Combe Mill Society - Risk Assessment

Activity: Small Steam Engines

Risk Assessment undertaken by: NRE, BL-W

Assessment Date 12 March 2023
Next review date: 1 March 2024
Date of last review: Not applicable new version
Assessment Ref: RA08_v4_SmallEngines

Certification The contents of and the conclusions drawn in this Assessment are the responsibility of the HTA and have been certified by the DRS as meeting the requirements of the Combe Mill Society for display on the web site.

Abbreviations used in this risk assessment

Where an action or reference applies to a specific person that person is referred to by his or her initials. These persons are:

- NRE, Nigel Evans; BL-W, Brian Layt Williams (HTA)

Where an action devolves on a post holder the following abbreviations are used:

Abbreviation	Post
CMS	Combe Mill Society
CP	A Competent Person; A person who has been approved as being capable of taking limited control of the Engines provided there is a PP available at the Mill
DRS	Director Responsible for Safety
HTA	**H**ead of the Small Steam Engines **T**echnical **A**rea or, where appropriate, a Proficient Person approved to take the HTA's place.
QNA	Quantitative assessment Not Applicable
PP	A Proficient Person; A person who has been approved as being capable of taking total sole control of the Engines.

*Residual Risk (RR) =H x P

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Hazard	Who might be harmed	Consequence of Hazard (H) and associated uncontrolled Risk.	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable	Resi-dual Risk
(1)	(2)	(3)	H	P	Risk	(5)	RR*
1 Operation of 4 heritage machines	Operators who are trained to Proficient level. Competent level Engines' trainees Visitors				QNA	The Bradford, Weir, Sisson and Reader engines are 4 heritage steam engines. Their design is such that modifications to meet modern safety standards cannot be made without damaging the heritage aspects of the engines. The operation of the engines is therefore carried out by operators working to a detailed Method Statement. CMS trains its own operators and the training they are given places special emphasis on the personal aspect in the safe control of Engines of this age. Engines are housed behind fence with a lockable gate. Only the HTA, PP and CP and trainees under supervision are allowed inside the gated area during steaming.	QNA

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2 Visitors and untrained volunteers inside guarded area.	Visitors and volunteers.	Injury from moving parts. Burns and scalds. Irreparable damage to engines. Consequences are Severe and Likely to occur	5	4	**5 X 4 =** 20	1) Gate to be locked whenever operators leave guarded area, even when not steaming. Visitors are not permitted in the area without the HTA's specific approval. 2) Small engine operators to be trained and certified to 2 levels of competency. Highest level is **Proficient** and part trained is **Competent**. A **Proficient** person is knowledgeable enough to take sole charge of the operation of the machinery in the absence of the HTA. A **Competent** person can only operate if there is a supervising PP in attendance in the area. An operator under training to become Competent must be directed by a PP inside the guarded area at all times. 3) The arrangements for supervising CPs and trainees are set out in hazards 8 and 9. The above measures reduce the Probability to Unlikely and the Residual Risk to Moderate. The Risk is adequately controlled and is justified.	**5** X 2 = 10

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3 Trapping in moving parts of machinery.	Operators and visitors	Loose clothing, beards, long hair and limbs can be caught in reciprocating or rotating parts dragging operator's visitors into machinery. They could escalate to Extreme levels of Harm and are assessed using the uncontrolled likelihood of the trigger event not the likelihood of the event itself. The assessed probability of the trigger event is Likely; making the uncontrolled Risk Very Serious.	5	**4**	**5 X 4 = 20**	1) Strictly No visitors or untrained volunteers allowed inside the guarded area. Persons inside the guarded are to be either certified as Proficient or Competent or receiving training. Space limitations permit only 2 operators to be inside the guarded area at once during steaming. Operators wear boiler suits or tight fitting clothing. No neck ties or scarves etc., long hair to be tied back. No running maintenance to be done whilst m/cs are operating. Operators are trained not to approach/ touch any moving parts once machines are running. 5) Any lone operator leaving the guarded area MUST stop all machines, turn off main steam valve and lock the gate behind him/her. The above measures reduce the Probability to Unlikely and the Residual Risk to Moderate. The Risk is adequately controlled and is justified.	**5** X **2** = **10**

