

One of the main causes of deaths and injuries at work each year is falling from height, particularly through or from roofs. To ensure safety during roofwork requires the commitment of all those involved in the procurement process. This publication aims to give advice on how this can be achieved, by addressing:

- The planning of, and safe systems of work for, work at height;
- The selection and use of work equipment for work at height;
- The management and supervision of work at height;
- The competence of workers performing work at height; And
- The role designers can play in limiting hazards.

The delivery of improvements in the prevention of falls from height will only be achieved with the full involvement of all those with a role to play, i.e. employers, workers, trades unions, trade associations, manufacturers, trainers and others.

This Best Practice Guide gives practical advice on the duties placed on clients, contractors, designers and manufacturers and includes recommendations for good practice while working on roofs. It concentrates on profiled roofs. Nevertheless, those engaged in other similar activities would benefit from the advice given, as many of the principles do apply and offer good practice.

I thank those involved for their valued input and the often lively and wide-ranging debate.

Paul Franklin (Chairman)

CONSTITUTION OF THE TASK GROUP

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- Fall Arrest Safety Equipment Training (FASET);
- Fibre-Cement Manufacturers Association (FCMA);
- Flat Roofing Alliance (FRA);
- Health and Safety Executive (HSE);
- Metal Cladding and Roofing Manufacturers Association (MCRMA);
- National Association of Rooflight Manufacturers (NARM);
- The National Federation of Roofing Contractors (NFRC); and
- Rural, Industrial, Design and Building Association (RIDBA)

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FOREWORD

This Best Practice Guide was drawn up by The Advisory Committee for Roofwork [ACR], to assist in making roof working a safer occupation. 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 best practice, which has been achieved. While this document concentrates on safe working practices on industrial and agricultural roofs, much of the advice is applicable to work on other types of roof.

Working on roofs is an extremely hazardous activity. This is confirmed by the Health and Safety Executive's (HSE's) accident statistics, which also show that many

of these accidents happened because the people carrying out the work were not competent to do so. Consequently, the work was carried out without the necessary planning or management and, often, without suitable equipment.

In addition, many designers of roofs do not do enough to design out risks. Neither do they consider how roofs will be built, the needs of the persons working on roofs, future maintenance needs nor demolition. Often, this results in the specification of inappropriate designs.

Some clients who have inadequate knowledge of their duties when commissioning roof work exacerbate the hazards, which exist when working at height.

This Best Practice Guide provides a source of essential information, by addressing the roles and responsibilities of all who may be concerned with working on roofs. It draws 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 roofs a less hazardous occupation.

Details of other ACR publications can be found on the ACR website www.roofworkadvice.info/publications

IMPORTANT REVISIONS TO THIRD EDITION

This third edition of the document contains the following changes:

Section	Revision
25 to 29	Added to cover the removal of materials from a roof
Back Cover	Changes to address details

INTRODUCTION

Roofs need to be constructed and then maintained, repaired and ultimately replaced. Managing the hazards connected with working on roofs is just as important as managing any other hazards that people at work are exposed to. The proper management of the hazards associated with roof working can only be achieved if all those responsible for this work undertake their duties conscientiously.

The failure of any roof while it is being worked on can have devastating effects. Consequently, it is a legal requirement to ensure the safety of persons working on a roof. It is, therefore, essential to plan working on a roof carefully and to recognise that the key to safety of those working on roofs lies in:

- Clients employing competent practitioners;
- Designers designing out risks;

- Proper planning and control of the work;
- Employing a competent roofing company;
- Ensuring that all workers on roofs are properly trained in the necessary skills and in safety procedures and appropriately managed; and
- Providing the building owner with good advice about the essential maintenance and advice about a safe system of work to be applied every time access to the roof is required.

This document gives advice on how these requirements can be met; starting with the preliminary decisions to be made and going on to give guidance on particular provisions to make working on roofs safer.

HOW THE LAW APPLIES

1. The erection, dismantling and repairing of roofs come under health and safety law. The specific requirements of the Acts and Regulations 1,2,3,4 are well documented in other guidance notes, to which the reader is referred.

- ¹ *Management of Health & Safety at Work Regulations 1999;*
- ² *Health and Safety at Work, etc. Act 1974*
- ³ *Construction (Design and Management) Regulations 2007.*
- ⁴ *Work at Height Regulations 2005*

2. UK Health and Safety Law requires hazards to be identified and, where possible, eliminated. Any residual risks should be assessed and safe systems of work developed to minimise them. If there is an accident on the roof on which you are working, you may be asked to prove that you applied these principles.

3. Remember, having a safe system of work when undertaking work on a roof is a legal duty and should be a co-operative effort between the Client, the Contractors and the Designer. If each of these parties carries out their duties properly, the risks associated with roof working will be minimised.

THE CLIENT

Preliminaries

Fragile Surface

4. Before commencing any work on any existing roof it is absolutely essential that you find out whether your roof is fragile or non fragile. **This is a key decision, which should only be made by persons competent to do so. If there are any doubts, assume that the roof is fragile.**

5. If the roof is identified as fragile or suspected of being fragile, systems of work, which protect the worker from the hazards of working on or close to

fragile roof areas, must be put in place, see ACR[CP]002 Guidance note for Safe Working on Fragile Roofs.

