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AN 06 SAFE WORKING PRACTICES ON ROOFS: THE DISTINCTION BETWEEN 'WALKABLE' AND 'NON-FRAGILITY'

1.0 INTRODUCTION

This advice note from the Metal Cladding and Roofing Manufacturers Association (MCRMA) is intended to remind all those involved in roof work construction that they have a responsibility to be aware of the most up to date advice on safe working practices and also to be compliant with the legal requirements.

In accordance with the Health and Safety at Work Act and the Construction (Design and Management) or CDM Regulations, buildings must be designed with safety in mind, not only for the construction period itself but also throughout the normal life of the building. This will include considering the safety of people involved in maintenance, installation of PVs, forming of penetrations, inspections, repair and even demolition.

2.0 'WALKABLE' AND 'NON-FRAGILITY'

Two commonly used phrases used within the roofing industry to describe two specific aspects of roofing systems, products and components are 'Walkable' and 'Non-fragile'. The phrases are not the same and are not interchangeable in scope or in their meaning.

Reference should be made to BS 5427:2016+A1:2017 *Code of practice for the use of profiled sheet for roof and wall cladding on buildings* section 4 Design and sub section 4.1 General

> At the design stage the principal designer should define the methodology for erecting and fitting the cladding system on the building during construction.
> Roof constructions should be capable of withstanding being walked upon without damage or failure.
> Roof constructions should also be designed to be classed as non-fragile (reference section 7.3 in part shown below).

NOTE 1 Walkability and non-fragility are completely separate issues. (reference section 7.3 in part shown below including Note 4).
NOTE 2 A roof assembly, if tested to 'Red Book' ACR(M)001-2019 [Sixth edition] "Test for Non-Fragility of Large Element Roofing Assemblies" and supported by 'Orange Book' Annex C Aide memoir for designers, specifiers and inspectors from ACR[CP]001:2016 Rev 5 'Recommended Practice for work on Profiled Sheeted Roofs' can be regarded as a method of preventing a person from falling through the fully and finally fixed assembly. It does not necessarily indicate whether walking on the roof would damage the roofing product.
NOTE 3 Walkable refers to an assembly that when walked upon normally neither fails nor shows signs of physical damage.
NOTE 4 Attention is drawn to the Construction (Design and Management) Regulations 2015

BS 5427:2016+A1:2017 section 7.3 explains in part;

Non-fragility is defined in the ACR(M)001-2019 [Sixth edition] Red Book *Test for Non-Fragility of Large Element Roofing Assemblies* and is the property of a whole roof assembly, not individual components; a non-fragile classification should apply to the whole roof including any accessories such as rooflights.

The non-fragility of any particular roof assembly should never be assumed. Evidence should be made available (usually from a roof system supplier) based on sufficient repeatable test data of the specific assembly being used to ensure the results are always valid.

The manufacturer's installation recommendations should be followed in detail; for example, small changes such as the number of fasteners, or distance of fasteners from the end of a sheet are critical, and any deviation can affect the non-fragile performance of an assembly.

NOTE 4 Walkability is not a clearly defined term and does not mean the same thing as non-fragility, so it is not related directly to safety: some roofs might be non-fragile (so safe) but damaged by foot traffic or a falling person (necessitating repair) whilst others might be undamaged by foot traffic but could fail under the impact of a falling person (so fragile).

3.0 TEST FOR NON-FRAGILITY

The 'Red Book' ACR(M)001-2019 [Sixth edition] *Test for Non-Fragility of Large Element Roofing Assemblies* describes a test standard which can be applied to any product which will form a roof or part of a roof and is intended to provide information about whether it can support the instantaneous loads imposed on it by a person stumbling or falling on it.

The Scope of the Red Book states the following;

The tests described in this document are applicable to any large element roof assembly and any accessories, which may be fitted on it, and are intended to provide information about whether the particular element can support the instantaneous loads imposed by a person stumbling or falling onto it. The tests are applicable to:

- Large element roof assemblies
- Any details of the roof assembly itself as well as the plane areas (for example hips and curved crowns)
- Any accessories which may form part of that roof (for example in-plane rooflights)
- Any accessories which are mounted directly on to the roof assembly (for example out of plane rooflights and sun tubes, louvre smoke vents, access hatches)
- Any adjacent or peripheral details which anyone on the roof may access (for example north lights, valley gutters, boundary wall gutters).

