



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Assessment Date 12 October 2023
Next review date: 1 March 2024
Date of last review: Not applicable. New Assessment
Assessment Ref: RA10_v4_WaterWheel

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:

- PH, Philip Hawtin; RJN, Richard J Newman (HTA)

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

Abbreviation or Name	Meaning
CMS	Combe Mill Society
CP	Competent Person: a person authorised to start up, supervise the operation and shut down of the water wheel
DRS	Director Responsible for Safety
H	Hazard's Severity of Harm
HTA	Generally the Head of a Technical Area: in the present context the Head of the Waterwheel Complex TA or an approved deputy.
P	Probability of Hazard's occurrence

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Page 2 of 22

Abbreviation or Name	Meaning
PP	Proficient Person: an individual who is deemed sufficiently qualified and experienced to allow them to take charge of all work within the Technical Area in the absence of the HTA.
RR	Residual Risk after all controls have been applied
STRA	Small Task Risk Assessment.

Scope of Assessment

This assessment covers the:

- Head Race, its immediate surroundings and its security fence;
- Waterwheel and associated operations
- Waterwheel Room; including the Mill's SW entrance, walkway, areas used for equipment storage, and public viewing.
- The Waterwheel Gear Room

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

(1) Hazard	(2) Who might be harmed	(3) Consequence of Hazard (H) and associated uncontrolled Risk.	(4) Risk from matrix*			(5) Control Measures adopted or required to make the Residual Risk Rating acceptable	Residual Risk
			H	P	Risk		RR*
	Waterwheel and	Associated Operations					
1 Contact with the rotating wheel Including falling into the wheel pit when the wheel is rotating	Members, public, volunteers & vulnerable persons	The severity of Harm is assessed as Extreme. The wheel, as installed, is protected by the stairway and a low brick wall. With this permanent protection the Probability of occurrence is assessed as Possible, leaving the as built Risk as Substantial	5	3	5 X 3 = 15	A wooden framed wire covered fence has been erected in front of the brick wall. The fence prevents unauthorised access to the wheel. The fence has a gate that is held shut by a bolt. Whenever the Mill is open to visitors, the HTA ensures that the gate is secured with a lock. The wall and fence prevent access to the wheel and reduce the Probability to Very Unlikely. The Residual Risk is formally Moderate. The Residual Risk is controlled and no further appropriate control measures were identified. The Residual Risk is acceptable.	5 X 1 = 5
2 Falling into the wheel pit when the wheel is stationary.	Members, public, volunteers & vulnerable persons	The severity of harm is less in this case and is assessed as Moderate. The Probability of occurrence is Possible. The as built risk is Moderate.	3	3	3 X 3 = 9	The gate is kept locked when the Mill is open to the public This risk is then bounded by that associated with the moving wheel (Hazard 1) and is not further analysed.	5

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
3 Contact with moving gear wheels in gear room.	Members, public, volunteers & vulnerable persons	The severity of Harm is assessed as Extreme and the Probability of occurrence as Likely. The uncontrolled Risk is Very Serious.	5	4	5 X 4 = 20	A gated wooden framed wire fence has been installed to prevent unauthorised access to the gears. The gate allows authorised members access when required. For security reasons the gate is kept locked even when the wheel is not in use. The need to work on the rotating wheel is a rare occurrence. The work is only carried out by trained persons. These precautions reduce the probability to Very Unlikely and the Residual Risk to Moderate.	5 X 1 = 5

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
4 Starting up the water wheel	Any person in contact with the water wheel when it starts move.	The uncontrolled risk is bounded by that identified for Hazards 1 and 3. The uncontrolled Risk is Very Serious. See hazard 3.	5	4	20 (see Hazard 3)	Prior to starting the water wheel the operator must ensure that: a) No person is present in the gear room and b) the safety gate in the gear room is locked shut. c) The safety gate in the wire fence in the water wheel room is locked shut d) Check that the water pump emergency switch is in the activated position. If not ascertain that it is safe to reactivate the switch, obtain the key and reactivate the switch. The above actions ensure that the wheel when operating meets the conditions justified in Hazards 1 and 3. Item d) above is not a safety measure but may save frustration as the starter switch is remote from the water wheel. The assessed Probability is Very Unlikely and leads to a Moderate Residual Risk.	5 X 1 = 5