6. For new roofs, establish with your professional designer and/or the manufacturer or supplier of the roofing products to be used, the performance of the roof assembly. For any system claiming to be non-fragile a specification must be provided/backed up with documentary evidence.

7. Assemble all the existing information you have about the roof and pass it to the company you have selected for the work, and place copies in the Health and Safety File.

Choose a competent company

8. The only way to start the job off properly is to choose a company competent to carry out roof work, who should demonstrate at least the following:

- a) A knowledge and understanding of the work and the health and safety laws covering roof work;
- b) That it can manage/eliminate the risks involved in working on roofs;
- c) It has been assessed for competence and employs a trained workforce, preferably holders of a CSCS/SCORE skills card;
- d) It understands the methods of use and mechanical properties of all the roof materials and systems involved in the installation;
- e) Is a member of a relevant trade association, e.g. one of those listed on the back cover. See also ACR Yellow advisory sheet No1 and the ACR Black Book

Insist on a method statement

9. Before letting any person work on a roof, insist that there is a project specific Method Statement [see Annex A] with appropriate Risk Assessments and that they understand it. If necessary, let someone who understands roof working read it and act on their advice. If you subsequently see work being carried on in an unsafe way or not in accordance with the Method Statement, STOP THE WORK. See Annex A and D

Accommodate the roof worker

10. Discuss the roof work company's requirements for access with them. You may have to shut down areas of production because of the inherent dangers of letting people work under a roof being worked on.

11. Plan any shut down. Remember, the roof workers' access requirements could obstruct passage around your site, affecting your daily operations.

12. Make all your employees aware that roof work is being carried out on your premises and warn them of the dangers associated with such work.

13. Allow adequate time for the company to carry out the work safely. Do not compromise safety by forcing people to rush high-risk work. You will also gain from this decision, because it will ensure that the work on your roof is of the required quality.

Getting Started

Essential Documentation

14. All roof work must be preceded by a method statement, which sets out in detail how the job in question is to be done. Therefore, the roofing company should be able to provide at least the following:

- a) A risk assessment covering the work, which should include managing the risks to people who will be in the vicinity while the work is being carried out;
- b) A viable programme for the work; and
- c) A statement of their requirement for power, ancillary structures associated with roof work and delivery schedules.

15. In addition, they should supply you with a list of those who will be working on the roof, accompanied by proof that they are competent to do so - paragraph 8c. **Do not accept untrained workers [see paragraph 29].**

Pre-start checks

16. Before letting the contractor start work, ensure that they have supplied what they have undertaken to provide for the safety of all concerned. **Do not let work start until every necessary safety item is in place.**

17. If the roof materials need to be fitted by a specialist contractor, or by a contractor approved by the material manufacturer, check the contractor has the necessary approvals and skills

18. It is recommended that you operate a permit-to-work system for any one who will access the roof. The system should ensure that everyone:

- a) Is competent to work on a roof;
- b) Is given a safety induction course before commencing work;
- c) Is properly briefed about hazards associated with a particular roof and safe access to it; and
- d) Has access to and is competent to use suitable safety equipment.

See Annex E for sample of a permit to work

Post-construction maintenance

19. Like any other product, roofs will perform better and for longer if you maintain them properly. But remember, the hazards in maintaining a roof can be greater than for constructing them. Do not allow any company to inspect and maintain your roof without vetting their skills and safety methods first. Do not

allow untrained employees to "pop up" for a quick look or to carry out quick repairs.

THE CONTRACTOR

20. It is the job of a roofing contractor to assess the risks associated with working on roofs and, as far as reasonably practicable, to minimise them.

Hazards associated with roofworking

Falls

21. The two major hazards associated with working on roofs are: people and objects falling off and through fragile roofs.

22. People fall during roof work because:
- There are unguarded openings or edges;
 - They slip on roof coverings, which are wet, covered in frost or growths;
 - They step on to incompletely fixed sheets or panels, which are fragile; or
 - They step on old assemblies, which have become fragile, over time.

Asbestos

23. If you think you may encounter Asbestos, or materials, which may contain Asbestos, there will be serious hazards associated with all such materials, which are covered by their own set of Regulations. You must follow the statutory requirements. Get advice from competent persons, if you do not feel confident about dealing with it yourself.

Do not take chances with asbestos and never walk on asbestos or fibre cement sheets or liner sheets. See ACR Green Book for further information

Power Cables

24. Before work commences it must be checked by your electricity supplier that there is no danger posed by overhead electric cables. If there are power lines within the vicinity of the work then specific provisions must be made to ensure that the work can be carried out safely. This may include delaying the work until the power can be turned off.

Removal of materials from the roof

25. Often and particularly during renovation work, materials, tools and plant will need to be removed from the roof. This must be planned in advance to ensure that the correct method is used to carry out the task safely.

