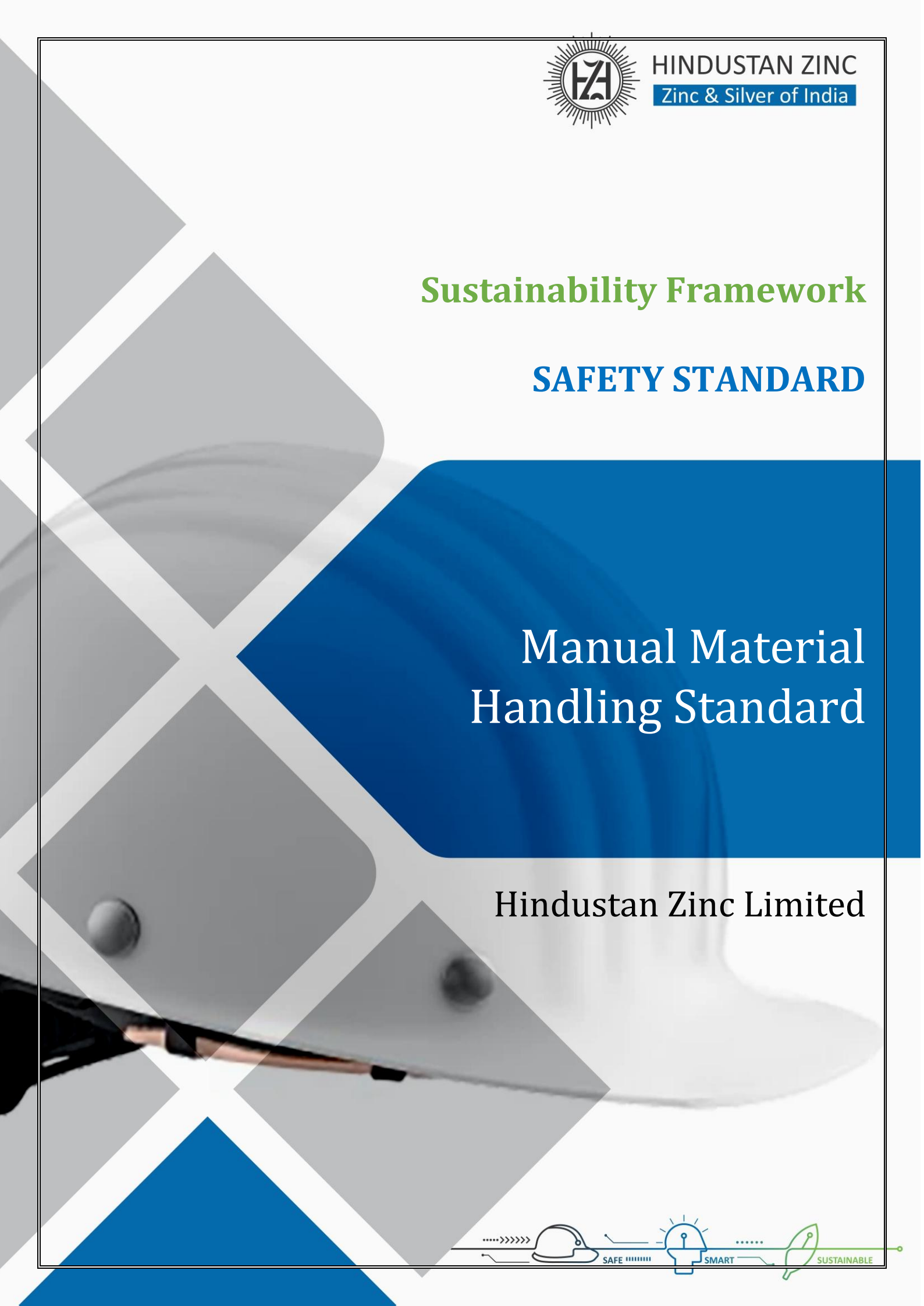
HINDUSTAN ZINC
Zinc & Silver of India

Sustainability Framework

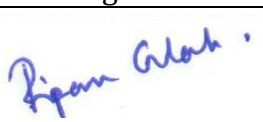
SAFETY STANDARD

Manual Material Handling Standard

Hindustan Zinc Limited



Document Control Details

	Issued by	Approved by
Name	Mr. Ripan Ghosh Chairman – Manual Material Handling Standard	Mr C Chandru Chairman - SRP Sub Committee
Sign.		
Next Revision Date – 30.07.2027		

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1. Objective

To establish a standardized approach to **Manual Material Handling (MMH)** at all HZL sites to:

- Eliminate or minimize the risk of injury.
- Promote safe handling practices.
- Ensure compliance with applicable occupational health and safety standards.

