HOUSE OF COMMONS SESSION 1998–99

ENVIRONMENT, TRANSPORT AND REGIONAL AFFAIRS COMMITTEE

POTENTIAL RISK OF FIRE SPREAD IN BUILDINGS VIA EXTERNAL CLADDING SYSTEMS

MINUTES OF EVIDENCE AND APPENDICES

Tuesday 20 July 1999

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The Environment, Transport and Regional Affairs Committee is appointed under Standing Order No. 152 (Select committees related to government departments) to examine the expenditure, administration and policy of the Department of the Environment, Transport and the Regions, and associated public bodies. It has a maximum of 17 members, with a quorum of 5. Unless the House otherwise orders, all members nominated to the Committee continue to be members of it for the remainder of the Parliament.

The Committee has power:

(a) to send for persons, papers and records, to sit notwithstanding any adjournment of the House, to adjourn from place to place, and to report from time to time;

(b) to appoint specialist advisers either to supply information which is not readily available or to elucidate matters of complexity within the Committee's order of reference;

(c) to communicate to any committee appointed under the same Standing Order and to the European Scrutiny Committee, to the Committee of Public Accounts, to the Deregulation Committee and to the Environmental Audit Committee its evidence and any other documents relating to matters of common interest; and

(d) to meet concurrently with any other such committee for the purposes of deliberating, taking evidence, or considering draft reports, or with the European Scrutiny Committee or any sub-committee thereof for the purposes of deliberating or taking evidence.

The Committee has power to appoint two sub-committees, to report from time to time the minutes of evidence taken before them and to lay upon the Table of the House the minutes of their proceedings. The sub-committees have power to send for persons, papers and records, to sit notwithstanding any adjournment of the House, to adjourn from place to place, to report from time to time the minutes of their proceedings, and to meet concurrently with any committee appointed under the same Standing Order or any sub-committee thereof, or with the European Scrutiny Committee or any sub-committee thereof, for the purposes of deliberating or taking evidence. They have a quorum of three

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The membership of the Committee since its nomination on 14 July 1997 has been:

Mr Andrew F Bennett
Mr Thomas Brake
Christine Butler
Mr John Cummings
Mr Stephen Day *(discharged 17/11/97)*
Mr Brian Donohoe
Mrs Gwyneth Dunwoody
Mrs Louise Ellman
Mr Howard Flight *(discharged 20/07/98)*
Mr Clifford Forsythe
Mrs Teresa Gorman (*appointed 30/11/98)*
Mr James Gray
Mr Philip Hammond *(appointed 17/11/97) (discharged 22/06/98)*
Mrs Eleanor Laing *(appointed 22/06/98) (discharged 05/07/99)*
Miss Anne McIntosh *(appointed 05/07/99)*
Mr Bill O'Brien
Mr Bill Olner
Mr Eric Pickles (*discharged 30/11/98)*
Mr John Randall *(appointed 20/07/98*)
Mr George Stevenson
Mr Graham Stringer
Dr Alan Whitehead

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TAKEN BEFORE THE ENVIRONMENT SUB-COMMITTEE OF THE ENVIRONMENT, TRANSPORT AND REGIONAL AFFAIRS COMMITTEE

TUESDAY 20 JULY 1999

Members present:

Mr Andrew F Bennett, in the Chair

Mr Tom Brake	Mrs Louise Ellman
Mr John Cummings	Mr James Gray
Mr Brian Donohoe	Mr Bill Olner
Mrs Gwyneth Dunwoody	Mr John Randall

Memorandum by The Fire Brigades Union (ROF 28)

1. INTRODUCTION

1.1 The Fire Brigades Union welcomes the opportunity to make a submission to the Environment Sub-Committee regarding the above mentioned matter. The question of external cladding systems and the problem of fire spread along the vertical surfaces (walls) of a building is one that has concerned us for some time.

1.2 However, in referring to external cladding systems the Sub-committee need to be aware that there are many types made from many dissimilar materials with differing fire performance characteristics available in the building materials market place. They may range from various types of;

— impregnated or treated timber or timber based building boards; or

— plastic based (glass fibre reinforced plastic, rigid upvc, etc.) pre formed boards; or

— insulated sandwich panels, being a finished panel of 50 mm to 100 mm thick formed with an outer skin of building boards, metal sheet, etc, and a core of foamed plastic insulant, or blown glass, or mineral wool.

1.3 External cladding systems may be installed to meet a range of requirements and tasks. The primary tasks for which installation may be recommended, that we have identified, are as follows:

— as a decorative system to enhance the appearance of a building; and

— as a decorative system offering enhanced weather protection to the building to which they are fixed; and

— as a decorative system offering both enhanced weather protection and insulation to the building to which they are fixed; and

— as a weather protection system; and

— as a system to improve the insulation and thus heat retention properties of an existing building; and

— as an infill system for replacing floor to ceiling window areas prior to fitting double glazing window systems.

1.4 In our opinion, the most likely reason for fitting an external cladding system to an existing building will be to improve the weather protection and insulation of the building to which they are fixed. This is particularly so in the case of multi storey flats built in the 1960s and early 1970s using the reinforced concrete panel building systems that were popular with the construction industry at that time.

1.5 Some of these buildings have not withstood the test of time particularly well and have proved unpopular with tenants for a variety of reasons, not the least being persistent condensation problems inside the flats and high heating bills. Both problems being caused primarily by the lack of thermal insulation, other than that offered by the concrete panels themselves.

1.6 Local authorities, housing associations and some private developers who have responsibility for such properties have therefore, sought to improve their older multi storey housing stock by attaching light weight cladding systems offering high insulation values, improved weather protection and often a more attractive finish, to the external faces of such buildings.

1.7 At the same time they have usually retrofitted double glazing and installed improved internal sound insulation plus cost effective central heating systems.

2. Whether a Risk is Posed by Such Cladding

2.1 There are a number of risks that may be posed by the use of combustible, or badly installed, external cladding systems. Having said that it should be understood that cladding systems themselves are unlikely to be the first item that is ignited. They are far more likely to become involved in fire as a result of a fire in a room that has vented through the room window(s) and which is travelling up the building face. This is a common occurrence and is predicted by the laws of physics (ie, heat rises therefore fire travels upwards).

2.2 The primary risk therefore of a cladding system is that of providing a vehicle for assisting uncontrolled fire spread up the outer face of the building, with the strong possibility of the fire re-entering the building at higher levels via windows or other unprotected areas in the face of the building. This in turn poses a threat to the life safety of the residents above the fire floor.

2.3 A secondary problem of fire spread through external cladding may be caused by the method of fixing the panels to the exterior facade of the building. If lightweight fixings (aluminium or metal alloys, etc) or resin bonded systems are used to attach the panels. There is a risk of the panels becoming detached when exposed to fire and falling from the face of the building posing the associated missile risk to firefighters and members of the public in the vicinity of the building.

2.4 Fires involving fire spread via external cladding have occurred before however, in the short time available to create this response it has been impossible to obtain comprehensive details of dates, times and places. No doubt the Home Office—Fire and Emergency Planning Directorate (FEPD) and the Department of the Environment, Transport and the Regions—Building Regulations Division (BRD) will have the details. A well-documented and well-researched fire of this nature was the Summerland Leisure Centre fire in Douglas on the Isle of Man in 1973.

2.5 We have long been concerned regarding the lack of fire resistance required for external cladding particularly in high rise (over 30 metres in height) buildings. The risk of a fire involving cladding in such buildings is no greater than in any other building however, what is different is the ability of the fire service to gain access to the fire to deal with it.

2.6 Fire service turntable ladders and hydraulic platforms will only give firefighters external access to a height of around 25 metres, although some brigades have aerial appliances that will give higher access these are relatively few and far between. Similarly inbuilt firefighting facilities provided for the fire service to use above 30 metres are all designed for firefighting within the building.

2.7 This means that firefighters must enter the dwellings above and below the fire and fight the fire from balconies or windows if they are to have any chance of stopping the fire spreading vertically up the entire face of the building. This can be extremely difficult and hazardous as those below the fire front may have flaming debris falling upon them, whilst those above the fire will be looking straight down into the flame front and will be enveloped in the smoke cloud. They will also have to deal with any accommodation that is on fire in the building.

2.8 If the flame front gets past them then the probability is that it will re-enter the building through window openings or balconies higher up the building and consume the contents of those rooms thus becoming self perpetuating. This fire scenario is known as "roll up" because the fire rolls up the building jumping from floor to floor through window and balcony openings and can occur whether or not cladding is present.

2.9 Fires involving external cladding will probably be caused by a fire in the accommodation breaking out through a window or balcony and the flame front affecting or involving the cladding system as it rolls up the building face.

2.10 The real problem is that any external cladding above the fire is likely to be exposed to flame front temperatures in excess of 900°C upon failure of the window if that failure causes the fire room to flashover. Window frame failure may also cause disruption of the external cladding if it is tied to it.

2.11 It is for these reasons that we believe that all cladding used on multi-storey buildings over 25 metres in height and the fixing systems should be completely non-combustible, or achieve a fire resisting standard equivalent to the external walls.

3. The Extent of External Cladding Systems

3.1 It is hard to attempt to quantify this information, as it will rest with those who own premises that have external cladding systems fitted. Certainly, we know of a number of local authorities who have used external cladding to upgrade and improve their residential properties and particulary the reinforced concrete panel system high rise flats.

3.2 Sandwich panel type systems are also proving popular in the industrial sector, particularly in the food production and cold storage industries where the use of internal sandwich panels is widespread.

4. THE ADEQUACY OF THE REGULATIONS PERTAINING TO THEIR USE

4.1 The primary method of controlling the fire risk of building products when used in works of construction is through the medium of the Building Regulations in England and Wales, or the Building Standards in Scotland. Enforcement of the Building Regulations or Standards lies with local authority Building Control Departments.

4.2 The Building Regulations in England and Wales and the Building Standards in Scotland do place requirements in terms of the fire spread upon external cladding systems through the imposition of technical requirements which reflect the following principles:

- that fire should not be able to spread easily through the use of such a system, generally such systems should be of limited combustibility;
- it should be noted that limited combustibility does not mean non-combustible (ie unable to burn) it means that the cladding should not propagate fire easily and then only in accordance with prescribed limits;
- where a building is close to another so much so that a fire in one building may cause the other building to become involved due to exposure to radiated heat then the cladding should be fire resisting;
- the external wall upon which the cladding is mounted should be fire resisting; and
- where the cladding has an air space behind it between its rear face and the face of the wall the gap so formed should be fire stopped to prevent fire spreading behind the cladding. .

4.3 Only in one instance, that is where the building is within the notional boundary (close proximity) of another building, is there a requirement for external cladding to be fire resisting.

Unfortunately, this requirement rarely bites as we do not tend to build multi-storey buildings less than two metres apart.

4.4 *Fire Testing External Cladding Systems*

The British Standard test that predicts whether a product is of limited combustibility is BS 476 Part 11—1982.

BS 476—Part 11 is a small scale test conducted under laboratory conditions. The test seeks to establish a temperature rise from the burning of the specimen in a furnace and also the duration and exent of any flaming. It sets limits which five specimens supplied by the applicant must achieve to pass the test. It is not particularly suitable for composite or bonded materials.

We have been particularly concerned for some time with the principle of small scale fire testing of large building components such as composite cladding, or insulated sandwich panel systems. We believe strongly that such testing and its findings should be validated by large scale testing of the complete system under realistic fire conditions. However, it appears that the real barrier to large scale testing is the question of cost rather than that of scientific prudence.

We understand that since 1991 work on a more realistic test has taken place and between 1995 and 1996 a new test procedure for external cladding systems was developed jointly by leading board manufacturers and the Fire Research Station. This is entitled "A Test Method to Assess the Fire Performance of External Cladding Systems" and we also understand that it was submitted for acceptance by the DETR, but nothing has since been heard on its progress towards adoption.

What ever happens in the future, we believe that the existing small scale test method is unsatisfactory and that a new test for both internal and external cladding systems and sandwich panels should be developed which should be based on the ISO 9705 Room Corner Test.

5. WHAT ACTION MAY BE NECESSARY TO COUNTER ANY RISKS POSED IN EXISTING BUILDINGS AND TO AVOID ANY RISKS IN NEW BUILDINGS OR ALTERATIONS TO EXISTING BUILDINGS?

5.1 This question really asks two questions, being:

(a) what can we do about existing systems already in use; and

(b) what should we do to prevent unnecessary risks with such systems in the future?

5.2 In the case of existing premises already fitted with an external cladding system it seems a case of establishing the size of the problem and dealing first with those presenting the greatest risk to their occupants. It would seem logical to carry out inspections of all high rise residential premises fitted with external cladding systems to ensure that they conform to the current Building Regulations or Standards. Where they do not then they should be either upgraded, or replaced, to that standard as a matter of urgency.

5.3 For low and medium rise residential developments or one and two storey domestic properties, unless they are premises housing the elderly, or disabled, which should automatically be classed as high risk priority, it would seem logical to inspect the cladding systems used to ensure they conform to the current Building Regulations or Standards and where not introduce a phased replacement or renovation programme.

5.4 In all cases on site inspections should identify whether a fire involving an external cladding system might jeopardise the means of escape in case of fire from the building. Where it is found on inspection that the use of external cladding may affect the means of escape from the building in case of a fire involving it then immediate remedial action should be undertaken.

5.5 All inspections should be jointly carried out by fire service officers of the fire authority and building control officers of the relevant local authority.

5.6 In the case of new buildings or alterations to existing buildings then we believe that the following requirements should apply:

— in buildings up to 25 metres in height all external cladding used should be of limited non combustibility and the fixtures should be capable of retaining the cladding system in place for at least one hour when exposed to a fire, any infill panels should afford the same fire resistance as the walls surrounding them; and

— in buildings over 30 metres in height all external cladding or infill panels should be inherently non combustible, or afford the same fire resistance as the walls to which it is attached; and

— a new large scale fire test for all cladding and sandwich panels should be introduced by the DETR and British Standards Institution as soon as possible.

6. Other Matters Which May Arise in the Course of Questioning

6.1 We believe that the role of the Building Regulations Advisory Committee (BRAC) in this matter and generally as to its constitution and working practices should be discussed by the Sub-committee. BRAC exists to offer guidance to the Secretary of State upon the content and application of the Building Regulations in England and Wales. In Scotland a similar body called the Building Standards Advisory Committee, or BSAC also exists.

6.2 Members of BRAC are nominated by professional bodies, or associations, but are appointed on a personal basis by the Secretary of State for Construction at the DETR, currently Nick Raynsford MP. They are then asked to sign the Official Secrets Act and theoretically from that point on they should not discuss any matters they may collectively consider with anyone else, including their nominating bodies.

6.3 This secretive procedure has caused some concern in the fire industry, as fire risk matters that we may identify, such as the fire risks of sandwich panels and external cladding systems, are submitted to the DETR who pass them to BRAC where they are apparently considered in closed session. Having done so BRAC then send their conclusions back to the DETR who seem to then issue a public consultation document on what they perceive to be the best way forward.

Once that public consultation process is complete BRAC then consider the responses received, before coming to their final conclusions, which in turn becomes their advice to the Minister.

6.4 As an example, in December 1997 the Building Regulations Division of the DETR undertook an extensive public consultation exercise upon amendments that BRAC proposed to Approved Document B (Fire). Approved Document B is the guidance document to discharging functional requirement B (Fire) of the English and Welsh Building Regulations. Since closing the consultation exercise in March 1998 the 170 plus responses received, have been analysed at the Building Research Establishment (BRE) and the outcomes passed to BRAC for consideration.

6.5 As yet and some 19 months later, no announcement has been made on the final proposals which will, when published, amend the English and Welsh Building Regulations for at least the next five years. We understand that BRAC has now concluded its deliberations and their advice has now gone to the Minister, with an announcement being likely in November of this year.

6.6 Secretive processes and delays of this nature only serve to bring the process of government into question and given that this government is committed to a far higher degree of openness than its predecessors we are surprised and disappointed that the government permits BRAC to continue to work under a cloak of secrecy.

6.7 By comparison, Health and Safety Commission Committees and the Central Fire Brigades Advisory Council operate an open system of meetings that is much more in line with a policy of open government and enables interested onlookers to keep abreast of current thinking at a government departmental level.

6.8 We believe that the constitution of the Building Regulations Advisory Committee should be amended and reformed to permit it to become an open committee whereby it's discussions and deliberations are in the public domain.

Memorandum by the Fire Safety Development Group (ROF 26)

1. INTRODUCTION

1.1 On 11 June 1999 a wheelchair-bound man died in a tower block fire in Irvine. We believe that the fire started in a room on the 5th floor and burs out through the window. Within about 10 minutes the fire had spread up seven floors but was contained within the area of the cladding. The fire broke through into the building, possibly by means of the area beneath the windows or the windows themselves, and engulfed the upper nine floors.

1.2 There may have been special circumstances relating to this fire but nevertheless we consider it highlighted a number of aspects of fire safety which need to be addressed. These are:

1.3 Firstly, a distinction between products that conform to the Class 0 standard inherently, or through modification by additives.

1.4 Secondly we seek urgent action from the DETR to regulate the use of plastics and to reduce the threat to life from toxic smoke and burning droplets. We have assumed the Committee will be professionally advised, and have therefore written our evidence accordingly.

1.5 We have been informed that the windows at the corners of the tower block had been letting in cold and/or moisture. In order to eliminate these problems and also to improve visual appearance, new window frames of unplastised polyvinyl chloride (uPVC) were fixed. The exterior wall around the window was covered with glass reinforced polyester plastic sheet. This gave a picture frame effect around the window. The glass reinforced polyester sheet was also extended below the window. We do not know if the fire was spread by means of the surface of the plastic sheet or whether the fire spread within a cavity that may have existed between the cladding and the original external wall.

Memoranda

2. "WHETHER A RISK IS POSED BY SUCH CLADDING"

2.1 Regulations in Scotland, England and Wales specify that exterior cladding should be Class 0 fire performance. Class 0 is the highest category for surface spread of flame of a material and is defined in the Approved Document B Fire Safety to the Building Regulations (England and Wales 1991). This definition is also used in the British Standard (Scotland) Regulations.

2.2 We believe that there is confusion about the Class 0 standard for two reasons. Class 0 materials refers to the performance of the surface of the material, but applies to the total product, ie the facing plus any coating, adhesive, paint, etc plus the substrate to which the facing is bonded. Clearly these other elements will affect the performance of the cladding in a fire, and will vary with the nature of the coating, the thickness of the adhesive, the type of substrate etc.

2.3 A material of limited combustibility can achieve a Class 0 rating as defined by the regulations but a Class 0 material is *not* equivalent to a material of limited combustibility. A material of limited combustibility is generally a material which is totally non-combustible or which contains a small amount of combustible material. Combustible materials, like plastic, wood, etc are *not* materials of limited combustibility but can achieve Class 0 performance by adding fire retardant chemicals or facing the combustible material with a metal foil or sheet. Thus there is a fundamental difference between products that are inherently Class 0 and products modified to enhance their performance. This serves to undermine the integrity of the regulations and therefore reduces fire safety.

2.4 Confusion often occurs because some manufacturers refer to Class 0 products without due consideration for the way the product will be used or treated. The performance of an external cladding sheet which, when tested alone and meets the requirements of Class 0, could easily be downgraded to an inferior level by painting the sheet with the wrong type of paint.

2.5 We believe that both methods can suffer from technical problems, particularly for products used for exterior applications, when the additive may not be durable. With time, the performance will fall to a lower level. If a facing foil or laminate has been used on the plastic material, this could be damaged with time or delaminate due to loss of adhesion between the foil and the substrate. These types of products still remain combustible and will contribute to fire load in the event of fire. Higher levels of smoke will be developed when combustible materials burn than for materials of limited combustibility. Furthermore, in the case of thermoplastics, they could drip in the event of a fire and this will exacerbate fire spread.

2.6 It is well known that fire and smoke can spread unhindered in cavities and for this reason, regulations specify cavities should be divided at certain intervals depending on the nature of the cavity. If the requirements had been followed, we do not think the fire would have spread as described in the newspaper reports but further investigation should show if cavity barriers were lacking.

2.7 The cladding appears to have helped spread the flame over the surface and may also have been consumed by the fire. However, it may not have been considered necessary by the designers/specifiers to use a product with Class 0 performance as the sheet may have been classed as a window frame rather than an external cladding. If the plastic cladding used on the building had a lower spread of flame than required by regulations or insufficient cavity barriers were used, then we consider that this system presented a fire risk.

2.8 We understand that the uPVC window frames made a big contribution to the rapid spread of the fire and its entry into the upper parts of the building. This would help to explain how the fire could burst out of the flat where it started, and then manage to get back into the tower block to destroy the floors above the fifth floor.

