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"Trees"

HEALTH HAZARDS OF TREES, WOOD DUST, PRESERVED WOOD, AND WOOD PRESERVATIVES

WOOD DUSTS FROM CUTTING OF TREES AND WOODWORKING:

Vapors from sawing depend upon the type of wood and the volatile extractives present. For example, sawing vapors from pine contain: a-pinene, b-pinene, and delta-carene, and other terpenes. The major terpenes found in sawing vapors are nearly the same as those in turpentine and the TLV of turpentine is often applied to sawing vapors. Also, logs may contain molds, rotting fungi, bluestaining fungi, and bacteria which can be present in the dusts. Respiratory disorders have been attributed to wood dust (see below), including suberosis which can progress to chronic bronchitis and emphysema (cork dust), sequoiosis or granulomatous pneumonitis (redwood), and maple-bark disease (spores of fungus *Cryptostroma*, *Coniosporum*, *Corticale* found in diseased maple trees). Also hypersensitivity pneumonitis, called allergic alveolitis in Europe, appears can be due to fungal spores.

MUCOSAL AND NONALLERGIC RESPIRATORY EFFECTS:

The most frequent complaints by wood workers include dryness in nose, eye irritation, nasal obstruction, nasal bleeding, coughing, wheezing, sneezing, prolonged colds, and frequent headaches. Slight decreases in pulmonary function have been reported in pulp and paper mill workers exposed to wood dust. Workers exposed to dust above 5 mg/m³ more frequently experienced inflammation of the middle ear and had colds longer. Impairment of nasal mucociliary clearance has also been found in furniture workers; usually transient and returns to normal over a weekend. Exposure to hardwood dusts may cause anosmia (loss of sense of smell). Biologically active substances have been detected in the bark of many trees which have been associated with such symptoms as giddiness, drowsiness, visual disturbances, colic, muscle cramps and cardiac arrhythmias.

DERMATITIS:

As many as 300 species of trees have been implicated in wood-caused dermatitis. The chemicals associated with allergic reactions are generally found in the inner parts of a tree, such as the heartwood, and the workers most prone to these reactions are those involved in secondary wood processing (carpenters, joiners, finishers). The symptoms include redness, scaling, and itching, which may become chronic upon repeated exposure. The parts of the body most often affected are the hands, forearms, eyelids, face, neck, and genitals. Contact eczema has been associated with cedar, rosewood, and pine. Joining wood using adhesives or working with wood products such as plywood or particle board may involve formaldehyde exposure due to inhalation or skin contact with formaldehyde-containing glues or dusts. Irritant chemicals causing dermatitis and conjunctivitis are found in the sap or latex of certain trees (see attached table IARC, P. 86-87). Skin sensitizers traced to liverworts and lichens have been found in the bark of some trees, causing dermatitis. Cedar-poisoning, for example,

appears to be due to epidermal sensitization to lichen components such as usnic acid and others.

ALLERGIC RESPIRATORY EFFECTS:

| Clinical condition: | Type of wood: |
|------------------------------------|--|
| Hypersensitivity pneumonitis | Mahogany, teak, okume, cedar, sequoia, cork, maple-bark, plywood, oak |
| Acute airway obstruction | Abiruana |
| Allergy of upper respiratory tract | Arbor-vitae |
| Asthma | Iroko, red cedar, abiruana, domestic sawdust, mahogany, ramín, oak; also formaldehyde (see dermatitis below) |
| Rhinitis | Cedar, abachi, makore, iroko, okume, manzonia, rosewood |

CANCER:

Adenocarcinoma of nasal cavity and ethmoid sinus has been seen in the furniture industry; but woodworkers in the building industry (lumber, carpentry, or construction workers) do not appear to be at risk. It is possible that carpenters are commonly exposed to soft woods, rather than hard woods, or because the work may not produce a sufficiently high concentration of dust of the appropriate particle size to be harmful. Few cases have been found in workers who entered the furniture industry after the second world war; this may be due to some factor present before 1945 which is no longer present or may be due to substantial improvements over the past 30 years in exhaust ventilation. A study of AFL-CIO United Brotherhood of Carpenters and Joiners workers showed a significant excess of malignant tumors of the bronchus and lung; other lung cancer studies do not agree -- OSHA considers these data inconclusive at this time. There appears to be an increased risk of Hodgkin's disease among woodworkers, particularly carpenters. NIOSH considers data for other cancer sites to be inconclusive.

OCCUPATIONAL EXPOSURE LIMITS: see attached.

HEALTH HAZARDS OF PRESERVED WOOD AND PRESERVATIVES: see MSDS companion sheet #11: Preserved wood and wood preservative products. Cornell University. Chemical Hazard Information Program. 120 Delaware Ave. Room 232. Buffalo, NY. 14202.