26. Removal methods required will depend on the weight, size, quantity and shape of the materials to be removed and whether the materials are to be reused. Methods to consider are:

27. Mechanical – hoist, crane, forklift, MEWP, etc. Particular caution must be taken when using MEWPs as most Boom type machines are only designed for lifting

people and tools and so have very limited lifting capacity.

Rubbish chute – correctly covered and erected [but are of limited use with large element roofs]

28. Materials should not be removed from the roof by an operative using a ladder, unless the materials are light enough and small enough to be carried in such a way that the operative can retain three points of contact on the ladder at all times.

29. As sheeting materials, insulation, gutters etc are inevitably large items relative to their weight dropping materials from a roof is rarely likely to be acceptable practice. If, after a rigorous risk assessment of all of the options, this is deemed to be the safest option, the area below should be fenced off or protection methods put in place to ensure that no one can access the landing area⁵. The protection needs to be far enough away from the impact area to ensure that materials that are blown by the wind, break up or bounce cannot reach the fencing/protection. Wind conditions must also be reviewed during the work because of the effect that they will have on the safe distances that materials can be dropped. Edge protection must also have more frequent inspection if roofers are leaning on it whilst dropping materials.

⁵ *As a guide only, the minimum distance for any exclusion zone should be at least half the drop height or 6 metres (whichever is the greater)*

Other hazards

30. Other hazards which must be taken into account include: the use of power tools, sharp edges, swarf, dust [when cutting roofing products], materials stored on a roof, manual handling, etc

31. In addition, you are responsible for providing measures to protect other people who are in the vicinity of the roof you are working on.

Risk Assessments

32. It is not acceptable to provide cover-all generic risk assessments. While certain parts of generic assessments may apply to all jobs, each job should be looked at on its own, to identify the hazards and assess the risks, to develop systems of work which will remove or reduce these hazards and manage the residual risks.

Planning the work

Choosing the team

33. Choose the team that will work on the roof carefully. In particular, ensure that the person who will supervise the work is competent to do so, as that person will set the standards for the other workers to follow.

34. If introducing inexperienced workers, ensure that they are given formal training on health and safety before they go on a roof and that they always work in an

area where the supervisor can see them and speak to them. **Never allow inexperienced people to work on roofs unsupervised.**

Gather Information

35. If there is a Health and Safety File, read it.
36. Always assume existing roofs are fragile unless a competent person decides that it is non-fragile.

Control access to and movement over the roof

37. Provide dedicated and safe access onto the roof, and ensure that all persons access the roof from these point(s) only. Whenever possible, access should be via a stair-tower. However, if ladders are used:
- They should be tied at the top and extend sufficiently past the access point to gain an adequate hand hold;
 - They should not be more than 9m long, without a rest platform; and
 - The person using it should have both hands free.

38. It is not good practise to allow people to walk on roofs for safety reasons and to prevent roof damage. Where it is necessary to protect roofs or gain access over fragile surfaces Stagings⁶ or other forms of work platforms should always be provided.

⁶ Stagings should be secured to prevent accidental displacement, including by the wind. Remove them when they are not in use.

39. If walking over large areas of roof is unavoidable, provide obviously demarcated dedicated walking areas and enforce their use. **Ensure that persons on the roof cannot approach fragile areas or exposed edges**, by an effective means: either by covering or by providing an effective barrier. High visibility tapes, used on their own, are not acceptable.

40. Minimise the amount of walking on roofs, by ensuring that materials necessary for the work are deposited as close as possible to the point at which they will be required. Provide dedicated walkways for carrying materials to their point of use.

41. **Never allow people to walk on rooflights.**

42. Remember, non-fragile assemblies can be rendered fragile if they are not fixed down in accordance with the manufacturers' instructions.

Storing materials

43. While individual roofing components may be light, in packages they may be quite heavy. Provide some means of spreading the load.

44. When stacking materials on the roof, make sure that you find out the maximum load that the roof can

support. If in doubt, consult a structural engineer and never exceed the maximum load allowed on a roof.

45. Ensure that all materials stored on the roof are secured against accidental displacement⁷.

⁷ Materials on the ground may also be subject to wind uplift.

46. Arrange the stacks of material so that the item to be used first is at the top of the stack and so on. This will stop roof workers having to separate the delivered items to find the one that they need to use. In addition, ensure that workers are supplied with sufficient fixings to allow them to fix the sheets as specified.

47. Remember, **even non-fragile roof assemblies may be rendered fragile by heavy loads or constant traffic.**

Limiting loads carried by people

48. Regulations covering manual handling⁸ have been in place since 1992. These Regulations require you to avoid, so far as is reasonably practicable, the need for manual handling of heavy or awkward loads. The amount that can safely be handled will also vary according to weather conditions.

⁸ *The Manual Handling Operations Regulations 1992.*

Fixing the assembly

49. Always fix roof assemblies in accordance with the manufacturers' recommendations, e.g. sequence of laying down the sheets, number of fixings, etc.

