

Managing risk from drops

This paper considers options for controlling the risks arising from unprotected drops. These may be natural hazards, such as cliffs; or man-made hazards, like drops from battlements, fortifications and other historic structures. Hazard means anything that can cause harm. Risk is the likelihood, high or low, that somebody will be harmed by the hazard.



Cliffs at Rhossilli, Gower

We follow the VSCG guiding principles. These stress the importance of considering, first and foremost, risk control measures that do not restrict public access or conflict with heritage and conservation objectives. In consequence it is neither desirable nor practicable for all drops to be eliminated or fenced.



York city walls

Society accepts the existence of unprotected drops in public places. Traditionally people have been free to walk alongside unfenced quaysides, lock sides, city walls and cliff tops.



Cliffs at Rhossilli, Gower

The very nature of our countryside means that eliminating the hazard is unlikely to be practicable. For example, we would not wish to remove dramatic cliffs and crags from the landscape, nor deny access to them.



The Cobb at Lyme Regis

Similarly heritage and conservation considerations usually mean it is unreasonable to remove the hazard of drops from historic buildings. It is usually not permissible (or desirable) to alter scheduled monuments and listed buildings by erecting barriers or fences.

In consequence, although we believe that our recommendations are consistent with the principles of prevention established by health and safety legislation (S.I. 1999 No. 3242 The Management of Health and Safety at Work Regulations 1999 Schedule 1), it is often inappropriate to eliminate the drops or deny public access. The final choice of risk controls therefore reflects the difference between managing risk for people using the countryside for sport and recreation of their own free will, and the duties of an employer to his employees in the workplace.

Risk assessment

1. First, identify the hazards.

We are focussing on the natural hazards of unprotected drops (such as cliff edges) and the man-made hazards of unprotected drops (such as found at fortifications and other historic structures).

Look for other contributing hazards such as:

- Worn steps and stairs, uneven paths.
- The condition of the edge. Is it solid, slippery, crumbling, or shelving?
- Are there any trip hazards near the edge that could lead to a fall?
- Parts of the path or steps that are narrow, especially where there could be pushing.
- The effect of weather conditions such as high wind, poor visibility and icy surfaces.

2. Consider who might be harmed and how.

You need to know a lot about your visitors to judge who could be harmed. How many? Their age and experience. What activities take place? Where and when? Are visitors able to gain access when it's dark? Is there any supervision?

3. Evaluate the risk.

Consider how likely it is that the hazard would cause harm.

Think how visitor behaviour affects the risk:

- How close is the drop to visitor car parks and paths?
- Is the drop obvious?
- Are there any attractions, like viewpoints, that might draw people (especially children) to the edge?
- Are there places where there could be pressure from crowds of people?

Consider the severity of the likely consequence:

- How far will someone fall?
- What is the nature of the landing ground?
- How easy is it to effect rescue or bring in emergency services?

Slips, trips and falls are the most common accidents. Falls from height will almost always result in serious injury unless the landing is very soft or the height not great.

Consider the site location with reference to the [VSCG risk control matrix](#). It is reasonable to expect visitors in remote, wild or mountainous areas to be aware of the hazards around them and have high levels of personal safety skills. There would be few, if any, risk control measures introduced in these extreme environments. At the opposite end of the scale, in a managed urban site, fully accessible to children, it is reasonable for visitors to expect very low levels of risk.

Options for risk control

First consider whether your risk assessment indicates the need for action. The law requires you to ensure, as far as is reasonably practicable, that members of the public are not put at risk. You must be able to demonstrate that your precautions are reasonable in the circumstances. But what determines this?

