

WORKING AT HEIGHT

1. Scope

This standard applies to all Vedanta business units, operations and projects and to any task where there is a risk of a fall by a person from one level to another that is reasonably likely to cause injury to that person or any other person. This includes but is not limited to work on temporary structures, roofs, climbing on vehicles and use of scaffolds, portable ladders etc.

The objective of this standard is to ensure that all work at height tasks are planned and performed in a safe manner through appropriate risk management and the implementation of suitable controls to prevent injuries due to falls.

2. People

- 2.1. Persons who work at height must be trained and certified as competent;
- 2.2. Medical testing is mandatory for people required to work at height and must include conditions such as vertigo or illnesses that may affect the person or the work. The frequency of medical testing must be determined by a risk assessment.

3. Process

- 3.1. Prior to any work at height being carried out a hazard assessment shall be conducted. The hazard assessment must identify all possible falls from height during the expected activity and the potential for injury. The risk of the fall must be controlled through the appropriate use of the hierarchy of control, which in order of priority is:
 - 3.1.1. Eliminate the need to work at height;
 - 3.1.2. Implement fall prevention wherever practicable to provide a safe working area using stable work platforms, scaffolding, secure fences, edge protection and covers etc.;
 - 3.1.3. Utilise fall restraint devices such as short lanyards with harnesses, static lines, retractable lanyards, etc.;
 - 3.1.4. Utilise fall protection systems such as fall arrest harnesses and lanyards, nets, bags, etc., including when working on elevated work platforms or man lifts.
- 3.2. Each Vedanta business unit and operation is required to design and implement a work at height procedure, instruction and/or permit that manages the risk of a fall by a person from one level to another;
- 3.3. Each working at height task shall be planned to specifically include how those procedures will be implemented in practice. This must include self-rescue and emergency rescue procedures with periodic mock drills. It must also include restrictions on work time considering weather conditions, night work etc.;

- 3.4. The Vedanta guidance note **GN21 Work at Height** is the minimum requirement of each unit or operation;
- 3.5. Where overhead work is being conducted, barricades must be erected around the work area to protect others below from falling objects;

4. Review

- 4.1. A system of inspecting and auditing working at height procedures must be implemented to ensure that the standards required are maintained;
- 4.2. All work at height equipment must be tested and certified including, but not limited to, scaffolding, platforms, EWP's, scissor lifts, man baskets, fences, edge protection, covers, harnesses, lanyards, static lines, anchor points;
- 4.3. Regional legislation and regulations; local and international standards; codes of practice and guidance notes specific to the unit or operation must be followed.



Phil Turner

Group Head Safety & Occupational Health

ISOLATION

1. Scope

This standard applies to all Vedanta business units and managed operations, including new acquisitions, admin/corporate offices and research facilities located off site; during exploration, through all development phases and construction, operation to closure and, where applicable, for post closure management.

Types of Hazardous energy & its potential: This standard applies to all sources of hazardous energy and hazardous substances.

Energy Types		
Energy Source	Kinetic Energy Examples	Potential Energy Examples
Electrical	Current	Batteries, capacitors, voltage,
Mechanical	Turning shafts, gears	Tensed spring, flywheel
Hydraulic	Pistons, motors	Pressure in accumulators
Pneumatic	Actuators pistons	Pressure in tanks, lines
Steam	Flowing steam	Steam in pipelines, drums
Chemical	Flowing liquid, gases, slurry, cake	Trapped gases, liquid, slurry
Gravity	Moving components	Elevated counter weights
Radiation	Released energy	Contained source material

2. People

2.1. **Isolation Officer:** Whenever equipment, plant or section of plant is to be isolated there must be a person designated to carry out the isolation procedure. That person is referred to as the Isolation Officer. No person may be designated as the Isolation Officer for a piece of equipment unless s/he has been trained, assessed and authorized by the respective business unit as competent to carry out the isolation procedure for that piece of plant or equipment. Tests for voltage, for example, require competency in electrical work as outlined in the electrical standard.

2.2. Isolation Officer's responsibility

- 2.2.1. Ensure safe start/stop & execution in accordance with the isolation procedure before any work begins;
- 2.2.2. The Isolation Officer's lock and tag must be the first to be applied and the last to be removed;
- 2.2.3. The Isolation Officer's lock must be a master series lock since it will remain on the plant or equipment when handing over to subsequent shifts and to another designated Isolation Officer;
- 2.2.4. Where isolation involves only one person on jobs to be completed within a single shift and where it is not appropriate for a master series lock to be utilized, the person must be an Isolation Officer and s/he must apply his/her personal lock and identification tag;
- 2.2.5. After locking and tagging, the Isolation Officer must clear the area of personnel before a trial step to ensure that the plant or equipment has been isolated, achieved zero energy state & verified;
- 2.2.6. An Isolation Officer shall confirm effectiveness of controls associated with the live work area; including controls to prevent unauthorized access.

2.3. Everyone's responsibility

- 2.3.1. Everyone, including the Isolation Officer, who has to perform work on the plant, equipment or system, must first apply a personal lock and identification tag in accordance with the isolation procedure;
- 2.3.2. Personal locks must be such that they can only be locked/unlocked by their owner;
- 2.3.3. Personal locks may never be removed other than by the person to whom they belong. Where a lock has been inadvertently left in place and the department or area manager determines that it is impractical to recall the owner, the lock can be removed but only under the direct supervision of the department or area manager or his/her appointed nominee and in accordance with a written procedure.