2.9 We are concerned about the increasing use of plastic and combustible materials on the face of buildings and consider that their use should be examined in more detail. Building regulations do not pay sufficient consideration to the effect of fires spreading by external means. Smoke and flames issuing from windows can be very severe and easily affect other parts of the same building.

2.10 There is an increase in the use of plastic products and in particular uPVC for renovation work on the exterior of buildings and we consider their use should be examined in more detail. As the work is frequently for small repair and maintenance work, detailed planning permission may not be required and the application is unlikely to be covered by any fire regulations.

2.11 The uPVC window frames in the Irvine fire were stated to have melted. This is a common occurence with this type of thermoplastic and has occured in other fires. We have had experience of a plastic soffit lining board melting and molten plastic falling on fire fighters below. The molten material also helped to spread the fire within the building although the product had been used for an exterior application. In this case, the plastic soffit board was destroyed which then enabled the fire to enter the roof space and spread throughout the building. One fatality occurred. A picture showing this fire is included.

2.12 Our understanding is that at present the DETR have no plans to reconsider the relevant regulations. We think this ill-advised. We also believe it is necessary to consider that contribution made to the fire by burning plastic building materials and in particular foam plastic cores of external composite cladding panels.

3. "The Extent of the Use of External Cladding Systems"

3.1 External cladding systems are widely used both in new building and in refurbishment work. We understand the type of plastic cladding used on the property in Irvine is widely used throughout Scotland. However, we believe the fire spread and re-entry to the building was probably a consequence of the PVC window framing and sills. We do not think this type of alteration is widespread but it should be looked into.

4. "The Adequacy of the Regulations Pertaining to Their Use"

4.1 We believe the present regulations in England and Wales were revised in 1991 to ensure that cladding systems did not spread fire and present a risk. As a result of the experience with a fire that spread within the cavity behind an external cladding system, the Approved Document B was changed to specify that combustible insulation was precluded from external wall construction in buildings with a storey at over 20m above ground level. The Scottish regulations were amended in 1997, after fears that a fire could spread up a cavity. Since then, every opening has had to have a seal.

4.2 We believe that not only should the external face of the cladding be Class 0, in accordance with the regulations, the Clase 0 standard should also apply to the inner face of the cladding sheet where there is a cavity behind the external sheet.

4.3 We do not consider there is adequate regulation governing the use of plastic products on the exterior of buildings. Responsibility for implementation may be split between Building Control and the Fire Autorities and it is not always clear which authority is responsible for renovation work.

4.4 We also wish to make a distinction in the regulations between integral Class 0 materials and modified products. This should reflect the different fire performance between a non combustible composite cladding and one consisting of a metal-face foam plastic.

5. "What Action may be Necessary to Counter any Risks Posed in Existing Building and to Avoid any Risks in New Buildings or Alterations to Existing Buildings"

5.1 We do not consider there should be a wholesale review of all external cladding systems, as we are sure that the majority will have met regulatory requirements. A more detailed study is, however, needed to examine the fire behaviour of thermoplastic products when used in exterior applications. When plastic window frames could be affected by fire as a result of the design of external cladding systems, some form of fire protection may be necessary to protect the frame. Alternatively, fire barriers should be used to prevent fire ingress into the building.

5.2 Thermoplastic products should not be used in areas where they could melt or be destroyed by fire and thus add to the spread of fire. It may therefore be necessary to replace some of these plastic products with materials of limited combustibility.

5.3 There is also widespread concern amongst many fire fighters about the safety of external cladding systems consisting of metal-faced foam plastics. These systems will generally have Class 0 fire performance, but in real fires the foam plastic lining can ignite and burn. This helps to spread the fire via the building fabric and there will be an increase in the generation of smoke and toxic fumes. Collapse is also possible. We believe this subject is still being reviewed by the DETR and consider more stringent controls a priority.

6. "Other Matters Which may Arise in the Course of Questioning"

6.1 We have highlighted some problems with burning plastics which this fire has raised. There is at present nothing in Building Regulations to require control of smoke, fumes or burning droplets from building materials. This should be rectified as the increasing use of plastic materials means there will be further instances of burning or molten plastic helping to spread the fire or cause injuries to fire fighters or building occupants. The DETR should act to rectify this, especially as Home Office Statistics consistently demonstrate how more people die in fires after being overcome by smoke than any other cause.

6.2 We consider the use of Class 0 materials should be more stringently controlled for external wall cladding. Products which can only achieve this rating by means of surface treatments, coatings, foil coverings or impregnation treatments should not be allowed.

6.3 Apart from the specific recommendations for improvement we have proposed in our Memoranda, there is an overall broad but important point to make. The Irvine incident once again illustrates the unpredictable and unexpected nature of fire.

6.4 This view was well expressed recently (FSDG Seminar on Fire Issues, House of Commons, February 1999) by Frith Hoehnke, an architect who carried out the extensive revision of Scottish fire safety building regulations which came into force in 1997. Mr Hoehnke then said: "I would never advise a client to cut anything to do with fire to the bone because, when I look at the fire reports of actual fires, the most incredible things have happened . . . So far as fires are concerned it is really the unexpected that defeats us on many occasions. Indeed, it is usually when not just one thing goes wrong but one, two or three things go wrong at the same time that all our defences are breached and disaster strikes".

6.5 We concur with this opinion. It raised the question of whether regulatory decisions about fire safety in buildings should be left as they currently are within the BRAC or (in the case of Scotland) the BSAC remit. Clearly both these bodies call in expert opinions but they do not always reflect a full range of available specialist experience.

6.6 The Government is currently moving, through the Home Office, to establish a Fire Safety Advisory Board which should bring this wider experience to bear on all fire safety matters. Logically BRAC and BSAC should work more closely with such a body. It might, indeed, finally emerge as a Fire Safety Commission reviewing fire hazards in a continuous and therefore more sensible way. These are, as we said, wider issues but every single incident has its lessons to teach and the Irvine fire should be another providing support for such a broader move.

The Fire Safety Development Group is an alliance of eight leading companies manufacturing structural fire safety products within the UK and Europe.

July 1999

Examination of Witnesses

MR GLYNTON EVANS, Fire Safety Adviser, and MR JACK FORD, Secretary to the Officers National Committee, the Fire Brigades Union; and MR DAVID HARPER of W R Grade Ltd, Vice Chairman of Fire Safety Development Group, and DR BOB MOORE, of Cape Calsil Systems Ltd, Chairman, Technical Committee, Fire Safety Development Group, the Fire Safety Development Group, examined.

Chairman

1. Gentlemen, could I welcome you to the first of four sessions this morning into the potential risk of fire spread in buildings via external cladding systems. Could I thank you for coming, and ask you to identify yourselves for the record.

(*Mr Evans*) I am Glyn Evans from the Fire Brigades Union. On my right is my colleague Jack Ford, also from the Fire Brigades Union.

(*Mr Harper*) My name is David Harper from the Fire Safety Development Group. I am Vice Chairman of the Group. To my right is Dr Bob Moore, Chairman of the Technical Committee for the Fire Safety Development Group.

2. Do any of you want to say a few brief words to start with?

(*Mr Evans*) Just to say, Chair, we welcome the Committee's deliberations on this. As you are probably aware, the FBU represents 50,000 local authority fire fighters and that is why we are interested very much in this matter.

Chairman: Could I stress to you, gentlemen, when we ask the questions if one answers and you all agree please do not feel you need to repeat it; but if you disagree please come in quickly.

Mr Donohoe

3. What exactly is this cladding we are talking about?

(*Dr Moore*) Cladding is the external skin of a building. It is a non-load-bearing material. Very often it is a sheet material; it could be of brick, concrete or fibre cement, these sorts of materials. It is essentially there to prevent the weather entering the building. There is something else called "overcladding", which is an extra sheet put on the outside of a building, usually to renovate a building as opposed to a new building, but it is being used for new buildings as well. It is mainly used as a renovation exercise to upgrade the performance of materials in terms of appearance, particularly thermal insulation, and to prevent moisture entering the building. There are two different sorts of cladding: one, which is the new building of the first instance; and then overcladding which would be classed as a repair and maintenance product.

4. What risks are posed by such cladding with regard to fire safety?

(*Mr Evans*) The main risk is the problem of vertical envelopment of a building in fire—that is the real problem. Cladding systems in the round are not going to burst into flames spontaneously, or without an ignition source. However, being as they are put on the outside of a building, if a fire occurs within a building it leaves the building through a window opening in an external wall, and the strong probability is that the cladding will be involved. If the cladding cannot resist the spread of flame across the surface then it will vertically envelop the building; in other words, the fire will spread to the outside of the building and it will go vertically. The problem we have to a certain extent, touching on one of the later questions, is that we do not currently consider vertical envelopment in fires. To a certain extent we are hoisted by the petard of what happened here in 1666, the Great Fire of London, and we look at fire as a horizontal problem, with a fire in one building affecting the exterior of another building, and that is how the Building Regulations work. The problem with cladding is that it will, if it is able, spread fire and it will spread it vertically. The other problem is that we do not really recognise the problem of vertical envelopment. If you get multistorey buildings you will get fire spread up the outside if the cladding will permit it.

5. Do you think it is right that should be allowed to be the case?

(*Mr Evans*) No.

6. What is wrong with the Regulations?

(*Mr Evans*) Basically the problem is, first of all, the Regulations do not really cater for vertical envelopment; they deal with a fire in another building affecting the exterior face of that building. They also deal, in the case of roofs, with burning brands falling on the roof. The problem that then develops is we use space separation to determine the combustibility of the cladding. The further the building is away from another building then the cladding can be of limited combustibility; that means it does not burn very well. The problem we as fire fighters have is if you get a high-rise building, which is over, say, 25-30 metres in height and the fire spreads up the outside of the building—all the fire fighting facilities in multistorey buildings are inside the building. They are there to allow fire fighters to fight the fire within the building; they are not there to allow fire fighters to fight a fire on the external face of the building. Our aerial appliances will go up to 25-30 metres (that is a hydraulic platform or a turntable ladder); above that height, if the fire is on the external face of the building, we cannot get to it. Our people have either got to hang out of windows, above, below or to the side of the fire, and try to reach it. That in itself is extremely difficult and is dangerous, as you will appreciate. That really is the problem we perceive there.

7. As a fire fighter do you actually practise on the basis of some fire of this nature taking hold in a multistorey flat? Do you go out and practise what you do in these circumstances?

(*Mr Evans*) It is a very difficult situation. Most of the fire service training is to fight fire from within a building, because that is where the fire fighting facilities (the fire fighting lifts and the dry riser installation, which is a long pipe throughout the building) are. The quick answer to your question is, no, not particularly; but I would guess, given recent

[**Mr Donohoe** *Cont*]
events, that may very well be looked at. The other problem it poses is that you get what is called "roll up" the building. When the fire comes out of a window it rolls up the building; and you can get fire re-enter the building through windows at levels above it, and by that the fire can jump floors. I have to say in fairness, that is not always purely a cladding issue—roll up occurs on an ordinary building. That is what happens, the fire rolls up the building. You can end up being presented, certainly in a multistorey, with a series of floors with rooms on fire because the fire has rolled up the building.

Mr Olner

8. You mentioned all these risks and, as I understand your answer to Mr Donohoe, you are not satisfied that the Regulations governing the fire safety of cladding is adequate?
(*Mr Evans*) That is true.

9. Could you perhaps tell the Committee, so we can get a feel of it, just how rapidly does this fire spread? How many incidents are we talking about? Are we talking about a minimal risk or are we talking about something that does occur or may occur regularly?
(*Dr Moore*) There are not a great number of fires, as I understand it, with this type of product. There are a large number of fires in what are called "composite sandwich panels"; these are well known and there have been a large number of these throughout the country. These are composite materials with foam insulation between metal. I do not think this overcladding is quite the same situation as that. I think the problem is relatively small in the number of fires that do occur by this fashion. There have been one or two others, which have meant the Fire Regulations[1] in England and Wales have been modified. There was a fire in this sort of system at Knowsley Heights about eight years ago and, as a result, the Regulations[2] were changed in order to ensure that that problem did not occur.

10. What has happened during the previous eight years? How many situations are arisen like the Knowsley one?
(*Dr Moore*) I could not say there were more than about two or three, to my knowledge. The Fire Brigades Union may have knowledge of this type of system. In composite cladding areas there have been a very large number which I think we should not overlook in this particular inquiry.

11. What would you be recommending to us as to what should be done to minimise the risks you have indicated?
(*Dr Moore*) There is a certain amount of lack of clarity as to whether an overcladding system is covered by the Regulations[3], or whether it is a refurbishment activity which is outside the Regulations[4]. I think this is unclear to us as experts. There may be a difference in what goes on between the Scottish situation and that in England and Wales. Again, I think there is insufficient clarity. Our colleague from the Fire Brigades Union did not mention there may be a need for cavity barriers to stop fire going behind an overcladding system; because that is one of the areas which is a very common method of fire to spread, where the fire travels up the inside of the cavity; you should put in some form of barrier to stop this, and I think that should be clarified. The other area, which is perhaps pertinent to this particular fire, was the fact that the window frames I believe actually melted and allowed the fire to go in via that route. I think it should be made abundantly clear that window frames should be protected from the fire going up through the cavity or from the outside. I think there is not sufficient, as I see it, in the Regulations[5] specifying how you should fire-protect the window areas.

12. So you are not too happy then with the test for assessing the fire performance of external cladding systems?
(*Dr Moore*) We are not happy, but perhaps the Fire Brigades Union have got a further point to make on the actual test methods for exterior products.

13. Are you happy with them?
(*Dr Moore*) Not really, no. The actual test methods, as such, are not really the full-scale tests we would like to see. We are particularly unhappy with what we call this Class '0' rating. Particularly with plastic products, you can obtain this rating by putting chemicals in; you can cover up plastic foam or a combustible material with a metal sheet or a foil which, in effect, still allows the fire to burn and destroy the plastic material underneath; and in effect you may even meet the requirements for a Class '0' material, but the actual product can still contribute to the fire, can still cause problems and can still give off fumes, toxic chemicals when they burn and, if they are the right sort of plastic, can drip plastics on people who are trying to fight the fire. Overall there are a number of reasons why our Group is unhappy with the Regulations[6], particularly in relation to this Class '0' rating which is actually used both in Scotland and in England and Wales.

Mrs Dunwoody

14. In aircraft now, because of the toxic fumes that killed so many people in Manchester within a very short period of time, there are very strict Regulations on the internal as well as the external materials. Are you really saying to us that in buildings, particularly multistorey buildings, the same sort of restraints do not apply?

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[1] Approved Document B, Fire Safety to the Building Regulations 1991 (England and Wales).

[2] Approved Document B, Fire Safety to the Building Regulations 1991 (England and Wales). It also includes Part D Structural Fire Precautions of the Technical Standards supporting the Building Standards (Scotland) Regulations 1990.

[3] Ibid.

[4] Ibid.

[5] Ibid.

[6] Ibid.

[**Mrs Dunwoody** *Cont*]

(*Dr Moore*) I do not think there is anything in any of the United Kingdom Regulations[7] regarding smoke and toxic fumes given off. It is of concern that it is not covered. It is very difficult perhaps to legislate for this, because obviously you have got these sorts of fumes being given off by the content but, nevertheless, one does not want added fumes being given off by the materials used in the building.

15. Yet there is a wealth of evidence in aviation alone of the effect of toxic fumes. People started to die in Manchester within six seconds.

(*Dr Moore*) Yes, indeed. There have been other fires where it has been the fumes and the toxic fumes being given off by some of the products which have led to more deaths than perhaps for other reasons, so I think this should be looked at.

16. They do know the properties of the materials being used?

(*Dr Moore*) Yes, and there are British Standards Working Parties trying to work on this but have not actually reached a conclusion yet.

(*Mr Evans*) I would like to support what Dr Moore says. The situation is that the current test for cladding is a small-scale laboratory test, which is not particularly relevant, we would argue, to the system that is used. What has happened, and since you have set up this inquiry, Chair, is that the British Standards Institution have now published a draft BSI for tests for external cladding systems, which is a far more relevant test; it is a large-scale test because some of these systems can be 10-20 metre panels, 4"-6" thick. To test them in a laboratory, we would argue, is not relevant to how they are used in real life. The other problem, as Mrs Dunwoody quite rightly points out, is that there is no requirement for smoke or toxicity testing and that worries us. You have the potential for products being defined as fire-resisting (which they are) which smoke, and which are capable of smoke-logging a building. That is the problem, and it is something we the FBU have been arguing about for some time. There ought to be a smoke and toxicity test for building materials, particularly those which are going to be used to line walls, ceilings and escape routes.

Mr Donohoe

17. If that draft becomes a reality, what does it mean in real terms?

(*Mr Evans*) What it means in real terms is that for a product which was an external cladding system, if this standard becomes a full standard and is then called up by the Building Regulations as a standard to be achieved by external cladding systems, then they would have to meet that standard before they could be fitted or used in buildings.

18. Can we have a copy of that?

(*Mr Evans*) Yes.

(*Dr Moore*) As I understand it (and the FSDG, as such, was not specifically involved) I believe there were some draft tests set up with the Fire Research Station with some of the people who manufacture external claddings; so there are methods in some draft form perhaps related to the standard the FBU representative is referring to. There is a test and perhaps we may well hear about this later on. There have been steps already taken to draw up such a test.

Mr Cummings

19. Approved Document B (fire safety) is at present being revised. Have your organisations made any representations to the DETR on this subject during the consultation period whilst revision is taking place?

(*Dr Moore*) We have made a relatively small comment in that particular aspect. We made a very long reply to the whole thing and those were the areas affected. The area here today was actually in Part 4, the spread of flame on the outside of buildings. We said we did not feel, like the Fire Brigades Union, that the test methods for these sorts of materials were adequate, and that a large-scale test should be used.

20. So you have made detailed submissions?

(*Dr Moore*) Yes, very detailed for all of it; but on this particular issue we raised a point that we actually needed a full-scale test—a room corner test, that type of thing which has been referred to already—and that should be included in the Approved Document B.

(*Mr Evans*) Yes, we have made a detailed submission on the proposals for Approved Document B, but this was not one of the matters that was under discussion during the consultation process on Approved Document B. The last time that this matter was dealt with, on our understanding, was in 1991 when the Building Regulations were reviewed at that time. It was not a matter that was reviewed this time, if you see what I mean. The way the DETR put out their consultation papers—and in fairness to them many other government departments do the same—is they pose their consultees with a list of questions and sometimes with options as well. This matter was not a matter that was consulted upon. Therefore, as it was not consulted upon, we did not respond on it because it was not asked about.

21. It seems to be a very strange consultation when you are dealing with Building Regulations which cover all aspects of the construction industry?

(*Mr Evans*) The Department of Environment, Transport and the Regions Building Regulation Division has an advisory committee—the Building Regulations Advisory Committee, BRAC. They actually sit in perpetuity and periodically review the Building Regulations, roughly on a five-year cycle—although by the time the review of Approved Document B comes out this time it will be nearly seven years since the last review. They publish the matters they want to consult upon. If I may say, that is another concern we have. I am not saying it is impossible, and neither am I criticising any members of the Building Regulations Advisory Committee, but it is difficult to get matters into there. If something came up in this intervening period of approximately five years and we found a fire issue, or

[7] Approved Document B, Fire Safety to the Building Regulations 1991 (England and Wales) and the equivalent Guidance document in Northern Ireland. It also includes Part D Structural Fire Precautions of the Technical Standards supporting the Building Standards (Scotland) Regulations 1990.

[**Mr Cummings** *Cont*]
it was another issue pertinent to the Building Regulations, it is very difficult to get it in and get an amendment done.

22. Have any representations ever been made to the Health and Safety Executive on this issue?
(*Dr Moore*) Not that I am aware of.

23. Is there any reason why it has not been done?
(*Dr Moore*) It has not been a route which has been thought of as being a route in relation to fire safety. The DETR seems to be the main body dealing with these particular Regulations[8] for new buildings. Different Acts apply to buildings once they are occupied. The Fire Safety Act is for occupied buildings.

24. Are you happy with the method adopted during the stages of consultation?
(*Mr Evans*) I think we would welcome the debate in BRAC on some of these issues being far more open than it currently is. We would also like to see a better balance with fire service representatives upon the Fire Advisory Panel. At the moment the Fire Advisory Panel has nine members, only one of which is a fire officer.

Mrs Dunwoody

25. One!
(*Mr Evans*) Yes, one.

Mr Donohoe

26. What about the other eight?
(*Dr Moore*) Just to add a little to what has been said already: the problem we do find in this particular industry, particularly in terms of legislation, we have got this rather awful term "tombstone legislation"; it is a nasty term to use but that is what it means: you get a major fire and as a result you get some changes taking place. It is not done very much in a logical fashion. We have got, "Oh, we must revise these Regulations[9] or Approved Document B every five years"; and then we have got the other complication because they have different sets of requirements in Scotland and they may go out of tandem. You have England and Wales going perhaps every five years from 1990-1995, say, and then Scotland comes in the middle and revises theirs halfway through. There is no logical relationship between the two. What we would all like to see if it was possible, and I know devolution may have affected things, was a unified set of Regulations[10] for the whole of the United Kingdom, bringing it up to the same level of safety as expected in the various parts of the country. You do not want to downgrade safety, you want to go up to the higher levels, which might exist in Scotland or England and Wales in certain areas.

