



ADVISORY COMMITTEE FOR ROOFSAFETY
Best Practice Guide

ACR [CP] 002:2012
Guidance Note for Safe Working on
Fragile Roofs or roofs with fragile elements
[second edition]

**Covering the Designing, Planning and carrying out of Inspection,
Maintenance, Repair and Refurbishment Work.**

PREFACE

Since the CDM Regulations were introduced in 1995, much energy has been focused on new build to make roofs a safer place to work.

Specifically the Advisory Committee for Roofsafety was set up to improve roof safety standards and its first task was to establish a process to determine if a new roof construction was non-fragile. With this now in place for some years, there has been a marked improvement to new build roof specifications to make roofs a safer place. However for existing buildings built prior to the mid 90s, it is very likely that those buildings will have fragile roofs, or at least elements within the roof that are fragile. It should also be noted that even today's new build will not remain non fragile for ever and will still represent a serious hazard in the future. As roofing contractors become more confident on new build which are currently non fragile, there is a serious risk of becoming more complacent when working on all roofs, ultimately leading to even more accidents in this area of work.

This document has been prepared to reinforce the point that working on older roofs represents a serious hazard. The roof is likely to be fragile, or at least have fragile elements in it, possibly covered in lichen which may not be visible but will be very slippery if wet, and could be painted or treated in such a way as to hide materials that are damaged. Without doubt, in the future, serious accident statistics associated with roofing, will primarily arise out of maintenance work. The roofing industry must recognise this, avoid becoming complacent and take all possible steps to protect the people working on old roofs. I am confident that reading this document will lead to a greater awareness of the hazards so that the appropriate action is taken to minimise accidents. I would like to thank those involved in preparing this valued document from the wealth of their many years of experience working within the roofing industry.

Mike Long

Chairman of ACR

CONSTITUENTS OF THE SUB GROUP

1. This document was originally prepared by a sub group of the ACR representing the following Associations:

- Fibre-Cement Manufacturers Association (FCMA)
- Flat Roof Alliance (FRA)
- Health and Safety Executive (HSE)
- National Association of Rooflight manufacturers (NARM)
- Rural and Industrial Design and Building Association (RIDBA)

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FOREWORD

2. This Code of Practice has been drawn up by The Advisory Committee for Roofsafety [ACR], to assist in making working on fragile roofs safer. It draws on the experience of people who have spent many years in the roofing industry and, as such, the advice given in the document is a statement of good practice, which has been achieved. While this document concentrates on safe working practices on profiled sheet fragile roofs, much of the advice is applicable to work on other types of fragile surface.

3. Working on a fragile roof is an extremely hazardous activity. Even a simple inspection is highly dangerous without adequate knowledge and planning. This is confirmed by the Health and Safety Executive's (HSE's) accident statistics. It is this Committee's opinion that many of these accidents happened because the people carrying out the work or the inspection were not competent to do so. Consequently, the work was carried out without the necessary planning or management and, often, without suitable equipment.

4. Working on or inspecting an existing fragile roof should be treated as working on a roof with no covering. The situation is exacerbated by the fact that it is often impossible to provide back up safety systems e.g. nets, airbags etc due to existing constraints within the occupied building. **Consequently working on a fragile roof or a roof with fragile elements is extremely hazardous and not a task to be undertaken lightly.** The hazard coupled with working at height, is exacerbated by some clients who may have had no guidance on how to commission safe work on fragile roofs.

5. This Code of Practice provides a source of essential information, by drawing on existing good practice, which is already being followed by informed clients, competent designers and roofing companies. The recommendations in this document are intended to reduce the level of accidents by encouraging clients, designers and roofers to recognise their responsibilities and co-operate, to make working on fragile roofs a less hazardous occupation.

REVISIONS TO THE SECOND EDITION

6) The second edition of the document contains the following changes:

- a) In general minor changes have been made to individual paragraphs to improve clarity or guidance.
- b) Section 3: Cleaning a rooflight from above: Access to valley gutters and adjacent roof slopes added.
- c) Paragraphs 15, 75 & 82 introduce replacing damaged roof sheets from below
- d) Appendix 2 figure 10, dimension changed from 1.5 m to 2m to bring the advice in line with HSG33 Health and Safety in roof work.
- e) Appendix 3: amended to reflect requirements of Control of Asbestos Regulations 2006.

SECTION 1 – GENERAL

Working on any roof is a hazardous activity, irrespective of whether it is fragile or non fragile. Falls through fragile surfaces account for 22% of all fatal accidents which result from a fall from height in the construction industry

Introduction

7. This document is intended to give health and safety advice on how to control the risks involved and is aimed at informing the following:

- Building Owners and Property Managers
- Building Professionals e.g. Building and Estate Surveyors, Architects, Surveyors, Heating and Ventilation Engineers
- Sole traders
- Contractors carrying out construction work
- Maintenance Contractors
- Insurance Inspectors
- Manufacturers / Suppliers

8. Any person carrying out an inspection or work on a roof must have adequate information, training, instruction and management control to assess and carry out the task safely.

9. A roof should always be treated as fragile until a competent person has agreed otherwise.

10. No one should be allowed access to the area below a roof when it is being worked on, unless there is an adequate protection system designed to retain all falling objects that could cause injury.

11. Only suitable persons having appropriate competence, training and physical fitness should be allowed on any roof.

12. An inspection will always be needed prior to work on any roof being started. This should be carried out following the procedures detailed in Section 2 of this document

13. All persons involved in roof work need to be aware of the risks presented by a roof being fragile or that may become fragile over time. **Existing asbestos cement sheets and old roof lights should always be treated as fragile**

14. In other cases fragility may arise from the: -

- General deterioration of the roof due to ageing, neglect and lack of maintenance.
- Corrosion of metal clad roofs and fixings.
- Quality of the original installation.
- Selection of original material, fixings and washers.
- Subsequent impact and thermal damage.
- Deterioration of the supporting structure, sheeting and fixings from below due to processes within the building and other causes.
- Damage from rain and storm water leading to random areas of weakness.

- Increased frequency of inspection (e.g. to support manufacturers' guarantees or regular maintenance of equipment on the roof) exposing the roof to excessive trafficking.

15. The hierarchy of risk control in the Work at Height Regulations 2005 requires that you should avoid work at height if you can do so. Therefore if it is possible to do any of the required work without going on the roof then that method should always be selected. For example using a mobile elevating work platform (MEWP) and sheet replacement from below. The techniques described in this document recognise that work has to be done by going on the roof.

Scope

16. The document covers work on roofs clad with all types of profiled sheets, including asbestos cement.

17. It deals specifically with the measures necessary to avoid falling through the roof. Falling off the roof is dealt with in other documents.

Note: See ACR[CP]001 Recommended Practice for work on Profiled sheeted Roofs (orange book) and ACR[CP]006 Edge protection for roofwork (purple book).

18. The specific safety issues of safe working on slated and tiled roofs, shingle, non fragile flat roofs, and thatched roofs are not addressed in this document and reference should be made to HSG33 Health & Safety in Roofwork (published by the HSE) for further guidance.

19. The health issues concerning the handling of asbestos containing materials (ACM) are not covered in this document and reference should be made to Control of Asbestos Regulations 2006. Although some detail about dealing with asbestos cement in the specific case of repair or overcladding is dealt with in Appendix 3, this does not cover work with any other low density asbestos containing materials (ACM) eg asbestos insulation/spray.

