

VSS16 SHAFT AND HOISTING SAFETY PERFORMANCE STANDARD

1. Scope

This standard applies to all underground mining operations managed by Vedanta businesses and specifies mandatory requirements for all existing operations, new acquisitions, shafts and adits including those developed for exploration or mine construction purposes. This standard applies to all employees and business partners. The Hoisting and Shaft Management Guidance Note provides additional guidance.

The objective of the standard is to eliminate the risk of fatalities and serious incidents resulting from any activities associated with hoist and shafts.

A mineshaft refers to a vertical or inclined opening to a mine, which may serve as a means of transportation of manpower, hoisting of ore/waste or as a means of ventilation. For the purposes of this Standard, internal shafts that are not used for man transportation or hoisting are not included.

2. People

The Mine Manager is responsible to ensure that all statutory duties as outlined in the mining legislation are strictly observed. The Mine Manager shall ensure that there are appropriate standards, procedures and systems in place for the management of hoisting systems and shafts. The Mine Manager in conjunction with Authorized Person, must ensure that for each shaft:

- 2.1. The responsibility for all activities associated with a shaft used for man transportation and/or hoisting has been assigned to a competent person such as a Shaft Engineer or Conveyance Engineer.
- 2.2. Every person appointed to operating a winder or give signals to operate the winder is in possession of a statutory licence or certificate to carry out the specific duty.
- 2.3. Only authorised and medically fit person shall operate or give signals to operate a winder.
- 2.4. A Training Programme and annual re-training is in place for all persons involved in work in or around the shaft for their specific roles and responsibilities.
- 2.5. All personnel working in or around the shaft are aware of the hazards and risks in relation to the shaft and winding system, as well as controls to mitigate such risk.
- 2.6. Personnel are supplied with and wear personal protective equipment (PPE) and clothing, specified for their work.

3. Process

The processes below shall be put into place.

- 3.1. A Hazard Identification and Risk Assessment (HIRA) is required to ensure that all hazards associated with hoisting and shaft management are assessed and controls are in place to ensure safe and sustainable operations. This shall be recorded on a risk register and the Mine Manager shall review and approve the risk register annually. The HIRA must include:
 - 3.1.1. The potential for instability and loss of integrity of the shaft,
 - 3.1.2. The potential for fires in underground operations, the shaft or winder areas,
 - 3.1.3. The potential for any unintended or uncontrolled movement of conveyances within the shaft,
 - 3.1.4. The potential for a conveyance to fall down the shaft,
 - 3.1.5. Overwind, under-wind, excessive acceleration or deceleration, unsafe or excessive speeds or uncontrolled movement,
 - 3.1.6. Slack rope, drum slip conditions or unsafe tail rope conditions,
 - 3.1.7. Braking systems and systems performing an equivalent function that are intended to ensure that the winder remains under control,
 - 3.1.8. Emergency response and warning systems that are intended to alert persons to an emergency in a winding system or conveyance,
 - 3.1.9. Communication systems.

- 3.2. Safe Operating Procedures (SOP) shall be developed for the key activities for hoisting and shaft management and associated as outlined in the Guidance Note.
- 3.3. Shaft inspections shall be conducted by a Conveyance Inspector, Structural Designer, Shaft Engineer or Mechanical Supervisor who has been specifically trained in how to conduct structural visual inspections of conveyances and associated works.
- 3.4. All shafts shall have appropriate guarding and barricades in place, in line with the controls set out from the risk assessment.
- 3.5. A clear system of communications shall be in place between the winder operator and the persons in charge of hoisting and working in the shaft.
- 3.6. The mine manager shall ensure that every winding system used at the mine includes at least the following safety systems:
 - 3.6.1. Ropes and devices that can withstand all forces reasonably expected to be borne by the ropes and devices,
 - 3.6.2. At least 2 braking systems that ensure the winder remains under control in the event of a failure in any one of the systems,
 - 3.6.3. Control measures that detect any warning system for slack rope, rope slip, unsafe balance rope conditions, unsafe coiling of rope, continuous conveyance jam monitoring device, independent and interlocked to the winder.
 - 3.6.4. Warning systems to alert persons to any emergency in the winding system.
- 3.7. Signage for payloads shall be clearly displayed showing the payload allowed in conveyances.
- 3.8. Barricades or other access control shall be in place at all entrances to the shaft.
- 3.9. Shafts shall have ventilation that prevents accumulation of explosive or noxious gases.
- 3.10. There shall be a standby power system ensuring the continuous operation of at least one man-riding shaft is available.
- 3.11. An emergency control plan shall be in place for evacuation of persons; emergency systems in the event of a power failure; recovery from an incident such as mud rush, fire/smoke, accident/damage in the shaft.
- 3.12. A Daily, weekly and quarterly conveyance Inspection shall be carried out by an appointed person.
- 3.13. A Major Conveyance and NDT Inspection shall be carried out by a Conveyance Inspector at intervals of 6 to 36 months, as per legal requirements and Vedanta procedures.

4. Review

- 4.1. The mining, engineering and safety departments must review the items included in this Standard annually.



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