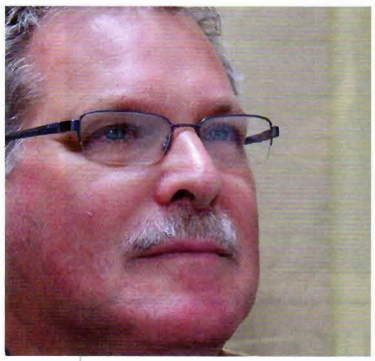
TALKING TIMBER

IS WOOD "FIREPROOF"?

***Jim Coulson** looks at the subject of timber and combustivity, with some surprising results*



We all know that wood burns – right? Well, maybe not – at least, not so readily as is popularly thought...

Have you tried lighting a fire, using large chunks of wood?

I can tell you that you will have very little success in getting it going: because wood is very difficult to ignite – and the larger the cross-section of wood you try to set fire to, the less you will succeed in getting it to burn.

It is common to hear people talking about "treating wood to make it fireproof": but that term is inaccurate.

The whole question of wood in fire is complex, and the two main things that people often mix up are fire resistance and flame retardance.

The two are not the same – and neither of them really involves making wood "fireproof"!

I will explain flame retardance in an article to follow in a forthcoming issue of *TTJ*, but fire resistance is the property of a material – any material, not just wood – to resist the passage of fire (which includes smoke and hot gases, not just flames) through its thickness, from one side to another, when it is used as a "fire barrier".

The commonest example of this is a fire door. Its whole purpose is to prevent a fully-developed fire from spreading out of the room or corridor where the fire started, and then getting into an adjacent room or corridor, where people are trying to escape.

You will, I'm sure, be familiar with the terms "half hour" and "one hour" fire doors and so on, thus you should see that the concept of fire resistance is actually measured in time.

But fire resistance is about more than just holding back flames and hot gases.

It's also about preventing the fire from spreading, by whatever means – and that may happen because the material itself conducts heat through its thickness and thus ignites flammable materials on the other side, without actually letting the "fire" get past.

So, while the lay person might think that steel makes a good fire barrier, because it doesn't burn, it doesn't make very good fire doors because it conducts heat from one side to the other very rapidly and so allows the fire to spread indirectly.

Which is why, even though wood burns (eventually), a wooden fire door is a great idea, despite that seeming to be counter-intuitive.

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Wood burns at a known and predictable rate – around 0.5-0.6mm per minute, depending on exactly which type of timber or wood-based panel we are talking about.

And that means a 44mm-thick door leaf, composed of a chipboard or flaxboard core and a veneered plywood skin, can hold back fire for more than an hour!

Not only that, wood holds its strength for as long as it isn't burning, so a fire door doesn't fall away while it's stopping the fire. And a timber beam doesn't fall down and make the building collapse – unlike steel or concrete, which lose their strength about halfway through a fully developed fire, which can reach 1,000°C!

Look at the photograph below of the backs of a pair of double-acting one-hour fire doors after more than an hour of exposure at 1,000°C. What is amazing is on the other side the front faces look pretty "normal". So – does wood need to be treated to make it "fireproof"? You tell me! ■

Fire door testing at Exova. The rear of doors after an hour at 1,000°C

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