Definitions

Competent Person

20. A competent person is a person who can demonstrate that they have sufficient professional or technical training, knowledge, actual experience and authority to enable them to:-

- carry out their assigned duties at the level of responsibility allocated to them;
- understand any potential hazards related to the work (or equipment) under consideration;
- detect any technical defects or omissions in that work (or equipment), recognise any implications for health and safety caused by those defects or omissions, and be able to specify a remedial action to mitigate those implications.

Note: To assess the non fragility of a roof this implies:

- Sufficient knowledge of the mechanical and physical properties of the materials and assemblies involved and

- Practical experience of installation of the product, usage, behaviour and failure in service.

Note: To work on a fragile roof this implies:

- Recognising that this is a high risk task.
- Sufficient training in the use of the equipment and how to deal with the hazards associated with the task allocated to them and,
- An understanding of the need for and the ability to check the adequacy of the safety equipment allocated to them and,
- Being able to state the correct procedure for the task and the emergency procedures that need to be in place for the work.

Crawling Boards and /or roof ladders

21. Access platforms, boards or stagings that rest on the roof and get their support by spanning the roof purlins.

Note: These must always be used in conjunction with an appropriate fall protection system.

Note: The techniques involved in installing such access equipment is not easy and the work should only be carried out by operatives who have been specifically trained and who are experienced in such tasks

Edge Protection

22. A physical barrier that collectively prevents access or falls for all workers.

Note: For details of edge protection to be used in conjunction with the recommendations of this document consult ACR[CP]001 (Orange Book) Recommended Practice for work on Profiled sheeted Roofs & ACR[CP]006 (Purple Book) Edge protection for roofwork and BS EN 13374

Fall Arrest System

23. A collective or personal system which limits a fall and minimises the consequences should it occur.

Fragile Roof

24. A fragile roof is any roof the surface of which is likely to fail when a reasonable foreseeable loading is applied to it.

Note: Remember a person walking (with or without tools or/and materials) is a reasonable foreseeable loading.

Note: A test for fragility is given in the Advisory Committee for Roof Work (ACR) ACR (M) 001.[The Red book]

Note: It is stressed however that all complete roofs should be treated as fragile unless a competent person has confirmed otherwise.

Harness and Lanyard System

25. Personal protective equipment (PPE) which when fixed to a specified attachment point acts as either a work restraint or fall arrest system.

Note: This definition includes inertia devices.(i.e. BS EN360 devices)

Note: If a fall can occur then a means of energy absorbance must be included in the system and the harness must be a full body harness rated to BS EN 361.

Nets

26. A collective fall arrest system to BS EN 1263, installed as close as possible under the surface to minimise fall distances.

Note: Net installations have specific requirements for maintaining a clear space under them and anchorage requirements to work correctly.

Note: Nets to EN1263 only provide fall protection for people; separate considerations need to be made for potential falling objects/debris.

Note: See advice given in ACR[CP]003 Blue Book] Recommended practice for the use of nets in roofwork and BS8411.

Personal fall prevention system

27. Work equipment designed to prevent a worker getting to a point where he could fall, e.g. over the edge of a roof or through it. (See Figure



Figure 1 A personal fall prevention system

Powered Access Equipment

28. Mobile elevating working platforms (MEWP) that provide a safe working platform for work at height.

Soft Landing system

29. A collective fall arrest system which does not necessarily minimise the fall height but does minimise the consequences of the fall e.g. Air Bags, bean bags etc.

Work Restraint System

30. A personal fall prevention system using a harness and lanyard attached to a suitable anchor which prevents a worker getting to a point where he could fall, e.g. over the edge of a roof or through it.

Health and Safety Legislation

31. All work on roofs including the inspection, maintenance, repair and refurbishment of fragile roofs come under health and safety law. The specific requirements of the Acts and Regulations are well documented in other guidance notes.

32. In general, UK Health and Safety Law requires that a risk assessment is carried out within which hazards should be identified and, if possible, eliminated. Any residual hazards should be assessed and safe systems of work developed to minimise residual risks. If there is an accident on the roof on which you are working, you will be asked to prove that you have carried out these duties.

33. Remember, achieving safety in roof working is a legal requirement and should be a co-operative effort between the Client, the Contractor and the Designer. If each of these parties carries out their duties properly, the risks associated with roof working will be minimised.

Note: See ACR[CP]001 (Orange book) Recommended Practice for work on Profiled sheeted Roofs

Note: The duty to co-operate is a requirement of the Construction (Design and Management) Regulations (CDM)

34. All work on roofs will be subject to the Work at Height Regulations 2005.

35. The order of selection of equipment implied by the Work at Height Regulations 2005 is shown in Appendix 1. These Regulations require that in selecting which work equipment to use the relative risks associated with the following activities have to be taken into account

- Installation
- Use
- Removal
- Rescue

SECTION 2 – INSPECTION

Planning the Inspection

36. All inspections must be planned. The following actions are recommended:

37. Obtain and examine all available drawings, specifications, recent surveys including Asbestos Surveys, and the Health and Safety File.

Note: Since May 2004 there should be an Asbestos Management Plan for all non domestic buildings.

38. Identify all services and their location.

39. Confirm with the person responsible for the building, any preferred or available means of access and any on site rules/ permits of work needed.

40. Identify the on site hazards which will affect the inspection i.e. Consider:

- a) The size of building, height to ridge, valleys, and eaves.
- b) The available space for siting of access equipment at ground level and consider how it will be moved around. Similarly consider how access equipment can be raised to and moved about the roof.
- c) Whether the roof structure (rafters and purlins) is strong enough to support the person carrying out the inspection and maintenance workers with their equipment and materials who will carry out the work.

- d) The steepness of roof, surface texture and weather conditions all influence potential for sliding off and falling from or through the roof.
- e) Any old and broken roofing sheets, evidence of water leaks and staining, rusting end laps and peeling paint.
- f) Any holes in the sheeting seen as pinpricks of light from inside the building.
- g) Any missing or damaged ridge and verge cappings.
- h) Debris on the roof surface, blocked gutters or downspouts which may mask potential hazards on the roof surface.

Note: Lichen and moss will retain water long after a period of rain and will be slippery even in dry weather.

- i) Any damaged roof lights.
- j) The condition of fixings and washers, including evidence of wear and cracking around fixing points.
- k) Any evidence of previous repairs will give an indication of the overall condition of the roof and how often it has required repair.
- l) Any evidence of external surface over coating treatments (Turnerising), which may have blacked out roof lights visible from within the building.
- m) Roof lights which may be visible from inside the building may have discoloured to match the roof covering externally.
- n) Any evidence of asbestos unidentified within the Asbestos Management Plan.
- o) Any evidence of failed or failing structural members (shown by deflected sheeting, dipping of the ridge line, etc).
- p) How the work can be carried out with respect to the effects on third parties and disruption to the business.
- q) Whether the roofing and cladding contains ACM and the need to be able to comply with the Control of Asbestos Regulations 2006.

Note: See also specific requirements in Appendix 3 for Asbestos Roof Over-Cladding and Repair.

- r) Any other toxic/hazardous substances. E.g. gases emitted from ventilators on the roof.
- s) The condition and suitability of access, safety systems and anchorages, and other hazards relevant to future maintenance and repair works.

