NZR Open wagon
BP3070 (La-2) kitset

New Zealand Finescale

Welcome to the NZFinescale La-2 wagon kit. The kit takes advantage of (at the time of writing) the latest digital technologies to produce high fidelity parts that are hopefully relatively easy to build.

These instructions and associated information are provided in soft copy. This enables far fuller information than is practical in print form. Using the zoom feature on your pdf reader will allow closer inspection of the photographs.

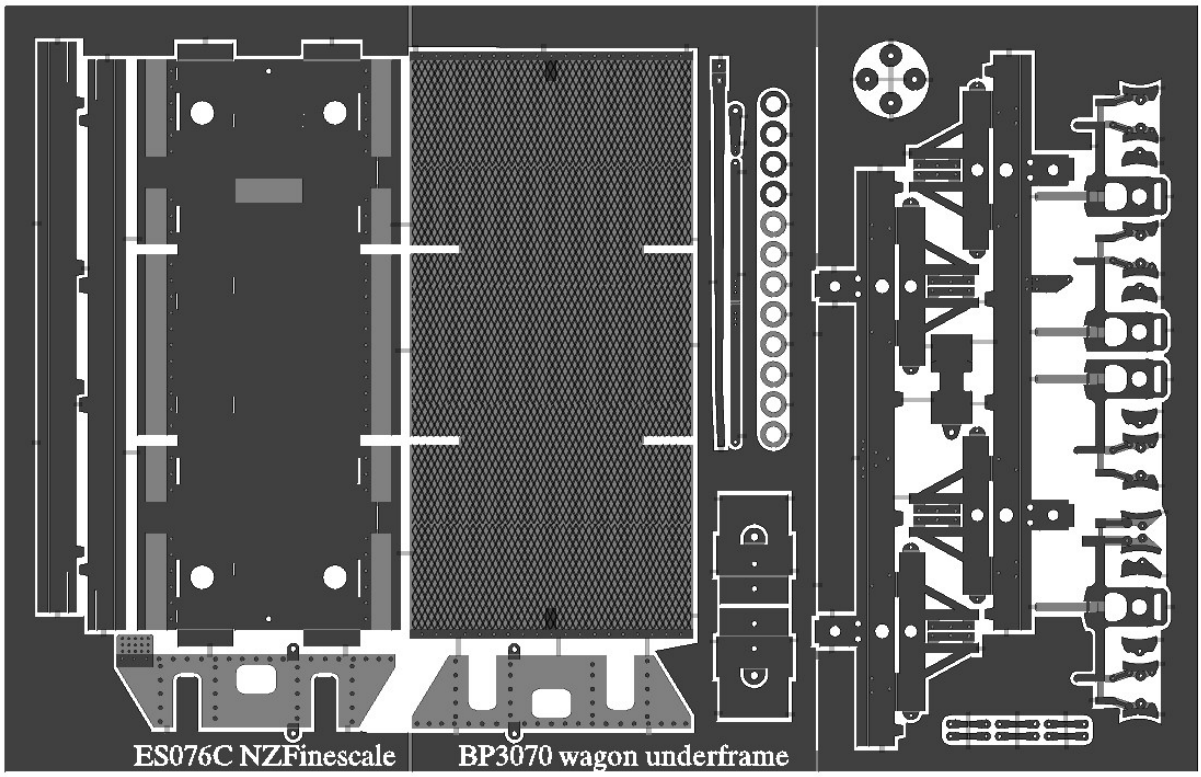
As always I welcome comment and feedback. If you need any help we will always do what we can.

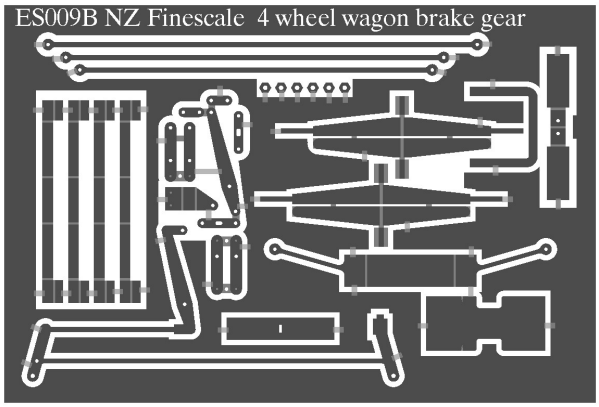
If there is some variation not covered that you would like, please get in touch as there are often parts available after release that may not be listed. The La-2 kit has versions with alternate handgrabs as well as new condition/distressed upper doors.

Contact me at lawrence@nzfinescale.com. To contact me by mail or phone, look at the website (www.nzfinescale.com) for current contact details.

Parts Key

Note that unlabelled parts are either duplicates, spares, redundant or self-evident. With small parts, generally more are supplied than are required. There are a number of etched parts that are also supplied as castings, which are generally the better option.





0.25mm Brass etched parts:

1	Underframe etch	2	Brake gear etch

3D printed parts:

1	Body

Cast brass parts:

1	Axleboxes (4)	5	Brake set
2	Springs (4)	6	Brake cocks (2)
3	Handbrake ratchet	7	Gladhands (3)
4	Handbrake pivot		

Other parts:

1	Pinpoint bearings (4)	6	0.2mm steel spring wire
2	Wheelsets 23.8mm axle (2)	7	0.8mm tube
3	0.3mm wire	8	0.8mm Teflon tube
4	0.4mm wire	9	Etched ballast weight
5	0.5mm wire	10	Sidechain

General comments

The kit is a representation of the NZR BP3070 La class wagon generally referred to as the La-2. The artwork and patterns were derived from copies of the original NZR prints obtained from various sources and photographs of the prototype. There were a lot of these wagons built, however, and they were quite long lived so the real thing had some variations that may not be covered by the kit.

There is a wealth of detail in this kit that many will consider not worth the effort. Don't be afraid to leave out the brake rigging, and smaller parts if this is not your thing. Without doubt there are small and fiddly parts to assemble. However, these should all fit, and where possible guides, slots or tabs/spigots are provided to assist fixing. The brake rigging is supplied in full and simplified form so select according to your taste.

In general, the specification for this kit has been exacting. Pattern work has been proven over a number of iterations.

Please consider following the instructions. There has been some learning on my part, and I'd hate you to have to repeat all the mistakes I made. In the photos, views are generally taken in progress and many are 'warts and all' rather than cleaned up. In particular, you will note spatters of flux pretty much everywhere. This is how the model really looked as I was building it. The order of the instructions is hopefully logically laid out, but where something really does need to precede another step I have tried to highlight this. In the sample build I have deliberately used only simple tools and a standard Weller soldering iron. It is possible to do a tidier job, but I wanted to show what was relatively easily achievable.

Technical preliminaries

Specification: This kit has been designed to finescale standards and incorporates springing. This not only helps keep the wagon on the track, but also reduces running noise and produces realistic movement when in motion. It is also intended to take scale couplers. It is possible to fix the axleboxes in place and to carve the headstocks to take Kadee couplers if desired.

Rivets: Many of the rivets in this kit need to be punched. Locating dimples have been etched on the reverse side to help with this. If you have a rivet press this will present no difficulties. If not, the rivets can be pressed in using a sharp instrument with the work resting on a yielding surface such as aluminium or medium density fibreboard. Further advice on this, and other techniques, can be obtained from NZF on request.

Folds: The kit design requires the builder to make many folds, generally along guides half-etched into the brass. The usual practice for 90° folds is for the etched line to be to the inside unless stated otherwise. The quality of the final result is strongly dependent on the quality of the folds and a simple bending jig should be constructed before commencing. Mine consists of two pieces of 25 x 1.6mm strip. The pair are clamped together with one long edge true and a suitably sized (3mm) hole drilled at each end. Snug fitting dowels are inserted into the holes to keep the faces true during use. To make a fold clamp the etched part in the bending jig using a vice and use a flat square piece of material (like a sturdy rule) to push the etching into shape. Commercial photo-etched folding jigs are available too.

