

Health and safety expert panel - Designing for health – Guidance for designers

Designing for health: Roof work: Maintenance and repair

Introduction

All designers will recognise the potential for harm when their design involves construction, maintenance or repair relating to roofs or items on roofs.

This note concentrates on maintenance or repair of items requiring access onto roofs and is written to enable a consistent approach to the risk management of such work.

The Designer 'owning the design risk' will be the specifier/designer of the items: these items may be M&E plant, ventilation cowls, drainage sumps and the like.

NOTE This example is designed to provide further information to assist the designer when considering the HSE guidance (L153) paragraph 86.

Example

The following example is used to illustrate the principles of appropriate risk management and decision making.

Air Handling Units on a flat roof, without envisaged barriers or upstand.

Access required 6 monthly to change filters.

Major maintenance required at 12 monthly intervals

Unit replacement every 10 years.

Roof is accessed via internal secure stair from top floor of building.

No access to roof other than to authorised personnel.

The AHU are positioned in the most advantageous position from an energy efficiency perspective, the need to minimise pipe runs and the desire to position above convenient vertical riser locations.

This has resulted in the items being placed near the roof edge. This is an engineering/cost based decision.

A WORKING AT HEIGHT

Definitions

The Designer should define a working space around the items which reflects the nature of the anticipated maintenance work eg temporary laying out of parts, opening access panels to plant item, general space to work. The distance required on the 'exposed' side (ie nearest the roof edge) is denoted **WD**

WD should take account of CIRIA 'Safe access for maintenance and repair' (see p46) and be 0.7m minimum. The actual distance will depend upon the nature of the work, any projections / overhangs, any access doors which would impede the movement of maintenance personnel, etc.

Beyond this dimension, there needs to be a 'protective distance' such that if the operative trips he/she will not fall over the unprotected edge, nor be unnerved by its proximity. This is denoted **PD** and is taken as 2.0m.

Risk management process

Scenario 1

The distance from the working perimeter to the roof edge is greater than PD

The decisions relating to maintenance access are based on engineering and cost considerations providing that:

- The maintenance work items may be reasonably carried up the stairs
- There is a safe passage across the roof to the place of work activity
- Environmental conditions e.g. wind, temperature do not adversely affect safe working
- The replacement of the entire unit (10 yearly intervals) has been thought through,

and these are recorded on a *Maintenance Philosophy Statement*, acknowledged by the Client (see reference 1).

NOTE 1 No roof barrier is required as the only access is by competent persons, there to do a specific job. Designers may wish to suggest a barrier is installed as a means of 'future proofing' the roof for other additions of plant.

NOTE 2 The Designer should consider the provision of a 'toe board', placed on the roof surface to avoid penetrations, if there is opportunity for small items to roll into the 'PD zone'. This will also act as a demarcation between WD/PD.

NOTE 3 The Designer should nonetheless consider placing the plant at ground level, as this will allow access at all times, will avoid the need for maintenance persons to enter the building, and will allow easier access to a maintenance vehicle. However, this decision is one based on engineering considerations, cost and client preference and may involve others in the Team e.g. architect (layout of ground works), civil engineer (layout of ground works, drainage), structural engineer (new base slab), landscape architect (soft landscape); however although others collaborate, the decision is made by the owner of the risk (M&E engineer). Such a decision may also be made by the architect on grounds of aesthetics.

NOTE 3 The client is not taking on designer duties by acknowledging the proposed method. The client is just acknowledging the methodology required.

Scenario 2

The distance from the working perimeter to the roof edge is less than PD

In this case there is a realistic risk of harm that needs to be dealt with.

The options are, in order of preference:

	Option	Comment
1	Move the plant to ground level	An engineering/cost based decision, taking account of any client wishes (Note 1 below). In the absence of any impediments (cost, aesthetics, impact on other aspects of design), assumption is that plant would be moved. If there are impediments, move to step 2.
2	Move the plant away from edge such that $PD > 2.0m$	An engineering/cost based decision. In the absence of any impediments (cost or impact on other aspects of design), assumption is that plant would be moved (see also Note 2 of scenario 1). If there are impediments, move to step 3.
3	Install sufficient length of roof-edge barrier to allow all work on the Unit to be protected.	This should be the solution unless considered aesthetically unacceptable compared to option 4. Cost should not generally be a reason for rejection of this option (see also Note 2 of scenario 1).
4	Facilitate lanyard fixing points on the plant so as to allow the necessary movement and work at all locations.	Designer to produce <i>Maintenance philosophy statement</i> (1) and obtain Client buy-in (Note 1) (see also Note 2 of scenario 1).

NOTE 1 The client is not taking on designer duties by acknowledging the proposed method. The client is just acknowledging the methodology required.

Scenario 3

The distance from the plant face to the roof edge is less than WD

This does not provide adequate working space.

Plant must be re-positioned (unless it is possible to access from below using, say, a cherry picker which allowed adequate access for the work involved, from the basket. In this case the proposed safe system of work would need to be explained in the *Maintenance philosophy statement*, and client buy-in obtained.

B ENVIRONMENTAL CONDITIONS

The designer must also consider whether the environmental conditions likely to be encountered on the roof are conducive to safe and healthy working. These will include wind and/or low temperatures.

Although working in the sun can be harmful, given that this work is occasional, it is considered that this is reasonably dealt with by PPE (through the safe system of work) and hence no action is required by the designer.

There is no readily available advice on the subject of wind and low temperature working (singly or in combination) when working in the open. Any adverse effect is conditioned by the combination of the two components, length of exposure time, time of year, height from the ground etc.

For common building types, and heights, it is considered reasonable for the decision as to whether the plant is placed on the roof to be based on 'working at height' considerations. Higher buildings, or those in high wind areas, may need specific consideration.

General comments

The more frequent the required access, the more justification there is for investing in measures to eliminate the risk e.g. moving the roof items or the provision of permanent edge barriers.

Reference

1	Safe access for maintenance and repair CIRIA C686 (2 nd Edition 2009)
2	HSE booklet HSG33 Health & Safety in Roof Work – page 68 section on designers http://www.hse.gov.uk/pubns/priced/hsg33.pdf

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