Note: see paragraph 53 re additional requirements associated with accessing parts of roof which are not adjacent to valley gutters or eaves.

- t) Check availability of anchorages for personal protective equipment (PPE).
- u) Check the inspection records of any installed safety systems to be used.
- v) Verify the maximum number of persons allowed to use the installed safety system at any one time.

41. If this information is not available from existing records it is likely that it will need to be gathered by the inspection.

Selecting the Technique to Use for Inspection

42. Based on the information above decide on the techniques you are going to use for the inspection.

43. Where possible inspections should be carried out without going on the roof. This could be done by one of the following methods, in order of preference:

- a) Using binoculars or other visual aids from vantage points which don't require work equipment (e.g. adjacent building, existing access points etc.).
- b) Remotely from a MEWP either over the roof (see Figure 2) or from underneath.
- c) Via remote sensing equipment (e.g. remote or radio controlled camera techniques).
- d) From a traditional or proprietary scaffold tower that could be erected to view over the roof surface or from underneath.
- e) Using a tied ladder at valley gutter and eaves positions, ensuring that the ladder rises above the roof edge by a minimum of 1m.

Note: Use ladders as a last resort.



Figure 2 Using a MEWP to inspect a vent

44. The following additional actions may also be necessary:

- a) Only select workers who have been trained on the inspection and use of the equipment /PPE being used.
- b) If fall protection PPE is to be used check all equipment has an up to date valid inspection record, the system components are compatible and the manufacturers' instructions for use are followed.
- c) If mechanised access equipment is being used arrange for the provision of a qualified and competent operator to drive the equipment. Provide full body harnesses and lanyards for work restraint for all who work in it.
- d) Where an inspection is required in the middle of a long run of valley gutter, which cannot be reached by a MEWP, ensure it is carried out in compliance with paragraph 53.

45. Finally prepare a method statement of a safe system of work to manage and control the residual risks remaining in carrying out the inspection. This should also detail the rescue procedure should a fall take place using the equipment selected, do not rely on the emergency services.

How to carry out the inspection safely

(Assuming you are going on the roof)

46. On no account, walk on any roof sheeting unless it is known with certainty that it is non fragile.

47. Always treat any roof as fragile and as if sheeting didn't exist, unless a competent person has confirmed otherwise.

48. Never walk on any fragile roof without using appropriate crawling boards with fall prevention/protection measures. Use roof ladders for steep slopes. **Walking the line of purlin bolts is not safe and should never be attempted.**

Note: Testing has proved that with most roofing products local to the purlin is the weakest part of the roof. Here the sheeting is less flexible and loading of the sheet may cause the sheet to tear against the purlin. Also a line of fixings may be stitchings connecting end laps for sheets where there is no purlin below.

49. Do not consider going on any roof in poor weather conditions such as rain, ice, frost or strong winds (particularly gusting) or if slippery conditions exist on the roof.

Note: Winds in excess of 23mph (Force 5) will affect a persons balance. See NFRC publication "Roofing and cladding in windy conditions"

Note: Forecast wind speeds can be obtained from the internet, Radio/TV and as a service provided by the Met Office.

Note: see also paragraph 40(h).

50. Inform the on site management/ operators of how you intend to carry out the inspection and include in your plans for the safe working within the premises. If the site is unoccupied make sure that you have someone responsible with you, that someone in overall control knows you are there and what your plans are. Access or work permits are useful.

51. Check that the system of work detailed in the Method Statement can be followed, in particular:

- a) Confirm the information provided about the roof. (If any of the information detailed in paragraph 40 is missing it must be established before going on the roof).
- b) Check the suitability of the existing access, safety systems and anchorages.
- c) If the conditions found on site are not as anticipated stop the work and re-assess the activity.**
- d) Ensure suitable footwear is worn.,
- e) Carry out a pre- use check of all equipment, including personal fall protection equipment.

52. Establish effective barriers to segregate your activity from pedestrians and vehicles. If this is not reasonably practicable post a man on the ground to stop any other vehicle from approaching the access equipment. This person must remain there for the duration of the work activity.

53. Where an inspection is required in the middle of a long run of valley gutter, access via the valley gutter should only be carried out, with the following precautions:

- a) An inspection of the structure internally shows full structural support of the valley gutter to be used.
- b) Ensure the gutter width allows clear access (i.e. not less than 200mm) to walk in using a proprietary safe walking system or a specifically designed and installed PPE anchorage system.
- c) Where systems described in (b) above are not available, place protective sheeting on both sides adjacent to the valley gutter. Normally protective sheeting should be placed for a minimum of 2m up each slope and should span a minimum of 2 purlins. Shallow pitches may need more extensive coverage. See Figure 5.

Note: The installation of such equipment is difficult. Special consideration needs to be given to how the equipment will be raised, deposited, distributed and placed on the fragile roof surface. This could have an influence on the form of access and edge protection required at the eaves or the end of a valley gutter to allow handling of this equipment.

Note: In practice the sheets will tend to slide down the roof slope but it is acceptable to support the bottom edge of the sheet on the lowest line of fixing bolts.

54. If there is a requirement to inspect other parts of the roof which cannot be readily done from valley gutters or eaves, these can be accessed by using appropriate crawling boards (guardrailed where the roof cladding is fragile) and/or roof ladders secured as necessary.

55. Warning: when using access equipment, do not be tempted to over reach out of a MEWP basket, tower scaffold or from a ladder to inspect suspect materials – move the access equipment to the suspect part.

56. Remember always follow the prepared method statement - **"Plan the work & work to the Plan "**

SECTION 3 – MAINTENANCE

Cleaning a Roof Light from above

57. Cleaning should be done from within a MEWP basket using a stiff brush and hot soapy water. If MEWP access is not possible then less preferable methods such as the use of access towers to reach the roof, nets for fall arrest and crawling boards for access over fragile materials will be needed.

Note: Where asbestos cement sheeting (AC) sheeting is adjacent to the roof light ensure it is not abraded by the stiff brush as this could release asbestos fibre.

58. When using boom type powered access equipment from which to carry out the cleaning work the operatives must be restrained to prevent them falling from the platform by wearing a harness with a work restraint lanyard attached to a designated anchor point on the platform where the risk assessment shows that they are required.

Anchoring to the platform should not be used as a means of fall arrest for working outside the platform, or over – reaching from the platform.

59. If work must be done from the roof

- a) Provide safe access to the eaves or valley gutter level by scaffold or scaffold towers. Ladders should normally only be used as a last resort.
- b) If using a MEWP for access, onto the roof, the MEWP should reach well beyond the end of the valley gutter, and a person should be able to step directly onto a protected zone of the roof. See BS8460 paragraph 6.12 and Annex B with regard to exiting the MEWP platform.
- c) Provide appropriate edge protection and strictly control the operatives movements. (see Figure 3).



Figure 3 Installing a proprietary edge protection system

Note: For details of edge protection and fall protection requirements see Appendix 2 Fall Protection Requirements for Minor Work on Roofs.

Note: For details of standard of edge protection consult BS EN 13374 Temporary Edge protection systems and ACR[CP]001(Orange Book) Recommended Practice for work on Profiled sheeted Roofs & ACR[CP]006 (Purple Book) Edge protection for roofwork.

