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Southern Hardwood Log Storage--Practices, Problems, and Benefits

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Winter Decking of Mixed Hardwoods near Brinkley, Arkansas.

Storing logs is essential to the southern hardwood lumber industry. Logging is impractical, even impossible, for many weeks in a normal year. The forests supplying the industry lie generally on low land along the major rivers. Heavy local rains make the silt-clay soils too soft or slick for logging machinery. Annual flooding from melting northern snows or heavy winter rains in the upper watersheds can literally exclude machinery from the forests. It is entirely possible to stand on top of a Mississippi River levee that is dusty from lack of local rain, and see many square miles of forest flooded by a surging river. When the woods are inoperable, hardwood mills must turn to stored logs or face complete and costly shutdown.

A medium or large mill may annually store 3 to 5 million board feet of logs. The cash value of this timber will be about $50 per M. With the added costs of putting it into storage and getting it out, an annual capital outlay of a quarter of a million dollars can be at stake. Hence the industry has a decided financial interest in minimizing losses in storage.

Loggers everywhere in the United States have difficulty in storing logs safely, but nowhere more than in the warm, humid South. During 4 to 6 weeks of summer, bluestain fungi may penetrate a foot or more into the ends of unprotected logs. Dote and rot sometimes develop in 10 weeks. Ambrosia beetles, commonly called pinhole borers (2), are the chief insect hazards; they can riddle a log in 10 days, but even light attacks introduce stain. Most southern hardwoods are subject to significant and rapid end-checking. These fractures in the ends of the logs not only degrade the lumber but provide additional avenues for fungus infections. Checking is most severe in oak, pecan, and other dense species (4). Winter weather slows all these processes of deterioration, but serious damage often occurs during warm spells, or if logs are not utilized by spring.

Storage Methods

Log Ponds

Log ponds for all-season storage have been used for many years in the South. The logs attain a moisture content that exceeds their fresh-cut condition, and reduction of the oxygen supply stops or greatly retards fungus development. The water forms a barrier to insect infestations, and checking is eliminated. Some mill men say that ponded logs, because of their extra water content, saw more easily than logs that have been in air storage.

Many logs float, at least until they have become waterlogged, and the exposed surfaces are subject to attack by insects and

fungi. Weighted booms or racks are sometimes constructed to assure submergence and hence complete protection. Although storage is usually for only a few months, some logs have been ponded 7 years without noticeable damage.

Both natural and man-made ponds have proved suitable. Some ponds are set up so that water can be added or drained at will to permit log handling. Others are never drained but require that some water be pumped in to maintain full volume or provide circulation. Of course, most natural ponds or lakes maintain levels consistent with the source of water.

Logs are typically hoisted into a pond by crane and retrieved in the same way, or by jackladder. The deeper the pond, the more complicated is the retrieval of sunken logs especially if the pond cannot be drained.

A hardwood veneer and plywood plant in Alabama has constructed several ponds 300 feet long, 30 feet wide, and 10 to 12 feet deep. Each can hold 200,000 board feet of large logs. Only prime logs are stored, and, to facilitate later use, logs are allocated to ponds by length. Since the ponds are not drained, individual logs are fished out as needed.

Costs of construction, maintenance, and operation usually preclude building artificial log ponds except for storing high-value logs. About an acre of pond, 10 to 12 feet deep, is needed for each million feet of logs.

Some users of ponds have reported trouble with chemical staining of logs. Such staining is most common when the water contains considerable iron—the iron reacts with acids in the bark of some species, especially oak.

Deck Storage

Though there are log ponds in all parts of the South, the vast majority of southern hardwood logs that go into storage at present are cold-decked—that is, stacked on the ground in reserve for future use.

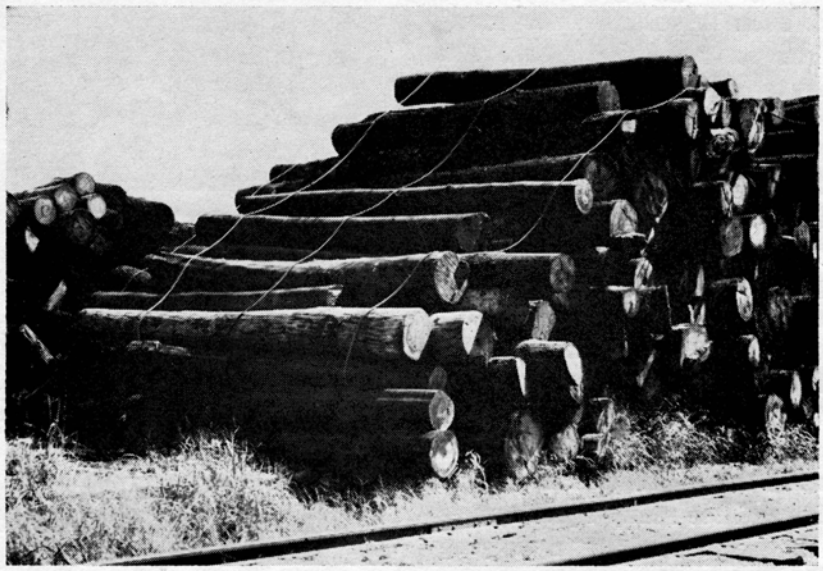
Not long ago, the term cold-decking, as used in the South, referred exclusively to the storage of logs during winter, with cold weather the sole deterrent to attack by insects and fungi. More recently, chemicals and especially water sprays have made summer decking possible and lessened the hazard of winter storage.

