



## Toxic woods

### Woodworking Sheet No 30

#### Introduction

This information sheet is one of a series produced by HSE's Woodworking National Interest Group. Its purpose is to provide information on the reported adverse health effects associated with the more common woods used in commercial quantities within the UK, eg mahogany, oak, pine, teak etc (see Table 2).

The information given is appropriate to users of wood so that suitable precautions may be taken to avoid or minimise ill-health effects.

Inclusion of a wood in Table 2 does not automatically mean its use will result in adverse health effects. Many timbers are used regularly without apparent effect, but this depends upon the species involved, the concentration and extent of exposure, and the levels of toxic agent within the timber, as well as the sensitivity of the user to the wood.

This information sheet does not attempt to provide adverse health effect information for all woods. Other woods not listed in Table 2 may have toxic effects.

#### Classification

Wood is classified into two broad families:

- hardwood;
- softwood.

The classification is botanical and depends on the fine structure of the cells in the wood species. It does not refer to the physical properties of the wood. For example, balsa wood is a hardwood!

#### Wood products

Users should remember that veneers are often made of hardwoods; so are composite materials such as plywoods.

The type of wood making up particle boards, eg chipboard, hardboard, MDF is not always known, but is usually a high proportion of softwood.

#### Toxicity

In bulk, wood is unlikely to give rise to toxic effects. The hazardous forms that may give rise to health risks are:

- dust;
- sap, latex or lichens associated with a wood.

#### Toxic activity

Toxic activity is specific to a wood species. Knowing the exact species is important in establishing what the potential toxic effects may be. Individual wood species (of which more than 100 are commercially important in the UK) are very easily confused. For example, 'rosewood' may be used for up to 30 different species; and an individual species may have up to ten different trade names.<sup>2</sup> An additional difficulty is that trees vary within a species. One specimen may contain low levels of its toxic agent and the next contain much higher levels. So experience may not be a reliable guide.

#### Occupational exposure limits

Under the Control of Substances Hazardous to Health (COSHH) Regulations 2002,<sup>3</sup> both hardwood dust and softwood dust have been assigned maximum exposure limits<sup>4</sup> (MELs) of 5 mg/m<sup>3</sup> (8-hour time-weighted average, total inhalable dust). This means that employers should reduce their employees' exposure as far as is reasonably practicable, but must not in any case exceed the MEL.

#### Ill-health effects associated with wood

(An explanation of medical terms can be found in Table 1.)

#### Skin

The main effect is *irritation*. This can be caused by skin contact with the wood, its dust, its bark, its sap, or even lichens growing on the bark. Irritation can, in some species of wood, lead to nettle rashes or irritant dermatitis. These effects tend to appear on the forearm, backs of the hands, the face (particularly eyelids) neck, scalp and the genitals. On average, they take 15 days to develop. Symptoms usually only persist as long as the affected skin site remains in contact with the source of irritation, eg wood-dust. Symptoms subside when contact with the irritant is removed.

*Sensitisation dermatitis* is more problematic and is usually caused by skin exposure to fine wood dust of certain species. This is also referred to as allergic contact dermatitis and results in similar skin effects to those produced by skin irritants. Once sensitised, the body sets up an allergic reaction, and the skin may react severely if subsequently exposed to very small amounts of the wood dust.

Cross-sensitisation may develop where other woods or even non-wood materials produce a similar response.

### **Respiratory and allied effects**

Wood, especially inhalation of fine dust, can have many effects on the respiratory tract, including:

#### *Nose*

- Rhinitis (runny nose);
- Violent sneezing;
- Blocked nose;
- Nose bleeds;
- Very rarely - nasal cancer (a recognised industrial disease associated with the inhalation of hardwood dusts).

The most common effects arise from *irritation*, where symptoms usually only persist as long as the sufferer remains in contact with the irritant. *Allergic* effects, as a consequence of sensitisation to wood dust can also occur, eg rhinitis.

