



**Temporary Works  
forum**

Promoting best practice in  
the construction industry.

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## Stockpiles

A number of responses were received from members in reply to the following question:

- Q. Could you please inform me of the size of stock pile that requires a temporary works design? We were recently asked during an audit if we had a temporary works design for a stock pile on site.**

## Introduction

The two main types of stockpile are:

- Granular materials that are not normally contained and change in loading, shape and size as the material is used. This type of stockpile is also subject to additional loads from machines removing material from the pile and often weather conditions.
- Solid construction materials, e.g. bricks and similar materials on pallets, precast units, timber and steel sections. These materials will be generally sourced by crane or fork lift truck and are easier to assess for loading conditions.

## Extracts

The following extracts are from responses made by members:

1. Stockpiles are a particular problem on soft clays.
2. Size is not the only factor which determines the design requirements for a stockpile. You also need to consider:
  - material;
  - compaction;
  - location (e.g. relative to site boundary, site compound haul routes, etc.);
  - duration that the stockpile will be in place;
  - requirement to access around and on the stockpile;
  - ground conditions; and
  - presence of buried services below the stockpile, etc..



What is important is that the Temporary Works Coordinator (TWC) identifies a stockpile as 'temporary works' and then takes appropriate steps to manage the associated risks at design stage and also during construction and maintenance.

3. It depends on circumstances: risk, materials and potential for collapse, not size. Stockpiles can be just as prone to collapse and injury as other temporary works.
4. Stockpile stability is like any other form of temporary slope stability. It must be designed. At what height a stockpile needs managing and designing is a question that needs to consider:
  - The type of material in the stockpile?
  - How it is placed in the stockpile?
  - How susceptible is the supporting ground to potential bearing/slip failure?
  - What plant is being used to place the material on the stockpile?
  - Quality of supervision?
  - The consequence of failure of the stockpile?

We have provided stockpile management for stockpiles as low as 3m in the past, and obviously the larger/higher they get the more design, control, supervision and management is required.

5. Stockpiles of material (spoil, topsoil, etc.) are definitely 'temporary works':
  - All stockpiles are temporary by their very definition.
  - They all require some design input (the lower risk ones less so than the higher risk ones).
  - The effort required all depends on the context. The TWC needs to ask themselves what would happen if the stockpile failed; how many people would get injured, killed?
  - If the stockpile has the potential to injure or kill people then it must be on the 'Temporary Works Register' and the proper management controls applied.
  - Higher-risk stockpiles, e.g. 10m high adjacent to an in-use school playground, should be designed and have a Cat 3 design check.
  - Lower-risk stockpiles e.g. 1m high with a fenced off 2m exclusion zone all around, should be designed and may – for example – have a Cat 1 design check.
6. The measures required should be determined by **risk assessment** and subject to design if a collapse can cause injury. There are two issues: Firstly, the construction and stability of the pile. Secondly, the effect of the pile on the ground and local structures.



7. For the construction of the stockpile there are issues of:
  - the stability of the side slopes and what an appropriate factor on that is;
  - how the pile is constructed and accessed (as large dumpers or dump trucks accessing a heap have significant overturning effects); and
  - how the pile is managed (and the loads from excavators on the pile when it is being constructed and trimmed).

For the effect on the ground, the stockpile is effectively a surcharge load with a construction surcharge on top of this. Geotechnically, the materials are generally loose and not fully compacted and there are similar issues with water within the stockpiles. There is a perception that stockpiles cannot accumulate water within them, but this is not the case and it can be a significant hazard.

8. A temporary site stockpile should be risk assessed on the basis of its potential to cause harm or damage. This assessment should determine whether a temporary works design is required or not.
9. One thing for certain, you can't simply state a limiting factor on the size of the stockpile as to whether it needs design input or not.
10. On confined sites no design should be accepted that involves building a stockpile at or steeper than the angle of repose. All designs should be based on angle of repose plus an angle reduction factor to create a factor of safety. Where wheeled vehicles may gain access the design should consider compaction, running surface material and side edge protection (to prevent plant driving over the edge). Design detail and control measures will be needed if wheeled plant is expected to tip over an edge (under most situations dumper skips should be emptied on the flat and the material double handled from ground level or over the edge by tracked plant).

Note that the need for side edge protection for wheeled plant can compromise natural drainage and the design needs to consider how drainage will be ensured and maintained. Method and sequence of reduction must not create temporary vertical or near vertical faces, even where relatively shallow benches are worked. Worth a reminder that collapse and spillage from a large waterlogged stockpile is akin to a landslide situation and material can run for a considerable distance.



11. All stockpiles should be individually risk assessed first. Our view is that, traditionally, stockpiles do not normally need formal design unless they are at risk of compromising the health and safety of personnel and/or damage to third party assets.

Many stockpiles are transient, constantly changing shape, profile and condition, which make them difficult to manage through any temporary process. Therefore, where there are health, safety and asset damage risks, then we would recommend that the company's safety process is followed to ensure safe working activities. The health, safety and environmental mitigations could include controls on, for example:

- specific plant used;
- competency of plant operators;
- specific risk assessments;
- rigorous method statements;
- slope protection;
- slope inspections and monitoring;
- toe drainage;
- barriers to catch debris; and most importantly;
- exclusion zones.

## Recommendations

The feedback from the members includes a great deal of experience and highlights many issues that need to be taken into account when assessing the safety of stockpiles:

- ground bearing capacity;
- stockpile stability;
- any buried services;
- any underground structures creating voids.

This is a limited review of stockpiles but from the responses it is evident that to ensure that health and safety issues are fully addressed, all stockpiles should be **risk assessed**. This may take the form of a visual assessment or a detailed calculation depending on the recommendation of the Temporary Works Coordinator. It should also be carried out irrespective of material type and size.



## Useful references

Working on stockpiles

[https://www.ihsa.ca/pdfs/safety\\_talks/working\\_on\\_stockpiles.pdf](https://www.ihsa.ca/pdfs/safety_talks/working_on_stockpiles.pdf)

Management of tips and stockpiles

[http://www.hsa.ie/eng/Your\\_Industry/Quarrying/Stockpiles\\_Tips\\_and\\_Lagoons/Management\\_of\\_Tips\\_and\\_Stockpiles/](http://www.hsa.ie/eng/Your_Industry/Quarrying/Stockpiles_Tips_and_Lagoons/Management_of_Tips_and_Stockpiles/)

Health and safety at quarries

Quarries Regulations 1999

Approved Code of Practice and guidance

Health and Safety Executive (HSE)

L118 (Second edition) Published 2013

<http://www.hse.gov.uk/pubns/priced/l118.pdf> (pp61 and 62)

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