

FR1 – Farish Wagon Clasp Brake 2FS Conversion Kit v1.3

This etch provides an easy method for converting Farish wagons with clasp brakes to 2FS. It was designed for the LNER van but will work for other vehicles using the Farish LNER underframe such as the LNER/BR High Sided Open.

The LNER van underframes are generally very good and are let down only by the fact that the clasp brakes are not in line with the wheels. On the face of it, it is straight forward to convert them using wheels on 15.2mm axles, and use brake shoes from elsewhere to put the brakes in line with the wheels. However the amount of slop in the Farish underframe with these axles means that the wheels will drag against the brake shoes making it far from free running. In order to get around this we came up with this simple little etch.

The etch assumes that you are removing the Rapido coupling and its housing from the underside of the vehicle. If not there will be insufficient clearance for this etch to fit without modification.

Additional parts required from Association shop (Part numbers in brackets)

4x top hat bearings (2-041)

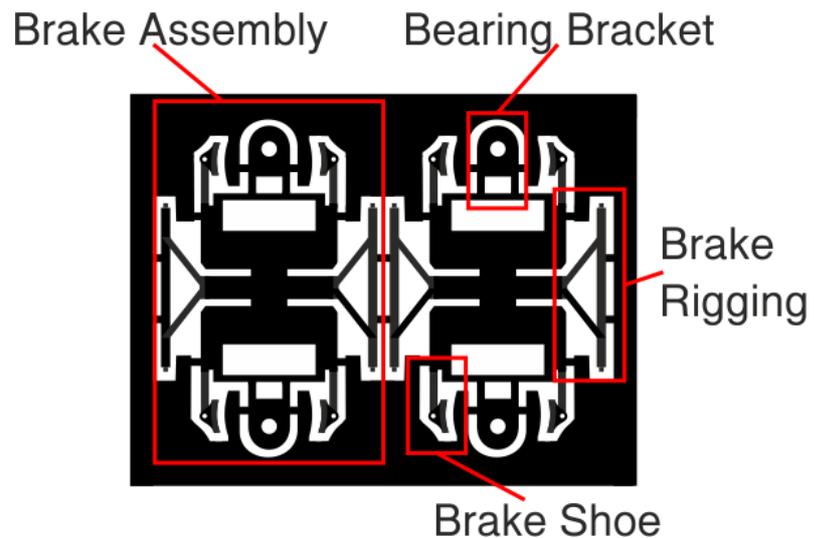
2 pairs of 3 hole 6mm wheels on 12.25mm axles (2-005)

For beginners, general instructions on building these kits can be found in a separate document. For experts, or if you don't like reading instructions and just want to know the suggested order, you can simply **follow the text in bold** and dip into the detail where necessary.

There is also a video for the BR1 Brake shoe etch available on the web site at <http://www.festiveroad.net/pages/shared-etches/> which might be helpful in showing the general principles of how these assemblies go together.

Building the etch

The etch contains two assemblies, one for each wheel, comprising bearing brackets for the axles to run in, clasp brake shoes, and rigging that joins each pair of brake shoes. All these remain as part of the etch and are folded into position. All **half-etched fold lines are on the inside** of the fold.



1. Before removing the assemblies from the etch, place some top hat bearings on the work surface with the bearing surface facing down. Check that the holes in each bearing bracket fit over the bearing. If they don't, use a taper broach to gently open out the holes until they just fit. Apply a small amount of solder cream to the half etched area on one bearing bracket. Place the bracket on top of the bearing and **solder the bearing in place**. Repeat for the other bearing.



2. In order to obtain sufficient clearance for fitting to the wagon, **the outside faces of the bearings need to be filed down**. Take care when doing this not to weaken the bearing bracket. You can file them flush with the etch (as in the pictures here) but if you leave a millimetre or so it will help with aligning the assemblies on the wagon.

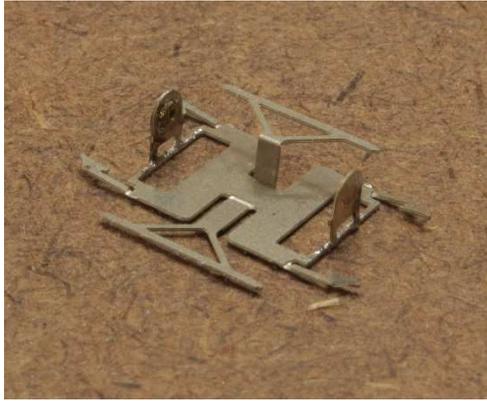
3. **Remove one assembly from the sheet** by cutting through the tabs that join the assembly to the fret, then file away the remains of the tabs (particularly those on the brake rigging which will be visible). Take care when cutting the tabs not to exert any sideways force on the parts. The brake rigging is held to the etch with a relatively thin piece of metal and sideways movement when being cut or filed will weaken the piece making it more prone to detach before it has been soldered. *If you have not filed the bearing flush, then before cutting the tabs that hold the bearings it is essential that you drill a hole in your work surface slightly bigger than the bearing and ensure that the bearing is in the hole and the face of the etch is flush with the work surface. If you do not do this the bearing bracket will distort when you cut the tab.*



