



Method Statement

Oiling of Line Shafting and Associated Plant, Beam Engine and Waterwheel (Including Inspection of Line Shafting)

Version	1	2	
Date	30/1/2014	19/5/2016	
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Oiling of Line Shafting, Beam Engine and Waterwheel

Issue History

Version N°	Date of Adoption	Details of Change Made
1	5/2/2014	First formal issue
2	19/5/2016	Revised to reflect the introduction of the electric motor to rotate the line shafting.

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Oiling of Line Shafting, Beam Engine and Waterwheel

1. Purpose and Scope

This method statement sets out the instructions that must be followed when oiling the line shafting in Combe Mill, its associated plant and the Beam Engine and Waterwheel. It also covers the visual checks that must be carried out during the course of the oiling. It does not cover the oiling of the small steam engines as these are not associated with the line shafting.

2. Safety

2.1. Warnings

- 1 When the beam engine is in a position to drive the line shafting, the shafting is connected directly to the engine. As a consequence when the engine starts to rotate the line shaft also starts as does any item of plant connected to it.
 - ◇ An accidental start of the engine could have serious consequences.
- 2 In a similar way the electric line shaft motor is connected to the line shafting via a clutch that transfers the drive to the line shaft. Consequently when the motor starts up the line shaft also starts to rotate.
- 3 To reduce the potential risks associated with an unexpected engine or motor start the Mill uses a disc control system and the motor has an electricity supply via a lockable isolating switch mounted just above the control panel in the Blacksmiths' Shop.
 - a The disc control system has a red disc permanently screwed to the engine signalling system (see Item 1 in the pictures below).
 - ◇ When no one is working on the line shaft the red disc is covered with a green disc marked 'OK to start'
 - b When the motor is not in use the isolating switch is left locked in the off position.
- 4 When a person needs to work on the line shaft (s)he gains control of the line shafting by:
 - ◇ Removing and retaining control of the green disc, thus exposing the red disc,
 - ◇ Ensuring the isolating switch is locked off and retaining control of the key.
- 5 The instructions for applying these control systems are set out in Section 5.1.
- 6 Oiling must only be carried out by approved operators or by trainees under the personal supervision of an approved supervisor.

2.2. Working at Height

- 1 The work involves working at heights and should only be carried out by persons who are happy and confident to do such work.
 - ◇ All those carrying out this work must be familiar with and abide by the Society's working at height arrangements.
 - ⇒ These are set out in MS_16*.
 - ◇ All ladders and step ladders must be checked before use.

2.3. PPE

- 1 The following PPE is available for use when oiling the various items
 - a Rubber gloves

* At the time of writing MS_16 is in the process of development. Until such time as it is published on the Society's web site, the Society's policy is summarised in MS_1400: copies of which are available from the Director Responsible for Safety.

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- ◇ The oil used to oil the line shafting can cause dermatitis
- b Safety helmets
 - ◇ Where a second person is used to secure the base of a ladder there is a clear risk from falling objects.
- 2 PPE is provided for your protection: Members are urged to wear it.
- 3 Members supervising others must ensure that Members under training, contractors, other volunteers and visitors wear the required PPE. Persons declining to do so must not be allowed to undertake the operation.

3. Equipment and Lubricants Required.

- 1 The following equipment is required:
 - a A suitable ladder
 - ◇ The ladder must be inspected for obvious defects before it is used
 - ⇒ A ladder that is found to be defective must be put to one side and clearly labelled to show that it **must not be** used.
 - ⇒ **Do not use defective ladders**
 - b A suitable pair of steps
 - ◇ The steps must be inspected for obvious defects before it is used
 - ⇒ Steps that are found to be defective must be put to one side and clearly labelled to show that they **must not be** used.
 - ⇒ **Do not use defective steps**
 - c Suitable applicators to apply the oil. The Society uses:
 - ◇ An adapted teapot as an oil can for general use
 - ◇ A Wanner Oil gun to apply oil to the beam engine.
 - d A supply of rags or similar to wipe up any surplus oil
 - ◇ Care should be taken in disposing of contaminated wipes as they can be inflammable.
- 2 The oil used is **Morris Compound Steam Cylinder Oil 680**.
 - ◇ The band saw has its own special oil contained in a dedicated oil can (see Item 20 in Section 0)

4. Oiling the Beam Engine

- 1 In total, there are around 32 points which need a few drops of oil.
 - ◇ These should be lubricated using the Wanner Oil gun and NOT the teapot
- 2 In addition to these lubricating points there are two additional points requiring attention. They are:
 - ◇ A bearing on an adjacent pulley
 - ◇ An oiler on the steam pipe feeding the engine.
 - ⇒ For further details concerning these two special items see pictures immediately below

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- 3 Picture showing the bearing (being one of the bearings of the large, flat belt, pulley wheel behind the engine that needs to be oiled)
 - ◇ The bearing is located at a low level behind the protective grille.
 - ◇ The other bearing is oiled from the forge area



- 4 To fill the oiler on the steam pipe feeding the beam engine, carry out the following procedure.

