

Bachmann Crab detailing/upgrade kit

Bachmann's OO gauge ready-to-run Crab is a fine model that captures the distinctive character of these engines. By providing the necessary research and refinements, this kit will help you create an even better loco. You can also use the components to enhance Lima's much earlier version of the Crab – the body is surprisingly good for its age but the tender is miles out dimensionally and the chassis needs a lot of work to bring it up to present-day standards.

Bachmann evidently based their model on No 42765 as preserved on the East Lancashire Railway. In fact it is more of a generic Crab and lacks many of the key features that identify locomotives from particular periods and batches. As a case in point, the front frame extensions ahead of the smokebox were of two distinct types on the prototype, but Bachmann's interpretation steers a middle course and is neither one nor t'other! The chassis too is common to all models, and disregards the substantial variations that can be seen by comparing how these engines looked below the footplate when new and in later LMS/BR days.

You'll be able to identify most of the prototype detail differences (and spot the anomalies in the RTR model) by following the notes below. The principal areas needing attention are the front frames, the rear end under the cab, the footsteps, the tender axleboxes and the coal rails. Whether you're converting your loco to EM or P4 or sticking with OO, this kit provides a range of detailing components that will significantly enhance your Bachmann model and enable you to produce an accurate portrayal of almost any individual locomotive.

Prototype notes

The best source of information on the class is *LMS Locomotive Profiles No. 2: The Horwich Moguls* by David Hunt, Bob Essery and Fred James (Wild Swan Publications). The ISBN is 1 874103 56 9. The book includes a full set of GA drawings for loco and tender.

For a supposedly standardised class, there were many variations among the Crabs. If you are thinking of renumbering or modifying your Bachmann model, we have listed the main points to look for. As always, check with dated photographs to see how your chosen loco looked at any given time. We have used LMS and/or BR numbering as appropriate to the period concerned. As built, the 245 Crabs were numbered from 13000 to 13244. Between 1934-6 (the book gives exact dates for each engine) they were renumbered 2700-2944 in sequence. By 1950 all but a handful had been renumbered in the series 42700-944.

Buffer beams Most of the first 30 Horwich-built engines (but not all) had a profusion of snap-headed rivets on the buffer beams. Later engines were built with flush buffer beams but some acquired the riveted type during repairs. In LMS days there were spacing blocks between the buffer housings and the buffer beams, but these were removed when the locos were fitted with larger-diameter buffers with a 16in head.

Front frames On the first 100 engines the frames visible above the front platform tapered down almost to a point, and the angled portion began level with the front edge of the smokebox. On later engines the front frames were considerably deeper in profile and the top of the angled section was several inches further forward, level with the smokebox numberplate. Only the last 20 engines had lifting holes with reinforcing rings when built, but all Crabs subsequently received these as a modification. Although not always visible in photographs, the reinforcing rings were riveted in place.

Sandpipes Initially, the first 100 engines had sandpipes to the front and rear coupled wheels only, and there was no sandbox between the trailing coupled wheelsets. Later engines received sanding gear on the centre wheels also, to which form all earlier engines were eventually rebuilt.

Cylinders Twin anti-vacuum valves housed in a large oval-shaped cylinder recess were fitted at build to Nos 13000-141/50-66/80/1/237-41. The remaining engines had cylinder castings featuring a single valve in a smaller circular recess. In time most of the earlier engines received these cylinders. However at least a dozen Crabs (42798, 42811/13/15/17/30/3/51/9/81/938/9) still had their original cylinders with twin valves and oval recess in BR days while a handful – 42917/9 for instance – had oval-recess cylinders with just a single valve.

Drain cocks and pipes The original locos had long, straight pipes clipped to the rear of the steps. Subsequently these were cut short. Later engines had pipes that curved down beneath the steps; these too could sometimes be shortened. Scottish Region locomotives (including transfers from other regions) had prominent shrouds around the relief valves at the base of the cylinders; in this instance the pipes could be either long or short pattern.

