# TechLine

Forest Products Laboratory

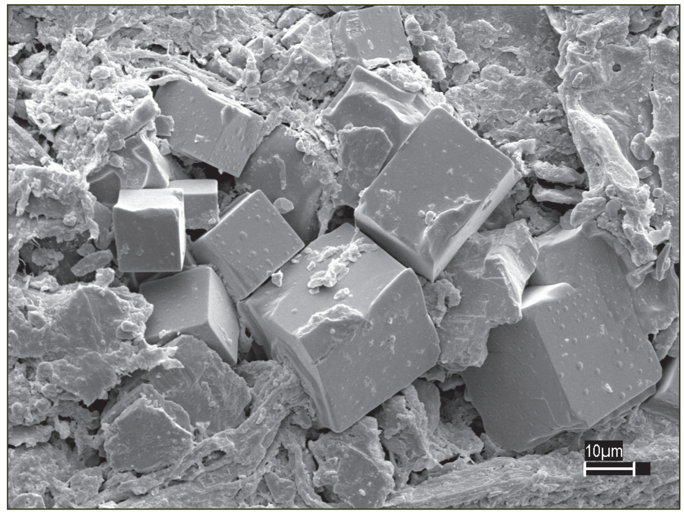
## *Salt Damage To Wood*

### *"Fuzzy Wood" Often Confused with Fungal Decay*

Many types of deterioration can affect wood in service. One potential problem facing dock owners is the occasional development of "fuzzy wood" caused by salt uptake into the wood (Fig. 1). This salt damage—also referred to as "salt kill" or salt defibration—is sometimes seen in wood that is chronically exposed to salt, such as marine pilings, bridge decks where salt is used as a de-icer, utility poles that are splashed with road salt, or wood associated with salt storage.

Wood in this instance acts like a bundle of straws, wicking salt water into the wood structure. As the wood surface is exposed to heat and drying (as from direct sunlight), the water evaporates and salt crystals form in the wood cells (Fig. 2). Over time, the physical forces exerted by the salt crystals push the fibers of the wood apart, causing the "fuzzy" appearance (Fig. 3a). This phenomenon is often seen in extreme environments, both hot and cold. Past research at FPL has shown that salt damage can accumulate in as little as 5 years of repeated wetting and drying cycles. Salt damage can be observed on untreated wood or wood treated with waterborne preservatives, such as CCA (copper chromated arsenate) and ACQ (alkaline copper quat). It does not usually occur on wood treated with oily preservatives, such as creosote, because the oil forms a barrier to the salt movement.

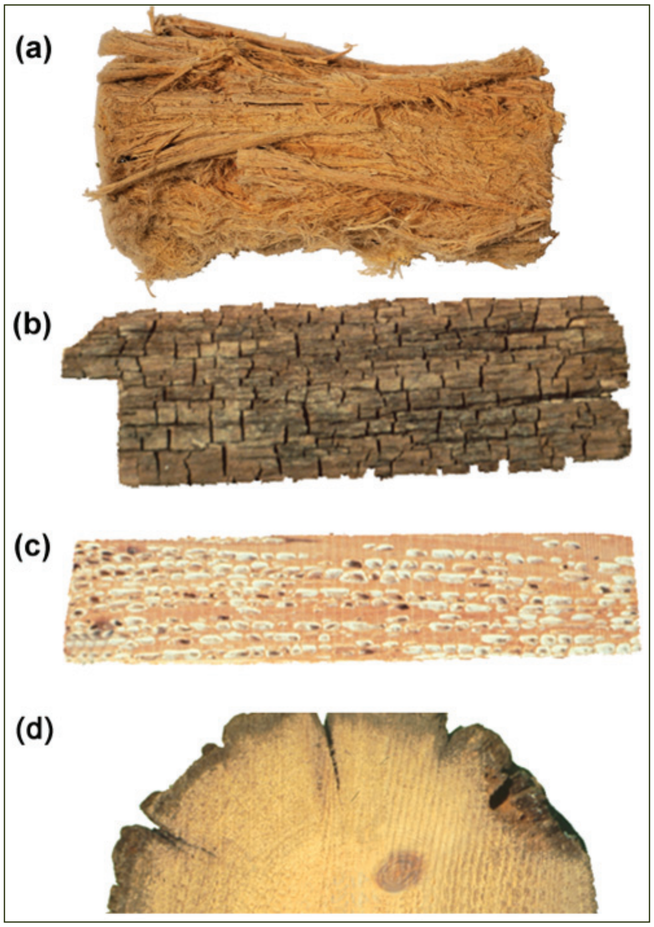
**Piling in Charleston, South Carolina, damaged by salt exposure. This pile was located in a marina and subjected to frequent wetting and sea spray.**




**Scanning electron micrograph of salt crystals found in fuzzy wood samples from a pile in Charleston, South Carolina. (Image provided by Tom Kuster, FPL.)**

Although salt damage can be unsightly, the fuzzy wood need not be a cause for alarm. The gradual sloughing off of the wood surface proceeds slowly, and the wood beneath the affected area remains sound. Salt damage has been observed on poles and piles that are still in service after 25–30 years. Paints, coatings, or barriers have been suggested to prevent the movement of water from the wood surface, but it's not clear how effective these treatments might be.

Salt damage is sometimes confused with fungal decay, although characteristic signs of salt damage are considerably different than those of fungal decay. Two kinds of fungi are primarily responsible for structural failure of wood—brown-rot fungi (Fig. 3b) and white-rot fungi (Fig. 3c). When wood is infected with brown-rot fungi, the wood darkens and cracks across the grain in a cubicle pattern. It eventually shrinks and becomes crumbly. When white-rot fungi infect wood, the wood may lose color and appear bleached. White-rotted wood does not crack or shrink. It retains its outward shape and often feels spongy. A third, less important, kind of decay, called soft-rot decay (Fig. 3d), occurs under very wet conditions or on wood surfaces that are alternately wet and dry over a long period of time. Soft-rot generally causes




**Examples of (a) salt damage, (b) brown-rot decay, (c) white-rot decay, and (d) soft-rot decay.**

the outer surface of the wood to become soft when it is wet, but the zone immediately under the soft rot is typically still firm. None of these fungi can grow in conditions of high salt. Chemical preservatives provide the best protection against deterioration of wood by decay fungi in outdoor applications.

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