



Combe Mill

Work on the Beam Engine May 2006

Written by Ron Rutherford

Report on Work on the Beam Engine at Combe Mill on 19 & 21 May 2006

Summary

It had been found that either pressure or vacuum could be on both sides of the piston at the same time. Two possibilities were considered:-

- 1) Piston rings damaged
- 2) Valve damage

On inspection, both were found to be untrue.

The remaining probability is there is insufficient pressure in the valve chest to keep the valve in contact with the port face.

On Friday, 19 May, the piston was checked using the following procedure.

1. Remove cylinder cover bolts, ensuring that bolts and nuts were kept paired. Note that the two bolts nearest the valve chest had cut-away heads
2. Remove one gland retaining bolt, slip a wire rope sling into the gap and replace the bolt.



Splitting the cylinder cover (1)



Lifting the cylinder cover (4)



Top of piston showing contamination (5)



Underside of piston showing contamination (5)

Report on Work on the Beam Engine at Combe Mill on 19 & 21 May 2006

3. Lower the piston to BDC and pass the wire rope over the beam and connect the ends with a shackle. Insert 2 small pieces of wood to protect the wire rope from the corners of the gland.



Cylinder cover held on two boards (4)

4. Bar the engine over to raise the cylinder cover until it almost touches the entablature. Place 2 pieces of board, one either side, as supports (tied to the uprights) and lower the cover to rest on them.
5. Lower the beam to release the wire rope and then raise to get the piston to TDC. (A thick layer of grease and gland packing was found on top of the piston which was removed)
6. Remove the 4 fixing nuts, again taking care to note which nut paired with each stud.



Removing top plate of piston (7,8)

7. Remove the 2 square headed bolts and replace them with 2 eyebolts (we only had one and improvised the other)



Top plate of piston removed showing jumble of metal and contamination (7,8)

8. Using 2 levers, with wood to protect the top of the cylinder, raise the piston top plate and sling securely as high as possible.

9. It was found that the springs shown in the diagram of the piston were useless and some loose pieces were removed. One was left in each of the 4 sections.



Inside of piston showing one spring on end of adjusting screw (10)

Report on Work on the Beam Engine at Combe Mill on 19 & 21 May 2006

10. 2 car valve springs were cut in half and one fitted, with washers, on to each of the 4 adjusting screws. The screws were then screwed out to give some radial pressure to the flat spring left in position so that it could spread the new spring pressure radially to the piston rings.



Cutting the springs (10)

11. Reverse the process to re-assemble.

On getting steam on Sunday, 21 May, it was found that there was no improvement in performance. It was then decided to inspect the valve and port faces.

Procedure as follows.

1. Remove the vertical rods from each side.
2. Remove the top plate fixing nuts (2 studs and 2 bolts) again noting pairing.
3. Lift the valve and chest top (2 strong men) out of position.



Inside of valve chest showing port face

No apparent damage was found and the whole thing replaced. The engine could be run if the Roller boiler pressure was at 150 psi and the water level in it at the lowest safe level (therefore maximum volume of HP steam)

At lower pressure, the engine stopped. It seems probable that due to lack of pressure in the valve chest, the valve is not pushed into contact with the port face.



Valve showing face

Editor's note: The 'Roller' referred to in the above description was probably one belonging to Darren Curryer visiting for the steaming event to provide steam now that the Cornish boiler had been retired.

Script by Ron Rutherford
Photographs by Joy Brown