Driving wheels The last ten locomotives were built with Stanier-pattern wheels with their distinctive bevelled rims. Following works visits, this pattern of wheel could sometimes be found on other engines of the class, always with square-ended balance weights.

Balance weights The original design had crescent shaped balance weights cast integrally with the wheels. Some are flush with the tyres, while on other engines they stand slightly proud. Built-up (square-ended) balance weights were fitted to engines with Stanier-pattern driving wheels – the last ten locomotives had these wheels from new and many more were rewheeled with them from 1932 on. Some square-ended balance weights appear to be riveted. Mixed sets of balance weights are not unknown.

Smokebox These had flush rivets at first. For later repairs, snap-headed rivets were generally preferred.

Valve gear All engines had Walschaerts gear apart from Nos 13118/22/4/5/9 which had Lentz rotary poppet valve gear, similar in concept to Caprotti valve gear. In 1953 the poppet valve engines, now Nos 42818/22/4/5/9, were modified to take Reidinger valve gear; the main visual difference was the removal of the tubular shrouds around the universal joints.

Dome: Early engines had a small, rounded dome of clear LYR ancestry. Subsequent engines began to acquire a taller, more angular dome with a flattish top – many later Horwich engines were built with them. A

fair measure of boiler swapping seems to have taken place over the years and no logical pattern to the dome type can be inferred.

Footsteps A real mixed bag, both on engine and tender – originally they were smooth-faced but later, as a safety feature, many engines received steps with turned-up edges, while on others just the outer corners were bent up. On some Crabs, the steps were snap-riveted to the backing plates, on others they were flush. Different patterns could frequently be found on the same locomotive.

Slidebar steps An early modification was to fit a small step to the lower slidebar, to facilitate oiling. This was probably a depot modification and there were endless variations in size and shape. Early ones were of sheet metal, but later they were fabricated from steel rod or bar.

Cab As new all engines had flush-riveted cabs, except the last ten which had heavy lines of snap-headed rivets on the cab sides and front. Repairs and modifications produced individually varying lines of rivets on many engines.

Gangway doors The first 100 engines lacked gangway doors between cab and tender. With the narrow Fowler tender this was found to be a draughty and potentially unsafe arrangement. Subsequent engines were fitted with doors and these were retro-fitted to the earlier examples.

AWS: The BR automatic warning system was fitted to around half these engines from 1958 onwards. A receiver was mounted on the pony truck, protected by a bang plate fitted to the front buffer beam. There were two reservoirs, a large one (with battery box) on the right-hand footplate ahead of the cab and a smaller one on the driver's side. Engines believed NOT to have been fitted with AWS by the time modification work ceased in 1963 include 42703/6/9/11/16/18/20/36/7/39-46/48/9/51/2/4/6-9/61/3/4/7-9/73/80/4/8/90-4/7/9, 42800/1/3/4/6-9/13/16/18/22-5/7/9-37/39/46/7/50/5/7/64/9/72-7/81-4/90/3/6/7/9, 42900/2-9/13-19/22/27/39.

Tenders Apart from the first five engines, which had tenders built on old Midland railway frames, most of the class had Fowler's standard flush-riveted 3,500 gallon tenders. The tenders attached to Nos 13235-44 had snap-riveted sides and – apart from 13236/7/40 – stayed with these locomotives throughout their lives. Other Crabs could occasionally be seen with riveted tenders (No 42932 had one in the early 1960s) but they were not common. Several members of the class latterly acquired second-hand 3500-gallon tenders from 4Fs, Compounds and Royal Scots which, although of similar design, had endless differences of detail.

Coal rails and tank vents The ten riveted tenders were the first to be fitted with coal rails. Their tank vents, hitherto inside the coal space, were repositioned on the rear platform, to reduce the amount of coal dust getting into the tanks. Many earlier Crab tenders subsequently received coal rails and had the air vents resited, but some kept their original tank vents in the coal space even when fitted with coal rails. On some tenders without coal rails, the vents were nevertheless on the rear platform. Due to corrosion damage, square reinforcement plates were often added at the base of the tank fillers.

