NZR Hopper wagon
BP3146/3148 (Q4) hopper wagon kitset

New Zealand Finescale

Welcome to the NZFinescale Q4 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.

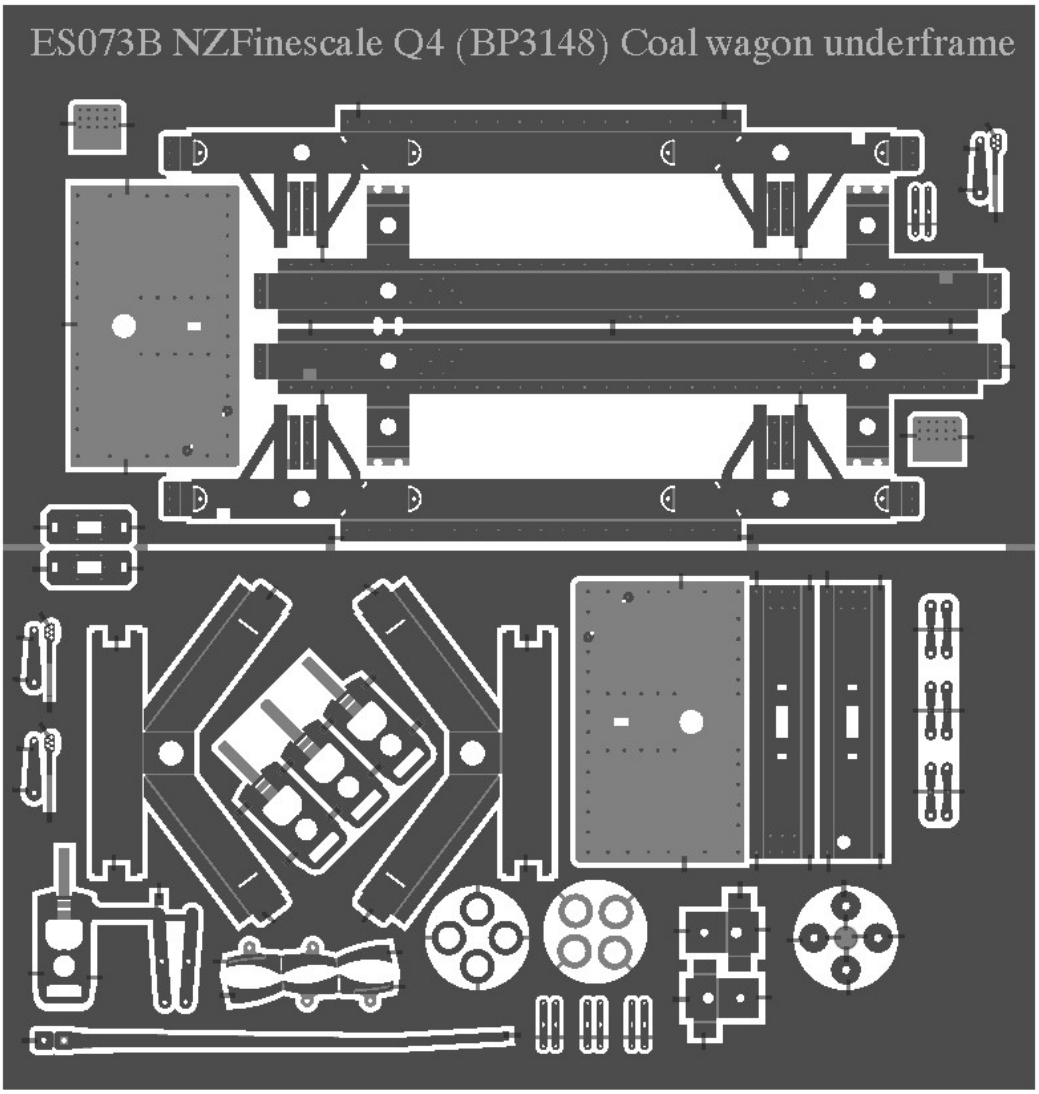
As always I welcome comment and feedback. If you need any help we will always do what we can.

