



Guidance on Managing Stockpiles in the Quarry Industry



Contents

Introduction	4
Key Health and Safety Legislation in Ireland	5
Responsibilities	5
Employer Responsibilities	5
Employee Responsibilities	5
Hazard identification and Risk Assessment	5
Hierarchy of Controls	5
What are the Key Hazards?	6
Instability and Collapse	6
Vehicles and Machinery	6
Entrapment and Suffocation	7
Dust, Visibility, and Respiratory Hazards	7
Stockpile Safety Management	8
Communication.....	8
Design & Construction.....	8
Safe Loading and Unloading.....	8
Traffic Management.....	8
Monitoring and Inspections.....	8
Emergency Response and First Aid.....	8
Training and Technology	9
Training and Culture	9
Use of Technology.....	9
Checklist	9
References and Resources	10

This guide provides an overview of how stockpiles should be managed in the Quarry industry.

Under the Safety, Health and Welfare at Work (Quarries) Regulations 2025 stockpiles are included within the legal definition of a 'tip'. Stockpiles are accumulations of materials such as aggregates, sand, gravel, or other minerals that are temporarily stored within a quarry site. While essential to quarry operations, they present significant risks to employees and equipment, if not properly managed.

Unsafe stockpile management can lead to:

- **Collapses and landslides** – causing injuries or fatalities.
- **Vehicle rollovers** – especially when heavy machinery operates on or near stockpiles.
- **Entrapment hazards** – workers may become buried under materials.
- **Dust and visibility issues** – leading to respiratory illnesses and accidents.

Key Health and Safety Legislation in Ireland

- **Safety, Health and Welfare at Work Act 2005** – Places a duty on employers to ensure a safe working environment.
- **Safety, Health and Welfare at Work (Quarries) Regulations 2025** – Specifically addresses safety in quarry operations, including stockpiles.
- **Safety, Health and Welfare at Work (General Applications) Regulations 2007** – Covers machinery, traffic management, and workplace safety.

Responsibilities

Employer Responsibilities:

Employers bear significant responsibilities in ensuring stockpile safety. This includes undertaking geotechnical appraisals, to determine if stockpiles pose a significant hazard and if so carrying out a geotechnical assessment. Employers must conduct hazard-based risk assessments for all stockpile operations, implement control measures to mitigate identified hazards, and develop comprehensive safe operating procedures. Furthermore, employers are obligated to provide safe systems of work and safe work equipment and ensure that all employees receive adequate training on stockpile safety procedures.

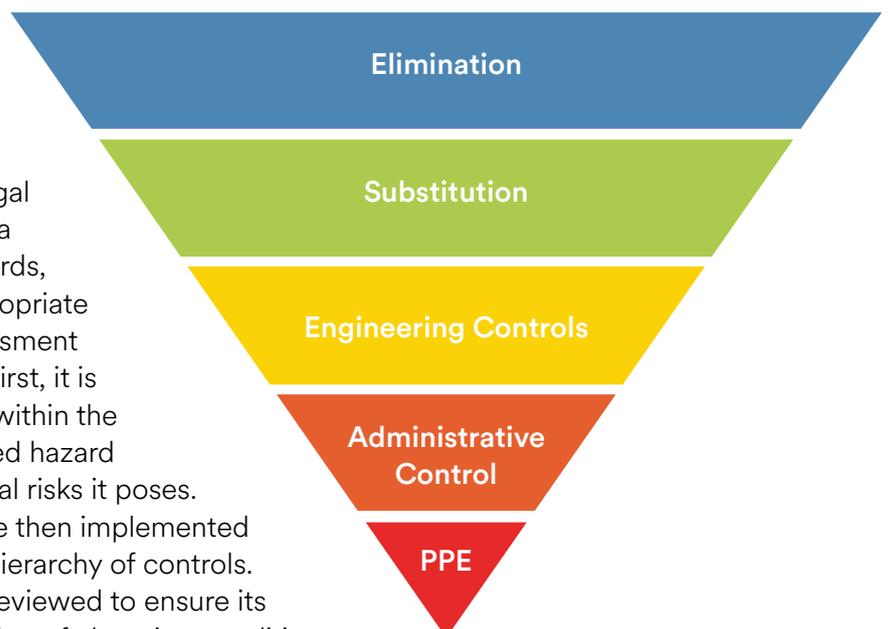
Hazard identification and Risk Assessment:

Under Section 19 of the Safety, Health and Welfare at Work Act 2005 it is a legal requirement that all employers prepare a written risk assessment identifying hazards, evaluating risks, and implementing appropriate control measures. A thorough risk assessment process involves several critical steps. First, it is essential to identify all hazards present within the workplace. Following this, each identified hazard must be evaluated to assess the potential risks it poses. Appropriate control measures should be then implemented to mitigate these risks considering the hierarchy of controls. The risk assessment must be regularly reviewed to ensure its continued effectiveness and consideration of changing conditions.

Employee Responsibilities:

Employees play a crucial role in maintaining safety around stockpiles. Their responsibilities include following all established safety procedures when working in these areas, consistently using the appropriate personal protective equipment (PPE) provided, and reporting any observed hazards to their supervisors.

Hierarchy of Controls



What are the Key Hazards?

Instability and Collapse

Stockpiles can collapse due to improper construction, overloading, incorrect method of material retrieval or adverse weather conditions. Stockpiles approaching or exceeding 20 metres in height are likely to constitute a “significant hazard” and may require a geotechnical assessment under the Safety, Health and Welfare at Work (Quarries) Regulations 2025. To reduce the risk of instability or collapse employers should:

- design and construct robust stockpiles considering the material properties,
- determine the angle of repose,
- maintain appropriate slope angles (typically 37–45 degrees for dry material),
- avoid undercutting the base of stockpiles,
- ensure materials are stored on level stable ground,

- account for the effect that weather conditions have on the stability of edges and surfaces, and
- monitor stockpiles ensuring the height of stockpiles is controlled and faces are stable.



Angle of Repose – Steepest angle at which a sloping surface formed of loose material is stable

Vehicles and Machinery

Machinery such as loaders, excavators and dump trucks are commonly used while working on or around stockpiles. Risks include vehicle rollovers, collisions, entrapment and fall from heights. To help reduce the risks employers should:

- maintain safe haul roads and access ramps with proper gradients,
- use designated traffic routes to prevent vehicle-pedestrian interaction,
- identify overhead power lines,
- install barriers and signage to indicate safe operating zones,
- install edge protection e.g. bunds,
- conduct statutory inspections and pre-operational checks on machinery, and
- ensure vehicles are maintained.

Entrapment and Suffocation

Employees can become trapped or buried when working on or around stockpiles. To assist in reducing the risk of entrapment employers should:

- ensure safe operating procedures are followed,
- be aware of material properties, environmental and climatic conditions,
- avoid loading material from the base in a way that undermines the face,
- avoid lone working,
- use remote-controlled equipment where possible, and
- ensure emergency rescue plans are in place.

Dust, Visibility and Respiratory Hazards

Fine dust particles from stockpiles can cause respiratory diseases and impair visibility, leading to accidents. To reduce the risks associated with dust employers should:

- apply dust suppression techniques (e.g. water sprays),
- use personal protective equipment as determined by the risk assessment, and
- ensure there is adequate lighting and reflective signage in stockpile areas.



Stockpile Safety Management

Effective stockpile management in quarries is crucial for reducing the risk of incidents and meeting legal obligations.

Communication

- Communicate hazards, associated risks and control measures to employees.
- Communicate safe operating procedures, equipment operation and the correct use of personal protective equipment (PPE).
- Establish communication channels for reporting potential hazards.
- Ensure communication channels allow for rapid relay of changes in conditions, such as after heavy rain or freezing conditions.

