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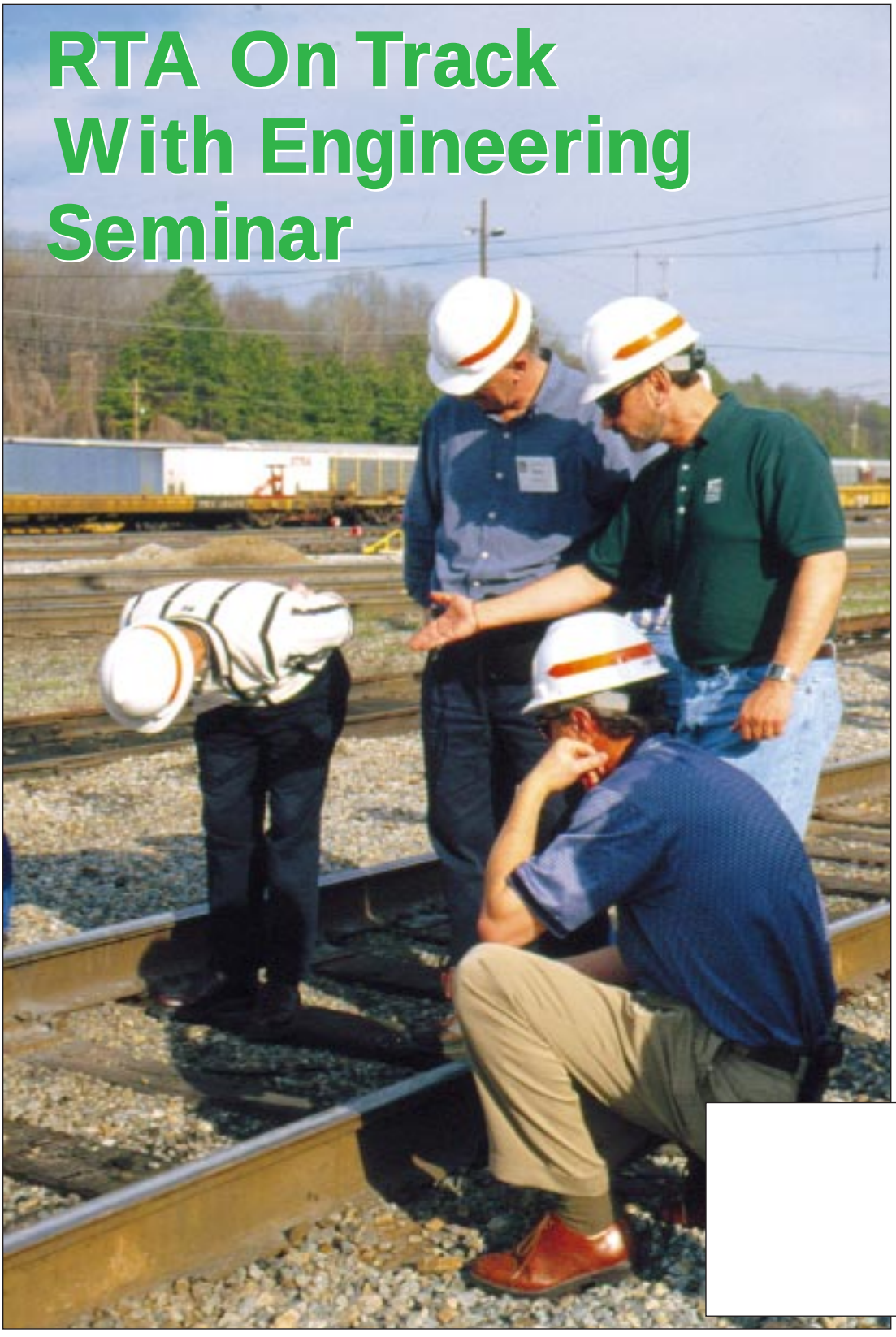

Special Reports

Study Finds New Solutions To Sawmill Profitability

Researched and Written by Gerry Roskovensky, Koppers Industries

Lumber prices improve and yet profit margins diminish. Sound familiar? Stumpage cost, log quality and diminishing diameters are all culprits. How do we resolve critical issues such as these and remain a viable industry?

