



This article is provided by FMES for your interest thanks to the kindness of the original publishers. FMES makes no representations or warranties of any kind, express or implied about the completeness, accuracy or reliability with respect to this document and any sentiments expressed are not necessarily supported by FMES. Any reliance you place on this document is therefore strictly at your own risk

“Old Rube restoration part 16”

This document was written by Paul Naylor in winter 2025/26 and is the sixteenth article in a restoration project. The articles were published more or less simultaneously in the Frimley and Ascot Locomotive Society newsletter.

I need to progress carefully now since it would be easy to forget to put things on the chassis while upside-down, turn it right way up and then have some pain, or add things that get in the way of later items. Whilst I can remember what came off it by my own hand, and the order, I also have parts that had already been removed, so it will be a journey of discovery.

I thought that the next addition had better be the connecting rods. This is to make sure that they fit and turn smoothly to check quartering and centre to centre distances. Following some good advice from a club colleague a good few years ago (the value of club membership!), I used needle roller bearings in the axle boxes of my locos to good effect, with the lubrication being through the axle centres to a cross hole in the bearing. The additional refinement here was to use roller bearings with a seal in only one end, and position the open end against the wheel: this served to keep muck out from between the frames, and leakage from the unsealed end lubricated the wheel to axle box rubbing surfaces. I did, however, always use solid bronze bushes for the connecting rods... Old Rube is the opposite: solid axle boxes and roller bearings in the connecting rods! I am not too sure of this as some latitude is needed to accommodate the up and down movement of the wheel sets in use, however that is what is there, and the clearance required has well 'worn in'. Unfortunately, this makes lubrication awkward as the 'centre hole' method does not work here thanks to the retaining caps on the pins, and the builder 'modified' each roller bearing by grinding a hole in the outer case of the bearing to correspond to an oil hole in the connecting rod (and no end seals). This is probably OK as long as the bearing survived the operation, except that one of the bearings has lost a couple of rollers at some time and needs replacing (running such a bearing with missing pins causes undue wear and can jam)...

Starting with the left-hand set and getting rid of the treacle revealed that the bearings seemed to be completely bunged up with fairly solid old steam oil and these did not rotate, so I suspect that the bearings probably did not perform as freely as they should. Getting rid of this (and making a note not to use steam oil as lubricant) also revealed the absent rollers in one bearing, so this, at least, needs replacing. The photos show the cleaned up inside view of the connecting rod set, and a close up of the offending bearing (which does not show the missing rollers). The screws visible do



not seem to serve a purpose in bearing retention, they hold on a bronze flange on the outside (look-alike solid bearings perhaps). The overall photo shows a couple of these with missing heads. The joints also

have some slop in them: probably caused by wear because of the unforgiving nature of fitted roller bearings to allow some movement, but I do not think there is anything to be served in replacing/bushing these for this reason. Too much precision can be a disadvantage and steam engines had the reputation to continue working when worn out... The bearings are all imperial and of two sizes (3/4" for the main driving pin and 5/8" elsewhere), fortunately I was able to buy a replacement for the offending bearing.

When it arrived, grinding a little bit of the casing was nerve wracking but quite easy, and a flush with WD40 to get rid of dust seemed ok. It spins without any issues (ie no grittiness). Removal of the old one was a matter of drifting it out and pushing the new one in with a smear of Loctite to hold it there... I wonder if the loco originally had solid bearings that wore out and these were bored out for the roller bearings leaving the brassy surrounds held in with four screws each?

I had to make two new oil pots for the end bearings: these are brass, pressed into rather shallow (c 3.0mm deep) holes and the outer two, with slightly shallower holes, had been epoxied in at some time, bunging up the oil hole in the middle (!). I made these a press fit with the aid of Loctite and they seem to stay in place OK (at the moment...). Re-assembling the connecting rods back on the engine was easy, taking care not to dislodge any roller pins. On examination, these roller bearings (Timken) had a small gap in the retaining pressed end that allowed the rollers to escape, unlike the bearings I have used on other jobs. The retaining caps were added but noted to be quite tight for the two rear axles. The bolts/endcaps had M8 washers as spacers, so I measured the spacers required with a little float and turned up some steel 'washers' the right diameter and right hole size. These seem to work OK too, but I won't Loctite them in (this time 270 'threadlocker' NOT 603!) until I have done the same to the right-hand side and checked quartering. The photo shows the left-hand side (upside down again): the right-hand side is not attached yet (and the third axle is a little rotated as you can see).



And so, on to the right side. This one is similar to the left and bunged up as much with treacle (and with full complements of roller pins), however it has three properly fixed oil pots and one missing. I turned up another oil pot, cleaned the bearings and the rest of the connecting rod up and fitted it to the respective crank pins. I then tried to see if it all rotated ok without binding... it did (possibly this is not a surprise since it is well worn in) and I could 'get on'. Most of the pin retaining caps fitted OK on this side (ie the connecting rods had a little float), however on closer examination, the two caps on the front wheel set needed some attention. This pair are behind the cross head, and need to miss it when the wheelset is at its extreme range of lateral travel – this is also the leading set that gets most force in cornering. The retaining cap on the right-hand side is worn really thin, presumably in contact with the cross head although there are only small witness marks on it. I had



presumably in contact with the cross head although there are only small witness marks on it. I had

to remake it to give a reasonably good clearance with the cross heads and provide some retaining strength that was failing on the old one. This was a simple turning job, but with a need to adjust size etc to make sure that the connecting rod had some freedom of movement and it all missed the crosshead. For some reason (yet to find out?), each connecting rod pin has TWO bronze washers between the wheel and rod, each around 1mm thick. To eliminate risk of crosshead contact, I had to get rid of one on this front wheel set: time will tell whether this is a problem or not. It always surprises me (on my own locos as well) that a really large design with apparently loads of space for components, inevitably has some places where space is at a premium! I then 'loctited' (Loctite 270) the bolts in while I remembered to do it. On my locos, these retaining caps were held on with right hand threads on the right-hand side, and left-hand threads on the left, so when running forwards, they had a tendency to tighten: here there is the risk that the ones on the left-hand side unscrew themselves without retaining glue (shades of 'knock off' wheel nuts on older cars). 270 thread locking compound can be unscrewed with a little difficulty, but it will soften above 150 degrees C to allow easier removal. So far so good then, the next job is probably re-attaching the slide bars and cleaning up and refitting the main connecting rod to continue checking it all works as intended.