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Preserving Timber

KEYWORDS

creosote
decay

preservatives
solvent

toxic
vacuum

Timber needs to be protected from:

- Wear and tear
- Effects of weathering
- Attack by insects and fungi

Timber preservation

Work that is done to extend the useful life of timber and timber products.

Wood preservatives are chemicals that are used on timber to prolong its life and to protect it against decay by fungal and insect attack. Usually, softwood is preserved and used as an alternative to more durable hardwoods. The softwood decays more easily as it contains a lot of sapwood.

Preservatives used on cheaper softwood keep costs down and also help to conserve hardwood trees and tropical hardwoods that take longer to grow. It is wiser to use properly treated home grown softwoods than costly imported hardwoods.

PRESERVATIVE TYPES

The three main forms of preservative are:

- Tar oil preservatives
- Water-borne preservatives
- Solvent-based preservatives

These preservatives can protect the timber in two ways. Firstly, they give physical protection by stopping fungi and insects getting at the wood. Secondly, they give chemical protection, making the wood poisonous to insects and fungi. Paint, for example, gives excellent physical protection.



Different types of preservative



Tar oil preservative

Creosote was perhaps the most important of these preservatives. It had been in use since the 1830s, but it is now banned, although a substitute is now available. This is used for the pressure treatment of telegraph poles.

Tar oils are made from coal tar and other chemicals. They are applied by brushing, spraying, dipping and pressure treatment. Tar oils are very toxic and not suitable for indoor use.



Telegraph poles have to be treated with oil preservative to ensure long life

Advantages	Disadvantages
<ul style="list-style-type: none">● Cheap and plentiful● Highly toxic to insects and fungi● Penetrate the timber well● Permanent, they are not easily washed out of the wood (leaching)	<ul style="list-style-type: none">● Strong smell● Toxic to plants● Cannot be painted over unless well weathered● Not suitable for indoor use

Water-borne preservatives

Water-borne preservatives are made from various toxic salts that are dissolved in water. The applied to the wood. When the water dries out, the toxic salts remain. Chemicals such as chrome arsenates (CCA) and borates are used as preservative salts. These are particularly good for protecting softwoods in damp conditions. Water-borne preservatives are usually pre-impregnated, although they can be applied by other methods.

Advantages	Disadvantages
<ul style="list-style-type: none">● Timber is clean after treatment● No bleeding (such as occurs with oil in hot weather)● Generally colourless● Timber can be painted after treatment● Not a fire hazard and can be combined with fire-retarding chemicals● Are usually odourless and so can be used indoors	<ul style="list-style-type: none">● Many types can be washed out of the wood● Timber needs to be dried out by kiln air seasoning after treatment● Can cause distortion and swelling due to the water● Do not protect against weathering effects

Solvent-based preservatives

Solvent-based preservatives are toxic substances that are dissolved in a solvent other than water. Usually this is an oil solvent, which is easily evaporated (e.g. white spirit). After treatment the solvent evaporates, leaving the preservative in the wood. This type of preservative penetrates the wood well because of the light oil solvent.

Advantages	Disadvantages
<ul style="list-style-type: none"> ● Resistant to leaching ● Suitable for indoor and outdoor use ● Can be painted over after the solvent has evaporated ● Usually do not stain ● Not corrosive to metals ● Penetrate the timber well 	<ul style="list-style-type: none"> ● Can be a fire hazard ● Can have a strong smell ● More expensive than other types

Safety

- All preservatives must be handled with care
- Read the manufacturer's instructions thoroughly
- You should wear all the appropriate protective clothing
- The environment must be protected also – ensure correct disposal of preservative containers

