MY LOCO OVERHAUL

I have just recently completed the first mechanical overhaul of my 3½" gauge LMS 8F after 12 years of running. During this time it has been steamed a total of 82 times and has covered almost 500 miles without any major work being done to the locomotive. Nearly all the mileage has been done with PTFE Flouroscint self expanding valve spools to my own design fitted in the cylinders. Due to rusting problems in the cast iron valve sleeve bores the sleeves have now been changed to a bronze material. The new valve sleeves now fitted are also to my own design, using a large number of small holes [40 in numbers] drilled in the sleeve as ports. This is to help the soft PTFE to move smoothly over the openings without any risk of jamming. The holes are 1/16" in diameter and have a port area which is greater than that of the normally square holes used by many designers.

After tidying up a little of the scoring caused by the rust in the old sleeves the piston valves have been put back into use. It was thought that the piston valve PTFE parts would be "self healing" and rebed to a steam tight fit in the new bores. The pictures show the new valve sleeves and the old piston valves before they were refitted into the cylinders.

The other parts of the loco were examined for wear, mainly in the motion work moving parts. The worst wear was to be found in the knuckle joints in the coupling rods, where it was severe. They were bronze bushes with silver steel pins. These were replaced with hardened silver steel bushes and hardened pins throughout. Just why the knuckle joints were so badly worn is difficult to understand, as these joints are not expected to have much movement, except when the loco is run on bad track. Not a problem at the Colchester track.

Also showing excessive wear were the bushes and pins in the coupling rods. These were also bronze bushed the same as the knuckle joints. They have been rebushed with cast iron bushes which I hope will be harder wearing than bronze. Just why these bushes should have worn is difficult to understand. When the new close fitting bushes were back in place the wheels spun round normally, which proves that the quartering was not the reason for the wear. I am told that cast iron bushes were used in the side rods of locomotives during the war to save on bronze, but I can find no information as to whether this was successful or otherwise. Any ideas as to the reason for wearing of coupling rod bushes would be welcomed.

There was one other heavy wearing area on the 8F. This was the pin and bush in the little end of the con rod. This was as expected, as this is a very hard working joint on any loco. A new hardened pin and cast iron bush has now been fitted in the con rod and I shall see if this is an improvement in due course.

Finally, whilst the boiler was off the loco it was given a treatment with a dose of kettle descaler. There was NO sign of any reaction to the descaler at all and the boiler was considered to be completely clear of all traces of lime scale. This proves that our use of

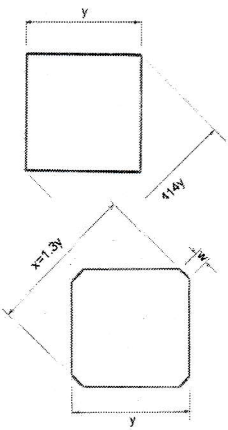
rainwater at the Colchester club site is the best practice to prevent boilers scaling up.
I always blow down my boilers after a run to purge out any sludge from the boiler.
As there is no such thing as totally clean water this must be the only correct way to run your locomotive. It is little known that rain water acts as a scrubbing brush as it falls, removing dust floating in the air which would find its way into our boilers if we do not purge it out after a run.

Geoff King

READERS LETTERS

ROUNDS, SQUARES AND POLYGONS

May I be permitted to comment on the data presented by Mike Gipson in Link No.28. Mike suggests a formula for determining the size of a square that can be machined from a round bar. The formula he suggests will produce a satisfactory result for the original requirement he postulates – i.e. to produce a square end on a brake shaft or valve spindle to receive a lever or hand wheel. Mike then goes on to propose the use of the formula to determine the size of a piece of round stock from which to produce a square bar when a suitable piece of the required section cannot be found in the material store. In this case the use of the formula is likely to lead to disappointment! For the square section the corner to corner dimension may be determined from our old friend Pythagoras or, more conveniently, by simple trigonometry. i.e.



$$y = xCos45^0 \quad = 0.707x$$

or $$x = \frac{y}{0.707} \quad = 1.414y$$

If Mike's formula is used a chamfer is left on the corner of the square as shown below. This is ideal if the intention is to fit a lever or hand wheel to the end of the round shaft because the matching hole will not have perfectly sharp corners and the chamfer is required for clearance. If the objective is to produce a square bar from a piece of round stock the chamfer will, in all probability, be unacceptable. To put things in perspective, a 1" square bar machined from a 1.3" diameter round bar (instead of 1.414" inch diameter) will have a chamfer almost 0.1" wide on the corners. In practice, of course, the nearest size larger bar than the minimum would be used but this might still prove too small if selected using Mike's formula.

The same comments apply to a lesser extent to the formula quoted for the hexagon. In general terms the diameter of the circumscribing circle of a polygon with an even number of sides is given by:-

$$d = \frac{x}{Cos\left(\frac{180}{n}\right)}$$

where x is the width across flats of the polygon and n is the number of sides. If the polygon has an odd number of sides the equivalent formula is:-

$$d = \frac{2r}{Cos\left(\frac{180}{n}\right)}$$

where r is the radial distance from the centre of the figure to a face. Very handy to know if you are building a 5, 7 or 9 cylinder radial aircraft engine and are looking for a blank for the crank case!

Norman Barber