- d) For access from the eaves or along a valley gutter, and up the internal slopes, nets or other collective fall arrest systems should be provided beneath a fragile roof cladding. In addition, crawling boards should be used to walk over the fragile roof cladding.
- e) Where nets or other collective fall arrest systems cannot be used, and where access is along a valley gutter with fragile roofing to each side, each slope should be protected by boarding, rigid sheeting or stagings for a minimum distance of 2m up the slope. This should be increased if the slope is particularly shallow, or if people need to walk on the roof adjacent to the valley gutter. See Figure 5.
- f) Access from the eaves or a valley gutter up a fragile roof slope should be gained using guardrailed crawling boards or roof ladders. Roof ladders should only be used on slopes too steep for access by guardrailed crawling boards. These should be pushed up the roof to the work area and secured to prevent sliding and lateral movement.
- g) Special consideration needs to be given to how the protective equipment to prevent falls through fragile roof slopes can be raised, deposited, distributed and placed on the fragile roof surface. This could have an influence on the form of access and edge

protection required at the eaves or the end of a valley gutter to allow handling of this equipment.

Note: The techniques involved in installing such access equipment is not easy and the work should only be carried out by operatives who have been specifically trained and who are experienced in such tasks.

- h) Remember that the roof structure needs to be strong enough to take the combined weight of the crawling boards, the operative and the equipment required. Similarly the roof structure should be strong enough to support the weight of nets and forces generated by a person falling into the net.
- i) Where personal protective equipment (harness and lanyard) are used for work restraint or fall arrest equipment it should be attached to suitable anchors.

Note: Where a work restraint system can be achieved it should be used - remember a fall arrest system needs a 12kN anchorage capacity, a work restraint system needs a 3kN anchorage capacity.

- j) Regardless of the state of the opaque areas the roof lights will almost certainly be fragile and at no time should the operative lean onto or stand on the roof light.

Note: There are proprietary rooflights manufactured to be 'non-fragile' for the expected life of the building. Unless there is clear evidence that such rooflights have been fitted, eg. Stated in the Health & Safety File for the building, all rooflights that require maintenance, and any neighbouring rooflights, must be considered fragile, and appropriate precautions taken.

Note: Non-fragile rooflights should not be walked on as this could result in damage to the external UV protection layer of the rooflight and lead to premature deterioration.

- k) On non-fragile roof claddings incorporating fragile roof lights, measures should be taken to prevent falls caused by people stepping back or inadvertently stepping onto adjacent fragile roof lights (eg such as the use of secure temporary covering methods of sufficient strength) .
- l) Single width roof light sheets surrounded by non-fragile material may be cleaned using long handled stiff bristle brushes to distance the operative from the roof light. The operative should remain at least 2m away from the roof light. Care should be taken not to spill soapy water onto the surrounding non fragile sheets making them slippery.

Cleaning an Eaves Gutter

60. Provide safe access to the work area, preferably by mobile mobile elevatings equipment (MEWP).

61. Cleaning from a MEWP – see paragraph 58.



Figure 4 Using a MEWP to clean the gutter

62. Where it is not possible to use a MEWP a mobile tower scaffold or fixed scaffolding platform will be required.

63. It is generally not considered acceptable to clean along the length of an eaves gutter from a ladder, although there will be occasions when this is unavoidable.

Note: An example could be where the physical access constraints dictated that a tower scaffold or MEWP was impossible to use.

64. Spot cleaning of gutters by ladders may be acceptable if the work was of short duration (total time of all work less than 10 to 15 minutes).

65. Debris from the gutter should be placed in a container and brought down for disposal. An exclusion area should be set up below the work area in case debris is accidentally dropped.

Cleaning a Valley Gutter

66. The inspection must have determined that the valley gutter is non-fragile.

Note: see section on inspecting valley gutters paragraph 53.

67. Assume that the roof either side of the valley gutter is fragile unless a competent person has confirmed otherwise. Either:

- a) protection such as a valley walker should be used. (See Figure 1)

or

- b) the full valley run and the roof slope up to a minimum of 2 metres either side should be netted; this should be increased if the slope is particularly shallow, or people need to walk on the roof sheets adjacent to the gutter, in which case they should walk on stagings or sheetings

or

- c) Where nets or other collective fall arrest systems cannot be used - see paragraph 59(e)

68. Installation of protective equipment to prevent falls, see paragraph 59(g)

69. For safe access at the end of the valley gutter see paragraph 59(a) to (c).

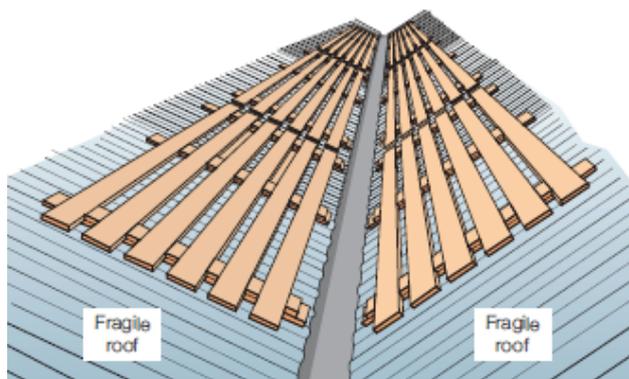


Figure 5 Protection installed along a valley gutter.

70. The wet and slippery conditions within the valley make the selection of suitable footwear imperative.

71. Use a safe system of work to transport and lower any waste or debris i.e. use of buckets to remove mud and silt, using two men to carry any larger items of wood, broken sheet etc

Servicing Plant and Equipment on a Roof

72. Unless a permanent safe walkway is provided, the service operative must be trained in the safety precautions required when working at height and should be accompanied by a competent roof worker at all times.

73. Unless a safe walkway is in place the advice in 'Cleaning a roof light from above' should be followed.

Note: See paragraphs 58 and 59.

74. Permit to work systems should be used and any permanent access route secured by a locked gate/door etc.

SECTION 4 REPAIR/ REPLACEMENT

Replacing a Rooflight from below

75. Where practical roof lights should be replaced from below using a proprietary replacement system. Access to the underside of the rooflight should be preferably by MEWP or tower scaffold. (see Figure 6)



Figure 6 Replacing a roof light from a MEWP from inside the building using proprietary under roof sheet replacement system.

Replacing a Rooflight from above

76. Only replace a roof light from above if impractical to do so from underneath.

77. Provide safe access to the eaves level or valley gutter by scaffold, scaffold towers or MEWPs. Ladders should only be used as a last resort however, if they are selected, alternative means should be provided for the lifting of tools and materials to the roof level.

Note: See paragraph 59(b) regarding the use of a MEWP for access to the roof.

78. Provide appropriate edge protection and strictly control movement of the operatives.

Note: see Notes after 59(c).

For access from the eaves or along a valley gutter, and up the internal slopes, see paragraphs 59 (d) to (i).

Note: See Appendix 2 Figures 10 & 11.

79. Roof light fragility see paragraphs 59 (j) & (k) regarding hazards posed by the roof light and adjacent roof lights.

80. When carrying out the work, at the roof light being repaired or replaced, the operatives should be protected by collective fall protection (such as, MEWP, mobile tower or scaffold used as a crash deck, nets or soft landing system appropriately wider and longer than the roof light) under the roof light. Personal measures such as 'work restraint' and 'fall arrest' should only be used as the last resort.