Water dome and filler There were several variations in the height and shape of the water dome, and the catch on the filler cap could face either way – on some engines it was loose.

Lifting lugs Anchor points for crane hooks were provided in the bottom of the bunker and on the rear platform, mounted at an angle. However the ten riveted tenders built for the Crabs had lifting holes drilled through the front and rear bulkheads (as on the Stanier 4000 gallon tenders) with square reinforcing plates. Possibly other late-build tenders had these also. As far as is known, the arrangements on earlier tenders were not altered.

Assembly hints

For clarity, the instructions describe the modifications to the RTR model and the subsequent fitting of new parts in sequence. However, we suggest you remove all unwanted details – such as tender springs and axleboxes, footsteps and front frame extensions – in one operation before starting to add the replacement fittings. We assume you will be using photographs and scale drawings to confirm the location of parts, so no specific measurements have been included. Study the photographs of our pilot model to see how parts fit – these images can be viewed in greater detail and clarity on our website, www.brassmasters.co.uk

All components in this kit can be fitted to the plastic model using a two-part epoxy resin adhesive, such as Loctite Super Steel or Araldite Rapid, with a gel-type superglue for small components. However we recommend soldering the steps and tender coal rails, building them as separate sub-assemblies before attaching them to the model.

Except where noted, fold lines and dimples for forming rivets are marked on the rear of the etched parts. If you don't have a riveting tool, lay the component face down on a flat piece of lead or hard rubber and gently impress the 'rivet' with dividers or compasses. Remove parts from the etched fret by laying it face down on a smooth, hard surface (such as a sheet of perspex or hardboard) and cutting through the tabs with a sharp craft knife or Stanley blade. Carefully file off the tabs, avoiding buckling the components. You may prefer to prime and paint them before attaching them to the model, which will make life easier if you're not planning a full repaint. Pointed tweezers are the best tool to use for handling small parts.

The castings may need a little cleaning-up to get rid of moulding flash. Emery-board nail files are fine for this, then finish off with fine wet and dry. Again, they can be painted before assembly. Use acrylic car paint (satin black or matt black) to paint the castings before attaching them to the model – just put the parts in a jam-jar lid and spray from about nine inches away. When dry, turn them over and spray any bald patches.

Railway modelling isn't as inherently dangerous as snowboarding or bungee-jumping but it still has its hazards. Be careful when handling sharp tools, follow manufacturers' safety hints regarding use of adhesives and ALWAYS wear eye protection when working with power tools. Remember too that modifying your Bachmann model in any significant way will almost certainly invalidate the manufacturer's guarantee. To preserve your rights, ensure it is well run-in before adding any detail parts and sort out any mechanical or electrical problems requiring remedial action.

Parts list

Etched fret – see drawing of etch

Castings

46	AWS cylinders	large and small
47	Battery box	
48	Cylinder drain cocks	(standard)
49	Cylinder drain cocks	(shrouded)
50	Vacuum pipes	
51	Metcalf steam injectors	left and right
52	Axle boxes	x 6
53	Springs	x 6
54	Tank air vents	
55	Water dome	
56	Water filler	
57	Tool rack	

The mystery object on the etch is an adjustable drawbar – this is not, however, applicable to the Bachmann Crab

Brassmasters can supply the replacement LMS sprung buffers that will be necessary if you opt to use the riveted buffer beam. The later pattern of dome mentioned in the prototype notes is available as a lost-wax casting from Alan Gibson (ref 4M828).

Loco detailing

Dismantle the locomotive body and chassis according to the exploded view diagram packed with the RTR model. It is helpful (but not essential) to separate the cast footplate from the moulded boiler/cab assembly. Be careful when handling the alloy footplate casting – it bends easily but won't straighten up again quite so readily.

Study the prototype notes above and choose which balance weights (15-17) are appropriate to your model. They can be used as overlays on Bachmann's OO wheels, although the latter's rim pattern is technically incorrect for a loco with square-ended balance weights. If modelling a loco where the crescent-shaped balance weights stand proud of the rims, use the half-etched set mounted so their outer edges are just resting on the wheel rims – this will make them concentric with the Bachmann wheels.