3. Process

- 3.1. There are nine mandatory isolation steps required for safe execution of jobs involving any type of energy isolation:
 - 3.1.1. Prepare for isolation by obtaining a written isolation procedure identifying energy sources; the number of locks required; isolation devices; communication with operators & other concerned persons;
 - 3.1.2. De-energize the plant or machine;
 - 3.1.3. Isolate all energy sources;
 - 3.1.4. Drain or block and, where appropriate, bleed residual energy to achieve a zero energy state;
 - 3.1.5. Secure each isolation device, generally with locks & suitable tags;
 - 3.1.6. Verify zero energy;
 - 3.1.7. Perform the task or activity;
 - 3.1.8. Inspect & restore normalcy - inspect the work area and remove isolation after job completion;
 - 3.1.9. Startup - ensure the safety of all.
- 3.2. Where it is necessary to work on live equipment for the purposes of commissioning, testing, sampling and adjustments, such work shall be carried out in accordance with a written procedure;
- 3.3. Where there is a need for work to extend over multiple shifts or where there are large numbers of people involved in the work, such as large maintenance & shutdown jobs or projects, a project isolation procedure can be implemented. This procedure must include requirements that 1) personal locks shall be used for each person working on the project; 2) an Isolation Officer's control lock is in place; and 3) the control lock cannot be unlocked without all personal locks first being removed.

4. Review

- 4.1. For further details on isolation refer to the Vedanta Guidance notes and the respective business unit isolation manual and procedures;
- 4.2. Business units are required to comply with all relevant local laws and regulations on isolation standards along with Vedanta Isolation Standard.



Phil Turner

Group Head Safety & Occupational Health

VEHICLES AND DRIVING

1. Scope

This standard applies to all vehicles and drivers on Vedanta operating and project sites or on company business outside these sites. The standard also applies to vehicles and drivers working under direct contract and control of Vedanta businesses. Vehicles include any equipment or machinery used for moving people or materials but does not include rail locomotives, cars or carriages.

2. People

- 2.1. A vehicle and road safety awareness program must be in place for all employees, contractors and visitors covering site and local environs;
- 2.2. Operators of heavy equipment and those driving in areas of heavy equipment activity must undergo induction and training covering the specific hazards pertaining to their role and must be authorized as competent. Reassessment of competence must be undertaken either annually or derived from a risk assessment for each vehicle type;
- 2.3. Operators of heavy equipment must be assessed and declared medically fit for their role;
- 2.4. A system must be in place to ensure that drivers:
 - 2.4.1. Have a valid driver's license;
 - 2.4.2. Are subject to behavior based feedback;
 - 2.4.3. Perform a pre-operation safety check;
 - 2.4.4. Understand emergency crash and breakdown procedures, including tire changing where applicable.
- 2.5. A system and procedures must be in place to manage driver fatigue;
- 2.6. Persons operating any equipment associated with a vehicle such as vehicle mounted cranes and winches must be suitably trained and accredited;
- 2.7. A zero tolerance policy and procedures must be in place for driving a company vehicle under the influence of alcohol; illicit drugs; or prescription medicines that forbid driving;
- 2.8. A zero tolerance policy must be in place for driver's texting, talking or reading a cell phone in a moving vehicle.

3. Process

- 3.1. A risk assessment shall be conducted to identify the conditions and behavioral factors that impact vehicles and driving safety. The risk assessment must cover all aspects of vehicles and driving and will have up-to-date action plans in place to manage identified issues;
- 3.2. Vehicle selection must be based on a risk assessment considering tasks, application and environmental conditions;
- 3.3. Vehicles must be subject to an appropriate pre-operation safety check;
- 3.4. The driver and all passengers must wear their seat belts at all times;
- 3.5. Speed limits and traffic rules must be rigorously enforced and reviewed regularly;

- 3.6. Systems and procedures must be in place to ensure that risks associated with vehicle journeys are controlled;
- 3.7. A site-based traffic management plan must be in place that includes but is not limited to:
 - 3.7.1. Setting appropriate speed limits;
 - 3.7.2. Overtaking protocols;
 - 3.7.3. Rules for hazardous or restricted areas;
 - 3.7.4. Minimum safe distances between moving vehicles;
 - 3.7.5. Installation of road safety signs;
 - 3.7.6. Demarcation of pedestrian walkways;
 - 3.7.7. Parking provisions.
- 3.8. Wheel chocks should be applied to parked vehicles on operating sites. Where a parked vehicle can move without the hand brake applied and not in gear, wheel chocks are mandatory;
- 3.9. Vehicles must be fitted with the following minimum features as appropriate to the vehicle's purpose:
 - 3.9.1. Fixed seats and safety belts for driver and all passengers, unless a risk assessment specifies otherwise;
 - 3.9.2. A speedometer;
 - 3.9.3. Drivers air bag and passengers air bag if available as a manufacturer fitted item;
 - 3.9.4. Fire extinguisher, first aid kit, two high visibility jackets and emergency road side triangles;
 - 3.9.5. Reflective tape should be considered for the front and rear of the vehicles to enhance visibility at night;
 - 3.9.6. Vehicles working within plant boundaries must have an audible reversing alarm and audible/visible systems alerting vehicle movement as required by the vehicle risk assessment.
- 3.10. Vehicles should not have:
 - 3.10.1. Seating that is side mounted;
 - 3.10.2. Externally mounted fuel containers or carrier.
- 3.11. Consideration should be given to the inclusion of IVMS (In Vehicle Monitoring System) or GPS devices to monitor and provide feedback on driver behavior.

4. Review

- 4.1. A formal inspection and preventative maintenance system must be in place to ensure that vehicles are maintained in a safe and roadworthy condition;
- 4.2. Vehicles must comply with local laws and regulations, particularly as these apply to the transport of hazardous materials.



Phil Turner
Group Head Safety & Occupational Health

ELECTRICAL SAFETY

1. Scope

This standard applies to all Vedanta business units and managed operations, including new acquisitions, admin/corporate offices and research facilities located off site; during exploration, through all development phases, construction, operation to closure and - where applicable - for post closure management. This standard applies to all electrical work above 110 volts DC or 50 volts AC.

2. People

- 2.1. There shall be site-specific electrical competency standards covering all electrical work including construction, usage, maintenance, repair, decommissioning and demolition of electrical equipment and including arc flash protection;
- 2.2. The competency standards shall specify the frequency for re-certification, which shall be no less than every two years;
- 2.3. Employees and contractors exposed to electrical hazards shall receive electrical hazard training at the commencement of their employment and thereafter on an annual basis that is specific to the equipment and conditions of their work area;
- 2.4. Duty Electricians/Artisans must be appropriately trained in emergency fire and first aid response procedures and appropriate equipment must be readily available;
- 2.5. All electrical work must be executed by competent personnel in accordance with governing regulation, code, design criteria and safe work procedures.

