ADVISORY COMMITTEE FOR ROOFWORK

Best Practice Guide

ACR [CP] 002:2005

Guidance Note for Safe Working on Fragile Roofs

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

FASET FCMA FRA HSE MCRMA NARM NFRC RIDBA

PREFACE

Since the CDM Regulations were introduced in the Early 90s, much energy has been focused on new build to make roofs a safer place to work.

Specifically the Advisory Committee for Roofing 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 it 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 issue 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, 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.

Chris Pearce

Chairman of ACR

CONSTITUENTS OF THE SUB GROUP

1. This document was 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 Roofwork [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 roofs 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 is extremely hazardous and not a task to be undertaken lightly**. The hazard coupled with working at height, are 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.

SECTION 1 – GENERAL

Working on any roof is a hazardous activity, irrespective of whether it is fragile or non fragile. It accounts for approx 14% of all construction industry deaths [2002/3]

Introduction

6. 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

7. 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.

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

9. 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 prevent injury from and retain all falling objects.

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

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

12. All persons involved in roof work need to be aware of the risks that can occur through 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**

13. 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.

14. The hierarchy of risk control in the new 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. The techniques described in this document assume that a decision has already been reached that the required work cannot be done by any other way than by going on the roof.

Scope

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

16. 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]001:2003 Recommended Practice for work on Profiled sheeted Roofs and ACR[CP]006:2005 Edge protection for roofwork (currently in course of preparation)

17. 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 Roofwork (published by the HSE) for further guidance.

18. 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 at Work Regulations 2002. Although some detail about dealing with asbestos cement in the specific case of repair or oversheeting is dealt with in Appendix 2, this does not cover any work with low density ACM

Definitions

Competent Person

19. 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 hazardous 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 in place for the work

Crawling Boards and /or roof ladders

20. Access platforms, boards or staging that rests on the roof and gets its 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

21. 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]001:2003 Recommended Practice for work on Profiled sheeted Roofs & ACR[CP]006:2004 Edge protection for roofwork (currently in course of preparation)

Fall Arrest System

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

Fall Factor (FF)

23. 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.

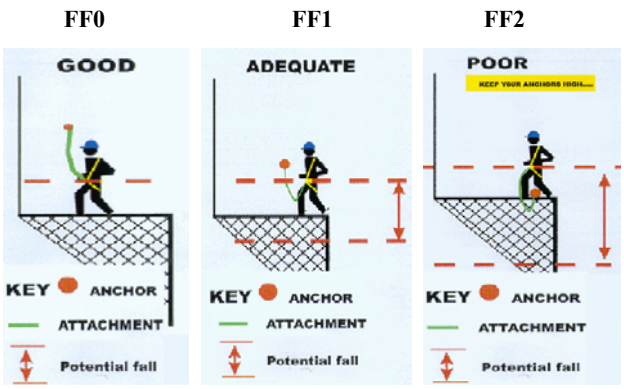

Figure 1 Fall factors

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

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) 001:2004 3rd edition.[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; seperate considerations needs to be made for potential falling objects/debris.

Note: See advice given in ACR Blue Book CP[005] 2005 Recommended practice for the use of nets in roofwork

Personal fall prevention system

27. Work equipment designed to prevent a worker getting to a point were he could fall, e.g. over the edge of a roof or through it. (See Figure 2)

Figure 2 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 systems using a harness and lanyard system which prevents a worker getting to a point were 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]001:2003 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 covered by 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. Additionally these 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

Related to the work equipment selected

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 rule/ 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 and valleys.

b) The available space for siting of access equipment and consider how it will be moved around.

c) Whether the roof structure (rafters and purlins) are strong enough to carry the person carrying out the inspection and potential maintenance workers with their equipment and materials.

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) If roof lights have discoloured to match the colour of the roof covering.

n) Any evidence of asbestos unidentified within the Asbestos Management Plan.

o) Any evidence of failed or failing structural members (shown by deflection of 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 to be able to comply with the Control of Working with Asbestos Regulations 2002. (CAWR 2002).

Note: See also specific requirements in Appendix 2 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 the future works.

