

# Fire Group

## Minutes of Meeting

held on Wednesday 2 July 2014, 2.00 p m

ARUP 13 Fitzroy Street, London, W1T 4BQ.

**Present:** David Metcalfe, CWCT, (Chairman)  
Luke Bisby, University of Edinburgh  
Sarah Colwell, BRE  
Dave Cookson, Kingspan  
Graham Fairley, Adamson Associates  
Simon Hepworth, Lakesmere  
Alan Keiller, CWCT  
Gavin Kerr, Arup facades  
Barbara Lane, Arup fire,  
Gary Ledger, Kawneer  
Brian Martin, DCLG  
Ivor Meredith, Kingspan  
Chris Mort, Siderise  
Lee Parker, SAPA  
Charlotte Roben, Arup fire  
Niall Rowan, ASFP  
Stuart Taylor, Wintech

**Apologies:** Mick Green  
David White, NHBC

In the following Minutes roman type is used to record what was said at the meeting. Italic type has been used for observations and comments by CWCT made after the meeting.

## 2 Background Action

CWCT receives enquiries about fire performance of facades and a number of issues have been raised recently. This meeting has been convened to explore some of these issues and determine what action CWCT should take to assist the industry.

## 3 Current CWCT Guidance

CWCT Standard Part 6 sets out requirements for fire performance of facades and generally follows the requirements of Approved Document B (ADB). It identifies information that the specifier must provide to the façade designer such as the performance of compartment floors.

It is generally performance based but does have some prescriptive requirements.

CWCT Technical Note 73 Fire performance of curtain walls and rainscreens provides advice on how the requirements of the Standard can be achieved.

## 4 Open discussion

Comments have been grouped under relevant headings and are not necessarily in the order in which they were made.

### General

Requirements of insurance companies may require additional measures over and above those required to satisfy Building Regulations.

There are no standard solutions and each building needs to be considered on the basis of the risks involved.

*Appreciate that simple rules may be inadequate for complex high rise buildings. Such buildings are likely to have a fire engineer involved who can deal with the requirements.*

*Need to acknowledge that most buildings do not require/have available this level of expertise and rely on the prescriptive requirements of ADB. It should therefore be possible to provide more specific advice and guidance on how these prescriptive requirements can be met.*

#### **Requirement for band of fire resisting construction at floor level**

UK Building regulations do not require a band of fire resisting construction in the façade at floor level. This is a requirement in many other countries.

The fire plume from a broken/open window will extend up the outside of the building sufficiently to be able to break back into the building.

#### **Fire stopping of curtain walls**

It was suggested that the purpose of fire stopping should be established.

ADB states 'where a compartment wall or floor meets an external wall, the junction should maintain the fire resistance of the compartmentation'.

Firestops are often tested between concrete blocks which do not represent what happens when the firestop is used with a curtain wall.

Siderise has tested a firestop in conjunction with a non-fire rated curtain wall in accordance with EN 1364-4. The EN 1364-4 test is used to test a firestop by using a section of curtain wall as the vertical face of the furnace with the firestop positioned between the curtain wall and the roof of the furnace which acts as a floor slab.

A 1 m high section of the curtain wall was fire protected and the firestop gave satisfactory performance for more than 2 hours.

ADB does not require the curtain wall to be fire rated in most cases.

It was stated that the performance of curtain walls in fire is not sufficiently well understood. Is the assumption that the glass will break and fall away within 10 to 15 minutes still valid?

*Tests carried out by LPC with stick curtain walling and glazing units composed of monolithic annealed glass showed this to be the case. Curtain walling with laminated glass may last longer and more complex facades with two skins of glazing may behave differently.*

Difficult to provide general solutions as requirements will vary according to the type of building. For example what is acceptable for a commercial office building may not be acceptable for a high rise residential tower. It was suggested that firestops between the back of the curtain wall and the floor slab may be acceptable for office buildings but not for high rise residential buildings.