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
5 Working on the moving pit or water wheels -contact with moving water wheel or its associated gear wheels	Members	In the wrong hands working on a moving wheel can lead to Extreme Harm with a typical Likely Probability. Thus posing a Very Serious Risk.	5	4	5 X 4 = 20	At present, the gear train in the gear room is disconnected so that the only gear wheel that can rotate is the pit wheel itself. The pit and the water wheels are connected to a common axle and one cannot be rotated without the other. No work is allowed on the moving combination without the specific approval of the HTA. In turn the work must be carried out by an experienced operator who is approved by the HTA as competent to carry out the task. The only operation so far identified as requiring this special approval is the greasing of the gudgeons on the main shaft.	5 X 2 - 10

(continued on next page)

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
5 (continued)						(continued from previous page) Before working adjacent to a moving wheel, an operator must-cover all loose clothing or jewellery so that it cannot obtrude. Additionally those with long hair must tie it back or cover it with an appropriate cap. These measures reduce the Probability of Occurrence to Unlikely and the Residual Risk to Moderate It may also reduce the severity of Harm that could arise but no claim is made for this effect. No other operations on a moving wheel are justified by the Assessment of this Hazard A separate STRA would be required for any other operation.	5 X 2 - 10

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Page 8 of 22

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
6 Movement of the wheel by legging	Members carrying out the work	Occasionally it is necessary to manually move the wheel to allow necessary information to be collected. The severity of Harm is assessed as moderate and the Probability as Possible leading to an uncontrolled Moderate Risk ,	3	3	3 X 3 = 9	Only trained and approved staff members are employed on this task. They only use the technique when essential. The use of trained and skilled workers reduces the Probability to 2 and yields a Residual Risk of 6. The risk is Tolerable and, in the absence of other alternatives, is acceptable.	3 X 2 - 6

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
7 Preparing to carry out work in the wheel pit -preventing re-flooding of the Head Race	Members or occasionally volunteers authorised by the HTA Warning Except in an emergency, no person should enter the wheel: -unless its structure is dry or specific approval has been given by the HTA.	Turning the pump on when a person is in the wheel pit would significantly increase the risk faced by the worker concerned. For a wet wheel, the Harm is assessed as Moderate and the Probability as Likely making the Risk, Moderate and unacceptable.	3	4	3 X 4 = 12	Before a person enters the wheel pit he/she must drain the water in the Head Race and allow the wheel to dry out. The steps that are required are: a) Collect and retain the key that prevents the resetting of the emergency stop button b) Disconnect the electricity supply to the pump that supplies water to the Head Race by pressing the emergency stop button; c) Allow the Head Race to drain and the bottom of the wheel to dry out; d) If not the same person, pass the key that allows the emergency stop button key to the person proposing to make the entry. The Residual Risk associated with an entry into the wheel pit when the wheel is dry is assessed as Tolerable in Hazard 8.	As determined in Hazard 8 6

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
8 Working in the wheel: -Awkward working conditions -Falls due to the slippery conditions	Members doing essential work that cannot otherwise be carried out	It is essential to enter the wheel's structure from time to time to check that the wedges are in place and to hammer home any that are loose. The basic uncontrolled Risk in a wet wheel is assessed as Moderate (see Hazard 7), which is unacceptable.	3	4	12 See hazard 7	1) Entry into the wheel pit is forbidden if the bottom of the wheel is wet and at least one other worker is aware of the intended work. . 2) The ban may be overridden in an emergency. 3) The work must be carried out in a manner that is consistent with the requirements of the Lone Working Regulations. For details see Hazard 9. 4) A person working in the pit must ensure that the supply pump is isolated and that he/she has control of the key that controls the setting of the emergency switch (see Hazard 7) 5) This work requires skilled worker(s) and only suitably trained and experienced persons approved as capable by the HTA are allowed to undertake it. 6) Using specially trained and skilled workers and isolating the supply pump reduces the probability to Unlikely; leading to a Tolerable Residual Risk, which, in the absence of other practicable measures, is acceptable.	3 X 2 = 6

