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	Current Revision Date	18-Jan-2024
	Current Revision Number	A5
	Next Revision Date	15-Jan-2025

HAZARD IDENTIFICATION AND RISK ASSESSMENT PROCEDURE

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1.0 INTRODUCTION

The effective management of occupational health and safety has always been a priority for Mansa Engineering Limited to protect its workforce, meet its legal obligations and be a responsible employer. However, there is still much to be gained by Mansa Engineering Limited in continuing to introduce industry-standard good practice processes in the area of occupational health and safety management.

Mansa Engineering Limited has decided to adopt the ISO 45001:2018 standard as an effective way to put in place occupational health and safety (OH&S) management system to ensure that our objectives remain clear and current and our processes, policies, and controls are continually improved.

A key part of an OH&S management system is the assessment of hazards and the risks resulting from them. In this context, a hazard is defined as a source with the potential to cause injury and ill health. A risk is the effect of uncertainty — the happening of an unwanted event, or the non-happening of a wanted event, which adversely affects occupational health and safety.

Risk is realized when:

- a) The occupational health and safety objectives of the business are not achieved
- b) Occupational health and safety are not safeguarded from or mitigated against hazards.
- c) There is non-compliance with organization policies and procedures or external legislation and regulation.
- d) The occupational health and safety resources of the business are not utilized efficiently and effectively.

The purpose of this procedure is to define the system for carrying out a uniform and consistent method for the identification, assessment, and control of occupational health and safety hazards within Mansa Engineering Limited.

The procedure applies to all activities and services that are under the control of Mansa Engineering Limited.


Procedures that may be outside of this scope but related include:

[MP-CRP-PRO-07](#) Control of Documented Information Procedure

1.1 RISK-BASED THINKING

Mansa Engineering encourages Risk-Based Thinking (RBT) throughout the planning, implementation, performance evaluation, and improvement 'process approach' to ensure intended results are achieved, to enhance desirable effects, to prevent or reduce undesired effects, and to achieve improvement in its processes. Using RBT in conjunction with this and other company procedures, Mansa Engineering strives to continually improve customer confidence and satisfaction, to assure consistency of quality of products and services, and to establish an initiative-taking culture of prevention and improvement.

Mansa Engineering acknowledges the risk management process must start with its personnel who know the business, know the hazards, and can help determine how to identify and address risk within the organization. Personnel is encouraged to approach management for any guidance with the RBT concept.

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2.0 REQUIREMENTS

In compliance with Integrated Management System (IMS) Organizational Chart (ISO Steering Committee) as maintained on the EDMS, and guided by:

ISO 9001:2015 Quality Management System


ISO 14001:2015 Environmental Management System

ISO 45001:2018 Occupational Health and Safety Management System

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3.0 ACRONYMS AND DEFINITIONS

- ALARP As Low As Reasonably Practicable
- LTI Lost Time Injury
- PPE Personal Protective Equipment
- RBT Risk-Based Thinking

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4.0 PROCEDURE

Responsibilities

The Project Procurement Coordinator/QHSE Coordinator is responsible for the implementation of this procedure.

4.1 HAZARD / ASPECT IDENTIFICATION

The QHSE Coordinator initiates the process of identifying occupational health & safety hazards and environmental aspects identification of Mansa Engineering Limited activities. The determination of HSE hazards/aspects shall be based on the best professional judgment of the Operational team. The process includes soliciting inputs from ISO Steering Committee in line with the Integrated Management System (IMS) Organizational Chart located on the EDMS, functions and examining operational activities, including conditions and operations in which changes might create hazards.

All inputs to and outputs from the process/activity as well as sub-processes within the system shall be considered.

Each hazard /aspect will be examined to determine how it interacts with an integrated management system and such interactions whether beneficial or adverse, are recorded as impacts.


