

- \*W. H. GREENWALT, Murray Wood Products Co., Memphis, Tenn.
- \*HARRY GILBERT, The Pullman Co., Chicago, Ill.
- \*ROLAND JONES, The Surtz Manufacturing Co., Chicago, Ill.
- \*HARRY J. KELLEY, American Seating Co., Grand Rapids, Mich.
- \*WALTER S. PAINE, Aetna Casualty & Surety Co., Hartford, Conn.
- \*J. A. PERDUE, Michigan Mutual Liability Co., Detroit, Mich.
- \*G. E. SANFORD, General Electric Co., Schenectady, N. Y.
- \*H. E. SEELY, The Brunswick-Balke-Collender Co., Chicago, Ill.
- \*Past General Chairman

### MONDAY AFTERNOON SESSION

October 10, 1938

The first session was called to order by General Chairman H. E. Seely, Insurance Department Manager, The Brunswick-Balke-Collender Company, Chicago. He sketched in his opening remarks the prog-

ress of the Section during the past year, spoke of the good work of all Officers and Chairmen of Committees of the Section, and then introduced the first speaker.

### Wood Dust Hazards Control

By H. H. VALIQUET

Ventilating Engineer, Employers Mutual Liability Insurance Company of Wausau, Wis.

Wood dust is a by-product of almost all woodworking operations including chipping and larking in the wood pulp plant and finishing wooden parts by sanding or sawing in sash and door, furniture, box, toy, and veneer factories. Processing in wood flour plants and the use of wood dust in the plastic and linoleum industries also present a dust problem. Since wood dust introduces the hazard of explosion and fire, dust control at the source is essential.

The first attempt at wood dust control in this country was made in about 1850 near North Conway, New Hampshire, where B. F. Sturtevant was making wooden pegs for shoes. To handle the refuse, he devised a *housed centrifugal fan to blow the trash away from the point of generation to a disposal.*

Not until about 1906 did capacity tables for centrifugal fans become available and methods of dust control begin to develop. Today the degree of dust control can be relatively adequate even though we have no definite standards by which we can judge results.

I hope, however, to outline a general

dust control program which will apply to most woodworking plants.

Removal of wood dust at the source is the prime consideration. We must not overlook the fact that some plants spend large sums of money for dust control. In the R. C. A. Victor Company's radio cabinet plant at Camden, New Jersey, 114 million cubic feet of air per minute are used to handle the trash, conveying tons and tons of refuse to disposal from woodworking facilities. Ford Motor Company, Fisher Body, Briggs, the Mengel Company, Westinghouse, General Electric Company, Globe-Wernecke and others are doing an extensive job of controlling dust at its source.

In the near future we hope to see the average and small plant provided with facilities for wood dust control and safeguarded in this way from fires and explosions such as the following.

In a Detroit woodworking plant a steam pipe passed through a brick flue used to convey trash from various floors to the point of disposal. Some flammable dust thrown down the flue ignited, and the explosion resulted in injury to eleven men.

Another accident occurred in a sander finishing room at Appleton, Wisconsin, where wood dust on rafters became dislodged and fell onto live coals that had accidentally rolled out of a stove onto the hearth.

An open lantern similar to those commonly used by night watchmen, a leaky dust pipe which caused a dust cloud in an engine room, sparks drawn from a grinder into a dust collecting system, spontaneous combustion of an oily rag, and back fire through a furnace feeder pipe which started fire in a shavings storage vault, are a few causes of destruction and suffering.

Static electricity is a hazard in industrial plants, particularly where flammable dusts or gases are present. Not every individual discharge of static electricity will ignite a dust or gas mixture because the ignition depends upon the nature of the flammable material, the amount of it which is mixed with the air at the point of static discharge, and the nature of the static discharge.

Carbonaceous dusts are explosive, and the enormously increased electrical capacity of matter in a finely divided condition is often a contributory cause of the explosion of combustible dust. Twenty per cent of a sample tested was of a fineness to pass through 200 mesh screen. Such particles are about 3/1000 of an inch, or 74 microns, in greatest dimension.

Wood subjected to prolonged exposure to temperatures of a low order (such as that of steam pipes) may ignite spontaneously. Wood flour ignites at a temperature no higher than that of a lighted match.

The exact combination of dust concentration, flame temperature, etc. may seldom occur. Reasonably safe conditions are the important criteria, and to make conditions safe we must have good housekeeping and carefully observed safety precautions.

Four steps are necessary: (1) Enclose the operation; (2) Ventilate at the source of the dust; (3) Remove possible sources of ignition; (4) Provide safe disposal of waste.

As an example of enclosing operations, we found a vertical sander belt completely hooded. The dust control here was good because ventilation was effective at the point of dust generation. However, even this set-up was not functioning correctly for, in the first place, the fan was running in the wrong direction, and in the second place, its speed was not sufficient to add effort to the

air movement because its discharge was connected to a dust disposal system already stronger than the fan effort. The suction of the main system was greater than that of the small fan in line with the vertical sander; therefore, the fan acted like a valve and restricted the natural flow of air and dust.

This was an example of lack of thorough analysis of the facts. The hood was good, but the ventilation was poor.

In another case we found a vertical sander under partial enclosure with sub-standard dust control. The lower side of the belt should have been enclosed with the top and bottom pulleys. Not all the dust could be caught because a large section of the belt was not enclosed. To finish completely such a crooked piece of wood as a bow lack of a chair, a large opening is necessary. The hood which is more nearly enclosed furnishes the best dust control for most work.

A much neglected unit from the standpoint of dust control is the wood sander. A hood developed by the Sheboygan Fibre Furniture Company not only accommodates awkward work, but produces excellent dust control. Unfavorable drafts cause little interference with the mechanical ventilation. A 5 inch pipe connection has 2.5 inches total suction (inches of water). This reading is taken 12 inches from the hood through a 1/4 inch clean drilled hole in 5 inch pipe. Such a suction would indicate that results on the 24 inch drum are excellent.

A horizontal sander should have as complete enclosure of sander belt as possible. Such a device used by Kirk and Blum of Cincinnati is very satisfactory.

Too many belts lack enclosing hoods and good ventilation. The cost of the sheet metal enclosure, once it is installed, is amortized over the usual period for such major expenses; but ventilation equipment costs money day in and day out as long as it is in operation. Consequently, ventilation carried on without an enclosing hood is more expensive and less satisfactory than ventilation carried on within a suitable hood.

When a belt sander is completely covered except at the point of operation, ventilation applied parallel to belt movement produces reasonable dust control. Not enough sander belts are guarded for dust control, but we are fast approaching the time when tentative hood standards should be set.