Mr Cummings

27. What you are saying basically is there is a lack of co-activity?
(*Dr Moore*) When we came to this issue we all tried to analyse what was said in the Scottish Regulations[11], as opposed to those in Approved Document B, and found if in effect they were saying the same thing it was very difficult to see that; and it was very difficult to interpret what they both meant in relation to these particular issues. I would like to see the coming together of these different areas, if we could do that.

28. A test for assessing the fire performance of external cladding systems has been developed by officials of the Fire Research Station. Would the adoption of this test method be sufficient to prevent fire infill systems, such as that involved in the incident in Irvine?
(*Dr Moore*) We within FSDG have no specific involvement in this but other people here may have. All I can say is that it seems highly likely that such a test would improve the situation. No-one knows the exact circumstances of the fire at Irvine, but it could have made a difference if that had actually been in place.
(*Mr Evans*) As Dr Moore says, people following us are better placed to answer that. All I can say is, I guess any test that is an improvement on the existing test would be welcomed. I suspect probably that this proposal for a test I waved about a few moments ago is probably the outcome of the work you have just referred to. On the basis of what is proposed in this draft, I have to say we welcome this because it reflects the test of the materials as they are actually being used.

29. There is a feeling expressed by the Fire Research Station that such a system would not have been successful in relation to the fire at Irvine. That being the case, what do you believe should be done to ensure the safety of systems such as this?
(*Mr Evans*) We put in our report quite clearly that, above a certain height, cladding systems (whether they are infill, whether they are weather protection, whether they are decorative or whatever) should be inherently non-combustible; or should be fire-resisting to the standard of the internal walls of the building. There is a requirement for the internal walls of buildings to be fire-resisting—that is an option—and at a height at which we can actually get to them to pull them off. We would not be unhappy with a limited combustibility, but based upon a realistic test. It is the test that actually tells you what the material is going to do. The test has to be relevant to how that material is going to be used. Small-scale testing can give you a good idea, but large-scale testing will validate what the small-scale testing shows; and that, we believe, is a fundamental problem with this. The Building Regulations, with regard to cladding systems, is a grey area. They do not look at vertical envelopment of a building in fire, and the existing test, in our opinion, is fundamentally

[8] Refers to the Building Regulations (England and Wales).
[9] Refers to the Building Regulations 1991 (England and Wales)
[10] Approved Document B, Fire Safety to the Building Regulations 1991 (England and Wales) and the equivalent Guidance document in Northern Ireland. It also includes Part D Structural Fire Precautions of the Technical Standards supporting the Building Standards (Scotland) Regulations 1990.
[11] Part D Structural Fire Precautions of the Technical Standards supporting the Building Standards (Scotland) Regulations 1990.

[**Mr Cummings** *Cont*]
unsatisfactory. If you put those three together then you will improve the safety of the system dramatically.

(*Dr Moore*) We are in a difficulty here because we have only had what we have seen in the newspapers to describe what went on in Irvine. As I understand it, I do not think it was quite what we have been talking about here, largely on overcladding system, which this particular test is designed to improve. We have two issues: one, can we improve the fire safety of overcladding systems? I think such a standard will. The other one is: what actually went on at Irvine? I think Irvine may well have been nothing more than an embellishment of a window with panels underneath it; which is not quite the same as an external cladding system. I think there are two different technical issues here. The new test would not relate to the one at Irvine, which I think may have been more simply a window problem, where they had window surrounds rather than a true external cladding system as we know it.

Mr Brake

30. Why, in your opinion, are there no plans to adopt the Test for assessing the fire performance of external cladding systems as mandatory for all such systems? Is it, as you perhaps outline, because the test is not good enough, or is it because manufacturers of external cladding systems are worried at the costs that might be entailed?

(*Dr Moore*) I think it is the first one, on the basis that the test is still in the development stage. I am not an expert in knowing how far the test got, the one developed in association with the Fire Research Station. Again, we might hear people talking about that later on. The test is still what we call a "draft". That is what is delaying it being put in place—more the fact of that than anything else. It is just a test which is not available but, hopefully, will be when they get to work on it.

(*Mr Harper*) The test itself will be set forward in draft and then agreed; it will not become relevant until it is accepted within the Building Regulations Part B as a requirement. People do not insist on fire safety tests for products unless they are required to by Building Regulations.

31. Are you aware of many systems that are up which were installed before the current Building Regulations, and is that a source of concern?

(*Dr Moore*) If we are talking about overcladding systems, they have been widely used for a number of years. They run into two types: one whereby you apply something like the insulation directly to the wall; that could be a polystyrene, or it could be incombustible material like mineral wool; and then you have a different system which is called a "rainscreen cladding system", where it stands off from the wall, allowing a gap between the wall and the outside cladding. You have two separate systems. These have been in place and have been widely used throughout the UK, particularly in high-rise blocks more than anything else; local authority people like these because they are very good for improving problems in existing buildings. As far as I am aware, apart from the Knowsley Heights fire which was a rainscreen cladding system, that is probably one of the few fires that has occurred related to that sort of system. As I have already said, as a result of that Regulations[12] have been changed in England and Wales for quite some time. The other systems I have less knowledge of, apart from the fact they are widely used in Europe and, as far as I am aware, they are not posing any great problem in terms of fire, even though polystyrene is being used. In the longer term there could be a problem, because vandalism could affect these sorts of products and remove the surface coating put on some of these materials and lay it open to fire, which no-one would have expected 20 years before when the material was actually applied.

32. What about the Fire Brigades Union, have you any information about older systems which are a source of concern to you?

(*Mr Evans*) The problem is, and we put this in our response, nobody really knows the extent to which these systems have been used. Obviously local authorities have used the product and developers have used them. The quick answer to your question is, nobody knows how many are in use. Some of the older systems, I guess, could cause problems. It depends how they are constructed; it depends how well they have withstood the test of time. If they are an overcladding system it depends very much on what has been used in the core of the insulant. If there is a fire in a room, and that fire comes out through the window and attacks that overcladding system, will the cladding system be able to withstand that thermal attack? There are a lot of imponderables in that. There are an awful lot of "ifs". I think the quick answer to your question is: nobody really knows, because these systems have developed over the years.

33. Do you think that the risk is great enough to warrant local authorities conducting a survey of external cladding systems to see what is in there?

(*Mr Evans*) We have put this in our response. We certainly feel it would be worth local authorities conducting an inspection of their existing systems to find out just what they have got pinned on the walls of their buildings. I have to say in fairness to local authorities, it is not just local authorities who use cladding systems.

Mrs Dunwoody

34. One of the witnesses says, "There are approximately 3,500 tower blocks in excess of ten storeys, most are suffering some form of vertical envelope failure", and then he goes on to mention a particular large building firm and the problems that have arisen there. What are we talking about? If you are really saying the majority of tower blocks, particularly those that have been built recently, have some form of cladding then this is rather more urgent than would be indicated by a timescale of ten years between one Building Regulation and another?

(*Mr Evans*) What you have to look at is what the systems are, and what standards they have been installed to—that is the crucial factor—and how well they have withstood the test of time.

[12] Approved Document B, Fire Safety to the Building Regulations 1991 (England and Wales).

Mr Donohoe

35. Would you as an individual, with the knowledge you have, stay in one of these high-rise flats?

(*Mr Evans*) I am not hedging, Mr Donohoe, but from my point of view it would depend very much on what was stuck on the outside walls.

Mrs Dunwoody: I do not want to be depressing, but I am thinking of giving notice!

Chairman

36. I accept you could look at what was on the outside and make a decision, but the problem we have is we do not want to alarm people unnecessarily. There must be people who will fairly soon hear what has been said this morning and some will be worried. Is there any simple advice, as far as people are concerned? First of all, living is actually dangerous, is it not, so how much more dangerous is it to be in one of these blocks? Is there some simple way in which people can make an assessment of what cladding is on the outside?

(*Mr Evans*) Let me put it to you like this: the situation is that with tower blocks you will not burn them down. They were designed and built at the time to resist a total flat burn-out. Believe you me, my colleague and I have many experiences of fires in flats. You will not burn down a tower block. There are two things here: you will not burn down a tower block; you may very well have fire spread up the outside of the block from a fire in another flat. The tactic has always been, with multistorey flats, to leave the residents in the flats, on the basis that they are safer there. Provided the means of escape, the exit routes out from the flats to outside, are not compromised by the cladding, then there is no reason for residents to fear for their lives. Provided they can get out of their flats, reach an escape route then they will get out of the flats. What they need is an early warning of a fire and the ability to respond to that and get out of the flat, and to ensure that their means of escape are not compromised by the cladding. In other words, the fire should not be able to spread round the building and into a means of escape route. I can guarantee you will not burn one of those tower blocks down.

(*Dr Moore*) The essential thing here is we must not be alarmist about this. To my knowledge, and probably the industry's knowledge, the number of fires in these sorts of cladding systems have not been large. I have already said that these materials are used in Europe; they are used in Europe probably ten or 20 times as much as they are in the UK—in France and Germany; and in those areas I do not believe there has been a major problem with these products. I do not think we should be alarmist. Nevertheless, we should take a view on this to see whether something as simple as vandalism could make the fire hazard worse than would have been expected when the product was first put up.

Chairman: Gentlemen, could I thank you very much.

Memorandum by Eternit UK Ltd (ROF 03)

INTRODUCTION

The Cladding Division of Eternit UK Ltd has been promoting External Rainscreen Cladding Systems for high rise refurbishment for over 18 years. In excess of 50 such residential tower blocks, throughout the UK, are benefiting from energy conservation, elimination of moisture ingress, prolonging the life of the main structure and external revitalisation from our Overcladding Systems.

As well as our own Research & Development Division and Specialist Consultants, the design and development of these systems involved the expertise of the Building Research Establishment, Fire Research Station and Warrington Fire Research Centre.

As early as 1991, Eternit UK commissioned the first full-scale fire test on our Cladding Panels & Systems using a four-storey construction.

In recent years we have been one of the Industry Partners supporting the DETR project, under the Partners in Technology Programme, culminating in a draft fire test. "Test method to assess the fire performance of external cladding systems"—Fire Note 3 published by the BRE/FRS.

ASSESSING THE RISK

Whilst there is a clear distinction between a total External Cladding System and partial window refurbishment, like the recent incident at Garnock Court, Irvine, both should be regulated by the Approved Documents. The materials used on a high rise structure, at the surface and within the cavity, should not pose any significantly greater risk than the current facade.

The above Test Method provides an effective measure of the system's performance in relation to fire.

EXTENT OF EXTERNAL CLADDING SYSTEMS

"Up to 4,800 tower blocks of more than six storeys were built for council tenants between 1959 and 1967" [Study carried out by South Bank Polytechnic]. Whilst some of these may have been demolished, it is estimated that in excess of 350,000 individual flats still remain. External refurbishment of these types of building can take two principle forms.

Insulated Render Systems.

Rainscreen Cladding Systems.

Whilst no official figures are available our estimate is that up to 2 per cent of these multi-storey blocks have been externally refurbished, half of them with Rainscreen Cladding.

EXISTING REGULATIONS

The current Approved Document "B" provides extensive guidance on the performance of the external cladding panel, the contents of the cavity and the use of cavity fire barriers. Generally if these criteria are met, the reaction to a fire event has been proven as no worse than the existing facade.

Control tests in the PiT's programme demonstrated that flames from a severe flat fire impinged over 2 metres above a window opening thus placing the next storey window at risk no matter what the external wall surface.

Demonstrating that all future Cladding Systems have a satisfactory performance to the proposed Test Method will provide further reassurance to the Building Owners and their Residents.

REDUCING THE RISKS

Whilst External Cladding Systems are designed to reduce the spread of fire, both on the surface and within the cavity, many other precautions can be adopted to minimise fire incidents:

Non combustible wall construction at ground floor level—start the cladding system above first floor level.

Control the disposal of large items of combustible waste from the residential block—old furniture, etc.

Landscaping or physical deterrents to avoid vehicles being abandoned and torched next to a tower block.

Improvement to caretaking facilities, security, external lighting and CCTV.

In our experience this "total" refurbishment approach, carried out on most of the projects we have been involved, has given a pride to the residents which is reflected in significant reductions in vandalism, malicious fires and damage.

FUTURE REFURBISHMENT PROJECTS

The adoption of the "Test method to assess the fire performance of external cladding systems" will ensure that a high standard for cladding systems is maintained.

Direct encouragement/promotion of the Centre for Window and Cladding Technology's "Standard for Walls with Ventilated Rainscreens". The comparable British Standard 8200 is so vague and out of date that it's current value is debatable.

Whilst we feel that our views are fully represented by the Fire Research Station and Fire Safety Development Group, Eternit UK Ltd would welcome the opportunity to offer further information on this important topic.

Martyn G Rich
Technical Applications Manager

July 1999

Examination of Witnesses

MR PETER FIELD, Deputy Director, Fire Research Station, MR TONY MORRIS, Fire Research Station, and Ms SARAH COLWELL, Fire Research Station, the Buildings Research Establishment Fire Research Station; and MR MARTYN RICH, Technical Applications Manager, Eternit UK Ltd, examined.

Chairman

37. Could I welcome you to the second session this morning and ask you to identify yourselves for the record, please.

(*Mr Field*) Peter Field, Deputy Director of the Fire Research Station. On my right is Sarah Colwell, from the Fire Research Station, and Tony Morris also from the Fire Research Station.

(*Mr Rich*) Martyn Rich. I work for a company that supplies overcladding systems in the UK, and have done successfully for the past 18 years.

38. First of all, do any of you want to make a statement to the Committee, or are you happy for us to go to the questions?

(*Mr Field*) Just a point of clarification, Chairman. The Fire Research Station is part of BRE—part of the privatised Buildings Research Establishment since 1997. Mr Morris is an expert in the field of fire spread and has been for some 30-40 years; and Ms Colwell is co-author of the report on the FRS test method for assessing the fire performance of external cladding systems.

39. I think you have all listened to what was said by the first set of witnesses—is there anything you want to comment on which they said which you strongly disagree with?

(*Mr Field*) Again a point of clarification in respect of the system perceived to have been involved in the Irvine fire, and whether or not the test method we have worked on would be appropriate to look at that. It is true to say that the test we have developed looks at total cladding systems. It is not clear from what we have heard whether or not the Irvine system is of this nature. Notwithstanding that, we believe the test facility itself could be accommodated to access the fire performance of systems which are not the same as total cladding systems and may involve windows and decorative panels.

Mr Gray

40. You conducted this research after the Knowsley Heights fire, what broadly were the conclusions you came to about the risk of spread?

(*Mr Field*) There were several issues arising from the research. First of all, the research reconfirmed the already known phenomenon that fire can break out of a room and can extend up the outside of a building, regardless of the nature of the fabric; and it can do so and involve floors immediately above. The work we undertook basically involved looking at complete systems at full-scale. That is a fundamentally important issue. It is important also to look at the total systems. The work basically has arrived at the situation where we have developed a performance criteria which essentially can discriminate fire performance of cladding systems; and, at the end of the day, this can be utilised by the regulators to determine whether or not such a method and such a criteria is appropriate for incorporating into the Regulations. The test method which has been published—

41. Before you go on to the solution, as it were, I want to be clear on your view about the risk. Do you think this really is a risk? Is there a problem here?

(*Mr Field*) Are we talking about the current building stock?

42. Yes.

(*Mr Field*) With the current building stock, as we have already heard, no-one really knows what is outside there in the actual building stock. Knowsley Heights was one incident. There have been a small number of incidents. Therefore, one has to balance the risks against the likelihood of fires occurring. Secondly, we have to look at the issues relating to the ability for people to escape from fires if and when they occur. I would perhaps suggest the evidence so far would suggest the risk is not too significant compared with living one's ordinary life.

43. You think it is more theoretical than real?

(*Mr Field*) One would not go that far. Clearly there is a risk, but whether the risk is a significant one I think is debatable.

44. If that is right, do the current Regulations do enough to minimise that risk, or could more be done regarding performance criteria?

(*Mr Field*) This is obviously a matter for the Department who frame the Regulations.

45. You advise the Department, surely?

(*Mr Field*) Yes.

46. We are asking you what your advice is going to be?

(*Mr Field*) We believe that the current Regulations and the guidance given in Approved Document B, first of all, state that the building envelope should not provide a medium for fire spread, which increases or poses a threat to life safety. That is a fundamental issue. We are not talking here about the ability of the envelope to burn; we are talking about the threat to life safety. In considering life safety we have to consider the time available for escape, the means of escape and obviously the attendance time of the fire service. There have also been issues referred to already relating to the Class '0' system of fire spread, which is basically a material based system of classification. I think there are some circumstances whereby utilising that of itself would not adequately identify the fire performance of a complete system. The other issue in the Regulations is that, there is also guidance given on the provision for cavity fire barriers. What our test method does is adds to this body of guidance. I do not think the guidance that is currently there should be ignored completely. It is far from being totally adequate. We think the tests add to the current guidance which is likely to be available.

Mr Donohoe

47. Could you just tell us what test method you adopted?

(*Mr Field*) Basically the test method involves a facade of a building which goes up to some 10 metres in height—

Mr Gray

48. 10 metres?

(*Mr Field*) Yes, 33-35 feet.—which is therefore capable of looking at a fire developing from a room and expanding up the outside of a building and extending to some three floors above the actual seat of the fire. It is only in those circumstances where we believe a total systems performance can be identified and looked at.

Mr Donohoe

49. That is what you would do in terms of the tests of all materials likely to be used?

(*Mr Field*) Yes. This is basically a test method for external cladding systems. It is done at full-scale deliberately because, as has been said earlier, there is some question over some of the small-scale testing.

50. What has been the results of those? If you were to adopt a similar situation as the one in Irvine, for instance, what was the result of those tests?

(*Mr Field*) We have not looked at systems which allegedly have been used in Irvine.

51. Why not?

(*Mr Field*) We understand they involved a window replacement decorative panel system. We have not looked at that specifically. The focus of research was purely and simply on total cladding systems which, by and large, are the large majority of systems used in the UK.

52. Given that it is on these blocks of flats in Irvine, why have you not had certain tests; it must be quite simple?

(*Mr Field*) It certainly could be tested but we have not been asked to do so by anybody at this moment in time. There is no problem in actually looking at those systems in this test facility.

53. Do you think in the circumstances all forms of cladding should be tested by you?

(*Mr Field*) It would certainly make sense to have the cladding systems tested in a properly defined test method, of which we believe this is one.

54. Have you got to be asked to do any testing?

(*Mr Field*) We are a private sector organisation; we are not part of government. Clearly, in days gone by, when we were part of DoE then this work was done and would have been done in the public interest without the need for formal contract. One regrets there are now commercial pressures that require clients to place formal contracts with us before we can undertake work.

55. Do you think that is something that is fundamentally flawed in terms of the positioning; it must be, surely?

(*Mr Field*) I think in fairness to the Department, we do have a dialogue with them and we do seek to take forward issues of concern. In fairness to them they did speak to us immediately after the Knowsley fire. Out of that came initial research which led to the research project which was funded jointly by the Department and industry to develop this particular test method.

56. After the Irvine fire, similarly the Department asked you to test?

(*Mr Field*) The Department have already been in contact with us about the related issues of the Irvine fire. They have already indicated to us they might be looking to us to provide new guidance with respect to what might follow on. They have also indicated they are considering the adoption of a test method as part of their revision of the Approved Document.[13]

57. I want to press you on this. What was the timescale after the Knowsley fire?

(*Mr Field*) The Knowsley fire I think started in 1991. Research was started by the Department immediately after that.

58. What do you mean by "immediately"? Weeks? Months?

(*Mr Field*) We had discussions with the Department within weeks of the fire occurring. You must appreciate that one has to undertake a survey of the circumstances surrounding any fire and look at associated issues before coming up with a plan for a research programme which would lead to an objective resolution.

59. Surely the Department itself should adopt almost a mandatory position as far as all of those claddings are concerned?

(*Mr Field*) This is a matter for them, I would suggest.

Mr Cummings

60. How are you funded?

(*Mr Field*) We are funded now by commissions coming from clients in Government and the private sector. The work we do for government is funded through one of three arrangements. One arrangement is part of the so-called "guarantee" following the privatisation of BRE, in which the Department is obliged to invite BRE to undertake a programme of work up to an annual minimum value. The second route is by the Department issuing multiple tenders for research and clearly whoever wins that research will take it forward. Thirdly, there is the Partners in Technology research competition which embodies partial funding from government, usually 50 per cent, and other members of the industry.

