

Chapter 14 Risk Assessment and Hazard Mitigation

- 1.0 [HSE Planning Process](#)
- 2.0 [Risk Assessment Methods](#)
- 3.0 [Risk Matrix Index](#)
- 4.0 [Hazard Identification Matrix \(HAZID\)](#)
- 5.0 [Hazard Classification Chart](#)
- 6.0 [Job Safety Analysis \(JSA\)](#)
- 7.0 [Toolbox Talks](#)
- 8.0 [PPE Requirements](#)
- 9.0 [Management of Change](#)
- 10.0 [STOP WORK Authority](#)
- 11.0 [Training](#)

1.0 HSE Planning Process

All projects undertaken by TDI-Brooks must undergo proper risk analysis and HSE preparation in accordance with the Safety Management System prior to the start of the project.

This is particularly important for those projects which do not utilize standard operating procedures and JSA's and/ or are conducted on non-company vessels.

The HSE preparation process includes completion of TDI's Hazard Identification and Risk Assessment, project specific HSE plan development and creation of task specific Job Safety Analyses, and/or Management of Change assessments for activities outside of TDI-Brooks' standard operating procedures.

2.0 Risk Assessment Methods

The hazard identification process is used for routine and non-routine activities as well as new processes, changes in operation, products or services. There are many methods of risk assessment and each company has their own terminology.

Common methods for risk assessment used by TDI-Brooks include our Standard Operating procedures, Job Safety Analysis, Last Minute Risk Assessment and Management of Change procedures.

The following hazard classification system is used in the TDI-Brooks HAZID matrix.

Title of Document:	Safety Management Manual	Document Number:	SMM Ch 14
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			Page 1 of 6

3.0 Risk Matrix Index

Risk Matrix Index	Approval Required
A1	Senior Management
B1	Senior Management
A2, A3, B2, C1	Senior Manager on Site
All Others	Supervisor

Consequence Classifications

Consequence Category	Health and Safety	Public Disruption	Environmental Impact	Financial Impact
1	Fatality	Serious Impact on Public-Large Community	Major/Extended Duration/Full Scale Response (>2500 bbl)	Corporate-major
2	Serious injury to Personnel	Limited Impact on Public-Small Community	Serious/Significant Resource Commitment (3.0 – 2500 bbl)	Corporate intermediate
3	Medical Treatment for Personnel	Minor Impact on Public	Moderate/Limited Response of Short Durations (0.5 – 3.0 bbl)	Division
4	Minor Impact on Personnel	No Impact on Public	Minor/Little or No Response (<0.5 bbl)	Local

Probability Classifications

Probability Category	Definition
A	Possibility of Repeated Incidents (1 in 2 projects)
B	Possibility of Isolated Incidents (1 in 4 projects)
C	Possibility of Occurring Sometime (1 in 20 projects)
D	Not likely to Occur (1 in 100 projects)
E	Practically Impossible (1 in 200 projects)

Title of Document:	Safety Management Manual	Document Number:	SMM Ch 14
Authority:	Director of Operations	Revision:	5
Custodian/Owner:	Designated Person Ashore	Issue Date:	June 2025
			Page 2 of 6

4.0 Hazard Identification Matrix (HAZID)

TDI-Brooks has a Hazard Identification Matrix that is used to evaluate potential hazards of all projects and already includes standard TDI mitigations. The HAZID matrix template may be viewed on the ShipNet Forms page.

Prior to each project, the matrix is reviewed by TDI-Brooks and client representatives and project specific hazards are added to the standard matrix where appropriate. Further mitigations are included as needed and the risk indexes updated accordingly.

The HAZID may be project specific or facility specific. The HAZID is maintained for the duration of the project or as long as the facility is in use. All HAZIDs are performed by personnel who have both experience and competence in hazard analysis methodologies and our field/ facility operations.

5.0 Hazard Classification Chart

Below is a sample chart showing hazard classifications by HAZID item number. Notice that for items 15 and 25, hazards were reduced after additional mitigations were put in place. (See arrows.)

		PROBABILITY				
		A	B	C	D	E
C O N S E Q U E N C E	1					
	2			8,12,13,2 7	7,18,22,25,3 31,32,33,3 35,,36,37,3	9,10,19,2 23,2 4
	3				6, 14, 26,2 8	
	4			11,21 ,	5,17,50, 51,52	15, 16,2 9

Title of Document:	Safety Management Manual	Document Number:	SMM Ch 14
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Custodian/Owner:	Designated Person Ashore	Issue Date:	June 2025
			Page 3 of 6

6.0 Job Safety Analysis (JSA)

The Job Safety analysis (JSA) is a participatory risk assessment conducted by the line workers and led by the supervisor before beginning a task. It requires participation and encourages contribution by all workers who will participate in that task.

The JSA process breaks a task into component steps, identifies hazards associated with each step and describes how the hazards will be mitigated.

Sample versions of JSAs for TDI-Brooks vessels are posted on the T: drive under the HSE folder. However, these documents are under continual revision as new hazards and controls are recognized.

7.0 Toolbox Talks

The Master and Party Chief shall ensure that individuals participate in required toolbox talks for their corresponding departments and operations.

All departments will conduct a toolbox talk/meeting at each shift change. Discuss work performed on last shift, upcoming work for the next shift and any maintenance items that need to be addressed. Hazards/ mitigations from the previous shift should be discussed as well. All participants from both shifts sign the meeting minutes.

8.0 PPE Requirements

The Master and Party Chief shall ensure that individuals use the recommended PPE as required by the TDI-Brooks PPE Matrix and recommended in the JSA.

PPE shall be replaced whenever it shows signs of wear and may provide inadequate protection. The HSE officer shall be consulted whenever issues arise concerning PPE equipment use and replacement.

9.0 Management of Change

The Management of Change procedure is described in detail in the corresponding SOP.

10.0 STOP WORK Authority

TDI-Brooks management strives to build a team environment in which each employee feels responsible for the safety of himself and his teammates. **ANY** employee, regardless of position or experience with the company, is empowered, encouraged and expected to **STOP WORK** if they feel anything is unsafe, or if they are unsure of their role/ responsibilities regarding an operation. There will be no repercussions from management for using **STOP WORK** Authority. If a manager does not recognize a **STOP WORK** from an employee, the employee may contact the HSE Director immediately for resolution.

Title of Document:	Safety Management Manual	Document Number:	SMM Ch 14
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Custodian/Owner:	Designated Person Ashore	Issue Date:	June 2025
			Page 4 of 6

11.0 Training

The goal of all TDI-Brooks safety training is to get employees to recognize hazards around them and mitigate risks. Employees are trained in hazard identification through multiple sources, including our computer-based training programs, safety videos, in person training, and weekly HSE talks. This training includes the proper use and care of PPE.

Title of Document:	Safety Management Manual	Document Number:	SMM Ch 14
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			Page 5 of 6