3. Process

- 3.1. Electrical safety devices such as earth leakage and overload protection shall be installed on all final distribution circuits and the settings established by qualified personnel;
- 3.2. Any electrical equipment or system must be capable of being separated from the source of supply in such a manner that it cannot be inadvertently re-energised;
- 3.3. **Isolation and access:**
 - 3.3.1. Work on live equipment shall not be allowed except in circumstances where it is essential to have equipment energized, such as testing or fault finding, and only with the necessary PPE and insulated tools. All energised electrical work will require a safe work procedure and, with the exception of voltage testing or where no tools are used, will require an Electrical Work Permit;
 - 3.3.2. Electrical panels, enclosures, control centers, substations and equipment shall be appropriately guarded, labelled, and made inaccessible (except for emergency shut off mechanisms) to unauthorised personnel. Areas containing such equipment are 'controlled areas';
 - 3.3.3. Where it is necessary for untrained personnel such as visitors to enter controlled areas there shall be a system for communicating the hazards and for

escorting them with appropriately trained personnel. Contractors must have a permit to work in controlled areas;

- 3.3.4. Access to an electrical cabinet or other enclosure with exposed and energised terminals in excess of 1,000 volts is prohibited;
- 3.3.5. Where high voltage switching is required, specific procedures and equipment to protect against arc flash must be in place.
- 3.4. Any alterations/addition/deletion within the established electrical system/protection scheme must include a documented change management procedure duly approved by a competent authority;
- 3.5. There must be a proactive system for making safe and removing electrical equipment unfit or unsafe for purpose or continued use;
- 3.6. There must be a system for maintaining an up-to-date set of single line diagrams, with supporting documentation showing system fault calculations, equipment details, electrical protection discrimination curves and cable ratings;
- 3.7. Single Line Diagrams should be displayed at electrical distribution points and should indicate the normal position of the incomer switches, bus-couplers and feeder switches;
- 3.8. There must be an assessment of overhead and underground power lines and appropriate labeling and controls must be in place to protect personnel working in close proximity;
- 3.9. There must be a system for maintaining an up-to-date set of buried services drawings and a mechanism for capturing installation changes;
- 3.10. Electrical equipment earthing switches must be used where provided and portable earths employed where they are not, using extreme caution to ensure that a live conductor is not inadvertently earthed;
- 3.11. Substations and electrical rooms must have appropriate signage and emergency procedures posted;
- 3.12. Adequate and safe means of removing victims in contact with live equipment must be available.

4. Review

- 4.1. Electrical equipment, grounding continuity and electrical safety devices shall be inspected and/or tested on a suitable schedule and the findings recorded;
- 4.2. Businesses are required to comply with local laws and regulations covering electrical safety.



Phil Turner

Group Head Safety & Occupational Health

CONFINED SPACE ENTRY

1. Scope

This standard applies to all Vedanta business units and managed operations, including new acquisitions, admin/corporate offices and research facilities located off site; during exploration, through all development phases and construction, operation to closure and, where applicable, for post closure management.

- 1.1. **Confined space** is an enclosed or partially enclosed space that:
 - 1.1.1. Is large enough for a person to enter; and
 - 1.1.2. May have limited or restricted means of entry or exit; or
 - 1.1.3. Is not designated as a place of work; or
 - 1.1.4. Has been identified as such in a risk assessment; and
 - 1.1.5. May:
 - 1.1.5.1. Have an atmosphere which contains potentially harmful levels of toxic or explosive atmospheres; or
 - 1.1.5.2. Not have a safe level of oxygen e.g. following a nitrogen purge; or
 - 1.1.5.3. Cause entrapment or engulfment.
- 1.2. Entry to confined space occurs when a person's whole body or upper body and head is within the confined space.

2. People

- 2.1. All persons required to work in a confined space; to act as a standby person; or a member of a rescue team must be trained, competent and tested.

3. Process

- 3.1. Confined spaces must be identified and permanent signage erected at the entry points denoting that a permit is required prior to entry. Where signage is impractical other means of highlighting the dangers need to be used.
- 3.2. Preparation
 - 3.2.1. Before any entry or inspection inside a confined space without supplementary protection such as self-contained breathing apparatus it should be thoroughly washed, drained and ventilated;
 - 3.2.2. All inlets and outlets that could introduce contaminants must be isolated or blanked off, including double block and bleed as appropriate;
 - 3.2.3. Tanks and vessels should be mechanically disconnected or blinded wherever possible;
 - 3.2.4. Specific safe work procedures must be developed for work activities that are more hazardous when carried out in a confined space, including hot work (cutting, welding); chemical cleaning; steam cleaning; and abrasive blasting;
 - 3.2.5. Where the risk assessment has identified the need for ventilation or purging this must be covered by a documented procedure.
- 3.3. Entry into a confined space must only be allowed after a written permit has been issued by a competent and

authorized person. Where the work continues over a shift the permit must be renewed or reissued. The permitting process must include:

- 3.3.1. A risk assessment, including requirements for a competent person to reassess levels of oxygen, contaminants, flammable & toxic substances, temperature extremes etc. and actions to be taken if these exceed established upper or lower levels;
- 3.3.2. Ventilation requirements;
- 3.3.3. Isolation procedures for energy sources and contaminants;
- 3.3.4. Requirements for specific safety equipment such as breathing apparatus; respiratory protection, rescue belt, life lines and other personal protective equipment;
- 3.3.5. The sign-in and sign-out of all persons entering the confined space;
- 3.3.6. A standby person, who shall be positioned outside the confined space and must have no other duties other than monitoring people and conditions inside the confined space and coordinating with rescue personnel if required;
- 3.3.7. Display of the permit;
- 3.3.8. Communication process and/or equipment between the standby person and personnel within confined space;
- 3.3.9. Safety specification of equipment to be taken into the confined space, noting that low voltage lighting and equipment should be used in confined spaces where practicable;
- 3.3.10. Barricading;
- 3.3.11. Rescue plan and equipment. Ideally, confined spaces will have two means of access/egress;
- 3.3.12. A completion procedure.