REFERENCES:

- Girard, J. P. "Allergic manifestations due to wood dusts" in Frazier, C. A. (Ed.) 1980. Occupational asthma. Van Nostrand Reinhold Co., N.Y.
- International Agency for Research on Cancer. 1981. IARC Monographs on the evaluation of the carcinogenic risk of chemicals to humans. Vol. 25. Wood, leather, and some associated industries.
- Meyer, B. et al. 1986. Formaldehyde emissions from wood products. ACS Symposium Series # 316. American Chemical Society. Washington, DC.

Darcy, F. J. 1984. "Woodworking operations - furniture manufacturing" in: Cralley, L. J. et al. Industrial hygiene aspects of plant operations. Vol. 2, Unit operations and product fabrication. Macmillan Publishing Co. NY.

NY Academy of Sciences. 1977. Cancer and the worker. NYAS. NY, NY. "wood dust"

29 CFR 1910.1000 - air contaminants. (as revised 01/19/89)

29 CFR 1910.1000 - air contaminants, proposed rule. BNA Occup. Safety and Health Reporter 18(3): 226. "wood dust"

ACGIH. 1987-88. Documentation of the threshold limit values and biological exposure indices. American Conference of Governmental Industrial Hygienists. Cincinnati, OH. "wood dust"

See also references for MSDS companion sheet #11.

You may be interested in the following factsheet:

"Pesticides for woodworkers, tree planters and tree nursery workers"; Pacific Northwest Labor College. Box 25. Maryhurst, OR 97036. (503) 245-1315.

Table 18. Principal toxic timbers^a

| Common name | Botanical name | Symptoms ^b | Active substances |
|------------------------------------|--|-----------------------|--------------------------------------|
| Arbor vitae | <i>Thuja standishii</i> | M | Tropolones |
| Ayan | <i>Distemonanthus benthamianus</i> | D | Oxyayanins |
| Blackwood, African | <i>Dalbergia melanoxylon</i> | D | Dalbergiones |
| Boxwood, Knysna | <i>Gonioma kamassi</i> | M G | Yohimbine (quebrachamine) |
| Cedar, Western red | <i>Thuja plicata</i> | (D) M | Tropolones |
| Cocobolo | <i>Dalbergia retusa</i> et spp. | D | Dalbergiones |
| Cocus | <i>Brya ebenus</i> | D | Quinones? |
| Dahoma | <i>Piptadeniastrum africanum</i> | M | ? |
| Ebony | <i>Diospyros</i> spp. | D M | Quinones |
| Guarea | <i>Guarea thompsonii</i> et spp. | M | ? |
| Ipè (lapacho) | <i>Tabebuia ipè</i> et spp. | D M G | Desoxylapachol |
| Iroko | <i>Chlorophora excelsa</i> | D (M) | Stilbene |
| Katon | <i>Sandoricum indicum</i> | M G | ? |
| Mahogany, African | <i>Khaya ivorensis</i> et spp. | D (M) | Anthothecol |
| Mahogany, American | <i>Swietenia macrophylla</i> et spp. | D | ? |
| Makorè | <i>Tieghemella heckelii</i> | D M | Saponin |
| Mansonia | <i>Mansonia altissima</i> | (D) M G | Mansonones (quinones), glycosides |
| Obeche | <i>Triplochiton scleroxylon</i> | (D) M | ? |
| Opepe | <i>Nauclea trillesii</i> | D M | ? |
| Peroba rosa | <i>Aspidosperma peroba</i> | D M G | Alkaloids |
| Peroba, white | <i>Paratecoma peroba</i> | D M | Desoxylapachol? |
| Ramin | <i>Gonystylus bancanus</i> | D | ? |
| Rosewoods | <i>Dalbergia</i> spp., <i>Machaerum</i> spp. | D | Dalbergiones |
| Satinwood, Ceylon | <i>Chloroxylon swietenia</i> | D | Alkaloid, furocoumarins |
| Satinwood, West Indian and African | <i>Fagara flava</i> et spp. | D | Alkaloid (?), furocoumarins |
| Sequoia | <i>Sequoia sempervirens</i> | M G | ? |
| Stavewood | <i>Dysoxylum muelleri</i> | M G | ? |
| Teak | <i>Tectona grandis</i> | D | Desoxylapachol |
| Liverworts and lichens on bark | <i>Frullania</i> , etc. | D | Sesquiterpene lactones |

^a From Woods & Cainan (1976)^b D - dermatitis; M - mucosal irritation; G - general symptoms; parentheses indicate suspicion only