The following is considered:

- a) Routine and non-routine activities
- b) Activities of all personnel having access to the workplace, including subcontractors and visitors.
- c) Human behavior, capabilities, and other human factors.
- d) Identified hazards/aspects originating outside Mansa Engineering Limited's workplace which may adversely affect the health and safety of our staff and other persons under our control.
- e) Infrastructure, materials, and equipment at the worksite and places.
- f) Modifications to the Integrated Management System including temporary changes and their impacts and adverse on operations and processes of Mansa Engineering Limited.

Aspect categorizes as below:

- a) Air emissions
- b) Energy
- c) Materials (Procurement)
- d) Waste Management
- e) Other issues

The findings shall be recorded by the QHSE Coordinator in the risk register and environmental aspect and impact register.

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Risk Rating: The figure below shows the key steps in risk assessment and control:


- a) Identify work activities of Mansa Engineering Limited
- b) Identify hazards / environmental aspects
- c) Identify risk associated with hazards / environmental aspects
- d) Risk rating as per risk rating matrix
- e) Evaluate the tolerability of the risk
- f) Identify controls for the risk
- g) Review the adequacy of identified risks controls
- h) Ensure risk assessment and controls are effective

Risk rating of the Hazards / Aspects shall be determined based on probability and severity of risks. The rating is based on the Risks Rating Matrix. The probability, severity, and risk rating shall be recorded in the environmental aspects & impact assessment & risk and opportunity register and health & safety risk assessment register.

The rating is based on the Risk Rating Matrix as shown below:

Risk Rating Matrix


Likelihood	Consequence				
	1	2	3	4	5
	Insignificant	Minor	Moderate	Major	Catastrophic
5 Certain	High 11	High 16	Extreme 20	Extreme 23	Extreme 25
4 Likely	Medium 7	High 12	High 17	Extreme 21	Extreme 24
3 Possible	Low 4	Medium 8	High 13	Extreme 18	Extreme 22
2 Unlikely	Low 2	Low 5	Medium 9	High 14	Extreme 19
1 Rare	Low 1	Low 3	Medium 6	Medium 10	High 15

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Likelihood Table

Level	Description	Criteria (read as either /or)
5	Certain	The event will occur The event occurs daily
4	Likely	The event is expected to occur The event occurs weekly/monthly
3	Possible	The event will occur under some circumstances The event occurs annually
2	Unlikely	The event has happened elsewhere The event occurs every 10 years
1	Rare	The event may occur in exceptional circumstances
		The event has rarely occurred in the industry

PROBABILITY (P) X HAZARD EFFECT (E) = RISK RATING						
RISK RATING		ALMOST CERTAIN	LIKELY	POSSIBLE	UNLIKELY	HIGHLY LIKELY
		P-5	P-4	P-3	P-2	P-1
HAZARD EFFECT [SEVERITY] HE	Multiple Fatalities 5	25	20	15	10	5
	Permanent Disability/Fatality 4	0	16	12		
	LTI/Hospitality 3		12	9	4	
	RWI/Medical Treatment Case 2	10	12	6		
	First Aid Case/No Injury 1					

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The hazards identified for routine activities are assessed using the criteria below:


RISK RATING	SCORE	ACTION
		NO IMMEDIATE ACTION IS REQUIRED TO PROCEED WITH CARE
MEDIUM	5--9	HAZARD TO BE INVESTIGATED IN CONJUNCTION WITH QHSE COORDINATOR WITH A VIEW OF REDUCING THE RISK
HIGH	10--12	MEASURES MUST BE IMPLEMENTED AS SOON AS POSSIBLE TO REDUCE THE RISK
VERY HIGH	15--25	TASK MUST NOT BE UNDERTAKEN UNTIL THE RISK IS REDUCED. WORK TO BE PROHIBITED IF RISK REMAINS UNACCEPTABLE



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Incident Classification Matrix