Note: see paragraph 54 re additional requirements associated with accessing parts of roof which are not adjacent to valley gutters or eaves

t) Check availability of anchorages for PPE.

u) Check the inspection records of any installed safety systems.

v) Verify the maximum number of persons allowed to use the installed safety system at ay 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

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, pre-existing access points etc.).

b) Remotely from powered access platforms either over the roof or from underneath (see Figure 3)

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 and eaves positions, ensuring that the ladder over sails the roof edge by a minimum of 1m.

Note: This method is the last resort.

Figure 3 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 the provision of a qualified and competent operator to drive the equipment and arrange provision of full body harnesses and lanyards for work restraint for all who intend to work in it.

d) Where an inspection is required in the middle of a long run of valley gutter, access via the valley gutter could be used as long as inspection of the structure internally shows full structural support of any valley gutter used and the work is carried out in compliance with paragraph 69.

45. Finally prepare a method statement of 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 and/or roof ladders secured as necessary. **Walking the line of purlin bolts is not safe and should never be attempted**.

Note: It is the weakest part of the roof assembly and additionally the apparent purlin line may be simply a stitching line for end laps for sheets with 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 quality of the existing access, safety systems and anchorages.

c) **If the conditions found on site are not as anticipated stop the work and reassess the activity.**

d) Ensure suitable footwear is worn to take account of wet and slippery conditions.

e) Carry out a peruse check of all equipment.

52. Establish effective barriers to segregate traffic. 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) Ensure the gutter width allows clear access (i.e. not less than 200mm) for foot traffic using a proprietary safe walking system or a specifically designed and installed PPE anchorage system.

b) Where systems described in (a) above are not available, the sheeting adjacent to the valley gutter on both sides of the valley should be sheeted out to span a minimum of 2 purlins, using minimum overhangs of 4x the board thickness.

Note: The installation of such equipment is difficult.

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.

Note: This must give a minimum of 1.5 metres of protected surface

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 and/or roof ladders secured as necessary.

55. **Warning:** when using access equipment, do not be tempted to over reach out of a basket, tower 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 MEWP basket using a stiff brush and hot soapy water or from crawling boards, roof ladders when this is not possible.

Note: Where 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 from falling by wearing a harness and work restraint lanyard system.

59. If work must be done from the roof

a) Provide safe access to the eaves level by scaffold or scaffold towers. Ladders should normally only be used as a last resort.

b) Provide appropriate edge protection and strictly control the operatives movements.

Figure 4 Installing a proprietary edge protection system

Note: For detail of edge protection and fall protection requirements see Appendix 2 Fall protection requirements for MINOR work on roofs

Note: Roof slopes above 10^0 must have dynamic edge protection at the eaves below the working area regardless of its distance from the edge

Note: For details of standard of edge protection consult BS EN 13374:2004 Temporary Edge protection systems and ACR[CP]001:2003 Recommended Practice for work on Profiled sheeted Roofs & ACR[CP]006:2004 Edge protection for roofwork (currently in course of preparation)

c) Access from the eaves should be gained using crawl boards or roof ladders, which should be pushed up the roof to the work area and secured to prevent sliding and lateral movement.

Note 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.

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

d) If nets or other collective fall arrest systems cannot be provided beneath the roof, the operatives should use fall protection PPE.

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.

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

Cleaning an Eaves Gutter

60. Provide safe access to the work area, preferably by powered access equipment.

61. Clean from the powered access equipment, with the operatives restrained from falling by a harness and lanyard system attached to a secure fixing and anchorage.

Figure 5 Using a MEWP to clean the gutter

62. Where it is not possible 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 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 to15 minutes).

65. Provide a safe area below the work for the controlled fall of debris.

Cleaning a Valley Gutter

66. Provide safe access to the end of the valley gutter run, preferably by powered access equipment provided egress from the basket is not required.

67. Where powered access equipment cannot be used (or egress from the basket would be required) a tower scaffold should be used. However as a last resort a ladder may be used if it can be correctly placed and secured.

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

Note: see section on inspecting valley gutters paragraph 53

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

a) other protection such as a valley walker should be used. (See Figure 2)

b) the full valley run and the roof slope 2 metres either side should be netted,

or

c) each slope should be protected using sheeting or staging which should span a minimum of 2 purlins, using minimum overhangs of 4x the board thickness, (see Figure 6).

