ASSEMBLY INSTRUCTIONS
SER/SE&CR/SR ROUND END OPEN WAGONS
ROW63, SEW63, ROW77, ROW85E

PLEASE READ BEFORE STARTING THE KIT

INTRODUCTION

I hope the kits will encourage other modellers of this neglected railway. The drawings are very carefully researched, and I try to make the kits as historically accurate as possible.

There are kits or parts for four different round-end open wagons, spanning the building dates 1858 to 1890. Extra parts are available for two variants, making 6 different wagons in all. (See Historical Notes at end) Check before assembly that you've got the kit for the period you're modelling. For example, the diagonal strapping was *inside* before about 1876, and *outside* after that date. Many of the earlier wagons were of course still in service decades after 1876, but to complicate matters, many seem to have been rebuilt about the turn of the century, and the strapping replaced *outside!*

TO COMPLETE THE KIT, you will need 3'1" Mansell wheels (Slaters or equivalent) except for ROW85E – the express version – which takes 3' 7" wheels; quick-set epoxy resin adhesive (eg. Araldite or Devcon), superglue, filler such as Milliput, paint and transfers. SER wagon transfers should become available from Fox Transfers by the end of 2002. If you plan to model the wagon before about 1890, you will need safety chains, eyes and hooks, available from SER-KITS as an optional extra.

TOOLS NEEDED: medium and fine flat and round files for cleaning up castings. A drill, which need only be a pin vice, or hand-drill, but preferably a 12V model drill. The following drills are useful: 1.4mm, 0.9mm, 0.6mm. (You can probably manage with 1/16", 3/64" and 1/32" if you're stuck.) Sharp point for marking. Craft knife, small set square, sandpaper and sanding block.

RESIN PARTS

This kit has new high-quality resin parts which should not give trouble in normal handling, but please work in the warm.

Handling finished open wagons

Note that open wagons have scale thickness sides, of around 1.5mm thick. Even with the new resin, I recommend picking up completed wagons by the solebars or ends. If open wagons are likely to get rough handling (grandchildren?) consider a load to support the sides.

HEALTH AND SAFETY: Like all white-metal castings the ones in this kit contain small amounts of lead. Keep them away from young children. Dispose carefully of all filings, drill swarf and metal dust. Do not eat while handling parts, and wash your hands thoroughly. So far as I know, the polyurethane resin poses no health risk, but avoid inhaling filing dust.

PACKING LIST

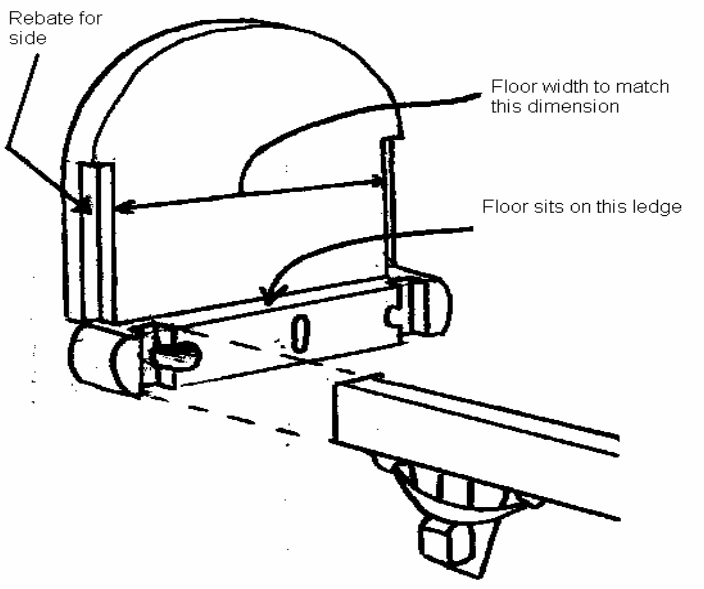
2 Resin sides	2 Resin ends	2 solebars with axleboxes
4 buffer stocks	4 buffers	2 coupling hooks
6 lge coupling links (Not ROW85E)	6 small links (Not ROW85E)	2 medium links (Not ROW85E)
Etched screw couplings (ROW85E)	1 brake casting	1 brake guard (catch)
1 brake lever	Pin for brake lever if etched	length p-bronze wire
Styrene floor	5 thou styrene strip	
Tarpaulin bar (ROW77 only)	Scale Wagon drawing	Instructions & history

RECOMMENDED ORDER OF ASSEMBLY

1. Clean up resin castings.
2. Scribe floor and assemble body.
3. Check that metal buffer stocks and drawhooks fit in resin ends. Fix buffer stocks.
4. Fix horse-hooks to solebar/axlebox castings. Also brake casting (one side only).
5. Paint all parts including wheels.
6. Fix white-metal solebar/axlebox castings (with wheels) into slots in headstocks (buffer beams)
7. Add buffers and coupling hooks
8. Add brake catches and brake handles.

