CONTROLLING WOOD DUST HAZARDS AT WORK

Timber is generally divided into two categories, softwoods like pine and cedar, and hardwoods like oak, teak and jarrah.

The Western Australian occupational exposure standard (OES) for airborne inhalable wood dust is 1mg/m3 (one milligram per cubic metre) for hardwoods and 5mg/m3 for softwoods.

The standard for MDF is also 1mg/m3 because it can contain hardwood.

The average inhalable wood dust in the breathing zone of the worker must not exceed the OES over an eight hour working shift.

Where dust from timber that has been coated with a toxic substance (such as lead paint) is involved, the OES for both the toxic coating and wood dust must be complied with.

Formaldehyde readings should be below 1ppm (one part per million) when averaged over an eight hour day. Short term exposures should not exceed 2ppm.

Who is at risk?

People exposed to wood dust at work are at greater risk of developing nose, sinus, throat, lung, and skin conditions.

Health problems may take a long time to develop, and are most common in people who have spent many years at workplaces exposed to high concentrations of wood dust.

Dusts from hardwoods are usually finer and therefore more easily inhaled.

Those most at risk are at indoor workplaces with inadequate dust extraction systems.

What work is hazardous?

Hazardous amounts of wood dust may be generated by jobs like floor sanding, furniture sanding, wood turning, routing, sawing, sweeping and emptying dust filters.

Dust hazards exist in varying degrees from timber felling in the forest to furniture manufacturing and cabinet making in factories and workshops.

The main hazards occur where there is poor natural or mechanical ventilation.

How can wood dust harm you?

Studies in Australia and elsewhere have linked wood dust in workplaces to asthma, bronchitis, lung, sinus and throat irritations, shortness of breath and skin problems.

The IARC (International Agency for Research into Cancer), after researching nasal cancer among woodworkers in Europe, has classified wood dust a human carcinogen.

Wood dust from timbers such as beech and oak which is fine enough to be inhaled are known to cause cancer. Other species such as, birch, mahogany, teak and walnut may also be capable of causing nasal cancer. As this is a rare form of cancer, the risk is small and generally restricted to the finishing trades where the dust is fine.

Freshly cut trees contain large amounts of microbes, mainly moulds. The number of these increase if the logs are stored outside and under moist or humid conditions. The microbes can cause inflammation of the airways during debarking, sawing and transportation.

What about different woods?

While there has been considerable research carried out on European and North American species, relatively little is known about the way dusts from different Australian timbers affect people's health. Each type of timber has its own chemical components and may affect people differently.

Even less is known about dusts from imported woods, for example from Africa, South America and Asia. There is a concern that adverse health effects from some of these wood dusts may not show up for perhaps many years. Protection for workers today is therefore vitally important.

What about chemicals?

Plywoods, fibre boards, particle boards and laminated products contain formaldehyde that can cause irritation of the respiratory system and eyes. Some suppliers provide Material Safety Data Sheets (MSDS) or similar information on .

Small amounts of formaldehyde may be given off during the cutting or machining of particle board, but this is seldom high enough to cause a problem. Higher levels may accumulate if products are stored in plastic or in unventilated enclosed spaces.

Many wood products have been coated with varnishes, lacquers, polishes and other chemicals. These may cause harm to health under some circumstances, and need to be considered when working with wood.

Dusts from second hand timbers may contain toxic paints, preservatives or lead.

Dust from CCA (copper-chrome-arsenic) treated pine timber is not significantly more toxic than from other timbers, provided dust levels are kept below occupational exposure standards.

There are also a number of chemicals used for sealing, coating and polishing timber that may pose a hazard to workers during their application, and the hazards from these substances are described in their respective MSDS.

What is the answer?

The best way of reducing wood dust at a workplace is by using machines that are enclosed or fitted with an effective local exhaust ventilation (LEV).

LEV involves locating an extraction outlet as close as possible to each identified source of dust, and having sufficient air velocity to draw dust away before it becomes airborne.

On some machines with a single cutting, grinding or sanding face, there may be several sources of dust either thrown, drawn or blown from different parts of the machine. Ideally, each dust source should be controlled by the LEV system.

While most wood dust is from machines, hand sanding fine furniture can be one of the dustiest jobs at the workplace. Hand sanding generally requires the use of respiratory protection.

What is available?

LEV systems consist of a hood to capture the dust, duct work to convey the dust and a mechanism such as a filter or cyclone to remove the dust. Energy to move the air and dust through the system is provided by a fan that is driven by an electric motor. Each of these components is important and needs to be matched to the job. Specialised knowledge is needed to design an effective LEV system.

Most modern wood working power tools and machines are fitted with one or more local exhaust ventilation hoods or outlets to capture dust.