Over the past several years, Koppers Industries has conducted extensive research in the utilization of hardwoods. The initial objective was to increase tie production, but the research resulted in potential solutions that have been developed into a computer simulator. The model examines the profitability of various cutting combinations, sawline effects, log grade effects, manufacturing cost, log cost and yield factors. Another dimension of the model examines how various log breakdowns can allow a mill to prorate log cost differently.

The research centered on red oak, white oak, hard and soft maple, and other species of logs that are 12 to 13 inches in diameter. The basic assumption is that when the first cut is made, the log displays a six-inch-wide face. Lumber production is assumed to be 4/4 dimension and that the ties are cut seven-inch by nine-inch. The studies were conducted using band-sawing methods to illustrate the results.

Yield analysis was determined through the use of Leland Hanks' study on Hardwood Log Grades and Lumber Grade Yields, Report: NE 468. Log grades were based on such factors as knots, log diameter, length and soundness.

Results demonstrated that sawing a log into all lumber, "live sawing," resulted in most cases in the lowest profit margin due to the higher production of lower grades of lumber. More sawlines were required, which created additional cost.

As expected, the analysis demonstrated that as a larger cant is incorporated into the breakdown, the average per thousand price for all the products in a log decreases. Unexpectedly, though, the study proved that total revenue accrued for all products sawn actually increased as a pallet cant or tie was added. Why? The reason is that while a larger timber will encompass a significant amount of 2 common and lower grades of lumber (flooring and furniture framestock), the decrease in sawlines allows a mill to increase total production by sawing additional logs.

There is no *one* correct answer on how to increase revenue and ultimately profitability, since every log and species is different. But, the Koppers study offers information to assist with the decision-making process.

The accompanying table *(see page 16)* is a tabulation of several thousand calculations that analyze tie-length logs. Any length of log can be examined with this simulator, but for the following example an average 2 clear-sided log will be analyzed. Scribner log scale is used in this analysis, as well as Doyle and international scales. The hypothetical typical mill produces 16,000 feet a day and operates at a cost of $125/M with a production rate of seven sawlines per minute—similar to many automatic mills.

Why sawlines? Why not our typical "Per M" method of comparison? The reasoning is based on the fact that as one incorporates a larger tie or timber into the process, less time is spent sawing a log, and more logs are inevitably sawn per day. More log turning may be required, but this forces a sawyer to turn the log, which aids the efficient removal of grade lumber.

At the end of table one, the reduction of sawlines increases exponentially when logs that formerly were live sawn are sawed into lumber and cants of various sizes. Cutting sawlines by 25 percent or more also decreases sawdust production.

The increase of volume/footage over the measured volume/footage of the log, "overrun," increases proportionately as sawlines are reduced. Yields on a 12-inch, 8'6" log increase 13 percent with a pallet cant and further improve with the incorporation of a tie.

Since lumber prices can vary in volatile markets, prices $50/M above the current market were used with a minimum of $240/M for the lowest grade boards. Maximum pallet cant prices were also assumed at $300/M. Tie price was assumed as $16.50 on oak and $14.50 on mixed hardwoods.

