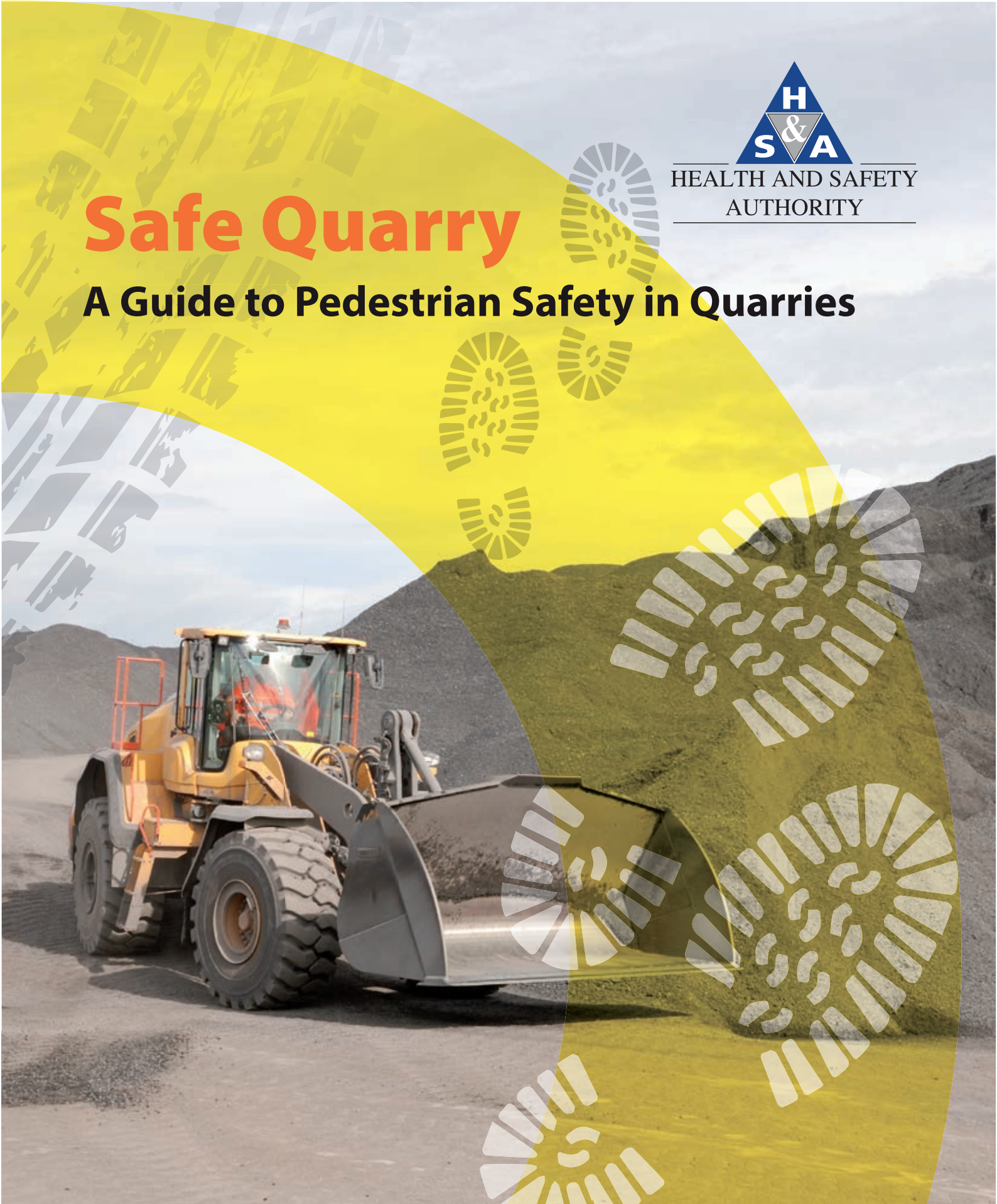




HEALTH AND SAFETY
AUTHORITY

Safe Quarry

A Guide to Pedestrian Safety in Quarries



This guidance has largely been developed from the Quarries National Joint Advisory Committee (QNJAC) "Follow our Footsteps- Guide to Pedestrian Safety in Quarries" document. We acknowledge QNJAC as the original source and thank them for allowing the Health and Safety Authority to replicate and adapt their material.



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1.1 Scope of this guidance

This guidance is for all those with responsibilities for the management of quarries and surface mining operations, including managers and supervisory staff.