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.

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

3D printed parts:

1 Body
2 Door upper
3 Door lower

Cast brass parts:

1 Axleboxes (4)
2 Springs (4)
3 Handbrake ratchet
4 Handbrake pivot
5 Hopper pocket (2)
6 Capstan hooks (2)

Other parts:

1 Pinpoint bearings (4)
2 Wheelsets 23.8mm axle (2)
3 0.3mm wire
4 0.4mm wire
5 0.2mm steel spring wire
6 Sidechain

General comments

The kit is a representation of the NZR coal hopper wagon to BP3146/3148 generally referred to as the Q4. 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 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 and sidechains, since NZR modellers use a variety of these that are not always compatible. Beautiful cast brass couplers to suit are available from NZFinescale.com.

3D printed parts: 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 doing it carefully will enhance the model.

Generally the resins used for these prints are quite tough but can be brittle. Unless suggested otherwise, 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.

If printed parts are distorted they can be readily straightened by immersion in hot water, followed by cooling against a true edge. Be cautious with boiling water as the parts will become excessively soft and hard to control.

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. 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

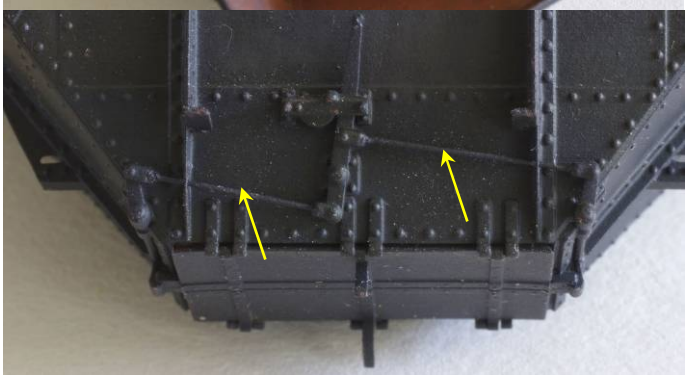
Clean up the main body part. Carefully break off any print supports by scoring with a knife and carefully breaking off the support parts.

Fit upper door surface into the hopper using CA glue.

Glue lower hopper door part in place.

Fit door operating rods (arrows, 0.3-0.4mm wire) between printed clevis ends. If carefully cut to exact length these will clip in place. Fix with CA glue. (These are hidden behind the solebars if you would rather leave them off)

That is essentially it for the body.

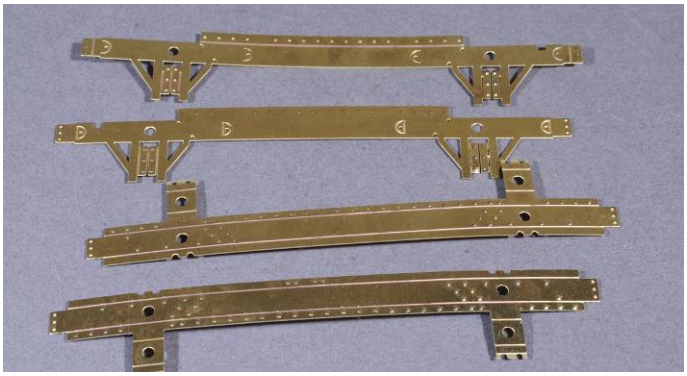


Underframe

Prepare the main solebar parts by embossing all rivets as shown.

Note that there are rivets that need to be punched from both sides.

Fold the stiffening angles at the top of the solebar inner parts with the half-etched guides to the inside



as shown.