180° folds are always made with the half-etched guide to the outside.

Soldering: Much can be written about this and those who are unsure are welcome to contact NZF for guidance. Briefly however:

- Make sure both surfaces to be joined, and the iron, are very clean
- Make sure you use an appropriate (usually acid) flux. Rosin cored solder is usually inadequate.
- Clean up flux regularly to prevent corrosion.
- Make sure the iron is of sufficient wattage and appropriate size for the job.
- Consider using a solder/flux paste such as Carr's 188.

If you do get solder somewhere obtrusive make a brass scraper and gently remove it. The brass won't damage the model, but is hard enough to take off the solder.

Soldering moving parts: To solder parts they need to be clean. To prevent soldering up parts the trick is to make them 'unclean'. Liquid gun blue (Birchwood Casey Perma Blue or similar) is useful for this. Clean all parts first and then use the blue on parts that you do not want the solder to take to. This is done by dipping in the blue for a few seconds and then washing clean in water. The parts are done when they appear first appear dark brown. Avoid over doing it as a thicker layer can flake off. Most fluxes will not work on a blued surface, although be careful with Carrs 188 paste as this sometimes can. Sometimes parts can freeze – which causes a moment of panic. I find that with gentle pressure the rather weak joint is easily freed. I have never had a failure with this method. The resulting joints have little free play and look very good in motion. Floppy valve gear is very unconvincing. Some brake gear parts in this kit may benefit from this technique.

Naming conventions for parts: I have used what I consider to be a rational naming of parts, based on my fairly superficial knowledge. The aim is to guide the builder in construction of the model, not provide an accurate historical reference to mechanical nomenclature. I may not always be entirely consistent, but reference to the pictures and drawings should make matters clear.

Additional parts: The kit is complete apart from couplers, since NZR modellers use a variety of these that are not always compatible. Beautiful cast brass couplers to suit are available from NZFinescale.com.

Important note

The modelling hobby is supposed to be fun. If disaster strikes, don't be afraid to get in touch for help, guidance or replacement parts. Where possible we will endeavour to replace parts gratis or for a nominal charge. We get a kick out of seeing models built, not languishing in a drawer, so we do what we can to see that happen.

Body

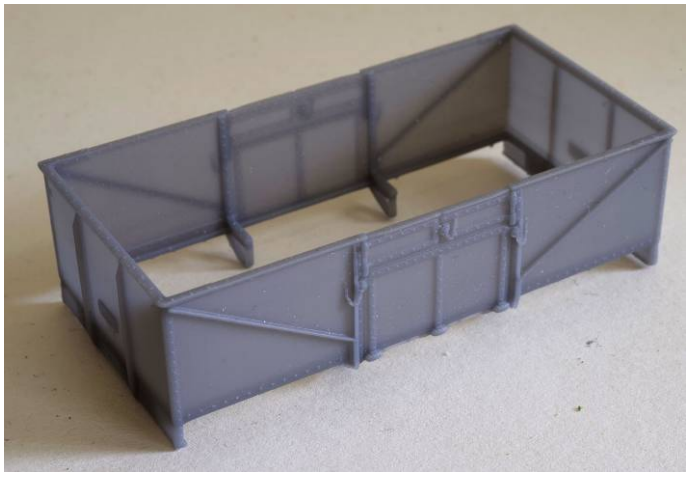
The body is supplied as a one piece resin print. 3D prints generally require support (somewhat like injection moulding sprue). This needs to be removed prior to building commencing. Support scars should be carefully filed/sanded flat. In reality the amount of clean up required should be small, but going it carefully will enhance the model.

Generally the resin used for these prints is quite tough but can be brittle. If cutting the print use an appropriate saw and abrasives rather than a knife or other cutter. Cut off discs can work quite well, but fast. Use with caution and avoid overheating the resin. Supports, if present can enerally be snapped off or cut with a knife.

If printed parts are distorted they can be readily straightened by immersion in hot water, followed by cooling against a true edge. Do not use boiling water as the pats will become excessive soft and hard to control.

The body part should be ready to use as is. Sometimes print artefacts (layering) may be visible. If these are a concern I suggest spraying with surface primer and reassessing. Most, if not all, such artefacts disappear after the first layer of paint. If any remain, they are easier to remove from a primed model.

Be careful with the solebar braces at the doors. These will be fine once assembled but are a little vulnerable at this stage.



The cleaned up body part should look like the one right. Note that this kit comes in a few different versions so yours may appear slightly different in some details.

Drill holes (0.3mm) for handgrabs,. Form suitable grabs from 0.3mm wire and CA glue into place. The actual fitting may be best left until near the end.

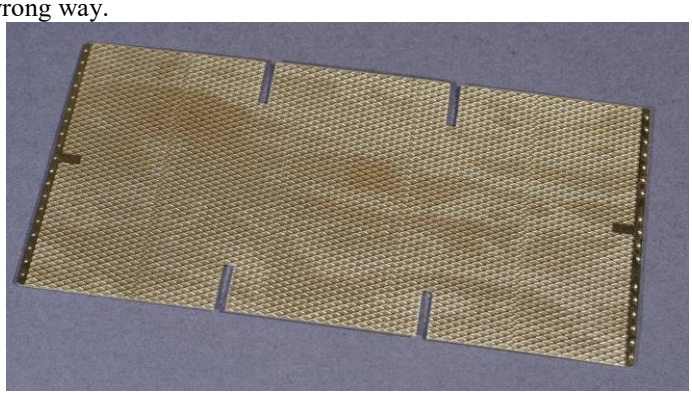
If fitting NZR couplers, check the headstock opening for fit and open up as required. If fitting Kadees more substantial surgery will be needed, and this may be better left until the underframe is done.

Drill holes for sidechain eyes 0.8mm

That is essentially it for the body.

Underframe

The underframe is built up from etched brass. This definitely needs to be soldered rather than glued. Building the underframe is more intensive than the body, but parts should all fit well. Pay close attention to the instructions as etched brass is VERY unforgiving if you bend it the wrong way.



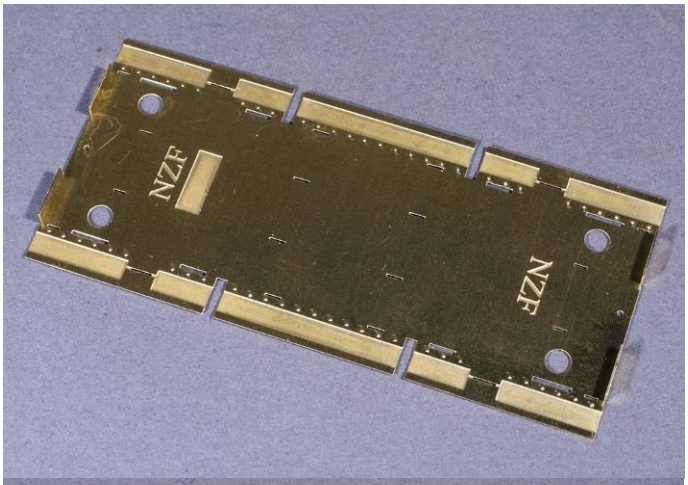
Wagon floor. The floor is supplied as an etch representing the chequer plate of the prototype. Test fit to the body from the top. The fit should be good, but you will probably need to file the edges true and remove the etching cusp. If the floor is tight avoid the temptation to force fit. File it until it is snug with gentle pressure.

There is a row of rivets at each end. Emboss these at the indentations on the underside. If modelling the wagon loaded this can be dispensed with.