4. Review

- 4.1. A system to review the identification of confined spaces and the application of the confined space entry standard must be implemented;
- 4.2. Businesses are required to comply with local laws and regulations covering work in confined spaces.



Phil Turner

Group Head Safety & Occupational Health

1. Scope

This standard is applicable to all business units and managed operations, including new acquisitions, admin/corporate offices and research facilities located off site; during exploration, through all development phases and construction, operation to closure and, where applicable, post closure management.

- 1.1. This standard applies to personnel and equipment involved in lifting operations using mobile or fixed cranes. The standard does not apply to hoisting operations in underground mines
- 1.2. Businesses are necessarily required to comply with local crane and lifting-related laws and regulations

2. People

- 2.1. Any person designing or approving a lifting plan must be trained and certified as competent through a Vedanta-approved approach or a National certification system
- 2.2. The operator's experience, skill and knowledge of the particular crane should be given due consideration
- 2.3. The crane operator, riggers and signal man must be trained every three years and certified by authorized agencies approved by Vedanta, ideally the crane OEM
- 2.4. Operators must undertake a pre-operational safety check for each shift that must be based on a risk assessment for the equipment

3. Process

- 3.1. Contract or hire cranes shall be inspected by a 3rd party and Vedanta representative before mobilization on a Vedanta site with a documented and recorded checklist
- 3.2. The selected crane must have valid visual inspection; NDT inspection for all load bearing parts; a load test certificate signed by a competent authority of the respective state government/regulator; and recertification if the crane configuration is changed. The crane must have all major modification / accident history available when entering the business and issue copies to the Vedanta authorized person
- 3.3. All rigging hardware must have valid certificates from a competent person certified by the state government/regulator
- 3.4. Cranes with a safe working load beyond 15T shall be fitted with rated load indicator
- 3.5. No lifting is permitted above 90% of the maximum rated load in the specific lifting configuration
- 3.6. Each lift is to be categorized as a Routine or Critical Lift
- 3.7. A Critical Lift is greater than 75% of the maximum rated load in the specific lifting configuration; multiple crane lifts; lifts over operating facilities where this may endanger personnel; lifts over power lines; blind lifts where the operator cannot see the load or its final resting place and lifts involving personnel cages
- 3.8. All Critical Lifts require a risk assessment and a lifting plan approved by a competent person per the Cranes and Lifting Guidance Note

- 3.9. Activities at night or during inclement weather are Critical Lifts and require that emergency response personal are available at all times during the lifts
- 3.10. Routine lifts may not require a lifting plan for each lift, but this must be considered and defined in a risk assessment
- 3.11. No crane shall be moved ("marched") with a load suspended. Any "pick and carry" operation must undergo a specific risk assessment of the dynamics of the load and crane during the planned travel
- 3.12. There must be documented procedures that require:
 - 3.12.1 All rigging connections to be checked prior to commencing a lift
 - 3.12.2 Checks that the load being lifted is within the rated capacity of the crane and lifting attachments and within the limits set out in the lift plan
 - 3.12.3 Checks of all safety devices or overload limiters to ensure they are not overridden or cut out
- 3.13. A pre-lift meeting with all members of the lifting team must be conducted
- 3.14. A dry run should be conducted prior to the lift
- 3.15. Hand signals or two-way radio shall be used for communication during crane operations. Mobile phones shall not be used
- 3.16. Loads must not swing over people or occupied buildings
- 3.17. Seat belt use is mandatory by the crane operator
- 3.18. Overhead travelling cranes must be fitted with audible travel alarms or an equivalent warning device
- 3.19. Tag lines must be attached on both the side of loads which require steadying or guidance while suspended
- 3.20. The load must be well secured and properly balanced in the sling or lifting device
- 3.21. All sensors/load cell of the crane should have valid calibration, certified by OEM or authorized representative
- 3.22. The OEM lifting chart shall always be used and there shall be no interpolation between the chart listings
- 3.23. A register of cranes and lifting equipment must be established that records all maintenance history which will begin once the crane has mobilized on site. These records are to be maintained by the business
- 3.24. There must be a system for the inspection, maintenance and approval of cranes and lifting equipment

4. Review

- 4.1. Crane safety devices shall be inspected or tested on a suitable schedule and the findings recorded
- 4.2. Businesses are required to comply with local laws and regulations covering crane safety
- 4.3. All documentation including recorded crane data is to be preserved

Phil Turner



1. Scope

This standard is applicable to all business units and managed operations, including new acquisitions, admin/corporate offices and research facilities located off site; during exploration, through all development phases and construction, operation to closure and, where applicable, for post closure management. Machine guarding is the elimination of access by people to moving parts of a machine that may present a hazard to those people. This includes hazards of rotating equipment, nip points, conveyors, V-drives and chain drives, shaft ends, couplings, rotating and oscillating levers and other rotating parts.

- 1.1. This standard applies to the design, construction, installation, maintenance, inspection, and operation of machine guards.
- 1.2. This standard is to prevent access to dangerous parts of machinery or stop their movement before any body part of a person enters a danger zone.
- 1.3. Businesses must also comply with local machine guarding related laws and regulations.

2. People

- 2.1. Equipment guarding should be designed and installed by the equipment OEM, noting that such guarding must be in accordance with GN18 – Machine Guarding. Where guarding is designed by other agencies or by Vedanta personnel, those persons must be certified as competent by respective business.
- 2.2. Each person removing a machine guard must be trained in the requirements of this Standard and the expectations of GN18 and designated as competent by the respective business. Such designation will include as appropriate any redesign, construction, installation, maintenance, inspection, cleaning and operation of the equipment and its guards.
- 2.3. The project engineer is responsible for ensuring proper machine guarding in the case of new projects/installations.

