Wood Preservation of Timber Products
Michigan State University Cooperative Extension Service
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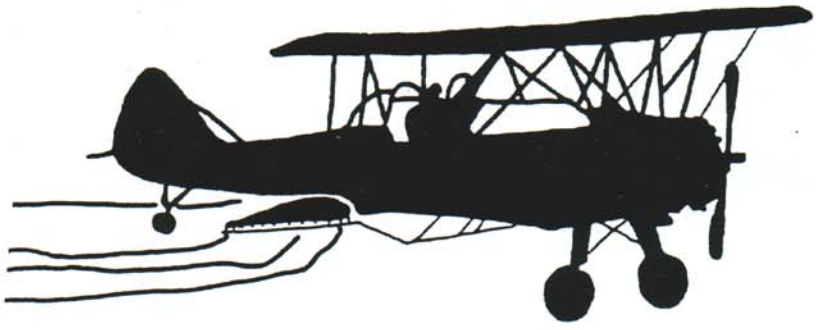
WOOD PRESERVATION OF TIMBER PRODUCTS

Category 2A



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P R E F A C E

This manual is intended to assist pesticide applicators prepare for certification under the Michigan Pesticide Control Act of 1976. The manual was prepared by Ms. A. E. Brown, Department of Entomology, Michigan State University, with the help of Mr. R. L. Mesecher and Mr. C. Dollhopf, Plant Industry Division, Michigan Department of Agriculture; Dr. E. A. Behr, Department of Forestry, Michigan State University; Dr. D. D. Nicholas, School of Forestry and Wood Products, Michigan Technological University, and Mr. D. Kaufman, John A. Biewer Company.

A list of self-help questions and instructions for completing the questions are at the end of the manual. If you encounter difficulties in using the manual, please consult your county agricultural extension agent or representative of the Michigan Department of Agriculture for assistance.

Some suggestions on studying the manual are:

1. Find a place and time for study where you will not be disturbed.
2. Read the entire manual through once to understand the scope and form of presentation of the material. You may want to underline important points in the manual or take written notes as you study the manual.
3. Answer, in writing, the self-help questions at the end of the manual. These questions are intended to aid you in your study and to help you evaluate your knowledge of the subject. As such, they are an important part of your study.
4. Reread the manual once again when you have finished studying it. Review with care any sections that you feel you do not fully understand.

This manual is intended to help you use pesticides effectively and safely when they are needed. We hope that you will review it occasionally to keep the material fresh in your mind.

INTRODUCTION

Wood preservatives are chemicals applied to wood to protect it from attack by decay fungi, harmful insects, or marine borers. The cut ends of timbers most often allow decay to begin. The degree of protection obtained depends on the type of preservative used and the thoroughness of the method of treatment. Good wood preservatives, properly applied, substantially increase the useful life of wood structures.

Wood preservatives differ in their effectiveness and in their adaptability to certain use requirements. Some methods of application ensure better penetration than others. There is also a difference in the treatability of various woods, especially of their heartwood, which generally resists preservative treatment more than sapwood.

Wood preservatives may be divided into two general categories: oils, and waterborne salts applied as liquids.

PRESERVATIVE OILS

Oil-based wood preservatives are generally resistant to leaching and thus suitable for wood to be used outdoors. However, these preservatives may adversely influence the cleanness, odor, color, paintability, and combustibility of the treated wood. They do not cause the wood to swell.

Coal-Tar Creosote

Coal-tar creosote is a yellowish to dark brown oily liquid made by distilling coal tar. The structure is somewhat variable, depending on the source of coal and on the operation conditions.

Uses: Coal-tar creosote is highly toxic to wood-destroying organisms. It is also relatively insoluble in water, which gives it a high degree of permanence in wet locations. Creosoted wood may be used for structural timbers outdoors, or for marine protection.

Methods of application: the mixture may be applied by brushing or spraying it onto the wood, or by immersing the timber into a bath (dipping). If the wood

will be on or in the ground, or used for marine protection, a brush or spray treatment does not provide much protection. Most creosote is impregnated into wood by pressure injection.

Disadvantages:

- Creosote has an unpleasant odor. Food should not be stored near treated wood to prevent it from picking up the odor. Vapors are harmful to growing plants.
- It is a potent skin and eye irritant.
- The color of creosote and the fact that wood treated with it usually cannot be painted satisfactorily make it unsuitable where appearance and paintability are of major importance.

Safety: Protective clothing should be worn during application and while working with freshly creosoted timber. Freshly creosoted wood can be ignited easily and will burn readily. Ordinary precautions should be taken to prevent fires until the volatile part of the oil has evaporated. This can take several weeks in warm weather.