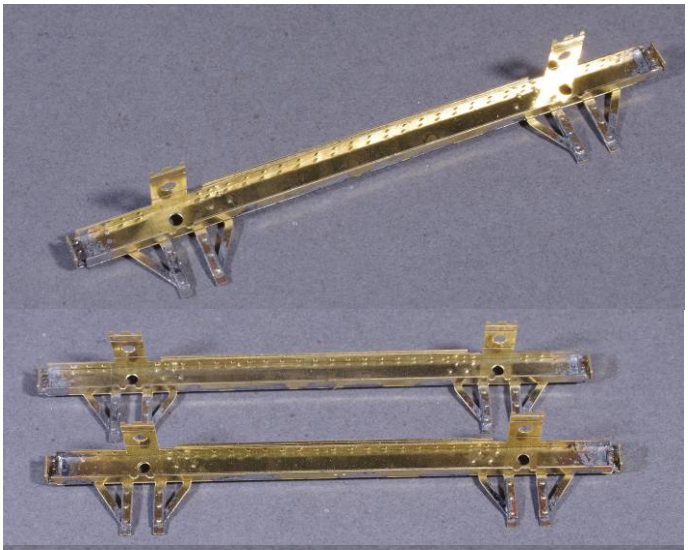
Also fold the horns 180º and solder in place. I generously apply solder paint and then clean off excess with a tissue, before applying the iron.

Also fold the semicircular spring retention tabs 90º. And the headstock mounting angles 90º.

Form the solebar channels by folding top and lower edges 90º with the guide to the inside.

Fold the headstock brackets 180º and solder to headstock.

Tit the solebars to the solebar backing parts filing to fit if necessary – do not force.

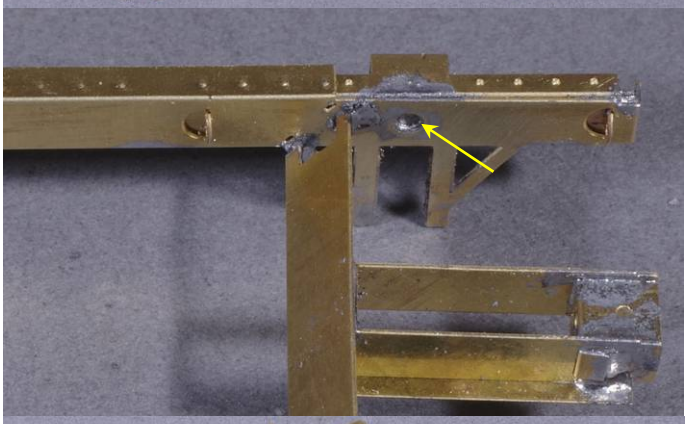


Solder solebars to backing parts.

Clean up spring castings.

Solder in place from inside locating the pip on the casting with the hole in the solebar (arrow). (shown here out of sequence).

Fold spring covers into place and solder at lower edge.

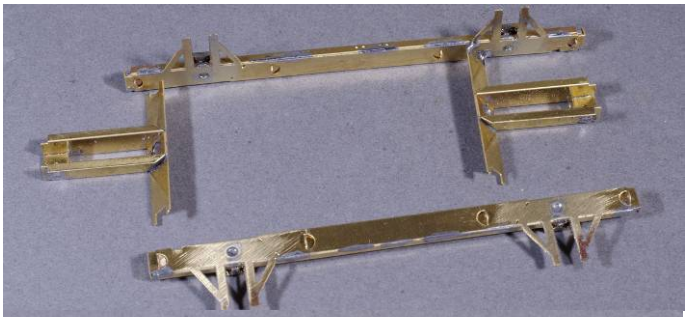


Fold underframe internal structure as shown being VERY careful to get the orientation of folds correct. 90º folds with guide to the inside, 180º folds with guide to the outside.

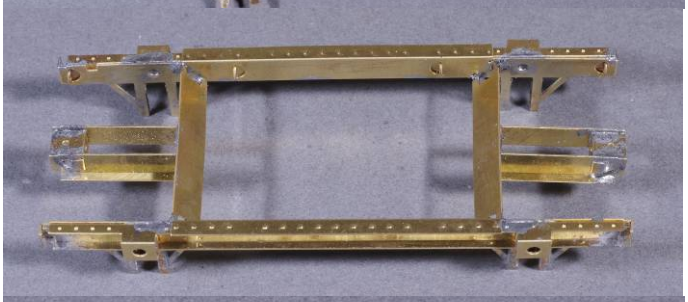
Add coupler mounting plate by slipping the tags into the matching slots and folding tabs to retain before soldering up.

