# Composite panels

## your 17 point checkl

**THE WAR of words, facts and advertising between manufacturers of composite panels and site assembled roofing systems bubbled over into a conference on neutral ground in London recently.**

Supported by the Royal Institute of British Architects - where it was held - plus the Construction Industry Board, more than 100 delegates from the roofing and architectural world attended to hear the arguments for both sides.

And arguments there have been, with aggressive marketing, claims, counter-claims and complaints doing the rounds within the industry.

Stuart Borland, of Building Sciences Ltd, lead the debate on insulated panel systems, which utilise foam plastic insulation sandwiched between metal sheets.

While the composite panel industry argues that the product is easier and safer to fix and does not pose the problems of condensation that are claimed to dog built-up systems, its detractors are quick to point out the fire risks posed by the insulants, as reported in Roofing magazine in recent months.

Built-up systems expert David Coates took the stand to discuss the pros and cons of site assembled roofing systems, which are billed as being more flexible than composite panels and therefore suit a wider range of applications.

Typically the systems are insulated with mineral wool and formed from an assembling process comprising a liner sheet, vapour control layer, insulation, breather membrane, ventilation space and weather sheet.

And while Coates agreed that composite panels were suitable for some situations, he argued built-up systems suited more situations and delivered better noise and heat insulation and fire performance.

There is no doubt that the debate will continue, with the built-up system boys fighting their corner in an aggressive marketplace.

However, as one built-up systems manufacturer told Roofing after the conference, there are pros and cons for each system and situations where one is better suited than the other to a certain application - so why the arguing?

The conference findings will be published in a procurement file at a later date.

However, during the event, Dr Gordon Cooke, international fire safety consultant and visiting professor from the Department of Civil Engineering, City of London University, circulated a 'checklist of fire safety considerations'.

Dr Cooke believes the 17 point plan provides a 'systematic questioning approach' to the design and specification of metal sheeted roofs clearly pertinent to fire safety engineering and roofing design.

The checklist is as follows:

**1 What are the fire safety objectives of the building?**

These may include life safety - occupants, people nearby and firefighters, property - loss of the building, loss of the contents, losses due to business interruption and environmental protection - protection against pollution of the ground and water by firefighting water and protection of the air against excessive smoke pollution.

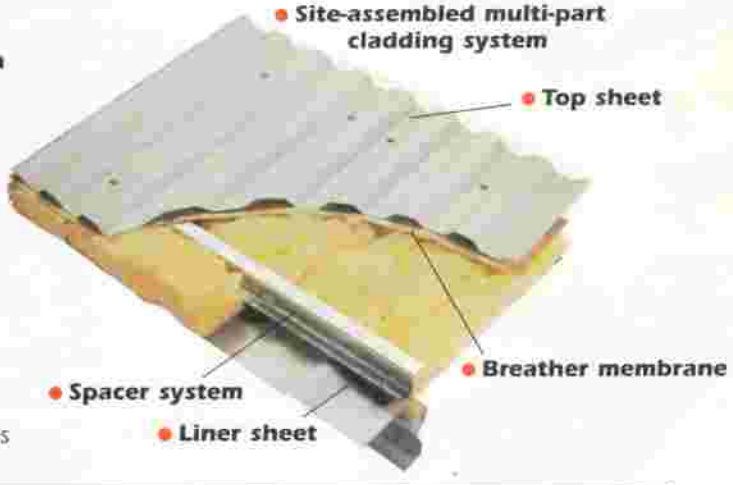
**2 Has the fire risk assessment been carried out?**

This is now a requirement under life safety legislation and recommendations for insurance purposes for many existing buildings. What provisions are being made for compliance with the Fire Precautions (Workplace) Regulations 1997 for the safety of emergency services personnel? Have the fire precautionary recommendations in the LPC Design Guide been followed?

**3 Is the building designed to comply with Approved Document B?**

Is there a requirement for the building to be compartmented? Where the roof system covers a compartment fire wall, does it satisfy Clause 8.24 of Approved Document B (1992 edition)? This requires that a strip of roof 1.5 metres wide either side of the wall should have a designation of AA, AB or AC and involve the use of materials of limited combustibility - rock wool and foamed glass insulation are non-combustible but foamed plastic insulants are not.

Note that Clause 3.4 of the LPC Design Guide recommends that a roof has to have a protected zone either side of a fire wall not less than five metres wide for some occupancies if the wall is parallel to the ridge or as far as the next structural member if the wall is at right angles to the ridge line. The different requirements of Approved Document B and the LPC Design Guide should be considered in detail, not forgetting the requirements for ceilings such as Class O.



# or built-up systems?

## st for roof fire safety

**4 If the fire safety strategy relies primarily on active measures, such as smoke vents and automatic sprinklers, will they be adequately maintained and are they alone capable of doing the job?**

**5 Has fire resistance been considered?**
A roof is not normally required to satisfy fire resistance criteria unless it forms part of an escape route. However, the intrinsic fire resistance of steel-faced panels with non-combustible insulation cores will eliminate the potential for fire spread between facings. This makes it easier for the fire brigade to extinguish a fire at roof level implying less personal threat and less fire damage, including damage by firefighting water.