Radius the corners slightly to ease the fit into the body.

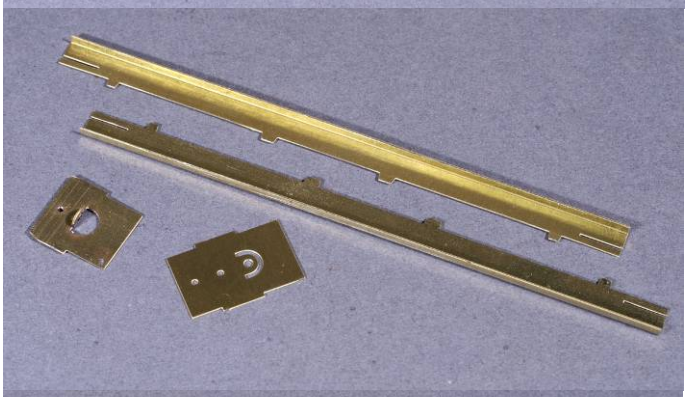
Note that some of these wagons were fitted with wooden floors in later life. Use V groove styrene sheet to represent this if desired (not supplied).

Subfloor: Clean up the subfloor. Emboss all rivet detail at the half-etched guides. These rivets will be on the underside of the wagon so you may decide to skip this.
Open out all slots to 0.25mm. This is done by filing a chisel from fret waste. Insert into the slots and work until a nice square slot is obtained. The slots are quite closely toleranced, but the etch cusp means that they can be too tight to easy assemble parts. Opening out with a fret waste chisel is an easy way to save later troubles. The wider slots are 0.5mm, but these are generally fine without any fettling.
Fold up the tabs at the ends 90º with the half-etched guide to the **inside** of the fold.



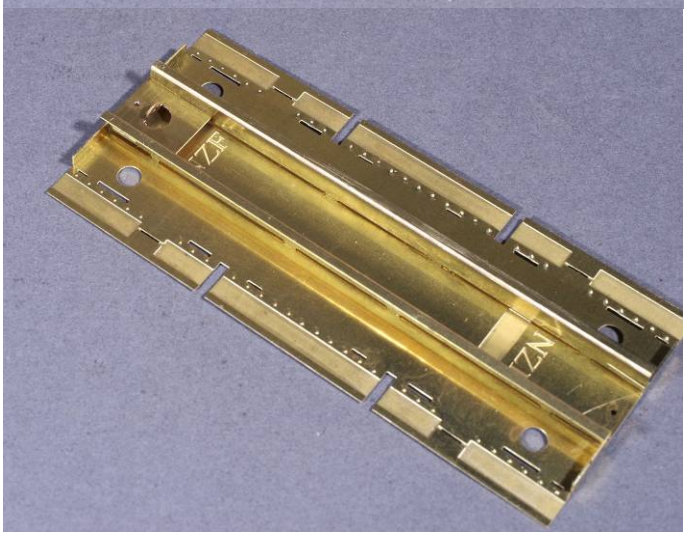
Clean up the inner solebars and fold 90º with the half-etched guide to the **outside** of the fold.

Also clean up the coupler mounting pads. Fold 180º at the half-etched guide and solder. Fold up the little coupler centring guide 90 º. Chamfer the outside corners of the pads a little.

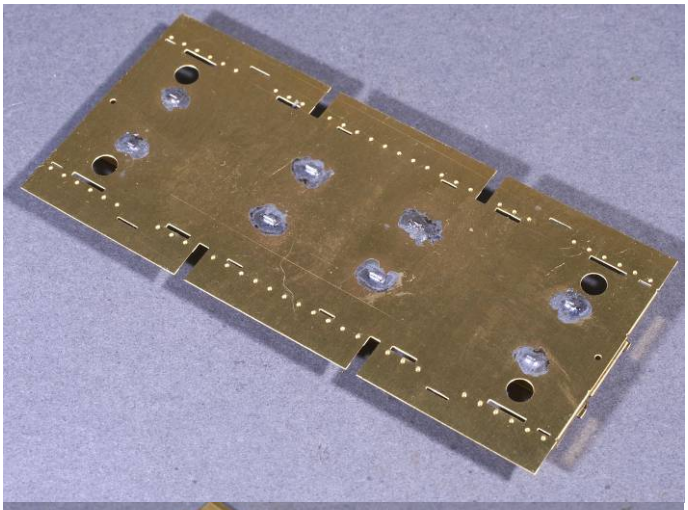


Fit inside solebars to subfloor, capturing the coupler pads at the same time as shown (a pad is needed at both ends, but only one shown here).

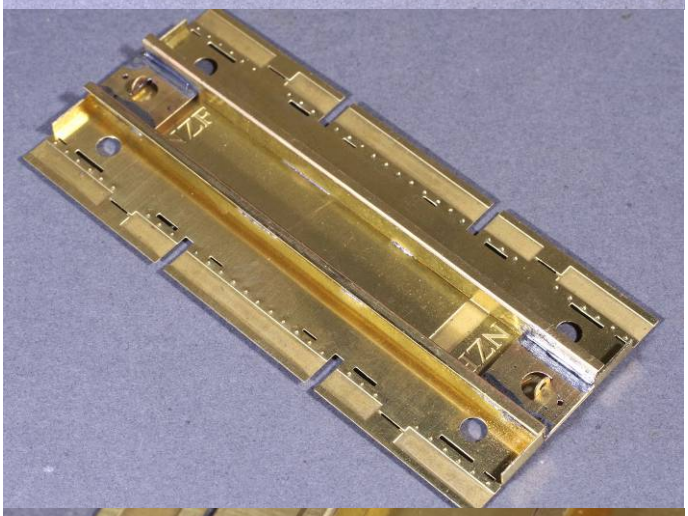
Test fit and adjust as required to grt a nice relaxed fit. The coupler mount holes in the subfloor should align with those in the coupler pads.



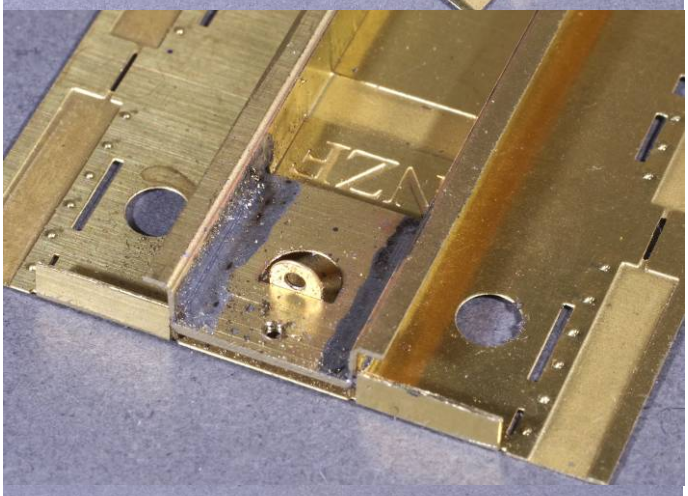
Carefully clamp to hold and solder solebars in place from the top.



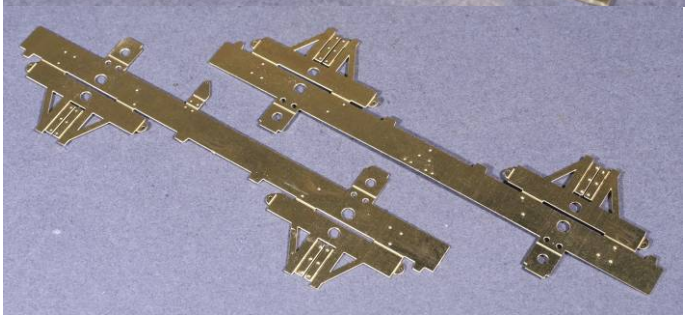
Fix coupler pads from underneath.