50. **Never allow partial fixing only of roof sheets.** Complete all work as you go. Each sheet should be fully fixed, allowing progress of the work as it is laid down, with the correct number of fixings as required. Remember wind can lift unfixed sheets therefore, at the end of each day; ensure that all sheets are fully fixed.

Scheduling deliveries

51. Avoid material deliveries at ends of shifts, because workers may hurry to finish the job and, inadvertently, take risks they may not normally take.

Provision of fall protection

52. To prevent people and materials from falling from the roof, edge protection must be provided at the eaves and gable of roofs and at any other roof edge off which workers on the roof can fall.

Nets

53. The Advisory Committee for Roofwork considers that properly erected safety nets should be the preferred method of additional fall protection. Where nets are provided you must ensure that they are erected as close as possible under the working area and that:

- They satisfy the current relevant standards;
- They are erected properly by competent people, trained and assessed to CSCS standards, who

are able to prove their competence through a CSCS safety net riggers card;

- c) There are no obstructions within the nets arresting distance; and
- d) Competent people regularly inspect them.

54. Nets may be removed when a non-fragile roof is in place (minimum ACR[M]001:2000 class C), but see Annex B.

Personal Protective Equipment [PPE]

55. Collective fall arrest systems (such as safety nets) are to be preferred to personal fall protective systems such as safety harnesses and lanyards. However where, following a risk assessment, such equipment is considered the most effective means of fall protection, you must issue this to your workers. There are two main types:

Work Restraint: which physically prevents a person from reaching any position from where a fall is possible.

Fall Arrest: which allows a person to reach a position from where a fall is possible but limits the distance and consequence of a fall should it occur.

It is essential that the correct type of equipment is selected for the job and where there is a choice of which system to use Work Restraint should always be selected in preference to Fall Arrest

In addition, you must:

- a) Train operatives in its proper use, including fault recognition and storage;
- b) Ensure that there is a rescue plan in place so that fallers can be rescued immediately;
- c) Ensure that the certificates showing that the equipment is in working order and meets the requirements of the Regulations⁹ accompany the PPE.

⁹. *Personal Protective Equipment at Work Regulations 1992.*

56. Before using Personal Fall Protective equipment ensure that there are no obstructions within the arresting distance.

57. Anchorage systems for both types must have a valid certificate of inspection. Remember the removal of roof sheets may affect the integrity of systems. If in doubt consult the installer of the system.

Construction Drawings

58. If the safety of the workers depends on a set pattern of fixing roof sheets ensure that a drawing, which sets out in detail the sequence of operations, is kept on the site. Whatever method is used to transmit this information to the workers, it must be in a form that

is understood by all operatives and should be referred to in the method statement.

59. If the sequence of the work is altered, do not restart until you are sure that the new work sequence does not increase the risks to the roof workers and, if necessary, that the method statement has been amended.

Reporting Incidents

60. Today's "near miss" is tomorrow's accident so it is essential to set up a system for roof workers to report any accidents and incidents, regardless of how minor they think they are. A heavy stumble could make a non-fragile assembly fragile.

61. After any such report, the area of roof in question should be inspected by a competent person, to ensure its non-fragility has not been affected. You must act on the competent person's advice.

62. Similarly, if safety equipment, e.g., nets or harnesses are used to arrest a fall, they should be taken out of use until they have been inspected by a person competent and passed as fit for reuse. Any equipment deemed as not safe to use must be destroyed.

Method statements

63. Having considered all the points in paragraphs 21 to 62, write a job-specific method statement - also see Annex A.

DESIGNERS OF NEW ROOFS

The Law

64. Whoever designs the roof assembly assumes the responsibilities of a designer under the Construction (Design and Management) Regulations 2007 which require you to give due consideration to removing the hazards at source. Only when this is not possible, you must reduce the risk from the hazard and inform the Contractor of the residual risk, so it can be included in the Health and Safety Plan.

Designing in fall protection

65. Workers require protection from falls when they construct and maintain roofs. Therefore, consider this at the design stage, by thinking about how temporary edge protection could be fixed to the structure during roof construction. For safety during maintenance, consider the provision of a permanent parapet or barrier at the eaves and along the gable.

66. Consider the spacing and layout of any rooflights to minimise the risk of accidental foot traffic. In addition, avoid locating rooflights too close to the edge of a roof.

Provision of access to maintain the roof

67. People who have to work on roofs must be able to access the roof safely. Therefore, consider designing in systems that will minimise the risks associated with

getting on to the roof. For example, you might consider [a] the provision of permanent protected lockable ladders, or [b] permanent ladder stops at the eaves, above a solid and even hardstanding, or [c] a level hardstanding, which can be used for towers or to position suitable powered access equipment, or [d] an internal access hatch.

Specifying Roof Assemblies

68. You should specify a non-fragile assembly. Tests for determining non-fragility are given in Document ACR(M)001:2005¹⁰.

¹⁰ ACR[M]001:2005, *Test for Fragility of Roofing Assemblies*

69. The supplier of any roof assembly specified should be able to advise you of the classification of this assembly and, on request, provide the test data to support the classification.