Pentachlorophenol

Pentachlorophenol, also called PCP or penta, is a buff-colored crystal. Products sold as wood preservatives consist of pentachlorophenol and various types of petroleum oils. The performance of these solutions is influenced by the character of petroleum oil used.

Uses: Penta is very effective against decay fungi and termites. There are formulations that can be used under paint or varnish. Labels indicate any limitations of use.

Methods of application: Penta may be brushed on wood, or timbers can be dipped. Spraying is not usually recommended due to danger of drift. Some formulations are to be injected under pressure; these should be used if the wood is to be in or on the ground. Sprayers used for penta application should not be used for applying other pesticides.

Disadvantages:

- Penta solutions have an unpleasant odor due to certain oils used as solvents. This may make it undesirable to use certain penta solutions inside a structure inhabited by people or animals.
- It is a strong irritant of the skin and mucous membranes (eyes and nose).

Disadvantages: (Continued)

- While wet, penta will kill plants. Make sure all living plants are kept away during this period. Commercially treated wood stays wet for a long time.
- Penta is highly corrosive to some sprayer parts.
- Penta may seep out over many months, increasing exposure to livestock and food supply. This is referred to as "bleeding."

Safety: Protective clothing must be worn and should include goggles, vinyl-coated gloves, and a respirator. Ventilate after application.

Penta must not be used near food, feed, or animals. Do not treat containers intended to hold produce or grain, etc., with penta.

Tributyltin Oxide

Tributyltin oxide is a colorless to light yellow liquid. It protects treated wood against mildew, surface molds, and fungi. Tributyltin oxide is an effective fungicide and can be used at low concentrations. Wood treated with tributyltin oxide should be painted, varnished or enameled after treatment.

Uses: Tributyltin oxide may be applied for either indoor or outdoor use. It is good for use in enclosed spaces, as it is not as irritating to the respiratory membranes as penta.

Plywood may be treated to eliminate checking, warping, and grain raise if the solution is water repellent.

Tributyltin oxide is not harmful to plants, and it is less toxic to humans than penta.

Methods of application: The solution is sold ready to use. It is best applied as a dip, but may be brushed or sprayed on the wood. Several coats should be used if it is to be brushed or sprayed on.

Disadvantages: Tributyltin oxide is not very effective against decay when the treated wood is exposed to ground contact. It is recommended only for aboveground uses.

Safety: Since tributyltin oxide can be absorbed through the skin, protective clothing should be worn, including goggles, vinyl-coated gloves, and a respirator. Avoid breathing vapors or spray mist.

Do not store tributyltin oxide near food or food products.

Copper Naphthenate and Zinc Naphthenate

Copper naphthenate and zinc naphthenate are two other wood preservatives used for in-place applications. Copper naphthenate leaves a green color on wood treated. Zinc naphthenate, while slightly less effective in preventing decay, is colorless. Both are available under a variety of trade names. They are brushed or sprayed on as solutions containing 24% copper or zinc napthenate (equivalent to 2% metallic copper or zinc).

WATERBORNE PRESERVATIVES

These preservatives can be used for treating wood that will be in contact with the ground or water and that will be painted. Waterborne wood preservatives leave the treated wood surface comparatively clean, paintable, and free of odor. Flammability of wood treated with waterborne material is less than that of wood freshly treated with an oil. However, some do promote glowing of the wood as when in a grass or surface fire.

Since water is added during treatment, the wood must later be dried to the moisture content required for use.

Chromated Copper Arsenate

There are three types of chromated copper arsenate (CCA): Type A, Type B, and Type C. Type A is high in chromium, Type B is high in arsenic, and Type C is intermediate.

Uses: When used properly, CCA is intended for treating wood commercially that may or may not be in contact with the ground or water. Paint and varnish can be applied over CCA after it has dried. It is safe for use near plants.

Methods of application: CCA is available in dry, liquid concentrate, and paste formulations, depending on the type, for use only by commercial treaters.

Disadvantages: Warping, hardening , and checking of treated wood may occur somewhat more frequently than on untreated wood.

Safety: Wear goggles, rubber gloves, and a respirator approved by the U. S. Bureau of Mines when handling CCA solutions or when sawing CCA-treated wood. Wash thoroughly after handling.

Fluor-Chrome-Arsenate-Phenol

Fluor-chrome-arsenate-phenol (FCAP) is sold as a powder and as a solution to commercial treaters only.

Uses: FCAP protects treated wood against termites and decay fungi. Wood treated with FCAP is fully paintable after seasoning to below 25 per cent moisture content.

Method of application: FCAP is to be used by commercial treaters in vacuum pressure impregnation.

Disadvantages:

- Warping, weathering, and checking of treated wood may occur at a slightly higher rate than untreated wood.
- Yellow staining results from formulations of FCAP that contain dinitrophenol. To eliminate this problem, sodium-pentachlorophenate has been substituted in some formulations.