Locate lugs on underframe inner parts into slots in solebars and solder up.

Be sparing and work on a flat surface to keep things true. Tack first, tweak and reheat if needed.

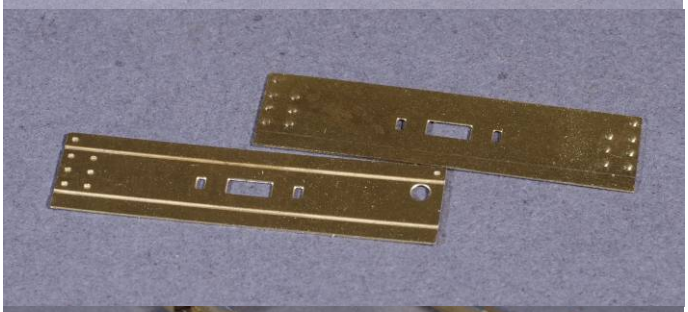


At this point the underframe is still a little fragile. Just make sure everything is square, or can be made so with gentle pressure.

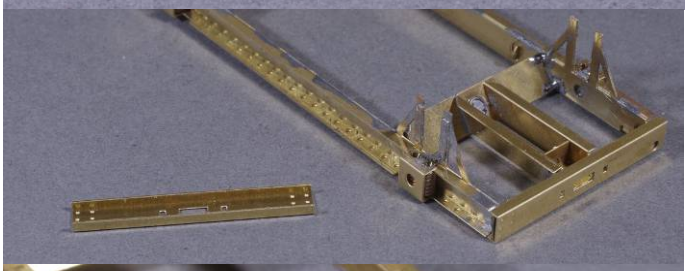


Clean up and punch rivet detail into headstocks.

Open coupler slot to take couplers if necessary.



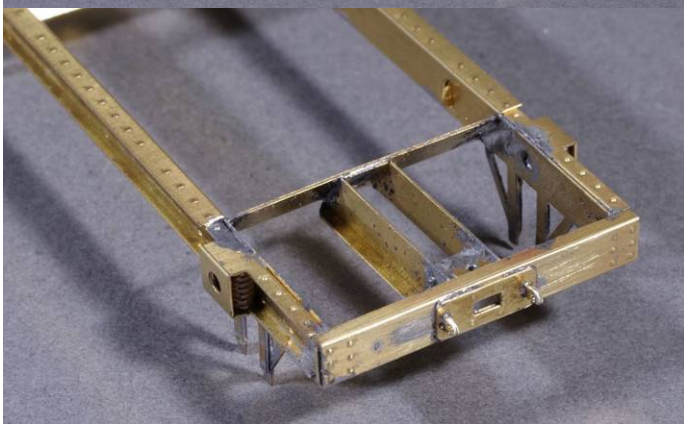
Fold up headstock channels and fit to underframes.



Solder headstocks to underframe making sure:

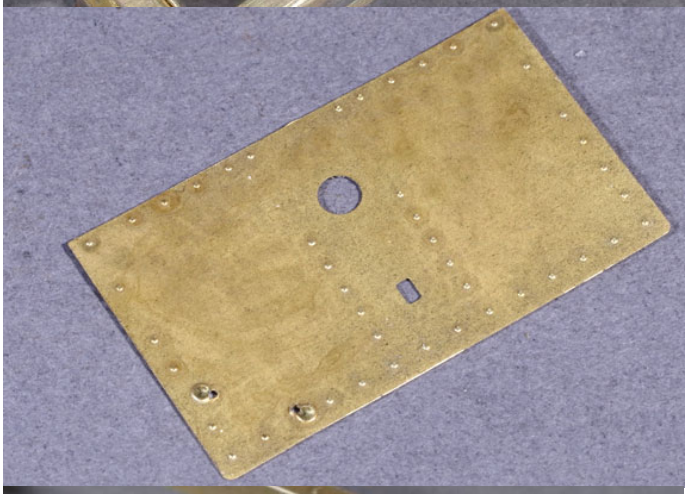
- Handbrake mount is on the same side as the pivot mounting bolts on the solebar
- Everything is nice and square.