3. Process

- 3.1. No activity should be carried out on machinery or its danger points while it is in operation or motion, except as described in 3.2 below. The machine must be isolated in accordance with the specific requirements and the work must be approved through a permit to work. Specifically, every operation must:
 - 3.1.1. Eliminate the need to work and working alone on a machine while it is in motion.
 - 3.1.2. Ensure that all dangerous parts and nip points are guarded so that no one can be injured by the machine during operation.
 - 3.1.3. Implement a robust interlock protection system on all machine guarding wherever practicable to ensure the machinery will stop if the guarding is removed or tampered with.
 - 3.1.4. Revoke the Isolation and Permit to work only after completion of the job.
- 3.2. For any task such as machine testing, adjustment etc. that requires the machine to be in operation while work is taking place, a safe operating procedure for the specific task(s) shall be developed and all personnel involved shall be certified as competent on the SOPS. Such work must be approved on a case by case basis by the Engineering Head or the SBU Head.

- 3.3. Every business must ensure that machine guards:
 - 3.3.1. Are of sufficiently robust construction to prevent ejected machine parts or material penetrating the guard.
 - 3.3.2. Do not give rise to additional hazards.
 - 3.3.3. Are not easily bypassed or made non-operational.
 - 3.3.4. Are located at an adequate distance from the danger zone.
 - 3.3.5. Do not inhibit the operator's ability to operate the machine safely, e.g. by obstructing essential visibility.
 - 3.3.6. Enable essential work to be done without guard removal.
- 3.4. Fixed guards must be installed such that guard removal/opening is impossible without using tools, either by permanent means (e.g. welding) or by means of fasteners (bolts etc.).
- 3.5. Ensure systems and equipment are in place for the safe start-up of conveyors, which may include engineering controls such as interlocks and conveyor logic systems.
- 3.6. Ensure systems and equipment are in place that provide positive feedback for the safe start-up of conveyors, such as audio warning, radio communication, CCTV and visual display for the operator.
- 3.7. Ensure adequate illumination during machinery inspection, maintenance, cleaning and operation.
- 3.8. Before starting equipment, physically inspect to ensure:
 - 3.8.1. Nobody is working on the equipment;
 - 3.8.2. Access platforms are clear;
 - 3.8.3. Guards are fitted and tightly secured; and
 - 3.8.4. Permit to work and isolation are surrendered.

4. Review

- 4.1. All Vedanta operations are required to develop and document inspection, maintenance and testing procedures to ensure that guards and protection devices are maintained in good working order and are in good repair.
- 4.2. Machine guarding inspection must be part of the Preventive Maintenance schedule of equipment.
- 4.3. Periodic internal and external audits covering machine guards must be undertaken at all locations to ensure compliance with this Standard.
- 4.4. Regional legislation and regulations; local and international standards; codes of practice and guidance notes specific to the unit or operation must be followed.



Phil Turner
Group Head HSE & Sustainability

1. Scope

This standard applies to all rail operations including trains, locos, wagons, tracks, loading facilities and dumping facilities managed by Vedanta or its Business Partners and specifies mandatory requirements for all existing operations and new acquisitions.

- 1.1. The objective of the standard is to eliminate the risk of fatalities and serious incidents resulting from any activities related to rail operations.
- 1.2. Businesses must also comply with National and local rail operations laws and regulations.

2. People

The Head or Area In Charge of Logistics/Rail/Port operations is responsible for ensuring the implementation of this Standard and that all statutory duties as outlined in the local legislation are followed. They may assign an Authorised Person whose role shall be to ensure that there are appropriate SOPs, training and risk assessments in place for driving, operations, loading, shunting, coupling and decoupling. The Authorized Persons shall ensure:

- 2.1. There is a list of personnel authorised as Supervisor, Loco Driver, Pointsman, Linesman, Mechanic for all rail activities.
- 2.2. A Training Programme is in place for all Loco Drivers, Pointsmen, Maintenance Mechanics and Supervisors who work on rails or on and around loco and wagons, with specific training for each task such as driving, shunting and loading / unloading.
- 2.3. Annual re-training programmes are in place for all authorised personnel.
- 2.4. The Business Partner site leader plus the loco driver and at least one Pointsmen in each team as identified in 3.2 below have the appropriate education, training and minimum five-years' experience in the role. This shall be clearly defined in a job description.
- 2.5. All personnel working in the railroad environment have general awareness training on "Line of Fire" risks associated with moving trains or wagons; pinching between wagons; or caught under wheels of locos or wagons.
- 2.6. All personnel working in a rail yard, on tracks and in rail activities wear appropriate PPE and clothing with 360° retro-reflective 50 mm strips on chest, back, arms and legs.

3. Process

The Authorised Person shall ensure:

- 3.1. Each operation has completed a hazard identification and risk assessment to ensure that all hazards associated with rail operations are identified, risks are assessed, and appropriate controls are in place. The assessment must:
 - 3.1.1. Establish a Risk Register that is reviewed annually.
 - 3.1.2. Apply learnings of previous incidents into the process.
 - 3.1.3. Ensure all specified controls are in place.
 - 3.1.4. Develop a monitoring and review process to cover effectiveness and limitations of current practices.
 - 3.1.5. Cover all hazards including but not limited to coupling/decoupling; overhead electrical hazards; working at heights; jumping between wagons; mounting/dismounting moving trains; opening/closing a switch; and opening/closing wagon gates.
 - 3.1.6. Identify approved tools and equipment.
 - 3.1.7. Establish work zones to ensure locos and vehicles have safe separation distances.
 - 3.1.8. Include non-standard equipment, e.g. wagon bumpers