You should take into account not only the likelihood that someone may be injured, and the seriousness of the injury which may occur, but also the social value of the activity which gives rise to the risk, and the cost of preventative measures. Cost is not simply the money that would be needed for prevention. It is also the cost to society in the loss of amenity, and loss of personal freedom. These factors need to be balanced against each other. A recent case, which went to the House of Lords ([Tomlinson v Congleton BC \[2004\] 1 AC 46](#)), helps to confirm this. In it, Lord Hoffmann said “it will be extremely rare for an occupier of land to be under a duty to prevent people from taking risks which are inherent in the activities they freely choose to undertake upon the land. If people want to climb mountains, go hang-gliding or swim or dive in ponds or lakes, that is their affair.”

It therefore may not be reasonable to introduce risk controls that restrain people’s freedom to enjoy access to open cliff tops or deny a sense of adventure in exploring a ruined castle. It is necessary to take into account the social value of the activities that would have to be prohibited in order to reduce or eliminate the risk. People’s mental and physical wellbeing is enhanced by active recreation in the countryside.

The assessment may show that the level of risk is already as low as is reasonably practicable and therefore no new risk controls need to be introduced.

If further risk reduction is desirable, you may choose a single technique or implement a combination of controls selected from a hierarchy of risk control options. These include hazard elimination or reduction, access restriction, information and education, supervision, and emergency response procedures. As it is frequently impossible to eliminate or fence drops, making sure that visitors are aware of the hazard is often a significant component of risk control.

When evaluating possible controls bear in mind what effects they will have on other activities and conservation. The degree and choice of risk control will vary with the particular nature of the site and its visitor profile. The various control options are described below.

1. Eliminate the hazard

Physically remove the hazard if it is reasonable and practicable. You may, for example, be able to build up the ground level below a walkway and thereby eliminate the drop, or reduce the height of a possible fall.

In many situations, (for example coastal cliffs and castle ramparts), removing the hazard is simply not an option.

2. Minimise risk of exposure to the hazard

You might be able to lessen the risk of falls by establishing clearly marked paths that lead visitors away from unprotected drops. However, there are many public rights of way and coastal paths where this might not be reasonably practicable.

In historic sites it might be possible to deny access to routes alongside drops, without lessening the overall enjoyment of the monument.

3. Physical control measures

Case law suggests that you do not necessarily have to fence natural hazards if the danger is obvious.

Case Law Judgement A natural, physical feature of the land, the dangers of which are plain, does not require to be guarded by protective measures, despite being capable of causing danger to careless persons. It is reasonable to expect the visitor to be aware of sudden drops. "To hold that this embankment constitutes a concealed danger which ought to have been fenced would in my view defy common sense. The logical extension of such a finding would be that every path along an embankment or cliff edge would require to be fenced in order to guard against a fall by a person going too near the edge and losing his footing"

Judgement in John Malarkey Duff v. East Dunbartonshire Council and others, 1999, ScotCS 114

If access rights on your land (in England and Wales) have been created by the Countryside and Rights of Way Act 2000, you cannot be sued for injury caused by a natural feature. (For more detailed information on this Act visit <http://www.openaccess.gov.uk>.)

When you are thinking about using a physical barrier to minimise risk of contact with a drop, you should take into account the following factors:

- What is the purpose of the barrier? Is it just to visually mark the hazard or is it designed to physically exclude people? Is an existing fence intended to contain livestock rather than protect people?
- Is the visual impact of the barrier acceptable?
- Could dense, prickly planting provide an alternative to fencing?
- If fencing is not practicable (e.g. due to unstable ground), can hand rails be provided to allow visitors to have something to hold on to?
- Beware of fencing designs that stop adults but allow toddlers to get through.
- Would a fence or wall be an invitation to climb or sit on, and thereby create a hazard? (You may need to cap walls to discourage this.)
- Would it draw people closer to the edge?
- Would fencing attract people to loiter and engage in anti-social activities?
- Would it create hidden areas, away from the supervision and presence of responsible adults?
- You must apply your solution consistently. If you decide to fence one drop, then visitors would reasonably assume that similar hazards elsewhere would also be fenced. This does not necessarily mean that all drops would be treated the same. There may be variations in approach, justified by differences in zoning according to the risk control matrix.

