

Western



Australia.

Forests Department

Fire Resisting Qualities

OF

Jarrah and Karri.

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The Fire-resisting Qualities of Jarrah and Karri.

IN considering the merits of any timber for constructional purposes the degree to which it resists fire is a matter of the first importance. In point of non-inflammability the whole eucalypt family holds a deservedly high place. Fires which would consume pine and other softwoods, and which would damage beyond repair such timbers as beech, elm, and oak, would do comparatively little harm to jarrah. Its fire-resisting quality has led to the utilisation of jarrah for beams and pillars, in place of steel, in large constructions such as warehouses and factories. In the city of Perth and in Fremantle some of the largest warehouses have floors of jarrah carried on beams of jarrah, and supported by jarrah pillars. The space occupied by such beams and pillars is no greater than that required for steel. In the tension of a great fire steel bends and buckles, leading to the collapse of the whole structure, whereas jarrah chars only to a limited depth, and, by remaining in position, minimises the loss. At a fire in Perth some time ago at a warehouse in which jarrah beams were used, the jarrah did its work splendidly. The intensity of this fire was such that steel pillars would have bent and failed at the critical moment; and what, owing to the use of jarrah, was only a moderately destructive visitation would, if steel pillars had been employed, have become a conflagration involving the whole of the extensive premises. Wharves, quays, jetties, and bridges in Western Australia are constructed almost exclusively of native timbers, but no instance of a destructive fire on any of them is on record.

Many inquiries have been made into the strengths of Australian timbers, and into those imported from outside, and the results have been tabulated on many occasions, but so far no comparative statistics have been compiled touching the fire-resisting qualities of Australian woods as compared with the softer timbers imported so largely into the Commonwealth.

The subject is topical at this moment, for the reason that large sums are now being spent throughout the Empire on homes for returned soldiers. One effect of this has been that, in England at last the old bogey about the danger of wood for building construction in towns has been laid, for the English Health Department has sanctioned timber as a building material for War Service homes.

In London several fire tests of Westralia's principal timbers have been made, and the reports upon these are of interest, and there can be no question that the behaviour of these timbers under fire does not materially differ from the most of the other hardwoods of the Commonwealth. The following notes give particulars of these tests:—

Reports on the fire of September, 1902, at the Victoria Docks, London, E., on the premises of the Aeme Wood Flooring Company, Limited, in which large stacks of deal, pine, American redgum, and jarrah were involved; and tests made by the British Fire Prevention Committee on the 29th January, 1902, and the 9th July, 1903, clearly demonstrate the fire-resisting qualities of karri and jarrah timbers.

The British Fire Prevention Sub-committee in their report of the Committee of December, 1902, on this fire, said, though the jarrah bore the brunt of the fire, as what wind there was blew in this direction, comparatively little damage was done to this pile, and this was confined to the North and West faces, the fire failing to penetrate far into the interior. Your sub-committee are of opinion that but for the resistance offered to the fire by this stack of jarrah, the conflagration would have assumed much larger proportions, as in the rear were large quantities of deals, and had they ignited the task for the fire brigades would have been far larger and more difficult.

"The Street," in its issue of October-November, 1902, in an illustrated article on this fire, said, "The fire swept all before it until it reached the stacks of Australian hardwood. The fierceness of the fire met an instant check, and failed to lay hold of the close-grained wood, thus giving the firemen the first chance of really tackling the flames and eventually extinguishing them; subsequent investigation showed that these wonderful West Australian woods were merely charred on the surface, and the large stacks remained intact. Inside the mill were several railway trucks loaded with hardwood blocks of the description used for public roads, ready for despatch to customers. The steel frames, springs, and wheels were all that remained of the trucks, but the contents were intact except for slight charring of the external layers of wood blocks. There can be little doubt that if the timber in the mill and in the yard had consisted wholly of Australian hardwood instead of deals and hardwood in juxtaposition, the fire would not have made much headway before being mastered by the brigade and the dock company's floating engine. After all, an actual fire is the best fire test, even though an expensive one for the moment."