- 3.2. During shunting and coupling/decoupling operations, crews of at least three persons (Loco Driver & two Pointsmen) are always present.
- 3.3. Each rail crew has one person designated to give radio instructions to the loco driver. That person must ensure:
 - 3.3.1. Positive communication with the correct loco driver (in the case where more than one loco is present)
 - 3.3.2. No one is in the line of fire before giving an instruction to move a loco
- 3.4. No person shall mount or dismount a moving loco or wagon.
- 3.5. Flags, de-railing devices and a person as a Safety Watch are used when workers are on the track to protect from trains or wagons moving into their work area.
- 3.6. All locos and wagons parked on a slope have four skids available and the Pointsmen places skids under the wheels of the wagon next to the loco to prevent rolling.
- 3.7. All railroad signage is identified and installed at visible locations, including "overhead electrical"; "rail crossing"; and, at entrance to tracks, "authorized personnel only".
- 3.8. Training of employees on loco sounds for movements.
- 3.9. Adequate supervisors are visible in the field for monitoring work activities.
- 3.10. Two-way radios are used to communicate with the loco driver and mobile phones use is avoided during critical loco movements.
- 3.11. All locos undergo a documented pre-use inspection that verifies the presence of firm railings, stairs and couplers on the locomotive; locomotive floor is clean; and brakes, lights, horn and fire extinguishers inside the cabin are working properly.
- 3.12. Locos used for transportation have all lights and horns fully functional including Near Light, which should be switched on for night-time coupling & decoupling.
- 3.13. Rail sidings are designed, constructed and maintained to reduce derailment.
- 3.14. A yearly survey of track gradient and, based upon this, completion of lifting & packing track maintenance (most preferable after monsoon period).
- 3.15. A loco and track maintenance plan is in place and updated weekly to eliminate derailments.
- 3.16. Speed within Vedanta sites is maintained to a maximum as required by local legislation.
- 3.17. Hygiene facilities are available and easily accessible for workers' use.
- 3.18. Each rail operation has a Rail Safety Champion who ensures the implementation of this standard.

4. Review

The requirements of this Standard shall be reviewed at least annually by businesses through their logistics departments.



Phil Turner
Group Head HSE & Sustainability

1. Scope

This standard applies to all operations managed by Vedanta businesses and specifies mandatory requirements for all existing operations, new acquisitions, including those developed for construction or operational purposes. This standard applies to all business partners.

The objective of the standard is to eliminate the risk of fatalities and serious incidents resulting from collapse or other excavation accidents. Excavations can include trenches, potholes, earthworks, tunnels, retaining walls, small excavation pits used in exploration, environmental restoration, formwork, and construction.

2. People

The SBU Head is responsible for ensuring that all statutory duties as outlined in the legislation are strictly observed. The SBU Head shall assign an Authorised Person to ensure that there are appropriate resources; equipment and a management system in place for training, monitoring and controlling the safety of all people working in excavations. The Authorised Person shall ensure that:

- 2.1. All personnel working in excavations are authorised.
- 2.2. All site PPE requirements are applied to work in excavations.
- 2.3. A Training Programme is in place for all employees and Business Partner personnel on the excavation safety requirements, which must include:
 - 2.3.1. Permits to Work and Risk Assessments
 - 2.3.2. Identification and management of buried services
 - 2.3.3. Confined Space training if required, e.g. if the risk of engulfment, entrapment or hazardous atmosphere exist
 - 2.3.4. Excavation safety training, including SOPs review
 - 2.3.5. Emergency rescue training
- 2.4. Annual retraining is in place for all personnel or more frequent as required by the scope of work.

3. Process

- 3.1. The Authorised Person shall ensure SOPs are implemented and revised at least every two years, or more frequently as required, covering:
 - 3.1.1. Assignment of responsibilities.
 - 3.1.2. Consultation with a competent person regarding the design of any temporary works.
 - 3.1.3. Identification of health and safety hazards and the conduct a risk assessment for each excavation.
 - 3.1.4. Description of how controls will be implemented, monitored and reviewed.
 - 3.1.5. The minimum training requirements.
 - 3.1.6. Documentation and practice of emergency procedures.
- 3.2. Any excavation over 1.5 meters deep in type 1 or 2 soil per GN25 shall have appropriate shoring/support or shall be sloped back at a minimum of 45°.
- 3.3. Any excavations over 1.5 meters in type 3 or 4 soil shall have support and sloping designed by a competent person.
- 3.4. Shoring is required for loose soils (type 3 & 4); where sloping is not permitted; or where the excavation is near a structure. The shoring must be designed and installed using good engineering practices and it must be capable to withstand the maximum load that could be applied to it without buckling, shifting or failure. For soil types 1 & 2, shoring shall be installed as per the risk assessment and based on the site condition.
- 3.5. Each excavation shall have adequate working space, which should be a minimum of 300 mm from the edge of the foundation.
- 3.6. All excavations must have a minimum of two means of access. The project shall determine the number of additional access points as required by the risk assessment and based on the number of workers and size of the excavation.
- 3.7. For excavations deeper than 1.5 meters, a designated Safety Watch shall be positioned at top of the excavation with radio

- communication to emergency services. The Safety Watch will monitor conditions and assist in the case of any emergency.
- 3.8. Excavations must be kept dry and free of water and debris.
- 3.9. Buried services shall be identified prior to start of digging and where these are located within the excavation they must be exposed with care, normally by manual excavation.
- 3.10. Overhead services shall be identified and the limits of approach shall be specified and strictly maintained, including visually by a Spotter. Signs must be installed that clearly identify overhead hazards.
- 3.11. All excavations shall be checked daily for any changes and prior to start of work. Checks should look for:
 - 3.11.1. Tension cracks in the soil
 - 3.11.2. Sliding / sloughing soils, rocks or materials
 - 3.11.3. Toppling, subsidence and bulging
 - 3.11.4. Stability of excavation walls
- 3.12. An inspection shall be conducted after heavy rain to check for wall and shoring stresses and water accumulation.
- 3.13. Mechanical plant, spoil pile or heavy loads shall be no closer than 1m from the zone of influence (as described in GN25).
- 3.14. Hard barricading should be installed around the excavation area to restrict access.
- 3.15. If excavation meets the definition of a confined space as defined in the Confined Space Safety Standard, then the requirements of that Standard shall be applied.
- 3.16. Every excavation shall have an Emergency Response and Rescue Plan.

4. Review

The requirements of this Standard shall be reviewed at least annually by businesses through their Civil Engineering and Safety departments.