**6 Are maintenance or refurbishment operations at roof level likely to involve hot working processes?**
If so, it would be wise to specify a roofing system of non-combustible components.

**7 If the roof is to be penetrated by flues, has this been taken into account with regard to the potential for ignition of any combustible material in the roofing system?**

**8 In the event of fire, is the roofing system likely to be involved at an early stage?**
If this is the assessment, then avoid the use of insulants such as foamed polystyrene which can ignite and produce flaming droplets. One effect of this is the ignition of secondary fires away from the initial source of fire, even before flashover. Such fires are difficult to extinguish and make firefighting hazardous. They produce dense smoke which, if not vented, adds to the smoke damage and air pollution.

**9 Is the roof a low level or overhanging structure which could be prone to an arson attack from outside the building?**
Arson is inexorably increasing and now accounts for more than 50 percent of all fires.

**10 Does the roof adjoin a different height building?** If so, consider designing a fire resisting 'skirt' to prevent the risk of fire spread via the roof from the lower building into the higher building.

**11 What are the chances of fire spreading from a nearby building?**
Although space separation requirements in Approved Document B may not apply to buildings on the same site, the potential for fire spread from neighbouring premises should be considered for insurance purposes. Also, if fire started by radiated heat is a possibility then it may be prudent to specify a non-combustible roofing system.

**12 If the roof comprises aluminium alloy sheet, has the design been checked via-a-vis compartment fire walls?**
Aluminium alloy sheet melts at around 660C - roughly the temperature at which flashover occurs (steel melts at around 1,550C - above the temperature reached by severe fully developed fires). Therefore it is unwise to specify aluminium alloy sheet roofing over a fire wall.

**13 Is there an understanding of the performance of fire retardants?**
Fire retardants in combustible insulation materials only prevent ignition for small ignition sources. They will have little or no effect in most developed building fire events. They may indeed add to the smoke production and toxicity of the fumes once fire has taken hold.

**14 Is there an understanding of the current test regime for composite panels?**
Sandwich panels which have steel facings and combustible cores may have passed the Loss Prevention Council's LPS 1181 large scale Reaction to Fire tests - provided both facings are mechanically attached to a supporting structure. The ignition source used in this test - a 35kg timber crib (750mm square by 350mm high) creates a severe test of short duration (peaking at three minutes). Arguably this does not represent a) severe localised fire which continues to burn and spread or b) a fully developed fire of much greater thermal severity.

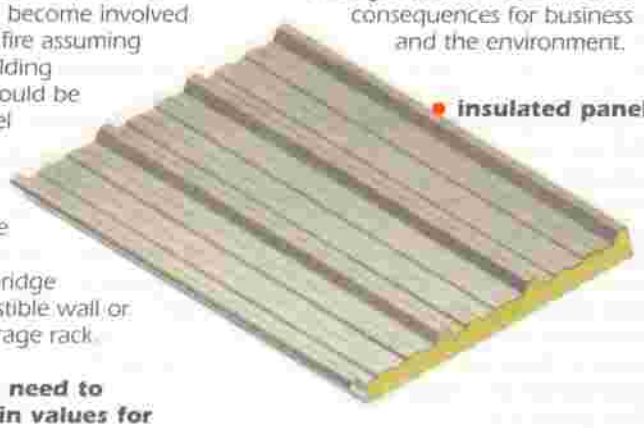
However, compared to a wall panel, a roof panel is unlikely to become involved in the early stages of a fire assuming the fire starts in the building contents. Exceptions would be the ignition of the panel during refurbishment welding, where the roof is so low that flames can impinge upon it at a very early stage, or where a fire bridge exists such as a combustible wall or a high combustible storage rack.

**15 The roof may need to provide certain values for thermal insulation, sound insulation and sound absorption - how do these interrelate with the fire performance?**
(A doubling of the mass improves the sound insulation by approximately 5db) A high density rock wool specification will achieve both sound and fire protection.

**16 If the roof is to be a built-up system, are the lower facings adjacent to the fire walls (if any) specified as steel?**
Otherwise a less robust lower facing, together with the insulation, could collapse and destroy the fire stopping at the junction of the fire walls and the roof.

**17 Is there an awareness of the large number of recent major fire losses in the food processing and storage industry which have involved combustible foamed plastic insulation?**
These fires have demonstrated the real life performance of rigid polyurethane or polystyrene cored composite panels which can increase the fire load (the building envelope itself) and contribute to the rapid spread of heat and smoke. As a result of the danger to firefighters (two died in a food factory blaze at Sun Valley Foods, Hereford) guidance is being given by the Home Office as to operational procedures. Unless there is a threat to life, firefighters are now reluctant to enter such premises.The food industry is increasingly turning to non-combustible insulation for new build and refurbishment to minimise fire damage, business interruption, loss and damage. Roofing designers and fire safety engineers should be aware of this trend.

This checklist is intended to keep the specifier abreast of the fire issues which should be considered before deciding on a particular roofing system. It should be recognised a roof specification that satisfies life safety requirements does not automatically satisfy the need for protection to minimise property loss and damage with its dire economic consequences for business and the environment.



• insulated panel