If you are re-wheeling your model and fitting the thicker style of crescent-shaped balance weights, solder the two layers together before gluing them in place with epoxy adhesive – the outside radius is designed to match the inner rim radius of finescale wheels (Alan Gibson or similar). If it's appropriate to your prototype, press out the rivets on the square-ended balance weights – they align with the spokes – but otherwise use them plain. In both cases, the larger balance weights go on the centre wheelsets, the other two pairs are identical.

The cylinder drain cocks (48/9, plain or shrouded according to prototype) have been designed so that the pipes, front and rear, can be inserted into holes drilled 0.33mm in the lower valve seatings. The centre pipe lies alongside and behind the rear pipe. Whatever your kind of pipes your prototype may have had, we recommend using the shorter, cut-off pattern – the longer style of pipe will almost certainly foul the pony-truck wheels.

If your chosen loco had sheet-metal slidebar steps (44), punch out the rivet detail, fold them up and glue in place at the correct angle (step parallel to the ground), being careful not to impede the action of the crosshead. The stirrup style of slidebar steps is easily made from 0.33mm wire bent into a U shape and glued in place.

Now to the loco body. Look yourself in the eye and ask if you have the skill, the equipment and the nerve to remove the inaccurately shaped frame extensions above the front footplate. If not, stay with what you have. If you feel confident, use a carborundum slitting disc in a power tool to slice off as much of them as possible. The sections under the smokebox will come off with a burr in a mini-drill – this is where separating the footplate from the boiler is useful. You will probably need to chop the front steps off as well to gain access to the remaining stumps but replacements are provided on the etch. Smooth off with a file and fill any scars.

Consult the prototype notes and choose which type of front frames (1/2) to use. These are etched as a double thickness. Drill through the lifting holes 0.6mm, then punch out the rivet detail on the outside faces only. Solder or glue the two thicknesses together and smooth the exposed edges. Add the rivet detail to the reinforcing rings (3) and glue or solder these in place, rivets aligned with the outside face. Offer up each assembly in turn to the footplate and check for fit before gluing the frames in place, with the reinforcing rings on the inside. If necessary, add the footplate steps (43) and replace the lamp irons (42) and grab irons you will almost certainly have obliterated while performing major surgery on the running plate.

If required, remove the existing buffers and file the cast buffer beam flush, then add the riveted front buffer beam (4) as an overlay. Replace the buffers using spacing blocks (5) if modelling an early-period loco – then add the small buffer steps (6) and the vacuum pipes (50). Having formed the rivet detail, fix the AWS bang plate (13) to the bottom edge of the buffer beam. Note this is sometimes slightly offset to the left, rather than being centred.

Remove the moulded cab doors – being careful not to chop off the beading into which the cab handrail locates – and file smooth. Bend up the etched cab doors (18) through 90° and glue in place. Depending on the minimum radius of your curves, they may need to be slightly joggled so they don't catch on the tender doors – but you can cross this bridge when you get to it.

At this stage you can reunite the body moulding and chassis. First, we recommend you get rid of the excessive amounts of white grease plastering the inner workings, then sparingly relubricate your model. If you don't do this, a thin film of grease will slowly seep out over time and cover your nicely weathered model in a shiny black coat.

Decide which kind of footsteps to use – plain (9, 11) or with turned-up edges (10, 12). If your prototype had turned-up corners only, make these from the plain, flat type supplied on the fret. Note that – despite what model manufacturers over the years may have thought – the loco and tender steps are not identical, so don't mix them up. Study the etch and parts list to work out which is which. Check to see if the rivets were visible on your prototype and, if necessary, punch these out. Note the dimples for forming the four heavy bolts on the left-hand rear steps, which mark the position of the injector. This particular set of steps also has extra rivets on the angles, which are marked on the etch – all the others are evenly spaced.