Fold up sidechain eyes and coupler mount doubling plate and fit to headstocks

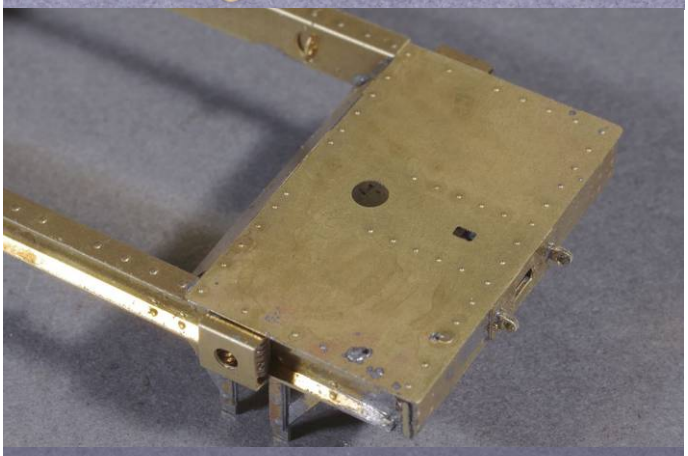


Add some washers to the top side of the coupler mount, solder in place and then drill/tap M1 for coupler mounting.

Clean up the decks, punching the handgrab bolt heads from underneath.



Fit decks soldering from underneath.



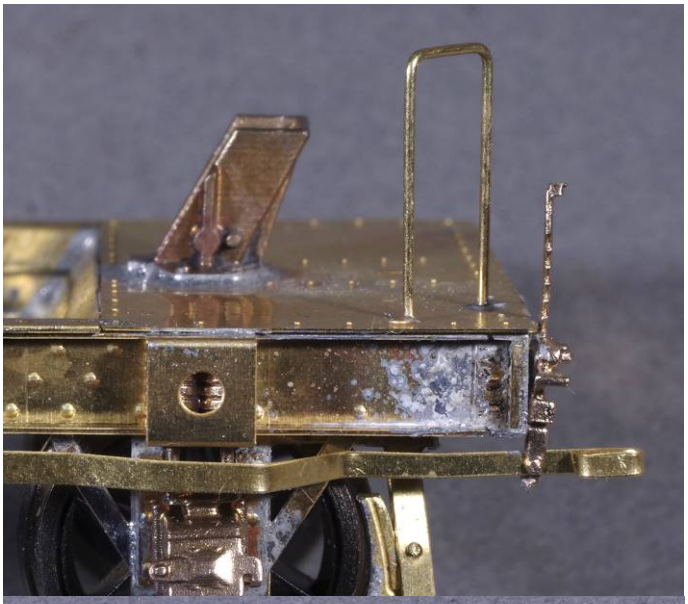
Clean up cast hopper pockets. Make sure the hopper can fit neatly into them before fitting.

Fit hopper pockets, soldering from underneath. These need to be fitted as far outboard as possible in the deck holes. Check hopper fit before fixing and file holes slightly if required.

Drill for handgrabs 0.4mm. Be cautious as the drill may pick up an edge.

Fit 0.4mm wire grabs fixing from underneath. There should be 9mm clear space under the grab when fitted.

Also fit cast capstan hooks to deck corners opposite handrails if desired (not shown).



Clean up suspension sliders.

Form a loop at the top of the slider by feeding the etched tag through the labyrinth as shown.

