the top and work down, as the first few steps are often straight and this will give you an easier start. When dry, reinforce with woodwork glue behind. Trim the outer stringer to shape. A pair of curved blade needlework scissors is a useful tool for this operation. Repeat for the inner stringer. It may help to pre-bend the stringers, but it is not simple, as they follow a compound curve. Stairs are tricky and a



few trials and errors will occur before perfect products are made. This method is one which I have evolved over the years, and it works. Do not be led up the 'Plasticard' garden path as it will warp and try to regain its original flat profile. It is alright where small areas are concerned, but plastic is not a stable material whereas card is when properly painted. Resistance boxes and the like, can be made from card and/or balsawood, whilst whitemetal controllers and handbrakes can be bought from me.

The car roof is cut from 1/8" thick balsawood and sanded to the correct curved profile to allow the rain to run off. The sprung trolley poles which I supply are designed to drop into a small eyelet recessed into the centre of the trolley plank. Stick the trolley plank of 1/16“ thick balsawood into position and drill a hole and fix the eyelet in it with woodwork glue. Cut a groove on the underside, from the eyelet to a position of the edge of the roof, at the top of the stairs. Solder a wire from the underside of the eyelet, ensuring that the hole is kept free from solder, and fix it in the groove. Fill the groove and sand off flush. This way, only the smallest amount of the eyelet is visible inside the car and that is good enough for me. In my experience, the purist builds very little.

When the roof is stuck to the upper deck, the wire is passed down the bulkhead, and, therefore, cannot be seen. A piece of 1/16” balsawood strip should be stuck to the underside of the ceiling to give a location for the sides and ends.

Another method is cut a piece of glossy white card to the shape of the inside face of the upper deck, and stick this to the underside of the roof. This gives a location and an instant white ceiling.

FINAL ASSEMLY

As all the pieces have now been made, assembly of the complete body can commence. All the interior faces and upper deck bulkheads should have been finished to completion, properly stained and varnished. The upper deck is made up as a box, enclosed by the floor, sides, ends and roof, in that order, using Evostick 528.

The herring bone of seats for the two sides should be painted to completion using matt paint for the upholstered parts. These two assemblies should be stuck to the inner faces of the car sides. End seats must be cut, shaped, painted and then fitted, once the sides have been fixed in position.

Care must be taken to ensure that the inside faces and interior is clean and free from bits and pieces, as once this box is complete, no further access is possible. Position the trolley feed wire down behind the bulkhead side pillar and through a small hole in the floor, ready to run down the outside of the lower deck body, behind the stairs. The balsawood roof will need two coats of sanding sealer to fill the grain and eliminate the fluff of the sanded wood.

Make and fit end indicator boxes at this stage.

The lower deck consists of an open topped box made up of the floor, sides and end bulkheads. Seats should be on a strip as on the upper deck. The longitudinal seats at the ends over the sand boxes on the real tram, should be made separately, painted and fitted after the box is completed. If cast seats are used, they must be fixed direct to the floor or side and floor of the car, depending on whether the seats have one or two supporting legs. As the box over the truck was made so that the upper surface was level with the base of the seat, the legs must be removed from seats in this area.

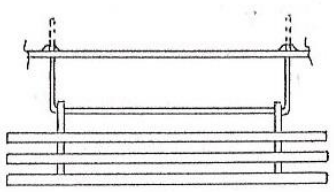
Full length longitudinal seating as on many old open top cars is very much easier to construct. The bases are made from 1/8" thick balsawood and the backs from 1/16" thick balsa or card. The kickplate is again 1/8" Balsa. All this construction must be done during the assembly of the floor and sides.

Most tramcars have a rubbing strip along the lower deck tumblehome to prevent damage to the main body panels by a glancing blow. Cut the edge of a piece of 1/16" thick balsawood or hardwood square. Shape it to a rounded vee. When finished, out it off 1mm back from the edge and stick it to the car side with Evostick. Clean off any surplus adhesive with White Spirit.

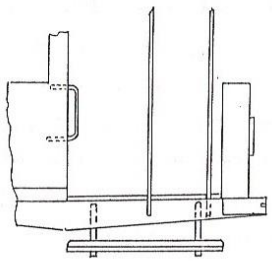
The top deck should locate inside the lower deck and may now be stuck in position, providing the lower deck is clean, as access is not possible afterwards.