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
9 Lone Working	Person undertaking the work.	See hazard 7			See hazard 7 12	1) Given the nature of the hazard covered in Hazards 7 and 8 it is clear that traditional lone working, where a worker is alone on site and the necessary safety back up is arranged off site, is not permissible. The HTA has banned such working. 2) Such is the isolation of the work place that the mere presence of a second person on the site does not make the associated risk smaller. The HTA has therefore banned entry into the structure of the waterwheel unless at least one other person is aware of the work and in a position to check the condition of the worker at pre-agreed time intervals. 3) The above conditions meet the requirements referred to in the assessment of Hazard 8 thereby confirming the Moderate Residual Risk as set out in that Hazard.	6

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
	Head	Race					
10 Falling into the head race	Inquisitive adults and unsupervised children	A fall into the head race could lead to death by drowning or by impact dependent on whether the race is full or empty. The severity of Harm is consequently Extreme and the Probability of falling into an unfenced Head Race is estimated as Likely. The assessed Risk is Very Serious	5	4	5 X 4 = 20	1) The integrity of the built In security fence is the main means by which CMS reduces the risk of a serious accident involving the Head Race. 2) With the fence in place and the gate routinely locked shut the probability falls to Very Unlikely; leading to a Moderate Residual Risk. 3) It is, on occasion, necessary for persons to gain access to the enclosed area in order to carry out minor work on the Head Race or the fence itself. 4) Only persons authorised by the HTA are allowed to enter the fenced area. 5) More major work must be justified by an STRA 6) Any work not covered by the above requires a separate risk assessment.	5 X 1 = 5
	Waterwheel	and Gear Rooms					

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
11 Water wheel Room: -multi usage of a main entry and exit to the Mill	Any person observing the water wheel or passing through the Mill.	Historically this area and its associated stairway have served 3 distinct purposes These are: a) the main entry to and exit from the first floor of the Mill building. b) The controlled storage of unused tables and chairs. c) The uncontrolled storage of sundry items. Wholly uncontrolled the level of Harm was assessed as Extreme and the Probability as Possible leading to a Substantial and unacceptable Risk	5	3	5 X 3 = 15	The water wheel room and its associated stairway and entrance to the first floor form a key area. Sufficient space must always be available to allow persons to pass through it. The controls necessary to achieve this objective are: a) To mark on the Mill floor the line of the main walkway from the SW (Riverside) entrance to the corresponding positions on the stairs (Action DRS by 16 April 2023) b) Ensure that no stored material ever obstructs the walkway (Action DRS and HTA) c) To provide a more secure system to retain the tables stored on edge and presently secured by a rope tie to anchors in the wall. (Action HTA)	5 X 1 = 5
(Continued on next page)							

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
11 Water wheel Room (Continued)					High	(Continued from previous page) d) The stored material in front of the waterwheel would interfere with the movement of visitors at events such as Steaming Sundays where large numbers of visitors would be expected. The HTA must ensure that the stored material is removed before the visitors are expected. The execution of the above actions reduces the Probability of Occurrence to Very Unlikely and the Residual Risk to Moderate. No further reduction is practicable. The Risk is controlled and is therefore acceptable.	5

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
12 Storage of tools in the Gear Room	Persons entering the caged area to deposit or collect their tools.	At the present time only the pit wheel can rotate. All other gear wheels are disconnected. Contact with the rotating wheel could cause Extreme Harm. Given the remoteness of the storage area from the wheel the Probability of contact is no more than Possible. The uncontrolled Risk is Substantial and unacceptable.	5	3	5 X 3 = 15	Tools can only be stored by persons approved by the HTA. They must be stored in the designated area. The person placing or removing the tools must not venture into the pit wheel area irrespective as to whether or not the wheel is moving. Observation of the above conditions reduces the Probability of contact to Very Unlikely and the Residual Risk Moderate which, in the absence of any further means of reduction, is acceptable.	2 X 3 = 6 See Hazard 13