Clear coupler mounting holes 0.8mm and Tap M1.0. (Taps are available from NZFinescale.com).

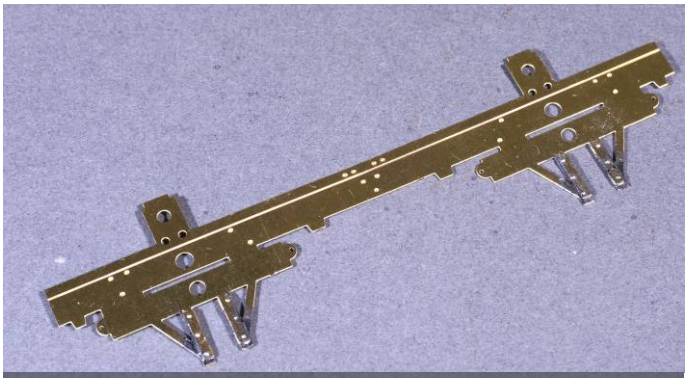


Clean up outer solebar parts and emboss all rivet detail. Take care to clean up the edges that will be the outer channel faces as these will be visible in the finished model.



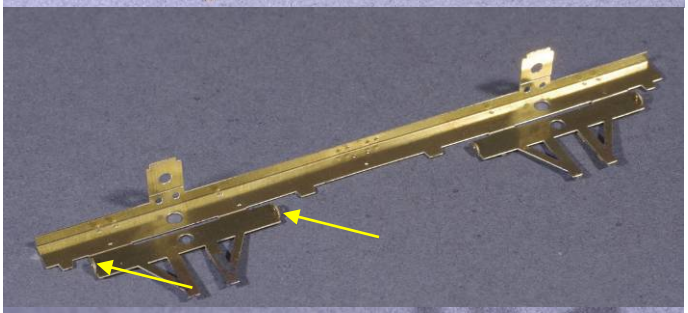
Carefully fold the horns 180 º. Squeeze tight in a vice with some wood packing to get a close joint without damaging the rivets.

Solder up. I liberally applied solder paint and then removed it with a tissue leaving the bare minimum in and around the joints. Touching with a well wetted iron gave well soldered joints without great excess.

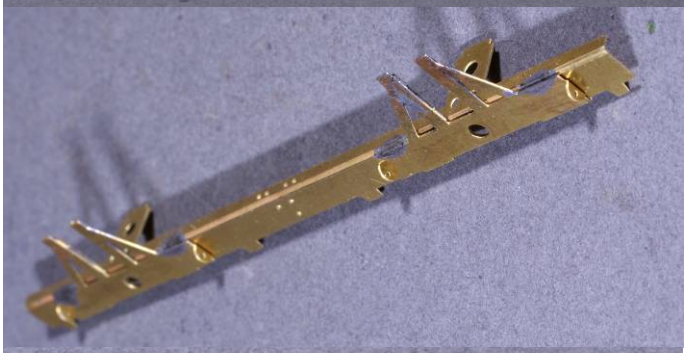


Fold solebar angles 90 º with the half-etched guide to the outside as shown.

Also fold up the little semicircular spring retention tabs 90º (half-etched guide inside) as indicated by the arrows, four per solebar.



Fold W irons back 180 º and fix with solder as shown.

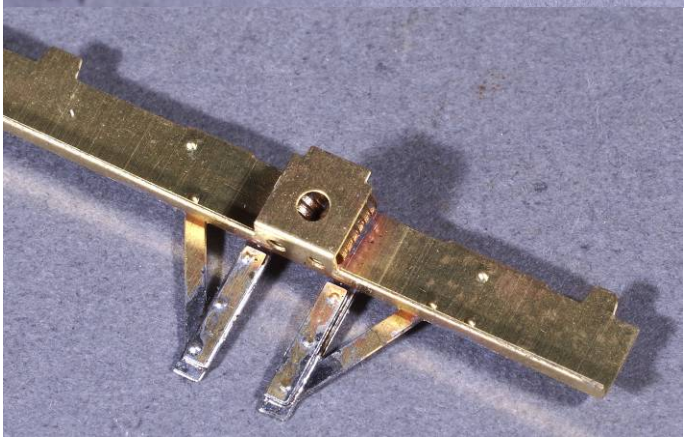


Clear spring castings 1mm. This is easiest before removing them from the sprue.

Fit spring casting to solebar locating via the dimple on the casting and hole in the solebar.

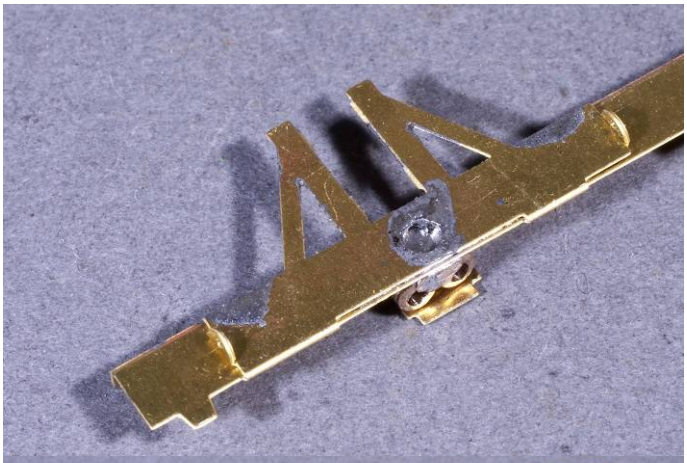
Make sure spring is at or below the top of the solebar or the subfloor will not fit properly later.

Fold up the spring cover to retain.



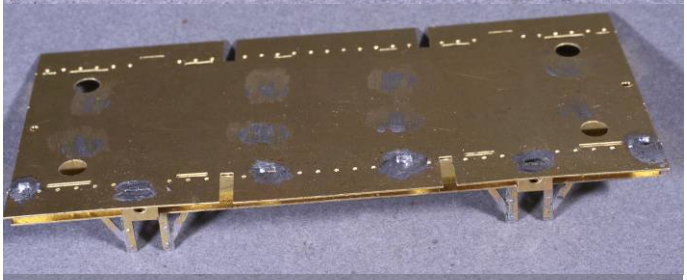
Solder springs in place from behind.

Clean up any excess solder flat as this is a sliding surface for the springing.



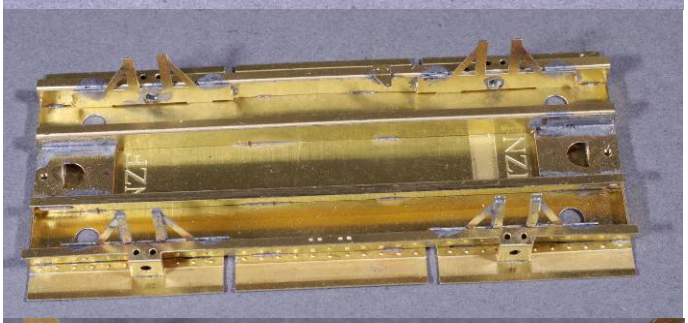
Fit solebars to subfloor, making sure that they fully engage. Take extra care with the spring covers.

Solder from top as shown.