70. To take account of the maintenance of the roof, specify one of the following programmes, which will fulfil the requirements of your roof:

Low maintenance roofs

71. Low maintenance roofs are those, which require very infrequent access, e.g. simple duo-pitched roofs requiring only maintenance that can be done from ladders, or low pitched roofs requiring infrequent access for roof maintenance only, by experienced roofworkers. The minimum standard for this type of roof is a Class C assembly to ACR[M]001:2005

Medium maintenance roofs

72. Medium maintenance roofs are those, which require regular access for maintenance of the roof only, by experienced roof workers. The minimum standard for this type of roof is a Class B assembly, to ACR[M]001:2005.

High maintenance roofs

73. High maintenance roofs are those, which require frequent access for maintenance, e.g. roofs with penetrations for plant exhausts, etc. The minimum requirement for this type of roof is a Class B assembly to ACR[M]001:2005. In addition, provide dedicated walkways with handrails, if required, to reach the item of plant to be maintained.

74. If you mix and match products you could end up with a fragile construction. **Always seek advice from a competent person before you mix and match products if it is not possible to discuss the proposed change with the relevant manufacturers.**

75. Remember, the preferred method of fall protection may be nets. In this case you must ensure that any supporting structure, which will support nets, can carry the loads that it will be subjected to. Discuss

the requirements for nets with a competent supplier of nets.

76. Remember, also, that the environment in which roofs exist can change. Such changes may have a dramatic effect on the mechanical properties of the assembly you specify for the roof. **Changes in condition, which would cause this, should be given prominence in the Health and Safety File.**

77. When incorporating roof lights, find out how weathering will change the colour of the roof and the rooflights. Specify rooflights, which do not discolour to become indistinguishable from the rest of the roof. It is advisable to specify weatherproof caps to the rooflight fixings of a distinctly different colour to the other fixings. Conventionally, poppy-red fixings are used.

THE MANUFACTURER

78. Manufacturers of sheets for use in roof assemblies also have responsibilities:

- a) They should test their sheets to be non-fragile in accordance with ACR[M]001:2005, in which the components are tested as part of an assembly and, as such, the type of and number of fixings, size of washers and the skills with which contractors apply these are relevant to the non-fragile performance of the assembly.
- b) For new roofs, the conditions affecting guarantees of non-fragility should be clearly stated [and given prominence in the Health and Safety File, which would be handed over to the building owner at the end of the contract];
- c) Any claims for non-fragility of roofing assemblies for a given period of time will depend on each component performing to the required level throughout that period. If any component fails to perform for the required period, it is likely that the assembly will become fragile during the period;
- d) If you are providing a guarantee of performance you must state very clearly the conditions under which the guarantee is supplied;
- e) They should provide specific information to be included in the Health and Safety File relating to the maintenance of their product and information about any issue, which is relevant to non-fragility and safety;

BIBLIOGRAPHY

Some useful references include:

1. HS(G)33: Health and Safety in Roofwork [HSE]
2. The Red Book ACR[M]001:2005 Test for Fragility of Roofing Assemblies
3. Profiled Sheet Roofing and Cladding - A Guide to Good Practice [NFRFC]

4. Technical Guides [various] - MCRMA
5. BS 5427 Code of Practice for Performance and loading criteria for profiled sheeting in building
6. Building Regulations - Approved Documents B, F and L
7. Cladding Manufacturers' Literature [various]
8. INDG401 Rev 1 Working at Height Regulations – A brief guide as amended
9. The Green Book ACR[CP]002 :2005 Safe Working on Fragile Roofs
10. The Black Book ACR[CP]005:2006 Guidance Note for Competence and General Fitness Requirements to Work on a Roof
11. ACR Information Sheet 1 Selecting a Competent Roofing Contractor
12. The Magenta Book ACR[CP]07:2007 The Use of Horizontal Safety Lines in Roofwork

The Advisory Committee for Roofwork [ACR] is a body dedicated to making working on roofs safer. Its membership is made up of nominees from the major roofworking Federations and Associations and the Health & Safety Executive, who provide the experience of many years of involvement in working on roofs in the advice given in their documents.

ANNEX A

A1. Working on a roof is high-risk work, which requires the closest attention to detail at all times. There should be a job specific method statement in writing, agreed and understood by all parties before the work starts. Rigorous supervision is needed to ensure that the agreed method is followed in practice, but there should also be a system to allow necessary changes to be made and validated.

A2. Safety method statements should be clear, concise and include simple sketches.

A3. The following general questions are particularly relevant to a low-pitched industrial roof consisting of inner sheet, insulation layer and profiled metal top sheet. It is not an exhaustive checklist, but is intended to act as a prompt when method statements are prepared and reviewed.

A4. The equipment required to carry out the work safely should be clearly specified, and there should be a system of inspection and training to ensure that the equipment used is in good condition and fit for its purpose.

A5. Non-standard or unusual systems will require special consideration. There may also be risks specific to an individual site, which will need to be addressed (e.g. the presence of overhead power lines).

Some of the issues, which need to be addressed by a method statement, are given below, in Table A1.