61. Overall, what percentage comes from clients in Government and the private sector as compared with the Department?

[13] *Note by witness:* The Department have not asked FRS to undertake tests following the Irvine fire.

[**Mr Cummings** *Cont*]

(*Mr Field*) In respect of the fire safety that we undertake, I would suggest something of the order of 15 to 20 per cent.[14]

Mr Donohoe

62. If I can go back to one of the answers that you gave, in 1994/95, after you had completed what I understand was Department funded research into this problem, what was the conclusion and advice to the Department by you?

(*Mr Field*) The conclusion of the initial research was that there needed to be a far more embracing programme of work in which we had the industry on board because there were significant issues here for the industry. That led to the research programme, again partly sponsored by government, which was the Partners in Technology programme, which concluded in 1997/98 and led to the development of the test method. There was no specific advice given at the time of the initial research that was undertaken.

(*Mr Rich*) After the incident at Knowsley, as a manufacturer, we saw it as a very serious position.

Chairman

63. Did you manufacture the material used at Knowsley?

(*Mr Rich*) No. By October 1991, our company had commissioned three full scale fire tests in the FRS laboratory to reassure our customers, both past and future, of our products' performance. There was no test method available but it is very similar to the test method that has been developed today. Industry was much more reactive to that incident.

Mr Donohoe

64. After the incident at Irvine, I do not know if your company particularly supplied any material for that?

(*Mr Rich*) No.

65. After that incident, did you not think that the manufacturer of that particular material should be asking for and perhaps paying for research to be undertaken?

(*Mr Rich*) Certainly, if he has a responsibility.

Mrs Ellman

66. Mr Field, you made a comment a few minutes ago about a disparity between the commercial interest and the public interest. Could you expand on what you were referring to there?

(*Mr Field*) That is a difficult question. One has to recognise that the work of the Department—and I am speaking for them here—as I understand it, in respect of the approved document, is concerned with matters of life safety. There may well be a lot of issues relating to life safety in respect of fire which it is appropriate for the public purse to pay for. I would certainly wish to comment on the responsible attitude of the cladding industry following the Knowsley fire and here again today. There is no doubt that they have been very responsible in coming forward and working with us and with government in respect of developing an appropriate test method.

67. You do not feel this is unsolvable?

(*Mr Field*) I do not think so, no. The Department, at the end of the day, will have a certain responsibility to the public to ensure that essential life safety issues are dealt with and I believe they do that quite well. The responsible industry I think does take these issues very seriously indeed as well. I do not think commercial issues get in the way.

68. Would the test method that has been devised be enough to stop fires in in-fill situations like Irvine?

(*Mr Field*) The test method can be adapted to examine the fire performance of the systems we believe to have been involved in the Irvine situation and would have been able to predict whether or not the circumstances that did occur at Irvine would have occurred.

69. What are your views on systems that were established before the current regulations were in place?

(*Mr Field*) This is a difficult one because we do not have enough information on what systems are out there in the public domain.

(*Mr Morris*) These problems are not new. The first possible problem with plastic on the outside of buildings goes back to the late 1950s. Full scale tests were done at the LCC before they introduced plastic clad high rise buildings in London. I do not know if they are still there but if you are round by Paddington Station there were many tower blocks near Paddington with GRP cladding. The situation has been constantly under review since then.

70. Is anyone responsible for holding information about the condition of buildings and the set up before the regulations?

(*Mr Field*) I do not think we know the answer to that.

Mr Brake

71. You were in when the previous witnesses were giving evidence. Their view was not terribly favourable towards the tests for assessing the fire performance of external cladding systems. Why do you think that was?

(*Mr Field*) There may have been a slight misunderstanding there. There was certainly a comment made about the current test methods that were in the approved document, which is basically that which is looking at the spread of flame in BS476 type testing, which would then provide Class O ratings. My own feeling was that they were relatively favourable towards the full scale test that we have developed. It was the small scale test that is currently in the guidance that they were concerned about.

72. As far as you are aware, there have not been concerns raised by manufacturers about the costs, for instance, of the full scale test?

(*Mr Field*) Not at all. Manufacturers have been working and supporting the initiative in this respect. At the end of the day, because this has now gone out

[14] *Note by witness:* There has been a significant reduction in funding of fire safety research in recent years as a result of changing government priorities.

[**Mr Brake** *Cont*]
for public comment through the British Standards Institution, any modifications in respect of criteria and costs and scale will come back before it becomes a fully fledged standard.

73. Mr Rich, your company will not be putting in a submission expressing concerns about the costs of these tests?

(*Mr Rich*) No, we will not.

74. You would not expect any of your competitors to?

(*Mr Rich*) They have been involved with it as well. We see it as an industry wide problem.

Chairman

75. When you say you see it as an industry wide problem, does that mean that almost all manufacturers of cladding material want to see a solution to this or are there vested commercial interests in particular systems?

(*Mr Rich*) I am only talking on behalf of the ventilated rain screen over cladding type of system. There are, as far as I know, three major producers in this country who were involved with the development of the test method.

(*Mr Field*) I think it is worth noting that the Partners in Technology research programme, which basically has led to this particular test method, was responsible for bringing together three of the key manufacturers of these systems in the United Kingdom who commercially are clearly in competition with each other. It was a very high accolade for that particular programme of work for that to happen.

76. On the whole question of fire safety, is the legislation really outdated? Ought there to be a new Fire Safety Act?

(*Mr Field*) I am not sure I can actually comment on that.

(*Mr Morris*) The legislation is very simple indeed. The Act of Parliament is a simple, functional requirement. What many people have been referring to as regulation is in fact advisory material in the approved documents which have exactly the same status as the Highway Code.

77. So you do not think we need a new Fire Safety Act? I understand the Assistant Chief Fire Officers' Association has been pressing the government to allow parliamentary time for a new Fire Safety Act.

(*Mr Morris*) We have at the moment a very, very flexible system.

78. That is somewhat ambiguous.

(*Mr Field*) On reflection, I think it is very important to recognise that, should there be any changes in respect of legislation, it is very difficult to detach the responsibility for the building regulations in particular from life safety in respect of fire.

79. What has been suggested to us is that the building regulations perhaps are all right to start with but, because materials deteriorate, a problem develops over time.

(*Mr Field*) This is the so-called ageing process?

80. Yes. Are you satisfied that really the regulations cover the ageing process satisfactorily?

(*Mr Field*) It is very interesting because we have only recently been discussing with the Department this particular issue. We ourselves have recognised there may be a potential problem here. The legislation does not necessarily address that issue at the moment. Whether it is a real problem or not we do not know. Maybe it should be looked at.

81. Mr Rich, can the residents of a tower block easily identify that your material on the outside comes from your company and that there is not a problem with it?

(*Mr Rich*) We cannot obviously put our name on the front of the tower block.

Mr Donohoe

82. But you would like to.

(*Mr Rich*) Yes. The local authority would be able to identify where they purchased the materials from. Most manufacturers like ourselves offer the complete system. In other words, it has all come from one source so there is one source to go back to if there is a problem.

Chairman

83. You could almost give a guarantee for buildings that you have installed the material on that there is not a problem?

(*Mr Rich*) There are some things that are outside our specification. In other words, how windows are treated, what material is used in the glass of the windows, so flame re-entry is always a problem, but on the decorative cladding we are pretty sure that our materials perform very well.

84. You are saying you provide the whole system but you do not provide the windows?

(*Mr Rich*) Yes.

Chairman: If there are no more questions, can I thank you very much for your evidence?

Memorandum by Stephen Ledbetter, Centre for Window and Cladding Technology (ROF 45)

FIRE AND FACADES

INTRODUCTION

Modern buildings of medium to high rise invariably comprise a loadbearing structure and a non-loadbearing cladding system. Hence, the cladding system becomes a load on the structure and attempts are made to minimise its weight.

The facade also fulfils many functions to moderate the internal climate of the building. The filtering of light, heat and sound leads to energy efficient buildings and greater comfort levels that lead to greater productivity in commercial premises.

Last but not least, the facade provides the aesthetic of the building and contributes to the cityscape.

Any changes to the facade to satisfy a single requirement such as fire performance will impinge on all other aspects of the wall's performance as well as its cost.

Walls may be constructed as single layer curtain walling in which an aluminium (or other material) frame holds infill panels of glass and opaque materials. More commonly, a wall may be constructed as a layered construction. In these walls a metal frame contains infill panels and acts as the structural part of the wall. It also serves to seal the building against air leakage and frequently provides the thermal insulation of the wall. An outer layer then serves to shed water from the wall and provide the aesthetic of the facade.

FIRE PERFORMANCE

Currently walls may be required to prevent the spread of fire into exit routes and from floor to floor but not suffer disproportionate damage in a fire.

Fire resistant walls are constructed to protect stairways where, say, they are at a re-entrant corner of a building. Such constructions are expensive as a result of the material and skills used and are not economically viable for the prevention of fire spread from floor to floor in a building.

Spread of fire from floor to floor may occur by the passage of hot gases between the floor edge and the inner face of the wall. Fire spread may also occur as a result of fire breaking out through the wall and burning back in again. Spread of fire behind the wall can be restricted by placing a fire stop with a fire rating equal to that of the floor slab and this is normal practice. Spread of fire by burning out through the wall will depend on the form of wall. For a layered wall with separate air barrier and rainscreen there is an internal cavity that can promote the spread of fire by acting as a flue. This happened at Knowsley Heights but may be prevented by the use of fire stops within the cavity. Guidance on this is given in publications by the BRE, and the Building Regulations. Standard and Guide to good practice for ventilated rainscreen walls by CWCT gives guidance on all aspects of layered walls. For a single-layer wall, spread will be from floor to floor and will depend on the nature of the fire and the materials used. In these respects the LPC report has looked at a restricted number of facade types. There is a European Standard under development for a method of testing fire resistant facades.

The LPC report has identified the glass as being a weakness in the glass/aluminium wall. It should be understood that in many constructions we want the glass to break early so that it falls in its broken state as small pieces with rounded edges. If the aluminium frame or fixings failed first the large sheets of glass would fall from the building to the possible injury of those fighting the fire. I would argue that the mode of failure during the fire is as important as the period of fire resistance in many cases.

I am a cladding engineer not a fire engineer but am sure that the use of sprinklers has a role to play in the performance of cladding in fires. As is so often the case in the construction industry, it seems that the costs of these solutions are seen in isolation. It would be possible to build fire-resisting walls on all buildings but the costs would be unreasonable and unnecessary. It would require elaborate testing for each project and yet for most walls (layered walls) we have no clearly defined tests and I believe that test specimens would have to be large (several storeys high).

Before any radical changes are made to the way in which buildings are constructed inthe UK, it would be advisable to look at the very few incidents of spread of fire in medium and high rise buildings and to establish the contributory factors. A proper risk assessment should then be undertaken. I feel the work of the LPC has been driven by a few incidents that have hit the insurance industry and that we run the risk of using a test method because it exists not because it delivers real benefits to building owners or users.

Stephen Ledbetter

July 1999

Examination of Witnesses

DR STEPHEN LEDBETTER, Centre for Window and Cladding Technology, and MR CHRIS BUNTAIN, Eglington Weber & Broutin (UK) Ltd, examined.

Chairman

85. We can continue with the third session this morning into the potential risk of fire spread in buildings via external cladding systems. Gentlemen, can I welcome you to the Committee and ask you to identify yourselves for the record?

(*Dr Ledbetter*) I am Dr Stephen Ledbetter from the Centre for Window and Cladding Technology at Bath University.

(*Mr Buntain*) I am Chris Buntain. I am technical manager of a company specialising in the development, manufacture and installation of insulated cladding systems.

86. Thank you. Do either of you want to add anything to what has been said so far?

(*Mr Buntain*) I think it is important from the outset that we clarify what the situation is with regard to the Irvine block. The Irvine block was not overclad. The Irvine block is a block of concrete common throughout the whole of the United Kingdom. It is made of concrete and it is as non-combustible perhaps as you can get within the building industry. It certainly will not catch fire. It was not overclad by any material at all. It had had its windows replaced by the local authority using a plastic window and it was the full height plastic window units within the block at Irvine that caught fire and the panels below the window, but not overcladding which the building is assumed to have had by some people. It was not overclad. It had a composite window unit which caught fire.

(*Dr Ledbetter*) There have been tests developed for fire and there has been research into the behaviour of fire. It has largely been by fire engineers and not by building engineers. This misunderstanding of the type of cladding seems to be rife amongst those developing tests. I would emphasise the point that we need to be clear as to what types of construction cladding we are discussing at any stage.

Mrs Ellman

87. What is your assessment of the risk of fire in external cladding systems?

(*Dr Ledbetter*) My own assessment would be that there are very few incidents that are known within the industry. Obviously, not all incidents are reported back to the industry from the Fire Brigade and from local authorities but we do always resort to talking about one or two incidents which are notable, notable because there are not very many I suspect, and notable because of course in a high rise building there is a greater risk. It may be a very rare event. It is the same if we get an accident with an aircraft, where the intensity of the event is great but the number of deaths is not that great compared with the number of people generally killed in, say, road accidents. What we get is a concentration of people's minds as to what could be a large but rare event and I suspect that there are more people injured and killed by fire in low rise buildings.

88. You think the dangers are exaggerated?

(*Dr Ledbetter*) If we see a fire in a high rise building, we perceive that it might become a large fire. That is probably more a matter of perception than reality. I am not aware of many incidents of fire spreading through high rise buildings, particularly through the cladding, by burning out and burning back in.

(*Mr Buntain*) Before any research is undertaken, we should get a perspective on this thing in so far as the scale of high rise incidents is concerned with regard to cladding installations. Like Dr Ledbetter, I do not know of a great number of incidents of fires which have taken place in multi- storeys or indeed in any overclad buildings. I know of some but there are not very many. I would suggest also that we should call on European experience which is perhaps 20 times more in terms of the surface area of buildings that are overclad with potentially fire reactive insulants. We should have a look at Europe and find out what exactly the scenario has been there and whether there have been situations which have given rise to concern. For example, typically, the German market is 20 times larger in overcladding terms than our own United Kingdom market per annum. Therefore, their experience is at least 20 times more than ours. The Germans also pay great attention to detail in terms of the soundness and fitness of their materials. They will test absolutely anything before it is assessed as being fit to put on a wall and it would seem to me that it would be appropriate to have a look at this German and continental experience more widely to find out what the extent of the problem is and how they are dealing with it and how they are addressing it; and also to see whether there is any pending European legislation coming about which might address this problem and some test procedures which might come through the European technical lobbies which might address this problem.

89. Are current regulations adequate?

(*Dr Ledbetter*) I believe that the current regulations are adequate in as far as they can be. One of the problems with regulation is that it is very difficult to be specific and write regulations which embrace all forms of construction. There is a very wide diversity of new construction and I believe that is what we want as a country in terms of having a diverse cityscape and diverse forms of architecture. It is more complicated with overcladding where we go back to existing buildings and we overclad them. Then we end up with an even greater diversity of forms of construction. What we have done at the time being is write regulations which generally embrace the intent of preventing the spread of fire. We are looking at developing methods of test. To date, we have developed methods of test that are specific to just two types of building construction and not to all forms of building construction. Therefore, to write tighter regulation would be difficult because it would not embrace all the buildings that we currently construct.

[Mrs Ellman *Cont*]

(*Mr Buntain*) There has been some inference, if not suggestion, that full scale fire tests have not been carried out on fire reactive cladding systems in buildings. Some 10 or 12 years ago, a test was carried out at Cardington under the auspices of the Building Research Establishment, albeit it was only to a three storey structure at the time, but it was full scale and it did have largely the types of cladding system which are predominant in the field of overcladding, particularly on multi-storey buildings. The fire tests were carried out and certain conclusions were drawn by Building Research at that time relating specifically to fire fixings which would restrain and retain the cladding on the wall while the fire was being extinguished; and also to find out how these systems reacted in a real fire situation. When I have a look at the test equipment and the proposed test regime which is now being suggested, I see many similarities to something which did occur about 10 or 12 years ago. It is wrong to think that we did not take fires seriously then. Those of us, including myself, who are involved at the sharp end of designing and installing these systems did have a Defects Action Sheet produced by Building Research which we have incorporated into our high rise designs ever since that fire test was carried out. It is not embodied in law; it is a recommendation but most manufacturers put it in. Fire stopping in multistoreys is something that is done in these systems.

90. What could be done further now to minimise the risk of fire damage in the situations you describe?

(*Mr Buntain*) Fire damage is not the problem. Nobody is really interested in retaining the building. The building will be damaged whether it is concrete, whether it has plastic windows or whether it has polystyrene on its outside. It will be damaged by fire. The fire authorities—I think they would agree—have two prime concerns. One is the safety of those people escaping from the fire and, secondly, those people who are fighting the fire. If the building survives, well and good, but the main concern is to get people away safely. If the building is, to a large extent, non-combustible or highly fire resistant—and the two words again should not be confused; you can get a material which is non-combustible but it need not be fire resistant—it is very significant in giving the fire authorities confidence to fight that fire in the knowledge that the building is not exacerbating the fire.

91. What could be done to secure that type of building? More regulation? Different regulation? Something else?

(*Dr Ledbetter*) We currently have a position whereby the industry has its own guidelines as to how it puts fire stopping in cladding, how it uses materials that are not ignitable. The respectable part of the industry obviously works in that way. That is not to say that all of the industry does but most buildings that are high rise are supervised in their construction or renovation by professionals. Therefore, we do get that check from the professionals involved in design. There is currently some confusion. We have a number of methods of test being developed and to give guidance on that at the time being or to embody it in regulation would be difficult. We have a method of test developed by the Building Research Establishment which is currently up for discussion as a proposed British Standard. I was in receipt only yesterday of documents from the European Technical Committee where the Germans are requesting that a test be developed, a slightly different test. We have also had a test developed by the insurers, by the Loss Prevention Council, and all of these are different tests and all of these tests relate to different forms of cladding. I have personally been asked by all of these groups to advise them on the forms of construction because they are essentially fire engineers. I think there is a need for the constructors and users to sit with the fire engineers and develop recognised tests before we can advance with regulation. In the meantime, we have to work on the best advice that we currently have and our lengthy experience in this field.

Mrs Dunwoody

92. Why are you making this artificial distinction? Why should your group be more accurate in their assessment, which is what you seem to be implying?

(*Dr Ledbetter*) I am not suggesting that my group would be more accurate in its assessment. I am suggesting that there are different groups involved in this issue. There are some people who understand fire and the spread of fire from largely traditional forms of construction. What we have to understand is that the method of cladding buildings has changed radically in the last 20 years, particularly so in the last 10, where we have developed new systems of building. We need the manufacturers and developers of those systems to sit with those who have been studying the other aspects, such as fire, in a more traditional setting. We need a cross-industry discussion between those developing tests, those constructing and those developing yet further systems.

93. Are you saying that you are not fully represented on the Ministry's committees and on its consultation documents?

(*Dr Ledbetter*) The way in which the tests have been developed is for specific solutions to specific problems. Nobody has actually looked at the problem in its generality.

94. So you do not discount the evidence that we heard this morning; you are simply saying that it can be interpreted in a different way?

(*Dr Ledbetter*) I apologise. I was unable to be here for the earlier part of the proceedings. There have been tests developed which look at specific forms of construction, not at all forms of construction. We should make a determined effort to sit down at industry, the test houses, the users and manufacturers, and discuss this issue.

Mrs Ellman

95. Are you saying that this should be left to the industry itself or certain sections of the industry?

(*Dr Ledbetter*) No. I am suggesting that we should have the normal method of developing technical standards that we use in this country. One method of test has just now been put forward for discussion as a proposed British Standard and I for one think it

[**Mrs Ellman** *Cont*]
should be broadened to cover other forms of construction so that it could then be used within regulation, if that is what was desired.

96. Why would you say that fire spread so quickly in Irvine, which you have mentioned, and in Knowsley in Coventry?

(*Dr Ledbetter*) Certainly in the case of Knowsley, that was an older form of construction and there was, I believe, inadequate fire stopping. We have learned the lessons of that incident.

Chairman

97. Are you satisfied that fire stopping has been put into all the tower blocks where it is needed?

(*Dr Ledbetter*) No, not at all. I am sorry if I have misled you but I am talking about new forms of construction and new forms of overcladding. I am not talking about the existing housing stock which I think is a separate issue.

(*Mr Buntain*) I think this is something which will impact on the future of building construction. I do not know whether this Committee deals with it or not but insulation standards are going to be very seriously looked at in terms of the increased insulation standards to cut down CO2 emissions and get things like affordable warmth and so on. With these insulation products which will have to be used, many of them on the exterior of buildings, the only place to put them probably, the whole question of the fire issue is very important. Unless the means of protection which are these fire barriers, which are recommended to be put in, are put in or unless a non-combustible insulant is used, for example, the building is at risk but that is not normally the case. Could I suggest finally that perhaps legislation may not be the route to go down because there are other things which regulate these systems. There are things like the British Board of Agrement or WIMLAS which are test bodies which do test these systems and which do test for wholesomeness in systems for use in buildings. It could be that the remit of Agrement or WIMLAS was extended to cover the kind of testing that you are talking about, because most people who are serious about being in the business of overcladding buildings do get a WIMLAS certificate or a BBA certificate for their product.

