



## IS WOOD 'FIREPROOF'? - PART 2

*Don't confuse fire retardance with fireproof, says Jim Coulson in his second look at wood and fire*



In my first piece about wood in fire (TTJ November 2017), I started off by remarking that we all know that wood burns... and I used the example of attempting to light a normal domestic fire with large chunks of wood and seeing how unsuccessful that would be in reality. However, although wood is renowned for being difficult to ignite, and also – as I showed in the previous article – has a fantastic ability to hold back fire, through its

thickness (which is the concept of “burn through” time that we now refer to as “fire resistance”), it does, of course, eventually burn, but only when it is involved in a fully developed fire.

It is when wood is actively involved in a fire that its other property might come into play: its ability to prevent the spread of flame from one place to another along its surface and not through its thickness. That “other property” is known as *flame retardance* and it is the one thing that wood is not quite so good at, where fire is concerned.

Therefore, it needs to be treated in some way to improve its ability to resist the spread of flame and that is where the misunderstanding has crept in – that it is possible in some way to make wood “fireproof”.

Let me be clear: wood needs no treatment or other process to give it very good fire resistance – because it is naturally good anyway, as I showed last time. And even though it must be treated to improve its spread of flame properties, it is a relatively straightforward matter to beef up its flame retardant abilities.

Spread of flame, being a surface phenomenon, only therefore requires the exposed timber *surface* to be treated and so it is almost never the case that wood needs to be impregnated with flame-retardant chemical to any great depth (the converse of what is often needed with wood preservatives).

All that is needed to make these treatments effective is for sufficient loading of chemicals to be impregnated into the few millimetres below the surface so as to satisfy the manufacturers' requirements. And there is at least one type of impregnation treatment that can be used outdoors, since it is resistant to atmospheric humidity.

However, the impregnation of flame-retardant chemicals is not the only way to achieve the desired result.

A brush-applied or spray-applied coating will often do instead – and, indeed, that approach can be used to upgrade timber already in place, which would be very hard to treat by impregnation without removing it and/or replacing it.

There is no exterior version of these “surface application”

**Jim Coulson is a consulting wood scientist and past president of the Institute of Wood Science, as well as a Wood Technology Society board member and a Fellow of the Institute of Materials, Minerals and Mining**

products currently available. The two processes – impregnation and an applied coating – are based on different interactions, although they will both achieve the same desired effect: limiting flame-spread within an interior space.

The main places where wood or wood-based products are used, for example as decorative panelling, are in places where crowds may gather, such as concert halls or in areas used for means of escape, such as corridors and stairwells.

Impregnation treatments use chemicals that interfere with the actual chemistry of combustion and thus inhibit the development of the fire, whereas applied coatings are usually based on “intumescent” materials that “foam” up and expand when heated and thus smother the flames and so prevent them from spreading.

So the message here is: while wood is generally brilliant in its behaviour in fire, its one Achilles heel – that it will allow flames to spread along its surface – can be easily overcome by treating it. But please don't let me hear you in future talking about making wood “fireproof”! ■

*Charring forms a surface protective layer to wood in a fire*



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