Note See Note after 59(i) for work restraint and fall arrest anchorage capacity.

81. Strength of the roof structure, see paragraphs 59(h) and note after 59(i).

Repairing a Cracked Roof Sheet or Rooflight

82. Where practical consideration should be given to replacing the cracked sheet from below rather than repairing from above. This avoids the risks associated with gaining access to and over a fragile roof cladding to carry out a repair. **See Figure 6.**

Note: proprietary under roof sheet replacement systems include profiles to replace rooflights, asbestos cement and metal sheets.

83. Where repair is necessary from the roof refer to paragraphs above, **'Replacing a Rooflight from above'** but with the following additional considerations

- a) Consider the use of an insitu flash band/bitumen compound or strips, or similar approved technique where the repair is fairly minor.
- c) When planning repairs to an asbestos cement roof there may be a risk of asbestos fibres being released. In such circumstances it is recommended that there is minimal disturbance to reduce this risk. In some cases over sheeting may be a more suitable procedure than either repairing or removal.
- d) Replacing sheets could damage adjacent roof sheets and so increase the problem. Over sheeting with a full or partial sheet of the same profile is generally possible on most roofs.

Note: Where you have a roof light or asbestos cement sheet these can be over roofed with a non fragile GRP

sheet of the same profile. This can usually be achieved by easing the fixing bolts of the original sheet and sliding the over sheet under the upper end lap and fixing down to the roof structure.

84. If you need to over-clad or repair asbestos cement sheets the additional requirements detailed in Appendix 3 must be followed.

Removal and Replacement of all or a large proportion of a Roof

85. Removal and replacement of a roof involves demolition and construction work, so the Construction (Design & Management)Regulations will apply.

86. The replacement roof cladding should be non-fragile.

87. The designer and contractor should consider the following.

- a) The use of an overcladding system which would avoid the need to remove the existing roof cladding,
 - b) If the roof can be removed from the underneath, e.g. from powered access equipment or tower scaffolds this is the preferred method for work at height. However this may not be the best method for asbestos cement products where control of release of asbestos fibre could be an issue.
 - c) If work has to be carried out from the roof surface provide safe access to the eaves or valley gutter by a mobile tower, stairway, scaffold.
 - d) Nets should be placed close to the underside of the roof cladding or some other collective fall protection system provided to the underside. Crawling boards should be used to walk over the existing fragile roof surface.
 - e) Should the operatives rely solely on crawling boards suitable fall protection PPE must be provided.
- Note: See note about anchorages for PPE after paragraph 59(i).
- f) Guardrails and toe boards must be provided around the full perimeter of the roof or the area of roof being worked on, and if appropriate debris netting placed under the roof and around the perimeter.
 - g) Provide for the lifting of heavy loads on and off the roof. Preferably this should be by powered lifting equipment or mobile crane.

Note: If using MEWPS do not carry loads on the guard rails and be aware of their safe working load.

- h) Provide for material storage both on and off the roof (check that the roof structure can carry the load).
- i) On the new roof introduce poppy red or similar washers and cap markers to the fixings to indicate the presence of roof lights.

Additional Factors to be considered

88. Access equipment should never be left in place unattended. There is the risk of children or the inexperienced accessing the roof.

89. The condition on the roof must be verified before going onto it at the start of each day's work. Check the current weather forecast to be aware of potential adverse conditions such as high winds, rain, ice and snow. When first accessing the roof in the morning or after cessation of bad weather, check if the working surfaces have become slippery.

90. Ensure that there is a suitable means of access onto the roof relative to the skills and numbers of persons who need to go there. On anything other than a small roof (e.g. lock up type garage) a tower, MEWP to reach well beyond the edge or scaffold with stairs should be used.

91. Ensure that the site and particularly the access routes and working area on the roof are kept clean and tidy to avoid slips and trips when going across to, returning from, or at the work area.

92. If the roof does contain asbestos the 'Control of Asbestos Regulations 2006 will apply.

Note: Disposal of asbestos cement roofing sheets should be carried out in accordance with, The Hazardous Waste (England and Wales) (Amendment) Regulations 2009.

Note See also Appendix 3.

SECTION 5 - ADVICE TO CLIENTS AND CONTRACTORS

Clients

93. The Client should consider the following before making any repair refurbishment or maintenance decision:

- a) Can taking action within the building solve the consequences of the defect and hence avoid the need to access the roof.
- b) When considering the future use of the building can the frequency of access be reduced through balancing the cost and lifespan of any repairs against an overall refurbishment.
- c) When choosing between the repair or refurbishment what are the effects to the business, the building concerned and the rest of the site. e.g. the conflict over storing and moving materials across the site to the work area and the effects of work being done above on operations within the building.
- d) Can serious hazards be avoided by suitable planning e.g. reducing the time that men are working at height by over-cladding of multiple defects instead of carrying out numerous isolated individual patch repairs.
- e) Providing permanent access ways along eaves, valleys and gable verges of large buildings.
- f) Unless there is a valid reason in any replacement policy fragile materials should always be replaced with non fragile assemblies to remove the hazard at source for future work.
- g) Do you have in-house ability to carry out and supervise the required works, or should competent advisors be employed to design, plan and manage the works including selecting competent contractors to

carry out the works. You should especially ask your advisors about your and their duties under the current Construction (Design and Management) Regulations.

- h) When selecting a contractor follow the principles given in paragraphs 4-19 of ACR[CP]001 {Orange book} Recommended Practice for work on Profiled Sheeted Roofs and ACR Information Sheet no 1 – Selecting a Competent Contractor

Contractors

94. At time of appointment / accepting the work the contractor should consider the following:

- a) Is the Client aware of his responsibilities under the CDM and other Health and Safety Legislation e.g. has the Client provided all the information necessary about the roof and is he committed to provide the necessary resources to allow the work to be done safely.
- b) Is it possible or practical to carry out the Clients/advisors requirements or are there alternatives he can suggest to the client which provide a safer and better quality job i.e. overcladding the existing roof instead of multiple repairs or, replacing sheets from the underside instead of patch repairs from above.
- c) Is the time scale and restrictions imposed on the work, by the client, reasonable and achievable.
- d) Can the appropriate level of on site supervision be provided to ensure that his men carry out the works safely and that they don't take unnecessary risks to compromise the safety of themselves and others.
- e) Can serious hazards be avoided by suitable planning to reduce the time that his men are working at height.
- f) Are all operatives carrying out the work adequately trained in the use of any equipment they may have to use and is the equipment the most suitable for the work.
- g) If nets or other collective fall arrest systems are to be used the client needs to be aware of the clear zone required below them to allow them to deflect under load to perform correctly

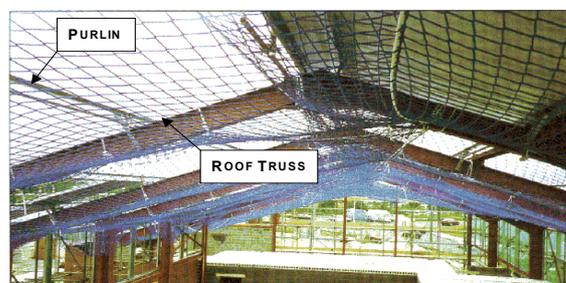


Figure 7 Maintain a clearance distance below nets

- h) Can the Contractor comply with all the principles in ACR[CP]001[Orange Book] Recommended Practice for work on Profiled Sheeted Roofs.