Fit a length of 0.2mm guitar string spring through the loop and pull the loop tight with pliers. Fix with solder. Final spring length should be around 25mm (not critical).

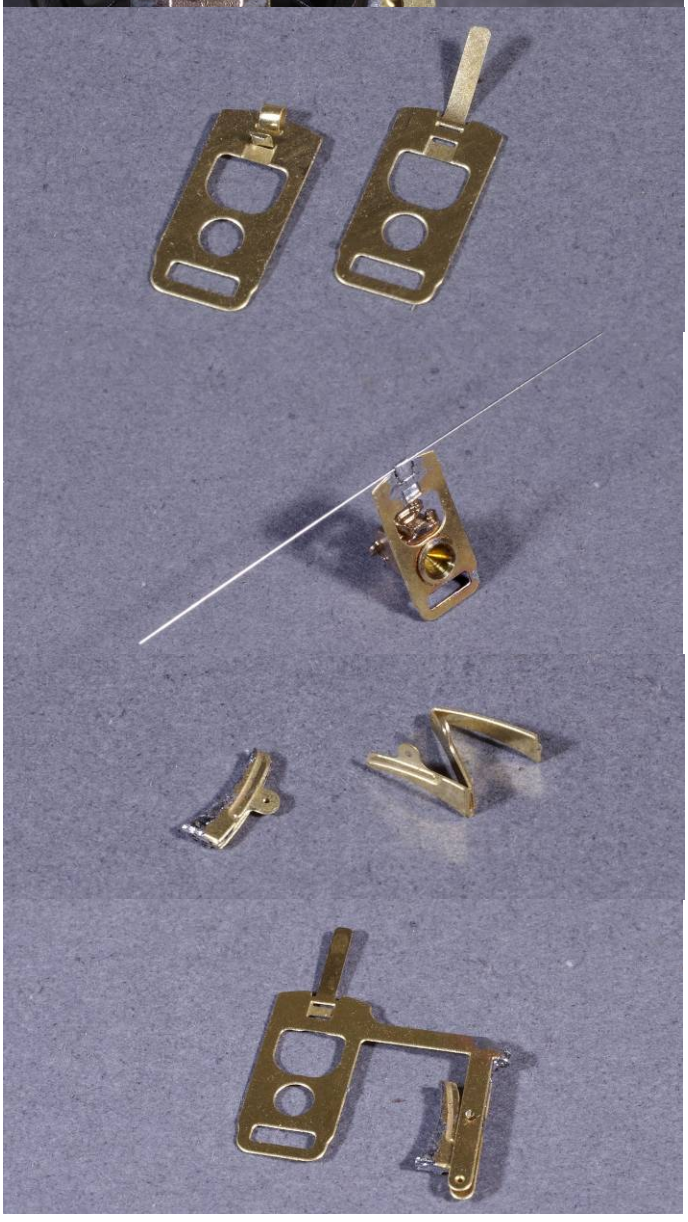
Assemble the axlebox castings onto the slider with a pinpoint bearing..

Spacer washers are provided to take up any excess clearance so check whether these are required BEFORE soldering everything up. Generally I find a 0.125mm washer under each pinpoint is good. Leaving the washers out results in a little slop in the wheelset, but this does not cause much problem.

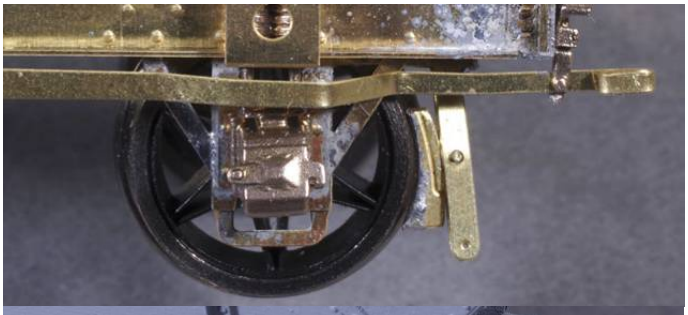
Fold up and solder the handbrake shoe as shown

Fold up the slider with the handbrake hanger and locate the shoe with a 0.4mm wire pin.