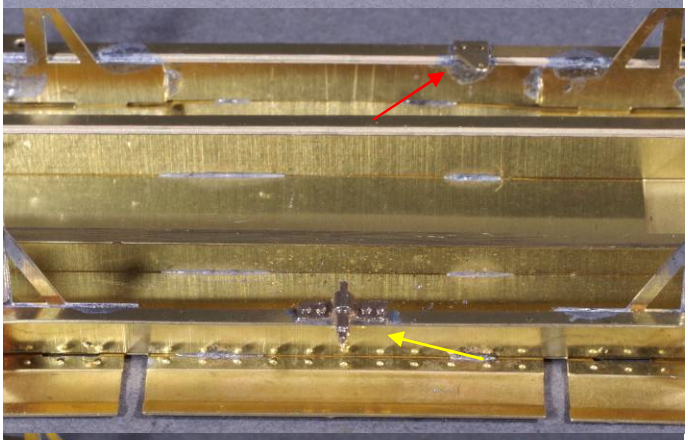
Model from underneath with both outer solebars fixed.

You may wish to open up the holes below the springs to 1mm. This makes it easier to achieve free movement of the suspension and is not obvious from normal viewing angles.



Add cast handbrake pivot, lining up with rivet detail of solebar (yellow arrow). Leave the inside spigot as long as possible.

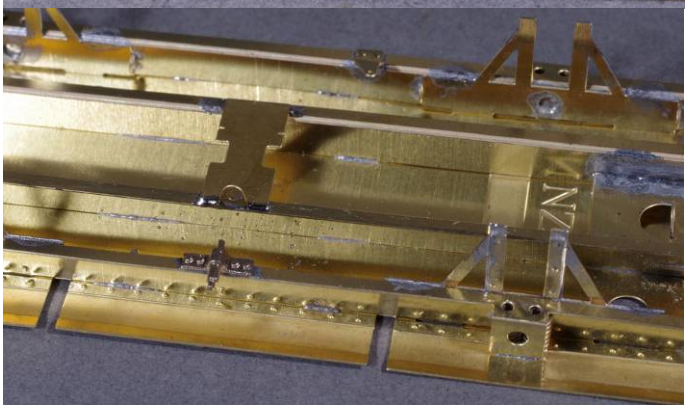
Fold and solder Westinghouse lever bracket into position (red arrow)



Clean up Westinghouse set mounting plate, folding the tag 90 º as shown.

Solder to inner solebars so that the hole in the tag lines up with the spigot on the handbrake pivot.

Later a piece of tube goes between the spigot and the hole in the tag. Use the tube to assist alignment but do NOT fix in place yet.



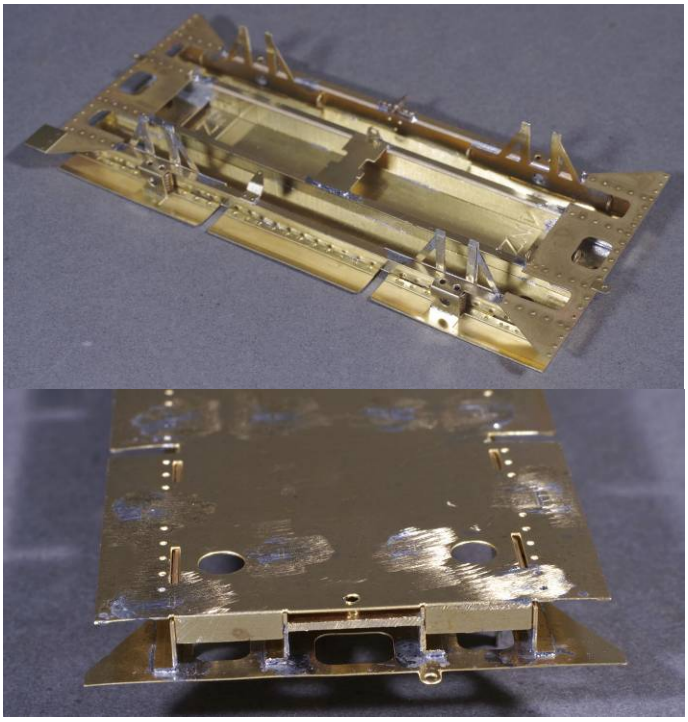
Test fit subfloor into 3D printed body, fettling as required.

Clean up reinforcing plates. Fold the brake pipe bracket at the inside edge of the reinforcing plates 90º. Do not fold the brackets at the outside edges.

Fit reinforcing plates, with the front edges flush with outer edge of 3D printed headstock (not shown). Tack in place on inside edges at inner solebars.

Solder reinforcing plates in place from inside via ends.

Carefully grind upper surface of sub floor flat using a cut off disc in a motor tool.



Spring units

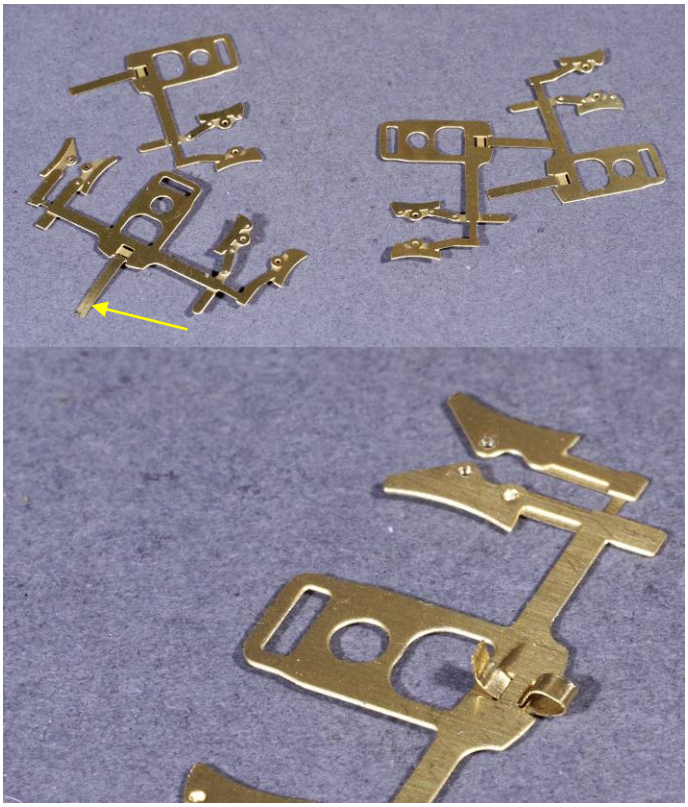
Springing is achieved using 4 small sliding subassemblies consisting of an etched slider, cast axlebox, pinpoint bearing and a guitar string 'leaf spring'. Brake shoes are integral with the slider and thus move with the wheels maintaining a constant spacing.

Clean up sliders, opening out the centre holes in the brake shoes and embossing the 'rivets'.

Make sure leaf spring retainers (arrowed) are half-etched thickness only by fully removing the attachment tag. These are deliberately long, so can be shortened slightly now.

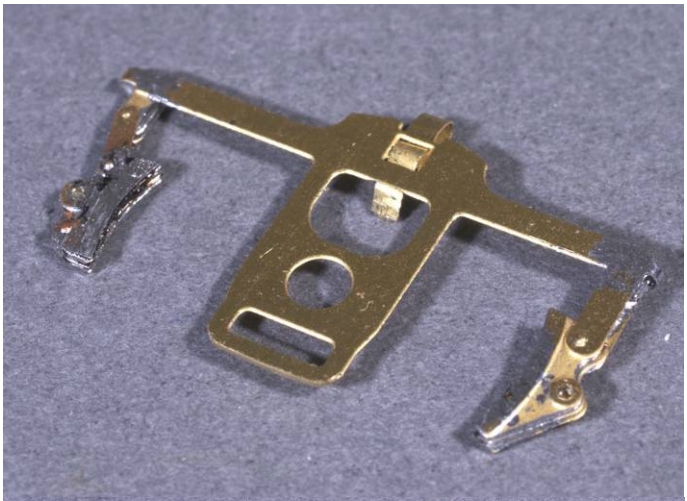
Fold and shape the spring retainer as shown being careful to get the correct orientation. (Also see following image).