Note: see note 53(b) re dimensions

Figure 6 A partially boarded out valley gutter (another line of boards needed to reach 2nd purlin line)

70. The wet and slippery conditions within the valley make the selection of suitable footwear described in paragraph 51 d above imperative.

71. Use a safe system of working for transporting and lowering 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 57-59

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

SECTION 4 REPAIR/ REPLACEMENT

Replacing a Rooflight from above

75. Provide safe access to the eaves level by scaffold or scaffold towers. 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.

76. When carrying out the work, around (within 2 metres of) 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). Personal measures such as 'work restraint' and 'fall arrest' should only be used as the last resort.

Note See note after 59(d) for anchorage capacity

77. The roof structure needs to be strong enough to take the combined weight of the crawling boards, the operative and the equipment required.

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

Note: see notes after 59(b)

79. Regardless of the state of the opaque areas the rooflight will almost certainly be fragile and at no time should the operative lean onto or place their weight, materials or equipment on any roof light.

Repairing a Cracked Roof Sheet or Rooflight

80. 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 where the repair is fairly minor.

b) 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.

c) 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 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.

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

Removal and Replacement of Roof

82. Removal and replacement of a roof involves demolition and construction work, so the CDM Regulations will apply.

83. The designer and contractor should consider the following.

a) 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 could be an issue.

b) If work has to be carried out from the roof surface provide safe access to the eaves by a mobile tower or scaffold.

c) Depending on the scale of the work, consideration should be given to the use of proprietary systems for access over the roof.

Note: These can be moved down the roof as the work progresses and provide a secure working platform for the operatives.

d) The roof should be netted or some other collective fall protection system provided to the underside with crawling boards above if a proprietary system is not used.

See Figure 7 and Figure 8

Figure 7 A crash deck providing collective fall protection

e) Should the operatives rely solely on crawling boards suitable fall protection PPE must be provided.

Note See note after 59(d)

f) Guardrails and toe boards must be provided around the full perimeter and if appropriate debris netting under the roof and/or 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

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

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

85. 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 a morning or after cessation of

bad weather, check if the working surfaces have become slippery.

86. 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 or scaffold with stairs should be used

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

88. If the roof does contain asbestos the 'Control of Asbestos at Work Regulations (CAWR) 2002' will apply

Note: Disposal of asbestos cement roofing sheets should be carried out in accordance with the CAWR Regulations 2002, the Special Waste Regulations 1996 and the Special Waste (Amendment) (England and Wales) Regulations 2001

Note See also Appendix 3

SECTION 5 - ADVICE TO CLIENTS AND CONTRACTORS

Clients

89. 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 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 overroofing of multiple defects instead of isolated patch repairs or providing permanent access ways along eaves, valleys and gable verges of large buildings.

e) 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.

f) 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.

g) When selecting a contractor follow the principles given in paragraphs 4-19 of ACR[CP]001:2003 Recommended Practice for work on Profiled Sheeted Roofs.

Contractors

90. 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 better quality job i.e. overroofing the existing roof instead of multiple repairs or, replacing sheets instead of patch repairs.

c) Is the time scale and restrictions to the work, as required 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 affecting 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 intended to be used for the work adequately trained in 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 requirements needed to allow them to perform correctly

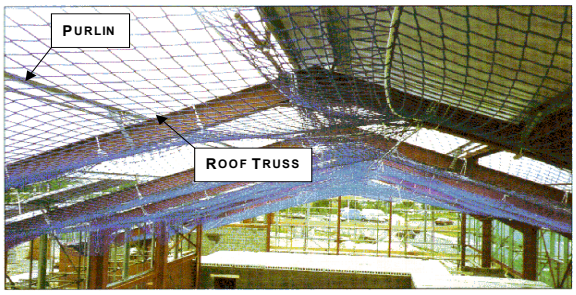

Figure 8 Maintain a clearance distance below nets

h) Can the Contractor comply with all the principles in paragraphs 20-58 of ACR[CP]001:2003 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:

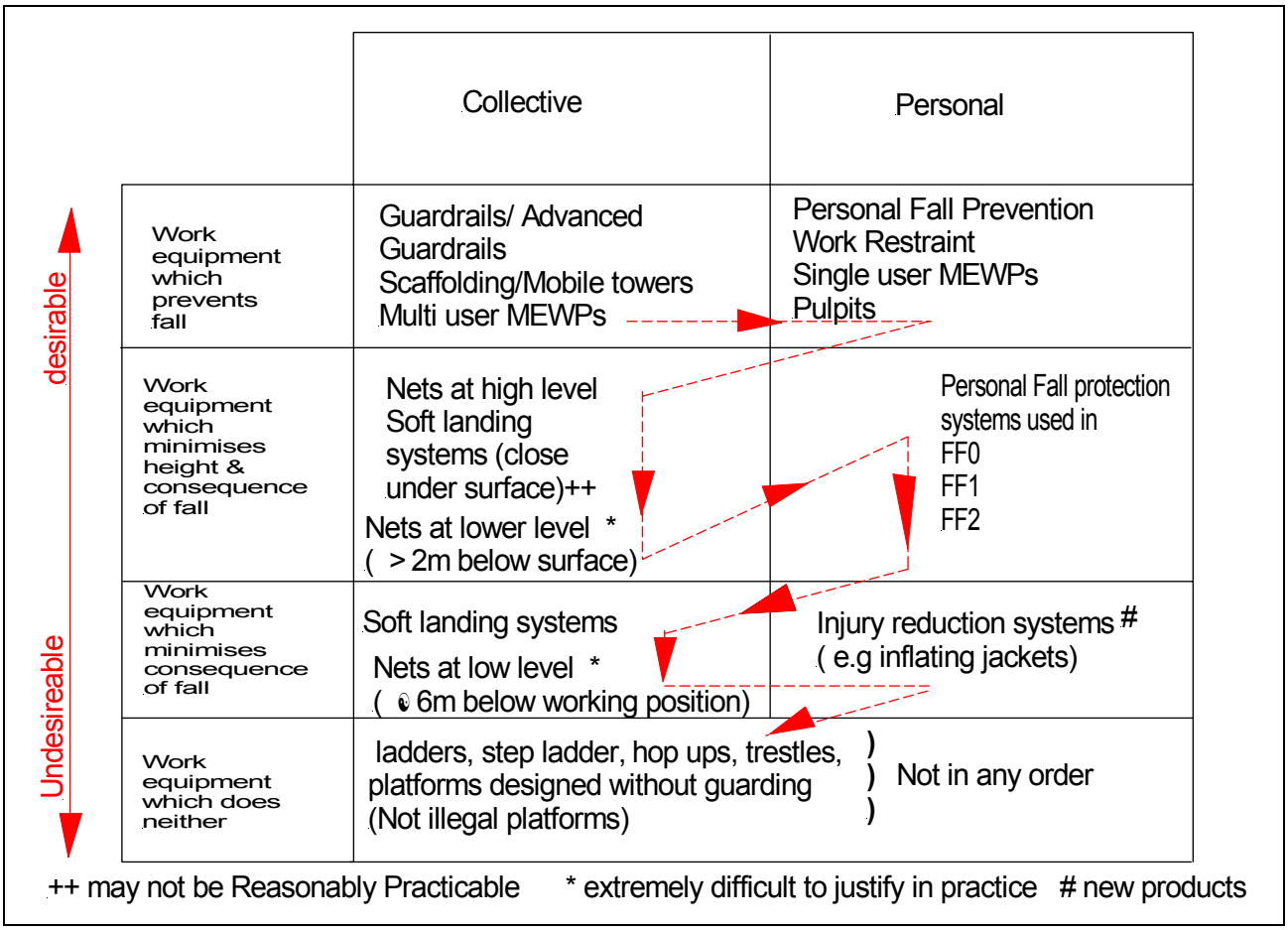

Figure 9 Order of selection of work equipment implied by the Work at Height Regulations 2005

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.