APPENDIX 1 SELECTION OF EQUIPMENT FOR WORK AT HEIGHT

1. The Work at Height Regulations are goal setting regulations in that they require the most suitable work equipment to be selected to carry out the task (subject to issues of ‘reasonable practicability’) as a result of a risk assessment.
2. The preferred order of selection of work equipment implied by hierarchy in Regulation 6 of the Work at Height Regulations is shown by the line in the diagram below:

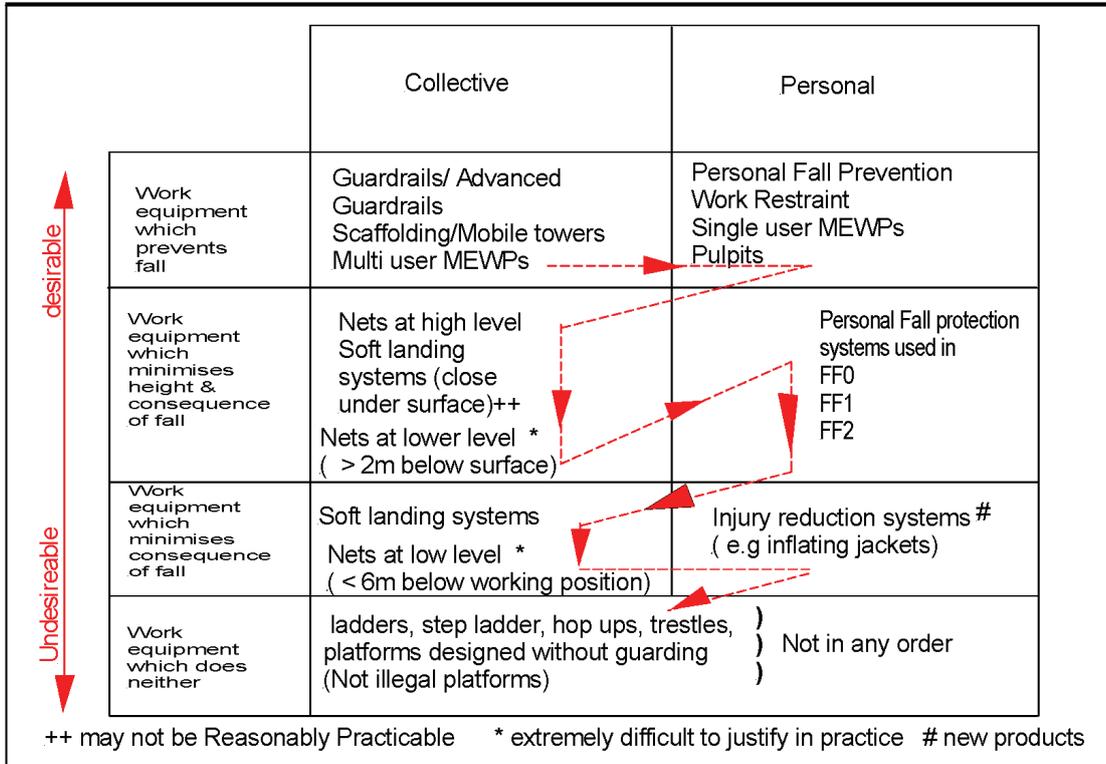


Figure 8 Order of selection of work equipment implied by the Work at Height Regulations 2005

Note 1: To justify the use of any particular equipment, all preceding equipment along the line of the arrow before the selection must be explicitly ruled out on grounds of reasonable practicability, taking into account the global risks associated with the installation, use, dismantling and rescue associated with that equipment.

Note 2: Equipment can be used in combination with other equipment to change its relative position within the hierarchy.

Fall Factor (FF)

The height of the potential fall divided by the length of the lanyard

Note. FF0 implies an overhead anchorage, FF1 implies an anchorage level with the harness dorsal or sternum attachment point, FF2 implies level with feet as shown in the following diagram.

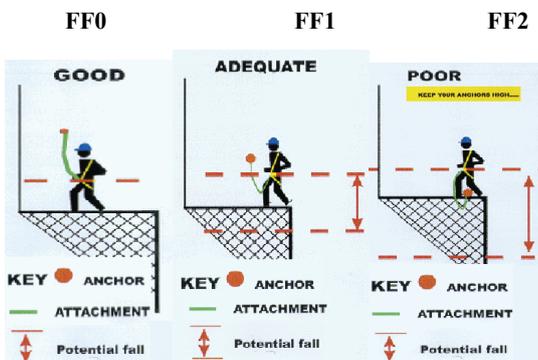


Figure 9 Fall factors

Note: To minimise both the height and consequences of a fall implies using FF0 in preference to FF1 in preference to FF2

