

Borate Breakthrough!

20 YEARS OF RESEARCH BEARS FRUIT FOR TIE INDUSTRY

By Marlane Bundock

A new era in the transportation industry began this year as railroad companies like Canadian National (CN) and Norfolk Southern Corporation (NS) have begun to install wooden crossties pre-treated with borate compounds. The companies' decision comes after two decades of examining borates as a preservative enhancement for crossties.

Researchers and manufacturers have developed a commercially viable method to penetrate timber with sodium borate—as part of a dual treatment process that is followed by standard creosote treatment. The positive outcome of the research has convinced railroad executives and others in the railroad and wood tie industries that borate pre-treated ties, over-treated with creosote, are more durable in certain applications and will cut costs in the future.

"We've ordered more than 100,000 of them so far," said Danny Plemmons, assistant manager of purchasing for NS, adding that the company plans on purchasing additional borate pre-treated ties in the future. According to Plemmons, NS, which operates 21,300 route miles of track in the United States and Canada, first installed the borate pre-treated ties in an active track line in Mississippi earlier this year.

"The decision was made after test samples of these borate-treated ties proved to slow decay and rot, especially in high-rot areas in the Southern and Southeastern U.S.," Plemmons said. "In

addition, we found borate was able to completely penetrate some hard-to-treat species of wood, like white oak." According to Plemmons, NS recently purchased its first supply of borate-treated crossties from Seaman Timber Company, which is headquartered in Montevallo, Ala., near Birmingham.

Kenny Dailey, Seaman's vice president and chief operating officer, said that the company supplied NS with a shipment of 14,000 borate-treated ties in January for a replacement project in Laurel, Miss. "The project was one of the first of its kind," Dailey said. "Out of the 750,000 ties a year that we supply to Norfolk Southern, 120,000 will be pre-treated with borate."

Dailey said the entire process, including pre-treating the timber with borate and then with an application of creosote, doesn't take much longer than average air-drying time for hardwood ties. "After treating the timber with borate, we impede the drying process for a period of time," Dailey said. "During this time, the treated timber is kept from exposure to sun or air. Then, it's stacked for air-drying for up to six months." According to Dailey, the borate compound also protects the timber from various decay elements during the pre-creosote drying process. "Once the timber is dry enough, it is ready to be treated with creosote."

Bill Rousis, director of purchasing and engineering for NS, said the railroad based its decision to use the borate crossties on the fact that the treatment has proven to extend the life of ties in certain areas of the country—especially in the South—where the rate



In January, more than 14,000 crossties pre-treated with borate, a preservative enhancer, were used by Norfolk Southern Corporation for a replacement project in Laurel, Miss.

of rot and decay are high. "The AAR/RTA study in Cordele, Ga., proved that borate pre-treatments work," he said.

Dr. Terry Amburgey, a professor in the Department of Forest Products at Mississippi State University, collaborated on the study. Amburgey said he has been studying borates for the last 35 years. "Prior to coming on board at Mississippi State University 27 years ago, I worked under the U.S. Forest Service Research Department, where I also researched borates."

In 1987, Amburgey said that the Railway Tie Association (RTA) and the Association of American Railroads (AAR) commissioned him to gather a study plan on using borates to pre-treat crossties. The plan resulted in a field study on an NS track in Cordele, where Amburgey began a 15-year examination of hundreds of the pre-treated ties. "The diffusion of borate into the core of the timber is what protects it from rot," Amburgey said. "The creosote treatment is the final layer of protection, which keeps the borate intact."

In 2002, Amburgey released the results of the study, which "were far better than we expected," he said. "The borate-treated ties looked great in comparison to the ones only treated with creosote. The borate-treated ties held up well against fungi, decay, spike kill and termites."

NS executives agreed that the results of the new pre-treatment process and study were impressive. "The ties held up well. Borate proved to be a fungicide and insecticide in zones with high rates of decay," Rousis said, adding that high decay usually occurs in American Wood-Preservers' Association (AWPA) zones four and five, which include most of the South and Southeast regions of the country.



Research has proven that wood crossties pre-treated with borate, then over-treated with creosote, last longer in track, especially in the Southern United States.

In addition, Rousis said the long-term benefits of the borate ties would decrease the overall capital spent on replacement projects. "It doubles the life of a tie in these areas," he said. "Although the borate process costs more, it is beneficial in the long run."

Bruce Emberly, supply manager of forest products for CN, agreed that the results of the Cordele study and others recently performed showed overwhelmingly that the borate pre-treatment process enhances the life of wood crossties and will prove to be financially beneficial for the railroads. "It will lower the change-out costs by increasing the life of the ties to almost 30 years," he said. "This will result in a decrease in the cost of labor, purchasing and disposal."

Emberly said CN decided to install wood ties pre-treated with borate as part of regular replacement projects last September. At that time, more than 7,700 were installed in track in Yazoo City, Miss. "The ties came from Burke-Parsons-Bowlby (BPB) Corp. We will be purchasing more from them in 2005 and already have plans for purchases in 2006."

Emberly also noted that the research marks a breakthrough in crosstie longevity throughout the industry. "The [borate pre-treatment] process is one of the most significant developments in the industry since the early 1900s," he said.

Floyd Bowlby, BPB marketing director, said the company has been working with the industry since 1983 to find a way to make the borate pre-treatment process cost effective. "It's significant to note that for the pre-treated ties to be effective, a reservoir of borate must be applied to the wood and allowed to properly diffuse throughout the cross-section of the tie," he said.

BPB, based in Ripley, W.Va., produces treated wood products for various industries. Bowlby said the company would provide Canadian National with 32,000 borate pre-treated ties in 2005 and 80,000 in 2006.

RTA Executive Director Jim Gauntt said it is important to communicate the significance of what he called a breakthrough in the industry. "We are always trying to improve our products and research improvement options," he said. "The 20 years of research that went into this project proved to be a success and will have long-lasting results for the industry as a whole." §

RAILROAD TIES
Arizona Pacific Wood Preserving

PACIFIC
RAILROAD TIES
WOOD

Choice of species.
Quality controlled.
Less than truckload orders.
Easy rail and truck access.
Choice of chemical treatments.
Good proximity to major tie markets.
Three decades in the railroad tie industry.

APWP

Call Ralph Morris at 530-534-7350 or Ken Laughlin at 520-466-7801
A member of the PWP Pacific Wood Preserving Companies
The Leader in Wood Preservation
information@pacificwood.com • www.pacificwood.com