#### *Lungs*

- Asthma;
- Impairment of lung function;
- Rarely - extrinsic allergic alveolitis (a disease with 'flu-like' symptoms which can cause progressive lung damage), eg when using western red cedar, iroko.

*Asthma* is of particular concern. Most wood dusts can irritate the respiratory tract provoking asthma attacks in sufferers, although effective control of dust levels normally improves the problem.

Some wood dusts can cause asthma as a specific *allergic* reaction. Once sensitised, the body will quickly react if subsequently exposed, even to tiny traces of dust. Unlike irritation, where people can continue to work with the dust once it is controlled to below the level at which irritation occurs, people who become sensitised will not normally be able to continue working with the dust, no matter how low the exposure.

#### *Eyes*

- Soreness;
- Watering;
- Conjunctivitis.

### **Whole body**

Inhalation of some wood dusts can have general (whole body) effects, eg South African boxwood, although this is not usual for the common commercial woods. Many effects have been described including headache, thirst, nausea, visual disturbance, drowsiness, anaemia and hepatitis.

### **Other**

Some studies point to rare adverse health effects, for example: effects on germ cells (eg sperm) and disorders of the lymph system (Hodgkins' lymphoma).

### **Splinter wounds**

Splinter wounds from a number of woods are slow to heal and often turn septic, eg greenheart, mansonia. This is partly due to the species involved and partly due to secondary infections, from bacteria and fungi entering through the skin.

### **Precautions**

- 1 Find out if timbers used have known ill-health effects. Contact your suppliers for information.
- 2 Consider substituting more harmful toxic woods by less harmful ones, eg substitute the more irritating and sensitising SE Asian teak (*Tectona grandis*) with a relatively allergen free teak of the same species grown elsewhere, eg South Africa.<sup>2</sup>
- 3 Provide an effective dust extraction system which will control exposure to wood dust to below the occupational exposure limits.
- 4 Provide suitable respiratory protective equipment where 3 above does not adequately control exposure, or as an interim/emergency measure, eg during maintenance.
- 5 Provide suitable protective clothing to protect susceptible skin areas where timber known to cause skin problems is used. This clothing should be designed so dust does not become trapped between clothing and skin.
- 6 Ensure proper maintenance of any dust extraction equipment and personal protective equipment (PPE).
- 7 Ensure employees are adequately trained in the correct use of dust extraction equipment and PPE.
- 8 Ensure good personal hygiene, which will include thorough washing after exposure to dust.
- 9 Use barrier creams.

### **Health surveillance**

Skin inspections for toxic woods likely to cause dermatitis are normally appropriate. Respiratory function

tests for toxic woods likely to cause occupational asthma may be appropriate. For further guidance see the HSE publications listed in the reference section.<sup>5,6</sup>

**Table 1** Medical terms made simple

<i>Allergen</i>	substance which causes an allergic reaction in the body
<i>Anaemia</i>	lack of haemoglobin in the red blood cells
<i>Asthma</i>	severe breathing difficulties
<i>Cardiac</i>	of the heart
<i>Conjunctivitis</i>	watery or prickly eyes
<i>Dermatitis</i>	skin complaint - itching, drying, cracking
<i>Extrinsic allergic alveolitis</i>	a disease with 'flu-like' symptoms
<i>Hepatitis</i>	infection of the liver
<i>Irritant</i>	something which may cause inflammation
<i>Lesion</i>	a mark on or wound of the skin
<i>Mucosal</i>	membrane lining air passages, eg nose
<i>Photosensitisation</i>	allergic reaction to light
<i>Rhinitis</i>	runny nose
<i>Sensitisation</i>	allergic reaction to a substance which is usually irreversible

