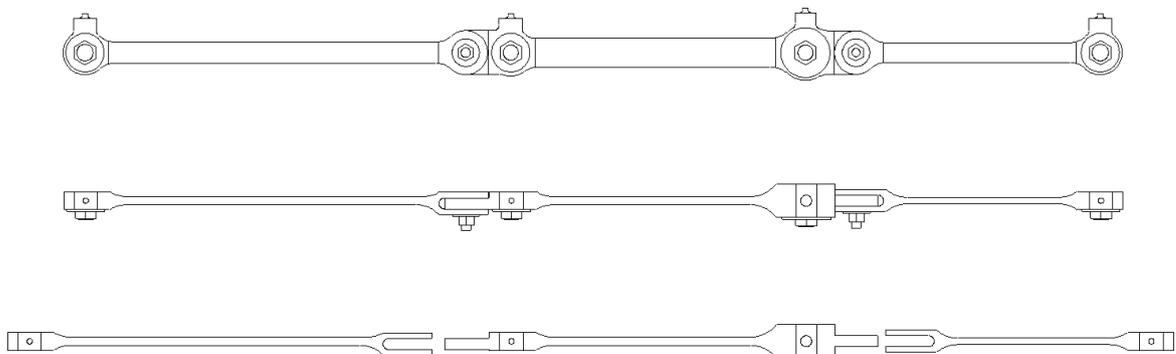


C501 - Class 14 Replacement Coupling Rods

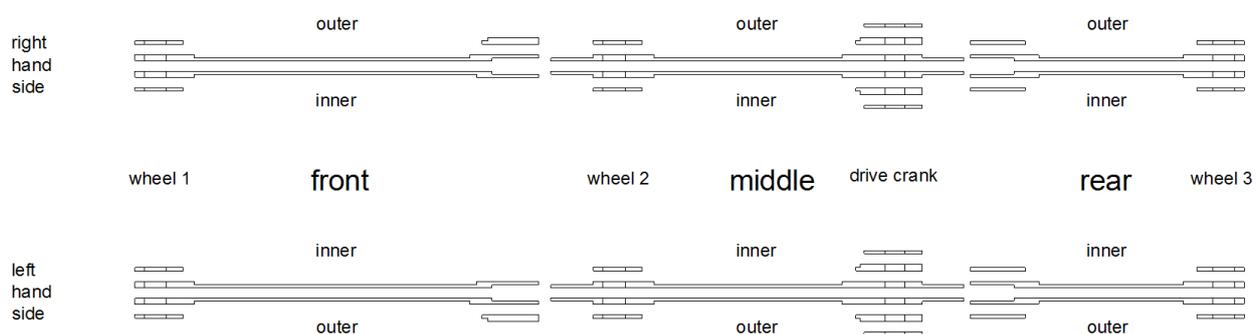
The rods are designed as replacements to fit the original Heljan Class 14 wheels and also Alan Gibson, Ultrascale or Markits replacement wheelsets. However, they can also be used to replace the original rods on any other model of a Class 14.

- Not being familiar with the prototype wheel numbering arrangement, nor what is considered the front and rear of the locomotive, we have used the following layout of the rods:
 - With the locomotive positioned so that the third crankpin from the left-hand end is on the drive crank such that from left to right the crankpins are - wheel crank, wheel crank, drive crank, wheel crank. This I have considered this the left-hand side of the locomotive and therefore the left-hand end is the front and the right-hand end is the rear.
 - The leading end of the rod is that end nearest the front and the trailing end of the rod is that nearest the rear of the loco
 - The inner part of the rod is that lamination nearest the loco chassis and the outer part of the rod is that lamination furthest the loco chassis
 - For the middle rod, the smaller boss is towards the front, the front and rear rods the joint makes it obvious.