APPENDIX 2 FALL PROTECTION REQUIREMENTS FOR MINOR WORK ON ROOFS

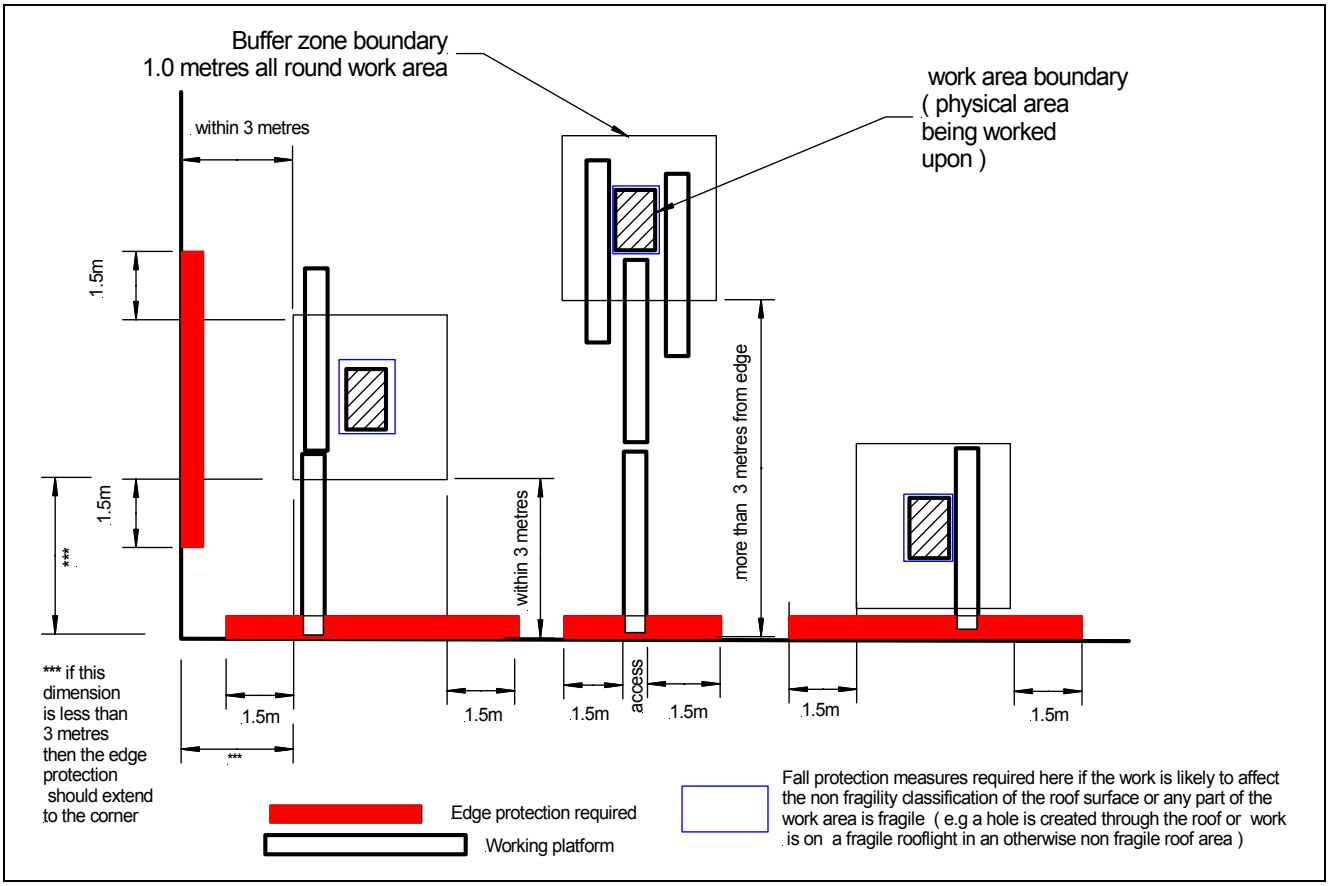

Figure 10 Edge protection requirements for non fragile roofs which have fragile elements in them