Consider what risk controls are applied on neighbouring property and similar sites elsewhere. It is important that visitors know what to expect.

- Do you need signing to explain what is and isn't fenced? For example, you may decide to have barriers only where there could be crowd pressure near drops at view points or pinch spots on a route.
- Ongoing maintenance responsibilities. You will need to inspect regularly and ensure there are no gaps in fencing or planting that could create hazards. You must keep a record of these inspections and any actions taken as a result.
- The safety of people who are working near drops on the site, particularly when erecting and maintaining the barriers. (The Work at Height Regulations 2005 may require additional temporary protection to be provided.)
- Is there a specific statutory requirement to fence? For example the Mines and Quarries Act 1954 and Quarries Regulations 1999 specify that a quarry, whether or not it is being worked, which is accessible to the public and which constitutes a danger to them, should have an efficient and properly maintained barrier to prevent people falling into it. Similarly, the entrance or shaft to an abandoned mine, which because of its accessibility constitutes a danger to the public, should be efficiently closed off and the closure properly maintained. (This duty does not extend to mines, other than coal mines, which have not been worked since 1872.)

If you decide that a barrier is necessary, the type that you choose will be influenced by the nature of both the risk and the environment. Consent is required for measures that affect ancient monuments, scheduled for their irreplaceable archaeological or historical value and buildings listed for their outstanding architectural value. Conservation areas, areas of outstanding natural beauty and sites of special scientific interest all require special consideration. A detailed analysis of different types of barrier is provided at the end of this paper.

Take care that risk control measures put in place to safeguard one group of visitors do not put other users at risk. For example, barriers erected to keep spectators away from drops at locks on canals and rivers, could create hazards for boaters using the locks.

4. Inform and educate visitors about the risks

The risk of exposure to harm may be minimised by informing visitors of hazards. Well-designed safety information can:

- alert visitors to the nature and severity of hazards and risks
- give visitors the knowledge to decide for themselves the risks to which they are likely to be exposed, and the precautions they should adopt
- impart information about the nature and extent of risk control measures provided by the owner or manager of the site
- let visitors know what is expected of them, on the understanding that they share responsibility for their own safety

When you are developing safety information, consider:

- Who is the audience for the information? Do you need to provide information that is targeted at specific types of visitor, like people new to the site, visitors

from urban areas, particular age groups, people pursuing different sports or activities, and so on?

- How is the information going to reach that audience?

1. Before they come on site. Consider:

- information on web sites
- posters or leaflets in Tourist Information Centres
- recorded telephone information lines

2. On arrival at a ticket office or in a visitor reception area. Consider:

- verbal warnings
- information printed on tickets
- guide books, leaflets, posters and information boards

3. On arrival at a car park or other access point.

- signs, notices and information boards

4. At the hazard itself.

- signs, notices and information boards

One of the VSCG guiding principles is to ensure that your visitors know the risks they face. There should be no nasty surprises. But you do not necessarily need to take further action if the dangers are obvious.

Case Law Judgement A man, injured falling from a cliff at High Tor, Matlock, failed to prove that the landowner was negligent in failing to erect notices warning of the danger.

Cotton v Derbyshire Dales District Council, Court of Appeal, 10 June 1994

Case Law Judgement A boy was injured falling from the flat roof of a low building at Darell's Battery, Landguard Fort, Harwich Harbour. The building was part of a site in the care of English Heritage and accessible to the public. The judge ruled that as the hazard was obvious, there was no breach in the duty of care in leaving it accessible.

Conner v Historic Buildings & Monuments Commission, 15 September 1997, IP506407



Where a drop is severe and unexpected, warning signs (and/or fencing) may be essential at the hazard itself.

Emergency response

You should consider what would happen if people did fall and were injured. How could you ensure the prompt attention of emergency services? What are their access points? How can you get people out?

You should have a written set of procedures that should be familiar to any staff and volunteers working on the site.