Form the angle on each step – the best tool we know for bending and forming small etched components is the Hold & Fold, described in Model Railway Journal issue 136, although a good pair of smooth-jawed pliers does the job pretty well. Turn up the edges or outer corners only as appropriate and then solder the steps to the backing plates (7, 8) while the latter are still in the etch, then remove and clean up any excess solder. Carefully form the fold-up box on the front footsteps, which will anchor them to the moulded lug on the loco body. On the rear footsteps, the etched prongs locate in holes under the cab.

On the right-hand side of the firebox is a pipe which, on the prototype, is considerably thicker than Bachmann's commendably fine handrail. We suggest you remove the latter, complete with knobs, and replace it with 0.7mm wire set in 7mm scale stanchions to take the thicker wire.

The remaining body detailing parts can be added in almost any order. Glue the front window frames (14) in place over the clear glazing – it's obviously easier to paint them first. If you are modelling an AWS-fitted loco, the battery box (47) stands upright on the footplate beside the firebox, just ahead of the cab on the right-hand side. The lug at the bottom of the battery box gives the correct spacing against the cab front. The larger of the two AWS cylinders (46) sits immediately ahead of the battery box. The smaller one is on the left-hand side.

There are two Metcalf injectors (51), one for live steam and the other for exhaust steam. The larger one is the exhaust steam injector. This goes under the cab on the right-hand side, tucked in behind the step, and with the curved pipe disappearing under the frames. Depending on gauge, it may be necessary to remove most of this pipe but the fiddle is not noticeable on the finished model. The live-steam injector simply glues to the back of the left-hand cab step – add whatever plumbing you feel may be necessary after studying prototype photographs.

Tender detailing

Dismantle the tender according to the exploded view diagram packed with the RTR model. If required, make a shorter drawbar to give a closer loco-tender coupling, or replace it with a simple hook-and-loop arrangement.

Bachmann's spring and axlebox detail looks very insubstantial, and should be replaced with the castings supplied – they are a far more accurate shape, have the correct number of leaves and are of prototypical thickness. You can remove the moulded detail with a sharp blade, taking a small slice off with each pass. If you are handy with a power tool you could use a miniature router or dental burr to shave them off. When you

have removed all the detail, file the surface smooth and fill any scars. Fit the cast springs and axleboxes (52, 53) in exactly the same position as the originals.

Turning to the tender body, remove the moulded footsteps – we suggest you get rid of them completely, but an alternative is to cut them back flush with the bottom edge of the buffer beams, using the stumps as backing pieces to support the new etched steps (which in consequence will be marginally out of gauge). Assemble the replacement tender steps (28-36) as described in the locomotive section, but do not fit these until later to avoid damaging them. Note that the backing plates with the two bolt heads low down (28) are for the front steps, whose upper steps (31, 32) have angle pieces with a row of four rivets. The tender rear steps (33) have a single bolt head and three-rivet angle pieces on the top steps (36, 37). Finally, bend back the angle at the top of each step – if you've left a stump of moulded step in place as an anchor point, you'll need to cut these off.

The rear face of Bachmann's front tender bulkhead has no detail, though the space behind it is hollow. Take the bulkhead overlay (41) and use it as a template to trace the outline of the void on to which, on the real thing, the coal doors open out. Using a 1mm bit, carefully drill around the edges of this space and cut through the webs with a sharp blade until you have a rectangular opening. Trim the edges off as neatly as you can, then check the fit of the overlay on the rear of the bulkhead. File off the bottom outer corners to clear the lifting lugs and then glue the overlay in place, carefully aligning the outside edges with the moulding. Open up the solid area above the 'coal' on the shovelling plate and glue a rectangle of black Plastikard into the newly created space at the bottom of the bunker to create a prototypical see-through look.

Bachmann's tender vents are too tall. Cut them off and replace with the castings supplied (54), either on the rear platform or inside the coal space as appropriate. In the latter position the vents should be just behind the tool rack, located in holes drilled 2mm in from the inside face of the side sheets. File the base of the vents square along one edge – this allows for the over-scale thickness of the side sheets and will enable you to locate the vents correctly.