ASSEMBLY – THE RESIN BODY

1. Occasionally, particular after long storage, the resin sides and ends may be slightly warped. DO NOT ATTEMPT TO BEND THEM STRAIGHT AT ROOM TEMPERATURE – THEY WILL SNAP. First warm the castings in hot water or with a hair-dryer and then very gently bend them between the fingers. Another method is to leave them on a flat windowsill in hot sunlight (summer only...)
2. Clean up the edges of the resin castings with a file and glass-paper, especially the casting ridges under the end stanchions. It's best, but not essential, to take off the shiny surface and any slight irregularities with a fibre-glass pen. Occasionally pin-holes occur (air bubbles in the casting) and these can be filled with resin glue or filler.
3. Clean the buffer stock holes with a round needle file. You may prefer to clean up the buffer stock castings at the same time and ensure they fit without forcing. EXPRESS WAGONS (ROW85E) ONLY: Carefully use a round needle file to lower the bottoms of the holes, making a vertical slot, so that stocks fit 1mm lower. The top of the slot can be filled with resin glue when fitting stocks, or with filler.
4. If modelling the wagon as running before about 1890, it should be fitted with safety chains in addition to the normal couplings. Refer to the drawing, and drill out either side of the coupling hook (you can just see little 'dents' to guide you) using a 0.9mm drill. The safety chain eyes will fit in these holes later on. NOTE – safety-chain packs are an optional extra.



5. Check that the corners of the styrene floor are square, and if necessary, reduce the length with glass-paper to exactly 106mm. The floor is supplied at a nominal 50mm width. Check that the width is the same as the inside of the rebates on the resin end castings. If resin shrinkage has occurred, it may be necessary to trim the floor carefully until it is the same width.
6. Scribe the floor planking at 4mm intervals with a sharp metal point and set square.

7. Glue the floor to the ends, holding them upright while the resin sets.
8. When set, offer up the sides and if necessary trim to fit into the end rebates.
9. Place the wagon on a sheet of glass or truly flat surface. Fix the sides to the ends with resin adhesive in the rebates, but DO NOT glue sides to floor yet. (That happens when you fix the solebars in place.) Leave to set for at least an hour and preferably overnight.
10. Cut a strip of 5 thou styrene sheet, 2.3 mm wide. Chop into 4 lengths, each either 21mm long (ROW63, SEW63) or 19mm long (ROW77, ROW85E). These will simulate the iron plates that hold the side-planks to the ends - and hide any gaps! Use a sharp point to emboss 'bolt heads' according to the drawing, and superglue them vertically over the joins where the sides slot into the ends.
11. Glue the buffer stocks in place, checking the orientation of the ribs against the drawing. Also check that the buffers will be horizontal when inserted. You can ensure this by threading a thin rod through the buffer stocks from one end of the wagon to the other.

WHITE-METAL UNDERFRAME - PREPARATION

1. Before assembly, check the castings against the drawing, and file or cut off any excess metal ('flash') left over from casting, including casting ridges behind the W-irons. Run a file over the top edge and make sure it's straight. If not, it can be gently bent. (This kind of white-metal is fairly pliable)
2. Gently offer the solebar castings into the slots in the resin ends, trimming as necessary. The scale distance between the solebars should be 42 mm. Check that they fit snugly into place without forcing. Remove, and…
3. Referring to the scale drawing, drill out the horse-hook (grab-handle) holes in both solebars (underframe sides) with a 0.6mm (No 73) drill. There are 'dents' to guide you. NB: small drills bind easily in white metal and snap. Use a sharp drill, slow speed and remove frequently to clear swarf.
4. Bend small pieces of the phosphor bronze wire to make square U-shaped horse-hooks and stick in place in the holes you've just drilled.
5. Check that the wheel bearings fit in the axlebox holes, and if necessary, clean out the holes. Gently scraping the inside is usually enough. If necessary, when using Slater's wheelsets, you can use a 2.5mm (No 39) drill held in the fingers or a pin vice. The intention is for the bearings to drop fully into the holes. Careful, there isn't much spare depth! NB: because the clearances inside these early axleboxes are so small (they're to scale!) there are occasional pin holes in the casting. These can easily be filled with model filler after assembly.
6. The brake is on one side only. Don't fit the brake guard yet, but fill the holes for it in the solebar *without* the brake.
7. **At this stage, I recommend painting the body, solebar/axlebox castings, wheels, and remaining components. (See Painting Notes on a later page)** Remember first to fill any gaps and holes, do a final clean up, and wash the body.