Painting to completion as detailed later may now take place, especially the ends of the lower saloon, as this is very difficult after the platforms have been attached. Ticket boxes and handrails must be fitted now.

Platforms are stuck to the main body around the top edge of the driver's screen, if one is fitted and at the four bearers which stick to the underside of the body ends. A fillet of woodwork glue on each side of the four bearers and along the join between platform and body end is advisable. The reason for using hardwood for the hearers should now be apparent as balsawood is too soft for the load placed upon it, especially if the car has no screen.



The front 1ifeguard gate can be obtained in whitemetal from me or made up of strip metal by the modeller. In each case the support wire should be taken up through the platform floor and cut off 1mm above the floor level. A bead of woodwork glue should be applied to the protruding 1mm length of wire to ensure that it does not come out. A pin chuck and fine drill is a most useful tool for this job and for fitting trolley hooks, trolley feed wire, fog lights, mirrors and handrails. Wherever possible drill a hole into the body and insert the mirror support wire, trolley hook or grab rail right into the main structure and they will not come off with first knock.



Entrance step supports should go right up into the platform bearer. Central entrance grab-rails are bent at right angles pass through the platform bearer. On open balcony cars you may like to take the power from the trolley through this grab rail and a balcony support rail. By doing this the trolley feed wire will not be visible anywhere.

PAINTING

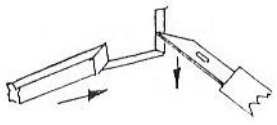
When two sections have been joined together, the gap should be filled with body putty. This is a plastic cement that dries hard and can be sanded off flush with the surrounding surfaces. Only apply the minimum amount required as it is a tedious task cleaning off the surplus putty. A lick of white emulsion paint will show up any small imperfections which can be cleaned up using flour paper.

The next step is to apply the beading to the panels, especially where there is a colour demarcation line on the finished model. Normally this occurs 1.5mm below the windows on both decks so a 0.5mm wide strip of self-adhesive tape is fixed in these positions. The colour of the tape is not important as it will eventually be covered with paint. This tape enables you to paint up to either side of the tape and then paint the strip with the appropriate lining colour. You can buy self-adhesive tape in a stationers, but it will not be in the narrow strips you require. Stick a strip 8" long onto a sheet of acetate, glass or metal and using a sharp blade, and a steel rule, cut off the 0.5mm wide strips. If you cannot hold the rule steady whilst cutting, stick it in position with two other pieces of tape. Do not stretch the tape when applying it to the model as this will cause it to creep back at the

joins and leave gaps. At a join, overlap the tape and cut through both tapes, thus giving a perfect butt joint. A lick of white emulsion paint is advisable to seal the tape and to show up any bits which need cleaning off. I like to make sure that everything is covered with some form of finish. I remember a model I once saw which was finished as far as the outside was concerned but the inside still showed the printing on the card which the modeller had used in the construction. Another modeller used self-adhesive wood effect plastic sheet for the interior which at the outset seemed a very clever innovation, but with the passage of time it curled up at the edges like the old-style railway sandwich. If you remember when trying new materials that plastic will shrink with age, then you will not go far wrong. If you now saw my Liverpool Baby Grand, built in 1957 using exposed X-ray film for the outside sheeting, you would understand why I am so against plastic. That car was a prize winner but now the panelling is distorted and curled at all the edges. My London rehabilitated E1 car was the same until 1976 when I completely rebuilt it using-exactly the method laid out herein.

Now we have the model ready for its first all over coats of paint. This is a thin coat of matt paint relating to the final colour, but beware..... All London Transport vehicles, both Red and Green had a pink undercoat and only the final top coats were red or green. If you use matt Post Office red or Lincoln green your vehicle will look too dark when finished. Many modellers have made this error and could not understand why the finished product did not look quite right. One friend obtained actual bus paint from a London Country area garage paint shop, but he used dark green undercoat and could not understand why the model looked nearly black. The pink undercoat shows through the top coat and gives that glow which is the subtle difference. So if the livery is a rich glowing deep red or chocolate brown, use an undercoat which is lighter than the final finish colour. For a batch of Bolton cars which I built I used quite a bright red matt undercoat and then the final maroon. The finished cars had that coachwork look which people generally credit to many coats of paint which were once applied to old vehicles This only gave the mirror like surface, it was the colour underneath that gave the richness of the livery.