2. Scope

This standard applies to **all manual handling activities** involving lifting, lowering, pushing, pulling, carrying, or moving of loads by human effort at **underground mines, smelters, processing plants, maintenance workshops, warehouses, and other HZL workplaces.**

3. Definitions

- **Manual Material Handling (MMH):** Physical activity of lifting, moving, carrying, holding, pulling, or pushing an object by human effort.
- **Load:** Any object, material, equipment, component, tool, or substance being handled manually.
- **Ergonomics:** The science of designing the job to fit the worker's physical capabilities and limitations.
- **SWL (Safe Working Load) :** The maximum load that can be safely handled.

4. Roles & Responsibilities

4.1 MMH Champion

- Ensure site-specific MMH SOPs are developed, reviewed, approved, and implemented.
- Allocate resources for MMH risk assessment, training, and control implementation.

4.2 Departmental Heads

- Ensure MMH standards are followed in all department operations.
- Facilitate worker training and ergonomic assessments.

4.3 EHS Officer

- Facilitate MMH risk assessments.
- Conduct audits and inspections.
- Monitor and report compliance status.

4.4 Supervisors / Line Managers

- Ensure safe practices during shift operations.
- Monitor worker behavior and provide on-the-job guidance.

4.5 Workers

- Follow safe MMH practices.
- Report any unsafe conditions or injuries.

5. MMH Risk Identification & Assessment

All manual handling tasks must undergo a structured **risk assessment** covering:

- **Load Characteristics:** Weight, size, shape, sharp edges, temperature, hazardous content.
- **Task Characteristics:** Frequency, distance, duration, posture, need for twisting/bending.
- **Work Environment:** Lighting, space, surface conditions, temperature, access routes.
- **Individual Capability:** Age, health condition, training, physical fitness.

Use Tools:

- HIRA (Hazard Identification and Risk Assessment)
- MAC Tool (Manual Handling Assessment Charts)
- Ergonomic Assessment Forms

6. MMH Control Measures

6.1 Engineering Controls

- Use mechanical aids (trolleys, hoists, conveyors, pallet jacks, lifts, etc.).
- Modify workplace layout to reduce handling.
- Design storage at waist-to-shoulder height.
- Ensure adequate lighting and slip-resistant flooring.

6.2 Administrative Controls

- Task rotation to minimize fatigue.
- Limit weight per person (preferably <20 kg; max 25 kg under favorable conditions).
- Use two-person lift for loads >25 kg; max 40 kg under favorable conditions.
- Develop site-specific SOPs and work instructions.
- Establish proper signage and instructions near MMH zones.

6.3 Personal Protective Equipment (PPE)

- Mandatory PPes
  I. Gloves (cut-resistant, chemical-resistant as applicable).
  II. Steel-toed safety shoes.
  III. Safety Goggles and Helmet
- Job specific PPEs
  I. As recommended after ergonomic assessment.
  II. As per HIRA and JSA.

7. MMH Safe Practices & Guidelines

7.1 General Lifting Techniques

- Assess the load before lifting.
- Bend at the knees, not the waist.
- Keep the load close to the body.
- Avoid twisting during lifting.
- Use both hands and a firm grip.
- Take breaks after repetitive tasks.

7.2 Specific Activity Guidelines

Underground Mining

- Handling of drilling rods, support materials, explosives, cables.
- Explosives to be handled only by trained personnel with SOP.
- Avoid carrying loads on ladders or uneven footings.
- Use tugger, winches, and mechanical lifters where possible.

Smelting Plants (Hydro & Pyro)

- Handling of anodes, cathodes, casting molds, chemical bags.
- Use pallet trolleys or forklifts for movement of bags and slabs.
- Avoid manual transfer of molten metal molds.

Power Plants

- Handling of valves, filters, motors, cable drums.
- Team lifting and mechanical aids mandatory for items >15 kg.
- Cable pulling with rollers to minimize resistance.

Workshops & Maintenance

- Handling of tools, spares, bearings, lubricants, welding sets.
- Tools heavier than 10 kg to have handles or lifting provisions.
- Use of adjustable height benches and jacks encouraged.