Do not tighten for now, just feed through enough of the tag so it can be grasped in plier jaws at a later step.

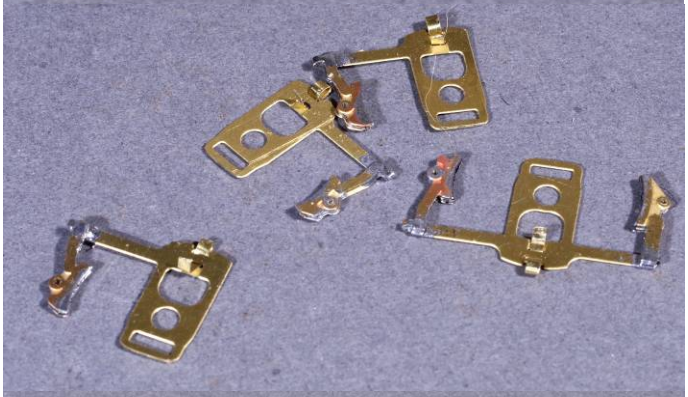


Fold up brake shoe laminations as shown, inserting the additional piece between the two attached to the slide to form shoes 3x the thickness of the etch.

Solder up and clear central holes in the brake shoes (0.5mm for the main shoes, 0.4mm for the handbrake).



Do all 4 sliders.

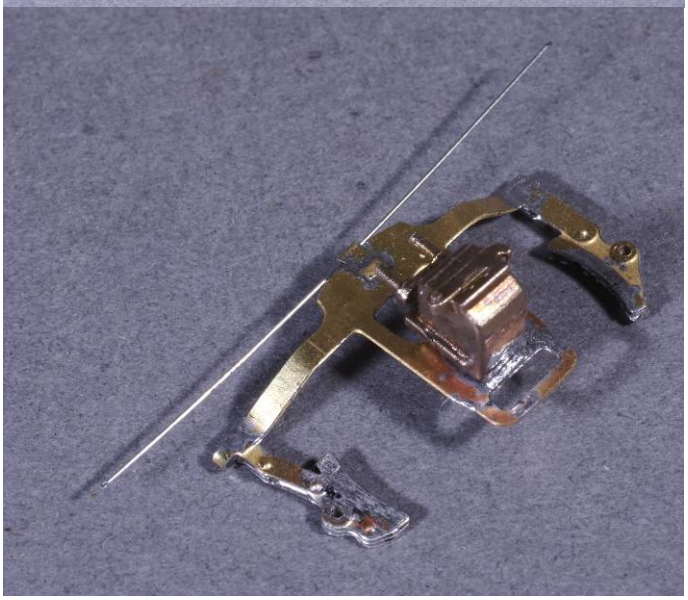


Clean up axlebox castings to clear pinpoint bearings. Also gently taper the spigots that slide up into the springs to make sure they do not catch.

Assemble boxes, bearings and sliders into one assembly as shown. The slider is captured by the flange of the bearing. Ensure the axlebox is true and tight to the etching.

The axle box goes on the side of the slider with the embossed riveted brake shoe detail.

Fit a guitar string spring to each slider. Feed the string through the etched loop and pull tight from the free end. The finished assembly should be tight and flat. Trim excess retainer and solder in place. Final spring length should be around 25mm.



Shape the arms holding the brake shoes as shown. If a wheelset is positioned in the pinpoint the brakes should align with the wheel tread, with running clearance.

Test fit sliders to underframe by first sliding spring into the inboard retaining tab on the outer solebar. Next, carefully slide the other end into the outboard retaining tag. With the axlebox central in the horns, gently flex the spring until the axlebox can be located between the horns. Ensure all slider assemblies can move smoothly with full travel.

Brakes

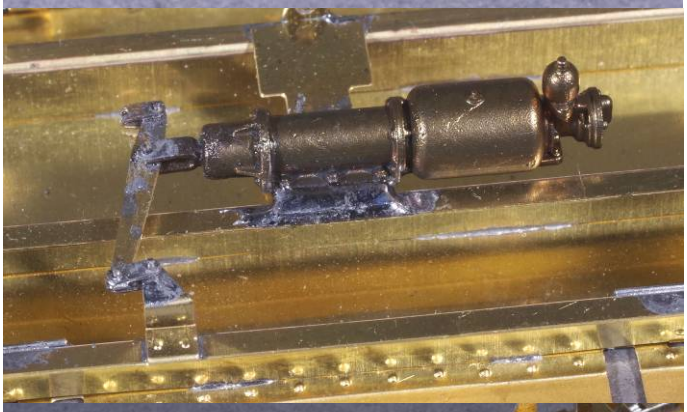
The brake rigging closely follows the prototype and is quite complex as it needs to allow the springing to operate and allow removal of wheels sets for maintenance. Parts are supplied for full rigging and for a simplified rigging that looks accurate in profile but is easier to assemble.

Fold up floating lever and it's linkages as shown.

Clear holes and pin to reinforce.

Clean up Westinghouse set casting and solder to it's mounting plate on the indicated centreline noting orientation.

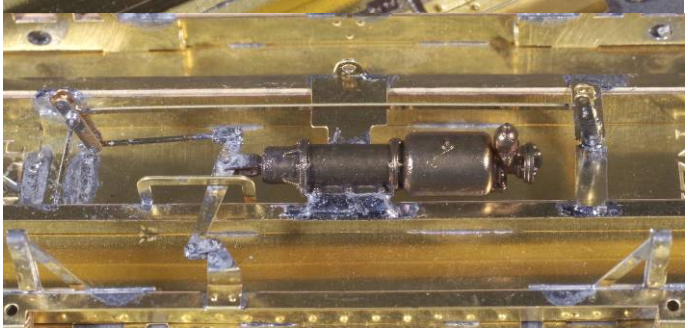
Fit floating lever to the chassis bracket and Westinghouse set as shown.



Fit safety loop to inside chassis member.

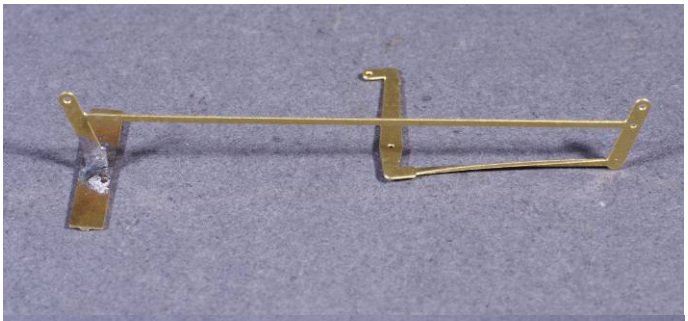
Fold and form hanger assembly and fit in the recess in the subfloor so that the arms are inclined towards the wagon centre.
Emboss 'rivets' in lever1 and fold the two halves around a 0.3-0.4mm packer. Fit a wire push rod between the clevis on the floating lever and the top of lever1. Assemble lever1 on a length of 0.3mm wire as shown between the hanger, capturing the longitudinal brake rod as you do so. (this is a fiddle). Be sure to use the longitudinal rod for 9' wheelbase wagons NOT the 8'6" version I have used in error here.
Fold up and form the mount for lever2.

Form lever2 as for lever1 and pin to mount. Capture the free end of the longitudinal rod with a 0.3mm pin and solder the mounting plate to the solebars.