Level/ Classification	Health and Safety Loss	Environmental Damage	Financial Loss	Community and Social damage	Operational	Security	Legal & Regulatory issue
5/(Catastrophic)	Fatality/Multiple Fatalities	Severe environmental impact. Local species destruction and long recovery period. Extensive clean-up involving external resources. Impact on a regional scale.	>\$500000	High level of concern from the local community. National and or international media interest	Loss is equivalent to more than a week of production interruption.	High Criminal offenses.	Serious legal breach resulting in an investigation by regulator, operations suspended, license revoked
4/(Major)	Lost Time Injury (occupational disease)	Major environmental impact. Considerable clean-up by site and external staff. The impact may extend beyond the lease boundary.	> \$50,000	Repeated complaints from the same area. (Clustering). Increased Local/National media interest	Loss equivalent to 3- 7days of production interruption	High intensity of civil unrest. High level of fraud and embezzlement.	Major legal breach involving investigation by the regulator
3/ (Moderate)	Medical Treatment Injury	Moderate environmental impact. Clean up by site staff and contractors. Impact confined within the lease boundary	> \$10,000	Repeated complaints from the same area. (Clustering). Increased local media interest	Loss is equivalent to 12 hours of production interruption.	Theft over \$10,000. The low intensity of civil unrest.	Moderate breach of legal issue with a report to Authorities.
2/(Minor)	Dressing Case	Low environmental impact with rapid clean-up by site staff and contractors. Impact contained to the area currently impacted by operations	> \$100	Small numbers of complaints. Local media enquires	Loss is equivalent to 6hours of production interruption.	Minor criminal offenses: Theft under \$5000	Minor technical/ legal compliance issue unlikely to attract regulatory response
1/(Insignificant)	First Aid Injury	No or very low environmental impact confined to a small area	< \$100	Isolated complaint. No media coverage	Loss equivalent to 1 hour of production interruption	Minor Infractions: Violations of internal policies and procedures	Minor technical/ legal compliance issue unlikely to attract regulatory response

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Tolerability Criteria

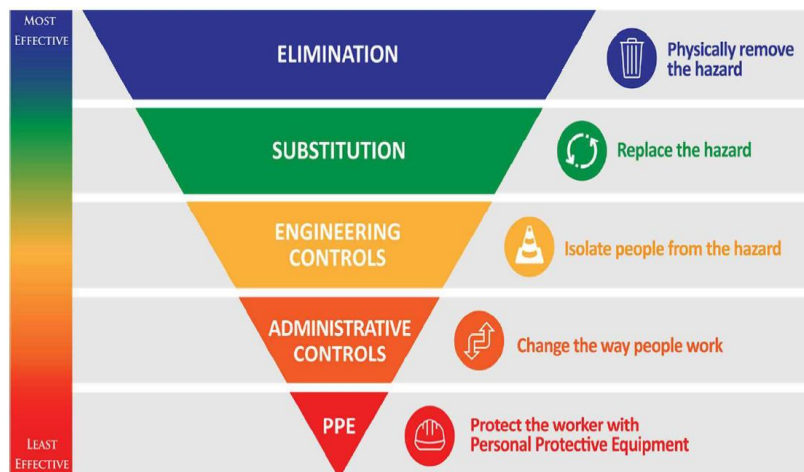
Risk	Result	Control Level
Catastrophic	Unacceptable	Chief Executive Officer
Major	Undesirable	General Manager – Engineering & Projects
Moderate	Tolerable but risk should be reduced if reasonably practical	Senior Project Engineer/IMS Chair
Minor/Insignificant	Broadly acceptable	QHSE Coordinator


4.2 HIERARCHY OF CONTROLS

The levels of risks as defined when assessing risk should correspond to the priority level for each of the controls and the level of resources that may be invested in them.

Control needs to include:

- At least one adequate action for each hazard identified.
- Mechanisms for assessing and monitoring the progress of the implementation of controls and effectiveness.
- More complex controls may also require additional complexity such as responsibilities, schedules, expected outcomes, performance measures, and in some cases budget for each action.
- The Hierarchy of Control below should be applied whenever hazard controls are being considered.



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In accordance with the above hierarchy, the most preferred control is to eliminate the hazard. Subsequent levels of the hierarchy are to be applied where possible to implement effective controls that will reduce the risk to ALARP. The least effective control is to protect people by providing PPE. This should always be the last resort.