After fixing the axlebox and spring bend the brake shoe arm to shape. With a wheelset located in the pinpoint bearing, the brake shoe should line up with the wheel tread with running tolerance.



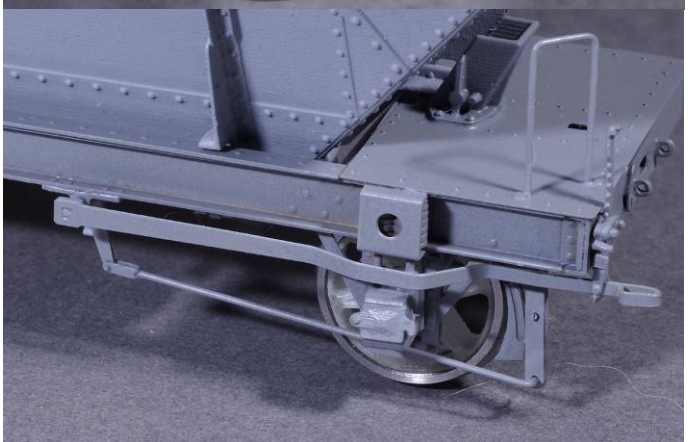
Note that the hanger needs to be inclined outwards at the lowest point. The brake shoe should be gently twisted so that it remains vertical.



Fit handbrake ratchet and pivot castings to headstock and solebar respectively.

Fold handbrake lever boss 180º and fix. Fold handle end 90º and form handle.

Attach lever at pivot and ratchet.



Clean up the brake rod clevis part and fit to a length of 0.4mm wire.

Firmly crimp the end of the wire. Rotate the etched part so that the crimp and slot are perpendicular.

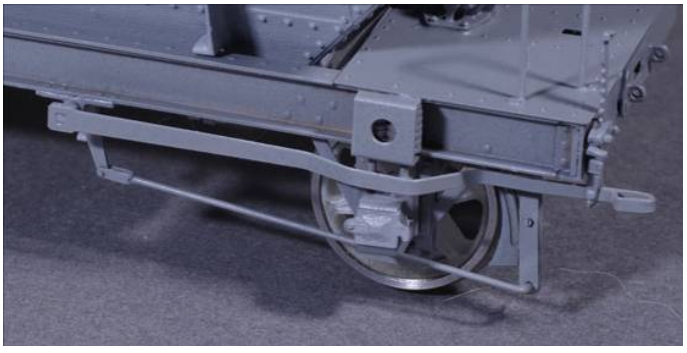
Fold the etch to form a clevis. Fix the wire by soldering sparingly.

Prepare the handbrake crank. Open out the big ends to fit the pivot casting on the underframe and the other holes 0.3mm. Treat crank small end with gun blue to resist solder. Solder reach rod clevis to crank small end with a 0.3mm wire pin, leaving it free to move. (see below).

Fit the axlebox sliders to the underframe. The easiest way to do this is to fit one end of the spring and then the other. Centralise the axlebox and gently flex the spring until you can slip the axlebox between the horns.

Trim any excess spring length to ensure the slider can move freely.

Fit up the handbrake linkage as shown in the photos above. Fit the reach rod into the brake shoe, but leave it free to pivot. Solder the big end of the crank to the pivot casting inside the solebar. The brake linkage should be able to pivot smoothly as the wheelset moves.



Note that the reach rod should go between the axleguard and the wheel. This is not practical with RP25 wheels so run the reach rod outside the axleguard.

Drop the hopper in place. It should contact the solebars on all four side shoes (Also in the pockets, but this will not be

visible so some clearance here is OK). Note that lifting eyes on the hopper corners (not supplied) were fitted after 1948. Handgrabs were initially fitted at the handbrake end only and were not painted white until fairly late in life.