If required, remove the tender dome and water filler and replace either or both with the alternative patterns supplied (55, 56), which are more typical of fittings carried by the majority of Crabs. Mount them on the circular bases (24, 25) included on the detail fret. At the same time you can cut off the thickly moulded lifting lugs on the rear platform, then glue the etched bases (26) in the same diagonal position. Now glue the actual lifting lugs (27) to the base plates.

At this stage you can reassemble the tender. Using epoxy or a generous quantity of cyano gel, glue the front and rear steps in place – make sure you know which is which – and check for squareness in all planes. Fold the rear guard irons (38) down through 90° and splay the bottom 3-4mm outwards, then put a sharp downturn in the last 1mm or so. Remove the tension-lock coupling and locate the guard irons on the moulded rectangle behind the buffer beam. Add the small steps (6) to the tops of the tender buffers and replace the tender lamp brackets with the etched versions supplied (42). Fit the vacuum pipe (50) to the tender buffer beam.

The tender doors can be fixed or made to open – though fiddly to make, folding doors will make it much easier to couple the loco and tender if you've made a new, shorter drawbar. Remove the tender doors (39) and their hinge plates (40) from the fret, being careful to retain the two half-etched hinge brackets. To model fixed doors, butt the two parts up against one another, with the hinges resting on the back (plain side) of the doors, with the top and bottom edges level but leaving a hairline gap between the doors and the support plate. Solder the hinges to the backs of the doors, then glue the support plates to the inside front of the tender sidesheets, level with the handrails (which are too short, by the way) and aligned with the cab doors on the loco. The hinges will allow you to put a slight set in them so the two pairs of doors have adequate clearance on curves. Check this on your tightest curves and adjust accordingly.

To make a working set, examine the gangway doors and on the inside you will find a faint half-etch line running vertically near the rear and at the top and bottom of the door. Take a piece of 0.45mm brass wire and solder this vertically at the half etch line, to leave a pivot point for the hinge straps. Now lay the door face down with the hinge wire uppermost. The hinge bracket should also have the half etch facing upwards. Insert the hinge straps from the outside of the gangway doors, juggle the hinges around the wire and again place everything face down with the inside of the doors facing upwards. Fold the hinges back over the hinge support – with the judicious use of tweezers, you can achieve a nicely rounded hinge joint. The reason for having such long hinge tails is that you can now solder them to the backing plate and if you use the side of a small file or tweezers pressed against the hinge joint this will stop solder from creeping along the tail and soldering the joint solid. After removing the stub from the rear of the upper handrail knob, you can now fix the door to the inside of the tender sides adjusting the height to match the doors of the cab.

Add the coal rails last, to avoid handling damage (once installed, however, they are surprisingly robust). Note they slope outwards along the sides of the tender, although the end sections are vertical. Solder the reinforcing angles (22) to the grooves in the front and rear coal rails (19), then remove the parts from the fret. Fold the vertical supports on the front and rear coal rails back on themselves, with the fold line on the outside. Do the same with the angled outer supports. Solder the u-shaped toolbar bracket (45) to the rear face of the front coal rail, then glue the front and rear coal rails in place on the bulkheads.

Carefully remove the left and right coal rails (20, 21) from the fret, leaving as little of the half-etched tags as possible (these parts are very fragile and cleaning-up with files could be tricky). Trap the 'legs' between two blocks of wood and gently bend the coal rails back – fold line on the outside – until they match the profile of the angle brackets (23). Remove the latter from the fret and solder in place in their grooves on the coal rails, flush with the top. The coal rails can now be glued in place on the tender side sheets, level with the front and rear coal rails and oriented so the thin support without angle bracing is at the rear of the tender. Solder or glue the corners of the coal rails. Finally, glue the tool rack (57) in place.

This completes the detailing and upgrading of your Bachmann model and we're sure you'll be impressed by the transformation. For more information on Brassmasters products including more parts to super-detail your models, visit our website, www.brassmasters.co.uk.