Phil Turner
Group Head HSE & Sustainability

VSS 9 PIT, STOCKPILE & WASTE DUMP STABILITY – SAFETY PERFORMANCE STANDARD

1. Scope

This standard is applicable to all business units and managed operations, including new acquisitions; during exploration, through all development phases and construction, operation to closure and - where applicable - for post closure management.

- 1.1. This standard covers the geotechnical hazards associated with temporary or permanent slopes excavated for the purposes of mining an ore reserve. It also covers waste dumps, stockpiles, spoil, and land bridges (collectively called “dumps”).
- 1.2. Businesses shall comply with Codes of Practice, guidelines and procedures outlined in relevant Environmental Management Plans and Biodiversity Action Plans as well as conditions stipulated in regulatory licenses to operate issued by national/local authorities.

2. People

- 2.1. Every person working on dump area such as dozer/truck operator or spotter shall be equipped with suitable means of communication e.g. 2-way radio;
- 2.2. Only experienced spotters shall be deployed on dumps;
- 2.3. Spotters, operators, engineers and surveyors shall be trained on the risks of tension cracks and ground movement and shall be empowered to stop activities;
- 2.4. A communication system must be developed including emergency response and training must be imparted to people working on dumps.

3. Process

- 3.1. A manager must be appointed with responsibility for the implementation of this standard;
- 3.2. The nominated manager must arrange for the development of a Slope Management Plan (SMP) & Dump Management Plan (DMP). These plans must:
 - 3.2.1. Be developed using suitably qualified and experienced engineers and specialists;
 - 3.2.2. Be based on adequate geologic, geotechnical and hydrogeological data;
 - 3.2.3. Include operating and slope monitoring procedures;
 - 3.2.4. Document that slopes and dumps are designed and constructed to specified minimum stability criteria using industry-accepted design techniques;
 - 3.2.5. Define accountabilities;
 - 3.2.6. Undergo an independent review every two years, or more frequently as determined by a risk assessment;
- 3.3. Dumps shall be constructed and maintained per the approved design;
- 3.4. Dump stability shall be confirmed by a competent agency;
- 3.5. Dumps created from the ground up should be made in lifts where the dump height exceeds 20m;
- 3.6. Trucks shall unload material at least 20m from the crest or at a distance determined by a geotechnical risk assessment as safe and then spread by dozer;
- 3.7. Dumps shall have proper drainage system including toe- drains and “garland” drains to keep water away;
- 3.8. Dumps shall be designed to not accumulate water and a slope of 1 in 100 should be maintained for drainage;

- 3.9. Dump sites are to be selected and designed such that material is not cast into a water-logged area;
- 3.10. In case of heavy rain, active dumping shall cease, and a geotechnical engineer shall verify when work can resume;
- 3.11. Ravines and gullies formed by heavy rain shall be patched with suitable material approved by a geotechnical engineer;
- 3.12. Clay material shall not be allowed;
- 3.13. Dumps shall be regularly monitored for settlement and movement by suitable survey systems. The monitoring process and frequency shall be determined by a geotechnical engineer based on the nature of rock, dump height, rainfall etc.;
- 3.14. Dumps witnessing tensile cracks (other than settlement cracks) shall be inspected by a geotechnical engineer at the beginning of each shift to give clearance that work can continue;
- 3.15. Dumps made by filling existing pits where the height exceeds 50m shall be monitored through a real time monitoring system like slope stability radar;
- 3.16. Dumps should be created away from any crest a distance of 0.5 to 0.75 times the dump height;
- 3.17. Dumps shall be audited and surveyed through an external independent agency at defined frequencies.

4. Review

- 4.1. Operations must complete routine monitoring on a periodic basis, the intervals for which must be determined by risk assessment;
- 4.2. Procedures and accountabilities must be in place to verify the conformance of the pit slopes, stockpiles, spoils and waste dumps to design and current conditions.
- 4.3. Management of change must be employed if changes are made to the excavation or dump geometries that depart from the design;
- 4.4. Accurate surveys of the dump location(s) must be checked against the property and permit boundaries and recorded.



Phil Turner
Group Head HSE & Sustainability

1. Scope

- 1.1. This standard is applicable to all business units and managed operations, including new acquisitions, admin/corporate offices and research facilities located off site; during exploration, through all development phases and construction, operation to closure and - where applicable - for post closure management;
- 1.2. This standard applies to personnel and equipment involved in handling of molten materials. The standard does not apply to hoisting operations in underground mines.

2. People

- 2.1. Supervisors of molten material handling activities must be experienced, knowledgeable and shall closely monitor the activities;
- 2.2. Employees operating mobile equipment used for handling molten materials shall be trained and authorized as competent by the business;
- 2.3. Operators must undertake a pre-operational safety check for each shift that must be based on a risk assessment for all molten material handling equipment;
- 2.4. Employees shall be given appropriate information, instruction and training on the dangers of working with molten materials including the danger from liquid contamination entering the furnace; the need to follow safe working practices; and the correct use of PPE;
- 2.5. Employees working in an area where molten materials are being handled must be periodically trained in emergency preparedness, response and evacuation.

3. Process

- 3.1. All vessels and equipment used for handling molten materials shall be designed as per OEM recommendation and must be certified by a competent engineer;
- 3.2. Standard operating and maintenance procedures based on a risk assessment shall be developed for molten materials handling activities and the application of the procedures shall be monitored;
- 3.3. All molten material handling equipment including cranes and associated rigging hardware must have valid load tests certificate signed by a competent authority including recertification if configuration is changed;
- 3.4. All molten material handling equipment must have necessary safety devices, fail safe devices and interlocks;
- 3.5. A warning device (a Bell, Horn, Siren or a flashing light) is required to be activated whenever mobile equipment is handling molten materials;
- 3.6. Molten materials handling EOT cranes greater than 15 T capacity shall be equipped with safety brake in addition to conventional brake;
- 3.7. Cranes with a safe working load beyond 15T shall be fitted with rated load indicator;
- 3.8. Long traverse and cross traverse motion shall be equipped with soft start devices like variable frequency drives and inverter controlled brake/electro hydraulic booster to avoid sudden jerk during acceleration and deceleration;
- 3.9. Molten material transport tracks shall be regularly inspected for undulations and prompt rectification action shall be ensured;
- 3.10. Cranes, forklifts and other equipment handling molten materials must have heat protective shields;
- 3.11. Preheating and inspection of ladles for any moisture shall be done before handling molten materials;