98. When we talk about public safety, is it good enough to refer to what most people in the business think? Do you not feel there should be better regulations?

(*Dr Ledbetter*) There is currently regulation which sets out the intent that fire should not spread through cladding, but it would be impossible, I believe, to write regulation which would actually be applicable to all forms of construction because we do not currently have agreed methods of test against which we could prove all forms of product and construction. That is the reality. Until we can develop those tests, it will be very difficult to frame legislation.

Mr Cummings

99. This Committee may wish to recommend that the draft British Standard resulting from the test devised by the Partners in Technology programme at the Fire Research Station become mandatory, at least for new cladding. What would your reaction be to such a recommendation?

(*Dr Ledbetter*) I believe that the test has been developed for a restricted form of cladding which is overcladding of buildings containing small glazed areas within concrete or masonry walls. There are many other forms of construction, notably curtain walling. This is the kind of cladding which appears on hotels and a number of residential blocks. I think any legislation which was framed in terms of residential properties would have to cover a wider variety of cladding systems.

100. Would you have any reservations about it becoming mandatory?

(*Dr Ledbetter*) In making it mandatory, we would have first of all to review the whole performance of cladding and consider which solutions were going to work and which were not within the new regulations. In my own written evidence, I have said that cladding performs many functions and one of the main criteria is to reduce energy loss in buildings which requires us to put a lot more insulation into buildings and therefore manufacturers will be required, to some extent, to modify their designs.

101. Would you embrace such mandatory requirements with enthusiasm, taking into consideration your previous comments that there are responsible manufacturers and irresponsible manufacturers?

(*Dr Ledbetter*) Given that we cannot develop a test that will cover all forms of cladding, I think it would be a reasonable move forward once we have developed appropriate test methods.

(*Mr Buntain*) I do not think we necessarily have irresponsible manufacturers. All manufacturers that I know in the industry which I represent take a responsible attitude towards fire safety and towards the fire regulations and the recommendations that are contained within the Building Research defects action sheet. That is what they do at the moment and I do not see that as being a problem. There is a commercial side to this which is inescapable. That is if full scale fire testing is required for every single system that is likely to be marketed within the United Kingdom it will have a very serious impact on the number of people manufacturing these systems because many people will not be able to afford the full scale cladding test. Perhaps I am fortunate in that the company that I represent will be able to afford it but there are many who will not. The insulative overcladding market may therefore shrink because people just cannot afford it.

Chairman

102. It could shrink just as much because it could be totally discredited, could it not?

(*Mr Buntain*) It could be but to date it has not been discredited. There is no suggestion that the whole overcladding industry is discredited. It is providing much more enhanced living standards for many

[Chairman *Cont*]
people. We are talking probably of 500 multi-storey blocks throughout the United Kingdom; we are talking of almost a quarter of a million houses within the United Kingdom which have been overclad with combustible and non-combustible insulation. The records of properties affected by this and situations which have arisen are not great. If they are great, they are not made public and perhaps if you suspect that there is a big problem out there then, please, get a perspective on it before you start going down that route.

Chairman: That is the whole point of the inquiry.

Mr Cummings

103. Have we got to wait until there is a catastrophe of significant proportions before we express concern?

(*Mr Buntain*) No. Everyone is obviously concerned if any incident occurs, whether it is a Knowsley or an Irvine, but you have to see where it actually lies within the context of all the things that have been done in the building industry just now. For instance, would you be as excited if a window was sucked out in a gale and landed on top of somebody's head? That can happen. Would you then go round the window industry and look at every window?

104. Would that not be a matter of fitting rather than of manufacture?

(*Mr Buntain*) That is true but again it could be that the manufacture is inadequate. You do not know.

Mr Gray

105. Surely that is what a Committee such as this would do. If a window was sucked out and landed on somebody's head, that is precisely what Parliament is supposed to be doing, finding out why, and if there were inadequacies in the manufacturing process we would take steps to close that manufacturer down or make sure he changed the process.

(*Mr Buntain*) You have a serious problem here, for example, with the windows at Irvine. What do you do about these windows? Do you say every PVCU window that is manufactured and used in the United Kingdom has to come out because of its potential fire risk? What do you replace it with? Do you replace it with a timber window, which we all know is likely to be combustible and require a lot of maintenance? Do you replace it with an aluminium window which will melt in a fire?

Mrs Dunwoody

106. Do you alternatively look at whether fire breaks could be used in relation to that existing window and provide a level of safety that was not provided at Irvine? It is not quite as simple as saying that Parliament does not have a responsibility because there must be a certain point at which the commercial interests of the manufacturing firms must be taken into account. Of course they must, but what is the formula? How many people do you have to burn to death before the commercial interest is not equal to the safety regulation?

(*Dr Ledbetter*) There is not only a commercial interest; there is the cost of putting the cladding onto the buildings. At the time being, we have an economical solution for refurbishing existing buildings to the betterment of the people who live in them and to the energy savings in those buildings. Currently, we still have local authorities who cannot find the funding to overclad their buildings on anything like a reasonable renewal cycle. If we start to look at fire performance and make it mandatory and we invoke the proposed BRE method of test, we will find that, when we go to a building, every one will be unique. If it was built 20 years ago, we have got to look at how it was constructed. Do we do a fire test for every one? What is that going to cost? We could be looking at doubling the cost of cladding these buildings. I would ask that you look at it in the sense that we can deal with road safety and we can look for measures of road safety but we do not go as far today as having someone walking in front of a car with a red flag because, as a nation, it is not economically viable.

Mr Cummings

107. Obviously, the Committee has received suggestions from previous witnesses. I quote: "It appears that the real barrier to large scale testing is the question of cost rather than that of scientific prudence." How do you react to the suggestion that safety may be being sacrificed to keep costs down?

(*Dr Ledbetter*) You can always make things safer by putting more resources into them, but that may be a question that has to be taken, I suspect, by a committee that takes the public interest and the national interest and we are here to provide technical information on which those judgments can be based.

108. Would you agree that there should be a requirement for all cladding systems to be made of non-combustible materials?

(*Dr Ledbetter*) It is currently the recommendation in the documents that my own organisation produces that materials involved should be Class 0 and therefore should not be ignitable.

Chairman

109. How far does that put some of the materials which are competitors totally out of business?

(*Dr Ledbetter*) We would make the recommendation that timber should not be used in overcladding systems. I do not think that is universally the case.

Mr Cummings

110. Do you believe the industry itself is proactive to the many changes that are going to be required?

(*Mr Buntain*) The industry will react to it.

111. I was talking of proaction rather than reaction.

(*Dr Ledbetter*) I think the industry has been proactive in that it has been involved in the development of tests. The issue has been that protagonists of particular cladding systems have gone off and developed particular tests to prove that

[**Mr Cummings** *Cont*]
their method of construction works, rather than there being a whole industry approach to look at all forms of cladding.

Mr Donohoe

112. Mr Buntain, on your initial statement to us this morning, you gave the impression that Irvine was unrelated to the inquiry in so far as Irvine was in-fill and not cladding. If we take that to be the case, are we examining something that is unrelated completely to Irvine or is it the case that it is part of the family of what a person could conceive as being partial cladding?

(*Mr Buntain*) Irvine is not overcladding, as such, in terms of the building industry's acceptance of the term "overcladding". It would not, in the mind of a building technologist, be a recognisable description of it. The Irvine windows were replaced presumably by the local authority. I do not know what criteria they used in the selection of these windows. In the tragic circumstances that there were, the windows exacerbated the fire and it spread vertically up the building. There have been a number of examples of fires bursting out of windows where things like the window situation at Irvine have not occurred, particularly windows which have a spandrel, a spandrel being that panel below the window which is of non-combustible material. That would certainly have helped the Irvine situation and the Irvine situation would not have spread if the panel below the window and above the window below it, the spandrel panel, were to be non-combustible and fire resistant material. Incidentally, the question of non-combustibility should not be taken as fire resistant. You can have non-combustible aluminium but it is not fire resistant.

113. I will ask you the question again, Mr Buntain, in more specific terms. Are you telling us that we are here looking at something which is unrelated to the fire at Irvine?

(*Mr Buntain*) I think you could be broadening this to a wider perspective of overcladding. Irvine has been described as overcladding. It appeared in the press and was described on television as overcladding and it was not. You, as a Committee, I think, as I understand it, have wanted to expand this remit to the whole question of overcladding which was not an element within Irvine. Overcladding has been used on something like a quarter of a million houses and probably 500 multiblocks in the United Kingdom at the moment without any real problems. We talk of Irvine and Knowsley but who can instance many more in between that? There are not that many that we know of. I cannot quote any and my experience goes back 20 years.

114. Given what has happened in specific terms in Irvine, what changes, if any, are needed by the industry?

(*Mr Buntain*) By which industry? By the building industry or the people who supply UPVC windows?

115. By the industry supplying the in-fill, not so much the window producer. It is the in-fill that allowed the spread of the fire.

(*Mr Buntain*) There are two things. The window was a composite unit which went from floor to ceiling. It was delivered as a composite unit presumably and it was installed as a composite unit. It was not two separate things. It was not a spandrel and a window; it was one big unit. It came from the window manufacturer who made the spandrel below the same material as the window above. It was all PVCU and the panel was also, in my understanding, of plastic.

116. Should that manufacturer be taken to task?

(*Mr Buntain*) I have no idea. I do not know what regulations apply to the manufacture of windows. I am not a window expert but that is what the situation at Irvine was confined to.

117. Do you know if there has been any test done to a similar system as that installed at Irvine?

(*Mr Buntain*) I do not know.

(*Dr Ledbetter*) I am not aware of any such test.

118. Do you think there should be an Irvine test done?

(*Dr Ledbetter*) The test we have discussed to date would not have been applied at Irvine anyway because we would not, as an industry, have called that overcladding.

119. Is there a regulation that covers Irvine?

(*Dr Ledbetter*) Not that I am aware of.

120. Do you think there is a need for a regulation?

(*Dr Ledbetter*) I am not fully aware of the circumstances at Irvine. These are rare events and they should be kept in perspective. I suspect that, if we were to have the regulation, we would have to carry out tests every time we went to do a project.

121. You talk about the need for fire testing but what does it cost for one of these tests?

(*Dr Ledbetter*) The costs of the tests are not clear. I am not well placed to tell you the cost of commissioning the tests but you have to understand that if you ask anybody who conducts tests what the cost is you have to add to that the cost of making the specimen. You have to build a three storey piece of wall.

122. If I were to say to you that the cost could be anything between £10,000 and £20,000, the cost of recladding a building is about ten million, so the cost in real terms is minimal, is it not? Therefore, to have the test done before the installation of any of these systems would seem to be a fair way forward, would it not?

(*Dr Ledbetter*) The cost of running the test is not £10,000 to £20,000. In the case of Irvine where they simply replaced the windows, to do an effective test we would have to make a part of that building. It has been there for 20 years so how do we make those existing panels and put the windows into them to test them? It is complex and expensive.

123. Is it not the case that, while you are trying to suggest that it is the cost of the actual test that is the barrier, the real barrier is that in industry they would need to have a change to the product line?

(*Dr Ledbetter*) No, that is not what I am suggesting. If we take the Irvine case, there are many windows that could have been used in that building.

[**Mr Donohoe** *Cont*]
It would be possible to select windows with different performances and that is a matter for the purchaser, the client.

124. If as a company, which you are, you were told that there had to be a change made to your product line, that would be a fairly substantial cost implication to you so you would do anything, would you not, to have that happen to your company?
(*Dr Ledbetter*) I am not a company; I am a research organisation.

Mr Gray

125. You are employed by the manufacturers.
(*Dr Ledbetter*) I am employed by manufacturers and by clients. I am a membership based organisation. I have local authorities and manufacturers.

126. Your wages are paid by people who manufacture these things and it might be argued that you have a reason for defending them.
(*Dr Ledbetter*) And by people who use them. I would say I was independent for that reason.

Mr Donohoe

127. Even although you are not particularly a single company, you are therefore representing the industry. Is it not the case that if there were to be recommendations after fire testing and in every instance there was to be one and it had cost implications of some enormity, it would affect your—?
(*Dr Ledbetter*) My experience of the industry is that provided there is legislation or standards which are universal then manufacturers will change their products to comply because it is just an added cost to the cladding which is passed on. That they can handle. What they cannot handle is confusion where, even if they wish to improve their product as many do, they are undercut by people in the market who do not comply. The industry would like a level, clear field on which they could produce a good product.

Chairman

128. Are you saying we have that now or not?
(*Dr Ledbetter*) No, we do not have that because we do not have agreed standards. We have different standards for different products.

129. You think we need agreed standards quickly?
(*Dr Ledbetter*) If we had agreed standards and they were universally agreed and applied, then the cost would just be a cost to the client, the local authority or the owner of the building.
(*Mr Buntain*) My understanding is that there are no regulations which cover the fire performance of windows, apart from providing means of escape. This was not an issue in this case. There is nothing, to my knowledge, within the regulations of any part of the United Kingdom, which would have impacted on Irvine or any other window that has been installed throughout the whole of the country. They are not tested, as I understand it, for fire, largely because there are other parts of a window which are even more fire reactive, such as the glass. The glass always breaks and that is a hazard in itself. It is a hazard to fire fighters, apart from anything else. They are not tested and therefore there is probably no legislation at the moment which would have been able to be referred to by the Irvine authority when it came to replacing these windows. They would not turn up a book and say, "Ah, here is the regulation that applies."

130. Should there be some regulations then that apply to windows?
(*Mr Buntain*) It may be that this has to be addressed.
(*Dr Ledbetter*) It would be very difficult to write legislation for windows in domestic properties to be fireproof because people want them to open for reasons of ventilation. You cannot make people keep the windows closed. Therefore, you are going to get spread of fire through a window. You have to understand that windows fulfil many functions. The primary ones are ventilation and light, not preventing fire.
(*Mr Buntain*) If you want no problem, make the window a wall. You cannot do that.
Chairman: On that note, I think we had better finish this session. Thank you very much indeed.

Memorandum by the Department of the Environment, Transport and the Regions (ROF 31)

The following memorandum is intended to address the issues that the Committee wish to examine.

1. WHETHER A RISK IS POSED BY SUCH CLADDING

The following points under this section are intended to set out the risks associated with external cladding. Some background information is also provided which it is hoped will help explain the philosophy behind the Building Regulations (section 3) that were developed to minimise the risk.

Schedule 1 of the Regulations contain functional requirements which, where relevant, must be complied with. Part B of schedule 1 deals with fire safety and Requirement B4 (1), which has particular relevance to cladding systems, states:

"The external walls of the building shall resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building."

1.1 *External fire spread*

External walls or the cladding attached to external walls can contribute to the fire spread both internally and externally if adequate precautions are not taken. The main function of an external wall in the context of external fire spread, is for it to be able to confine the fire to the building. This is intended to restrict the fire from hazarding a nearby building and can also aid fire-fighting. The origins of this requirement lie in the great fire of London. However the extent to which external fire spread needs to be considered is largely dependent on the amount of space that there is around the building. An external wall is considered to be an element of structure if it has a loadbearing function and it should then not collapse prematurely in fire. To achieve this and to help prevent external fire spread it may need to have fire resistance. In tall blocks of flats the loadbearing element is usually the structural frame of the building and the infill walls will only need to have fire resistance if they are located sufficiently close to a boundary. The standard of fire resistance needed depends on the use and height of the building. If the side of a building is sufficiently removed from the boundary then it need not have any fire resistance. Conversely, where the wall is on or very close to the boundary, then most or all of the wall will need to be fire-resisting.

1.2 *Flammability at external wall surfaces*

In addition to fire resistance, it is necessary to consider the outside face of the wall in terms of its susceptibility to ignition and subsequent flame spread over its surface. Typically, sources of ignition could be flames issuing out of windows or other openings caused by a fire within the building or alternatively from an external fire source. External fire spread to the cladding can be caused by fire radiation from another building or from a source immediately adjacent to the cladding such as the ignition of refuse caused by arson. The standard of fire precautions that are necessary is affected by:

(a) the distance to the boundary;

(b) the height of the building; and

(c) the use of the building.

Where external fire fighting might be difficult, high standards of performance against fire propagation and spread of flame are needed. Therefore where the external wall of a building is on or very close to a boundary these standards apply. Because of this difficulty in fighting external fire spread in the upper parts of high buildings it is necessary to apply higher standards of fire performance to the upper parts of such buildings regardless of the distance to the boundary. Where a low building is not close to a boundary, there is no restriction on the flammability of external wall claddings. Also a lesser standard of performance is acceptable for the lower parts of a high building unless it is on or close to the boundary.

1.3 *Materials of limited combustibility.*

In high buildings the risk from fire spread is such that the combustibility of materials used in the construction of external walls, including thermal insulation materials, needs to be limited. The exception to this is where both leaves of the cladding are of masonry construction, such as brick or block, in which case the insulating material need not be of limited combustibility. A material of limited combustibility is a material with a performance specification: this includes non-combustible materials or materials that are defined by reference to a method of test. Typically, plasterboard would be considered as a material of limited combustibility.

1.4 *Cavities*

Hidden voids in construction can provide a route for fire spread throughout or around the building and this can be particularly relevant in the context of external cladding systems. Any void between the new cladding and the existing building should be closed at regular intervals or at the line of compartmentation. Typically the floor of each flat will form the line of compartmentation, an issue covered in paragraph 3.1.

1.5 *Surface Flame Spread*

Construction materials and their behaviour in relation to fire are classified using a number of standard tests such that the performance of particular elements of buildings can be specified without reference to specific materials.

The provisions necessary to reduce the spread of flame over the surface of a material are based on the comparison of the results of small scale fire tests with larger scale fire research and experience of real fires. Any guidance that is given must be sufficient to provide a satisfactory level of safety whilst being practical in its application.

The surfaces of materials (including cladding systems) are classified by reference to two British Standard test methods. These are the spread of flame test which measures the distance a flame will spread across the surface of a sample and the fire propagation test which assesses the contribution that the sample makes to fire development. The spread of flame test has four classes. These are class one to class four, with one being the highest performance rating. Class "O" is a further class, defined for the purposes of the Building Regulations, that is used for critical situations where a higher standard of performance than that of Class one is appropriate. The Building Regulation issues relating to flame spread are covered in paragraph 3.1.

Whilst non-combustible materials are inherently of the Class "O" referred to above, many materials that are by definition combustible will also achieve this classification. The intent of this methodology is to identify materials that will have a low risk of fire spread.

2. The Extent of the Use of External Cladding Systems

2.1 The Department does not collect statistics on the use of cladding systems but it is believed that external cladding systems are widely used.

2.2 The Department has a call-off contract with the Fire Research Station to investigate real fires and this highlights any areas of concern that affect Building Regulations. The following are fires notified to the Department that involved external fire spread but were not necessarily attributed to the cladding system:

Knowsley Heights, Liverpool, 1991. Deliberate fire spread up and behind rainscreen cladding, extended over 11 floors. Building Regulations were changed as a result of this.

Mercantile credit building, Basingstoke, 1991. Fire on 8th floor spread up the building behind glass curtain walling.

Three storey block in Milton Keynes, 1995. Roof destroyed.

Alpha House Coventry, 1997. Flames travelled up the outside of the block from 13th to 17th floor. No fire penetration of the flats.

Butler House, Grays, Essex, 1997. Fire in top flat of 14 storey block caused uPVC window frames to melt and drip, which in turn caused some damage to cladding.

3. The Adequacy of the Regulations Pertaining to their Use

3.1 In England and Wales (Scotland has a different set of Building Regulations) where new buildings are erected, or existing buildings materially altered, or in certain cases where there is a material change of use, then the work is required to comply with the Building Regulations 1991. As far as fire is concerned, the purpose of the Regulations is to secure reasonable standards of health and safety for persons in or about buildings (and any others who may be affected by buildings, or matters connected with buildings). Schedule 1 of the Regulations contains the functional requirements and Requirement B4(1), which has particular relevance to cladding systems, is given in paragraph 1.

Guidance on how to comply with the functional Requirements of Part B is given in Approved Document B (fire safety). Approved Document B includes several provisions to restrict the materials used in external walls and cladding by reference to the surface spread of flame rating. These provisions are as follows:

The external surfaces of walls of any building closer than one metre to its boundary (and therefore closer to other buildings) should be class "O" in order to reduce the risk of external fire spread from one building to another.