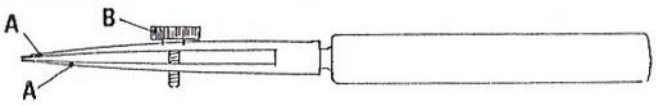
When the first coats are dry, sand down with a small piece of flour paper. Keep changing the paper as hard pieces of paint build up on the paper and these in turn will scratch the surface. Do not use the same piece of paper on different colours as this will transfer the red onto the cream, for instance. As the window surrounds were emulsioned cream, there is no need to paint right down to the glass. This is a dodge I evolved for myself and now I get very little paint to clean off the windows at the end. In positions where you must paint top coat up to the glass, make sure the undercoat gets on the glass first as top coat over undercoat is easily removable by running a blade down the edge of the window, followed by a sharpened piece of hardwood to remove the unwanted paint from the glass. Matt paint does not really adhere to the acetate but top coat gloss really does. This needs so much effort to remove it that the acetate gets scratched in the process. There will probably be the need for a second undercoat which when dry will only need a slight touch with the flour paper.



Making sure that you are not wearing a wool jumper and the area is dust free, the final gloss top coats can be applied. There will be two coats of slightly thinned Humbrol gloss applied with a good quality art brush with at least a 24 hour interval.

After the paint has been given time to dry and harden off, the model must be lined out. The main body colour is usually picked out with a gold or yellow line and the cream or white panels with black or gold. In the past I have used tapes and rub-down self-adhesive 'Letraset' type lining aids but I

have for the most part applied my draughting skill by using slightly thinned down paint, applied to the model with a draughting ink ruling pen compass.



Practice is required to master the use of these instruments but the results are well worth some self-training. A ruling pen consists of two sprung blades 'A' and an adjusting screw 'B' which regulates the distance between the blade tips, and the resultant line width. For the width of line required here, the blades will be just touching and the paint will filter down between them to deposit a fine line. This is why the paint will need to be thinned down. it is important to only load a very little paint between the blades as a lot will cause a flood onto the model. This is a process that you cannot hurry. You will need to keep cleaning the pen out with white spirit as the paint will start to dry in the pen and prevent it working. This basic pen can be used for all flat surface lining. The curved surfaces are a different matter and for these I use the ink bow which is a compass with the same arrangement as the basic pen in place of the usual pencil lead. If you set the centre pin of the 'compass' slightly longer than you would for drawing circles on paper, the pin can be used to locate against the edge of a piece of card. Try it with a dry run and you will see what I mean. This method can be used for the staircase sides, using the stringer edge for location. The dash can be lined out by locating against the ends and upper edge. The upper deck ends can be lined using the underside of the floor as location. In order to line out the bulkheads before the platforms are fitted, I cut a hole in a cardboard box so that the car body is held at an angle of 45 degrees, with its end facing up to the modeller. Take care not to let the ruling edge (in my case a 12" steel rule) touch the model or the paint will run under the rule and spoil the line. It is possible to clean off a bad line with white spirit on a very soft rag but if the main body colour is not hard dry then it will also come off and then you are really in trouble.

Coats of arms can be applied with a fine paint brush or the ruling pen if you have become proficient in its use. Do not spare the pennies when you buy your brushes; the finish is only as good as the brush used to apply it, so invest in a few sable brushes from an art shop or a good model shop. Clean them in white spirit immediately after use and look after them. They will last a long time and after a while you will only need to replace the top coat brush and relegate it to lesser tasks such as floors or staining. If your top coat results in brush marks it is only because the paint is too thick. Humbrol straight from the tin is always too thick. On the undercoats, the marks can be sanded out but the gloss finish cannot be successfully sanded.