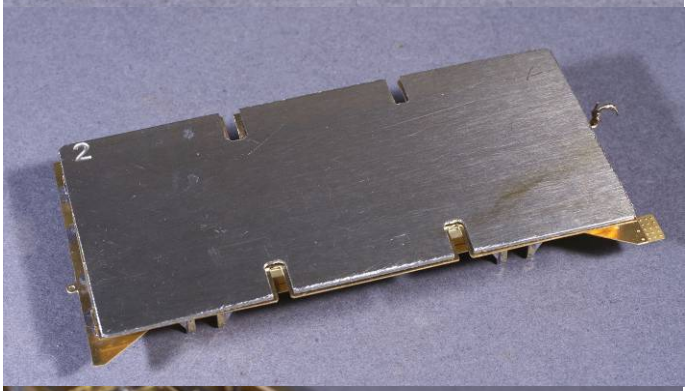
The alternative simplified brake rodding. Note the 90° twist in the push rod.

Use is similar to the full brake gear.



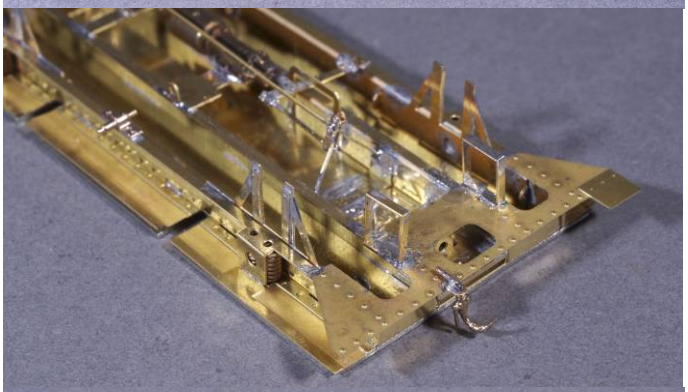
Fit ballast plate soldering from underneath.

In this example I have used a scratchbuilt plate – the kit provides an etched one.

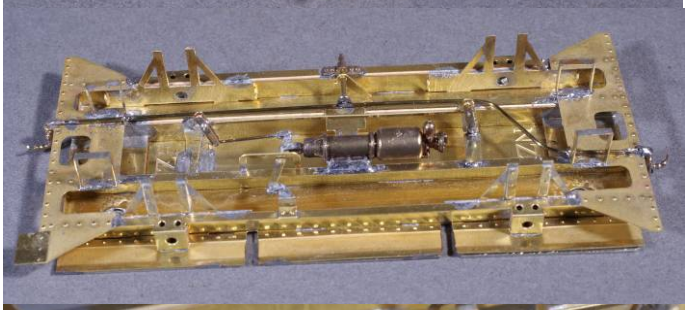


Fit cast brake cocks to either end. Make sure that these are fitted sufficiently loosely to allow body fitting.

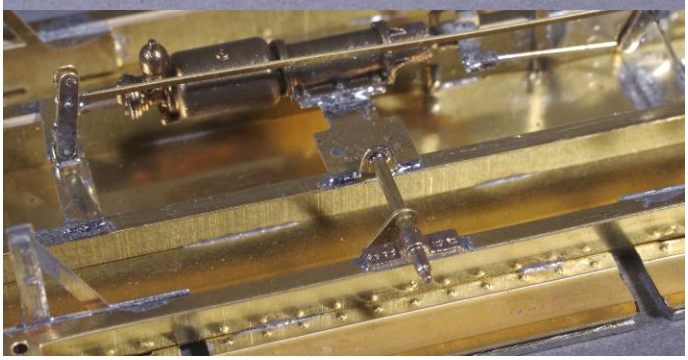
Also fold up and fit the safety loops for the brake stretchers.



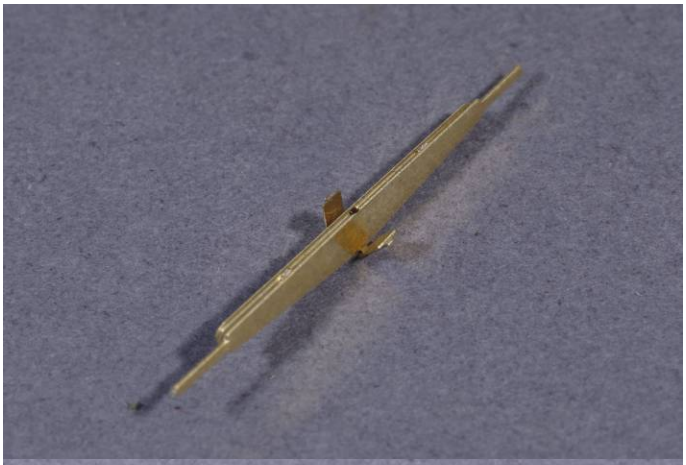
Fit 0.5mm wire brake pipe between cocks, clipping into the etched brackets on the reinforcing plates.



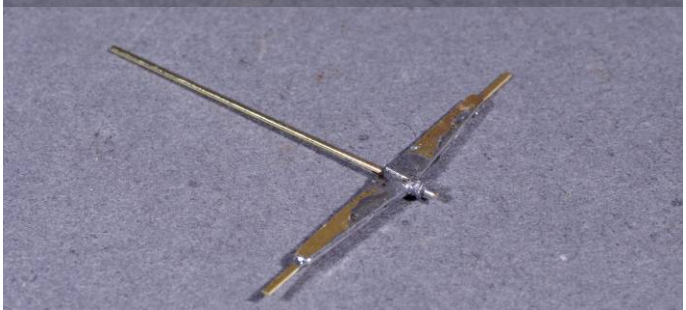
Fit handbrake cross shaft from 0.8mm tube, capturing the handbrake crank big end before soldering in place.



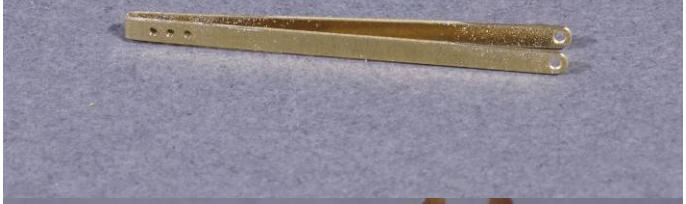
Fold up brake stretchers as shown. Solder up and open up central hole.



Add a 0.4mm pull rod and some etched adjuster nuts to the outside end.



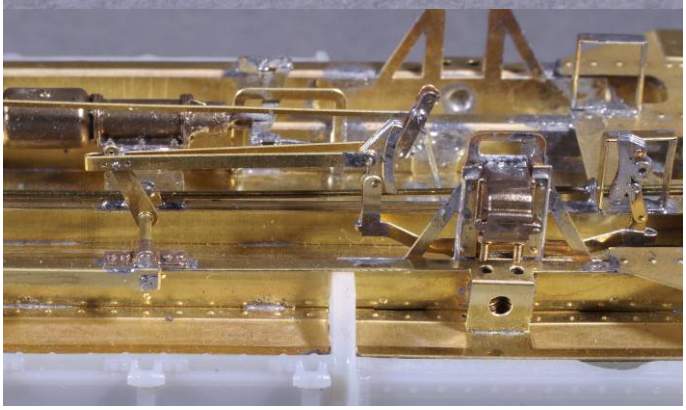
Clear holes in handbrake push rod 0.3mm and 0.4mm at the ends. Form by folding around a piece of fret waste.



Install the suspension slider with the handbrake shoe.

Fit push rod to handbrake crank with 0.3mm wire. Do not solder. Dry fit the push rod with a 0.4mm pin as shown. The suspension slider should move freely.