Appendix 2 Fall protection requirements for MINOR work on roofs

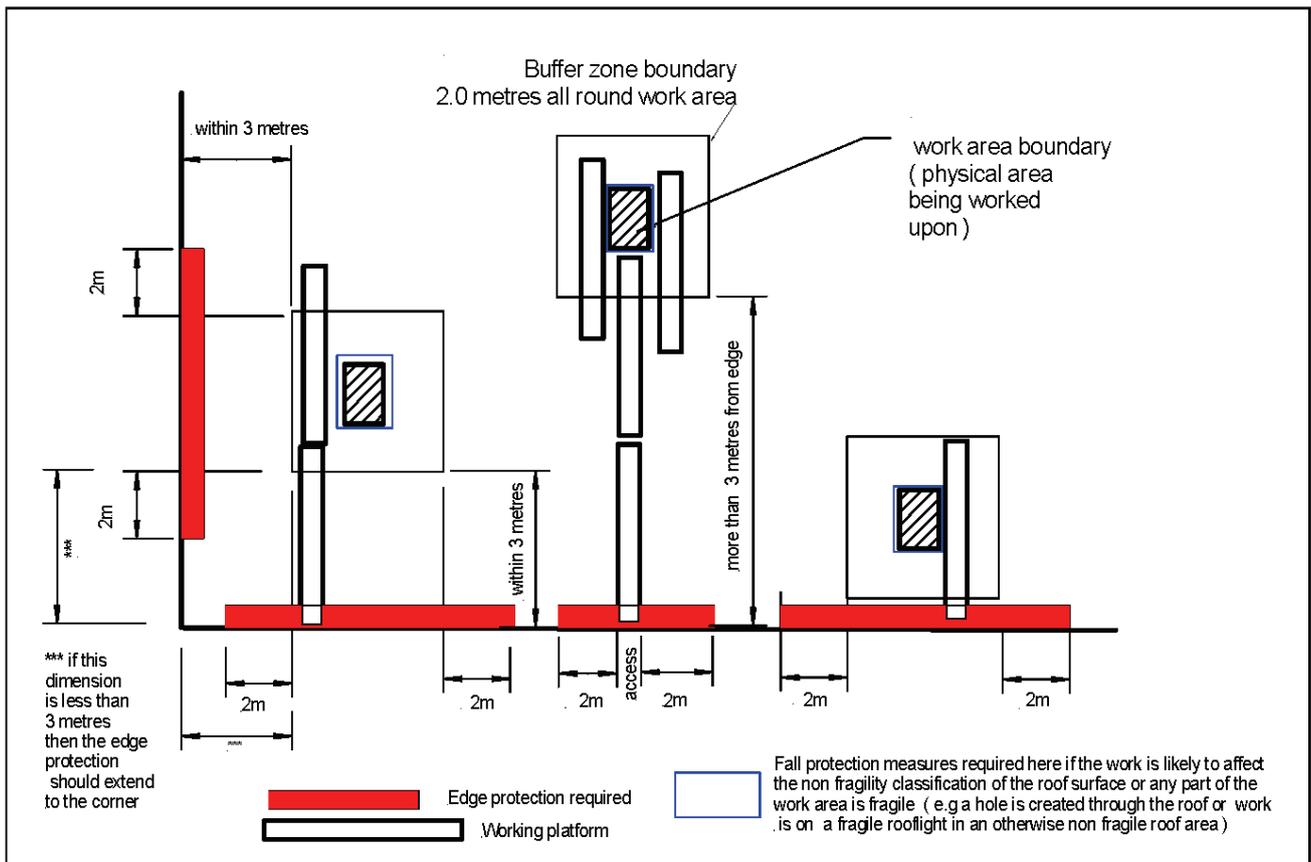


Figure 10 Edge protection requirements for non fragile roofs which have fragile elements in them

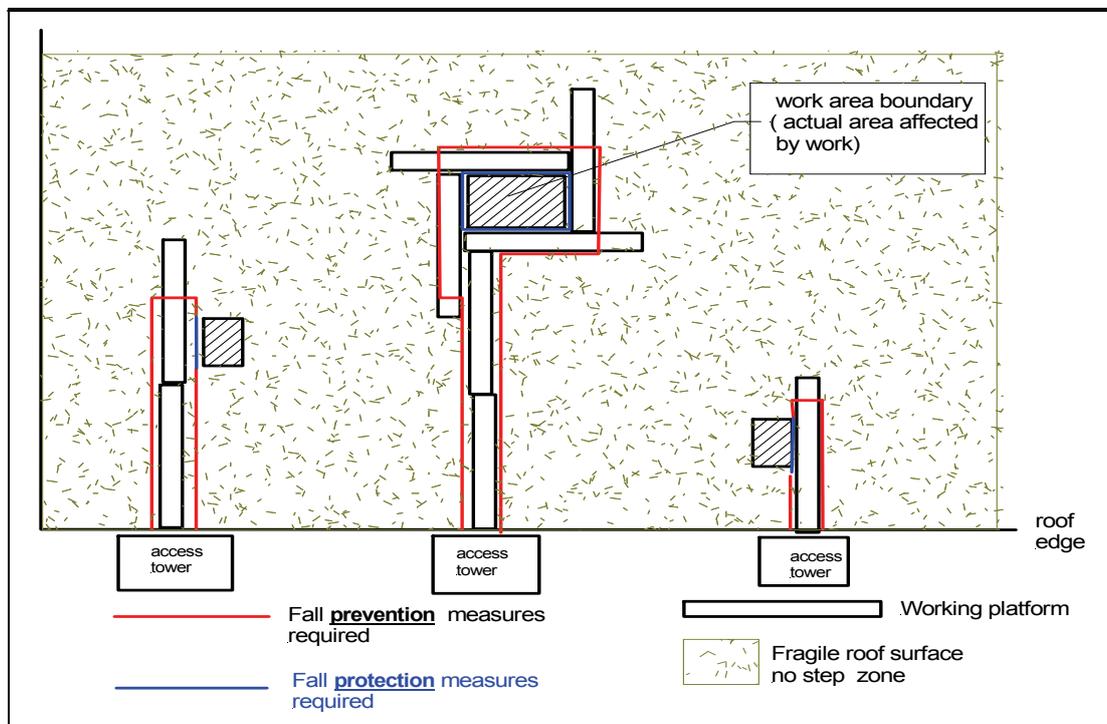


Figure 11 Fall protection requirements for fragile roofs

APPENDIX 3 - ASBESTOS ROOF OVER-CLADDING



Figure 1 Complete overlidding of an AC roof

WHAT YOU NEED TO KNOW:

Where is asbestos normally found in Roofwork?

1. Large amounts of asbestos-containing materials (ACMs) were used for a wide range of construction purposes in new and refurbished buildings until 1999 when all use of asbestos was banned. The peak period of use was between 1950-1980.
2. ACMs were used as many external building products such as profiled roof sheets which normally contain a mixture of chrysotile (white) asbestos and cement. Hence the name 'asbestos cement' (AC). Some older sheets (pre 1980) may contain amosite (brown) or crocidolite (blue) asbestos.
3. Other AC external building products include drainage down pipes, rain gutters, wall cladding and soffits. AC products are generally regarded as lower hazard due to the relatively small asbestos content (10-15%) and the well bonded nature of the fibres in the cement matrix. However, large quantities of asbestos fibres can be released if the materials are destructively smashed or broken or cut or drilled especially using power tools.
4. In addition, other more hazardous ACMs may be found in proximity to AC products. In particular, AC profiled roof sheeting (or occasionally wall panelling) may be sprayed with asbestos coating on the inside as insulation or fire protection. Also asbestos insulating board (AIB) products including soffits or panelling may be near by.
5. All work with ACMs must be strictly controlled in accordance with legislation (see below). All work must be carried out by a licensed asbestos contractor unless it meets certain criteria for exemption. Most work with AC products including profiled roof sheeting will be exempt from licensing (essentially as it is "lower risk") but workers still need to be competent and have adequate training (see paragraph 15). The exemption will not apply where disturbance of higher hazard ACMs could occur (eg sprayed coating, AIB soffits).

SUMMARY OF ASBESTOS RELATED LEGISLATION

6. Control of Asbestos Regulations (CAR) 2006 –All ACMs are subject to CAR 2006. These regulations cover work with asbestos, prohibition of the importation, supply and use of

asbestos, and licensing of asbestos removal activities. In addition, Regulation 4 contains an explicit duty on the owners and occupiers of non-domestic premises, who have maintenance and repair responsibilities, to assess and manage the risks from the presence of asbestos.

7. The supply, use (including re-use) and importation of all ACMs is prohibited. Any ACM which is removed from a building (including roofing materials) cannot be reused and must be treated as hazardous or special waste. Asbestos waste is subject to labelling, packaging and transportation requirements (details are set out in Regulation 24 and Schedule 2 of CAR 2006). These restrictions have been in place for many years and are restated in CAR 2006.
8. With regard to work with asbestos, under CAR 2006, before employers undertake any work including maintenance and demolition which is liable to cause exposure to asbestos, they must identify the ACMs and carry out a risk assessment in order to identify the appropriate controls to prevent or reduce worker exposure and spread. The controls should be set out in a written plan of work (also called a method statement). The Regulations also stipulate that anyone who is liable to be exposed to asbestos must be given adequate information, instruction and training including awareness training and safe work practices and controls. The employer will also have to consider any other health and safety hazards which the work creates (eg access and height issues) and how they will be controlled.
9. Information on the presence of asbestos in non-domestic buildings should be able to be obtained from the occupier or owner under their duty-to-manage requirements (eg there should be an asbestos register or plan). The Construction (Design and Management) (CDM) Regulations (2007) also require arrangements to be in place to deal with asbestos during construction work, including refurbishment and demolition. Where construction or building work is to be carried out, the CDM client must provide designers and contractors who are bidding for the work (or who they intend to engage) with project-specific information about the presence of asbestos. The information on asbestos should be passed to the contractor before work starts. However where asbestos information is not available or is unreliable, employers should carry out their own inspection and checks to identify the presence of ACMs.