Winter decking. — Dry fall months, from late September to late November, usually offer loggers a good chance to accelerate their operations and accumulate a reserve for the winter, when logging becomes difficult or impossible in many areas. Winter decks are common not only at mill yards but at distant rail sidings, barge landings on riverbanks, and other locations chosen for their accessibility to transport.

Most logs are stored less than 5 months. Damage is usually within tolerable limits, but without further protection some attack by stain fungi and ambrosia beetles almost always occurs. Logs also end-check considerably, even during a normal winter.

Most mills are careful to deplete their Winter inventory before warm weather speeds deterioration. Unless transport breaks down—as occasionally happens when low water levels prohibit barging of logs decked by a river—the last of the piles are usually sawn by April.

Chemical treatment.—If logs did not check, and if bark did not become loose, chemical sprays would be an excellent way of protecting hardwood logs in storage.



Mixed hardwoods under water-sprinkling storage at West Helena, Arkansas.

A mixture of pentachlorophenol as a fungicide and benzene hexachloride (BHC) as an insecticide has proven effective for some hardwood species (2, 5). But the chemicals protect only the surfaces to which they are directly applied, and as soon as new surfaces are exposed by checking or bark sloughing the treatment no longer is a barrier to fungi. Since the most destructive checking occurs at the ends of logs, spray treatments must be supplemented by end coatings. The fact that both the

spray and the end coating must be applied very soon after the logs are cut—preferably within 24 hours — normally creates operational problems. In addition, many logs lose patches of bark during storage, and the sapwood thus exposed becomes liable to infection.

In 1958 cost of materials for spraying and end-coating decked logs 14 to 16 inches in diameter was estimated at $1.90 per MBF (5). Labor and equipment were additional.

In general, chemicals are not now widely used on stored logs in the South. During summer some companies spray fresh-cut logs with BHC as a protection against insects. This treatment is principally to protect logs in transit to the sawmill for early conversion, and not for those going into decks.

Water sprinkling. — Western and northern mills have for some years been protecting decked logs by sprinkling them with water. Both industrial experience and research findings (3, 7, 8) have been very encouraging. Until recently, applications in the South have been limited. Now, though, the simplicity and economy of this method of all-season storage have begun to attract wide attention. Pulp companies are exploring the possibilities of storing bolts under spray. Several large sawmills have installed spray systems with very promising results (1). Many more are making or planning installations.

A sprinkling set-up requires nothing more than a source of water under pressure and an arrangement of pipes and sprinkler heads to distribute water over all parts of a log deck. Costs of installation vary, but some estimates are well under $1 per thousand board feet for initial capacity. Perforated plastic hose sometimes burst under surges of pressure.

Some mills draw water from ponds or lakes, and in certain cases the drainage is such that much of the water returns to the source for recirculation. Regardless of whether the water is reused, good drainage is necessary to maintain firm ground for log handling. One mill has built a long concrete slab to facilitate piling and unpiling of logs. Piling logs high conserves both water and yard space, and without sacrifice of protection. In yards with suitable high-lift equipment, decks as high as 40 feet have become common.

As in ponds, the water protects the logs by reducing the oxygen needed for fungus development. It also lowers the temperature of the log piles, but in summer this effect is of no importance. In fact, on a day when air temperatures are around 95°F., a 10- or 15-degree reduction might, by itself, favor rather than retard fungus growth.

Complete wetting of all log surfaces is essential. Protruding ends of carelessly stacked logs, stopped-up hoses or nozzles, insufficient pressure, or failure to allow for the effects of wind result in dry areas that are highly vulnerable to attack. The speed with which a log is moved from stump to spray deck also appears to be very important.

The commercial operations to date have applied water full-time—around the clock. A test by the Southern Forest Experiment Station in cooperation with the Chicago Mill and Lumber Company (1) indicated that intermittent spraying may also be satisfactory. After 4 months of storage, logs sprayed only during the 12 daytime hours, or for alternate half-hours around the clock, had only slightly more degrade than decks under constant spray.

Some difficulties can be expected while experience is being gained. While no insect damage has been reported from industrial operations, ambrosia beetles infested an experimental lot of sweetgum pulpwood bolts that were stored under spray in a wooded area with heavy beetle populations. One mill found that oxidation stain developed in hackberry lumber sawn from sprayed logs, possibly because moisture contents were higher than in lumber from fresh-cut logs (6). In general, the effect of log storage on the products made from the logs is a subject that requires further investigation.

At present, almost all spray decks are at mill yards, but some industrial planners are now considering more remote locations.

Possibilities

While the hardwood industry's immediate interest in log storage is to keep the mills running when logging crews cannot operate, a practical system of all-season storage would have other advantages.

For one thing, it would enable contractors to reduce costs by concentrating their operations in seasons when working conditions are best. At present, many logs are made and moved under conditions that are hard on both men and machines.

Reliable storage would increase opportunities for trading and selling round products. Prime veneer or specialty logs could be sorted from woods run and held safely until accumulated volume make a sale feasible.

Blowdowns could be salvaged currently, and normally inaccessible areas could be logged as opportunity offered, without

regard to temporary oversupply.

For these and perhaps other reasons, it seems safe to predict that the southern hardwood industry will improve and expand its log-storage practices.

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