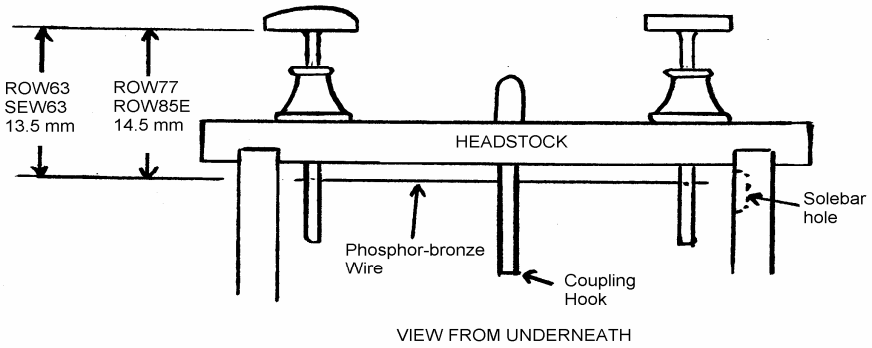
UNDERFRAME ASSEMBLY

1. Place the resin body upside down on a small block of wood so that it's steady.
2. Take your time over the next few steps - the good running of the wagon depends upon it. Put the bearings into the holes, and sandwich the wheelsets between the solebar/axlebox castigs. Manoevre the solebars into the slots in the resin ends.
3. Check that the w-irons are vertical, viewed from the end. If not, very carefully deepen the bearing holes.
4. Check that the axles are at right angles to the sides. If necessary, file one solebar end to fit more deeply into the end slot.
5. Holding the solebars in place, turn the wagon over. (Yes I know, it usually all falls apart at this point, so try again!) Place the wagon on a sheet of glass and check that the wheels sit level. Check also that the body is level. If necessary, (and it's normally not) gently file down the top of one of the solebars until everything is true.

6. When you're satisfied with the fit, run a thin smear of resin glue along the corner between floor and side and quite a lot into the slots. Fix the solebars (with wheels!) in position. Again, check the wheels are at right angles to the sides. Let the glue begin to set (about 5 minutes), then - holding the solebars in place, turn the wagon over and stand it on the glass. Make sure all four wheels touch. (I usually put a heavy weight into the wagon) Let the resin glue set, preferably overnight.

BUFFERS AND DRAWGEAR

1. Fit the buffer stocks. 4 rib buffers are fitted with the webs on the diagonal viewed from the end. 3 rib buffers should have the outer web horizontal. When gluing in place, it's worth passing a long 1/16 in. rod through opposite stocks to ensure the holes are in true alignment as the glue sets.
2. Clean up the buffers. (Note that in ROW63 and SEW63 two are flat-heads and two are round-heads. Check with the drawing to get them the right way round!) Some modellers have been worried about the fragility of these buffers, but the metal is pliable, and can be bent straight again after an accident! I've been using them for more than 10 years now. (The alloy used for the buffers is prone to pitting, so you may need to use filler)
3. The buffers should need little adjustment in order to slide easily in the stocks. You can simply scrape the buffer shanks along the length with a craft knife, rotating the buffer between each scrape. Don't file the shanks across the width – the roughness will stop the buffers sliding smoothly. You can also gently run a 1/16" drill through the holes in the buffer stocks. Whatever method you choose, the buffers should slide easily in and out. If not, your derailment rate will rise!
4. Drill a hole 0.6 mm (No 73) right through each shank to take the spring wire. For ROW63 and SEW63, the hole centre should be 13.5 mm along the shank from the rear of the buffer-head. For ROW77 and ROW85E, 14.5mm. If you're squeamish about drilling through a narrow rod, do as I do, and make a simple jig from a couple of inches of 1/16" I.D. brass tube. Drill the hole through the brass tube at the correct distance from the end. It's then a simple matter to feed each buffer into the tube for drilling. This jig is also useful for protecting the shank when painting the buffer heads.

