

A close-up photograph of a safety net. The net is made of thick, yellow and teal ropes knotted together in a grid pattern. The background is blurred, showing hints of a construction site with various colors.

## Reach new heights of safety

**Roofs are an inevitable part of any building, so it pays to minimise the risks associated with working on them. This guide shows you how.**

**Working at height poses a significant risk to construction and maintenance workers, with falls accounting for half of all fatalities in our industry. But roof work also involves other risks, including those associated with handling roofing materials, and the danger of a roof collapse.**

**Designers play an important role in helping to manage these risks, so that working on roofs can be as safe as possible. In this guide, we offer advice about how to design your project so that the risks associated with roof work are kept to a minimum.**

**Life outside the tick box.**



## The construction phase

It is inevitable that workers will need to access a building's roof during the construction phase of a project. In consequence, designers should provide systems that help contractors to manage the risks.

### ***Workers falling from roofs***

There is a clear risk that construction workers will fall off the advancing unprotected leading edge of a roof that is in the process of being built. Designers can help reduce this risk by:

- **Including anchor points for safety nets in their design**
- **Making provision for Personal Protective Equipment (PPE) to be anchored on structural members**
- **Ensuring, where possible, that items like service ducts are not located in the deflection zone of fall-arrest systems**

Designers may consider incorporating parapets into their design, and ensuring that they can be installed at an early stage in the construction process. Parapets provide protection for contractors – such as those fitting and maintaining mechanical and electrical plant – who subsequently work on the roof.

### ***Collapse during construction***

A further fall-risk relates to the potential for a part-built roof to collapse while construction workers are on it. One factor in this is its ability to carry loads that are heavier than those needed in the final design.

For example, although a single roof sheet is fairly light, a large stack of sheets has a significant weight. By ensuring that roof structures can bear the load of accumulated building materials, designers can help reduce the risks associated with premature collapse.

### ***Deliveries of supplies***

Ideally, a crane should be able to reach every part of a building during the construction phase. This may affect the building's footprint and location.

Use of a crane makes it easier to deliver building materials to the roof, thereby reducing the need for construction workers to carry them at height.

Even so, roof sheets inevitably have to be manoeuvred into position manually. So designers should consult with suppliers to source materials that minimise the risks associated with manual handling.

When it comes to storing materials, scaffolds should incorporate high-level loading and storage bays that are fit for purpose.

### ***Weather conditions***

Be mindful of the impact of weather conditions on the storage and handling of large sheets of roofing material.

For example, strong winds can make it very difficult to handle large roof sheets, and this can pose a significant risk to contractors. Moreover, building materials can blow away in strong gusts and cause injury to passers-by.



## The maintenance phase

If possible, designers should eliminate the need for maintenance workers to access roofs.

### ***Minimising the need to access roofs***

Designers should try to minimise the number of items on a roof requiring ongoing maintenance. Various strategies can be used to achieve this. For example:

- **Vent stacks can be routed through the side of a building, rather than through its roof**
- **Exhaust flues can be combined into a single vent**
- **Systems can be designed to ensure that process by-products are dissipated well above the roof line, to minimise the need for regular cleaning**
- **Alternatives can be found for materials whose manufacturer's guarantee requires annual inspections**
- **Guttering can be positioned to enable cleaning from a cherry-picker, or an alternative safe access route**
- **Durable seals and details can be specified for roof joints, so that repairs are needed less frequently**
- **Robust structural details can help protect against damage from wind**

### ***When access to roofs is essential***

Items needing regular maintenance should be located at least four metres away from the edges of roofs. This makes it unnecessary for people to work close to the edge, and impossible to carry out the work from a ladder.

Dedicated walkways should be designed to enable access to items requiring routine maintenance. These should be non-fragile and non-slip for the life of the roof, and include either a handrail or a horizontal line to which a lanyard can be attached.