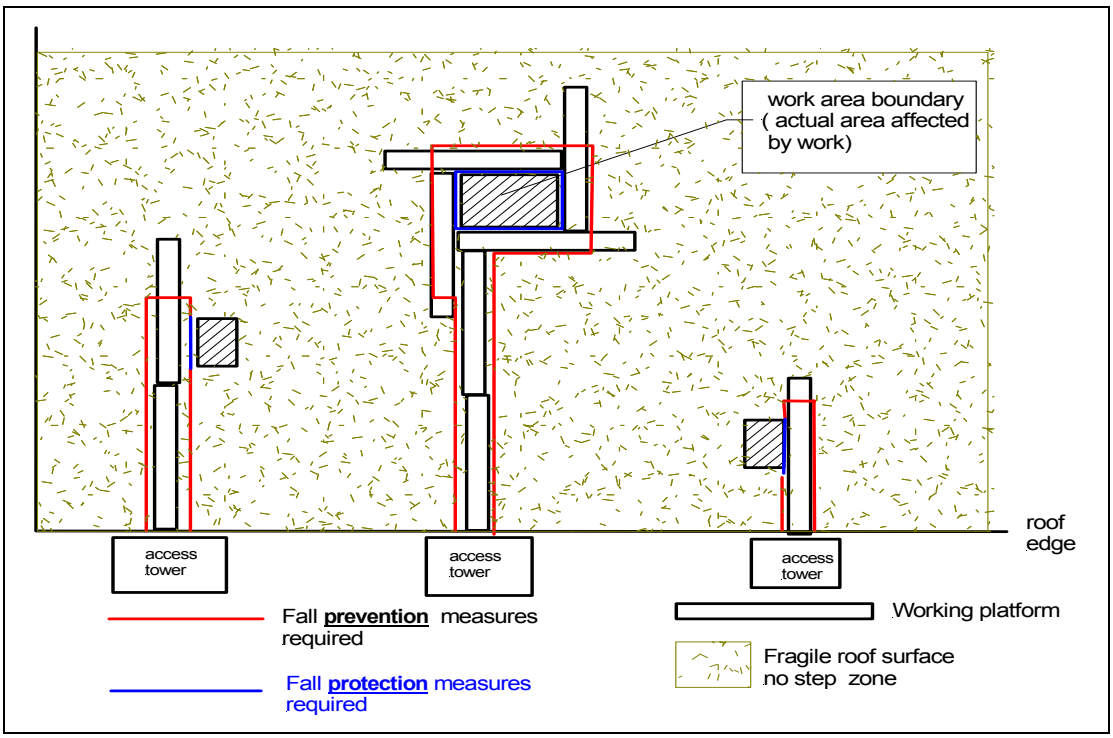

Figure 11 Fall protection requirements for fragile roofs

APPENDIX 3 - ASBESTOS ROOF OVER-CLADDING

Figure 12 Complete overcladding of an AC roof

WHAT YOU NEED TO KNOW:

Where is asbestos normally found in Roofwork?

1. Asbestos was used in hundreds of different products and buildings from the 1920s to the late 1990s.

2. Use of asbestos peaked in the 60s and early 70s but the majority of buildings built pre 1985 will contain Asbestos Containing Materials (ACMs) in some form

3. Asbestos roofing materials will normally contain 10-15% white asbestos although some older sheets may also contain brown or blue versions together with a bonding material such as cement.

Note: hence the name 'asbestos cement'

4. Asbestos cement was used up until 1999 in a variety of different premises and materials.

5. You cannot tell simply by the colour if the building product contains blue, brown or white asbestos.

6. Materials that release fibres more easily and thereby increase exposure are asbestos insulating board, e.g. in the form of soffit boards and sprayed coatings

Note: e.g. sprayed on the underside of roofs for fire, sound or condensation protection.

7. Asbestos cement materials are less hazardous because the asbestos is well bonded with the cement and usually only contains between 10-15% asbestos, but high levels of fibre can be released if sheets are roughly treated or powered tools are used .

Note: Powered drills can be used safely provided provision is made for capturing released fibres.

8. You will need to get an analyst to check what sort of asbestos material it is to check if a licensed contractor is required. [See paragraph 11 below]

SUMMARY OF ASBESTOS RELATED LEGISLATION

9. **Control of Asbestos at Work Regulations 2002** –Requires the prevention of exposure to asbestos, or where this is not reasonably practicable, reduction of exposure to the lowest level reasonably practicable; providing information about asbestos to those likely to disturb it.