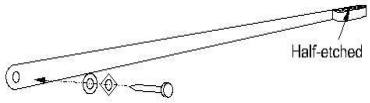


VIEW FROM UNDERNEATH

5. Clean up the hole in the resin end for the coupling hook. Use either a fine needle file, or a hand-held 1.4 mm or 3/64" drill. The hook should slide smoothly in and out without sticking.
6. If you are making the Express Wagon, ROW85E, partially assemble the screw coupling before proceeding. (See detailing notes below)
7. Run the phosphor-bronze wire through your fingers to straighten it, then cut off two pieces 41.5 mm long. Checking with the diagram, slide the wire through the hole in the coupling hook just behind the headstock, and then into the hole in the right-hand buffer shank. Push the wire right through so that it overshoots into the hole moulded into the solebar. The wire can now be pulled back into the hole in the other buffer shank. (It's much easier to do than explain) With a little bit of adjustment, the two buffers should now spring easily in and out.
8. When you're satisfied, push the coupling hook fully in, and put a blob of resin glue or superglue to hold the wire in place. When set, the ends of the wire can be bent to touch the headstock so that the buffer heads protrude fully and the draw-hook is held back by the spring.

DETAILING

1. ROW63, SEW63, ROW77: The push-rod brake casting has two holes to fit over two spigots behind the solebar. Some filing is needed to fit the casting to the 1863 solebar. The metal is pliable enough to bend the brake 'off' more, if it fouls the wheels. Purists may wish to drill out the push-rod adjustment holes with a 0.6mm drill. ROW85E: The cast-iron brake casting should be manoevred into a slot behind the W-iron and glued in place.
2. Brake guard (catch): Clean up the cast brake catch strap and locate in position with its lugs in the holes cast into the solebar. Glue in place. You should have filled the holes in the other solebar earlier on.
3. Brake levers: when available, an etched lever with square nut and round washer will be supplied. Curve the end with the half-etch inside as in the diagram and assemble onto the brake casting with a pin.



4. Cast levers: Some brake levers have a locating pin to go into the pivot hole. Those that don't will be stronger if you drill the pivot with a 0.6mm (No 73) drill and hold the lever in place with a cut down dressmaker's pin.
5. ROW63, SEW63, ROW77: To make 5-link (SER) coupling chain - clench together three of the smallest links, and clench a medium link on the end. Thread a large link through the other end of the chain, and clench through the hole in the coupling hook. To make SE&CR chain, join together 3 large links on each hook. Coupling hooks and links are scale size, and if you work to 'coarse' standards, you may need to replace them with larger, non-scale versions.
6. ROW85E: Etched loops and centre are provided. The longer loops go to the drawhook, while the shorter loops are for coupling. If you prefer to use the cast drawhooks (they look better), saw a slot into the hole for the etched loop and seal with low melt solder (70 degrees) or a drop of resin glue as it begins to set – so as not to stick the loop!
7. ROW77: sand the styrene strip tarpaulin bar to a rounded top profile. The ends should be rounded and overlap the wagon ends. Glue in place.
8. Fit the four safety-chain eyes, if using them. Cut the fine chain to the length in the drawing, open out the links at each end and fit in place, hanging one of the cast hooks at the end of each chain.

PAINTING AND LETTERING

1. In SER days, the wagons were painted 'light red' - an oxide of some sort. Southern Wagons Vol. 3 states this was Venetian Red – an oxide of iron - but it's not clear what the source of that information is. In any case, Venetian Red as bought in artists' shops is way too bright. A watercolour painting of Folkestone Harbour in the Folkestone Public Library shows the wagons as somewhere between pink and red with a trace of orange – a kind of terracotta. No doubt the colour darkened with age.
2. A good colour can be obtained by using Humbrol red-brown 100, and adding a little black to taste.
3. Take the red down onto headstocks and solebars including the buffer stocks. Below the solebars, black. The body strapping was originally painted black. But rust and weather...?
4. The interior was presumably left unfinished wood, and should therefore be a yellowy-grey for a new wagon. Or coal black after the first load!
5. In theory, the Mansell wheel axles were painted blue as a distinguishing feature. The wheel centres were varnished hardwood (ie. brown) and the tyres white when new.
6. The 'SER' is in white serifed letters 8" high (4.7mm) on the bottom plank on the left. The number, also serifed, is on the right bottom plank. The number is repeated on both ends in 3 1/2" lettering, centred on the bottom plank. Transfers are available from Fox's. Note that the drawing of SER wagon lettering in Southern Wagons Vol. 3 contains many inaccuracies
7. In SE&CR days, wagons may have eventually been repainted a mid or dark grey. The SE&CR lettering is non-serifed, and before 1917 of a similar in size and position to the SER's. After 1917 Maunsell had very large lettering higher up, presumably to make it clear during pooling who the wagons belonged to. Again, Fox can supply.