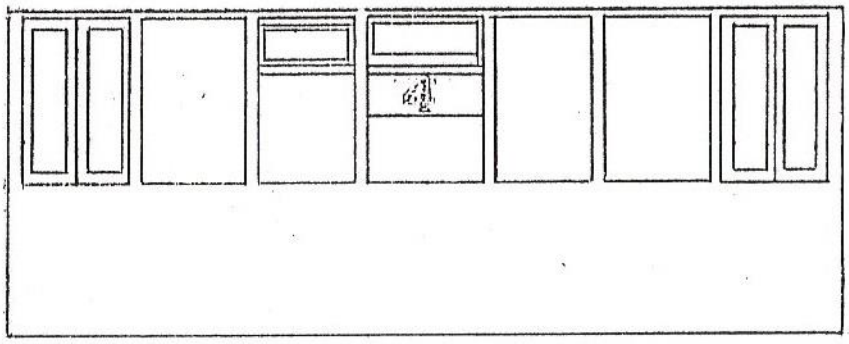
FITTING THE TRUCKS

Bogie trucks as purchased from me have 6BA or M3 screws with a nut as king pins. I only rest the body on the king pins as I like to be able to remove the trucks easily for servicing, but should you so desire, the nut may be used to permanently secure the truck in place but they must be fitted before the upper and lower decks are joined together.

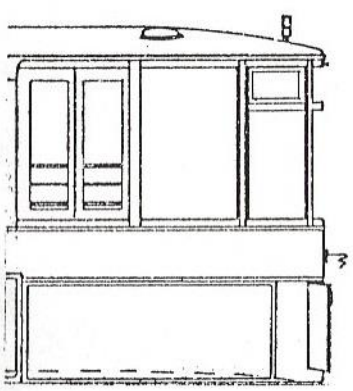
The four-wheel trucks have no fixing points. I use Evostick and secure the upper side of the truck casting to the underside of the body. Variations on this method have been evolved by fellow modellers to enable the trucks to be fixed, yet easily removable.

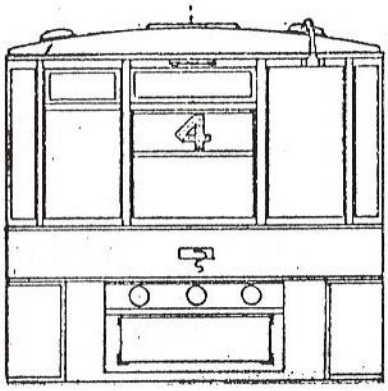
Well you should now have a finished working model. You may not agree with my methods, you may have evolved some of your own but I hope that this has helped you along the road of tramcar modelling, which I enjoy because when the model is finished, it is all you. Not a bought toy or an assembled kit but good old fashioned scratch building. Remember, it is not what others think about

your model, it is what you think that counts. Look at the good parts, improve on the not so good. I still have my first model and I never criticise the work of others, I only try to help the modeller to...Start...Improve ...or Outshine.

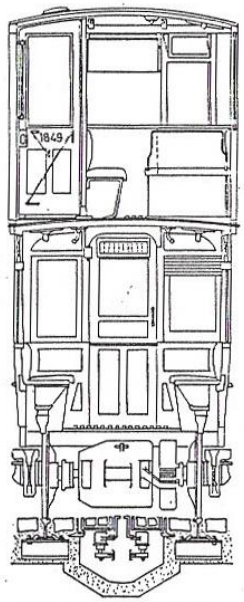


ABOVE · THE DEVELOPED UPPER DECK END OF AN L.C.C. E1 TRAM DERIVED FROM THE VIEWS SHOWN BELOW.

