Health Hazards in Woodworking

Simple precautions minimize risks

by Stanley N. Wellborn

Industrial woodworkers have long recognized the risks of their trade. But it has been only in the past few years that artists and craftsmen have become concerned about—or even aware of— the many hidden dangers in woodworking.

Of course everyone recognizes those hazards that cause immediate and traumatic injury—blades that cut fingers and limbs, wood chips and fragments that fly into eyes, loose clothing or long hair that catches in whirling machinery, smashed fingers and toes, muscle strains from heavy lifting. But now medical authorities in the United States, Canada and England cite a number of insidious causes of disease that can be directly attributed to woodworking. Their list includes wood dust, sap and oils, mold and fungus, chemical additives, toxic solvents and adhesives, vibration and noise.

A diligent search of medical literature, or a chat with an industrial hygiene specialist, will turn up dozens of horror stories about the health hazards of woodworking. For example, the 43-year-old woodworker who had operated a lathe for more than 25 years and became worried about a persistent sinus irritation and sore throat. His doctor prescribed a standard treatment, yet the condition did not improve. Finally, lab tests revealed cancer of the nasal passages. Or the art student who broke out in a rash, with blisters resembling second-degree burns, shortly after she began to sculpt wood. When she stopped woodworking, her skin healed.

The mere existence of a medical case history doesn't mean every woodworker will succumb to serious disease; the biggest unknown is often the size of the risk. In most cases, woodworkers can take adequate precautions for relatively little cost. Common protective measures are described in the box on page 56. Woodworkers who notice something wrong with their health would be wise to suspect something in the shop; some potential problems are discussed below.

Respiratory ailments

Health authorities warn that woodworkers should be most on guard against inhaling foreign substances.

To most woodworkers, concern about the cancer-causing potential of wood dust overrides all other health worries. Indeed, this concern appears justified, at least on the surface. Woodworkers are 500 times more likely to have certain types of nasal cancer than non-woodworkers. However, the risk of developing cancer solely through exposure to wood dust is quite low.

"The statistics on cancer in woodworkers can be made to sound quite alarming," says Dr. Julian A. Waller of the University of Vermont Medical School and an authority on health hazards in the arts. "But the actual risk advances only from 'extremely rare' to 'rare.' Only one woodworker in 1,400 will get this cancer, and at that after an average of 40 years of exposure."

Nevertheless, in various health hazard evaluations conducted by the National Institute of Occupational Health and Safety (NIOSH) in Cincinnati, Ohio, investigators have concluded that wood dust is at least a contributing factor in the development of some other types of cancer. In a report prepared after an evaluation of the Cooper Union School of Art in New York City, the Institute cites studies pointing out that "cancers of the larynx, tonsils, tongue and lung have been reported to have resulted from inhalation of wood dust" among furniture workers in England and Sweden.

In addition, the NIOSH report mentions that many researchers have found that the normal functions of the mucous membranes in the nose, throat and lungs were impaired in workers exposed to wood dust for more than ten years.

Among the most recent and thorough research on this problem is a study done by Dr. Samuel Milham, Jr., of the State Department of Social and Health Services in Olympia, Wash. He reviewed the death records of more than 16,000 members of the United Brotherhood of Carpenters and Joiners of America, and found that the results supported the hypothesis that wood contains carcinogens. The study also found an above-average incidence of leukemia and lymphoma among millwrights, lumber workers and cabinetmakers.

Although risk of cancer from exposure to wood does appear to be low for most woodcrafters, the incidence of other forms of respiratory illness is high. At one time or another, virtually all woodworkers have suffered irritation of the upper respiratory tract after breathing sawdust. The condition is usually transient and produces coughing, wheezing and tightness in the chest. Frequently, however, long-term exposure produces "fogged lungs" on X-rays and a type of occupational asthma that can become virtually permanent.

Redwood dust, for example, is the cause of sequoiosis, an acute illness that resembles pneumonia. It usually appears within a few hours after exposure, and its symptoms are shortness of breath, bronchio-constriction, dry coughing, chills, sweating, fever and general malaise. Repeated episodes of this ailment can cause permanent scarring of lung tissue.

Wood dust from another tree, the Western or Canadian red cedar, causes similar symptoms that can develop into asthma or rhinitis, an inflammation of the nasal passages.

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Medical researchers believe the causative agent in red cedar is plicatic acid, which is thought to give the wood its characteristic fragrance. Lumber workers in the Pacific Northwest are frequently affected by cedar dust. One medical case history tells of a 30-year-old worker who could breathe at night only by kneeling on his hands and knees. When he left the woodworking industry, he regained his health.

Another source of respiratory difficulties is the mold and fungus that grow in damp areas of the shop, particularly in piles of sawdust. Mold has also been known to cause serious reactions in skin and fingernails after continuous exposure.