*ADB gives prescriptive requirements that provide a means of satisfying the Building Regulations. Some of the requirements are related to the size and use of the building. These will affect the number and location of firestops but do not affect how they are installed.*

The proposed revision of EN 13830 the curtain wall product standard has a performance requirement for fire propagation to upper levels. This is assessed by testing to EN 1364-4. CWCT has considered that as this would require a fire protected section of curtain wall at the position of the fire stop, this would represent a higher level of performance than required by ADB and hence for CE marking purposes npd could be given for this characteristic.

## Fire testing

Fire testing on a project basis would not be economically acceptable except for very large projects.

*It follows that some simple rules need to be established to cover most buildings.*

Awareness of limitations of testing is required when applying the results of fire testing.

## Rainscreen cavity barriers

ASFP has produced a benchmarking test for rainscreen cavity barriers but this test does not allow for panel movement so does not fully represent the conditions in a real fire.

It was suggested that rainscreen walls are often constructed without cavity barriers.

A case was reported of cavity barriers not being fixed securely and falling to the bottom of the cavity.

*Some manufacturers' installation details show cavity barriers 'fixed' by spikes which only penetrate part of the way into the mineral wool part of the barrier. This does not appear to be a secure method of fixing. Use of spikes which penetrate the full thickness of the barrier and are then bent over will provide a more satisfactory fixing but the spike will then penetrate the waterproof covering to the intumescent material which may result in degradation of the intumescent material.*

*Questions have been raised about the required location of cavity barriers but time did not permit discussion of this.*

## Combustibility of insulation

Limited combustibility insulation should be used above 18m when following the prescriptive requirements of ADB CI 12.7 but other materials, principally foil faced phenolic foam are often used in rainscreen walls. There is a degree of ignorance with some people confusing class 0 with limited combustibility. In other cases building control officers are permitting the use of class 0 materials making it difficult for cladding consultants to enforce the requirement for limited combustibility insulation.

Higher standards of thermal insulation are requiring greater thicknesses of insulation and in some cases this can only be achieved within the designated wall zone by use of combustible insulation. Architects are unaware of the problem and need to allow a wider wall zone to accommodate the greater thickness required with limited combustibility material.

Cavities/openings may be formed in a fire due to melting or deformation of materials. The cavities/openings may lead to unexpected routes for fire spread

In ADB the requirement for insulation of limited combustibility applies to all insulation so includes insulation within a rainscreen cavity or within a curtain wall spandrel panel. The Scottish handbook only refers to insulation exposed within a cavity which would presumably permit the use of combustible insulation in a fully filled and sealed spandrel panel.

## Use of ACM on high rise buildings

ACM refers to aluminium composite material. The normal material consists of two skins of aluminium approx. 0.5mm thick separated by a polyethylene core 2 to 5mm thick. This material generally achieves a reaction to fire classification of class 0 or class B s1 d0. There are versions available with a mineral core which can achieve A2 s1 d0. There are also similar materials available with other metals such as copper used for the facing.

There have been major fires in buildings in various parts of the world including the Middle East and France where ACM materials have been used for the cladding with the ACM responsible for external fire spread.



See 'Fire hazards of exterior wall assemblies containing combustible components', Nathan White, Michael Delichatosis, Marty Ahrends and Amanda Kimball paper presented at 1<sup>st</sup> international seminar on fire safety of facades and available from MATEC web of conferences [http://www.matec-conferences.org/index.php?option=com\\_toc&url=/articles/matecconf/abs/2013/07/contents/contents.html](http://www.matec-conferences.org/index.php?option=com_toc&url=/articles/matecconf/abs/2013/07/contents/contents.html)

It was stated that clause 12.7 of ADB is intended to prohibit the use of polyethylene cored ACM in buildings over 18m as they are not classed as limited combustibility. This is not clear from the wording of the current clause. The current clause is preceded by a heading 'Insulation Materials/Products' which implies that it only applies to insulation. The wording of the main text refers to filler materials which could be taken to include the polyethylene core but this is not clear.

It was suggested that clarification could be achieved by means of a FAQ. Approved Documents can be downloaded from <http://www.planningportal.gov.uk>. The page for each Approved document also has a FAQ section related to that Approved Document. Sarah Colwell agreed to raise this with Brian Martin.

*How would this affect other materials used for rainscreen panels e.g. high pressure laminate?*

### **Breather membranes**

It was suggested that clause 12.7 of ADB has a wider application and applies to all materials other than those specifically excluded ie gaskets and sealants.