Where a building is 20 metres or more in height, the external surfaces of walls more than 20 metres from ground level should achieve a class "O" surface spread of flame rating. Below this height timber cladding at least 9mm thick, or some other materials that are less restrictive than class "O" materials, could be used. This is to reduce the risk of fire spread over the walls of tall buildings whilst allowing certain commonly used materials to be retained in positions where fire fighting operations from the ground could be effective.

In the case of the outer cladding of a wall of "rainscreen construction", which has a drained and ventilated cavity, the surface of the outer cladding which faces the cavity should also satisfy the provisions detailed above. This is to take account of the specific problems associated with this type of construction.

Approved Document B states that the external envelope of the building should not provide a medium for fire spread if it is likely to be a risk to health or safety. The Document also points out that the use of combustible materials for a cladding framework, or of combustible thermal insulation, may present a risk in tall buildings. Therefore in a building with a storey at more than 20 metre above ground level any insulation material used in the external wall construction should be a material of limited combustibility.

With regard to fire stopping Approved Document B suggests that a cavity barrier should be provided at the junctions between an external cavity wall that is not of masonry construction and every compartment floor. The BRE guidance on avoiding risks with thermal insulation, which is referenced in the Approved

Document that deals with energy efficiency, recommends that to prevent fire spread, cavity barriers should be provided at every floor level. We have asked the Fire Research Station to review and update their report on the fire performance of external thermal insulation for walls of multi-storey buildings, referred to in Approved Document B.

The current Approved Document B is being reviewed but there are no changes proposed that will affect cladding systems other than the 20 metre height mentioned above is being reduced to 18 metre to fall in line with other height dimensions relating to fire fighting. In general it is considered that the risk of serioius fire spread via external cladding will be minimal if the guidance given in Approved Document B is followed.

The Fire Precautions (Places of Work) Regulations may have a bearing on cladding issues but these Regulations are the responsibility of the Home Office.

4. What Action may be Necessary to Counter any Risks Posed in Existing Buildings and to Avoid any Risks in New Buildings or Alterations to Existing Buildings

4.1 The Building Regulations in England and Wales only apply to new building work, and thus cannot be used to require any alterations to existing buildings although the Department is reviewing this in respect of the conservation of energy. The provisions of the Building Regulations as set out in the preceding section do, however, apply when new buildings are erected and thus such work is covered.

The Building Regulations also apply to building work that is classified as a material alteration. An alteration is material if, at any stage of the work, it would result in the building not complying with certain requirements of the Regulations where it previously did. The most pertinent requirement with regard to cladding is external fire spread, but structural requirements could also be an issue.

Thus with regard to the alteration (or replacement) of cladding, if this was the only work being carried out, and if it at no time made the external fire spread or structure any worse that it was already, the work would not be controlled by the Building Regulations. There is therefore the possibility that external cladding installed some time ago, and thus not complying with the current Building Regulations, could be replaced without being controlled by the Regulations as long as the building was not made any worse with regard to these particular requirements in the process. This is a possible problem area and one that the Department may need to review.

The Building Regulations would need amendment to ensure that all such work was covered. It is possible that the Building Act might also need to be extended to support this. Any such amendment would need careful drafting to ensure that an undue burden was not inadvertently imposed on replacement and repair work. However a balance needs to be struck between construction costs and safety.

5. Other Matters Which may Arise in the Course of Questioning

5.1 The Department has funded the Fire Research Station (BRE) to produce a method of test for "*Assessing the fire performance of external cladding systems*". This report will be referenced in the revised Approved Document B and it is proposed that it will become a British Standard.

5.2 Review of Building Research Establishment Report 135—1998 "Fire performance of external thermal insulation for walls of multi-storey buildings". This review is required to give better design guidance for cladding systems, particularly with regard to cavity barriers.

July 1999

Examination of Witnesses

Mr Nick Raynsford, a Member of the House, Minister for Construction, Mr Paul Everall, Official, DETR, Mr Tony Edwards, Official, DETR, and Mr Anthony Burd, Official, Department of the Environment, Transport and the Regions, examined.

Chairman

131. Minister, can I welcome you to the final session this morning on the potential risk of fire spread in buildings via external cladding systems and could I ask you to identify your team?

(*Mr Raynsford*) Thank you very much. I am Nick Raynsford, Parliamentary Under Secretary in the Department for the Environment, Transport and the Regions. I am supported by Paul Everall, who has overall responsibility for the building regulations, Anthony Burd and Tony Edwards, both of whom are involved in that section, looking at building regulations and associated fire issues.

132. Do you want to say anything to us to start with or are you happy to go straight into questions?

(*Mr Raynsford*) Can I make a very brief introductory statement, just to clarify a few points? Can I stress that building regulations in England and Wales are written in functional terms and are intended to secure reasonable standards of health and safety for persons in or around buildings. This

[**Chairman** *Cont*]
includes others who may be affected by buildings such as fire fighters. The regulations are not intended to address property protection issues. The regulations are contained in part B. There are five elements in that. Part B1 deals with means of escape; B2 and B3, internal fire spread; B4, which is particularly relevant to external cladding, deals with external fire spread and B5, access and facilities for the fire service, which obviously is equally important. The key issue in front of the Committee particularly relates to requirement B4 which states that the external walls of the building shall resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building. Guidance on fire safety measures that will tend to show compliance with the regulations, if followed, is given in approved document B. The guidance is currently under review but there are no significant proposed changes with respect to the guidance given on cladding systems as part of the current review—and I stress the current review. The BRE guidance document that is associated with energy conservation, which is "Thermal Insulation: avoiding risks", gives some guidance on the spread of fire in wall cavities and we have asked the Fire Research Station to update their report number 135 which is a document referenced in approved document B. In particular, we are asking them to give added guidance on fire stopping, which is made clear in the part L guidance but is less clear in the existing part B and we feel there is a need for improvement there. The following guidance that has a bearing on cladding issues is given in approved document B, firstly on external fire spread. The intention is to confine the fire to the building and to restrict the fire spread to neighbouring buildings. Secondly, on the flammability of external wall surfaces, it is necessary to restrict the combustibility of external walls of buildings that are less than one metre from the boundary and, irrespective of the distance from the boundary, restrictions also apply to the external walls of high buildings and those buildings that are used for assembly and recreation purposes. The high buildings significance is very much in relation to the needs of fire fighters who have particular difficulty above certain heights. Thirdly, on materials of limited combustibility, in high buildings the risk of fire spread is such that the combustibility of materials used in the construction of external walls, including insulation materials, needs to be limited. In a building with a height of more than 20 metres above ground level, any insulation material used in the external wall construction should be of a material of limited combustibility. Fourthly, on cavities, hidden voids in construction can provide a route for fire spread throughout or around the building and this is particularly relevant in the context of external cladding. As I have already stated, we have asked the Fire Research Station to review the BRE report that we refer to in approved document B, particularly with respect to the guidance given on fire stopping, to make absolutely clear that there must be effective stops between storeys. I hope this clarifies the ways in which the building regulations do cover aspects of fire safety relating to external cladding. As I have already stated, we have asked the Fire Research Station to update their guidance that is associated with the approved document. This will particularly bring it into line and expand on their more recent guidance document that is associated with energy conservation. I should in conclusion say that in addition to this most British Standards referred to in approved document B that relate to methods of fire test will be withdrawn when the new harmonised European standards are in place. My Department will therefore be working to produce supplements to the Approved Document which will take account of these changes and in many instances there will not be a direct correlation between standards. This will mean that we will have to review a number of sections in the Approved Document including that relating directly to external cladding systems to make sure that the guidance we give is compatible with the new harmonised test methods introduced by Europe.

133. Could you tell us the timescale for those European regulations?

(*Mr Raynsford*) We have not a precise timescale. I think the Europeans would hope that these could be all brought in within a year. I have to say our officials and officials in a number of other European countries are doubtful whether that timescale is feasible given the complexity of many of the issues and the need for a very thorough review.

Mr Donohoe

134. Are you saying that all of the concerns that have been expressed because of the lack of regulations particularly of what is known as vertical infill are now covered and will be covered on the basis of your statement this morning?

(*Mr Raynsford*) I am not saying that all the concerns are covered because I have highlighted the need for greater clarity, for example in relation to guidance on fire stopping. Obviously with the introduction of the new harmonised European tests there will be issues that need to be addressed that are not currently addressed. We also are awaiting the report on the Irvine fire which I know was a cause of real concern and as and when the report is available we will want to draw conclusions and even though there are different procedures in England and Wales to Scotland we will certainly want to learn from the evidence of that fire.

135. The Chairman has asked earlier whether you can put any time on when you expect to receive the report from Irvine.

(*Mr Raynsford*) We obviously cannot put a time on when we expect the report on the Irvine fire and we will respond as quickly as we can to that. On other issues we have already undertaken with the Fire Research Station work in relation to test systems for cladding which is currently out for consultation and subject to that that will become a British Standard and I think that will have an important impact. The guidance which relates to Part B will be harmonised with the document associated with Part L,and I would expect fairly speedy action on this.

136. What are we talking about? Six months, a year?

(*Mr Raynsford*) It is difficult to give a precise figure but I would certainly hope the harmonisation of Part B and Part L could be achieved in a reasonably short timescale. On the wider ones, the European ones, you

[**Mr Donohoe** *Cont*]
will understand why there has to be a larger element of uncertainty but certainly on the harmonisation of Part L and Part B I would hope we could achieve that within a year.

137. There was a programme known as Partners in Technology which your Department asked be undertaken by the Fire Research Station. What has happened to that programme and what was its purpose?

(*Mr Raynsford*) That programme has devised a new fire test system which we believe is a considerable improvement on the previous test system because it is a test which covers the whole system rather than simply the material. That was a product of the Partners in Technology project which involves funding by the Department but also by the industry itself and this, as I have said, is something which has led to a document which is now out to consultation and which could well in consequence lead to a new British Standard.

138. Do you accept that there is a problem with external cladding?

(*Mr Raynsford*) I accept that there can be problems in circumstances where external cladding is not applied appropriately or where it has been applied to standards in the past which were not as rigorous as those that currently apply.

139. Do you think it is sensible that there are flammable products put on the outside of buildings?

(*Mr Raynsford*) The whole of our current building regulations seek to ensure that where there is risk, and I have stressed that is particularly significant in high buildings and also where buildings are close to boundaries with other buildings, there must be the highest standard of flammability and that is why Class O applies.

Mr Donohoe: Thank you.

Mr Brake

140. Just to go back to the harmonised EU test. What input has the DETR provided to that process?

(*Mr Raynsford*) I am not sure myself what input officials have made to the development of the test and I think I would ask officials to respond on that.

(*Mr Everall*) Perhaps I could start and Tony might want to add a few words. We do work closely with colleagues in Europe and with the European Commission. There is a body called the Standing Committee on Construction at which officials from all the Member States discuss the implementation of the Construction Products Directive and an important aspect of that has been the work on fire regulations and fire testing in particular. There is a Fire Regulators Group in Europe where we discuss this and where the new single burning item test was developed. Tony Edwards is the Department's and the United Kingdom's representative on the Fire Regulators Group and no doubt he can answer anything further you like on that.

(*Mr Edwards*) Thank you, Chairman. That is right, I represent the United Kingdom which includes Scotland at the Fire Regulators Group in Brussels. We meet about four times a year and basically give guidance or decide on the policy that filters back to the CEN technical committees. I also attend what is known as TC127 which is the CEN Technical Committee relating to fire safety. I am nominated by the British Standards Institution to be part of the United Kingdom delegation for that Committee.

141. Could I just ask you whether your view is that this harmonisation is going to improve standards in Europe or is it going to be a lowest common denominator standard?

(*Mr Raynsford*) We would certainly be opposed to anything that reduced standards. There is a very strong case for harmonisation in that there is a lack of consistency between standards applying in different countries. Indeed, within the United Kingdom there are different standards in Scotland to those in England and Wales. In the interests of greater clarity there is an obvious case for seeking harmonisation but we would certainly not wish that to in any way erode or reduce standards. On the contrary, we want to see more effective standards and tests in place that really do reflect the hazards that may arise.

(*Mr Everall*) Fire testing has been very difficult because the French system is different from the English system is different from the German system and it took a number of years to develop this single burning item test which is a test which is not a lowest common denominator but one which Member States genuinely believe will serve the purpose. It may need to be adapted in the light of experience but at least it is a test which countries have accepted should be the one that is harmonised across Europe.

142. Are you able to comment at all on where United Kingdom standards lie in terms of a European hierarchy? Are we up there with the best or down at the bottom with the worst?

(*Mr Raynsford*) I am simply not aware of objective measures that would enable such a conclusion to be drawn but my officials who have had detailed experience of working in Europe may be able to comment.

(*Mr Edwards*) I do not think you could draw that sort of comparison. First of all, we are talking about test methods. They are the harmonised standards and they are standards of tests. It would be down to each individual Member State or the regulators of each individual Member State to regulate as to what standard they want, so even though this is a common method of test we or a Member State could have a lower standard still than another Member State. That is down to the individual regulators and that is something we are still looking at. As Mr Raynsford has said, we are not setting out to lower standards. The problem we have is that the test methods measure different things to the British Standards methods of tests and this causes problems for industry and it causes problems for regulators. That is about where we are.

(*Mr Raynsford*) In case there is any uncertainty about this the building regulations will still apply. There will be no question of any erosion of current standards.

143. Can we return closer to home. Can I just ask you what representations did the Government receive regarding the fire safety of external cladding systems during the consultation of the forthcoming

[**Mr Brake** *Cont*]
revision of Approved Document B? How many responses? Where did they come from? What was the main drift of the responses?

(*Mr Raynsford*) I shall have to ask officials to give a response on detailed responses because obviously I did not see all the detailed responses but this was not a major issue because, as you know, changes to matters of fire cladding were not proposed as part of the revision. Perhaps I could ask Mr Edwards to comment.

(*Mr Edwards*) Overall we got about 200 responses to the consultation which covered the whole aspect of fire safety. I cannot give a figure but there were very few on external cladding systems because, as Mr Raynsford said, it was not throwing itself up as an issue. The BRAC Working Group did actually look at cladding systems to see whether the guidance we gave needed changing and other than the review of the FRS Document (135 happens to be the number given to it) in support of the guidance on Approved Document B, very little came out of it. A little bit of tidying up and clarification.

Mr Gray

144. What else could we be doing to prevent fire spreading up through external cladding systems as described here leaving aside the advice of BRAC whose response you are currently awaiting?

(*Mr Raynsford*) The issue takes us into the much wider area of high quality design which is very much part of the Government's agenda for regeneration and urban renaissance, as you have undoubtedly heard on many previous occasions in this Committee. So we are seeking a raising of standards generally in terms of quality of design. Obviously we want to ensure that designers are able to make use of guidance documents that are consistent, hence the wish to ensure greater consistency between Part L and Part B and that the guidance is clear and focuses on necessary standards which must be achieved in order to ensure proper safety.

145. Would DETR with your responsibility for these matters make representations to the Home Office about the need for wider fire safety legislation for which there is quite a lot of pressure coming from fire fighting authorities?

(*Mr Raynsford*) I am meeting with George Howarth in September to discuss matters relating to fire and in particular issues relating to sprinklers where this is a quite separate issue and we are also reviewing at the present time, and I will be reviewing the interface between our two Departments' separate responsibilities in respect of fire.

146. Just to help you with that, the Committee has seen a letter from George Howarth saying that he is very, very keen on bringing in a Fire Safety Bill to bring together the 69 separate pieces of legislation that currently cover fire safety but at the moment he cannot see legislative time for it. Will you be adding to the pressure from fire fighting authorities to find time for that Bill?

(*Mr Raynsford*) Obviously that is a matter for members of the Cabinet to discuss when formulating next year's legislative programme, but I will certainly be seeking to ensure that our Department's interests are reflected in discussions about the appropriate regime necessary to ensure fire safety.

147. We have talked a lot about external cladding. What do you feel about infill such as that that caused the problem at Irvine?

(*Mr Raynsford*) It is very important indeed that infill materials should meet the standards of non-combustibility particularly in the circumstances I described where the greatest risk is where you have buildings very close to adjacent buildings and where you have high buildings where it is more difficult for fire fighters to gain access. That is why the requirement for Class O surface spread of flame rating must apply in those cases.

Mrs Ellman

148. What action are you planning to take about systems that were in force before the regulations were in place and not covered by them?

(*Mr Raynsford*) I think this is a very important and a very real question because under existing regulations the replacement of existing cladding is only required to ensure that the new cladding is no worse than the performance of the previous cladding. Currently building regulations do not extend to improvements in existing buildings but we are reviewing that in relation to Part L of the building regulations on energy efficiency. There is an obvious read-across from that review to this part, in particular on the issue that you have highlighted where we are looking at older cladding systems that do not meet the standards that are currently in force where it would obviously be desirable if they were to be replaced for the standards to be improved not simply made no worse.

149. But what are you going to do about systems where nobody is currently planning to have any replacement?

(*Mr Raynsford*) That is a matter, as I say, we will have to look at in relation to any changes that are proposed to the building regulations. Currently building regulations do not extend to changes to existing buildings; they relate to new buildings. In our review of Part L on energy efficiency for obvious reasons we have been addressing the scope for extending the building regulations but there are difficulties with it. It may well require changes in legislation and it may not be possible without that Until we have clarified that it would be premature of me to give any pledge of our ability to extend building regulations in respect of fire matters to existing buildings. The important issue is that we are reviewing it and there is a clear read across from the work we are doing on Part L to this Part, Part B.

150. Is anybody responsible for identifying how many such buildings exist?

(*Mr Raynsford*) That is a very interesting question and I am not sure how many buildings with external cladding systems do exist. That sort of information is difficult to ascertain.

151. Is anyone responsible for trying to ascertain as far as you are aware?

[Mrs Ellman *Cont]*

(*Mr Everall*) It is the responsibility of building owners and occupiers to ensure that appropriate fire safety measures are in place. There is no central government role at the moment, at least in terms of counting up the number of buildings with deficient or defective fire measures in them. Building regulations traditionally and indeed the legislation constrains us to dealing with building work, new buildings, extensions to existing buildings. If nobody is carrying out building work then the Buildings Act and building regulations just do not apply. There is other fire-related legislation to which reference has already been made under the Home Office for looking at fire safety measures in existing buildings but I am not aware that that extends to anyone in central government collecting information on the number of unsafe buildings.

Chairman

152. If we do not know how many buildings there are in this category we do not know how many are badly insulated at the present moment.

(*Mr Raynsford*) We obviously have estimates based on surveys which highlight the energy efficiency and performance of parts of the existing stock. That is something which has prompted the review of Part L that I referred to a moment ago. With regard to the combustibility of materials used for external cladding of buildings, we have a much more complex issue there because it will cover buildings going back certainly centuries and we are almost certainly in a building at the moment which would prove problematic if any such test were to be applied to it. This is just one of a very large number of historic buildings in the country. I think you appreciate the difficulty of trying to get a really comprehensive picture of the extent of hazards in the external surfaces of cladding of buildings.

153. What about concentrating on high rise blocks of flats?

(*Mr Raynsford*) That is a key area and that is an area particularly where local authorities have a very important role in relation to their own stock to examine the safety and obviously the means of escape as well as the flammability characteristics of their stock. But it is something that is important and that is why the building regulations do distinguish between taller buildings and other buildings where there is a greater risk.

154. Only for new ones. Surely we have a very substantial stock of those high-rise flats where the press and people's perception of them was pretty grim five to ten years ago. They have I think perhaps had something of a revival on the basis that perhaps children are no longer in them in large numbers, there have been various systems put in like concierges and it does appear that these blocks are having a second life, if you like. If there were considerable fears about fire safety then you could very quickly get a downturn in their popularity. What can you do to reassure people that the risk is minimal for people in these blocks from frightening fires outside if not risk to their lives?

(*Mr Raynsford*) There are two obvious areas to pursue. One is for the owners of properties, and local authorities own a very substantial number, so for the local authority itself as part of the general management function to review the safety and the condition of its stock. But, secondly, when we come on to the improvement and modernisation of existing properties, as you have rightly highlighted, it has been shown that in some areas properties that were not very popular a few years ago can be made attractive to particular groups of people and where that is done it is likely that they will need substantial work including the possibility of cladding because it is the thermal insulation of properties which is particularly problematic. The external cladding systems must conform to building regulations and I have described the safeguards that are in place to ensure that those new cladding systems must meet the new standards of fire safety. There are I believe proper safeguards in place there. We are, as I said, clarifying the position in terms of consistency between guidance associated with Approved Documents L and B to make absolutely clear the guidance on fire stopping between floors on all such buildings.

Mr Gray

155. We are told there are only 500 of them in the United Kingdom broadly. Surely the Government could make a systematic survey of tower blocks to make sure the situation that happened in Irvine does not happen again?

(*Mr Raynsford*) The Committee may well wish to make recommendations on that particular line. I have been trying to outline the steps that are in place to ensure these issues are addressed by the owners of the property and where improvements are carried out they are carried out in a way that ensures proper standards of fire safety.