Pedestrian safety will be improved where safely maintained vehicles are operated by safety conscious and trained vehicle operators. To operate a loading shovel or a dumper truck at a quarry the vehicle operator must have been issued with and be in possession of a current registration card in respect of the Quarries Skills Certification Scheme.

A site where vehicles are well maintained, have good visibility, trained and competent operators, well designed roadways, and minimised reversing manoeuvres will automatically put pedestrians at less risk of an injury than sites where this is not the case. The interaction between vehicles and pedestrians is potentially dangerous if not well managed.

Therefore, this guidance is intended to deal specifically with the residual risk to pedestrians after specific vehicle safety measures have been introduced and includes consideration of the other hazards on site that impact on their safety.

Pedestrians are still being injured and killed at quarry locations.

Appendix 2.1 of this document contains accounts of what can, and in this case, did happen when a man just went to work as normal on an ordinary day but never made it home safe.

This guidance cannot cover every risk and is not exhaustive, but will highlight those key matters of concern. The risks associated with your particular operation, and the methods of reducing those risks, should be identified during your site specific risk assessment.

1.2 Who is a pedestrian?

A “Pedestrian” in this context can be defined as someone who is on site and on foot but is not in an office, weighbridge or welfare building.

A key task in maintaining and improving pedestrian safety is to identify who the pedestrians are on your site and understanding how they interact with the environment they are in.

Pedestrians are:

- All employees
- All contractors
- All hauliers
- All delivery drivers
- All official visitors (including enforcement officers/regulators)
- All members of the public:
 - Customers/visitors to site
 - Persons using public rights of way that cross through operational areas of quarries (this category might also include cyclists and horse riders)
 - Persons accidentally or deliberately trespassing
- **YOU!**

Pedestrian safety is an aspect of quarry work that will affect everybody in the quarry at some point during any working day.

Each person will have different expectations of how they should behave in relation to vehicles and other hazards on site and the extent to which they understand or perceive the dangers from them.

For example, do not assume that all pedestrians will understand the additional risks posed by large quarry mobile plant such as reduced visibility, variable stopping distances and overriding noise, as they are quite different from the interaction they may have with conventional road vehicles.

1.3 What should site management consider?

Inadequate separation of pedestrians and vehicles can result in fatal or non-fatal injury that could have been avoided by careful planning and proper design of the quarry. Pedestrian safety must be paramount when developing the Operators Vehicle and Traffic Rules as required by Regulation 23 of the Safety, Health and Welfare at Work (Quarry) Regulations, 2008.

When planning and designing a work activity, the Quarry Operator should go through the 'risk assessment hierarchy of control' where in this instance, the first question is "Can the need for some pedestrian activities on site be eliminated or avoided?". Guidance on risk assessment can be found at https://www.hsa.ie/eng/Publications_and_Forms/Publications/Safety_and_Health_Management/Guide_to_Risk_Assessments_and_Safety_Statements.pdf.

This will reduce your areas of concern and enable you to focus on those areas and occasions where pedestrian activity is unavoidable, necessary or likely to occur.

The next step is to identify the hazards on site such as:

- Vehicle movements / proximity to pedestrians
- Underfoot conditions
- Rock faces
- Rock piles
- Blasting practices
- Stockpiles
- Fixed-Plant access / proximity
- Working machinery proximity
- Water's edge issues
- Environmental factors - weather conditions, lighting
- Geo-technical hazards and weaknesses of formation
- Other operational activities (e.g. Plant and Site maintenance)
- Blind spots, poor sight lines
- Dynamic nature of quarry site
- Use of public rights of way within the quarry boundary and public access to the quarry

1.3 What should site management consider? (cont'd)

Then assess the risks from those hazards to the various pedestrian categories on site.

Once this has been completed, you will be in a position to consider the reasonable practicable level of protection required to provide the necessary controls.

These will include:

- Physical segregation of pedestrians and vehicles, barriers or rerouting of pedestrians to avoid hazards
- Mark-out and sign the vehicle, pedestrian and hazardous areas
- Mark-out and sign crossing points for both drivers and pedestrians
- Instruct, inform and alert both drivers and pedestrians about routes, rules and layout. Consider site inductions, tailored brief-inductions, toolbox-talks, maps, leaflets and signage
- Effective communications – radios, hand signals
- Appropriate PPE, who provides it and what standards of wear are expected on your site (see Appendix 2.3)

1.4 What should site management do?

The following list is not exhaustive, but highlights some of the key actions required.

