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TREATED WOOD FOR HOUSES

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TREATED WOOD FOR HOUSES

By

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A wooden building properly constructed and intelligently maintained is in little danger from either decay or insect attack and will give indefinitely long life at low annual cost. On the other hand a wooden building constructed in defiance of the well known principles of good building practice can deteriorate fairly rapidly and be a heavy expense to its owner. The important precautions for preventing damage by decay and termites are to keep the wood dry at all times and away from contact with the ground, and, in termite infested territory, to insulate the wood completely from the ground by the metal termite shields recommended by the U. S. Bureau of Entomology and others, or by any other means of insulation that will accomplish the same purpose. These precautions, properly carried out, will prevent damage by termites and decay, without the use of preservatives. In some localities it may be necessary to take additional measures against the entrance of dry wood termites, as recommended by the California committee and the Bureau of Entomology, but in most parts of the country this is not necessary. When it is not practical to observe these precautions the use of preservatively treated wood is important for the parts of the building in danger of attack.

Wood preservatives may be classed roughly into three general groups having the distinguishing characteristics and general properties indicated below:

1. Preservative oils.--This group comprises preservative oils of the creosote class, including coal tar creosote and its mixtures with petroleum or tar, wood tar creosote, water gas tar creosote, and products of generally similar character. Coal tar creosote is the most effective wood preservative known the world around but, unfortunately, its color, odor, and unsatisfactory painting properties limit its usefulness for treating house lumber. It is being used successfully, however, for the sills, floor joists, first floor subflooring and similar parts of a considerable number of houses in California and elsewhere, with little or no objection on account of odor. Since these parts do not require painting and are for the most part concealed the color and unpaintability cause no inconvenience. Carpenters do not enjoy handling creosoted wood, however, and do not favor its use. Carelessness in nailing untreated finish lumber to creosoted wood may result in the staining of finish lumber by the creosote following along the nails. In short, creosoted wood can be used with entire

success by those who desire to take advantage of its high effectiveness but it must be used with care.

2. Water borne preservatives.--This group includes the various salts that are dissolved in water and injected into the wood in this form, particularly zinc chloride, zinc meta arsenite, and Wolman salts. The water must be removed by thorough seasoning after treatment to avoid the shrinkage troubles that result from installing unseasoned wood in buildings. The seasoned wood is clean, paintable, odorless, and generally suitable for use in any part of a building. Salts that are soluble in water will gradually leach or dissolve out of wood in contact with wet ground or frequently exposed to water. Some salts leach less rapidly than others but no preservative salt now in common use is immune to leaching. On the other hand, there is little danger of leaching from lumber in buildings and no sound basis for the exaggerated fears that seem to be prevalent. Leaching takes place only in the presence of liquid water. Fog and damp air do not cause leaching unless they result in condensation and dripping of water over the treated wood.

3. Toxic chemicals in volatile, nonaqueous solvents.--This group is of much more recent development than groups 1 and 2. It results from the demand for a preservative that can be applied to finished wood products "in the white," without causing swelling and distortion of the wood or interfering with subsequent finishing. Such preservatives consist essentially of a highly toxic chemical dissolved in some cheap, volatile, organic solvent, such as Stoddard's solvent. Other compounds may be included in the formula for special purposes. The concentration of the toxic compound in the solution varies according to the ideas of the manufacturer and perhaps, in accordance with the toxicity of the individual chemicals. A commonly used concentration is 5 percent by weight.

The convenience of these preservatives is obvious, for they are commonly applied by nonpressure methods and do not require kiln drying or long air drying after treatment. The solvent is inflammable and the treating and the subsequent evaporation of the solvent from the treated wood must be carried out with due regard to the fire hazard involved. After the solvent has evaporated from the treated wood, however, the fire hazard is practically no greater than that of untreated wood.

Extravagant claims are sometimes made as to the penetrating properties of preservatives of this type and mere surface treatments may be recommended as sufficient. Such claims should be heavily discounted. Substantial absorption and deep penetration are required with these as with other preservatives and they cannot be obtained by superficial methods of application.

It is a rather common belief that the effectiveness and dependability of a preservative can be determined by a few laboratory tests. Unfortunately this is not true. Laboratory tests can be made that give very interesting and useful information and may show at once that a chemical proposed as a preservative is worthless. On the other hand, if a preservative gives favorable results in laboratory tests it must still demonstrate what it can do in actual use before it can be fully relied upon. There is no laboratory test that takes the place of service tests and no standard series of laboratory tests by which to measure a new preservative. This situation makes the introduction of new preservatives slow and difficult and is very discouraging to intelligent promoters who believe sincerely in the value of their preservatives and are honestly promoting them.

Perhaps the first laboratory test to make on any new preservative is to determine its toxicity to fungi. This is a purely comparative, empirical test and the results vary according to the fungus used and the details of the test method employed. The results cannot safely be converted into terms of the amount of chemical required per cubic foot of wood or into years of life expectancy. The results are useful, however, when compared with results obtained in exactly the same way from preservatives whose effectiveness is known from long experience.