Chairman

156. Are you encouraging us to make that recommendation or would you be disappointed if we did?

(*Mr Raynsford*) We would look at the recommendation along with all your other recommendations very carefully and thoughtfully.

Mr Donohoe

157. If it is proven there is a problem with infill it would have to be the case, would it not, that the Government would have to consider some form of funding of any renovation?

(*Mr Raynsford*) I think it is premature to reach any conclusions on that. It would depend entirely on the circumstances. If it were the case that, let us say, in a group of up-market privately-owned properties it was a particular problem, I am not sure it necessarily follows that the government should meet part of the cost for renovating properties which have a very substantial capital value whereas it might be in urban regeneration areas with rundown properties that will require an injection of funds from the Single Regeneration Budget or the New Deal for

[**Mr Donohoe** *Cont*]
Communities Budget. I do not think I can give a categoric answer but for certain properties in areas where there is a need for regeneration funding and government programmes already exist it would probably be appropriate for those to be available in certain circumstances, yes.

Chairman

158. You think those programmes would guarantee to reduce the fire risk rather than increase the fire risk?

(*Mr Raynsford*) As I have said, where there is new building work being carried out to existing buildings that involves installation of new cladding systems then all the safeguards that I have described will apply. There is the lacuna I have highlighted where you have an existing cladding system in place where the current provisions only require that any replacement is no worse than the current one. As I have already indicated, that seems to me not to go as far as it might. That is an area that bears further work.

Mr Donohoe

159. Local authorities give grants, for example, for the removal of all lead piping. It could be something that could follow from that. Could there not be a regulation put in place that would suggest they have to give grants on the basis it was proven there was some problem with this cladding?

(*Mr Raynsford*) I think if you are discussing grants from the private sector there are obviously a lot of competing issues about what the priorities are and except for the disabled facilities scheme the grants system is a discretionary one and the local authority itself would be able to determine to a significant degree what it regards as its priorities.

Chairman: On that note, could I thank you very much for your evidence.

APPENDICES TO THE MINUTES OF EVIDENCE

TAKEN BEFORE THE ENVIRONMENT SUB-COMMITTEE OF THE ENVIRONMENT, TRANSPORT AND REGIONAL AFFAIRS COMMITTEE

Memorandum by Knowsley Metropolitan Borough (ROF 02)

I can confirm that Knowsley MBC has one multi-storey block, known as Knowsley Heights Block One, which was the subject of an overcladding system in 1989–90.

The project was undertaken on behalf of the Council by Architect Sidney Bolland with advice from BRE Watford and MANWEB the local electricity supplier. The scheme, as designed, comprised overcladding panels fixed to vertical sheeting rails, all of which extended to ground floor level.

Shortly after completion an arson attack at the ground floor of the building caused a spread of fire up the face of the building and in the void behind.

The Borough Council then appointed Bickerdike Allen & Partners to advise on reinstatement of the block, assisted by BRE Scotlab and the Fire Research Establishment.

A revised scheme was then implemented in which fire stopping was introduced at each storey level. The overcladding also terminated at first floor level, the ground floor of the building being brick clad.

The cladding comprises Cape Universal cladding panels which are self-finished requiring no decoration.

The works undertaken by Bickerdike Allen helped inform the drafting of the revised Building Regulations regarding overcladding systems and techniques.

Graham Winckles
Head of Design Consultancy

June 1999

Memorandum by Mark Heywood, Mark Heywood Associates (ROF 05)

We are Structural Engineers who specialise in the design of ventilated rainscreen overcladding systems for particular use in the overcladding and refurbishment of domestic tower blocks. To date, in conjunction with our major client, CEP Claddings Ltd, we have been involved in the refurbishment by external cladding of over 100 tower blocks throughout the country. This would constitute approximately 50 per cent of those refurbished with board clad systems. If steel, aluminium and render systems were also to be considered then we would be talking of perhaps some 20 per cent of those treated.

In terms of the extent of the problem, there are approximately 3,500 tower blocks in excess of 10 storeys throughout the country. Most of these are suffering from some form of vertical envelope failure and would be candidates for refurbishment by overcladding.

With regard to fire spread in tower blocks there have been a number over the years ranging from the one at Knowsley in April 1991 to the most recent tragic event in Irvine. A number of these have occurred in externally clad tower blocks with little or no associated damage.

As pure coincidence, I had visited the flats in Irvine in the week prior to the fire as part of an initiative by Miller Construction with a view to overcladding them. The flats are of Wimpey "No-fines" construction and remain generally untouched from the original construction. At some stage, however, replacement UPVC windows with new GRP sills to all single windows, and UPVC window with GRP pods and under window panel to the lounge window, have been added. This does not constitute external cladding as generally considered but appeared to be a means of improving the resistance to moisture ingress around the window.

The GRP used to form the window pods appeared to be a general format GRP. The pods "picture framed" both the window and under window panel with the replacement UPVC windows sitting in them and being sealed with mastic. The under window GRP panel was secured to the pod with self drill and tap fixings.

Both the pod and the under window panel appeared to be set back close to the substrate and there was no visual external evidence of any fire barriers being incorporated between each floor level.

In terms of the current Building Regulations, which changed in 1991, the requirements for this type of building would include the use of a minimum Class 0 fire resistant material for cladding and fire barriers at each floor level. Prior to 1991 and the Knowsley fire there was no regulations covering the inclusion of fire barriers although the Class 0 requirement for the cladding was still relevant.

Most fires in tower blocks fall into two categories:

(1) The vandal fire whereby items of furniture, rubbish or even abandoned vehicles are deliberately set on fire.

(2) The accidental fire whereby someone drops a cigarette in some furniture or perhaps a chip pan catches fire.

To tackle the first of these, the recommendations of the DOE, although not covered by legislation, were not to take cladding down to ground floor level and use architectural detailing in the form of bollards, paving and landscaping to prevent unauthorised access to the base of tower blocks. Improved tenant security in the

form of "Concierge" schemes along with an enhanced requirement for Local Authorities to regularly remove rubbish, old furniture, etc to prevent a build up of combustible materials was also important.

With regard to the second item, this is down to the cladding system itself and the skill and design of its application. The system designer must ensure that all necessary precautions are taken around penetrations through the cladding to prevent the passage of fire and smoke to other properties in the block. This requires each application to be carefully considered by a competent designer and not just left to the whim of the contractor.

Since 1991 work on fire has been done in several quarters both by the regulatory authorities and the product manufacturers themselves. However, during 1995 and 1996 at the instigation of the DOE, a collaborative effort between the major cladding manufacturers, Trespa, Eternit and CEP, and the Fire Research Station, under the auspices of the Government's "Partners in Technology" scheme, a test procedure for external cladding systems was developed. This is entitled "A test method to assess the fire performance of external cladding systems" and has been put forward for acceptance by the DOE. The test requires the construction of a two and a half storey height section of cladding so positioned about the fire source as to simulate the conditions at window head, reveal and an internal corner. The latter element reflecting the worst conditions of a vandal fire. The basic test method was developed on the "Snoopy" rig at Cardington and involved input from other European sources as well as the Loss Prevention Council with a view to Europe-wide acceptance. This was also the first time that the external cladding system as a whole was subject to test as opposed to the testing of individual elements of the assembly.

This work was completed, at some considerable expense to the participants, over two years ago and submitted to the DOE for approval. To date nothing has been heard of its progress.

Overall, there is enough information and test procedures around to ensure that, whilst obviously not preventing fires in external cladding systems, certainly minimising their effect. However, we do seem to be very slow to act in terms of legislation.

With the advent of new technology, we are continuing to put ourselves at ever more risk. Currently I am aware that there are panel manufacturers who are using structural bonding techniques to adhere metal, glass and board panels on aluminium or timber railing systems on the outside of buildings with no mechanical fastenings. I am not aware, however, that there is any fire legislation that covers either the resin or the composite construction. The concern is that, should a fire occur, panels may become detached from the building causing a danger to those in the vicinity. It is imperative that we have a standardised total system test for all external claddings such as that submitted to the DOE.

Mark Heywood

July 1999

Memorandum by Oldham Metropolitan Borough (ROF 06)

The Authority has recently completed the external cladding to 160 properties in three storey blocks at the Busk Estate in Oldham.

Technical details are attached which indicate the measures taken to reduce fire spread[1]. We are currently examining the feasibility of external cladding to two multi-storey blocks at Crossbank and Summervale House which are both 15 storeys high. Again similar safeguards will be incorporated into the specification to minimise the risk of fire spread.

The technical memorandum indicates that all work will be carried out to conform with current Health and Safety requirements and Building Regulations. Perhaps, in the context of the recent incident in Irvine there is scope to revisit the current regulations with a view to enhancing the fire stopping requirements to the lower levels in multi-storey accommodation.

C Greenwood
Assistant Director Housing Renewal

July 1999

[1]Evidence not printed. Available for inspection in the House of Lords Record Office ROF 6(i).

Memorandum by Leeds City Council (ROF 08)

I confirm that several of our high and low-rise blocks of flats and maisonettes have been clad with proprietary rendered insulation systems.

A typical system previously specified by the Department of Housing Services has consisted of 60 mm thick non-combustible mineral fibre insulation slabs fixed to substrates with steel pins (a minimum of 8 Nr per square metre) with a minimum of 80 mm embedment into existing wall construction and with a decorative render finishing coat. The finishing coat consisting of a colour modified render with a textured or dash finish.

The systems used by Leeds City Council have been designated as being "Non Combustible" in accordance with the current Building Regulations 1991 and Approved Document B. The systems are described as having to achieve a Class "O" spread of flame classification all as defined in the Approved Documents of the Building Regulations. The systems are further described as not to be a fire risk at any stage of installation, nor constitute a fire hazard after completion, if for any reason the insulant becomes exposed.

Our specifications for rendered insulation cladding systems insist that any system used on Leeds City Council properties are to be provided by companies with suitable reputations [approved] and "track records" in this field eg Permarock Products Limited, Epsicon Limited, Structherm Limited and Edlington Stone Group Limited.

The providing companies have been members of the External Wall Insulation Association with the capability of being able to provide systems to suitable standards and underwritten guarantees from the EWIA for agreements for the Employer for the design and construction of the systems. The Agreements have been formulated to make them binding for periods of 15 years and the systems have been required to provide 30 years of minimum life expectancy.

Should the occasion arise when the surfaces of external rendering have to be over-painted as a result of damage, repairs or graffiti and the like we would propose the use of a Class "O" rated water-based masonry paint to be obtained from an approved manufacturer

P D Flint
Property Services Manager
July 1999

Memorandum by Trafford Metropolitan Borough Council (ROF 13)

The Council installed external cladding on four of its 15 storey flat blocks on the Tamworth Estate as part of a comprehensive refurbishment programme carried out between 1992 and 1998.

In its choice of an overcladding system the Council had a number of important factors in mind. Briefly these included:

- The overcladding has been terminated at first floor level to reduce risk of impact damage and exposure to accumulation of flammable material at ground level (this was at least part of the cause of the serious fire at Knowsley on an overcladded block).
- Fire barriers have been provided within the cavity horizontally at each floor level and vertically between each flat.
- The cladding panels themselves have Class "O" surfaces on both sides.
- The system suppliers specified, "Eternit", had carried out full scale tests on their system to prove their resistance to fire spread.

Within the last 18 months we have experienced four fires, within two of the blocks, two of which were serious. The performance of the system has been as expected with the fires being contained locally with minor smoke damage to the surface of a number of panels.

Director of Engineering and Planning
July 1999

Memorandum by Sefton Council (ROF 17)

I confirm that Sefton Council owns 14 multi-storey blocks of flats. Seven of these are in the Seaforth/Waterloo area and seven are in Bootle. Five of the blocks in the Bootle area have recently been externally re-windowed and overclad. The sixth block is currently underway and it is anticipated that the seventh block in Bootle will be undertaken later this year.

The systems employed have been a Blundell Permarock system comprising an external insulation board, mechanically fixed to the existing sub-strata then a render and dash finish has been applied. The systems incorporate fire-stopping as required by the Building Regulations.

J Robinson
Housing Director
July 1999

Memorandum by St Helens Metropolitan Borough Council (ROF 20)

I am writing in response to your letter on behalf of the St Helens Metropolitan Borough Council.

Buildings erected or altered so as to include external claddings do have the potential to increase the risk of fire spread to different parts of a building depending upon the construction of course. The building regulations contain many requirements intended to inhibit or prevent fire spreading from one building to another or spreading to other units or compartments of the same building.

Cladding is controlled to some extent under regulation B4 (External Fire Spread) which is designed to limit or prevent those fires in the building of origin from spreading to other buildings. Combustible claddings are allowed in limited areas provided that the building is sufficiently removed from the relevant boundary—the actual distances from the boundary depends upon the height and designated use of the building etc. Non-combustible cladding could be used widely where this does not compromise the required standard of fire resistance.

Fire spread through a building is controlled by regulation B3 which requires fire-stopping in selected places between dwellings and separate compartments of the same building; eg the junction of party walls/floors and compartment walls/floors, where they unite with external elements of construction. However, it remains theoretically possible even with those precautions for fire to progress through cavities to reach other parts of the same dwelling or the same compartment.

Buildings constructed in the last 20 years or so would have been approved on the basis of the above mentioned requirements. However, buildings can be modified without the knowledge of the local Building Control officers and of course maintenance work which is outside the scope of the building regulations can be carried out at risk to the integrity of the structure.

G E Parkinson
Chief Building Control Officer

July 1999

Memorandum by Manchester Housing (ROF 22)

Manchester City Council has one externally clad tower block. No other externally clad properties, either high rise or maisonette have been identified.

The system employed "PERMAROCK" involved the fixing of material to the original wall.

The fixing method employed was such that no void was created between the original and the new external surface.

The schemes' specification indicates that fire breaks were not provided within the cladding, the issue of fire spread being dealt with by the close fitting cladding, which would stop fire spread.

Decorations are not yet an issue as the block has not reached the next painting cycle, but attention to the special painting requirements will be made when the works are specified.

Potential risks associated with the cladding could include;

Long term deterioration of the insulation material could be a problen, however, there is no evidence of this to date on the block identified.

A further risk is the possible expansion of material or heat retention which could create voids between surfaces should a fire occur within the block.

The installation of external cladding is dealt with by building regulations which cover structural changes and provide assessment of fire risk arising from such refurbishment.

Brian Sexton
Chief Programme Manager
Housing Development Group

July1999

Memorandum by Sheffield City Council (ROF 24)

Please see the following internal memo from Sheffield City Council's Architects Division. I apologise for simply passing on the information you require in this way but your enquiry did not reach me until very late and it seemed like a reasonable expedient in order to meet your deadline.

S. Jenkinson,
Technical Services Manager

POTENTIAL RISK OF FIRE SPREAD IN BUILDINGS VIA EXTERNAL CLADDING SYSTEMS

There are only two major multi-storey housing developments within your stock that have received overcladding in recent years, Hyde Park Block C and the various Hillside and Netherthorpe Tower Blocks. An explanation of the situation regarding fire spread for both developments is as follows:

Hyde Park Flats Block C

Any fire involving an overclad building appears to invoke widespread concern regarding other buildings with claddings of this type. This was also the case during the design of Hyde Park Block C (Harold Lambert Court), as two significant fires occurred which informed the design process.

Sheffield Design & Property engaged foremost fire consultants Arup Research and Development to resolve the fire issues relating to the overcladding with the consultant specialist over cladding Architects Peter Bell and Partners. The Sheffield Building Control Office in 1990 had little experience of dealing with construction of this type and the approval of the overcladding with respect to section B2—Internal fire spread (linings), B3 (2)—Internal fire spread (structure) and B4 (1)—External fire spread was referred to the Secretary of State for the Environment for determination. In his letter of 28 February 1991 and after due consideration the Secretary of State approved the details put forward for meeting the requirements saying... "In all the circumstances the Secretary of State determines that the proposals comply with the requirements of Regulations B2/3/4 of Schedule 1 to the Building Regulations 1985".

The building is constructed with a brick plinth to separate the cladding system from fires that may be started at the base of the building. The cladding itself has a system of fire barriers within it which serve to prevent fire spread between the dwellings. The cavity behind the cladding contains some timber members and the insulation, this has been carefully detailed to the satisfaction of the Secretary of State to meet the requirements of the regulations in respect of fire spread. The overroof contains no fire barriers as this was not required.

Since the installation of the overcladding there has been a serious fire on Block A (the cream and red block) at deck access level. This fire whilst breaking out onto the facade through the glazing was successfully restricted to a small area of the facade and failed to move beyond the installed fire barriers.

Hillside and Netherthorpe Tower Blocks

Fire risk due to external spread via cladding systems was an emotive issue at the time of the development of the Hillside (Phase 1) design. There had recently been a fatal incident due to a gas explosion at Solihull, and a serious fire via external overcladding (ventilated airspace) had occurred at Knowsley Heights, Liverpool. This meant that South Yorkshire Fire Officers took a keen interest in what was being proposed, including a visit to their colleagues at Knowsley, and Building Control took a similar interest.

It is correct that until that time there had been blocks refurbished elsewhere where a board overcladding system had been used which was full-height ventilated. This is in fact a principle of rainscreen overcladding as explained in the CIRIA guide. Some blocks had fire separation at intermediate points in the elevation. The solution agreed in Sheffield took on board the lessons learnt in these incidents.

In response to the Knowsley incident board cladding manufacturers devised a fire barrier solution which consisted of a perforated steel member coated with intumescent paint which would expand in a fire incident. This was rejected in Sheffield as we felt that the active life of the paint would be less than that of the refurbished building, and this would be an impossible item to maintain.

The main principles of fire safety in the Hillside and Netherthorpe blocks are as follows:

1. The new window is set within the opening of the original window, such that the curtilage of the dwelling for Building Control purposes remains the brick external wall. The integrity of the dwelling is maintained by the dwelling door and habitable room doors being self-closing fire standard, apart from additional precautions within the circulation areas of the block.
2. The periphery of each dwelling horizontally and vertically is protected by mineral wool insulation bridging the cavity between the original external wall and the new cladding. This is repeated around every window perimeter.

   For this reason we had to use aluminium cassette panels to allow movement of air within the cavity across the face of each dwelling. Ongoing research with Hallam University has confirmed that this achieves acceptable air movement conditions to prevent detrimental action within the cavity (eg steel reinforcement corrosion and concrete spalling). These panels are colour-coated and not paint finished.
3. All supporting members to the overcladding are steel or aluminium with separation to prevent electrolytic action.
4. The ground floor in every block is brickwork which is fire-stopped at first floor level to prevent fire at the ground (eg rubbish, car vandalism) ingressing behind cladding.
5. All new metal overcladding is incorporated in the lightning protection of the block.

6. New windows are aluminium, not UPVC.

It may be of interest that there was a deliberate arson incident to a first floor flat in Martin Block before the conclusion of Hillside (Phase 1) contract. Due to its nature this fire burnt unattended for longer than the design precautions had anticipated. There was smoke-logging of the circulation area outside but the fire did not spread beyond the flat involved.

I hope the foregoing assures you that the Sheffield stock which has been refurbished using rainscreen overcladding has been carried out with full involvement of Fire Officers and Building Control Officers, and that no known risk has been accepted. In both cases the panels are colour coated and redecoration should not be required.

JD Breakey
Practice Manager
Architects Practice

July 1999

Memorandum by Rochdale Metropolitan Borough Council (ROF 25)

In reply to your letter, requesting assurances and details of External Cladding Systems used by Rochdale Metropolitan Borough Council, Housing Services Department.

Rochdale Metropolitan Borough Council, Housing Services Department have for a number of years (1986–present day), used an External Cladding/Insulation System to a variety of building types and dwellings. The system that has been used extensively is the M.R (Polymer Cement Products Limited) SwissLab External Wall Insulation System.

The M.R System has been used on two storey houses/flats, four storey blocks of deck access flats, a total of approximately 1,000+ properties.

The external cladding has been used to improve the thermal efficiency characteristic of 1960 build No-Fines constructed dwellings, flats, houses and deck access flats, "B.I.S.F" steel framed houses/flats, and a small number (25) "Dennis Wild" dwellings. This M.R system has also been employed to improve the visual appearance of the estates, etc usually as part of Estate Action and other energy related improvement/refurbishment programmes.

We have been assured by the manufacturer of the "M.R SwissLab" that the product and use will comply with all the relevant Building Regulations, regarding the external fire spread and non-combustibility of the external wall cladding. In areas where a painted or anti-graffiti surface is required, this is specified as "Class O" to meet the relevant regulation. I enclose a copy of the Agrément Certificate No. 93/2914 (Second issue).[1]

It is the intention of Rochdale Housing Services to continue to use this, or a similar cladding system to approximately 2,500 properties, as part of future improvement and refurbishment programmes. I am not aware of any other "stand off rain screen system" that has been used on Rochdale Metropolitan Borough Council properties, and would not consider that this type of system would be suitable for the improvement programme envisaged.