- Design a scheme for the safe management and movement of pedestrians on site.
- Thoroughly review your existing arrangements and check where improvements can be made.
- Organise the site such that vehicles and pedestrians can move around safely, effectively and are not 'free-to-roam'. Arrangements should be such that persons are fully aware of the environment they are in but are suitably warned and protected from the hazards in it.
- Implement routes for persons and vehicles such that they are of suitable construction, number, size and location and incorporate the following principles:
 - Provide separate entry and exit points for pedestrians only.
 - Provide firm, level, well-drained walkways that take the most direct available route.
 - Provide clearly signed and lit crossing points where drivers and pedestrians can see each other easily.
 - Provide clearly signed restricted walk areas where permission has to be sought to enter due to increased hazards.
 - Ensure walkways remain unobstructed and are not awkward to negotiate.
 - Ensure they are sufficiently clear or protected from any risk of being struck by falling materials.
 - Ensure they are sufficiently clear of unstable or potentially unstable ground.
 - Ensure they are not susceptible to rapid deterioration under adverse weather conditions.
 - Provide a physical barrier between walkways and roadways wherever practicable.
 - Tackle unsafe and distracting behaviours such as uncontrolled use of mobile phones or stopping for a chat at whatever point persons happen to meet.
 - Ensure public rights of way are managed.

1.4 What should site management do? (cont'd)

- Provide simple and clear rules that both pedestrians and drivers can follow that are relevant to their tasks on site and support the existing Site Rules.
- Provide suitable information, instruction and direction that is easily understood and recognised by your target audience.
- Consider working with local authorities to re-route public rights of way outside the quarry boundary so that one-way systems can be introduced.
- Ensure awareness is maintained via any suitable and available means (e.g. Toolbox Talks, Safety Bulletins, Safety Stand-downs, poster campaigns, ongoing training courses / presentations).
- Inspect and maintain the arrangements you have made.
- Review your arrangements at regular and suitable intervals.
- Be able to demonstrate you have gone through this assessment process and it has been properly reviewed.



1.5 Who do you involve?

Depending on the person's role, task, experience and reason for being on site, their view of what is 'safe' will vary considerably. This makes it vitally important that the workforce, which includes everybody who works at the quarry, plus representatives from the other pedestrian groups mentioned above,

are involved and engaged in the planning, design and implementation of measures to improve pedestrian safety. This gathering of views and differing perspectives may take a little time but will ensure the development of a more robust plan that works for everyone.



1.6 When to review?

Quarry operations are dynamic environments. Regular reviews by site management in line with current regulations and company policy is required. Other triggers for a review include:

- Alterations to stocking, excavation and tip arrangements
- Temporary works
- Changes in activity levels
- Construction activities
- Changes in mobile plant
- Incidents and near misses
- Seasonal conditions
- Unusual weather conditions
- Workforce feedback

2.1 Fatalities - Case summaries

This is what can go wrong when vehicles and pedestrians are not segregated.

On a Saturday morning a foreman and quarry operative were processing materials in a small quarry. Following a midmorning tea break together in the canteen near the quarry entrance, they both set off to return to the working quarry. The quarry operative drove his front-end loader and the foreman walked along the haul road to his 360-tracked excavator. This was something they had done several times a day for over six years. It was a bright sunny winter day with the sun very low in the sky. As the quarry operative drove the front-end loader forwards along the quarry floor to the processing area, towards the low sun, he did not see the foreman and drove over him. The foreman never recovered consciousness and later died of his injuries.

At another location, a loading shovel operator was transporting sand in the raised bucket that was restricting his visibility; he was travelling down a sloped roadway running past the fitter's workshop. One of the fitters came out of the workshop door into the roadway and the loading shovel struck him. The loading shovel operator was unaware he had struck the pedestrian who was killed instantly. The route taken by the loading shovel operator was not the route he should have taken. The recognised route would have avoided travelling past the fitter's workshop.

This incident highlights the importance of segregating pedestrians from quarry traffic and why you should tackle it now!



It is vital for each quarry to establish safe pedestrian access routes and ensure that plans and rules are communicated to both drivers and pedestrians and that they are monitored, enforced and regularly reviewed.