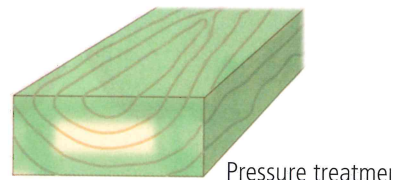
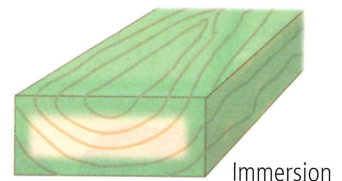
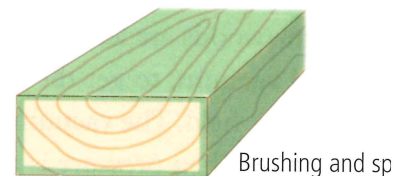
METHODS OF APPLICATION

There are a number of different methods of applying preservatives: brushing and spraying, immersion and pressure treatment. The type of method used will depend on:

- The degree of preservation required
- The amount of timber to be treated
- The time and cost of that treatment

Brushing and spraying

Preservatives can be applied using a brush or a spray gun. These methods are easy to use and cheap. It is necessary, however, to reapply the preservative regularly because it does not penetrate deep into the wood. Creosote substitute and solvents can be applied this way.



Penetration effect of different application methods



Applying preservative – protective gloves and glasses should be worn



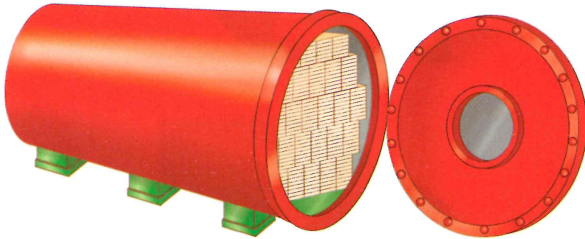
Immersion/dipping

The wood is placed into a container of preservative. The wood soaks up the preservative quickly. The immersion process penetrates better than brushing. Heating the preservative helps it to soak into the wood more effectively. Often the ends of fence posts are treated in this way a couple of days, using creosote substitute, before they are placed into the ground.

Pressure treatment

The most effective method of applying preservative is by forcing the preservative into the wood under pressure. This pressure can come from inside (vacuum) or outside (pressure). The timber is put into a treating cylinder. The air is sucked out of the cylinder and held for a few minutes to let all the air come out of the wood.

Some woods are less permeable to air than others, so these are held for a longer time in partial vacuum, to get the air out. The cylinder is then flooded with preservative while vacuum is held. The vacuum is released, allowing the preservative to take the place of the air in the wood. Then pressure is applied, forcing the preservative into the wood. A final vacuum is applied for a short time to remove any excess preservative. This is done so that no preservative is wasted.



Pressure treatment cylinder



The fence posts have been pressure treated with preservative



Exercises

- 1 What are the causes of wood decay?
- 2 Which types of wood are generally more resistant to decay?
- 3 Why is it necessary to protect timber from the weather?
- 4 Wood preservatives can be divided into groups. Make a list of these groups.
- 5 Why should creosote substitute be used only outdoors?



Exercises

- 6 Make a list of the different preservative treatments to be found in a hardware store.
- 7 List two safety precautions you should observe when using preservatives.
- 8 In each of the examples below, state which type of preservative you would use.
 - (a) Garden fence
 - (b) Bird table
 - (c) Patio seat
 - (d) Picnic table
 - (e) Window box
 - (f) Telegraph pole
- 9 How does timber preservation help to conserve the worldwide tree population?
- 10 Recommend a suitable preservative for a garden shed and describe a method that could be used to apply it.
- 11 List three advantages and three disadvantages of solvent-based preservatives.

Exam Question

- 1
 - (a) When wood is used in external situations it is normally treated with a preservative. State two reasons for the use of preservatives and names of two classes of preservatives.
 - (b) Name three methods of applying preservatives and state one advantage and one disadvantage of each method.
(JC, HL, 2006)

Web Links

www.buildingpreservation.com/Surface%20applied%20preservatives.htm

www.ronseal.co.uk/howto/fence_spray.jsp