Design & Construction

- Use engineered designs based on the quarry development plan, geotechnical appraisals and geotechnical assessments.
- Be aware of material properties, and site conditions when making and taking from stockpiles.
- Maintain clear access for vehicles and personnel.
- Keep stockpile bases wide and slopes stable to prevent collapse.
- Avoid building stockpiles under quarry faces.

Safe Loading and Unloading

- Identify vehicle access routes and designated tipping and loading locations.
- Construct access ramps with shallow gradients and fit suitable edge protection (bunds).
- Maintain a bund at tipping edges at all times.
- Develop and implement tipping rules to prevent vehicle rollovers and stockpile instability.

- Ensure operators are trained in safe tipping and dumping practices.
- Assess and control loading operations from stockpiles to prevent stockpile instability.
- Avoid carrying out tipping and loading operations on a stockpile at the same time.

Traffic Management

- Manage vehicle and pedestrian interaction.
- Establish one-way traffic systems where possible.
- Use clearly marked entry and exit points.
- Implement speed limits for vehicles operating near stockpiles.
- Provide high-visibility PPE for employees.

Monitoring and Inspections

- Ensure geotechnical assessments and appraisals are undertaken as required under the Safety, Health and Welfare at Work (Quarries) Regulations 2025.
- Conduct inspections on stockpiles as part of your daily inspection regime.
- Monitor for signs of erosion, slumping, bulging or excessive degradation.
- Train employees to recognise and report potential hazards.

Emergency Response and First Aid

- Prepare and revise as appropriate, adequate plans and procedures to be followed and measures to be taken in the event of stockpile collapses or accidents.
- Ensure occupational first aiders are available.
- Train staff on rescue procedures.

Training and Technology

Training and Culture

- Ensure new employees receive comprehensive training on stockpile safety.
- Provide refresher training as necessary.
- Create a workplace culture where employees feel comfortable reporting hazards.

Use of Technology

- Drones and LiDAR surveys - Used for stockpile monitoring and volume measurement.
- Remote-controlled machinery - Reduces risks for operators in hazardous areas.
- Automated warning systems – Alerts employees of instability or excessive vehicle proximity.

Checklist

- ✓ Is a robust design and construction of stockpiles being implemented?
- ✓ Are stockpiles risk assessed, assessments documented and control measures implemented?
- ✓ Has a competent person carried out an appraisal of stockpiles?
- ✓ If the appraisal identified a significant hazard has a geotechnical assessment been undertaken and findings implemented?
- ✓ Are safe operating procedures for stockpiles developed and implemented?
- ✓ Are stockpiles incorporated into documented daily inspections?
- ✓ Are stockpile access ramps bunded and the tip edge protected to prevent vehicle roll over?
- ✓ Are loading and tipping operations carried out on safe gradients and in suitable locations?
- ✓ Are employees trained in safe stockpile operations and traffic management controls?
- ✓ Are stockpiles within safe heights and slope limits?
- ✓ Does your traffic management plan incorporate stockpiles?
- ✓ Are control measures in place to reduce dust?
- ✓ Are emergency plans and or rescue plans in place the event of an incident?

Stockpile safety is a critical aspect of quarry operations. By following legal requirements and implementing best practices, quarry operators can protect workers, improve operational efficiency, and ensure compliance with Irish Health and Safety Legislation.

For further guidance, visit the Health and Safety Authority (HSA) website: www.hsa.ie

References and Resources

www.hsa.ie

www.besmart.ie

Safety, Health and Welfare at Work Act 2005

Quarries Legislation and Guidance

Risk Assessments Made Easy

Workplace Safety and Health Management 2006

A Short Guide to The Safety, Health and Welfare at Work Act

A Guide to Risk Assessments and Safety Statements



An tÚdarás Sláinte agus Sábháilteachta
Health and Safety Authority

Health and Safety Authority
Tel: 0818 289 389

www.hsa.ie

ISBN: 978-1-84496-321-8