10. In particular there is a requirement for all non domestic buildings to have been surveyed, assessed and an Asbestos Management Plan (AMP) to be in place

11. **Asbestos (Licensing) Regulations 1983** – check whether the roof construction (including soffits etc) contains asbestos insulating board or if any of the surfaces have been sprayed with asbestos coatings (rather than asbestos cement products.),if any work is required on these materials or they are going to be disturbed, you will need to use a contractor licensed by HSE to work with asbestos.

Note: You do not need a licence to work with asbestos cement products, e.g. corrugated roof sheeting.

IMPORTANT :The advice contained in this Appendix is not adequate to cover work with low density ACMs

12. **Carriage of Dangerous Goods and Use of Transportable Pressure Receptacles Regulations 2004** – there is an exemption to the requirements of these regulations for small quantities of asbestos using inner packaging of up to 1 kg carried in outer packaging of up to 4 kg in total for mixtures of asbestos and 6 kg (inner packaging) and 24 kg (out packaging) for white asbestos.

13. **Asbestos (Prohibition) Regulations (as amended) 1989** – you are no longer allowed to supply any material containing asbestos e.g. by re-using them at another job.

14. **Construction (Design and Management) Regulations 1994 (CDM)** – The AMP for the building should be checked, if one is not available checks should be made for asbestos before the contract is awarded to the principal contractor. All information about any on site asbestos known to the client/designer must be passed to the contractor before work starts and details of any residual asbestos should be put in the Health and Safety File at the end of the job.

Note: Good advice for designers on dealing with asbestos can be found at www.safetyindesign.org.

How can you be exposed?

15. Asbestos is only a risk if you disturb or damage it and cause fibres to be released into the air. If asbestos containing materials 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

Planning (over and above the requirements of section 2)

16. **Plan of work** - You must have a written plan of work that sets out how the work will prevent or reduce exposure to asbestos for roof workers. The plan must also cover how you will prevent exposure for building occupants and how you will prevent contamination of roof voids and other areas. Staff should know how to implement the plan This should include:

a) Summary of relevant section of any asbestos survey or asbestos management plan.

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) State the type and form of asbestos, the quantity, extent and condition.

d) Provide brief details of any access and fire risks and precautions taken.

e) Who will consider departures from the Plan of Work and how will these be noted and recorded on site.

f) State the expected exposure using controls specified.

g) How the release of fibres from the materials will be controlled.

h) How fibre and debris will be prevented from spreading to occupied areas, especially areas below the roof.

i) How debris will be prevented from contaminating the unoccupied areas.

j) What protective clothing and respirators are to be worn.

Note: Respirators should be FFP3 to BS EN149

Note: It is recommended that overalls should be disposable

k) Describe how control measures are to be maintained on site and what checks are to be in place and who is in charge.

l) State any additional precautions to reduce exposure

m) Provide detailed site information and a site specific description of the working method to be used with reasons

n) State what tools and other equipment are to be used

o) Welfare facilities

p) Waste disposal, including notification of the waste transfer to the local Environment Agency (or Scottish Environment Protection Agency) and transport to a suitable landfill site using a licensed haulier. 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 Special Waste

q) Emergency procedures in the event of an inadvertent asbestos exposure

r) 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.

Carrying out the work (over and above the requirements of Section 4)

17. The recommended method for fixing the overcladding sheets is using a self drilling tapping screw rather than a hook or J bolt. (as shown in Figure 13)

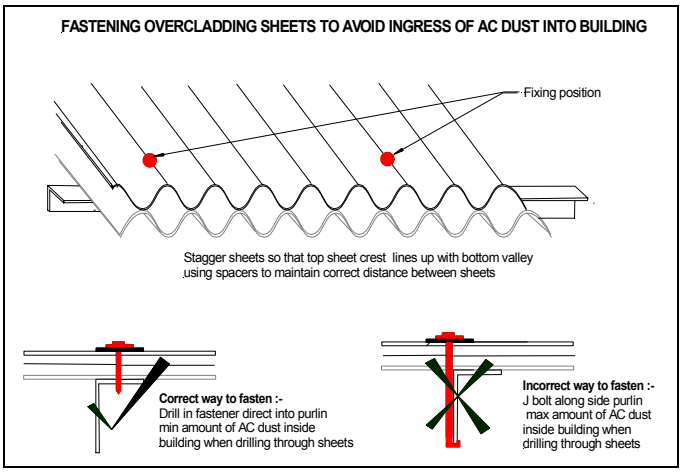

Figure 13 Fastening detail for minimum dust generation

18. **Controlling exposure** – some advice on dust suppression techniques can be found in **Asbestos Essentials Task Manual**, HSG210, (published by HSE), Task Sheets A9 (drilling through ACMs); A14 (removal and overlay);