In our first series of tables is Northern Red Oak. A two-sided log will result in approximately 46 percent of 1 common and better lumber, according to Hanks. Using a $600/M log (or stumpage of $500/M, plus $100/M logging cost) as an example, a log sawn into 4/4 (1 1/8inch) lumber resulted in a *loss* of $5.91 per log. By adding a pallet cant, a profit is realized. But even greater profit is realized by adding a larger timber such as a tie. The profit increased to $1.55/log. Sawlines were reduced from 13 to 7, and yield improved from 42 board feet to 57 board feet, improving overrun on the Scribner scale from 5 percent to 45 percent. The study demonstrates that even though traditional comparisons are made on a "Per M" basis, the log with a pallet cant and lumber would average $106/M more than a log cut into a tie and lumber. However, the total

net revenue would be greater by $2.45 per log, or approximately $858 per day more when cutting a tie and lumber out of the same log. Even if one-third of the potential tie logs are turned into ties, under this scenario a potential annual revenue gain of $76,000 could be realized. This begs the question, what is more important for the sawmiller: dollars of total net revenue or highest Per M? The bottom line is that revenue pays the bills.

The case is more impressive for white oak. Using $500/M (or $400/M stumpage, plus $100/M logging cost) we see that the *only* way to make a profit is to cut a large timber or tie. Even a log cut into lumber and a pallet cant would result in a loss.

Hard maple, because of high-grade yields for two-sided logs, resulted in the best revenue scenario when cutting a pallet cant and lumber. Other species, such as soft maple, beech, hickory and gum, could easily yield greater annual profits by adding larger cants and timbers to one's cuttings. Most mills do not pay these high scenario log costs, but the bottom line improves even more when you use lower log or stumpage costs.

What are the possible solutions facing the sawmiller who is seeking improved profitability? Do you make capital improvements such as Pennsylvania's Weaber Inc.'s twin band for sawing timbers; Virginia's Gilbert PLC's 10-inch, single arbor gangs; or West Virginia's Coastal Lumber's scragg mill? Moving the low-grade wood through the process as quickly as possible and reducing the number of sawlines with multiple sawline capacity is the solution for some mills.

Other mills may select species such as white oak, lesser species of red oak such as black oak or upper logs, and less valuable hardwoods such as hickory, soft maple, and gum and denote these species only for cant and timber production. Still others may make decisions on a log-to-log basis.

In addition to the option of adding value-added services to increase margins, one could choose to utilize the resource the "old way." By increasing overrun, minimizing low grades, maximizing the profitability of a log, and minimizing losses by incorporating larger timbers in the sawing process, sawmills *can be more profitable*.

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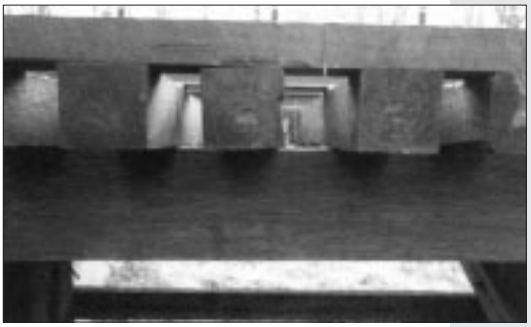
Engineered Wood Makes It Mark

By Bonnie Gibbs

When the Buffalo & Pittsburgh Railroad needed to replace 192 lineal feet of deteriorated bridge stringers, they enlisted Maine Track Maintenance as contractor and TEC Associates as engineer. To replace the old stringers, Wayne Duffett, president of TEC and engineer of record, opted to utilize Trus Joist's Parallam® parallel strand lumber (PSL), which was treated by Burke-Parsons-Bowlby Corp.

According to Floyd Bowlby, director of marketing for Burke-Parsons-Bowlby Corp., to treat the material, the company relied on its expertise to complete the job. "Trus Joist asked us to treat Parallam®, and we had experience treating laminated timber," he said. "We have treated glue laminated timber before for highway timber bridges and railroad applications. So with Parallam®, we relied on our years of experience treating glue laminated timber to treat this material."



The use of Parallam® ties by the B&P Railroad represents the first application of the material in a railroad environment.

The Buffalo & Pittsburgh job marked the first application of Parallam® in a railroad environment. Duffett said he chose the product because of its reasonable cost and availability in large sizes. "I've seen various types of engineered timber, and this is the first one that came along that was reasonably priced regardless of size," Duffett said.