The Tests of the British Fire Prevention Committee on Jarrah and Karri Doors and Jarrah Floor, January, 1902, and Karri Floor, July, 1903.

The aim of the committee, as set out in their prospectus, is "to obtain reliable data as to the exact fire resistance of the various materials. The tests are of entirely independent character, arranged on scientific lines, but with full consideration for the practical purpose in view All reports on tests solely state the bare facts and occurrences."

In their report of April, 1902, the committee give the following particulars of certain tests of jarrah and karri:—

Fire Tests Nos. 35 and 36, 29th January, 1902.—A 2in. jarrah four-panel (bead flush both sides) door; a 2in. karri four-panel (bead flush both sides) door.

Objects of Tests.—To record the effect of a fire of one hour, gradually increasing to a temperature of 2,000 deg. F. (Note: 2,000 deg. F. was attained in 30 minutes, and the temperature remained between 2,000 deg. F. and 2,200 deg. F. until the end of the test). The fire was to be applied from one side, and the doors were to open inwards on to the fire side. The door openings were to be approximately 3ft. by 6ft. 9in.

Fire Test No. 37, 29th January, 1902.—A floor of jarrah wood, area 222ft. 6in., super. in the clear (10ft. by 22ft.) loaded with 232lbs. per square foot in three separator loads of bricks, that in the middle covering an area of 47ft. 5in. super., and the two end ones 42ft. 8in. super.

Object of Test.—To record the effect of a fire of two hours' duration at a temperature gradually increasing up to 2,000 deg. F.

Results.—In the hour test it took 60 minutes for the flames to break through the jarrah door, while though at the end of 46 minutes a flame appeared at top of muntin of the karri door, it was not until the fire had been burning for 58 minutes that the top muntin fell out. In the hour's test the fire had been burning for one hour and 24 minutes before it appeared through any part of the jarrah door.

"Transport," of July, 1903, in its report of the test made by the British Fire Prevention Committee the previous day, as to the behaviour of karri hardwood under intense heat, says, "The test formed part of the programme arranged by the committee in connection with the Annual Congress (Fire), and representatives from the Continental fire brigades were present, besides many others. A large brick hut, 22ft. long by 10ft. wide, was arranged with several lengths of karri timber 2in. in thickness. These were placed so as to form a ceiling, and on top of these was a load of bricks weighing about seven tons. Coal gas was then turned on from a generator in the grounds, and in a very short space of time the interior of the hut was red hot, the temperature at the end of two hours, the time fixed for the test, reaching close upon 2,000 deg. F. Notwithstanding this enormously high temperature, in no place did the fire burn through the wood, and the load of bricks remained undisturbed to the finish. The underpart of the planks—those in actual contact with the fire—were, of course, considerably charred; otherwise the wood was unharmed. Everyone present expressed themselves well pleased with the astounding manner in which the timber withstood the test, and none more so than the foreign delegates, to whom the unrivalled strength and fire-resisting properties of karri wood came more or less as a revelation.

Fire Test of Karri Varillas.—A further proof of the fire-resisting character of karri is afforded by the following letter received from Mr. Hugh Wright, Los Mirasoles, Bahia Blanca, 17th April, 1901:—"Last December I had a camp fire pass through half a league of fencing hung with your varillas, and it left them practically uninjured; not one was burnt through or twisted, and those that suffered most were charred less than a centimetre in depth."

From these and other testimonials it is clear that structural works built of karri and jarrah timbers would be practically fireproof; for which reason, also, they are specially suited for underground railway work of every kind—sleepers, platforms, etc. The Underground Electric Railways Company, of London, Limited, have therefore ordered karri sleepers for their Baker Street and Waterloo Railway, specially on account of their fire-resisting qualities.

This is a subject of such importance, in view of the frequent and calamitous fires of recent years, that the company considers the above facts are worthy of the special attention of the public authorities, architects, engineers, and builders.