SER-KIT VARIATIONS

The two basic kits, ROW63 and R0W77, show the early and middle periods of the standard wagons.

ROW63 is based on SER Drawings Nos. 306 and 307 dated 1863, and has internal diagonal strapping, 14" wooden head buffers with 4-rib stocks and thinner end stanchions. It can be converted to the earlier **1858**

version (Drawing No. 311) by altering the strapping, and replacing the 4-rib buffer stocks with the earlier hooped pattern. (SER-KITS can supply a simple conversion kit)

A further variant (Diagram 306) has oil axleboxes. The difference is minimal, but an alternative solebar/axlebox casting is available for fanatics.

SEW63 is the step-end wagon, similar to ROW63, except for the cut-away ends. What for? – your guess!

ROW 77 is based on SER Drawing No 552, dated 1877, with external diagonal strapping, 12" metal buffers in 3-rib stocks, thicker, tapering end-stanchions and a tarpaulin bar.

ROW85E, SER Drawing No 823, has a similar body to ROW 77, but has iron-block brakes, 'express' axleboxes with 4' springs, and screw couplings. With 3'7" Mansell wheels, it has a very different look from earlier wagons.

WAGON NUMBERING

ROW63: 4081-4230, 3938-3957, 2306-2405, 4933-4942, 5070-5328

SEW: 4031-4080 (Note: These were built in a batch of 200, Nos 4031-4230, along with normal round-end wagons. The step-end wagons took the first 50 numbers.)

R0W77: 5707-5856, 6171-6185, 6252-6291, 6368-6397, 6483-6532, 6625-6974

ROW85E: It's difficult to be sure from the number sequences which are express wagons, but 7789-7838, 1159 and 1488-1596 can be confirmed from photographs.

The numbering was maintained in SE&CR days. Southern Wagons Vol 3 has SR conversion tables on p.32.

FINALLY:

I hope you've enjoyed assembling this kit. If you've had any problems, let me know, and I'll try to find a solution for later kits.

If you want to know more about the SER, the LCDR and the SE&CR, why not join the South Eastern and Chatham Society? Membership is £20 per annum in 2012, and the membership secretary is John Arkell, 30 Meadow Road, Rusthall, Tunbridge Wells, Kent TN4 8UL.

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HISTORICAL NOTES

From the earliest, the SER appears to have used open wagons with high round ends. A handwritten note on an early diagram refers to D-end wagons, and this may have been how they were known in Victorian days. The earliest picture that I know is an engraving of a goods train accident at Leigh (or Lyghe!) in 1846, showing such a wagon. The advantage of the round ends is obvious - by sheeting over, the wagon became almost equivalent to a covered van, at very little extra cost. For this reason, the SER built around two thousand of these wagons, and far fewer covered vans.

The earliest Historical Model Railway Society/Ashford round-end wagon drawing is from 1852, and while there are no end elevations, it appears to have lower round ends than the later versions, and - at 7'O" internal width - is a little narrower. By 1860, the pattern has been set for all subsequent round-end wagons, into early SE&CR days. For some 50 years, the internal dimensions remain the same at 15'l" by 7'3" with the wheelbase standardized at 9'4".

From 1852, the general appearance, too, remains virtually unchanged for over half a century. The ends are a false ellipse composed of three arcs - the two outside having the same lesser radius. Some modelling drawings have shown geometrically semi-circular ends - but there is no evidence whatsoever for these. The D-ends rise 3'O" above the sides, and an arc of diameter 7'7" (the wagon width) would intersect the side verticals at an angle, whereas it is clear in all photos and drawings that the outer arc is tangential to the side verticals.

One interesting variant was the 'step-end' wagon, in which the round ends were not brought down to the sides, but had a cut away, presumably for abnormal loads. Only 50 of these were built.