Prototype rods (lhs)



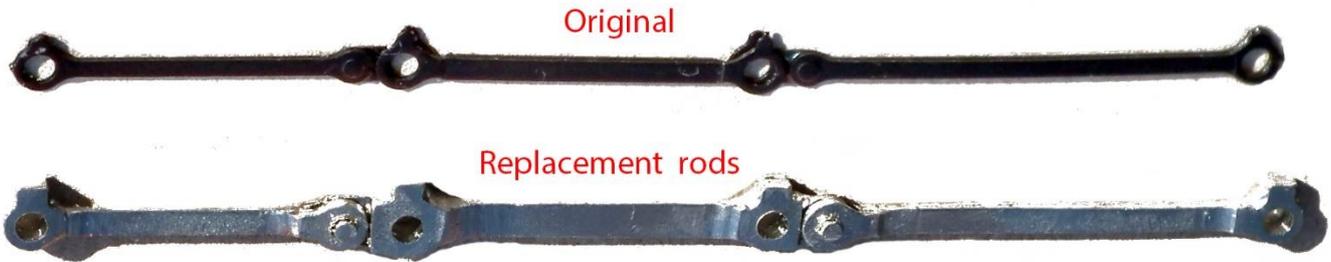
Model rods



- Each side is manufactured from six etches and hinged in front of the second axle and behind the third crank pins. There are also overlays for the bosses. The prototype rods are have quite a complicated arrangement with very substantial bosses, and the model rods replicate this. You are advised to study the diagrams above to ensure correct assembly.

The prototype rods have very thick bosses connected by what appears to be very thin rods. The fret includes all the layers to represent the prototype.

Compare the completed rods with the Heljan originals. Photographs of the rods and bosses on the prototype machines are on the last page of these instructions.



Note – spares of most of the smaller components are provided on the etch, primarily the boss overlays, so don't be surprised when you have unused parts left at the end.

3. Cut the middle rod left outer [1] and the middle rod left inner [2] from fret.
4. If using Alan Gibson or Ultrascale wheels, open the crankpin holes using a 1.5 mm drill. If re-using the original Heljan wheels, open the holes out to 1.3mm. When complete, drill a hole using the same size drill perpendicular in a scrap piece of wood. Leave the drill in the hole in the wood. Tin the mating surfaces of a pair of coupling rods and place over the drill. This holds one end of the rods accurately ready for soldering. **It is critical to align the two halves exactly** in order to make one rod so take some time tweaking.



5. Now take the middle rod leading boss overlay [3] and solder to the outside of the leading boss.
6. Take the middle rod left trailing and fit the outer boss overlay [4] and solder to the outside of the trailing boss and then add the middle rod trailing second boss overlay [5] to the outside of this.
7. Repeat on the inside of the rod with another middle rod leading boss overlay [3], the middle rod left trailing first inner boss overlay [6] and a middle rod trailing second boss overlay [5].
8. Place a little flux along the top surface of the rod and apply heat; the solder on the soldering iron will run down between the rods and join them. The secret is to apply only a little solder at a time. Solder will fill the “cusp” and give the impression of a solid rod. Repeat for the whole length of the rod. Clean up each rod with files.
9. The right hand middle rod is exactly the same as the left hand middle rod, so repeat paragraphs 3 to 8 to produce a second middle rod for the right hand side.
10. Next take the front rod left outer [7] and front rod left inner [8] and solder them together, using the same method as before, creating a forked end.
11. Solder the front rod fork overlay [9] to the outside of the trailing forked end. Solder a front rod boss overlay [10] to the front and back of the leading boss.
12. Repeat paragraph 8 for this rod.
13. For the right hand front rod repeat paragraphs 10 to 12 using front rod right outer[11] and front rod right inner [12] and the same overlays [9, 10].
14. Lastly take the rear rod left outer [13] and the rear rod left inner [14] and solder them together using the same method as before, creating a forked end.
15. Solder a rear rod fork overlay [15] to the outside and inside of the leading forked end of the rear rod. Solder a rear rod trailing boss overlay [16] to the outside and inside of the trailing boss.
16. Repeat paragraph 8 for this rod.
17. The right hand rear rod is exactly the same as the left hand rear rod so repeat paragraphs 14 to 16 to produce a second rear rod for the right hand side.
18. File the stepped end of the boss and fork overlays so that they blend into the face of the rod. There should be no steps visible. Clean up the rods paying particular attention to the joints.