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Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4) H	P	Risk	Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk RR*
4 Hot metal pipes, machine surfaces and expelled steam.	Engine Operators	Moderate burns and scalds are Possible, yielding a Moderate Risk	3	3	3 X 3 = 9	Operators to wear stout shoes /boots, be fully clothed, and wear work gloves. Safety glasses are advised, and face visors are to be worn if close inspection of steam outlets, cylinders, steam chests etc, are required. The use of personal protective equipment reduces the Probability to Very Unlikely and the Residual Risk to Trivial	3 X 1 = 3

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(1)	(2)	(3)	H	P	Risk	(5)	RR*
5 Adverse incident in area requiring immediate shutdown of machines.	Operators, Visitors	Collapse of an operator or a visitor or similar major incident warrants the immediate shutdown of engines. In the case of the former, visitors could enter inside the fenced area whilst engines were operating. Major Harm is Possible and the Risk is Moderate	4	3	4 X 3 = 12	An emergency stop handle connected to the main steam valve to the 4 engines is positioned at head height above the centre of the fenced area. This is in easy reach of the engine operators, but also in possible reach of visitors if necessary although it is not envisaged that visitors will ever need to use it. The Probability of having to physically activate the main steam valve in an emergency is reduced to Unlikely by the addition of this measure. The Residual Risk remains Moderate. It is adequately controlled and is justified.	4 X 2 = 8

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(1)	(2)	(3)	H	P	Risk	(5)	RR*
6 Slips and trips, from liquids spills and loose items left randomly in operating and visitor areas	Operators and visitors may be injured if they trip over objects or slip on spillages.	Slips and falls, causing contact with solid objects producing Major injuries such as abrasions, cuts bruises and broken bones. The Probability of such an incident arising is assessed as Possible. The uncontrolled Risk is Moderate.	4	3	4 X 3 = 12	Any spillage of any liquid, oil, water etc., inside and outside the compound must be cleaned up immediately. Sawdust is provided to cover the wetted area. Any loose tools, gloves, cups, bottles, cans, machine parts etc., left on floor in guarded area and in visitor passageway, to be removed or stored away safely prior to any start-up of engines or before any visitors arrive. Access is granted through the fenced area on non-steaming days, only to trained volunteers to change the beam engine drive belt and position the electric motor used to drive the line shafting. The above actions reduce the Probability of a Serious incident arising to Very Unlikely and the Residual Risk to Tolerable.	4 X 1 = 4

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7 Machine parts and/or steam, ejected from confines of an engine,	Engine operators	Mechanical failure or malfunctioning of engines and high pressure steam vessels and pipework. The Consequence of this incident arising is assessed as Major and the Probability of its occurrence as Likely.	4	3	4 X **3** = **12**	At least one Proficient person must execute or supervise start up and safe shut down. Competent and trainees must be supervised at all times. Operators have a check sheet of correct procedure in inspecting all machinery prior to starting. This includes integrity of drive belts, lubrication, and valve position, removing all debris and emptying buckets from drain pipes. This is followed by a strict start up sequence procedure. There is a shutdown procedure as well as an emergency stop procedure. The above measures reduce the Probability to Unlikely and confirm the Residual Risk as Moderate. The Risk is adequately controlled and is justified.	4 X 2 = 8

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(1)	(2)	(3)	H	P	Risk	(5)	RR*
8 Supervision of trainees	Person undergoing initial training Supervising PP	The various hazards that can arise are set out above and the details are not repeated here. The aim of the analysis is to demonstrate that the risk to the trainee and supervisor is no greater than that faced by the supervisor when working alone.			As above	1) Trainees are supervised on a one, hands on basis for the entire time that they are within the fenced operating area. 2) The supervisor must be a PP who has been approved by the HTA to undertake this duty. 3) The supervisor must not undertake any other tasks when the trainee is in the fenced area. 4) Before starting the activity the supervisor must ensure that the trainee is given an introduction to CMS's safety arrangements and our expectation of the visitor. The detailed risks above were confirmed as applicable when supervised trainees were working in the small engine area. With these arrangements in place detailed risks above were re-examined and confirmed as applicable when trainees were present,	As above