Table A1 - Important hazards to be addressed in Method Statements

HAZARD	PROVISION TO CONTROL HAZARD
FALLING when getting on and off ladders at eaves	1. Access to roof: have access points been discussed with the roofing gang in order to reduce travel over the roof to a minimum? If ladders are used (as opposed to towers) are means available for hoisting smaller components not craned up? Has the stability of long ladders been considered, e.g. will they need staying to reduce whip? Can the ladders be properly secured?
FALLING when walking past open edges to fetch materials	2. Materials handling: how are roofing packs loaded out onto the roof? Is this planned so as to reduce travel when fetching sheets and does it allow for protected routes/safe means of access? Splitting packs of

	them at ground level can save travel at height. Back loading onto the completed roof can reduce travel past open edges.
FALLING from steel frame when unslinging	3. Unloading cranes: if a crane is being used who is the Appointed Person, has a lifting plan been prepared, is a loading out plan available and are the operatives trained in slinging? How will they be protected from falling? Has the use of mobile access equipment been considered for this task?
FALLING from outside building frame at all stages of work. Gable ends are particularly hazardous	4. Edge protection: is it provided at eaves, gable ends and other open edges and programmed in before the roofers start work? Protection will also be required at ridges unless work progresses at the same rate on both roof slopes. What are the access arrangements for scaffolders installing edge protection? Is effective edge protection provided at the gable end of the ridge?
FALLING from both sides of gutter i.e. inside and outside building frame	5. Gutter fixing: how will workers be protected from falling? Peripheral edge protection erected for roofers will not be sufficient at this phase. Has the use of mobile access equipment been considered as the first priority? If the use of a temporary horizontal and fall arrest system is specified, who will erect and test the line?
FALLING from a partly completed roof	6. Leading edge protection: how will this be achieved? Has the use of safety nets been considered in the light of the legal duties/risk assessment for the total roofing operation If stagings are to be used as working platforms are they stable and of adequate width with handrails/running lines specified to suit the working practices? Work which requires kneeling or bending needs careful attention as the operator's centre of gravity can extend over the leading edge. What method is specified for moving stagings?
FRAGILE ROOFS	7. Roofs should be non-fragile. Have all assemblies comprising, e.g., metal liner panels, rooflights, etc, been specified to be non-fragile by the designer? If not, the design decision should be reviewed as a matter of urgency in terms of the designer's duties under the Construction (Design and Management)

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	<p>Regulations 2007.</p> <p>The total number and exact type of fixings specified should be installed. Until this is achieved, assemblies must be treated as fragile.</p> <p>8. For refurbishment work on existing roofs, are there any fragile areas on the roof, e.g. roof-lights? These will have to be protected as soon as laid. How will this be achieved? If the covers are to be used, are they strong enough, taking account of the span required? How will they be fixed, and what is the system for their removal?</p> <p>9. Zoning of the roof into working and non-working areas can reduce the number of fragile areas, which need to be protected. The system for marking out the zones and progressing the work should be specified. If the barriers marking the edge of the zones are within 2m of fragile material, then they must be strong and rigid enough to support the weight of a person who loses his balance.</p> <p>Zoning should take account of travel to the working area by the roofers and also the need for materials to be moved around the roof. The system should ensure that all fragile areas within the working zones and adjacent to access routes are protected.</p>	<p>method statement is communicated to and agreed with the roofing gang?</p> <p>13. Supervision: what are the arrangements for ensuring that the work proceeds according to the method statement?</p> <p>14. Modifications: what are the arrangements for agreeing modifications to the method statement and ensuring that these are communicated to the roofing gang?</p> <p>15. Validation: what are the arrangements for ensuring that the company safety adviser or other nominated competent person has reviewed and is satisfied with the system of work proposed?</p>
<p>SYSTEMS FAILURES</p>	<p>10. Methods of work are important. Is the method of work to be adopted when laying the first sheet specified? Some architectural features, e.g. hip ends, will require modifications to the working methods. These should be fully described. Has the fixing of ridge capping/flashing been included in the system of work?</p> <p>11. When is a roof non-fragile? Does the method statement make it clear at what stage of construction an assembly, such as a lining panel installation becomes load bearing? The number and type of fixings should be stated and installed; until this is achieved, they must be treated as fragile</p> <p>12. Communications: what are the</p>	

ANNEX B: CLASS C ASSEMBLIES

Moving of nets under Class C assemblies

B1. Roofing assemblies classified as class C under ACR[M]001:2005 are non-fragile. To obtain Class C, the assembly has to survive a single impact applied in the worst possible position on that assembly. Thus whilst being a single drop of exactly the same magnitude as the SIR 30 test, it is actually a more onerous test¹, which has been demonstrated by testing. An assembly just attaining Class C is, therefore, likely to be safer than a material just attaining non-fragility under SIR 30.

Note 1: The SIR 30 test was a single drop into the centre of a sheet. Experience shows that the worst location is invariably elsewhere because of the influence of the fixings, sheet profiles, etc.