Toxicity tests against termites are more difficult to make and more uncertain in their meaning than toxicity tests against fungi. The chief difficulty is to determine how much of the apparent effect of the chemical on the termites results from the toxicity of the chemical and how much from the abnormal conditions under which the imprisoned termites are made to live. Some pioneering work was done by the California Termite Investigations Committee in devising a test and very interesting results were obtained but the extent to which the results may be applied in practice is uncertain.

Another laboratory test of some value is resistance to leaching. This consists in soaking small specimens of treated wood in water for long periods of time. Analysis of the leaching water from time to time, or analysis of the wood after leaching gives an indication of the rate at which the chemical dissolves out of the wood. There is no standard leaching test, each investigator using the conditions he considers most suitable, hence the results obtained by various investigators can seldom be compared. Furthermore, the leaching conditions employed are usually very much more severe than the conditions to which wood in a building is exposed. The results of the test do not show how long a preservative will protect wood in actual service but they can be made to show how different preservatives compare with each other under the conditions of the test.

Complete resistance to leaching is not necessary, even in a preservative that may be used in contact with the ground, for long

experience has shown that a preservative as leachable as zinc chloride can protect railroad ties for many years in actual service. It is necessary for a preservative to be soluble enough to make the wood poisonous to the attacking organisms. A completely insoluble material would not be a preservative. Nevertheless, for preservatives to be used in contact with the ground, resistance to leaching is highly important and should be given considerable weight.

Other laboratory tests can be made to study the extent to which the proposed preservative is volatile, chemically stable, corrosive to metal or injurious to wood, safe from the standpoints of fire or health, and various other special properties that may be required in certain fields of use. All of these properties are important and failure to make good in some of them may cause a proposed material to be generally rejected. Favorable results in all of them, however, do not establish the degree of effectiveness or reliability of any new material.

In view of the great importance of accurate service records as a court of final appeal in evaluating preservatives, far too little attention is given to the subject by both producers and consumers of preservatives. Undoubtedly this situation merely reflects the great difficulty of obtaining adequate service records in convincing volume. Most users of preservatives seem content with the knowledge that their wood has been treated and make no effort to keep records on the results they obtain. Railroads and other companies that use large quantities of treated wood have so much money invested in preservatives that it pays them to watch results carefully and keep alert for opportunities to develop improvements in cost or effectiveness. As a result many valuable records are available on the life of railway ties, poles, piling and similar structural material treated with the older preservatives. Very few records are available, however, on wood treated with any preservative and used in buildings. Until such records become available preservatives for lumber for buildings must be chosen on the basis of performance in other uses, laboratory tests, and/or faith in the integrity and scientific knowledge of the promoters.

The treating problem does not end with the choice of the preservative. For a preservative to provide satisfactory protection it must not only be of suitable quality but it must be thoroughly impregnated into the wood in adequate quantity. Claims to the contrary notwithstanding, it is too much to expect brush, spray, or dip applications of even the best preservatives to give long life to wood exposed to conditions that favor rapid decay or heavy termite attack. Such superficial treatments do not penetrate deeply. They provide an outer envelope of treated wood so thin that it is easily abraded or checked through and both termites and decay can readily find and penetrate the weak spots. Surface treatments may sometimes be used to advantage but they are not to be relied upon for the protection of valuable buildings exposed to serious attack by decay and termites. Pressure treatment, skillfully applied, or at least a

substantial absorption and distribution of preservative are required for best results. Hot and cold bath treatment may sometimes be used as a substitute for pressure treatment but is likely to be less effective.

The lumber should not be cut into after treatment if that can possibly be avoided. Cutting after treatment may expose untreated wood to attack and thus defeat the purpose of the treatment. The simple method, but not the best, is to purchase the treated lumber in the usual commercial lengths and have it cut to size on the job. A little planning by the architect and a little cooperation on the part of the lumber dealer or treating plant operator, however, can provide treated material that does not need to be cut into on the job. When cutting into untreated wood cannot be avoided the cut faces should be protected by brush application of a suitable preservative but the penetration obtainable in this way is too slight to repair the damage entirely.

A major difficulty in the way of house builders desiring to use treated lumber is the inaccessibility of the treated material to most prospective users. In a few localities, due to the proximity of treating plants or of lumber yards that carry stocks of treated material, it can be obtained as required. In other localities it is necessary to make a special order of the treated material and have it shipped in by a treating plant or jobber. This may be both inconvenient and expensive and is likely to discourage the builder from using treated wood. Everything possible should be done by lumber treaters and lumber dealers to make treated lumber economically accessible wherever lumber is sold. This is not easy to accomplish and progress is likely to be slow. In the meantime the prospective builder who cannot conveniently obtain treated lumber may still erect a durable building if he will but obey the rules of good building practice. Most decay and termite damage in buildings can be traced directly to disobedience of these laws.