If dead weights are used to anchor horizontal lines, be sure to specify a roof structure that can support them. Use work-positioning rather than fall-arrest systems wherever possible. On a pitched roof, to which access is essential, the pitch should not exceed six degrees. There should be dedicated access points and walkways, with handrails, to the work area.

Gables and eaves present a further fall-risk to maintenance workers. Where parapets do not feature in a design, brackets should be provided to which temporary edge protection can be fixed. Suppliers of such protection will be able to advise on what is needed to secure their products.

### ***Designing safety into gutters***

Gutters need regular cleaning. And with that comes regular exposure of maintenance workers to the risks associated with working at height. Try to minimise this risk by designing a solid base around eaves gutters, which will enable the use of Mobile Access Towers (MATs).

Where this is not an option, provide ladder-tying points at two-metre centres close under the gutter. You should also ensure there is a hard and level base for the ladder, stretching the full length of the gutter.

If your project utilises valley gutters, you might consider making them strong and wide enough for people to walk in. Where possible, be sure to specify a non-fragile Advisory Committee for Roof Safety (ACR) Class B roof assembly for an upslope distance of two metres either side of the gutter.

Designers should provide dedicated access points for all gutters, making sure they are suited to the method of cleaning that has been adopted.

**Life outside the tick box.**



### **Falling through roofs**

The most reliable way of ensuring that workers do not fall through roofs is to specify a non-fragile assembly. Remember to consult suppliers in order to source materials that satisfy the ACR's non-fragility classifications (ACR [M]001:2000). Liners and top sheets need to be individually non-fragile.

If you cannot avoid the use of fragile roof assemblies, be certain to design in systems that enable them to be cleaned and maintained safely.

### **Roof lights**

Roof lights should never be walked on, as this can damage the surface and impair light transmission. They should be laid out to facilitate cleaning from opaque areas of a roof, and in such a way that movement across the roof can be in straight lines.

If you use roof lights in your design, establish how weathering will affect their colour, and the colour of other roofing materials. That way, you can avoid them blending in with each other over time, ensuring that they can be clearly distinguished for the life of the roof.

Roof lights should never be within two metres of an edge, or located less than two metres away from items requiring maintenance.

## Providing information

It is important to keep construction and maintenance workers informed of the potential hazards relating to roof work on your project. Designers should provide contractors with detailed information concerning risks, so that they can safeguard their workforce.

Make sure all hazards that are part of your design are given visual warnings. You can use poppy-red fixings to draw attention to hazards such as roof lights and non-walk areas.

By following this guidance, you can help reduce the number of accidents resulting from work on roofs.

## Roofing 1-2-3

There are three basic types of roof:

- **Low-maintenance roofs:** these do not need to be accessed very regularly – and when they do, it can be via a ladder or MAT. The minimum ACR non-fragility standard for such roofs is a Class C assembly
- **Medium-maintenance roofs:** these require regular access for maintenance, but only by experienced roof workers. The minimum ACR non-fragility standard for medium maintenance roofs is a Class B assembly
- **High-maintenance roofs:** these require frequent access for maintenance. They carry a minimum ACR non-fragility standard of a Class B assembly

## Location, location, location

It is worth remembering that even non-fragile assemblies can be made fragile in certain environments. Coastal areas and industrial areas where pollution is high can exacerbate corrosion, and cause non-fragile materials to weaken.

Likewise, a building used for industrial processes can be prone to fragility, because of the harmful by-products of production. The same is true of animal housing.

Keep the location of your building in mind when designing it, therefore. That way, you can be sure to use materials that will remain non-fragile into the future.



## Useful resources

ACR [M]001: 2000 – Test for Fragility of Roofing Assemblies (ACR)

ACR [M]001: 2003 – Recommended Practice for Work on Profiled Sheet Roofs (ACR)

HS(G) 33 – Health and Safety in Roofwork (Health & Safety Executive)

## See elsewhere on SID:

**CON301 Manual handling and vibration**

**CON306 Temporary works**

**CON302.1 Crane information**

**CON307 Fall prevention by design**