B2. That Class C is non-fragile means the following:

a) Once a Class C assembly [sheet or liner] is fully fixed, safety nets may be withdrawn from under them and moved on [leapfrogged]. But note:

(i) The netting, which remains in place, must protect at least 2.5m behind the leading edge and 2.5m in front of the leading edge, unless alternative leading edge protection is provided.

In practice, because of the way nets are supplied, this will usually mean that the netting remaining in place would be 1[one] full bay behind the leading edge and the full bay containing the leading edge.

(ii) Special consideration needs to be given to the 1st tier [strip] at the gable eaves, as the edge supports are different. Therefore, evidence that the installation achieved Class C in the support condition adopted at this location should be provided.

b) In a built up roof assembly [with a Class C liner assembly], if the top sheet is subsequently removed, no additional precautions need to be taken whilst working alongside the Class C liner assembly, provided it is still fully fixed, undamaged and was unaffected by the removal process of the top sheet (or the reason for its removal).

B3. Class C is the lowest class of non-fragile assembly and, particularly if engineered to pass the test criteria, may be close to the boundary between fragile and non-fragile. Its classification and use therefore requires the following to be taken into account:

That Class C assemblies should never intentionally be walked upon² and appropriate temporary access equipment, such as crawling boards, etc, should always be used.

Note 2: Accidental damage to such assemblies might render the classification void.

b) A Class C assembly must be treated like any other safety critical item, eg, a safety net. Therefore, any adverse occurrence that could affect its fitness for purpose should trigger an inspection. If an assembly has been subjected to an impact load (such as a trip or stumble), it and the adjoining fitted panels must, subsequently, be treated as a fragile area and identified and protected accordingly, until it has been replaced and the adjoining fitted panels inspected by a competent person and replaced if necessary. Procedures to ensure this happens must be in place.

c) The workforce must be aware of these limitations, as required by Regulations 3 and 8 of the Managing Health and Safety at Work Regulations [MHSWR].

d) Any person falling on a class C assembly may make it fragile for subsequent loads. While persons may be capable of self-recovery from a fall or stumble, where they are unable to, the additional weight of a rescuer may cause the assembly to fail. And, because all non-fragility classifications depend on the fixings of assemblies, any adjoining assemblies may also have become fragile³. In such situations the incident panel and all adjoining panels must be treated as fragile. This is a foreseeable risk of selecting Class C assemblies. Therefore, where class C assemblies are being used, rescue plans must be developed in advance of work starting. Again, in accordance with Reg. 5 and 8 of the MHSWR, the workforce needs to be aware of the Rescue Procedures.

Note 3. This includes adjoining Class B assemblies.

B4. All current non-fragility classifications depend upon correct workmanship during installation. In particular the manufacturer's specification for fixings and other components is of absolute importance and must not be altered, without the manufacturer's written agreement. The type, number, location and spacing of fixings must be clear and completely unambiguous in their meaning. An assembly must be fully fixed before the assembly may be treated as non-fragile. In particular partially fixing of sheets (commonly known as 'stitching') to progress the work quickly, followed on by fully fixing later, is dangerous. Any roof found in such a state must be treated as fragile regardless of the classification of the components being used in its construction.

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ANNEX C PROVISION OF NON-FRAGILE ROOFS

Aide memoir for designers, specifiers and inspectors

Designers of roofs and others who specify roofs should be aware that any doubt¹ about the non-fragility of a roof assembly could lead to the roof being classed as fragile and extra costs may be associated with the additional risks that have to be managed while it is being constructed. Some of the points that need to be addressed are given below and, in taking them into consideration, the views of the manufacturer and/or the Competent Person[s] should be taken into account. The answers to many of these questions should be included in the Health and Safety File.

¹ *Lack of documented evidence to support claims for non-fragility may cast doubt about claims.*

Points to be considered

The points listed below apply to the whole roof and not just the rooflights.

1. Is the whole roof a non-fragile assembly in accordance with ACR[M]001:2005?
2. If the roof is not non-fragile, why not?
3. If the roof is non-fragile, what ACR[M]001:2005 classification does it achieve?
4. For a non-fragile assembly, documented evidence of the test data relating to the assembly should be available. If it is not, why not?
5. What are the maximum and minimum purlin or other support spacings that the ACR[M]001:2005 non-fragile classification applies to? Does this cover all purlin or support spacings on this roof?
6. If the roof is a curved or barrel-vaulted roof, what are the maximum and minimum radii that the ACR[M]001:2000 non-fragility classification applies to? Does this cover the radius of this roof?
7. If the roof incorporates hips or valleys what is the maximum angle on the hip or valley that has been tested? Has adequate support been provided at the hip or valley?
8. Have the end and side lap dimensions been determined and adhered to on the installation?
9. Have the locations of rooflights been clearly marked² with the use of poppy-red headed fasteners?
² *This is recommended best practice, for ease of identification during future maintenance.*
10. Roof assemblies can be made up of different materials, eg, steel, fibre-cement, GRP, aluminium, polycarbonate, PVC, single plies, bitumen felt etc. Is there an issue regarding different rates of expansion and contraction?
11. In insulated sandwich panel roofs, is there adequate bearing for each panel and rooflight at the end lap? Is there sufficient bearing to accommodate site erection and material tolerances?
12. Can effective fall prevention measures be erected correctly in the appropriate areas?