4. Apply a small amount of solder cream to the fold lines next to the bearing brackets. Using a scalpel to start, and a steel rule to finish, **fold the bearing brackets up at 90° to the floor**. At least there is no protruding bearing to get in the way. Check for squareness and **solder in place**.

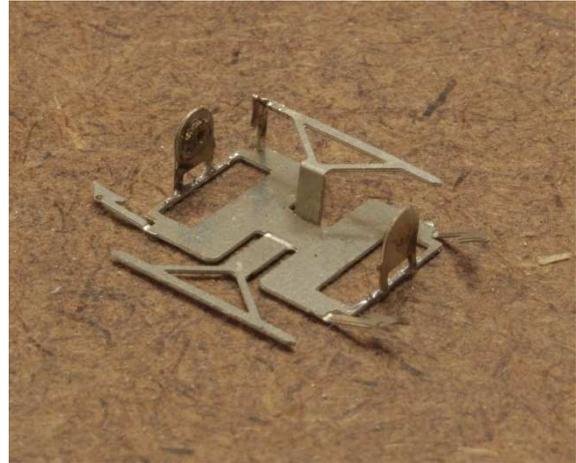


5. The brake rigging is connected to the floor of the etch by a piece of metal that has two fold lines, one on each side. Using a pair of long nosed pliers, hold one piece of brake rigging so that the nose of the pliers is just shy of the fold line, then **bend the entire piece of brake rigging up at 90° to the floor**. Do not solder it as we need some movement here for adjustment later.



6. Using tweezers, hold the bottom part of the brake below the second fold line, and use your finger or a steel ruler to **fold the top of the brake rigging down 90° so that it is parallel to the floor**. Again do not solder this, but check it is square with the floor.

7. The ends of the brake rigging should be more or less in line with the holes in the brake shoes. Fold up one shoe and see if the rigging fits into the hole on the shoe. If it does not then you may need to open up the hole in the shoe with a reamer, but take care as there is not much metal surrounding the hole. It may be that the rigging needs to be tweaked slightly to align the two parts. When the end of the rigging fits neatly into the shoe, apply some solder cream to the ends of the brake rigging, then **solder the brake rigging to the shoe**.



8. Repeat for the opposite brake shoe.

9. Repeat for the opposite brake rigging.

10. Fit a wheelset and check it runs freely.

- If it is tight in the bearings gently bend the bearing brackets outwards a smidgen.
- If it is floppy, squeeze the bearings together between finger and thumb.
- If the outer faces of the wheels rub on the metal check the back to back measurement of the wheels. There isn't much leeway here so it should be as close to the recommended 8.50 mm as possible.
- If the brake shoes are catching the wheel the brake assemblies can be adjusted a little because we haven't soldered the folds in the rigging support. It is important to ensure that the brake shoes are not touching the wheels – if shoes from opposite sides touch their respective wheels you will get a short. Checking this with a multi-meter is a good idea.