19. Specific controls will vary with the nature of the job, but for most overcladding jobs you will need:

a) Visqueen - to cover surfaces that are likely to become contaminated e.g. crash decks and the area of flooring or roof space beneath the exterior roof sheets

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

b) Signs and barriers to segregate the area to keep out unauthorised persons, including areas beneath the roof.

c) Fine water spray to dampen down areas prior to working on them

d) FFP3 respirators that have been face-fit tested on the individual (qualitative or quantitative).

Note: p.22-23 of HSG210 shows how to wear a respirator correctly

e) Wear suitable coveralls with a hood

Note this should be Type 5, category 3.

f) Asbestos waste bags in which to place any debris arising from drilling etc and a suitable means of sealing them

Note :The method of sealing should be checked with the bag supplier.

g) Somewhere to take off potentially contaminated coveralls etc

Note: On a roof, the use of vacuum cleaners with HEPA filters and readily cleanable footwear such as wellington boots normally recommended, is considered impracticable and potentially unsafe

20. **Additional training** – This need to be provided in the following topics with at least annual updates based on a training needs analysis:

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 employer/ees' responsibilities under The Control of Asbestos at Work Regulations 2002;

g) The fitting and use of suitable RPE and protective clothing;

h) Control measures specific to overcladding;

i) Disposal of contaminated clothing, RPE and waste.

21. **Clearing up the job** - you will not normally need an asbestos decontamination unit for personal decontamination when working with Asbestos Cement

22. All visible debris should be cleaned up and disposed of as special waste.

Management of any Remaining Asbestos materials

23. 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

24. 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 obtained from any of the participating organisations at the addresses printed below or downloaded free of charge from the ACR website at http://www.roofworkadvice.info

Fall Arrest Safety Equipment Training [FASET]
Carthusian Court
12, Carthusian Street,
London
EC1M 6EZ
Tel 020 7397 8128
Fax 020 7397 8121
e-mail enquires@faset.org.uk
Contact Mr S Kennefick

Fibre Cement Manufacturers' Association [FCMA]
ATSS House,
Station Road East,
Stowmarket,
Suffolk,
IP14 1RQ
Tel 01449 676053
Fax 01449 770028
e-mail fcma@ghyllhouse.co.uk
Contact Mr A M Hutchinson

Flat Roofing Alliance [FRA]
Fields House,
Gower Road,
Haywards Heath,
West Sussex,
RH16 4PL
Tel 01444 440027
Fax 01444 415616
e-mail info@fra.org.uk
Contact Mr P Franklin

Metal Cladding & Roofing Manufacturers Association [MCRMA]
18, Mere Farm Road,
Prenton,
Birkenhead,
Merseyside,
CH43 9TT
Tel 0151 652 3846
Fax 0151 653 4080
email mcrma@compuserve.com
Contact Mr C Dyer

National Association of Rooflight Manufacturers [NARM]
43 Clare Croft,
Middleton
Milton Keynes,
MK10 9HD
Tel 01908 692325
Fax 01908 674122
e-mail admin@narm.org.uk
Contact Lorraine Cookham

National Federation of Roofing Contractors
24, Weymouth Street,
London,
W1G 7LX
Tel 0207 436 0387
Fax 0207 637 5215
e-mail info@nfrc.co.uk
Contact The Technical Officer

Rural Industrial Design and Building Association [RIDBA]
ATSS House,
Station Road East,
Stowmarket,
Suffolk,
IP14 1RQ
Tel 01449 676049
Fax 01449 770028
e-mail secretary@ridba.org.uk
Contact Mr A M Hutchinson