

Cooperating to reduce fire danger

However resistant to fire a building's structure may be, if its furnishings and fittings burn easily a fire indoors can kill people and cause great destruction.

Many gaps exist in our knowledge of how materials will behave in fires—whether they will ignite easily, burn rapidly, give off large amounts of suffocating smoke, and so on. Only when these gaps are filled can adequate safety standards be set.

The burning characteristics of wood, wool, cotton, and other traditional furnishing materials are generally quite well known. But much less is known about the performance of the plastics and synthetic fabrics that have come into wide use only in the last few decades.

Some of these materials can pose new hazards—giving off noxious smoke or letting molten drops fall. On the other hand, some appear to be considerably safer than their traditional competitors. For example, curtains made of some synthetics ignite and burn much less rapidly than cotton curtains.

Part of the job of assessing the safety of materials can be done in the laboratory. Scientists have devised

methods for measuring ease of ignition, rate of flame spread, and the production of smoke and toxic gases. However, accurate safety assessments require information on what happens to the materials in real-life fire situations, and very little of this exists, particularly for plastics and synthetics.

At the CSIRO Division of Building Research, Melbourne, a team led by Dr Caird Ramsay is collecting information on the fire behaviour of plastics and synthetic fibres used in buildings. They are also comparing the behaviour of these materials with that of traditional materials.

The project involves laboratory tests and examination of the progress of actual building fires.

In these building-fire studies, the scientists are working with the Victorian Country Fire Authority (CFA), whose charter includes fighting fires in houses and other buildings in outer suburban areas of Melbourne and country towns.

At the request of the Division, the CFA sends forms—giving details of fires, the materials burnt, and the damage and injuries



Measuring smoke production from burning plastic.

caused—to Dr Ramsay. It also sends samples of fire-damaged materials.

The information on the forms shows the roles of different furnishings in spreading fires. Chemical analyses of the samples show what materials were involved; Dr Tom Pressley of the CSIRO Division of Protein Chemistry is doing some of the analyses. If the samples are large enough, Dr Ramsay's group subjects them to small-scale fire tests to examine their burning properties.

One type of plastic the scientists are examining in the laboratory for fire behaviour is flexible polyurethane foam, widely used in lounge chairs and other soft furniture. Another is rigid polystyrene foam, used for wall insulation, construction of cool

stores, and many other purposes. The scientists are also examining the fire behaviour of synthetic carpets.

Comparison of laboratory data and information obtained from the CFA should help the scientists develop adequate tests for materials used inside buildings.

An important aim of the project is to assist the Standards Association of Australia in building up a set of fire safety standards for these materials. At present, especially for plastics and synthetics, not nearly enough is known about their burning behaviour.

Fires in buildings: Australian statistics. G. C. Ramsay and A. N. Souprounovich. *CSIRO Division of Building Research, Report No. 35, 1975.*