FAQ's

What is preservation of timber? How does preservation of timber work?

Preservation means protecting wood, wood products or timbers from deterioration, decomposition or damage due to pest attacks through application of chemical substances. Wood is usually deteriorated by fungi, insects (termites, beetles), marine borers, and a host of other agents. Purpose of Preservation is to extend the useful life of the timber. Timber is to be seasoned well before application of preservatives.

Preservatives works to protect the timber in two different ways

1. Physical protection - preservatives which come under his category create a physical barrier between the timber and the decay causing agents like fungus/insects so that they are not able to attack on timber
2. Chemical protection – preservatives which come under his category usually impregnate into the timber come makes wood poisonous for the insects or fungus.

What are the different types of timber preservatives available in market?

Three types of preservatives are commonly used for treatment of timber.

1. Water-based– examples are:
    1. Copper Chrome Arsenic [CCA]
    2. Alkaline Copper Quaternary [ACQ]
    3. Copper Azole [CuAz, TanE]
2. Solvent-based– examples are:

. Light Organic Solvent Preservative [LOSP]

3. Oil-based– examples are:

. Creosote

a. Pigment Emulsified Creosote [PEC]

Water-borne chemical solutions comprise a mixture of water soluble compounds of copper and other chemicals. In the treatment of rural fence posts, other chemicals can be included in the formulation to prevent glowing and smouldering of the wood after a fire.

Solvent based chemicals, such as LOSP, are solutions of fungicides, insecticides and in some cases water repellent chemicals. *White spirit* is the solvent commonly used for LOSP formulations.

Oil borne preservatives such as creosote and pigment emulsified creosote are a complex mixture of chemicals obtained from the distillation of coal tar. Being a liquid it is normally used without the addition of a solvent. Fuel oil however is sometimes added to facilitate the treatment of railway sleepers.

Discuss few timber preservatives?

The following are the widely used preservatives:

1. Tar
2. Paints
3. Chemical salt
4. Creosote
5. ASCO

1. TAR

Hot coal tar is applied to timber with brush. The coating of tar protects the timber from the attack of fungi and insects. It is a cheapest way of protecting timber. Main disadvantage of this method of preservation is that appearance is not good after tar is applied it is not possible to apply other attractive paints. Hence tarring is made only for the unimportant structures like fence poles.

2. PAINTS

Two to three coats of oil paints are applied on clean surface of wood. The paint protects the timber from moisture. The paint is to be applied from time to time. Paint improves the appearance of the timber. Solignum paint is a special paint which protects the timber from the attack of termites.

3. CHEMICAL SALT

These are the preservatives made by dissolving salts in water. The salts used are copper sulphate, masonry chloride, zinc chloride and sodium fluoride. After treating the timber with these chemical salt paints and varnishes can be applied to get good appearance.

4. CREOSOTE

Creosote oil is obtained by distillation of coal tar. The seasoned timber is kept in an air tight chamber and air is exhausted. Then creosote oil is pumped into the chamber at a pressure of0.8 to 1.0 N/mm2 at a temperature of 50°C. After 1 to 2 hours timber is taken out of the chamber.

Discuss the various methods of applying preservatives on timber.

PRESSURE METHODS

The application of pressure to force preservative into the wood in a pressurized cylinder is still the most efficient way of treating timber and obtaining good absorption values. It is done in a commercially supplied pressure plant equipped with pressure cylinder, gauges, storage tank, vacuum and pressure pumps. Pressure methods are the most effective for the majority of types of preventive application of wood preservatives and are more amenable to control than most of the alternatives.

The conventional processes bear names such as double vacuum, empty cell, and full-cell processes, depending on the process variables used. It is usually desirable to obtain deep penetration, without an excessive loading of preservative. An initial pressure, or at least an absence of vacuum, coupled with a final vacuum to withdraw most of the excess preservative fluid from the cell cavities, is the normal way of achieving this end, although double vacuum schedules perform similarly. For very high hazard situations, where leaching is inevitable, full-cell processes are required. In this case, some of the air in the wood cells is evacuated before the pressure phase, so that it does not force out the preservative fluid on release of the main pressure application. All pressure processes require specialised plant, skilled operation and efficient supervision of the preparation and treatment of the timber.

IMMERSION METHODS

This category is often arbitrarily divided into ‘dipping’ and ‘steeping’ with a dividing duration of about ten minutes. Higher loadings of preservative chemical and deeper penetration result from longer immersion but the benefits do not increase in direct proportion to time. Most of the absorption occurs in the first few minutes, but deep penetration, particularly into end grain, requires up to one or several hours, depending on the size and species of timber. The method has the merit of being simple and requiring a minimum of equipment but its very simplicity makes it a difficult process to control, where more than a quick `in and out’ treatment is called for, eg sap stain control. Automatic immersion systems, which ensure that the whole load is submerged, with tamper-proof duration control, are available.

Immersion treatments are suitable for water-borne preservatives, as well as for appropriately formulated LOSP products. They are used effectively for sap-stain control, fence posts, building timbers and joinery, when the appropriate preservatives and durations are used.

Hot and cold treatments, are a development of immersion treatments. Soaking in hot solution, to expel air from the timber, is followed by immersion in cold preservative, or cooling down,

when atmospheric pressure forces liquid deeper, and at higher loadings, than would be achieved by straight immersion. Fence posts and other agricultural timbers are the main commodities treated by these processes.

BRUSHING AND SPRAYING

Brushing and spraying are the least effective methods of applying wood preservatives. The amount of preservative chemical loaded into the timber is generally small, but is greater for rough-sawn surfaces than for planed ones. For in-situ remedial treatment, these methods may provide the only practical option, and their effectiveness must be maximised by formulation, use of penetrating solvents, and liberal and possibly repeated application.

Spraying is also appropriate for the short-term protection of logs in the forest or at storage sites. Here again, accessibility dictates the process, but only a superficial layer is required for protection, and the volatilisation losses of the preservative, which are most severe from the first 1 - 2 mm of treated timber, are not too significant. The main difficulty with this form of treatment is control of the process and ensuring total coverage.

The only case where such superficial methods can be considered to give a useful degree of long-term protection is when they are periodically renewed as a maintenance procedure. This limits them to accessible timbers out of ground contact. Even in these cases, a more effective initial treatment is usually a more satisfactory solution.

Discuss fire resistance in Timber.

While timber is indeed a combustible material, in construction it has significant insulating properties and burns in a slow, predictable and measurable way. These factors see timber perform strongly against fire and give designers the ability to confidently create strong, durable, fire resistant timber constructions.

When exposed to the heat of a fire, timber goes through a process of thermal breakdown into combustible gases. During this process, a layer of charcoal forms on the burning surface of the timber and it is this charred layer that is the key contributing factor in timber's fire resistance. The layer acts as an insulator protecting the inner core of the timber, making it resist heat penetration and thus burn more slowly; while the temperature of the inner, uncharred core remains low, enabling it to continue to carry its load. Initially the rate of charring is fast but as the char depth increases it provides a stronger protective layer to the timber, slowing the overall combustion rate.

The self protecting nature of the charring layer increases the likelihood of a timber structure surviving fire as the uncharred inner core remains unaffected, maintaining its strength and with it the structure's stability.