Small portable machines such as sanders usually have a filter bag attached. These filters generally do not reduce fine dust exposure sufficiently. Larger machines are connected by a duct to a fixed or portable dust collection unit. The filters on these units are more effective. However in either case respiratory protection may need to be worn if occupational exposure standards are likely to be exceeded.

While most modern wood working machines are designed with dust control in mind, the effectiveness of the systems available can vary considerably. Dust control should be considered when purchasing new machinery.

Detailed guidance on the design of ventilation systems for a range of wood working machines is widely available. For example, organisations such as the US National Institute of Occupational Safety and health (NIOSH), the UK Health and Safety Executive (HSE), and the American Conference of Governmental Industrial Hygienists (ACGIH) all publish information on wood working machines. Some of this information is accessible via the Internet.

Maintenance of LEV systems is as important as good design. The performance of LEV systems needs to be monitored and the system maintained in accordance with the manufacturer's specifications.

What about older equipment?

Exhaust ventilation attachments and improvements have also been developed that can be fitted to some earlier machines, for example table saws, band saws, belt sanders and orbital sanders.

Machines and power tools that are difficult to fit with local exhaust ventilation may need to be replaced.

Room exhaust ventilation does not effectively reduce wood dust hazards.

Personal protective equipment, such as dust masks or respirators, should not be used as a substitute for safe exhaust ventilation.

What is the Law?

Section 19 of the Occupational Safety and Health Act 1984 says employers must provide and maintain a work environment in which employees are not exposed to hazards.

Regulations 3.38 and 3.39 of the *Occupational Safety and Health Regulations* require employers, main contractors and self employed persons to:

- identify toxic atmosphere hazards (eg. wood dust);
- assess the risk of injury or harm; and
- consider reducing the risk by:

    (a) an effective ventilation system;
    (b) an exhaust system that extracts contaminants; and
    (c) any other means to prevent a person being exposed.

Section 20 of the *Act* says employees must take reasonable care of their own safety and health and avoid adversely affecting the safety and health of others. An employee must comply "so far as he is reasonably able" with safety instructions, use the protective equipment provided and report hazards and any injury at the workplace.

The law also requires employers and employees to consult in order to resolve safety and health issues in the workplace. If an employee is concerned about his or her

health, they should raise the matter with their employer or safety and health representative if there is one.

Identifying hazards

Hazardous airborne wood dust can be generated by:

- hand sanding;
- machine sanding;
- machining;
- band sawing;
- table sawing;
- routing;
- woodturning;
- copy lathing;
- dry sweeping dusty floors;
- emptying dust filter bags; and
- using compressed air to dislodge dust.

Inspirable (inhalable) dust may not always be visible and, where there is a concern, dust exposure readings need to be taken to determine dust levels.

This can be done by an occupational safety and health service provider.

In addition to being a health hazard, dusty atmospheres or excessive dust accumulating inside equipment or work areas can cause fire or explosion.

Assessing risks

High levels of airborne wood dust at a workplace can place people at risk.

The degree of risk depends on:

- concentrations of airborne dust;
- size of dust particles;
- type of wood;
- additives in the wood;
- susceptibility of workers;
- effectiveness of exhaust ventilation; and
- other safe procedures.

Control measures

The preferred order of control measures is:

1. **Elimination**
   This is possible only if wood is not machined, sawn or sanded, or if all work that produces wood dust is outsourced to another workplace with adequate controls.

2. **Substitution**
   Replacing more "hazardous" timbers with less hazardous species may be possible if reliable data on health risks is available. For most species however, there is little data available.

3. **Isolation**
   Enclose plant or keep workers away from dusty areas.

4. **Engineering**
   - Attach efficient local exhaust ventilation to existing plant and hand held power tools.
   - Have local exhaust ventilation for hand sanding tasks.

5. **Administration**
   Some examples:
   - Use suction cleaners – rather than compressed air – to remove accumulated dust from ledges, corners, pits and floors.
   - Empty filter bags outdoors, away from work areas, and where the dust will not blow back into the workplace.
   - Rotate dusty tasks to reduce workers' exposure times.
   - Provide education, supervision and training on wood dust hazards for both employers and employees.
   - Monitor risks to ensure they remain as low as possible.
   - Workers exposed to wood dust should wash or shower before eating or smoking. This is of particular importance in the case of treated wood.

6. **Protective equipment**
   - Protective equipment such as face masks and respirators are a last line of protection. In some circumstances they may be needed to supplement other measures in order to reduce exposure to levels below the occupational exposure standard.
   - Respiratory equipment should meet Australian Standards AS/NZ 1715 and 1716.
   - People with skin sensitive to certain wood dusts should wear suitable protective clothing, eg. coveralls, long sleeves, and properly fitted industrial gloves.

Further information

Further information relating to many of the matters referred to above may be found in National Association of Forest Industries publications or obtained from:

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