How can you be exposed?

10. Asbestos is only a risk if you disturb or damage it and cause fibres to be released into the air. If ACMs are in good condition and in a position where they are not going to be disturbed or damaged then it is safer to leave them where they are and ensure that the risks are managed.

ADDITIONAL REQUIREMENTS FOR ROOFWORK INVOLVING ASBESTOS CEMENT

Preparation and Planning (over and above the requirements of Section 2 – Inspections)

11. **Plan of work** – Employers must prepare a written plan of work for any proposed asbestos roof work. The plan should set

out how the work will be carried out and what control measures will be put in place to prevent or reduce worker exposure. The plan should also explain how the spread of asbestos will be prevented; ie to protect building occupants and prevent contamination of roof voids and other areas. Employees should know how to implement the plan. The plan should include the following:

- a) The nature and probable duration of the work.
- b) A description of the work and work methods; its location and any areas below the roof which may be affected by fibres, dust or debris.

Note: it is recommended that a check for contamination on top of existing steel beams, and purlins etc is carried out before any work commences to establish a "pre work" agreed condition state.

- c) The type and form of asbestos, the quantity, extent and condition.
- d) Who will consider departures from the Plan of Work and how will these be noted and recorded on site.
- e) State the expected exposure using controls specified.
- f) How the release of fibres from the materials will be controlled.
- g) How fibre and debris will be prevented from spreading to occupied areas, especially areas below the roof.
- h) How debris will be prevented from contaminating the unoccupied areas.
- i) The protective clothing and respirators to be worn.

Note: Respirators should be FFP3 to BS EN149

Note: It is recommended that Type 5 disposable overalls are worn

- j) Describe how control measures are to be maintained on site and what checks are to be in place and who is in charge.
- k) Any additional precautions to reduce exposure.
- l) Provide detailed site information and a site specific description of the working method to be used with reasons.
- m) The tools and other equipment to be used.
- n) Welfare facilities.
- o) Waste disposal, (see paragraph 14, em9). Careful consideration needs to be given to possible contamination of work equipment (e.g. debris nets, scaffold board, clothing etc) as these may also need to be disposed of as Hazardous Waste.
- p) Emergency procedures in the event of an inadvertent asbestos exposure.
- q) How areas which may have become contaminated with asbestos, particularly areas below the roof are to be thoroughly cleaned as necessary when work is complete.
- r) The arrangements for the work will have to include how other health and safety hazards will be managed and controlled ie safe access, work at height and fire risks.

Carrying out the work (over and above the requirements of Section 4 – Repair/maintenance)

12. There are several overcladding methods and systems which can be employed and they generally involve drilling through the existing AC sheets. The use of self-tapping screws rather than a hook or a 'J' bolt is recommended. Drilling will release asbestos fibres and dust and will have to be controlled.

13) **Controlling exposure and spread of dust.** Over-cladding of asbestos cement sheeted roofs should be carried out by competent roofing contractors who understand the potential environmental and health risks to operatives and others who could be affected by the work. When an over-cladding job is first carried out in accordance with the work plan, it is recommended that a UKAS accredited Laboratory is employed to carry out personal and fixed point air sampling to establish that fibre release is adequately controlled. The results of this sampling can then be used on jobs using similar techniques.

14) Specific controls to suppress and control asbestos dust arising from over-cladding asbestos cement sheeted roofs will vary with the nature of the of the job, but for most over-cladding work the controls should include the following:

- a) Where any drilling, screwing or other fixing into the asbestos cement sheet is necessary, employ dust suppression measures . For example use a slow speed drill in conjunction with a suppressant material such as foam, paste or gel to minimise and capture dust locally at the point of drilling the sheet.
- b) 500guage polythene sheeting to cover surfaces that are likely to become contaminated eg. crash decks, flooring and the roof space beneath the exterior roof sheets.

Note: Visqueen can create a slip hazard. It will not be necessary to visqueen cover crawling boards used to access the roof.

- c) Sign and barrier the work area, and the area below the work, to warn and keep out unauthorised persons.
- d) Clean dust, small fragments and other contaminated surfaces with damp/wet cloths or rags. These should be disposed of as asbestos waste: see (g)

Note: Care should be taken to clean any asbestos cement dust which gets onto equipment eg drills, tools, crawling boards etc

Note: Vaccum cleaners with HEPA filters for capturing/cleaning dust and smooth cleanable footwear such as wellington boots are normally recommended. However these are considered impractical and potentially unsafe when used on roofs.

- e) FFP3 respirators that have been face fit tested on the individual.
- f) Wear suitable Type 5 disposable coveralls with hood.

g) All dust and debris arising from the drilling or fixing and other waste items should be double-bagged in asbestos waste bags which should be closed and sealed using fabric tape. The bags should be wiped down and then be disposed of as asbestos waste.

h) Somewhere (not on the roof) for operatives to remove potentially contaminated coveralls and thoroughly clean footwear. Disposable coveralls should go as contaminated waste.

Note: Guidance on dust control and suppression techniques for non-licensed asbestos work can be found in the Health & Safety Executive publication HSG210 **Asbestos Essentials (AE's)** or at www.hse.gov.uk/asbestos/essentials. The following AE sheets may be of assistance:

a9 - Drilling holes in asbestos cement (AC) and other highly bonded materials.

a11 – Removing asbestos cement (AC) debris.

a14 – Removing asbestos cement(AC) sheets, gutters etc and dismantling a small AC structure.

em6 – Personal protective equipment PPE.

em7 – Using damp rags to clean surfaces of minor asbestos contamination.

em9 – Disposal of asbestos waste.

15. **Asbestos Training.** Workers will require specific training on safe work methods for overcladding and on asbestos awareness. Annual refresher updates will also be required (based on a training needs analysis). Guidance on the contents of training is set out in AEs sheet em2. For overcladding work it should include the following:

- a) Where asbestos can be found;
- b) What asbestos products look like and the different forms that they take;
- c) The health hazards;
- d) The health risk (for themselves and others);
- e) What to do if they think that they have become contaminated;
- f) The fitting and use of suitable RPE and protective clothing;
- g) Control measures specific to overcladding; and how to use them;
- h) Disposal of contaminated clothing, RPE and waste (see em9);
- i) Recognising and dealing with other dangers such as access and work at height.

16. Clearing up the job – All visible debris should be cleaned up and disposed of as hazardous waste (see a14 and em9).

17. Management of any Remaining Asbestos materials

18. Make sure that any changes are noted in the asbestos management plan for the premises so that future contractors can be alerted to the presence of asbestos (eg on inner sheets of a double skin clad roof).

19. If it is a job to which the CDM regulations apply, information about residual asbestos **must** be placed in the Health and Safety File

This document can be downloaded free of charge from the ACR website at <http://www.roofworkadvice.info>
Where the up to date list of members can also be found

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Concrete Tile Manufacturers Association [CTMA]

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