## References

- 1 Woodworking Information Sheets WIS1, WIS6, WIS11, WIS12, WIS14, WIS23, WIS33 and WIS 34 HSE Books
- 2 Hausen B *Woods injurious to human health - a manual* W de Gruyter, Berlin 1981 ISBN 3 11 008485 6
- 3 *Control of substances hazardous to health. The Control of Substances Hazardous to Health Regulations 2002. Approved Code of Practice and guidance L5* (Fourth edition) HSE Books 2002 ISBN 0 7176 2534 6
- 4 *Occupational exposure limits: Containing the list of maximum exposure limits and occupational exposure standards for use with the Control of Substances Hazardous to Health Regulations 1999* Environmental Hygiene Guidance Note EH40 (revised annually) HSE Books 2002 ISBN 0 7176 2083 2 and *Occupational exposure limits: Supplement 2003* Environmental Hygiene Guidance Note EH40/2002 HSE Books 2003 ISBN 0 7176 2172 3
- 5 *Health surveillance at work* HSG61 (Second edition) HSE Books 1999 ISBN 0 7176 1705 X
- 6 *Preventing asthma at work: How to control respiratory sensitisers* L55 HSE Books 1994 ISBN 0 7176 0661 9
- 7 Woods B, Calnan C D, Toxic woods *British Journal of Dermatology* 1976 **94** Supplement 13

8 Goldsmith D, Shy C M, Respiratory health effects from occupational exposure to wood dusts *Scandinavian Journal of Work Environment and Health* 1988 **14** (1) 1-15

9 *Timbers - their properties and uses* Timber Research and Development Association (TRADA) leaflet, 2002, section 2/3, sheet 10. Available from TRADA Technology Ltd, Stocking Lane, Hughenden Valley, High Wycombe, Bucks HP14 4ND (Tel: 01494 569602)

10 Orsler R J *Health problems associated with wood processing* Building Research Establishment Information Paper 13/79 1979

11 BS EN 13556: 2003 *Round and sawn timber. Nomenclature of timbers used in Europe*

12 *Softwood dust: Criteria document for an occupational exposure limit* EH65/22 HSE Books 1996 ISBN 0 7176 1087 X

The future availability and accuracy of the references listed in this publication cannot be guaranteed.

## Further information

HSE priced and free publications are available by mail order from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA Tel: 01787 881165 Fax: 01787 313995 Website: [www.hsebooks.co.uk](http://www.hsebooks.co.uk) (HSE priced publications are also available from bookshops and free leaflets can be downloaded from HSE's website: [www.hse.gov.uk](http://www.hse.gov.uk).)

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**This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance as illustrating good practice.**

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**Table 2** More common toxic woods

