Preservative-Treated Wood for Foundations

By

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Abstract

General information is presented about the use of preservative-treated wood in foundations.

Introduction

Wood is an important construction material because of its favorable cost, strength, working characteristics, and availability. Nevertheless, it has natural enemies, namely decay fungi, termites, and other insects. Where wood is at a high moisture content as a result of exposure to weather or contact with the soil, or is used in important structural components such as poles, sills, or foundations, protection from decay and insect attack is achieved through use of ind depth, preservative treatments.

Several levels of protection are available with preservative treatments. The main difference in protection levels is the amount of preservative chemical forced into the wood. Considerations of cost and difficulty of replacement led to the development of specific standards for wood in foundation materials that include a margin of safety. It is important that only wood which meets these standards be used in wood foundations.

Treatment Standards

Major building codes and the U.S. Department of Housing and Urban Development (FHA) Minimum Property Standards require that each piece of lumber and plywood in wood foundations be identified with the American Wood Preservers' Bureau (AWPB) "FDN" grademark to indicate conformance with standards that were developed for wood foundations. A reproduction of this stamp is shown in figure 1.

The AWPB "FDN" grademark is applied only to wood treated under the quality control provisions of the American Wood Preservers' Bureau, P.O. Box 6085, 2772 South Randolph Street, Arlington, VA 22206. This grademark provides assurance that the products meet the treatment level required by the standards of the AWPB, and the requirements of Federal Specification TT-W-571 (copies available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402). These standards require that wood for foundations be treated to

1 / Maintained at Madison, Wis., in cooperation with the University of Wisconsin.
Preservatives Tested First

A retention of 0.6 pound of perservative per cubic foot of wood. Adequate treatment of each veneer in plywood is essential for long-term structural durability. For this reason, industry standards require sample borings to check penetration of each charge of plywood, and these borings must show all veneers to have been penetrated. The standards further stipulate that additional preservatives be applied to exposed ends and edges of lumber cut after treatment and that the amount of heartwood in treated materials of certain species be restricted to within certain allowable limits.

One research study, initiated at the Forest Products Laboratory in 1937, explored the utility of creosote-treated wood in a house foundation. That foundation gave excellent service, but creosote-treated wood is not accepted today for use in residential foundations. The only wood preservatives accepted for use in residential wood foundations are chromated copper arsenate (CCA) and ammoniacal copper arsenate (ACA). These preservatives are often referred to as waterborne preservative treatments because the wood is treated with a solution of chemicals dissolved in water. As the wood dries, these chemicals become permanently fixed within the wood. Once the wood is dry, these treatments leave a dry, paintable surface. Foundations built with waterborne preservative-treated wood have been used in private residential construction since 1969.

Before a wood preservative treatment is accepted, it is extensively evaluated for its effectiveness. A preservative must pass both laboratory and field tests before it can be used in buildings. Laboratory tests are conducted first. The preservatives that resist termites and decay fungi in the laboratory are selected for field trials. In field tests, 2- by 4-inch stakes, 18 inches long, treated with different amounts of the test preservatives are half-buried in an upright position in the soil. These stakes are exposed in fields for decades and examined periodically. The Forest Products Laboratory maintains field plots in Wisconsin and Mississippi. Wood in southern Mississippi is exposed to severe decay and termite attack. Untreated (control) 2- by 4-inch stakes of southern pine sapwood last about 2 to 4 years in the Mississippi plot and approximately 4 to 6 years in the test plot near Madison, Wis.

Stakes of southern pine sapwood treated with waterborne preservatives at levels comparable to those specified for wood foundations have been exposed in the soil in southern Mississippi for more than 30 years with no failure. Specifically, 2- by 4-inch stakes of southern pine sapwood treated with ACA at retentions of 0.24 to 1.25 pounds per cubic foot of wood have been in test for 32 years, while comparable stakes treated with CCA-I at a retention of 0.15 to 0.44 pound per cubic foot have been in test for 31 years. Stakes treated with CCA-II at retentions of 0.26 to 1.04 pounds per cubic foot have been in test for 29 years. No failures have occurred in test stakes treated with ACA at retentions of 0.51 or more pound per cubic foot; in test stakes treated with CCA-I at retentions
above 0.29 or more pound per cubic foot of wood; nor in test
stakes treated with CCA-II at retentions of 0.26 or more pound
of preservative chemical per cubic foot of wood. By compari-
son, 0.6 pound of preservative chemical per cubic foot of wood
is required by the treatment standards for material used in
wood foundations.

Since there have been no failures in stakes treated at reten-
tions comparable to those used in wood foundations, firm pre-
dictions of service life for these stakes cannot be made, but
prior experience with other preservatives leads us to conclude
that these stakes will last substantially longer. Environmen-
tal studies of soils in Forest Products Laboratory field plots
in Mississippi indicated no movement of chemical beyond 3 or
6 inches from treated wood stakes, depending upon the formula-
tion that was used.

Cautions

Even though both laboratory and field tests demonstrate that
pressure-treated wood is, itself, resistant to attack by ter-
mites, subterranean termites can build shelter tubes over
treated wood to gain access to untreated wood in other parts of
a house. Termites can also build shelter tubes over concrete
foundations. Therefore, where subterranean termites are
present, conventional soil treatments around foundations (both
wood and concrete) or other methods acceptable to the governing
regulatory agency are suggested to protect the whole house
from termite attack. Soil treatments should be applied by
professional pest-control specialists.

Potentials for metal corrosion should be considered when
selecting fasteners for use in preservative-treated wood below
grade. Preservative-treated wood foundations are used in a
variety of architectural designs. With some constructions,
wood is exposed to conditions where it is likely to be at a
high moisture content. FPL research with fasteners in ACA-
and CCA-treated wood at high moisture content indicates that
certain metals and alloys appear durable while others are sub-
ject to corrosion. Of those metals and alloys tested in this
research, stainless steel Types 304 and 316, copper, and
silicon bronze appear to be durable.

Further Information

For design specifications and/or further information on wood
foundations, contact:

AMERICAN PLYWOOD ASSOCIATION
P.O. Box 11700,
Tacoma, WA 98481 (206/565-6600)

AMERICAN WOOD PRESERVERS’ BUREAU
P.O. Box 6085
2772 South Randolph Street
Arlington, VA 22206 (703/931-8180)

AMERICAN WOOD PRESERVERS’ INSTITUTE
1651 Old Meadow Road
McLean, VA 22102 (703/893-4005)
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Figure 1.--An example of the AWPB, FDN stamp that is required on each piece of plywood and treated lumber in wood foundations.