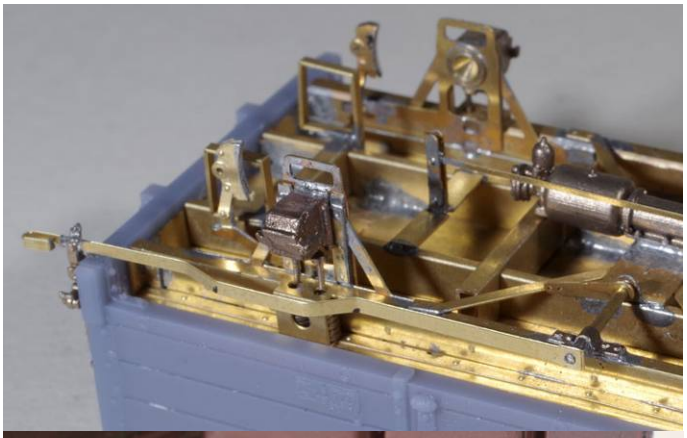
Solder the 0.3mm pin into position at the crank. Solder the 0.4mm pin to the front face of the push rod ONLY. This creates a secure, removable and flexible assembly. Clip pins to length.



Clear out the brake ratchet hole in the headstock 1.2mm.

Fold up handbrake lever. Fold the pivot boss 180º and open out the hole to fit the cast shaft on the underframe. Fold the handle end 90º at the guide and then form the handle. Shape to clear axlebox. (Shown here on an L2, but the parts are the same).

Glue the ratchet to the headstock and then solder the lever at the pivot and ratchet.



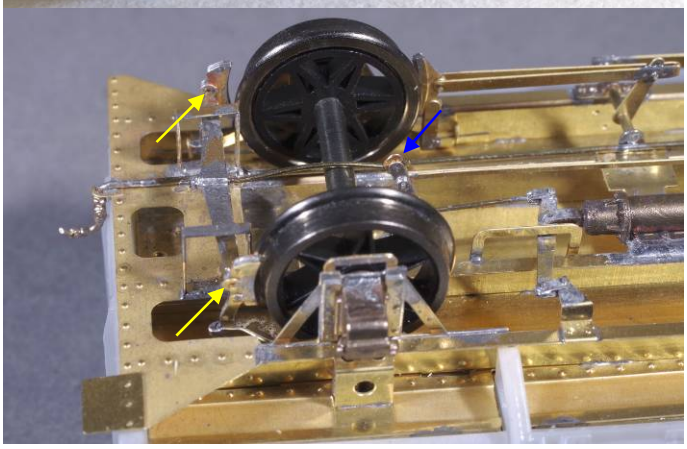
Fold up sidechain eyes 180º and fit to headstocks, gluing from inside the underframe. (This is best done after permanently attaching the body to the underframe, so if you've elected to leave the parts separate for now consider fitting the eyes later).

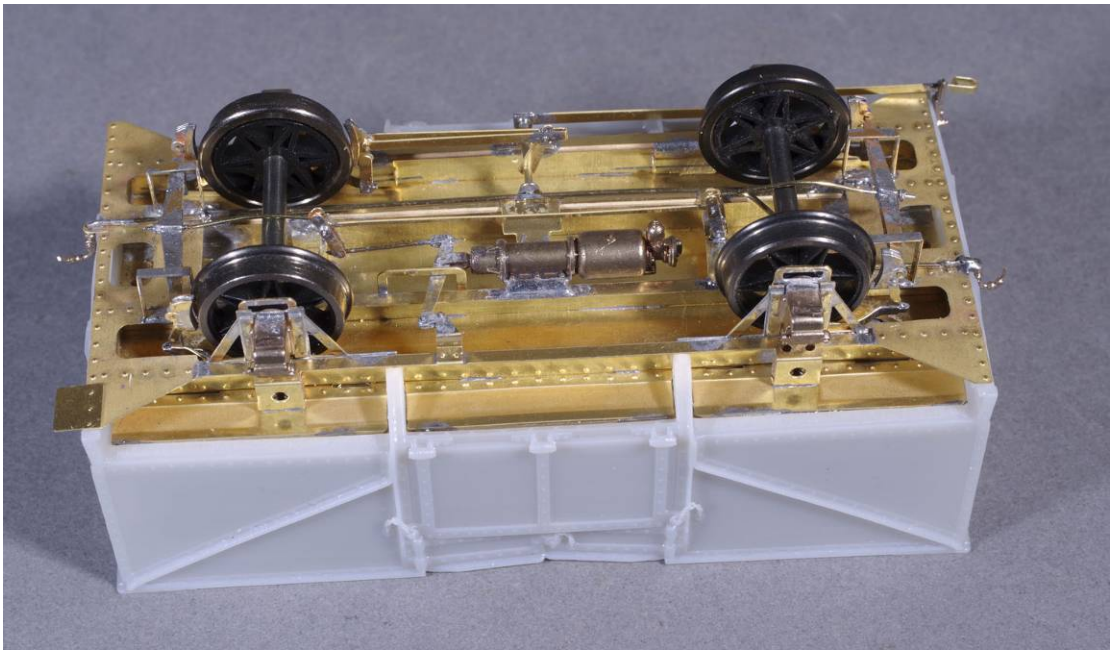
This photo also shows handrail, brake ratchet and brake cock fitted.

Install suspension sliders. This is a fiddle, but easy enough when you get the hang of it. Fit the outside end of the spring first and the the inner. Centre the axlebox and pull away from the underframe until it can be moved between the horns. To fit the wheels move the axleboxes out from the underframe. They can then be fitted without bending anything.

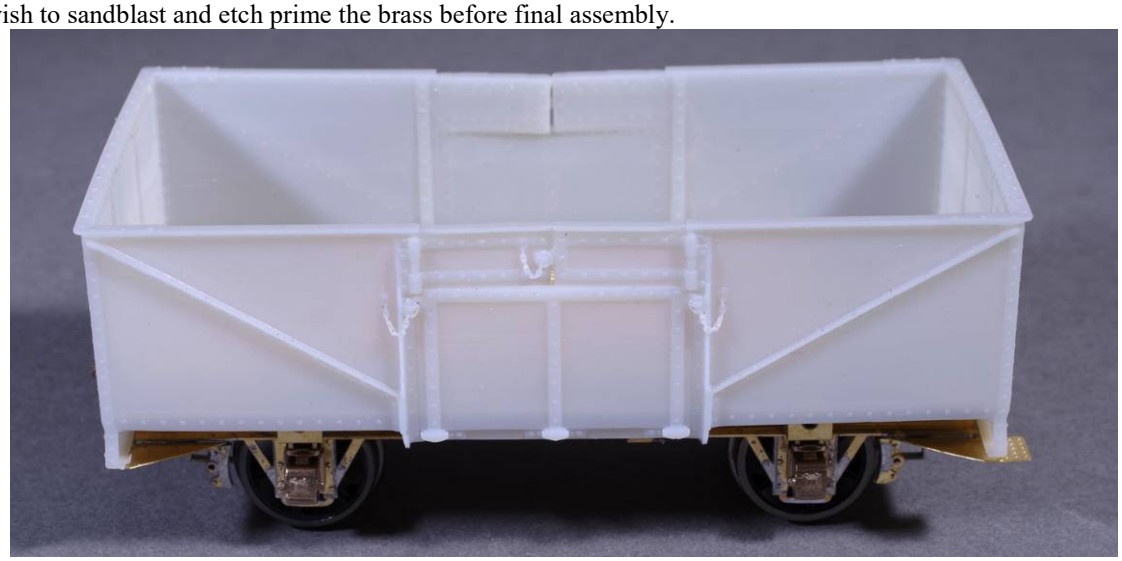
Fit brake stretchers. The spigots on the stretchers go through the holes in the brake shoes (yellow arrows). They are over length and will need to be clipped short.

The pull rod clips into the levers (blue arrow). Like the prototype the pullrods will need to be shaped to clear the axle.





The wagon finished apart from a few minor details like handgrabs, hoses and couplers. At this point the body, floor and underframe are still separate but a nice push fit. At some point they will need to be CA glued together, but you may wish to sandblast and etch prime the brass before final assembly.

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