It is also important to determine which of the control measures are critical to the management of the hazard, particularly if there are multiple control measures. Some factors that might indicate a Critical Control Measures for Mansa Engineering Limited Includes:


- a) Controls measure is relied on to control several different significant hazards.
- b) Control measure is relied on to prevent the most likely cause of significant incidents.
- c) Control measures are relied on to reduce or mitigate incidents with potentially extreme consequences.
- d) Whether other control measures are known to be of poor reliability or effectiveness; and there is a small number of barriers for a significant hazard.

In some instances, the control measures identified through the various hazard identification processes may need to be assessed as to:

- a) Functionality: That is does it control the hazard in an intended manner.
- b) Survivability: of the measure in an incident.
- c) Reliability of the control: both individually and in combination with other controls. Position in the hierarchy of controls: That is the control at the least desirable end of the hierarchy or a higher level.
- d) Independence and diversity: Can a set of controls be disabled by a single failure mechanism or does the failure of a control disable another?
- e) Administrative efficiency: Is the option easy to implement or will it be neglected because of difficulty or administrative or lack of expertise?
- f) Cost-effectiveness: Is the control cost-effective, could the same results be achieved at lower cost by other means?
- g) Effects on the environment: What will be the environmental impacts of this option?
- h) Regulatory: does the control (or lack of controls) breach any regulatory requirements?
- i) Timing: length of time the beneficial effects will be realized.

4.2.1 Implement Actions to Mitigate the Risk

Risk management processes can be implemented and reviewed during the work cycle. This would be for jobs with minimal risk residue and be classed as task risk management. However, some controls will require a control treatment plan to be implemented before commencement. The control treatment plan will document how the chosen options will be implemented and how they are integrated with the management processes of Mansa Engineering Limited.

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4.3 MONITORING OF CONTROLS

Implemented actions must be evaluated for effectiveness: Task risk management constantly monitors implemented actions by the people performing the task during a normal working day. For high-risk tasks, planned monitoring may be required. This may include assessment, reporting, and/or auditing of implemented controls. Responsibilities for monitoring and review should be clearly defined before the implementation of the control.

4.4 COMMUNICATION AND CONSULTATION

Communication and consultation with external and internal stakeholders should take place during all stages of the risk management process. With small groups, this can be done verbally. However, with large-scale risk management communication and consultation must be developed at an early stage in the process. Communications should be addressing issues relating to the risk itself, causes, consequences, and controls. This will ensure that those accountable for implementing the risk management process and stakeholders understand the basis on which decisions are made and the reasons why actions are required.

4.4.1 Recording the Risk Management Process


Risk management activities should be traceably auditable. Records of risk management documentation should be kept by the Control of Documented Information and the Electronic Documented Management System.

4.4.2 Major Hazard Management

The Major Hazard Management Program develops and implements processes to assist all staff to understand and control the hazard that has the potential to cause acute fatalities.

4.4.3 Monitoring and Review

Details/Scope	Frequency	Accountability
Review of document	Annual	Health and safety management and risk management team coordinated by QHSE Coordinator
Audit	Annual	Internal Auditor

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5.0 RECORDS

All relevant documents and records referenced in the procedure are kept according to the Records Lifecycle requirements in the Control of Documented Information procedure [MP-CRP-PRO-07](#).

6.0 REFERENCES

[MP-CRP-PRO-07](#) Control of Documented Information Procedure

7.0 REVISION LOG

Rev	Date	Section	Description of Changes	Approved by
A5	18-Jan-2024	All	Review and release. No revision required.	E. Haizel
A4	16-Jan-2023	All	Revised to show correct personnel roles	E. Haizel
A3	15-Jan-2022	5.0	Revised to show correct referenced document	E. Haizel
A2	20-Aug-2021	All	Reformatted for document consistency	E. Haizel
A1	12-Mar-2020	All	Original issue	J. Aidoo