The scope includes any accessories which are retrofitted on to a roof. It is also applicable to assessing non fragility of a roof after any retrofitting. Assemblies, when tested by a competent person, may be classified as:

- Non-Fragile – Class A
- Non-Fragile – Class B
- Non-Fragile – Class C

If an assembly fails this test it must be classified as "fragile". The ACR Red Book describes in details the test method and the method and means of classifying non-fragility.

4.0 AIDE MEMOIR FOR DESIGNERS, SPECIFIERS AND INSPECTORS

Designers, specifiers and inspectors of roof systems, products and accessories, which form part of a roof should be aware that any doubt about the non-fragility of a roof assembly could lead to the roof being classified as fragile. Those involved should reference and note the good practice advice contained in *Annex C Aide memoire for designers, specifiers and inspectors from 'Orange Book' ACR[CP]001:2016 Rev 5 'Recommended Practice for work on Profiled Sheeted Roofs'* and MCRMA Guidance document GD13 *Non-fragility of roofs: a checklist*

5.0 ADDITIONAL INFORMATION

There is a degree of overlap between the types and structural class of profiles which fall within the scope of:

BS EN 14782:2006 *Self-supporting metal sheet for roofing, external cladding and internal lining. Product specification and requirements*

BS EN 1090-4:2018 *Execution of steel structures and aluminium structures. Technical requirements for cold-formed structural steel elements and cold-formed structures for roof, ceiling, floor and wall applications*

BS EN 1090-5:2017 *Execution of steel structures and aluminium structures. Technical requirements for cold-formed structural aluminium elements and cold-formed structures for roof, ceiling, floor and wall applications*

Designers, specifiers and inspectors of roof systems and profiles should determine the structural classification for the profiles used in the application and the limiting spans for the applied static loads for each situation.

6.0 BACKGROUND

The Advisory Committee for Roofsafety (previously known as the Advisory Committee for Roof Work) is a body dedicated to making working on roofs safer. Established in 1998 from a working group, it was originally set up by invitation of the Health and Safety Executive (HSE) to look at the issue of fragility of roofing assemblies.

Today the membership is made up of nominees from the major roof working federations and trade associations which, together with the HSE, provide the technical experience of many years' involvement working on roofs, presenting their expertise and advice in their publications.

The MCRMA and its members took an active part in the development of BS 5427:2016 +A1:2017 and the association is a member of the ACR committee. The MCRMA endorses BS 5427:2016 + A1:2017and fully supports the work of the ACR and the guidance they produce.

7.0 REFERENCES

BS 5427:2016+A1:2017 *Code of practice for the use of profiled sheet for roof and wall cladding on buildings*.

BS EN 14782:2006 *Self-supporting metal sheet for roofing, external cladding and internal lining. Product specification and requirements*

BS EN 1090-4:2018 *Execution of steel structures and aluminium structures. Technical requirements for cold-formed structural steel elements and cold-formed structures for roof, ceiling, floor and wall applications*

BS EN 1090-5:2017 *Execution of steel structures and aluminium structures. Technical requirements for cold-formed structural aluminium elements and cold-formed structures for roof, ceiling, floor and wall applications*

ACR(M)001-2019 [Sixth edition] Red Book *Test for Non-Fragility of Large Element Roofing Assemblies*

ACR[CP]001:2016 Rev 5 Orange Book *'Recommended Practice for work on Profiled Sheeted Roofs'*

MCRMA Guidance document GD13 *Non-fragility of roofs: a checklist*

Available from the Health & Safety Executive web site at https://www.hse.gov.uk/

Fragile roofs – safe working practices
Health and safety in roofwork HSG 33 (2020)
Roofwork – what you need to know as a busy builder, contractor or maintenance worker
Roofwork – what you need to know as a building owner, user or managing agent
Working at height: a brief guide (2014)

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