- 3.12. Molten materials ladles shall be suited for the intended operation and shall be inspected regularly for shell condition and descaling;
- 3.13. There must be a system to ensure bottles, cans etc. are not charged to furnaces and ladles;
- 3.14. Water accumulation in sumps, drains, spillages etc. must be protected from contact with molten materials;
- 3.15. The maximum level of molten material in furnaces, ladles and other devices shall be clearly defined and any deviations shall have an effective control mechanism;
- 3.16. Furnaces must be operated within design limits and this must be monitored at regular intervals;
- 3.17. Critical water supplies shall have a backup supply in the event of failure of the primary water supply;
- 3.18. Equipment must be designed to "fail safe" in the event of any power or energy source failure;
- 3.19. Tools and equipment used in molten materials handling should be ergonomically designed;
- 3.20. Tools and equipment used in molten materials handling shall be secured;
- 3.21. Transmission cables, utility pipe lines and other infrastructure shall be protected from heat damage;
- 3.22. Correct PPE usage shall be mandatory for molten material activities and may include helmet, face shield, leather gloves, balaclava, toe guard, high ankle safety shoes and fire retardant clothing;
- 3.23. Fire retardant clothing shall be provided for any person entering an area where there is a potential for exposure to molten materials;
- 3.24. Molten materials transfer path/aisle must have pedestrian and access controls and be clearly marked. All necessary signage, posters, warning indicators and barricades must be in place;
- 3.25. Molten material transport roads/rail must have a risk analysis to identify and control hazards of metal spillage;
- 3.26. Traffic rules for molten material transport vehicles must be developed and rigorously enforced;
- 3.27. Molten material transport vehicles must be segregated from other vehicles and pedestrians unless effective risk controls have been established and implemented;
- 3.28. An emergency evacuation plan for personnel shall be in place and must consider emergency lighting in blackout scenarios.

4. Review

- 4.1. Mobile Equipment safety devices must be inspected periodically and tested on a suitable schedule for effectiveness and the findings recorded;
- 4.2. Businesses are required to comply with local laws and regulations related to molten materials safety.



Phil Turner
Group HSE & Sustainability

GROUND CONTROL– UNDERGROUND

MINES

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 contractors and subcontractors who provide works or services to Vedanta. The Sustainability Governance System Guidance Note **GN33 Fall of Ground** provides additional guidance.

The objective of the standard is to eliminate the risk of fatalities and serious incidents resulting from fall of ground in underground mines across Vedanta.

2. People

- 2.1. All employees and contractors working underground must undergo training in ground awareness and in identifying and communicating rock fall hazards. The training must be approved by geotechnical engineers and delivered by personnel competent and experienced in the practical management of FOG hazards. Refresher training must be carried out on a specified basis;
- 2.2. Supervisors must undergo specific training and be competent in rockfall hazard identification and mitigation;
- 2.3. Each operation must have the resources to ensure compliance with the Ground Control Management Plan/Code of Practice;
- 2.4. Suitably qualified and experienced geotechnical engineers must be used to develop the ground control practices, including the design rationale, calculations, support systems and specification of support materials;
- 2.5. Only trained, competent and authorized persons are permitted to conduct scaling and to install ground support.

3. Process

- 3.1. Each operation must establish a Ground Control Management Plan/Code of Practice that is specific to the operation and that consists of three elements: design; implementation/approach; and verification/monitoring;
- 3.2. Protocols must be developed and documented ensuring that no person shall go beyond the area of secured ground;
- 3.3. All underground excavations must be designed to specified and documented minimum stability criteria for all relevant rock types;
- 3.4. Up-to-date mine plans clearly identifying ground control hazards and pillars created for safety must be maintained in locations that are easily accessible to the workforce;
- 3.5. Appropriate geotechnical monitoring systems that allow for early warning of ground movement must be established;
- 3.6. Trigger Action Response Plans (TARPs) must be implemented for all geotechnical hazards and must

include risk assessments for non-standard operations and changes in management;

- 3.7. A ground hazard reporting system must be in place to allow the early identification of risks;
- 3.8. Standards must be developed and documented to ensure that appropriately certified personnel inspect and validate that ground support is working as intended;
- 3.9. A scaling regime must be in place to ensure both working areas and access ways are secured. The scaling regime must be transparent and formally documented;
- 3.10. Each operation must provide appropriate tools, equipment and documented work methods for scaling and ground support installation to cater for all sizes of excavation encountered in the mine without exposing people performing the work to injury. As a principle, scaling should be undertaken using a dedicated machine where possible;
- 3.11. Installed ground support must be fit for purpose with materials for all support types specified;
- 3.12. Any ineffective support must be replaced immediately or the area must be shut down;
- 3.13. Areas where risk of rock fall are identified must be barricaded off with clear hazard warning.

4. Review

- 4.1. Audits, reviews and quality assurance programs related to rock fall hazards must be carried out regularly and formally documented;
- 4.2. The Ground Control Management Plan/Code of Practice must be reviewed yearly and changes in ground conditions, support practices or mining method accounted for;
- 4.3. An annual peer review must be conducted on the ground management plan to monitor compliance;
- 4.4. An external review must be undertaken on a two year cycle to ensure that the ground management plan is appropriate to the operation;
- 4.5. Procedures must be in place defining the frequency and responsibility for inspecting, monitoring, evaluating and reporting on ground conditions inactive work places including development ends, stopes, shafts, declines, access ramps, airways, escape ways and other key sections of the mine including workshops, stores, shaft stations, etc.;
- 4.6. Procedures must be in place defining the frequency and method of testing rock bolts, cables and other support elements including third-party testing of materials used together with the necessary record keeping;
- 4.7. Businesses must comply with all relevant laws and regulations.



Phil Turner

Group Head Safety & Occupational Health