- a Shut the valve on the steam pipe
 - ◇ The valve is located on the back wall of the engine house
- b Ensure there is no steam pressure present
 - ◇ Check using the pressure gauge on the feed pipe
- c Remove the brass top plug on the oiler
- d Open the tap at the bottom of the oiler
 - ◇ Allow any water present to drain off
 - ◇ Close the tap on completion of the draining
- e Slowly fill the reservoir with oil via the top plug hole
 - ◇ When the reservoir is full, refit the top plug.
- f Ensure the valve to the steam pipe is closed
 - ◇ This ensures that there is no leakage of oil into the steam pipe
 - ◇ The engine driver will open this valve when steam is being used.



5. Lubricating the Line Shaft, Attachments & Water Wheel

5.1. Gaining Control of the Line Shafting

- 1 No work must be carried out on the line shafting unless the person in charge of the work has control of the line shaft. (S)he gains this control by gaining control of the beam engine and the line shaft's electric motor.
- 2 To gain control of the beam engine carry out the following instructions:
 - a Go to the beam engine
 - ◇ If there is no operator present, proceed to Item b immediately below:
 - ⇒ **Be aware** that it is desirable to consider if the operator might only be temporarily absent
 - If so it would be courteous to seek him/her out before proceeding further

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- ◇ If there is an operator present, agree with him/her what it is that you wish to do then continue as follows:
- b Ensure that the main steam valve supplying steam from the boiler is closed
 - ◇ If it is open close it
- c Ensure that the engine's steam inlet valve is closed
 - ◇ If it is open close it
 - ⇒ This valve is normally left in the open position and as a result may need closing.
- d When both valves are known to be closed take the green disc from its hook (see picture)
 - ◇ The permanently fixed red disc can just be seen behind the removable green disc.



- 3 The exposure of the red disc prevents an operator from starting the engine or barring it over.
- 4 To gain control of the line shaft's electric motor:
 - a Collect, from the key press, and retain the key for the lockable isolating switch
 - b Ensure that the isolating switch is locked in the off position.
 - ◇ If the switch is found in the on position, report the finding so that the circumstances can be investigated.
- 5 The person removing the green disc and the isolating lock key from the key press must retain them in his/her possession until (s)he deems it safe to return them to the engine house or key press as appropriate (see Section 5.3)
 - a Do not leave them lying around
 - ◇ They might inadvertently be returned to the engine house.
 - b Do not ask a third person to "look after them"
 - ◇ Such action leads to loss of control
 - c In cases of necessity, the disc and key may be transferred to a second person
 - ◇ The receiving person must be a competent person and must understand that they are thereby undertaking responsibility for the safety of the line shafting
 - ◇ Try to minimise such transfers as they tend to confuse managerial control
 - ⇒ Confusion can lead to mistakes and mistakes can have serious consequences.

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- 6 The person holding the green disc and isolating key has control of the line shaft: The safety of members working on the line shafting is therefore his/her responsibility.




5.2. Carrying Out the Lubrication

5.2.1. General




- 1 The lubrication instructions are set out in the following sections in the form of a description, which sets out in general terms where the lubrication point is to be found. Where necessary the description is supplemented by a picture. There is a further column labelled 'Comments'; this records other relevant information and further instructions.
- 2 Oiling pots should be filled until the oil level becomes visible unless otherwise indicated in the Comments column.
- 3 Use the converted teapot oil can unless otherwise stated
- 4 Oil drip trays are widely used throughout the Mill
 - a Poorly maintained, they could create an unpleasant environment due to spilt or dripping oil
 - b Drip trays that are inadequately suspended at height could additionally present a safety risk
- 5 During the oiling procedure:
 - a Look over the equipment for any misplaced or missing items, which could interfere with the proper operation of the line shafting
 - b Check each drip tray to confirm that:
 - ◇ It does not need emptying or cleaning
 - ◇ It is correctly located
 - ◇ Where appropriate, it is securely suspended.
 - c Make any necessary adjustments or repairs.

