

## BRIDGES ♦ BOARDWALKS ♦ JETTIES

The behaviour of timber structures exposed to fire is an issue of major importance. How structures behave in the first and second phases of fire development is termed its reaction to fire. The reaction to fire of a structure is a measure of how easy it is to ignite that structure and also how easy that structure contributes to the fire development and spread. This may be important for the intended use of the structure or the influence of the fire on the structure's surroundings.

Once we reach the fully developed fire phase it is assumed that all combustible materials present are burning. We are therefore interested in the fire resistance of the structure, a measurement of the ability of a system to withstand fire.

Fire resistance is defined in BS4422:2005 as "the ability of an item to fulfil, for a stated period of time, the required fire stability and/or integrity and/or thermal insulation and/or expected duty specified in a standard fire resistant test". Fire resistance is therefore a property of the elements of an item and not its materials.

Structural elements are required to maintain their load bearing capability for the appropriate period and separating elements must resist the passage of fire or excessive heat. The principle is one of maintenance of structural stability and containment of the fire until fire fighting is successful.

Set against the complex interactions of an assembly and a mixture of materials is the predictable speed at which timber burns known as the 'charring rate'.

Different timbers char at varying rates, largely as a function of their density, with the higher density timbers charring more slowly. For structural timbers listed in BS 5268: Part 2 this rate of depletion is taken at 20 mm in 30 minutes, from exposed face. Certain of the denser hardwoods, such as Ekki (density of 1070 kg/m<sup>3</sup>) and Oak (density of 640 kg/m<sup>3</sup>), which are used for structural purposes, have char rates of only 15 mm in 30 minutes, whereas lower density timbers such as Western Red Cedar (density 390 kg/m<sup>3</sup>) have rates of 25 mm in 30 minutes.



### CHARRING RATE

Type of Timber	Charring per minute
Softwood	0.80 mm
Softwood Glue Laminated	0.70 mm
Hardwood	0.55 mm

Bridges and structures supplied by Sarum Hardwood Structures are typically constructed in natural Ekki or Oak that we obtain from responsibly managed sources. Such hardwoods have qualities and characteristics that softwoods are unable to match.

- Superior structural capabilities**
- Fire resistant and fire retardant qualities**
- Environmental tolerance**
- Vandal resistance**
- No preservative treatment required**

If required, hardwood can be obtained from independently certified forests managed in accordance with the principles and criteria established by the Forest Stewardship Council and certificated with our Chain of Custody certificate No. SA-COC-001654 AV.



The mark of responsible forestry