In fact, for over 50 years, the visual changes above the solebar are really only in small details, although in practice, the changes resulted in progressively stronger wagons. The ends (but not the sides) start off with outside wooden framing similar in style to other SER goods and passenger vehicles of the time. From around 1877, the vertical stanchions become thicker in side elevation up to the crossbar and then tapering inwards to meet the top of the D. This is clearly shown on Ashford drawings and confirmed by photos where the crossbar in earlier wagons throw shadows onto the stanchions below. By the mid-1890s, the end stanchions are replaced with iron angle, and the solebars with patent steel channel. This is the first major change, but in many photos it is not very obvious.

The wagon sides are of 2" timber, or 2 1/2" in some later wagons. The strapping hardly changes except for one important feature. The diagonal strapping is internal until the late 1870s, and external afterwards. It seems that some early wagons were rebuilt around the turn of the century and the diagonal straps moved outside.

Buffer stocks are hooped in the early days, but by 1860 are replaced by standard short 4-ribbed castings on a circular wooden cushion. The buffers themselves have a wooden face 14" in diameter fixed to an iron casting, and the overall length of these buffer assemblies is 22" from headstock to face. Around 1878, new types of buffers are shown on the drawings, and by the 1880s these have settled down to a 3-rib stock with 12 or 13" metal buffer heads. However the express D-ends have longer stocks, similar to carriages.

All the round-end wagons, at least from the early 1850s seem to have had push-rod brakes - on one side only. Their main purpose was presumably to scotch the wagons in sidings, rather than to control them in a moving train. From around 1885, express wagons were fitted with a long lever with a right-angled crank moving a cast iron brake block.

W-irons were reasonably similar in profile - but not identical - while from 1860 to around 1875, the axle box was the standard SER type, with occasional variations, as in Diag. 306. which is a high box where the increased volume of grease makes 'hot-boxes' less likely longer or faster runs . From around 1875 a heavier, slightly larger axlebox came into use.

Springs varied in length and in number of plates. The differences for a modeller are reasonably minute, between 39" and 42", except for the later class of 'express fitted' wagons, which had 48" plates. To begin with, spring plates were 3" wide, allowing wagons to be rated 6-8 tons. After 1880 or thereabouts, spring plates are 4" wide, and wagons rated 8-10 tons.

So far as express wagons are concerned, we should not expect such goods trains to have run at particularly high speeds, though it implies speeds faster than a pick-up goods (which wouldn't be difficult)! It implies delivery direct, without diversions along the way as in the phrase 'expressly for you'. The express wagons

had links at the ends of the springs, hung from hangers not unlike the type used on 4-wheel passenger coaches, and would of course give a softer ride. Some of the express D-end wagons had large multi-purpose axleboxes (grease or oil), identical to those used on passenger vans and later carriages.

Wheels seem always to have been to Mansell's patent with wooden centres. In the 1860s they are 36" diameter, and this creeps up to 38" as the century goes by. Express fitted wagons had 42" or 43" diameter wheels, and to accommodate this, the W-irons were of a slightly different pattern.

Couplings were a standard 5-link chain. Under the SE&CR, couplings became standard 3-link. Express fitted wagons had screw couplings. Safety chains and hooks were fitted from the earliest years up to about 1890 and then discontinued. Photographs show that many older wagons retained the safety chains well into SE&CR days.

Some time around the turn of the century, wagons began to be fitted with oval chalk boards on the sides, towards the top of the right-hand end. These can be seen in photos.

From 1899 the SER formed a working union with the upstart London Chatham & Dover Railway. The union was called the South Eastern and Chatham Railway. As far as the D-end wagons are concerned, many older ones remained in service as built. However, later on, the SE&CR began a policy of cutting off the Ds of the ends, to make a distinctively low open wagon. Some of these survived into Southern days, and the HMRS has photographs of one. Quite a number of wagons – both pre-1877 with internal diagonal strapping and and post-1877 with external diagonal strapping - survived into early Southern days with round ends intact (see Southern Wagons Vol 3 p32).

Photographs – just about all the useful close shots are published in Southern Wagons, Vol 3 – details below.

FURTHER READING

An Illustrated History of Southern Wagons, Vol 3 – SE&CR, by G. Bexley, A. Blackburn, R. Chorley, M. King, OPC. (Note that there are a number of inaccuracies, particularly in the drawings of the round-end wagons)

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