Q wagon painting, decaling and operational observations

A summary of a chat group discussion, mainly contributed by John Brouwer and Kevin Crosado.

It is clear from photographs that Q wagons were not painted according to the official diagram, and furthermore that the Westport and Greymouth fleets were significantly different. These differences appear to be related to the working of the inclines at Roa, Rewanui and Denniston as well as the wharves at Westport and Greymouth.

Q wagons were not turned and the orientation of the hopper within the wagon was also maintained. Qs had to run with the handbrake trailing on the inclines. This allowed staff to drop the handbrake while they were running behind the wagon – it was rather awkward and dangerous to try reaching back to drop the brakes on a wagon running behind you, especially on rough track. The Roa and Rewanui inclines faced in the opposite direction to Denniston, which was the main reason the two fleets were kept separate. The door operating gear had to be on the correct side for the wharfies, too — hand brake side at Greymouth, non-handbrake side at Westport.

The notes below are a general overview derived from study of many photographs. Exceptions certainly occurred, and changes over time are also certain to have happened. Clear photos of wagons to support any contrary views will be gratefully received. My own focus is the 1930/40s period, and these notes inevitably reflect that.

Livery (except where noted) was tarred black, with white lettering on a black painted panel. I believe the inside of the hoppers were not painted and would therefore have been generally rust stained with perhaps some bare metal from the friction with the load.

Westport lettering.

Hopper sides: Distributed load on the left hand side, Tare weight in 4” characters in the centre and the wagon number, also 4”, preceded by ‘Q’ on the right.

Hopper ends: Wagon number without class letter in 4” characters on the left, with the tare in 2” characters immediately below. On Westport hoppers the word ‘tare’ appears to be absent.

Underframe: Tare weight preceded by ‘TARE’ in 2” characters together with ‘Q’ plus the wagon number on a red oxide patch on the solebars. The wagon number approximately central. Shopping codes and dates as well as overhaul dates were also on the solebar, but photos show various positions.

Greymouth Lettering.

Hopper sides: Wagon number (including ‘Q’) on the left, Tare in the centre and distributed load on the right. The load may have been dropped in later years.

Hopper end (uphill): 4” Wagon number without ‘Q’ on the left, with tare weight below in 2” characters.

Hopper end (downhill): 4” Wagon number without ‘Q’ on the right, with tare weight below in 2” characters.

Underframe: Tare weight preceded by ‘TARE’ in 2” characters together with ‘Q’ plus the wagon number on the solebars. The wagon number approximately central. Shopping codes and dates as well as overhaul dates were also on the solebar, but photos show various positions.

There appear to be a number of relatively common variations in photographs to the above guide. Tare weights not generally preceded by ‘TARE’ sometimes have this in 2” characters. Tare weights usually in 2” are sometimes in 4”. End numbers sometimes do have the ‘Q’. I assume that there is actually some systematic reason for this, but have insufficient data at present to comment.

Kevin Crosado's additional comments:

Trains of Qs ran through from Greymouth to Westport, or vice versa, when ships couldn't get over the bar at one or other of the ports. This created problems because the coal packed down solid in the wagons with the vibration en route and wouldn't flow through the doors. The hoppers had to be tipped on end so the coal could be loosened with bars. Traditionally this was done with a hook over the end, but this didn't do the hoppers a whole lot of good, hence the fitting of tipping rings at each corner after WWII.

Westport wagons sent to Addington for overhaul were generally grabbed at Reefton on the way back and used to convey shipping coal to Greymouth (but weren't normally used at the Greymouth mines 'cos of the handbrake issue) before resuming their journey from Stillwater. It means you can justify a few Westport wagons at Greymouth if you're modelling post-1943.

Incidentally, Addington did follow the painting diagram in the 1930s. However, Greymouth staff complained that the red oxide hopper paint only lasted 2 or 3 months, then they had to waste time tarring them. Addington was brought into line from 1942.