*Application of this requirement to breather membranes would cause a problem as most breather membranes only achieve a Class E to EN 13501-1. Tyvek have a material that achieves Class B s1 do to EN 13051-1 but this still does not satisfy clause 12.7.*

*Clause 12.7 specifically excludes gaskets, sealants and similar materials. Can breather membranes be included in the category of similar materials?*

It was suggested that application of Clause 12.7 to breather membranes could take account of the location of the breather membrane and other materials present. For example a combustible breather membrane located between limited combustibility insulation and the backing wall would be acceptable.

*If clause 12.7 is deemed to apply to all materials, the current wording of the clause does not allow for applying it in this way.*

### **Falling debris**

It was suggested that it is not acceptable for a curtain wall to fall from a building in a fire.

*Falling debris may create a hazard for people escaping from a building or fire fighters. There does not appear to be any requirement in ADB to limit falling debris and there is video evidence of the Basingstoke fire showing burning sections of curtain wall falling from the building.*

### **Brackets**

Time did not permit extensive discussion of brackets. It was requested that brackets be discussed at a future meeting.

### **BS 8414 test**

It was acknowledged that the BS 8414 test is a severe test.

BS 8414 is undergoing revision. The date for submission of public comments has passed but it may not be too late to make comments as they have not yet been reviewed by the committee. The revision does not include major technical changes.

The scope of BS 8414 part 2 was queried. The standard currently states 'This method of test does not apply to non-loadbearing external rainscreen overcladding systems or external wall insulation systems applied to the face of a building, the fire testing of which are covered BS 8414-1.'

It was stated that BS 8414-2 does apply to testing rainscreen walls where the rainscreen is supported by a stud back wall.

*In the CWCT Standard 'rainscreen overcladding' is defined as 'rainscreen applied to a masonry or concrete wall'. Using this definition it would not be appropriate to use BS 8414-2 for rainscreen overcladding. BS 8414 -1 applies for this case.*

*The current title of BS 8414-1 refers to cladding systems applied to the face of the building. The face of the building could be interpreted as the cement particle board on the face of a stud frame. The Draft revision of BS 8414-1 refers to 'the masonry face of a building' making it clear that Part 1 is not appropriate for a rainscreen which is to be applied to a stud wall. The implication of this is that a rainscreen system would have to be tested twice once for use on a masonry background and once for use on a stud wall background. Can it be assumed that a masonry wall is more robust than a stud wall and if a system gives satisfactory performance on a stud wall it can be assumed that it would give satisfactory performance on a masonry back wall?*

There is a certification scheme for rainscreen systems based on the BS 8414 test as described in:

LPS 1581 issue 2 Requirements and Tests for LPCB approval of Non-load bearing External Cladding Systems applied to the masonry face of a building, and

LPS 1582 issue 1 Requirements and Tests for LPCB approval of Non-load bearing External Cladding Systems fixed to and supported by a steel frame.

There are some modifications to the test procedure and the assessment criteria.

The requirements of this scheme allow some variation from the tested arrangement. For example if tests are carried out with two thicknesses of insulation intermediate thicknesses can be assumed to perform as well.

### **Installation**

Whatever measures are proposed by a designer the effectiveness of measures to restrict fire spread will depend on the quality of installation.

### **Fire rated facades**

Tests have shown that standard curtain wall systems can provide a level of fire resistance if the aluminium is suitably protected/reinforced by inserts. Is there a case for using fire rated facades on high rise buildings?

## **5 Future work**

It was suggested that a short 'roadmap' should be produced directing people to other documents for more detailed requirements. A short document of 2 or 3 pages is more likely to be read than a longer document. Could this be made freely available? Possibly published jointly with other organisations such as BRE and ASFP?

*Who would be the target audience? Is there a need for one document for building designers and cladding specifiers and a second document for façade designers?*

It was agreed that CWCT would consider the comments made at the meeting and prepare an outline for a 'roadmap'. It will require further input from those present to complete the 'roadmap'.

It was suggested that reference be made to Annex D of ETAG 026 Part 3.