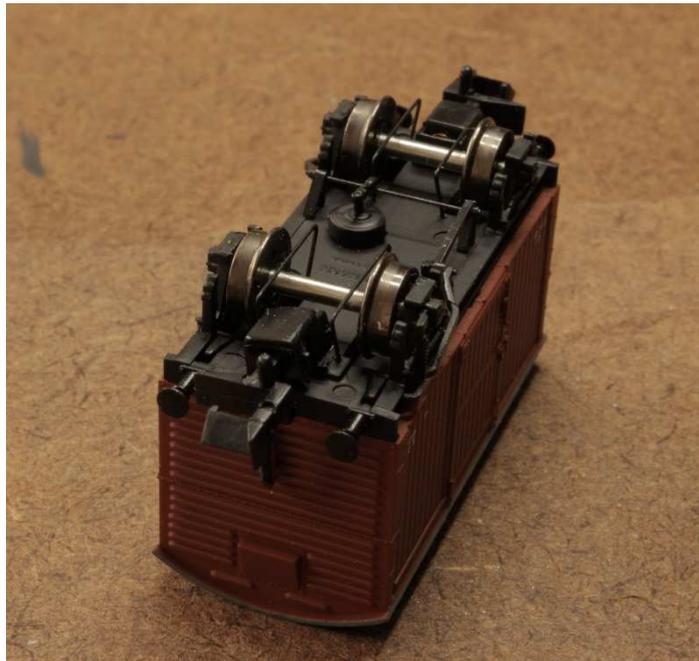


11. Repeat the exercise for the other assembly.

Altering the Farish wagon

12. The Farish underframe needs a few pieces filed off in order to provide clearance for the assemblies. If you have not done so already, **remove the coupling housings** by gripping with a pair of pliers and twisting.

13. Using a pair of pliers **remove the four brake retaining straps**, one behind each wheel. They may need a fairly hefty tug to remove them and will invariably become damaged in the process. The etch does not provide for these because they are not very visible and would impede the easy removal of the wheels at a later date. You can however fabricate some from 0.3mm nickel silver wire and fix them in place at the end of the process should you wish to do so.



14. **Remove the N-gauge wheelsets.**

15. **File flush the two raised locating lugs** for each coupling housing.

16. **The inside faces of the axleguards need to be filed in order to make at minimum 12.6mm clearance.** Don't file off more than you need to ensure free running as this may lead to a tendency for the wheelset to drop out of the bearing or for the wheel to rub against the outside of the etch where clearance is tight – the bearing bracket is very fragile and needs the restraint of the plastic axleguard to stop it moving outwards. Make sure to file the axleguards evenly over their entire face and right down to the floor. A large flat file is ideal for this. Take care not to damage the vacuum cylinder and cross rodding (which is prone to drop out) or the buffer heads (these will inevitably get scuffed and require a touch of paint at the end). Check with one of the assemblies as you go and ensure it sits square on the floor of the wagon and the wheels run freely – if they don't then you probably need to file some more. This is easier to check if the bearings have been filed flush

17. You will also need to **remove the moulded brake shoes**. These are quite easy to remove with a sharp scalpel. Cut them just below the springs.

Final Assembly

18. **Clean and paint the assemblies.** You can leave the painting to the end if you prefer and paint the entire wagon underframe, but if you want to spray-paint you will need to either remove the body from the underframe or mask the body. If spray painting the assemblies it pays to mask the bearings first with a little blu-tac or similar.

19. Roughen up the faces of the parts to be joined and **glue the assemblies to the wagon floor.** If you have left a bit of bearing protruding this will locate in the Farish axle hole. Otherwise, to get the correct placing, look at the axleguards side-on and the vertical parts of the bearing bracket should be invisible behind the plastic axleguard. Take care to ensure the parts are aligned correctly. If you leave the wheelset in the assembly it is easy to spot if the axle isn't perpendicular to the solebars. Check also that the axle is parallel to the floor by looking along the underframe from each end.



We recommend using a slow-setting glue such as Araldite or Serious glue which gives you time to adjust the alignment of the assembly to ensure it is central with the wagon axleguards. Alternatively you can hold the assembly in place and apply cyanoacrylate to the edges allowing it to penetrate underneath and fix the part in place, but make sure you are 100% happy with the alignment before doing this.

Troubleshooting

Whilst batch-converting a number of these wagons I encountered several that exhibited poor running. Investigation revealed this to be down to one or more of the following reasons:

- a) The brake shoes were dragging on the wheels. Pulling them out slightly using tweezers resolved this
- b) The bearings had not been properly cleared of paint. Next time I will take the trouble to mask the bearings as this is less work than properly cleaning them afterwards.
- c) Too much plastic had been removed from the inside face of an axleguard and over time this allowed the bearing bracket to splay outwards which in turn allowed the outer face of the wheel to drag against the etch where there is very little clearance. This usually resulted in the wagon dragging on one direction only. You can spot the problem axle by holding the wagon with the axles vertical and spinning the wheels. If the wheel drags then the axleguard at the bottom is suspect. I fixed this by inserting slivers of 5, 10 or 15thou plasticard between the axleguard and bearing bracket as appropriate until the axle spun freely.

Change History

V1.0 – Initial release

V1.1 – Tidied base where brake shoes join

V1.2 – Extra clearance for brake shoes

V1.3 – Reduced hole diameter in shoe to reduce chance of over-etching

V1.3.2 – Added troubleshooting section and added a few preventative tips to other sections.