Explosive and Chemical Handling

- Follow PESO and DGMS regulations for explosives.
- Chemicals to be handled using ergonomically designed drums, trolleys, and PPE.
- Labeling and MSDS must be accessible and reviewed.

8. Training & Awareness

All employees involved in MMH activities must be:

- Trained on ergonomic lifting techniques.
- Informed about site-specific MMH SOPs.
- Aware of the signs and symptoms of musculoskeletal disorders (MSDs).
- Refresher training to be conducted **annually** or upon job change.

9. Incident Reporting & Monitoring

- All MMH-related injuries (even minor ones) must be reported and investigated.
- Regular tracking of First-Aid and Reportable MMH incidents.
- Implementation of corrective actions based on investigation findings.

10. Auditing & Review

- MMH compliance to be included in monthly safety inspections.
- Site-specific SOPs to be reviewed **annually** or upon significant change.
- Internal audits to assess MMH program effectiveness.
- **Standard Renewal Process: -** This standard shall be reviewed and revised as necessary and, at a minimum, not later than two years from the date of the last revision.

11. Documents and Records

- HIRA report
- MMH Risk assessments (MAC Tools)
- Training Records
- Site Specific SOPs
- Inspection Checklists

12. Standard Renewal Process

- This standard shall be reviewed and revised as necessary and, at a minimum, not later than two years from the date of the last revision.

13. Annexures

- Annexure 1: Manual Handling Risk Assessment Form.
- Annexure 2: MAC Tool format.
- Annexure 3: Ergonomic Posture Checklists.
- Annexure 4: Dos and Donts Poster of MMH

14. References

- The Factories Act, 1948
- The Mines Act, 1952
- OSHA 29 CFR 1910 Subpart N (Materials Handling and Storage)
- ISO 11228 – Ergonomics: Manual Handling

15. Implementation Timeline

Milestone	Description	Timeline
A	Circulation of Corporate MMH Guide	Immediate
B	Site-specific SOP Development	Within 30 days
C	Worker Training & Tool Implementation	Within 60 days
D	MMH Audit Integration	Within 90 days

Annexure 1
Hazard Identification and Risk Assessment (HIRA)
This HIRA template is designed to systematically identify hazards associated with specific activities, evaluate the risks, and recommend appropriate control measures to mitigate those risks. It should be used as a standard format across all sites to ensure consistency and thoroughness in risk management.

Activity Description	Hazard Identification	Likelihood (L)	Severity (S)	Risk Rating (L x S)	Existing Controls	Recommended Controls	Responsible Person / Target Date	Likelihood (L)	Severity (S)	Risk Rating (L x S)
Manual lifting of heavy materials	Musculoskeletal injuries due to improper lifting posture	3	4	12	Basic lifting training provided	Introduce mechanical aids and refresher training	Site Supervisor / 30-Sep-2024	1	3	3

Annexure 2

MAC Tool - Manual Handling Assessment Charts
This template is designed to assist in the ergonomic risk assessment of manual handling tasks. It includes key factors such as task description, load weight, frequency, posture, duration, environmental conditions, risk level, and recommended actions.

Task Description	Load Weight (kg)	Frequency	Posture	Duration	Environmental Factors	Risk Level	Recommended Actions
Lifting boxes from floor to shelf	15	10 times/hour	Bending and twisting	2 hours/day	Poor lighting, uneven floor	High	Use mechanical aids, improve lighting

Annexure 3

Ergonomic Assessment Form

1. Employee Information

Employee Name:	
Employee ID:	
Department:	
Assessment Date:	

2. Task Description

Describe the task being performed:

3. Workstation Setup
Describe the workstation layout and equipment used:

4. Posture Evaluation

Body Part	Posture Observed	Comments
Neck		
Shoulders		
Back		
Arms/Wrists		
Legs/Feet		

5. Repetitive Movements
Describe any repetitive tasks and their frequency:

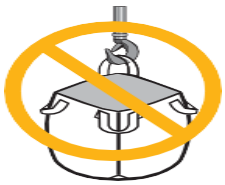
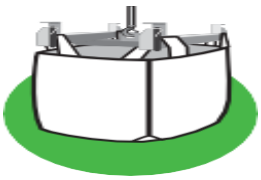
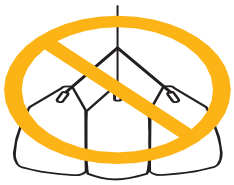
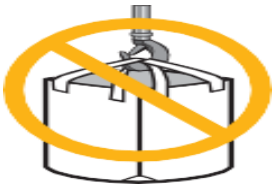
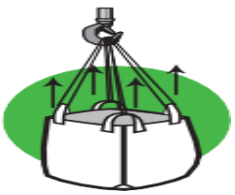
6. Force Exertion
Describe any forceful exertions required during the task:

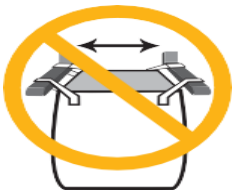
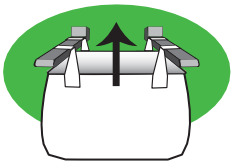
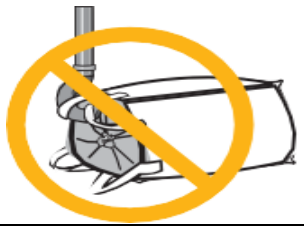
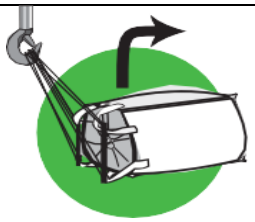
7. Environmental Conditions
Note lighting, noise, temperature, and other environmental factors:

8. Risk Level

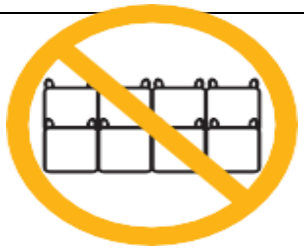
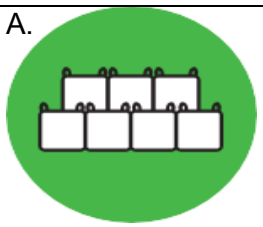
Risk Factor	Risk Level (Low/Medium/High)
Posture	
Repetition	
Force	
Environment	

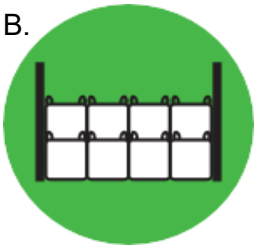
9. Recommendations
Provide recommendations to reduce ergonomic risks:

Sr no.	Check Point	Don'ts	Do's	Remarks
1	Never suspend an JUMBO BAG using fewer lift loops, sleeves, etc., than have been provided.			
2	Never gather loops to lift with one hook, unless the JUMBO BAG is specifically designed and approved by the manufacturer for doing so			
3	If lifting with one hook, slings or other lifting devices must be used to keep the loops vertical and prevent damaging lateral forces			
4	Ensure all forklift tines, crane hooks, bars or handling devices used are free of sharp edges or protrusions. Edges must be rounded to at least the thickness of the lift loops, sleeves, etc., used to support the JUMBO BAG. The radius must be a minimum of 5 mm.			
5	Never allow personnel to stand or place any appendage under a suspended JUMBO BAG. All personnel must be safely clear of any potential hazards when lifting, handling or emptying an JUMBO BAG.			

6	The distance between the forklift tines must be adjusted to the correct width to ensure all lift loops or sleeves are vertical to prevent damaging lateral			
7	Maintain a clear line of sight when moving an JUMBO BAG. Never move the JUMBO BAG if your line of sight is blocked. When handling by forklift, hold the JUMBO BAG close to the mast, as low as possible with the mast tilted back to an appropriate angle.			
8	Keep the JUMBO BAG clear of the floor so there is no contact with the floor or the wheels of the forklift. Never drag or push an JUMBO BAG. Never tilt the mast of a forklift truck forward when handling an JUMBO BAG.			
9	Always use slings and all lift loops when righting an JUMBO BAG that hastipped over.			

- **Good practice for Storage of Jumbo bags**

Sr no.	Check Point	Don'ts	Do's	Remarks
1	Only stack JUMBO BAGs if they are designed to be stacked, you are sure of their stability and they are stacked using a "Pyramid" or "Supported" stacking method, maximum three bags only A. Pyramid Stacking		A. 	

	• Each bag above the first layer must sit on at least four lower bags. Each layer is subsequently tiered inwards forming a pyramid structure. B. Supported Stacking • bags are stacked against two retaining walls of sufficient strength		B. 	
2	Never approach or repair a damaged bag without first removing all bags stacked on top.