

# Fire safety in high density 'sustainable' housing

Journals in the construction sector seem to be preoccupied with an increasingly excessive amount of jargon, such as sustainability, zero carbon, carbon footprint reduction, renewable energy technologies, modern methods of construction etc. The list goes on, but what does it mean for fire safety, asks Bill Parlor, Technical Officer, Association for Specialist Fire Protection (ASFP). After all, he says, fire is completely oblivious to all the jargon and doesn't even speak the language

**A**ssuming that 'sustainability' is the key word, which interpretation should be the focus?

According to my dictionary sustainability is 'the ability to keep in existence, maintain, or prolong; to support from below; to keep from falling or sinking; to support the spirits, vitality or resolution; to keep up a joke or an assumed role competently; to endure or withstand, to experience or suffer (loss or injury); to prove or corroborate.

So what then is high density sustainable housing? It seems logical to assume that 'high density housing' means more housing units in a smaller space than usual. Most fires already occur in normal density housing, so does this 'high density' terminology include an increased risk from fire? For me, the susceptibility to spread of fire is clearly increased. Higher density means less spacing and higher exposure to radiation from any fire than before. In my mind, we do need to take extra measures or extra precautions in such circumstances.

Interestingly, Approved Document B definitions include the term 'live/work unit' as a flat which is intended to serve as a workplace for its occupants and for persons who do not live on the premises. So this suggests that high density housing could include 'high density live/work units' too and these places may be largely unattended outside normal working hours, which is a clear opportunity for fire to

start and grow unseen.

## DOES FIRE CARE ABOUT SUSTAINABILITY?

Fire will be the consequence of an ignition source in any building. If it has fuel to burn and oxygen to feed the combustion process, then it will grow until the fuel and/or oxygen is consumed or eliminated.

A sustainable fire needs to have fuel available for the combustion to continue. The FIGRA index of construction product will tell us how fast the fire can grow and if escape is still tenable. The European classifications for Reaction to Fire of the linings exposed to fire (classes A1, A2, B,C, D, E and F) are based on the fire growth FIGRA index of the linings of the enclosure. But this underlying information has been omitted from Approved Document B, so we need to ensure that it is remembered when we stretch the limits of risk, as in 'high density' housing or 'mixed use' developments.

## MODERN METHODS OF CONSTRUCTION

The terminology seems to have been spurned by insurers, who face enhanced risks due to building methods that have no history in fire, or that include features that could well introduce significant risks.

The relatively recent tendency to use pre-fabricated pods is one such issue and demands that the vertical and horizontal spaces between pods include effective barriers to the passage of fire, especially where services

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perpetrate the spaces and penetrate the walls/floors of the pods. Without such measures, the assembly could create a perfect convection tunnel for fire spread.

To overcome these great concerns, new methods of fire test have been required by insurers to fire test the entire pod assemblies. The substitution of materials in the pod construction needs to be carefully understood and possibly banned, since minor changes on cost can have dramatic consequences in fire.

In previous times, the food industry became acutely aware of the fire hazards associated with some types of combustible cored sandwich panels. So much so, that AD/B 2000 introduced a new Appendix F. Yet six years later whilst Volume II still includes a dedicated Appendix F which highlights the significant hazards and risks, the same fire guidance is missing from AD/B Volume 1 for dwelling houses! Building methods are not limited to one sector of construction anymore!

## FIRE CHECK LIST

If a fire occurs, what will happen in the building being considered? Is the standard guidance still relevant? Have new hazards been introduced? Have the risks been increased or overlooked? Have the fire measures been increased?

The fundamental advice is relatively simple:

- Keep fire in the box, or out of the box
- Ensure fire stays in the room of origin and cannot pass from room to room
- Ensure the walls can prevent passage of fire



- Ensure hidden spaces behind, below or over walls include adequate fire stopping so that unseen spread of fire is prevented
- Ensure fire resisting systems and fixings have not been substituted for cheaper ineffective alternatives
- Ensure fire stays outside the building and cannot enter via walls, services or roofs
- Note that 'sprinklers' cannot protect every part of a building
- Ensure the building products that have been tested for fire are the ones being used and are suitable for the application
- Prevent substitution of products unless relevant test evidence or rules permitting change are clearly available and relevant to what has been done
- Has the fire load of the building been increased or decreased?

**CONCLUSIONS**

As for case histories, the

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original sustainable building was obviously the third building in the story of the Three Little Pigs.

You'll remember that the three little pigs built houses from straw, sticks and bricks. Two of the buildings proved not to be sustainable at all to the wolf's huffing and puffing (or wind?).

But the other building, which took longer to build, survived all the huffing and puffing and proved a useful and sustainable home for the third little pig. OK, it was about wind, not fire, and it was a fairy story, but it serves a point.

One last thought. Does high density housing also have a more open plan design and little barrier to fire spread? Looks good, but what stops the fire?