2.2 Illustrated examples of improvements to pedestrian safety controls on site



Keep pedestrians safe where you work



Warn them



Control them



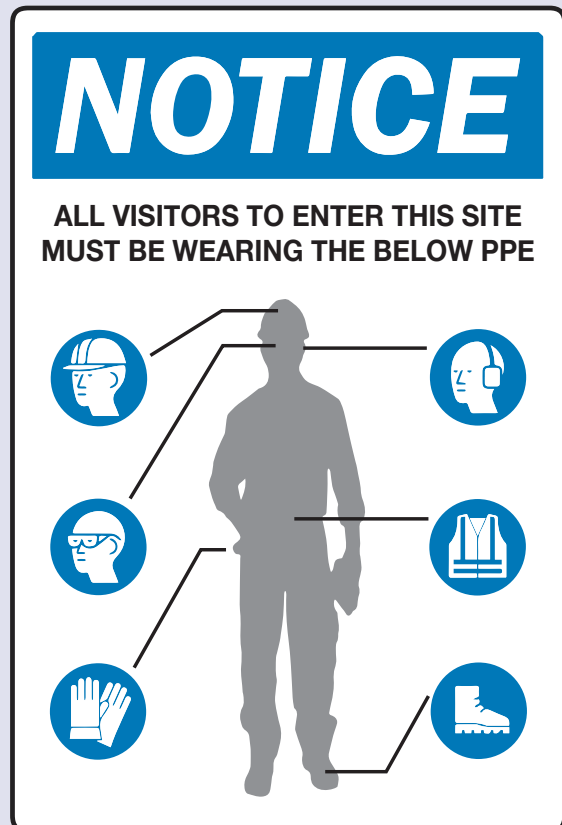
Equip them



Stay with them



2.2 Illustrated examples of improvements to pedestrian safety controls on site (cont'd)



2.3 Personal Protective Equipment (PPE) for pedestrians

Site Rules normally require pedestrians to wear a Safety Helmet, Safety Boots and Hi-Visibility (Hi-Viz) clothing as a minimum. There are often areas within the quarry where additional personal protective equipment (PPE) is required such as Safety Glasses, Hearing Protection and suitable gloves. It is good practice to have all these items on your person so you are equipped to enter areas of the site that require these additional items.

It is important to note that Hi-Viz clothing is the last line of defence in preventing incidents between vehicles and pedestrians. In a collision, it will not protect against injury, and should not be relied upon to always make you visible to vehicle operators. They may not see you for all sorts of reasons, such as being distracted, or having vision temporarily impaired by, for example, bright sunshine, reflections from surface water, or you not being in their direct line of sight.

However:

Hi-Viz clothing of the appropriate standard is the front-line of pedestrian visibility PPE on site and must always be worn according to site rules and where persons would be at risk when not clearly seen by others such as vehicle drivers, fixed-plant operators, fitters, supervisors and colleagues.

PPE must be maintained and kept in good order and replaced when appropriate. It should never be considered acceptable to

wear poorly maintained high visibility clothing. We should not accept that grubby and poorly maintained high visibility clothing is ever a “Badge of Honour”.



Fitters, for example, due to the nature of their work, may well need to change outer workwear more often in order to maintain the effectiveness of high visibility clothing.

It is important to assess this type of activity against the clothing provided. More frequent laundering, additional spare sets over and above that issued to other trades on site should be considered.

2.3 Personal Protective Equipment (PPE) for pedestrians (cont'd)

It is also most important to consider the contrast in colour between Hi-Viz PPE and a given background. DO NOT ASSUME that a bright yellow or orange will ALWAYS stand out against any background. Each site will have its unique shades of whatever minerals are being processed there, so consider the contrast.

The same goes for faded PPE, in that it may have started as a stark contrast to its background but when dulled over time, will often blend dangerously with its background.



This photograph illustrates how dulled PPE can start to blend with the background.

In addition, note that particular weather conditions can also alter a backdrop such as low, bright sunshine or glare off a water or icy surface.

This photograph illustrates how the light source behind the high visibility clothing reduces the effectiveness of the reflective material.



2.3 Personal Protective Equipment (PPE) for pedestrians (cont'd)

These two photographs show the effect of glare from a wet surface.



NEVER ASSUME YOU WILL AUTOMATICALLY BE SEEN BY OTHERS

JUST BECAUSE YOU CAN SEE THEM – IT DOES NOT NECESSARILY MEAN THEY CAN SEE YOU

WHEN APPROACHING VEHICLES ON FOOT ENSURE YOU FOLLOW THE SITE VEHICLE APPROACH PROCEDURES AND GET VISUAL CONTACT AND ACKNOWLEDGEMENT OF YOUR PRESENCE BEFORE PROCEEDING

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