In wilder settings where there are minimal site facilities and visitors are left to face significant hazards on their own, emergency response may be an important part of the risk control hierarchy. Visitors need to be informed of the actions necessary to initiate emergency rescue procedures, and you still need to have your own emergency plans in place.

In remote places, particularly in extreme weather conditions, it might not be possible to immediately initiate rescue. In such circumstances, visitors, such as mountaineers, should expect to be wholly responsible for their own safety.

Types of barrier

We discuss the merits of different types of barrier below. It is intended as general guidance and the list is not comprehensive. Local circumstances and, in particular, your risk assessment will help determine the most appropriate solution.

Security fence



Railings at Dover Castle

The ultimate protection would be security style palisade with fluted vertical metal bars, tipped with spikes. A more visually acceptable style may be traditional vertical railings at least 1500mm high with pointed tips. Either of these may be suitable at a perimeter where there is a significant risk of falls, especially of trespassers.

Metal railings

Where aesthetic values are important traditional style railings may be chosen. For most situations a height of 1.1 metres will be necessary, but where existing historic railings are in place a height of 900mm may be acceptable. (Note: for safety reasons on lower fences, if there is a danger of people being impaled, pointed tips should be rounded off.)

Horizontal railings



Carlisle Castle

These will normally be of a plain square metal bar construction with square uprights, or of round bars fixed in flat iron uprights. The use of horizontal rails is questioned sometimes due to the ease of climbing. This risk can be significantly reduced by the top rail being canted inwards, making climbing very difficult. The closeness of the rails should be decided on a risk assessment of the type of visitor at risk – where very small children are likely then the lower rails should not have gaps of more than 100mm.

Wire fences



Dover Castle

These should normally be 1.1 metres high and have wires not more than 100 mm apart. The wires should be strained taut with tensioning devices at regular spacings.

Stainless steel or galvanised cable is a popular choice but may be expensive. Mild steel wire is a cheaper alternative but can look untidy if not kept taut. Barbed wire should not be used where visitors are likely to be near.

Timber fences



These tend to be used as barriers rather than safety fences as they would be easily climbed and usually have horizontal rails with wide spacing. Strained wires can be

added between and under rails to close the gaps. Fences of vertical timber palings are an alternative.

Temporary chestnut paling and wire fencing may be appropriate as an interim measure and is often used in association with planted hedges, prior to them becoming established.

Wire mesh



Wire mesh may be decided upon to increase safety of fences and railings. The gauge should be 50mm or less to make it difficult for children to get a toe-hold for climbing.



Clifford's Tower, York

Mesh can be stapled onto timber rails or made up in sub-frames to be inserted in metal railings.

Simple pole barriers



Pendennis Castle

Where risks at drops are not severe it may be satisfactory to rely on single horizontal poles mounted on posts at waist height. Signage may be needed to emphasise the hazards beyond.

Walls



Beeston Castle, Cheshire

Where a wall may once have existed it is often more visually acceptable to rebuild to protect a drop. Conservation inspectors may argue that it is not appropriate to rebuild walls where historic detail is not known, but it is certainly a less visually intrusive means of guarding a sheer drop.

Where openings in walls exist, either as crenulations or former window openings, it is usual to fix bars or sections of railings. Spacing of bars should be as detailed above.



Wall surrounding dangerous mine shaft, North Cornwall Coast

The wall acts as a deterrent, designed to blend more with the natural landscape, but inside the wall is an additional post and wire fence to prevent access to the shaft.

Planting

Dense thorny planting is an effective means of deterring people from approaching hazardous areas. This needs to be regularly managed and may need temporary fencing in place until the vegetation is sufficiently dense.

Stone surfaces



Studley Royal

In some cases, uneven stone surfaces can serve as a means of deterring access.



At Studley Royal, for instance, access to a 2.5 metre drop from the roof of a grotto is made difficult by the inlaid stone surface.

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