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5.2.2. Oiling Points in the Forge Area

Item N°	Lubrication Point	Comments	Picture
1	Aperture in wall near steam condenser	There are no special oiling instructions	
2	Main shaft of beam engine	There are no special oiling instructions	
3	Oil pots under wooden cover adjacent to the whetstone	To carry out this oiling it will be necessary to lift the wooden cover. Ensure the cover is properly replaced after oiling. There are two pots and each needs to be half full	



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Item N°	Lubrication Point	Comments	Picture
4	Whetstone shaft bearings	<p>There are two bearings and each need to receive about ½ a thimble full of oil.</p> <p>Do not over oil</p>	
5	First line shaft bearing, by wall	There are no special oiling instructions	
6	Second line shaft bearing by tool cupboard	There are no special oiling instructions	

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Item N°	Lubrication Point	Comments	Picture
7	Third line shaft bearing above grinders	There are no special oiling instructions	
8	Fourth line shaft bearing above forge	There are no special oiling instructions	
9	Waterwheel shaft under the clock in the Blacksmith's Shop	Apply oil for about 10 seconds	

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Item N°	Lubrication Point	Comments	Picture
10	Fan blower bearings	There are two oil pots. Fill each $\frac{3}{4}$ full only. Do not over fill.	
11	Corn mill	There are two bearings to be filled. The one on the right can only be reached by removing a guard panel. This panel must be replaced immediately the bearing has been oiled.	




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5.2.3. Oiling Points in the Pit Wheel and Water Wheel Areas




Item N°	Lubrication Point	Comments	Picture
12	Waterwheel main journals	<p>The waterwheel has two journals: Both require oiling.</p> <p>The picture shows the journal nearest the river being oiled.</p> <p>The other journal is reached from the pit wheel side of the dividing wall and is not illustrated.</p>	
13	Waterwheel lay shaft	<p>The shaft is located in an aperture in the dividing wall and is reached from the pit wheel.</p> <p>There are no special oiling instructions</p>	

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5.2.4. Oiling Points in the Pattern Shop (upper floor)

Item N°	Lubrication Point	Comments	Picture
14	Oil cup under a trap door in the floor of the joiner's area	<p>The trap door provides access to the line shafting in the room below.</p> <p>Remove the cap and add ¼ of a cupful of oil</p> <p>Replace cap and close trap door.</p> <p>Ensure the trap door is properly closed as it could provide a trip hazard.</p>	
15	Above clocks	There are no specialised oiling instructions.	
16	Above band saw	There are no special oiling instructions	

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Item N°	Lubrication Point	Comments	Picture
17	Above old lathe	This is the left hand bearing as looked at from the ladder. There are no special oiling instructions	
18	Above old lathe	This is the right hand bearing as looked at from the ladder. There are no special oiling instructions.	
19	Old lathe headstock	There are two bearings to be filled but otherwise there are no special oiling instructions	

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Item N°	Lubrication Point	Comments	Picture
20	Band saw, 4 places, pulley wheel shafts	<p>There are 4 places to oil on the band saw pulley wheels. Apply a couple of drops using the special band saw oil. Do not over oil.</p> <p>Do not use the standard oil.</p> <p>To reach these items it is necessary to open the guard fencing around the saw.</p> <p>Be sure the fencing is restored and locked immediately on completion of the oiling.</p>	(no picture)

5.3. Returning Control of the Line Shafting to Its Normal State

- 1 Be aware that there are essentially two different conditions in which any return could be made: the Mill could be in steam or it could be in a dormant condition where the boiler is not producing steam.
 - ◇ **Remember:** the presence of live steam brings with it other significant risks
 - ◇ If any person is still working on the line shaft or its associated equipment; control of the shafting cannot be returned to the normal condition
 - ⇒ This continuing activity means that the green disc and the isolating key **must** be retained.
- 2 In all cases, ensure that any items disturbed as a result of the oiling process have been returned to their correct working condition. Key items are highlighted in Section 5.2. They include, but not necessarily exhaustively:
 - ◇ Various parts of the guard fencing
 - ◇ A wooden cover and a trap door
 - ◇ The oil drip trays.
 - ⇒ **Remember:** if an item has been disturbed, it is your responsibility to ensure that it is reinstated in proper working order.
- 3 Once satisfied that the line shaft is in a condition where it could be operated safely,
 - a Ensure that the electricity supply is locked in the off position
 - b Return the isolating key to its place in the key press
 - c Return the green disc to its hook in the engine house.
 - ◇ **This action completes the return of control of the shafting to the normal operating condition**
 - ◇ When the Mill is in steam, it is good practice (when practicable) to inform the beam engine operator that the line shafting has been returned to his/her control
 - ⇒ It is not mandatory
 - ⇒ The formal action is the replacement of the green disc.