

Toxic woods

HSE information sheet

Woodworking Sheet No 30 (Revision 1)

Introduction

This information sheet provides employers and operatives with information on the reported adverse health effects associated with the more common woods used in commercial quantities within the UK, as detailed in Table 2. This will help you take suitable precautions so that you can avoid or minimise their 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 any problems but this will depend on:

- the species involved;
- the concentration and extent of exposure;
- the levels of toxic agent within the timber;
- the sensitivity of the user, or the chance of developing sensitivity to the wood.

This information sheet does not provide adverse health effect information for all woods. There are other woods that are not listed in Table 2 that may also 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

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

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

The hazardous forms of wood that are most likely to cause health risks are:

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

Toxic activity

Toxic activity is specific to a wood species, so knowing the exact species is important in establishing what the potential toxic effects may be. It is easy to confuse individual wood species (of which more than 100 are commercially important in the UK). For example, the term 'rosewood' may be used for up to 30 different species; and an individual species may have up to ten different trade names.¹

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.

Workplace exposure limits

Under the Control of Substances Hazardous to Health Regulations 2002 (COSHH),² both hardwood dust and softwood dust have been assigned workplace exposure limits (WELs) of 5 mg/m³ (8-hour time-weighted average, total inhalable dust). Both hardwood dust and softwood dust are respiratory sensitisers and hardwood dusts are listed in Schedule 1 of COSHH as carcinogenic. This means you must reduce exposures to levels 'as far as is reasonably practicable' but they must not in any case exceed the WEL.

Ill-health effects associated with wood

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

Skin

The main effect is **irritation** that can be caused by skin contact with:

- the wood;
- its dust,
- its bark (or even lichens growing on the bark);
- its sap.

Irritation can, in some species of wood, lead to nettle rashes or irritant dermatitis. These effects, from direct contact or cross-contamination to other parts of the body by hand, 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 such as the wood dust or sap etc. 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. However, once sensitised the body sets up an allergic reaction and the skin may react severely if subsequently exposed to even very small amounts of the wood dust. Rashes can appear on skin well away from the original point of contact.

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 and are often very similar to the irritant effects.

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 or iroko.

Asthma is of particular concern. 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 (eg western red cedar) 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 unless:

- respiratory protective equipment (RPE),³ such as air fed respirator, is worn which provides suitable and adequate protection to prevent symptoms of sensitisation recurring;
- more frequent health surveillance is undertaken.

Eyes

- Soreness.
- Watering.
- Conjunctivitis.

Whole body

Inhalation of some wood dusts can have general (whole body) effects, eg South African boxwood, although this is rare and 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 very rare adverse health effects, for example effects on germ cells (eg sperm) and disorders of the lymph system (Hodgkin's 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 the timbers you use have known ill-health effects – contact your suppliers for information.
- 2 Consider substituting more harmful toxic woods with 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.²
- 3 Use effective local exhaust ventilation⁴ (LEV) to control exposure to wood dust at source to below the WEL.
- 4 Use suitable respiratory protective equipment (RPE) where your LEV does not adequately control exposure, or as an interim/emergency measure, eg during maintenance.
- 5 Use suitable protective clothing and gloves, where appropriate, to protect exposed skin areas where timber known to cause skin problems is used. This clothing should be designed so dust does not become trapped between your clothing and skin.
- 6 Make sure that your LEV and personal protective equipment (PPE) is properly maintained.
- 7 Make sure that everyone who uses the LEV, RPE and other PPE has been trained to use it correctly.
- 8 Make sure that there is good personal hygiene in place and adequate washing facilities for use before breaks and after work.
- 9 Use after-work conditioning creams to help prevent the development of occupational contact dermatitis.

Health surveillance

Employers are legally required to provide health surveillance for their employees when it is appropriate to protect their health. It needs to be properly organised and based on a risk assessment and managed by a competent person. This is so that appropriate action(s) can be taken if/when an early case of occupational disease is identified.

Skin inspections for woods likely to cause dermatitis are normally appropriate. Respiratory function tests for woods likely to cause occupational asthma also may be appropriate.

For more information see 'References' and 'Further reading'.

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

Table 2 More common toxic woods

Timber name(s) [# – used for plywood, \$ – softwood]	Use	Reported adverse health effects
Abura/bahia	furniture, shop-fitting, cladding	vomiting
Afrormosia	joinery, furniture, framing, veneers, cladding, boats	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)

Timber name(s) [# – used for plywood, \$ – softwood]	Use	Reported adverse health effects
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

References

1 Hausen B *Woods injurious to human health – a manual* W de Gruyter, Berlin 1981

2 *Control of substances hazardous to health (Fifth edition). The Control of Substances Hazardous to Health Regulations 2002 (as amended). Approved Code of Practice and guidance L5* (Fifth edition) HSE Books 2005 ISBN 978 0 7176 2981 7
www.hse.gov.uk/pubns/books/L5.htm

3 *Selection of respiratory protective equipment suitable for use with wood dust* Woodworking Information Sheet WIS14(rev1) HSE 2012
www.hse.gov.uk/pubns/WIS14.htm

4 *Wood dust: Controlling the risks* Woodworking Information Sheet WIS23(rev1) HSE 2012
www.hse.gov.uk/pubns/WIS23.htm

Further reading

EH40/2005 Workplace exposure limits: Containing the list of workplace exposure limits for use with the Control of Substances Hazardous to Health Regulations (as amended) Environmental Hygiene Guidance Note EH40 (Second edition) HSE Books 2011 ISBN 978 0 7176 6446 7
www.hse.gov.uk/pubns/books/EH40.htm

Health surveillance at work HSG61 HSE Books 1999 ISBN 978 0 7176 1705 0
www.hse.gov.uk/pubns/books/HSG61.htm

Woods B, Calnan C D 'Toxic woods' *British Journal of Dermatology* 1976 **94** Supplement 13

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

Timbers – their properties and uses Timber Research and Development Association (TRADA) leaflet 2002, section 2/3, sheet 10

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

HSE's Woodworking website has more information on wood dust www.hse.gov.uk/woodworking/

See also the HSE COSHH website www.hse.gov.uk/coshh/index.htm and asthma website www.hse.gov.uk/asthma

Further information

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit www.hse.gov.uk/. You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

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