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
13 Slips trips and falls	Members, public, volunteers & vulnerable persons	Injuries requiring first aid are Possible	2	3	2 X 3 = 6	Site inspection before the premises are opened to the public ensures that all material in the area is safely stowed away and that walkways and the stairs are free of obstructions. The RR remains Tolerable. There are no further simple ways of reducing it further. The risk is justified.	2 X 3 = 6
	Training and	Supervision					

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Hazard (1)	Who might be harmed (2)	Consequence of Hazard (H) and associated uncontrolled Risk. (3)	Risk from matrix* (4)			Control Measures adopted or required to make the Residual Risk Rating acceptable (5)	Residual Risk
			H	P	Risk		RR*
10 Supervision of training	Person undergoing training The Supervising Proficient Person	The various hazards that can arise are set out above and the detailed assessment of each hazard is not repeated here			As above	All Supervisors must be Proficient Persons (PP) The training provided is of the traditional kind where: a) the Trainee works alongside the Trainer who first explains and then demonstrates the task and/or responsibility b) Roles are then reversed as the Trainee undertakes the task under supervision. c) This process continues until the HTA can be satisfied that the Trainee has acquired the necessary skills and knowledge to become a PP. The individual hazards assessed above have been reconsidered against the scenario that a supervised but inexperienced person is involved. This concluded that the risks to the PP were unchanged and that the risks to the supervised Trainee were similar to those faced by the PP.	As above

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Page 18 of 22

Appendix

<p>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.</p>	
<p>1 Trainee development</p>	<p>The major feature of the training is the checking of the water wheel's wooden wedges. In comparison the start-up and shut down procedures are relatively straightforward. As a consequence these latter procedures are normally taught at the same time.</p> <p>As soon as the HTA is satisfied that the Trainee is sufficiently skilful the HTA will reclassify the Trainee as a Proficient Person and enter the person's name on the list that the HTA is required to keep. (See Item 3 below)</p> <p>The HTA must then ask the appropriate person (at present Tony Simmons) to issue the new Proficient Person with a certificate of Proficiency.</p>
<p>2 Competent Person</p>	<p>The Intermediate grade of Competent Person, permitted under the CMS Safety Policy, is not used in the normal context in the Water Wheel Complex Technical Area.</p> <p>For administrative reasons the HTA retains a discretionary right to appoint a person to the equivalent of a Competent Person who may start up and shut down the waterwheel provided that a Proficient Person has certified that the wedges are correctly in place.</p> <p>These Persons may only be appointed on the basis of need.</p>

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Page 19 of 22

<p>3 Loss of control of risk due to unqualified persons carrying out duties for which they were not properly trained.</p>	<ol style="list-style-type: none"> 1) The HTA is required to maintain an up to date list of the names of Proficient Persons This list is the definitive list of Proficient Persons approved to operate the Water Wheel. 2) The certificates of 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 the list. 4) The HTA is formally responsible for ensuring that CMS's safety requirements are met during work in the Water Wheel Complex. 5) The HTA seeks to resolve any matters arising by discussion. 6) If such discussion fails the HTA should consult the DRS. 7) The concept of Competent Person in the water wheel area is special, and is discretionary and appointments are only made on the basis of special need. 8) Certificates of Proficiency are not issued for this special form of competency.
---	---



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Page 20 of 22

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)

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Page 21 of 22

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 event'.

*Residual Risk (RR) =H x P



Combe Mill Society - Risk Assessment

Activity: Waterwheel Complex

Risk Assessment undertaken by: PH, RJN

Page 22 of 22

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.

*Residual Risk (RR) =H x P