Occupational health experts agree that the obvious and best way to prevent respiratory problems is to cut down the amount of airborne dust in the shop. Although no specific environmental standards for allergenic wood dust have been established by the federal Occupational Safety and Health Administration (OSHA), the American Conference of Governmental Industrial Hygienists has set a provisional (and very low) limit on "nuisance dust" of 5 mg per cubic meter of air space. A few minutes of steady hand-sanding normally produce about 15 mg per cubic meter in the immediate work area; a portable or stationary belt sander will generate about 150 mg per cubic meter. Without ventilation, the dust will remain airborne for hours and spread through the shop.

Skin irritations and allergies

A large number of wood species will produce skin irritation or glandular swelling in sensitive individuals who are directly exposed to their dust, oil or sap. Some woods, such as West Indian satinwood and mansonia, are classified as "primary irritants" because they are highly toxic and are likely to produce skin eruptions or blisters in most people on first contact. Others, such as cocobolo, are "sensitizers" that may cause allergic dermatitis only after repeated exposure.

A number of domestic U. S. woods have been mentioned in medical literature as causing skin irritations, such as hives and rashes, but such skin reactions are actually quite infrequent, occurring in less than 2% of the population. However, the problem becomes much more serious with tropical or exotic woods. A partial list of toxic timbers is given in the box on this page.

Dermatologists who have investigated wood allergies note several common characteristics. Allergic reactions are more pronounced during the summer, or when a person's skin is moist from perspiration, or when the wood dust itself is damp. Reactions are more frequent among persons older than 40. Freshly cut wood is much more likely to be an irritant than older, seasoned wood. Occasionally, a wood species from one geographic area will not affect a woodworker, while the same species grown somewhere else will.

In most cases, it is the heartwood rather than the sapwood that is responsible for skin allergies, and it is the accessory substances, or "extractives," from the heartwood that produce the toxic effects. Extractives are whatever can be leached out of the wood (with water or other solvents) without changing its structure. These powerful chemical components—resins, alkaloids, tannins, acids, salts and gums—vary widely from species to species and even from log to log. In some trees they make up as much as 20% of the wood structure. Most woods contain about 4% to 10% extractives. The effect of extractives can be devastating. One report cited a serious outbreak of dermatitis among workers at an English

Toxic Woods

This list includes woods that are known to cause allergic, toxic, infectious or respiratory reactions. Although researchers point out that not everyone is sensitive to these woods, they warn that woodworkers should be particularly cautious when sanding or milling them. The category "respiratory ailments" includes bronchial disorders, asthma, rhinitis and mucosal irritations; "skin and eye allergies" includes contact dermatitis, conjunctivitis, itching and rashes.

—*S. N. W.*

Respiratory ailments	Skin and eye allergies	
•		Arbor vitae (*Thuja standishii*)
	•	Ayan (*Distemonanthus benthamianus*)
	•	Blackwood, African (*Dalbergia melanoxylon*)
•	•	Boxwood, Knysna (*Gonioma kamassi*)
	•	Cashew (*Anacardium occidentale*)
•	•	Cedar, Western red (*Thuja plicata*)
	•	Cocobolo (*Dalbergia retusa*)
	•	Cocus (*Brya ebenus*)
•		Dahoma (*Piptadeniastrum africanum*)
•	•	Ebony (*Diospyros*)
•	•	Greenheart (*Ocotea rodiaei*)
•		Guarea (*Guarea thompsonii*)
•	•	Ipe [lapacho] (*Tabebuia ipe*)
•	•	Iroko (*Chlorophora excelsa*)
•		Katon (*Sandoricum indicum*)
•	•	Mahogany, African (*Khaya ivorensis*)
	•	Mahogany, American (*Swietenia macrophylla*)
•	•	Makore (*Tieghemella heckelii*)
•	•	Mansonia (*Mansonia altissima*)
•	•	Obeche (*Triplochiton scleroxylon*)
•	•	Opepe (*Nauclea trillesii*)
•	•	Peroba rosa (*Aspidosperma peroba*)
•	•	Peroba, white (*Paratecoma peroba*)
	•	Ramin (*Gonystylus bancanus*)
	•	Rosewood, Brazilian (*Dalbergia nigra*)
	•	Rosewood, East Indian (*Dalbergia latifolia*)
	•	Satinwood, Ceylon (*Chloroxylon swietenia*)
	•	Satinwood, West Indian (*Fagara flava*)
•		Sequoia Redwood (*Sequoia sempervirens*)
•		Sneezewood (*Ptaeroxylon obliquum*)
•		Stavewood (*Dysoxylum muelleri*)
	•	Sucupira (*Bowdichia nitida*)
	•	Teak (*Tectona grandis*)
•	•	Wenge (*Millettia laurentii*)

This information has been taken from:

National Institute of Occupational Safety and Health

International Labor Organization *Encyclopedia of Occupational Safety and Health*

Sculpture in Wood by Jack C. Rich, Da Capo Press, New York, 1977.

"Toxic Woods" by Brian Woods and C. D. Calnan, *British Journal of Dermatology*, Vol. 95, Supplement 13, 1976 (an excellent source on skin reactions to woods, with case histories and an inclusive list of toxic species).