If not, does the design include for the provision of safety nets? And have the nets been installed correctly below any fragile or open areas?

If not, what alternative fall protection measures have been provided?
13. What has been provided in the way of fall protection for workers who will maintain the roofs in the future? If nothing, why not?
14. Does the roof have fixed dedicated means of access at fixed points, to provide safe access in the future? If not, why not?
15. Is signage arranged to identify any risk[s]? In addition, is all signage easy to read, unambiguous and durable?

ANNEX D TYPICAL RISK ASSESSMENT

Site-		Contract No.-		Date-	
FOR USE AS ROOF INSPECTION RISK ASSESSMENT ONLY					
Risks Associated			Y/N		
Falls from Heights			<input type="checkbox"/>		
Falls through fragile materials			<input type="checkbox"/>		
High winds			<input type="checkbox"/>		
Slip on wet or icy surface			<input type="checkbox"/>		
Other			<input type="checkbox"/>		
Other			<input type="checkbox"/>		
Assessment by			Y/N	Comments	
Roof Access		Access Hatch	<input type="checkbox"/>		
		Tower Access	<input type="checkbox"/>		
		Ladder Access	<input type="checkbox"/>		
		Man Hoist	<input type="checkbox"/>		
Other (state)			<input type="checkbox"/>		
Roof edge protection			<input type="checkbox"/>		
Nets in place			<input type="checkbox"/>		
Roof Lights		Fragile	<input type="checkbox"/>		
		Non-Fragile	<input type="checkbox"/>		
Roof sheet Materials		Fragile	<input type="checkbox"/>		
		Non-Fragile	<input type="checkbox"/>		
Safety Line System Type			<input type="checkbox"/>		
Check current test cert			<input type="checkbox"/>		
Is PPE available and is some one available to demonstrate how to attach the PPE lanyard to the safety line system.			<input type="checkbox"/>		
Weather		Fine	<input type="checkbox"/>		
		Windy	<input type="checkbox"/>		
		Wet	<input type="checkbox"/>		
		Icy	<input type="checkbox"/>		
		Other	<input type="checkbox"/>		
Brief description of work required identified by the inspection					
IS A METHOD STATEMENT AND RISK ASSESSMENT					
REQUIRED PRIOR TO THE WORK BEING EXECUTED ?			Y/N		
SIGNED				DATE	
COPIED TO					

ANNEX E TYPICAL PERMIT TO WORK

WORKING AT HEIGHT

PERMIT TO WORK

This permit is only valid when all sections are complete. If you are in doubt or don't understand, then please ask. Do not proceed with your work until this permit has been authorised by the relevant member of staff.

Job description:

.....

Location:

Type of equipment to be used: Ladders Steps Mobile Platform Scaffold Safety Cage

PRECAUTIONS TO BE TAKEN (to be completed by the person requesting this permit)

	YES	NO	N/A
Are you competent to undertake this work?			
Do you have a licence to operate or erect / dismantle the equipment being used?			
Have all relevant departments been advised of the work being undertaken?			
Does the electrical supply need to be switched off, isolated and locked off?			
Do you need to isolate any additional plant or equipment?			
Will you be carrying out any hot work or generating sparks? If yes, you need a hot work permit			
Are caution / danger signs / barricades required and in place?			
Do you have the appropriate personal protective equipment?			
Are all tools and equipment safe, in good condition and suitable for the job?			
Are there any overhead services above or adjacent to the proposed work?			
All ladders MUST be tied off and or footed at all times	Mandatory		
The Safety Cage MUST be fastened to the Fork Lift Truck at all times	Mandatory		
A safety harness MUST be worn whilst on the Mobile Platform and Safety Cage at all times	Mandatory		
A hard hat MUST be worn at all times	Mandatory		
Are the weather conditions acceptable for the task being undertaken?			
Are the floor conditions stable and suitable for the equipment being used?			
Will the safety components (out riggers, etc) of the equipment be in use at all times?			

Plant & equipment to be isolated:

Isolated by: **Position:** **Date:** **Time:**

Other precautions required

Other safety equipment required

AUTHORISATION (to be completed by the person issuing this permit)

I verify the above location has been examined, the precautions on the checklist have been taken, and that permission is authorised for the above work only.

Permit issued by: **Date:** **Time:**

Position: **Date of expiry:** **Time of expiry:**

ACCEPTANCE (to be completed by the person accepting this permit)

I accept responsibility for the work to be carried out and confirm all precautions ticked above have been taken.

Name of person accepting this permit: **Company:**

Signature: **Date:** **Time:**

HANDBACK / CANCELLATION (to be completed by the person who issued this permit)

I confirm that the work has been completed / cancelled (delete accordingly) and the area left in a safe, tidy condition with normal service resumed and hereby cancel this permit.

Name: **Position:**

Signature: **Date:** **Time:**

