



F.R. Note 122

54/48

3- A53

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH AND FIRE OFFICERS' COMMITTEE
JOINT FIRE RESEARCH ORGANIZATION

This report has not been published and should be considered as confidential advance information. No reference should be made to it in any publication without the written consent of the Director, Fire Research Station, Boreham Wood, Herts. (Telephone: ELStree 1341 and 1797).

A VISIT TO A FIRE AT THE PREMISES OF THE LONDON PLYWOOD CO., PONDERS END

by

K. N. Palmer

July, 1954.

Fire Research Station,
Station Road,
Boreham Wood, Herts.

A VISIT TO A FIRE AT THE PREMISES OF THE LONDON PLYWOOD CO., PONDERS END

by

K. N. Palmer

The premises of the London Plywood Co., Wharf Road, Ponders End, were visited by D. O. Moss of Middlesex Fire Brigade and the author on 14th July, 1954. The London Plywood Co., were represented by Mr. Jeger, with Mr. Pring and Mr. Webb.

Details of the Premises

The fire involved a veneer drying machine situated in a large brick walled room with concrete floor. The veneer, in the form of thin wood sheets, was fed horizontally on metal rollers (about 3 in. in diameter) into one end of the machine and required 15-20 minutes to pass through the machine, a distance of about 20 feet. During this time it was subjected to drying by piped steam maintained at 55 p.s.i. (142°C) and was also pressed periodically by pairs of platens about 3 in. in width moving up-and-down at right angles to the veneer (in a sandwiching motion). The veneer finally passed to an operator who lifted it from the machine. The motive power was supplied to the machine by an oil pressure system at about 15 p.s.i. from two electrically-driven pumps housed in an adjoining room not involved in the fire. One pump developed the pressure in the oil, but it was only transmitted to parts of the oil system in the pump room, and the pressure was not communicated to the drying machine until the second pump was working. This second pump controlled both the horizontal motion imparted to the veneer sheets by the machine rollers and the vertical movement of the platens. The starting switches for both motors were in the machine room, about 6 ft. from the machine; the machine itself was devoid of electrical wiring. The pump room was separated from the machine room by a door which was badly burned on the drying machine side. The base of the machine was raised about 1 ft. from the floor and an oil sump was provided under the central portion of the machine. A second drying machine, operating on similar principles to that involved in the fire, was working at the time of the visit and shallow deposits of fine wood dust (rubbings from the veneer sheets) were resting on the platens and on the floor under the machine. A few scraps of paper were also lying under the second machine.

Outbreak of Fire

At 9.10 p.m. on 9th July, 1954, the machine operator was just beginning his shift on the machine and it is believed that at the time the rollers causing the horizontal motion of the veneer through the machine were not rotating although the platens were operating normally. He then pressed the switch operating the motor for both the above motions, there was a 'flash', and the oil in the sump ignited. Flame then spread upward through the machine causing serious damage; there was no explosion damage. It was not known whether any of the veneer was in the machine when fire broke out; it seems probable that the previous shift (finishing at 9 p.m.) would stop feeding the machine at about 8.40 p.m. but would, of course, continue to receive dried veneer from the machine until nearly 9 p.m. Usual practice was for the machine to be left running whilst the shifts changed. It is fairly certain that the fire occurred before any veneer was fed to the machine by the operator newly arrived. On balance, therefore, the machine ought not to have contained any veneer when the fire occurred.

Previous incidents

The rollers had ceased to rotate, although the platens still operated, on several previous occasions due to an airlock developing in the hydraulic system. This could not be overcome by pressing the motor starter switch (the operator might not have known this) but was remedied previously by bleeding the air from a valve attached to the machine. The machine involved in the fire had been running almost continuously 24 hours

per day (including Sundays) for the previous 6 years and the second machine had run for about 12 years. There had been no previous outbreak of fire in either machine.

Hydraulic Oil

The oil used in the system was L.T.B. Heavy Medium and the suppliers had tested a sample from the circuit of the damaged machine and found the oil to be of specified quality. The following results were obtained:

Flash point (closed cup) :	216°C (420°F)
" " (open ") :	224°C (435°F)
Fire " :	249°C (480°F)

Cause of fire

Three possible causes of the initiation of the fire were considered, viz.:

1. ignition of oil, either as vapour or mist
2. overheating of some part of the machine, due to friction.
3. ignition of wood dust by an external source of ignition.

1. In the present case the ignition of oil vapour would be highly improbable as the flash point of the oil was more than 130°F above the maximum temperature the oil would attain (the temperature of the steam pipes). The ignition of an oil mist is not considered a likely cause since a heavy concentration of drops is required and would probably have been noticed by the operator; the 'flash' observed may have been the spread of flame across the oil in the sump reflected in the whitewashed walls. In either instance the presence of an external source of ignition would be required.

2. As stated above, there was probably no veneer sheeting in the machine at the time of the fire, but it is possible that some foreign material had entered the machine or some veneer had become stuck and had been ignited by friction. A burning fragment might then have ignited the contents of the sump or material on the floor. The entry of a foreign body could have jammed the machine and caused the rollers to stop; if so, some mechanical damage might be observable on dismantling the machine. It should be remembered, however, that the machine had given little trouble in the past.

3. Laboratory tests have shown that smouldering combustion may be readily produced in the wood dust by either a glowing cigarette or sparks from an ordinary flint gas lighter. In addition, a layer of dust only 0.6 cm ($\frac{1}{4}$ in.) in thickness can sustain smouldering in still air. There is thus a possibility that a smouldering fire was initiated in a dust deposit by either a dropped light or perhaps by a spark struck from the concrete floor; the smouldering could develop into flame on coming into contact with paper or wood chips. This mechanism could permit a considerable time lag between the initiation of smouldering and the production of flame. It should be noted that the workers did smoke on the premises.