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9 Supervision of Competent Persons	Person undergoing further training, Supervising PP	The various hazards that can arise are set out above and the details are not repeated here			As abov e	1) A Competent Person (CP) may oversee unsupervised the operation of the engines and shut them down in an emergency provided that a PP is present at the Mill able to go to the small engines if necessary. 2) The HTA may permit a CP to undertake additional unsupervised tasks but should keep a written record. 3) All other tasks must be supervised by a PP. The individual hazards assessed above have been reconsidered against this scenario. The detailed risks above were confirmed as applicable when a CP was alone in the fenced area.	As abov e

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Appendix

This Appendix is not formally a part of the associated Risk Assessment. It has been prepared by the DRS providing a reminder of the existing safety management responsibilities that impact on the application of the Assessment.	
1 Trainee development	As soon as the HTA is satisfied that the Trainee is sufficiently skilful the HTA will reclassify the Trainee as a Competent Person and enter the person's name on the list that the HTA is required to keep. (See Item 3 below) The HTA must then ask the appropriate person (at present Tony Simmons) to issue the new Competent Person with a certificate of Competence
2 CP development	As soon as the HTA is satisfied that the CP is sufficiently skilful the HTA will reclassify the CP as a PP and enter the person's name on the list that the HTA is required to keep. (See Item 3 below) The HTA must then ask the appropriate person (at present Tony Simmons) to issue the new Proficient Person with a certificate of proficiency. (Continued on next page)

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3 Loss of control of risk due to unqualified persons carrying out duties for which they were not properly trained.	1) The HTA is required to maintain up to date lists of the names of Competent and Proficient Persons These lists are the definitive list of Competent and Proficient Persons approved to operate the small engines 2) The certificates of Competency and Proficiency provide reassurance to the persons concerned that they are on the HTA's list. Their possession is not obligatory. 3) Any person may ask for his/her name to be removed from a list. 4) The HTA is formally responsible for ensuring that CMS's safety requirements are met in the small engines area. 5) The HTA seeks to resolve such matters by discussion. 6) If such discussion fails the HTA should consult the DRS.

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Risk Rating Matrix

		Probability of Occurrence (P)				
		Very Unlikely	Unlikely	Possible	Likely	Very likely
Consequence of Incident expressed as the resulting **"Severity of Harm" (H)**	Negligible	Trivial (1)	Trivial (2)	Trivial(3)	Tolerable(4)	Tolerable(5)
	Minor	Trivial(2)	Tolerable(4)	Tolerable(6)	Moderate(8)	Moderate(10)
	Moderate	Tolerable(3)	Tolerable(6)	Moderate(9)	Moderate(12)	Substantial(15)
	Major	Tolerable(4)	Moderate(8)	Moderate(12)	Substantial(16)	Very serious(20)
	Extreme	Moderate(5)	Moderate(10)	Substantial(15)	Very serious(20)	Very serious(25)

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Guidance on Interpretation

Parameter Level	HSE Descriptor	Meaning
Severity of Harm (H)		
1	Negligible	Postulated event not expected to lead to noticeable harm.
2	Minor	Level of harm that could lead to an injury that needs first aid treatment at the Mill
3	Moderate	Level of harm that could lead to an injury that requires professional help
4	Major	Serious medical injuries: for example broken limbs or a period of unconsciousness or the need to report the incident to a Regulatory Body
5	Extreme	Harm that could lead to death or life changing permanent injuries
Probability of Occurrence (P)		
1	Very Unlikely	Not more than once in 10 years
2	Unlikely	Not more than once a year
3	Possible	Over 1 but not more than twice a year
4	Likely	Over 2 but not more than 4 in a year
5	Very likely	Almost certain to appear: the occurrence often overlooked as being a 'normal everyday occurrence'.

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Further Typical Measures that may be required to make the Residual Risk Acceptable

Risk R	Trivial	Tolerable	Moderate	Substantial	Very serious
Comment	Residual Risk (RR= 1 to 3) The risk is effectively non-existent and is acceptable as it stands.	RR = 4 to 6 The risk is adequately controlled but consider any justifiable minor additional measures	RR = 5-12 Additional controls should be considered where possible. The risk may or may not be adequately controlled.	RR=15-16 The risk is not adequately controlled: set out steps that must be taken before execution of operation can be approved	RR=20-25 The risk is not adequately controlled: the operation is unacceptable. Rigorous control methods are essential. Find an alternative if practicable.

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