In instances where an outbreak of fire, either deliberate or accidental, has caused damage to the cladding, this has usually been confined to the areas around doorways and window openings and has not led to, or contributed to, fire spreading to adjoining properties.

In one outbreak of fire, affecting the bin store area and staircase to a block of deck access flats, the intensity of the fire was quite severe but was confined to the bin store area only. This resulted in melting of the cladding and insulation, in the immediate vicinity, and only minor damage to the concrete supporting structure.

Alan Shaw
Assistant Housing Manager
(Planned Maintenance)

July 1999

Memorandum by South Tyneside Metropolitan Borough Council (ROF 27)

This authority has not received any details about the fire in Irvine or any warning through the usual agencies that particular cladding systems are a hazard.

I am afraid it is quite impossible to give a fully considered response to the general questions you raise in the extremely short space of time available. However I hope that the following information is of some assistance.

Please note that these comments refer only to those dwellings, which are the responsibility of this authority as landlord. In the private sector where new homes have been built or existing homes refurbished and where the work was subject to Building Regulation approval the relevant standards should also have been achieved.

[1] Ev. not printed. Available for inspection in the House of Lords Record Office ROF 25(i).

MULTI STOREY TOWER BLOCKS

The Borough, as housing authority, owns five tower blocks. (A total of 676 homes.) The three blocks in Jarrow have recently been insulated using External Wall Insulation and the two at Hebburn are currently being insulated.

The external wall insulation systems utilised provide a Class "O" finish—which requires that the finishes do not actively contribute towards the surface spread of flame and is the safest rating available. The insulants specified on these buildings are a combination of mineral wool, which is inert and phenolic boardings to achieve relief details. The phenolic boarding is used in conjunction with mineral wool firebreaks unless the system has been fully tested and given BBA dispensation to omit these. Where firebreaks have been included the whole system has been examined, commented upon, passed and inspected during the course of construction by Building Surveyors responsible for the enforcement of the Building Regulations.

The systems have been applied by Specialist Contractors and approved by the Systems Designers. The Systems Designer and the External Wall Insulation Association inspect all work and are required by the contract documents to carry a ten year guarantee. None of the systems had or will have anti graffiti paint applied.

OTHER BUILDINGS

The majority of Council homes in the Borough are of low rise, ie not more than five storeys (22,820 homes) and most of these are two storey houses and flats.

In common with many authorities in the north east South Tyneside has a small but wide range of dwellings of "non traditional" construction, ie not brick built cavity wall construction. These were mainly designed and built between and after the Second World War when traditional building materials were in short supply. The BRE and a working party of the Northern Consortium of Housing Authorities carried out a study of such buildings in the 1980s in relation to the Housing Defects Act (1984). A copy of a booklet produced at the time for this Borough is enclosed.[1] These studies concentrated on the structural integrity of the buildings and contain information about the materials and fixings used. The studies did not examine the fire risks of the types of construction used.

As you will see a variety of pre fabricated, steel and concrete framed structures rely quite heavily on external cladding systems. These external cladding systems are constructed from a wide range of materials such as concrete, clay, asbestos, timber and plastic of varying types. In some cases the cladding materials themselves could be considered non-flammable such as concrete and clay, whereas timber and some types of plastic may be flammable to some degree or other.

These cladding systems are generally mechanically fixed to the sub structure either by metal to metal fixings or by metal to timber type fixings such as screws or nails and in many cases the sub structure itself is likely to be flammable.

In addition there are properties which have load bearing brick or concrete "cross wall" construction but employ a curtain wall of timber frame panels on the front and rear elevations. These are clad internally and externally with light weight building materials. Such construction is less resistant to fire than traditional bricks and mortar construction.

In virtually every case there will be a void of some description behind the cladding system employed. We have no evidence to suggest that fire could spread easily in the inside of these structures such as to increase the risk to occupants.

The majority of cladding systems employed date from the original construction. As such they would have passed the Building Regulations in force at that time.

The current trend is to use cladding systems constructed of PVCu cellular foam extrusion. This has been the material of choice when replacing timber curtain wall panels in "cross wall" constructed dwellings and metal panels on BISF type prefabricated houses. It has also been widely used for fascia, soffit and bargeboards.

The specified components do not support combustion and conform to:

— Surface spread of flame BS476 Part 7 1987 Class 1

— Fire Propagation BS476 Part 6 Index I = 15.4

The cladding has been fixed to blockwork and or brickwork backgrounds and fire cavity stops have been installed in accordance with the relevant codes of practice.

F G McQueen
Director of Community Services

July 1999

[1] Ev. not printed. Available for inspection in the House of Lords Record Office ROF 27(i).

Memorandum by Matthew Smyth, Chartered Engineer, Smyth Plastics Ltd (ROF 29)

Area of expertise—Manufacturer of fibre reinforced plastic (FRP) cladding panels and mouldings used in external cladding systems.

This witness has been involved in the manufacture and supply of FRP panels for cladding purposes since 1982 and offers this contribution based on the expertise acquired in such products since that time.

1. TYPES OF BUILDINGS WHERE CLADDING IS APPLIED

(a) Commercial (factories, warehouses, superstores),

(b) Multi-storey (office blocks, dwellings).

2. PURPOSE OF CLADDING: GENERALLY

(a) To provide weather protection,

(b) To insulate,

(c) To improve appearance.

3. TYPES OF CLADDING

Most panels consist of a core of insulation with a skin bonded to one or both faces.

(a) Core materials—these can be:

(i) Foam (polystyrene, polyisocyanurate, polyurethane, PVC, Phenolic),

(ii) Glass fibre/mineral wool.

(b) Skin materials—these can be:

(i) Plastic coated steel,

(ii) Plastic (PVC, FR polyester, FR phenolic),

(iii) Mineral particle board,

(iv) Compressed paper.

4. Generally, skin type 3(b)(i) (plastic coated steel) is used in commercial applications whereas 3(b)(ii), (iii) and (iv) are used in multi-storey.

Disastrous high profile fires in commercial properties consisting of steel bonded to polystyrene foam have resulted in much destruction and loss of life and have been the subject of major inquiries involving the Loss Prevention Council and others. Accordingly this witness wishes only to address the five points detailed by the Environment Sub-committee mainly with regard to use of FRP/foam panels in multi-storey buildings.

5. FIRSTLY, WHY FRP/FOAM?

Its benefits are: lightweight, strong, weather resistant, excellent insulation value, low cost, easy to install, available in pleasing colours and of mouldable shapes.

Drawbacks are fire performance related. Regulations permit the use of fire risk materials on the outer faces of buildings and, as such, inferior grades of FRP can be used to reduce costs.

Even when higher cost fire resistant FRP is specified, the use of incorrect raw materials (by accident or design!) poses a problem as it is not possible to differentiate visually between fire and non-fire rated panels unless they are submitted to a fire test.

6. To illustrate the following five points this witness would wish to draw to the attention of this committee events surrounding the recent multi-storey building fire in Irvine, Ayrshire in June 1999. As there was a fatality, the matter is currently under investigation which will result in a report being submitted to the Procurator Fiscal after which details would become public knowledge. However, from the information made available by the press and the BBC, this fire is a classic example of the reason why this sub-committee is meeting.

7. The fire started in a house on the sixth floor and spread to a window. This ignited and the heat and flames travelled upwards to the next floor and set fire to the FRP panels on the same window of the house above. The fire continued to telegraph upwards until all windows in the vertical plane ignited. Consequently, each house from the sixth floor in the column suffered fire damage. Eye witnesses stated that the fire spread was rapid and that the time to ignite all floors was measured in seconds, this possibly being due to the upward travel of heat and combustible gases.

8. In conjunction with the above, the witness wishes to address the five points requiring examination by the Sub-committee.

(i) Risk—the risk of fire spread is undoubtedly posed by such cladding systems.

(ii) Extent of use—external cladding systems are extensively used throughout the country.

(iii) Adequacy of regulations—regulations require reviewing (see point iv below).

(iv) Necessary Actions—regulations should be reviewed to insist on the use of fire resistant materials on all such cladding systems. Products should be at least to BS476 parts 6 and 7 (1989 and 1987 respectively). Core materials which melt, soften, ignite and drip should be excluded. These regulations could be applied with immediate effect on new buildings, alterations to existing buildings and all ground floor cladding in existing buildings to combat the threat of arson or vandalism.

(v) Other Matters—One item constantly overlooked in the matter of accidental fires is the death and destruction caused by resultant smoke and toxic emissions. Home Office figures show that more fatalities result from these than from burning. Smoke and fumes from a house fire can enter other dwellings a considerable distance away but still in the same building. Such problems can be resolved by the use of phenolic resin systems in both FRP and foam. The UK is a world leader in the development and production of such resins and phenolic based cladding systems which emit comparatively tiny amounts of smoke and fumes during accidental fires. It is safe to say that if phenolic cladding had been installed in the floor above the house in Irvine which first caught fire the remainder of that building would have been left virtually untouched.

Finally, such cladding projects result in large numbers of identical panels. An additional panel per batch would permit the contractor to select one at random for destructive testing, ad-hoc or otherwise. In this way, the use of correct materials would be assured.

Matthew Smyth

July 1999

Memorandum by the Loss Prevention Council (ROF 35)

Background

1. The Loss Prevention Council (LPC) is a scientific and technical organisation with long experience of building fire protection, especially the testing of elements of construction. Another constituent part of LPC is the Fire Protection Association, which promotes good fire safety practice. LPC is supported by the UK insurance industry (Association of British Insurers and Lloyd's).

2. This memorandum addresses and offers views on the questions raised in the notice and presents LPC's experiences of the construction styles and building products used. It also discusses the views and practices of the insurance industry, based on recent research and experimental findings.

Introductory Comments on "Cladding"

3. LPC considers it important that the issue under discussion is properly differentiated and defined.

4. Cladding is a type of walling. The construction industry usually uses the term "external cladding system" to embrace cladding types such as rainscreen over-cladding. Several construction elements are usually involved in making up the overall building envelope in these cases, including panels, frames, brackets and seals. LPC has considerable experience of the performance of single leaf wall structures such as curtain wall facades and sandwich panel walls, which have many features in common with cladding. We consider it appropriate to consider what can be learnt from their performance in this inquiry.

5. We understand that the incident leading to this inquiry was a fire affecting a cladding system (adjudged compliant with pre-1991 "building regulations"), which resulted in rapid external fire spread and fire/smoke spread to several floors of a multi-storey residential building. (NB we use the phrase "building regulations" in this memorandum to mean the appropriate package of Regulations and guidance (Approved Document or Technical Memorandum) together with Building Control enforcement.

Is There a Risk Posed by Such Cladding?

6. Based on our experience with curtain walling and composite panels, LPC considers that there is a risk of unexpectedly rapid fire spread associated with the style of construction in question, and that under certain circumstances this might give rise to a number of unacceptable consequences:

— The period available for escape becomes shorter than expected, possibly leading to the loss of life;

— Fire fighting operations are made more difficult than expected; and

— Damage to the building (and the business if it is a commercial premises) is much greater than expected.

7. LPC's view is that the adverse features giving rise to these unacceptable consequences are unstopped openings (flues) and inappropriate use of certain building materials, largely based on combustible plastics. Alternative materials do exist (some based on better-performing plastic materials).

WHAT IS THE EXTENT OF USE OF EXTERNAL CLADDING SYSTEMS?

8. Cladding systems (including the other types described above) are widely used in the construction of a wide range of buildings, used for a variety of purposes. They are often used in major refurbishment. Details of the numbers of buildings involved (existing stock, annual new build, annual refurbishment) are best obtained from other sources such as the Centre for Window and Cladding Technology.

ARE REGULATIONS PERTAINING TO THE USE OF CLADDING SYSTEMS ADEQUATE?

9. LPC does not believe that the "building regulations" are adequate for the control of poorly performing cladding systems. The Building Regulations (in England and Wales, the situation is slightly different in Scotland) are performance-based and do not specify the detail of elements of construction. This is left to guidance (in this case Approved Document B). Approved Document B states that curtain walling and other forms of cladding need not have any fire resistance unless required because of proximity. LPC research testing (see Appendix) has demonstrated failure of curtain walling, promoting fire spread. LPC considers that this position should be revised and the type of building and its use taken into consideration.

10. Approved Document B does not specify that elements of non-structural wall construction should have fire resistance from either side, except in special circumstances. LPC's experience of fire research with walling systems (see Appendix) leads us to believe that a measure of fire resistance from both sides is desirable.

11. For most external wall applications the guidance refers largely to small-scale product tests such as surface spread of flame. LPC's view is that the real-scale performance of many walling systems can only be adequately tested by full-scale reaction to fire testing, including joints and other three-dimensional aspects of the design.

WHAT ACTION MAY BE NECESSARY TO COUNTER RISKS POSED IN (1) EXISTING BUILDINGS?

12. In LPC's view, risks posed by inappropriate use of poorly performing cladding systems in existing buildings are best dealt with by thorough assessment and effective management of fire risk, rather than by "panic-stations" stripping and replacement (though replacement may in certain cases be found to be the best option).

WHAT ACTION MAY BE NECESSARY TO COUNTER RISKS POSED IN (2) ALTERATIONS TO EXISTING BUILDINGS?

13. In LPC's view the use of cladding systems which incorporate flues or which do not perform well in full-scale reaction to fire testing should be discouraged by regulation. Additional fire protection measures, such as sprinkler systems, should be used where such cladding systems are in place.

WHAT ACTION MAY BE NECESSARY TO COUNTER RISKS POSED IN (3) NEW BUILDINGS?

14. In LPC's view the use of cladding systems which incorporate flues or which do not perform well in full-scale reaction to fire testing should be discouraged by regulation. Additional fire protection measures, such as sprinkler systems, should be used where such cladding systems are proposed.

ARE THERE OTHER RELEVANT MATTERS THAT MIGHT BE CONSIDERED?

15. The problem of rapid fire spread via the external wall is of great concern to insurers and has resulted in some large fire losses in the UK and abroad. Two examples that are of particular concern for insurers are glazed curtain wall facades when used on tall multi-storey buildings and sandwich panels when used in certain industries such as the food industry. See Appendix.

16. LPC and insurers have several concerns regarding particular wall systems when used in particular occupancies, ie, where the wall system may not have been considered as part of a whole building and the risks it presents. We believe there is need for greater clarification about the appropriate design and use of wall systems and the selection of fire testing to support the "building regulations". In any new work the factors that need to be taken account of are:

- Wall type;
- Interface with the rest of the building;
- Height and geometry of the building;
- Nature of the contents;
- Characteristics of the occupants;

— Acceptable risk to people and property (content and business).

17. LPC and insurers suggest that a technical review be undertaken of how wall systems can be better addressed in future "building regulations".

18. We would be happy to expand upon these short statements of our view with specific proposals and relevant examples.

APPENDIX

Multi-storey Buildings and Glazed Curtain Wall Facades

LPC has recently completed a substantial research project on this issue. Copies of the report (see below) are available from LPC.

Since the 1980s multi-storey buildings have tended to be built with lightweight facades often extensively glazed. One consequence of this is that the inherent protection to fire by more traditional brick/concrete walls construction has been removed.

By 1996 insurers' concerns that the existing "building regulations" did not fully address these buildings led insurers to commission research from LPC. Large-scale fire testing showed the unacceptable rapidity of fire spread via the facades to floors above the fire. The work found the weak links in terms of the facade design and the value of fire protection features and sprinkler protection.

The "building regulations" make no requirements specific to this type of walling and only require sprinklers for buildings over 30 metres (after 1991). As a result of the LPC work insurers now seek, whenever possible, increased levels of fire resistance at floor/wall junction and sprinkler protection for high-risk buildings.

Sandwich panels

Wall systems from sandwich panels that contain combustible insulation between metal linings are of great concern to insurers. Fires in the food industry with this type of walling have resulted in the complete destruction of many buildings and businesses, and the deaths of some fire-fighters.

The "building regulations" place no restrictions on the use of these panels. Hence, on behalf on insurers, LPC has introduced a code of practice, design guidance and a large-scale testing scheme for these products.

Supporting Documents

LPR11, "Fire Spread in Multi-Storey Buildings with Glazed Curtain Wall Facades".

"The LPC Design Guide for the Fire Protection of Buildings".

"Code of Practice for Fire Protection in the Food and Drink Industry".

LPS 1181, "Requirements and Tests for Wall and Ceiling Lining Products and Composite Cladding Products".

LPS 1208, "Fire Performance Requirements for Metal-Faced Fire Resisting Insulated Panels".

LPS 1220, "Test and Performance Requirements for Passive Fire Protection Systems Used for Upgrading Insulated Panels".

The above documents are available from LPC, Melrose Avenue, Borehamwood, Hertfordshire WD6 2BJ.

July 1999

Memorandum by Gateshead Metropolitan Borough Council (ROF 36)

Gateshead MBC have commissioned a variety of Cladding Systems to both high and low rise buildings over a number of years, and I am able to inform you that there would appear to be no risk of any serious fire spread arising from their use.

High rise multi-storey blocks have been overclad using materials with little or no susceptibility to fire spread with fire stops at appropriate floor levels where necessary.

Low-rise dwellings of a system-built type have been treated in a similar manner, although in one particular type UPVC cladding has been used. There has been a fire in one of the latter type, which started within the house, and spread to the exterior via a window. Although it caused the cladding in the immediate area to melt, damage was restricted to that area and did not result in the fire spreading.

All systems used have satisfied the current Building Regulations with the proprietary systems having Agreement Board Certificates.

Director of Housing

July 1999

Memorandum by International Fire Consultants Ltd (ROF 38)

Currently the whole aspect of the fire behaviour of facades is greatly confused at the European Standards level. There are a number of tests proposed for European standardisation of fire behaviour:

- Non-loading walls (applies to internal and external walls): prEN1364-1
- Curtain wall test: prEN1364-2
- Curtain wall part configuration test (curtain wall seals): prEN1364-4
- External cladding system: prEN1364-5
- Semi-natural facade test: TC127 draft SNFT

These all cover various aspects of the fire behaviour of external wall elements. We appear to be the only member country in Europe that requires no tests to be passed for this aspect of construction and the UK delegation, of which I am the leader, does not have any mandated view of the UK's needs.

This does appear to be an anomaly in the UK and we should really address this issue in regulations for this country. We would hope that the enquiry may identify such a need.

Peter E Jackman
Technical Director, IFC Group

July 1999

Memorandum by Kirklees Metropolitan Council (ROF 39)

We have a Housing Stock of some 29,500 dwellings which include 20 high rise blocks of flats ranging from six to 16 storeys in height.

Only two of these which are 16 storey blocks have been completed with an external cladding system by a company called Structherm.

While Fire Safety is given top priority on specification of systems, for my further assurance, I have contacted all concerned, Building Control Chief Architect and the Contractor for further information. Information received includes Fire Resistance Material and Fire Stops are in place. A detailed report from the company is promised for 15 July.

On the lower blocks of flats two/three storeys, several companies have been involved with different systems used.

I am assured that all systems are safe, but I am presently seeking further information from those concerned.

Fire Risk Assessment is a priority of our service to reduce the risk to loss of life and property damage.

Our Investment Programme funds many fire safety precautions for the safety of our tenants, these include:

- Smoke alarms fitted and maintained to all Council Housing with a planned replacement programme. Smoke detection is provided by single point detectors to full analogue addressable fire detection systems in certain high rise flats.
- Fire suppression (sprinkler systems) fitted to internal refuse storage areas at base of flats.
- Passive fire protection new fire doors in a continuing fire precaution works programme to high rise blocks.
- Fire resistant surfaces to escape routes is currently being carried out with our painting programme to certain high rise blocks.
- Modernisation of dry risers to all high rise blocks of flats to include replacement valves/valve cabinets.
- Emergency lighting to stairway/landings high rise flats.
- In partnership with West Yorkshire Fire Service we are working on Community Fire Safety to prevent fire. 40,000 Home Office Fire Safety Booklets delivered to Council Homes and adjacent premises.

A copy of our Crime and Fire Prevention Strategy is available on request.

Brian Mellor
Crime & Fire Prevention Co-ordinator

July 1999

Memorandum by the City of Wakefield Metropolitan District Council (ROF 42)

The multi-storey flats in Wakefield MDC are of a traditional construction and do not use combustible cladding in any panel. Any concrete panels which have been decorated have to be done with a Class O surface spread rating.

We have a number of non-traditional BISF Spooner houses etc, that have cavities within their overall cladding systems. Improvement works to these dwellings did include elements of fire stopping to the relevant standards applicable at that time but some have been clad in celuform.

We also manage a number of Winget properties which have been externally insulated, without the need for a cavity.

All other properties where fire stopping has been a concern, particularly maisonettes, have been addressed by improving internal fire safety measures.

Kevin Dodd
Head of Housing

July 1999