<i>Timber name/s [ # - used for plywood, \$ - softwood ]</i>	<i>Use</i>	<i>Reported adverse health effects</i>
Abura/bahia Afromosia	furniture, shop-fitting, cladding joinery, furniture, framing, veneers, cladding, boats	vomiting  skin irritation, splinters go septic, nervous system effects
Afzelia/doussie	stairs, doors, floors, cladding	dermatitis, sneezing
Agba/tola	cladding, general uses	skin irritation
Alder	construction, toys, brush handles	dermatitis, rhinitis, bronchial effects
Andiroba/crabwood	interior joinery	sneezing, eye irritation
Ash	joinery, sports goods	decrease in lung function
Avodire	decorative veneers	dermatitis, nose bleeds
Ayan/movingui	doors, windows, furniture	dermatitis
Basralocus/angelique	marine uses, barrels	general unspecific effects
Beech #	furniture, veneers, tool handles, musical goods	dermatitis, decrease in lung function, eye irritation (possibly from bark lichens)
Birch #	furniture, paper and pulp, veneers, flooring	dermatitis on sawing lumber
Bubinga	veneers, turnery, knife and brush handles	dermatitis, skin lesions possible
Cedar of lebanon \$	joinery, garden furniture, gates	respiratory disorders, rhinitis
Cedar (cent/s American) #	cabinets, joinery, panelling, boats, cigar boxes	allergic contact dermatitis
Cedar (western red) \$	indoor and outdoor constructions, shingles, planking, boats, panelling, cladding	asthma, rhinitis, dermatitis, mucous membrane irritation, central nervous system effects
Chestnut (sweet)	furniture, kitchen utensils, fences, gates, veneers	dermatitis (possibly from bark lichens)
Douglas fir #/\$	flooring, joinery, turnery, boats, vats, veneers	dermatitis, splinters go septic, rhinitis, bronchial effects
Ebony	tool handles, musical and sports goods	mucous membrane irritation, dermatitis, possibly a skin sensitiser
Freijo/cordia	interior furniture	possibly a skin sensitiser
Gaboon/okoume #	blockboard, veneers, packing cases, cigar boxes	asthma, cough, eye irritation, dermal effects (hands, eyelids)
Gedu nohor/edinam	furniture, boats, coffins	dermatitis (rare)
Greenheart	marine uses, axe handles, factory flooring, sports goods	splinters go septic, cardiac and intestinal disorders, severe throat irritation
Guarea	boats, furniture and cabinet making	skin and mucous membrane irritation
Gum (southern blue)	packing cases, construction, pulp, fibre-board	dermatitis
Hemlock (western) \$	construction, joinery	bronchial effects, rhinitis
Idigbo #	interior and exterior joinery, furniture	possible irritant
Iroko	construction, bench tops, marine uses, joinery	asthma, dermatitis, nettle rash
Larch \$	construction, fencing stakes, stairs, flooring	nettle rash, dermatitis (possibly from bark lichens)
Limba #	frames, drawer sides, coffins, veneers, furniture	splinters go septic, nettle rash, nose and gum bleeding, decrease in lung function
Mahogany	furniture, cabinet work, boats	dermatitis, respiratory disorders, mucous membrane irritation
Makore #	planks, floors, panelling, doors, furniture, boats	dermatitis, mucous membrane and respiratory tract irritation, central nervous system and blood effects
Mansonia	cabinet making, turnery, sports goods	splinters go septic, skin sensitisation, irritation, respiratory disorders, nose bleeds, headache, cardiac disorders
Maple	flooring, furniture, sports goods	decrease in lung function
Meranti/lauan (various) #	boats, flooring, furniture, joinery	skin irritation
Oak (various)	furniture, joinery, flooring, panelling, barrels	asthma, sneezing, eye irritation
Obeche #	model-making, musical goods, picture frames and rails	skin and respiratory tract irritation, nettle rash, dermatitis (handling articles), feverish, sneezing, wheezing
Opepe	construction, marine uses, flooring	dermatitis, mucous membrane irritation, central nervous system effects eg giddiness, visual effects; nose bleeds and blood spitting
Padauk	turnery, carving, boats, flooring	species-dependant: itching, eye irritation, vomiting, swelling (eg eyelids)
Peroba	construction, joinery, turnery	skin and mucous membrane irritation; systemic effects eg headache, nausea, stomach cramp, weakness, blisters
Pine (many species) #/\$	construction, stairs, doors, furniture, pallets	skin irritation (may cause photosensitisation); decrease in lung function
Poplar #	shelves, toys, matches, pallets, wood wool	sneezing, eye irritation, may cause blisters
Ramin	furniture, mouldings, toys, joinery	dermatitis (possibly from bark)
Rosewood (many species)	furniture, cabinets, musical goods, jewellery	dermatitis, respiratory disorders. Effects may arise from handling wood
Sapele #	furniture, mouldings, flooring, veneers	skin irritation
Spruce (several species) #/\$	construction, telegraph poles, packings, pallets	respiratory disorders, possible photosensitisation
Teak	marine fittings, joinery, scrubbing towers	dermatitis (potent, even after seasoning) nettle rash, respiratory disorders
Utile	furniture, cabinet making, veneers, mouldings	skin irritation
Walnut (not African)	furniture, fancy goods, gun-stocks, veneers	sneezing, rhinitis, dermatitis from nut shells and roots
Wenge	panelling, furniture, kitchens, veneers	splinters go septic; dermatitis, central nervous system effects eg giddiness, drowsiness, visual disturbance, abdominal cramps
Whitewood (American)#	construction, flooring, joinery	dermatitis
Yew \$	carving, turnery, cabinet making, sports goods	dermatitis, systemic effects eg headache, blood pressure drop, cardiac effects