Safety: Safety goggles and gloves should be worn during handling of FCAP solid or solutions. Wash thoroughly before eating or smoking. Do not breathe the dust; make sure there is adequate ventilation.

Keep FCAP away from children, domestic animals, and foodstuffs.

FUMIGANTS

When internal decay is already present in poles, pilings, or similar large timbers, fumigants may be used to arrest the problem. Chloropicrin and metam-sodium are sold as wood preservative fumigants.

During the fumigation process, a fungitoxic residue is left in the cells of the wood. The length of time of effectiveness of the residue depends on the fumigant used.

Safety: Chloropicrin and metam-sodium are irritating to the eyes, nose, throat, and skin. Avoid breathing the vapors. Wear rubber gloves and protective clothing.

If you must apply metam-sodium in enclosed areas, wear a mask or respirator of a type approved by the U. S. Bureau of Mines for Vapam protection. A full-faced gas mask with a black canister for acid gases and organic vapors must be worn if you will be exposed to chloropicrin vapors.

Do not allow chloropicrin to come into contact with any desirable living plants.

Note: You must also be certified in the category Space Fumigation if you intend to use fumigants for wood preservation.

TREATING PROCESSES

Pressure Processes

Impregnation of wood preservative chemicals under pressure is the most effective method of protecting wood from attack by termites, decay fungi, and other wood-destroying agents. The preservative penetrates much more deeply than preservatives applied by nonpressure methods. Many unseasoned woods can be treated by pressure processes. These processes are done by commercial treaters at specially equipped wood preservative pressure-treating plants.

Nonpressure Processes

The biggest advantage of treatment by nonpressure methods is that complicated equipment is not required.

Dipping: Posts, lumber, or other small wood items are soaked in a container of preservative. This process gives surface protection with some penetration into seasoning checks and ends. Unless treated wood will be used away from soil contact, protection will be sufficient only for a few years.

Brushing or spraying: These methods are generally used for timber or wood that will not be in contact with the ground or water. Several coats of preservative should be applied if the wood will be in contact with a source of prolonged dampness.

Field treatment of poles: The soil around the pole is removed down to about 18 inches below the surface. The preservative, in thickened paste form, is then troweled on and the pole is wrapped with waterproof paper. In some cases, treatment bandages may be used. Then the soil that was removed is shoveled back around the base of the pole. Creosote and penta are the most often used preservatives applied in this manner.

SELF-HELP QUESTIONS ON WOOD PRESERVATIVES

Now that you have studied this manual, answer the following questions. Write the answers in pencil without referring back to the text. When you are satisfied with your written answers, see if they are correct by checking them with the text. If your answer is wrong, erase it and write in the correct answer. Note that these questions are not necessarily those used in the certification examination.

1. Where does decay most often begin on timber?

2. Does sapwood resist preservative treatment more than heartwood?

3. What are some of the adverse effects that oil-based wood preservatives may have on treated wood?

4. Can creosoted wood be used in contact with water?

5. How is creosote applied to wood?

6. Why is creosote unsuitable where appearance is of major importance?

7. In warm weather, how long does it take for the volatile part of the oil in creosote to evaporate?

8. What influences the performance of pentachlorophenol solutions?

9. Is penta effective against termites as well as decay fungi?

10. Can sprayers used for applying penta be used later for other pesticides?

11. What effect does penta have on plants?

12. List protective clothing necessary during the application of penta.

13. Can tributyltin oxide be used at low concentrations?

14. Is one coat of tributyltin oxide sufficient for good protection if it is to be brushed on?

15. Should tributyltin oxide-treated wood be used in contact with the ground?

16. Are goggles necessary when applying tributyltin oxide?

17. Which preservative leaves a green color on wood: copper naphthenate or zinc naphthenate?

18. Can "glowing" of the wood be a problem with waterborne preservatives?

19. What are the 3 types of CCA?

20. Is it safe to use CCA near plants?

21. Who may apply CCA?

22. List 3 possible disadvantages of CCA.

23. Is safety equipment necessary when working with CCA-treated wood?

24. Is FCAP effective against termites?

25. Do all formulations of FCAP cause yellow staining of treated wood?

26. What safety equipment is necessary when handling FCAP?

27. When should fumigants be used?

28. What type of gas mask must be worn if you will be exposed to chloropicrin vapors?

29. What is the most effective method of treating with wood preservatives?

30. Explain how field treatment of poles is done.

This publication contains references to pesticides based on research and pesticide regulations. However, changes in pesticide regulations occur constantly. Some pesticides mentioned may no longer be available, and some uses may no longer be legal. If you have questions about the legality and/or registration status for using pesticides, contact your county MSU Extension office or the Michigan Department of Agriculture.

To protect yourself and others and the environment, always read the label before applying any pesticide.

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