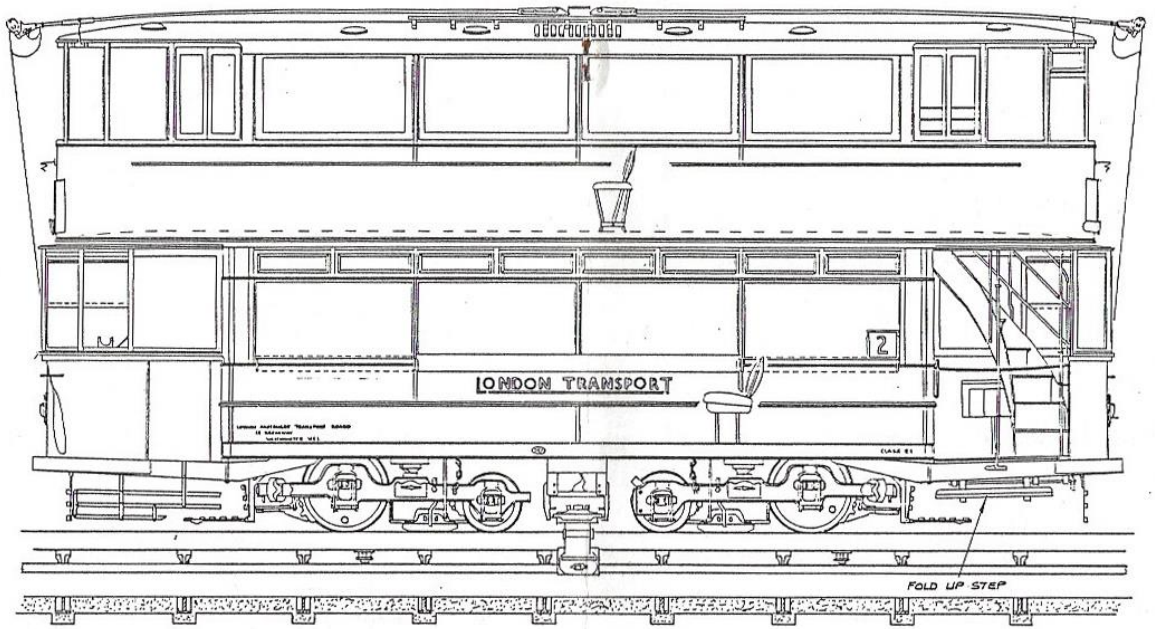


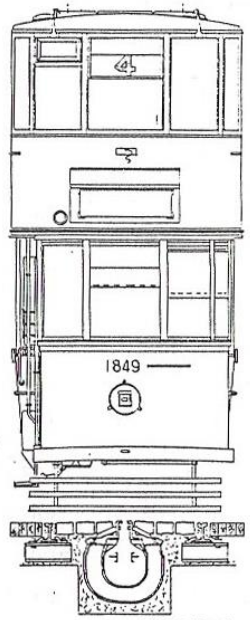


CAR FLEET No. 1727 - 1851

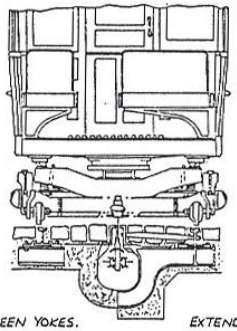


INSULATOR PIT.



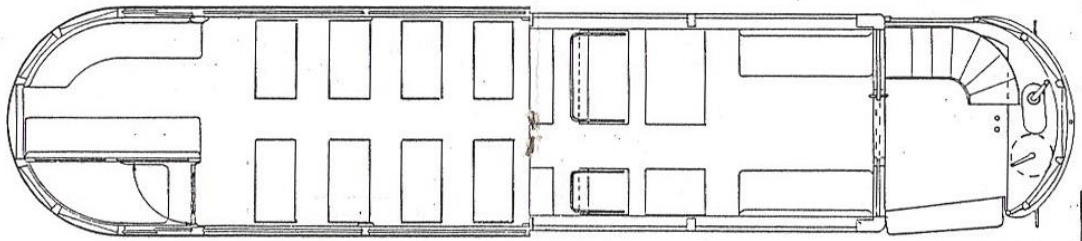


SHORT YOKE.



BETWEEN YOKES.

EXTENDED YOKE.



THE FOLLOWING FINE SCALE '0' GAUGE PARTS ARE AVAILABLE: MOTORED TRUCKS STAIRS SEATS CONTROLLERS LIFEGUARDS BRAKES FOGLAMPS & PLOUGH CARRIER SEND SAE TO TERRY RUSSELL FOR LIST.

DRAWN BY: TERRY RUSSELL, 'CHACESIDE', ST. LEONARDS PARK, HORSHAM, SUSSEX.

LONDON TRANSPORT

TYPE: "CLAPHAM" E1
BUILT. 1920

DRAWING No. TC 40

0 gauge model of a London E/3 built by Mike Skeggs and shown at the 2013 Festival of Model Tramways. (*Photo Bob Appleton*)

0 gauge model of a London E/1 built by Eddie Dawes and shown at the 2017 Festival of Model Tramways. (*Photo Bob Appleton*)

Details of Terry Russell's products are at terryrusselltrams.co.uk