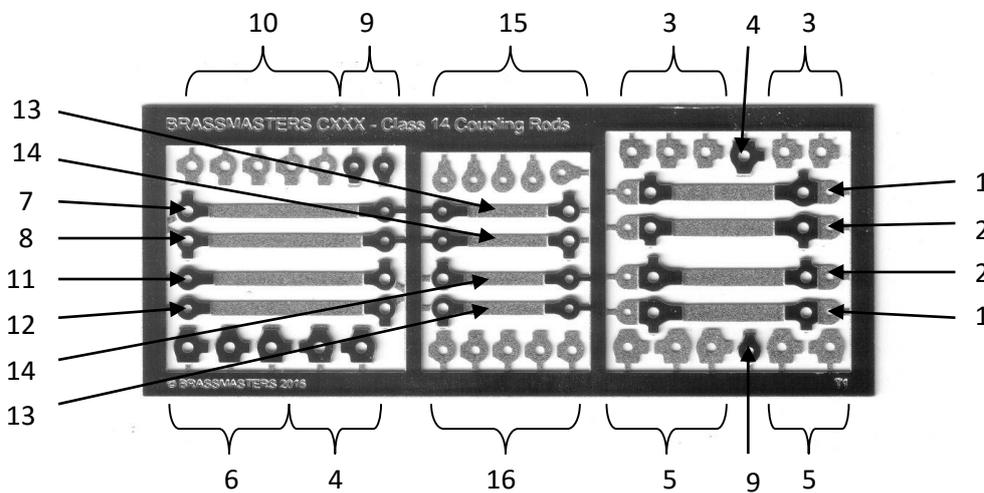
19. Each set of rods has two knuckle joints to manufacture. The front, middle and rear rods are joined with lengths of 1mm nickel silver wire. Countersink the hole on the inner fork to allow the solder to form the joint.
20. To stop solder flooding the joint apply a little oil to the surfaces not to be soldered - this will prevent the solder running into the joint. Keep the rear of the rod clean. Solder can then be quickly applied with a very hot iron to the back of the rod to fix the rivet in place. Clean off excess solder leaving enough to keep a strong joint, then cut back the wire at the front to leave 0.5mm protruding, We do this with a fine saw, cleaning up with a fine file because it leaves a 'sharp' edge. This can be filed to a hexagonal shape if required to represent the bolt head. See photograph above of completed rods.
21. Open up the crankpin holes in order that the rod will rotate on the crankpin bushes. This can be done with a reamer, broach or a fine Swiss file.
22. The crankpin bushes on the Ultrascale driving wheels are just long enough for the replacement rods, **but do not tighten up the nuts or these will lock the rods solid**. Instead solder the nuts onto the crankpins with a little slop between the nut and the crankpin. As supplied with the drop-in wheelsets, the Ultrascale crankpin bushes and screws for the outside crank are far too short for the huge boss. Replace these with longer ones as supplied for Ultrascale wheels (type E on their website). There is very little clearance behind the steps and their backing mesh so it is necessary in P4 to:

- a) Omit the backing washer and shorten the crankpin bearing tube to the thickness of the rod and boss
- b) Thin the nut to at least half its original thickness (secure with solder or Loctite)
- c) Reduce side play in the crank axle by fitting Peco fibre washers (cut to a 'C' configuration and clipped over the axles) between the frame and the cranks

This is sufficient for at least B6 turnouts and 4 foot radius curves, but if additional clearance is necessary consider either removing the rear mesh, thinning the steps and re-fitting, not fitting the full thickness boss overlays, or moving the steps out slightly.

In EM gauge, (b) and (c) may not be necessary.

23. if re-using the Heljan wheels for OO or EM gauges, carefully pull out the crankpins with a pair of pliers (they are knurled **so do not rotate or this will enlarge the holes in the plastic wheels**). Take special care with the metal outside drive crank, we find with this it is best to initially push out the pins from the rear rather than relying on just pulling which can shear the pins. The crankpin bearing surfaces are 1.25mm diameter and are just long enough for the replacement rods but need securing with Loctite or a super glue.



Part numbers

No.	Description	No.	description
1	middle rod left outer	9	front rod fork overlay
2	middle rod left inner	10	front rod boss overlay
3	middle rod leading boss overlay	11	front rod right outer
4	middle rod left trailing first outer boss overlay	12	front rod right inner
5	middle rod trailing second boss overlay	13	rear rod left outer
6	middle rod right trailing first inner boss overlay	14	rear rod left inner
7	front rod left outer	15	rear rod fork overlay
8	front rod left inner	16	rear rod trailing boss overlay



Completed conversion with Ultrascaple wheels

Pictures of prototype rods and bosses