Cost effectiveness is just one of the reasons railroaders are beginning to consider Parallam® as a viable substitute for sawn wood ties and stringers, said John Falstrom, eastern transportation products manager for Trus Joist. According to Falstrom, the product's treatability is a major benefit. "Parallam® material can be treated all the way through," he explained. "One hundred percent of the wood fiber in the cross section gets treated."

This treatment translates into durability, he added. "The engineered wood is roughly twice as strong, and railroads have a need for this (in certain applications)," Falstrom said.

Company Emerges In Railroad Supply Industry

Trus Joist recently emerged in the railroad industry with the introduction of Parallam® parallel strand lumber (PSL).

An engineering lumber company, Trus Joist manufactures structural composite lumbers used in a wide variety of industries, including housing and marine. "We were looking for new market, and the railroad industry caught our attention," said John Falstrom, eastern transportation products manager. "It was a natural evolution."

Chris Haechrel, communication coordinator, said the company wants to see continued use of Parallam®. "Trus Joist wants Parallam® to keep going in the direction its going, to keep it in commercial and residential projects," he said.

Trus Joist began as Trus Joist MacMillan, a partnership between Trus Joist International and MacMillam Bloedel, Haechrel siad. Then, Weyerhauser bought MacMillam Bloedel, later purchasing Trus Joist International in January 1999.

Currently, Trus Joist is the world's largest marketer and manufacturer of engineered lumber and operates manufacturing plants across North America. But the company is more than just a collection of mills, Falstom said. "We have engineers and technical experts on staff," he said. "We attend association meetings—we're a member of AREMA and we support RTA and the industry. We're not just selling a product. We do not want material used for anything it shouldn't be used for. We're a 35- to 40-year-old company with a reputation for doing things correctly." §

"Railroads can take a bridge, pull out bridge ties/stringers, substitute the exact same size with Parallam®, and get increased capacity."

Duffett said the railroad replaced only half of its stringers, so the increase in the strength of the bridge has not been quantified. "But, the manufacturers say that allowable stresses are substantially higher than sawn timber of the same specifications. There have been no bad reports yet."

Trus Joist believes that Parallam® will help short line and regional railroads address strength issues as Class I railroads begin running 286-ton cars.

According to Falstrom, another advantage of Parallam® is its low moisture content, which means the material is ready to treat sooner. "Because of the way the material is manufactured, the material comes out at an 8 percent moisture content," he said. "As soon as it is produced, it is ready to treat, which reduces inventories for treaters and railroads. We have a two- to three-week lead time, and I've heard some projected times for air drying timber at six to eight months."

Parallam® PSL stringers come uniform in dimension and strength, an attractive quality for Arthur Simpson, Maine Track Maintenance supervisor. "They come nice and square," he said. "I didn't have to shim them at the pile caps. They weigh about the same as solid wood stringers; we were able to handle them with the same boom truck." Duffett concurred, "The crew that put them in had no problems."

Considering its long length, Bowlby said the material has potential for continued use by the railroads. "The product has a future if you're looking to replace large timbers on railway structures, because you can get it in large lengths and in large dimensions," he said.

According to Don Schwabe, marketing manager for industrial operations at Trus Joist, Parallam®'s benefits can already be taken advantage of by the railroad industry. "For a short-term niche, Parallam® will be used in bridge structures such as stringers, pile caps and bridge timber because the members required are longer and often harder to source in longer length," he said. "The product will address the issue of 286 tons now required by Class I's. A change is taking place that is requiring structures to be stronger, and we believe we have a solution for that."

While not applicable in certain situations, the defect-free wood product is going to change the way people design structures, according to Falstrom. "At first, people are going to change out older ties with Parallam® to test it out," he said. "Then later, they'll design structures with the products. I know it will take a while, but we're in it for the long haul." §