



Keeping Wood Tie Markets Strong and Sustainable Since 1919

Presented by
*Bill Behan, Former RTA President,
Current VP-Business Development, Koppers Inc.*



Presentation Overview

- **RTA Output Summary and Crosstie Market Scope**
- Data
- Outreach/Education and R&D
- Tie Grading Intro
- Summary



RTA Answers the Call

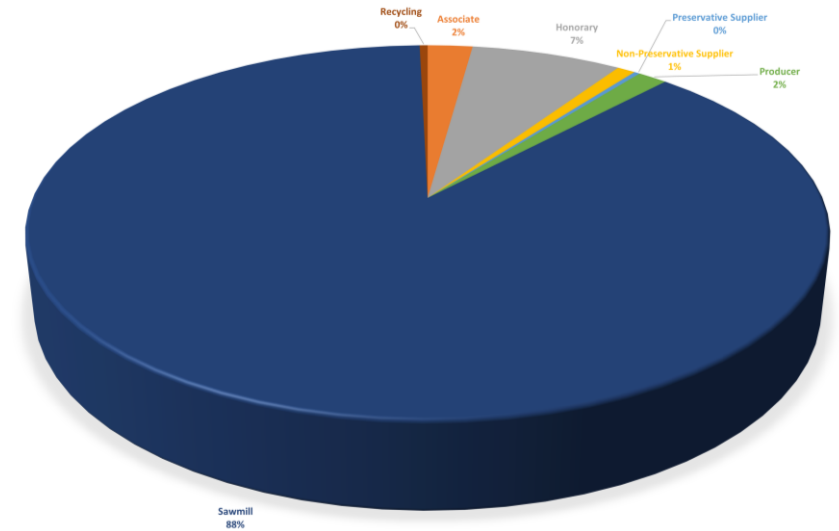


- Forum for membership:
 - Networking/Engagement
 - Technology transfer and R&D
 - Real-world data assimilation
- 100+ years of crosstie data
 - 1987 - Watershed year (triangulated data mapping: production, purchases and installation)
- 2-cents/tie dues structure
- HMR & AAR partnerships round out data needs for econometric forecasting

RTA Membership Categories

Membership Category (Revenue)	January 2024
Direct Producer	41
Sawmills (Indirect)	2,517
Supplier (Preservative)	8
Supplier (Non-Preservative)	26
Contractor & Recycling	36
Associate / Corporate	67
Global	1
Honorary Associate (Non-Revenue)	213*
Total Revenue	2,696

*Not counted in total



TRACKING THE POWER OF RAIL SUPPLY

THE ECONOMIC IMPACT OF RAILWAY SUPPLIERS IN THE U.S.

The railway supply industry has helped to power the U.S. economy for nearly 200 years.

140,000 
Miles of rail in North America

38,000 
Locomotives moving passengers and freight throughout the continent.

If the industry was represented as a U.S. city, it would rank

47th

Largest Metropolitan Statistical Area (MSA) in the U.S.

	GDP, in billions of U.S.\$
Providence, RI	\$80.2
Raleigh, NC	\$79.8
New Orleans, LA	\$77.2
Louisville, KY	\$75.0
Railway supply industry	\$74.2
Jacksonville, FL	\$71.5
Memphis, TN	\$71.5
Oklahoma City, OK	\$70.2
Honolulu, HI	\$64.8

Source: BEA, Oxford Economics

\$10 billion invested

over the last decade to develop and implement positive train control (PTC) technology.

\$74.2 billion

contribution to U.S. GDP in 2017.

The railway supply industry directly employed
125,100 workers in 2017.

On average, they earned
\$78,800 in annual income.

By comparison, the average worker in the U.S. earned approximately \$55,400

The railway supply industry supported an additional
525,000 workers in the wider economy, either in the supply chains of railway suppliers or through the wage spending of those employed by the firms themselves or their supply chains.

For every direct job in the railway supply industry, an additional
4.2 jobs are supported elsewhere in the economy.

\$16.9 billion 

Tax contribution in 2017.

This was made up of \$10.7 billion in federal taxes and \$6.2 billion in state and local taxes.

States where railway suppliers generate the largest impacts:

- 1 Texas \$15.1
 - 2 California \$6.1
 - 3 Illinois \$5.0
 - 4 Pennsylvania \$3.7
 - 5 New York \$3.1
 - 6 Ohio \$3.0
 - 7 Louisiana \$2.9
 - 8 Oklahoma \$2.0
 - 9 Indiana \$1.8
 - 10 Florida \$1.7
- GVA, in billions of U.S.\$

9,900 
veterans

employed in the railway supply industry.

4,000 corporate members



Economic Impact

- RTA has **over 30 years of economic impact data in concert with other associations in this space** (equilateral power to model and predict landscape)
- Joint policymaking efforts with many collaborators: AAR, ASLRRA, Hardwood Federation, Treated Wood Council, etc.
- Boots on the ground: 45G and BRACE
 - Marketplace impact of tax credit approaching **\$1 billion** over the last 10+ years



Presentation Overview

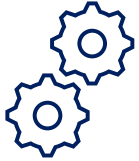
- **Data**
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RTA Econometric Models and Tools



Easy forecasting and planning tools for mapping marketplace dynamics



Updated and easy-to-use, RTA-developed tools



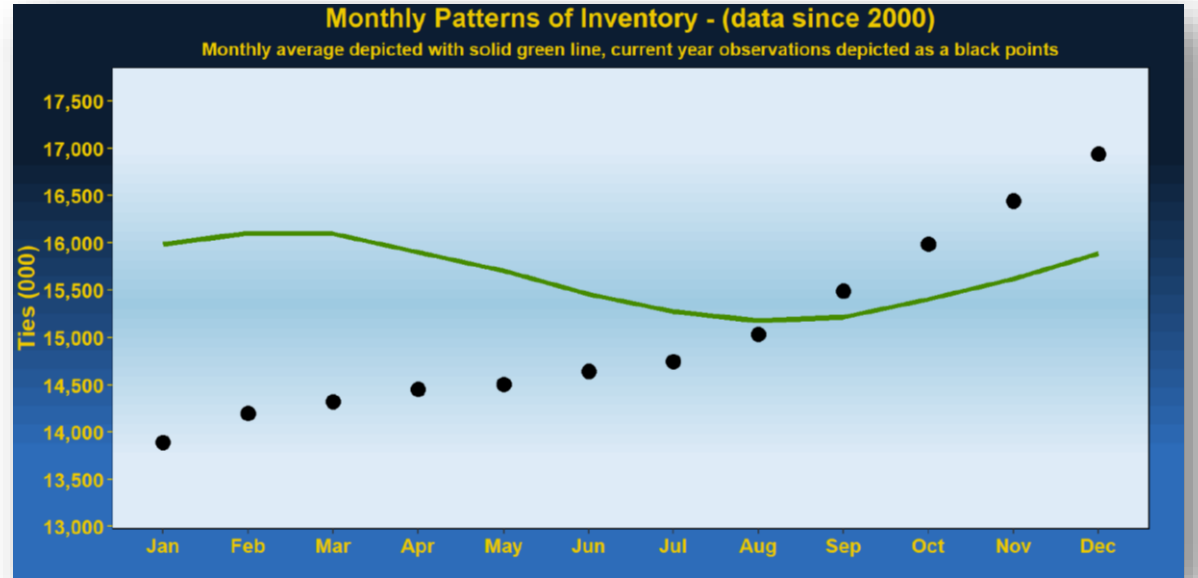
Purchase/Production statistics since 1988

RTA Monthly Reports and Dashboards

1. Compared to last month, the quantity of logs on hand at mill yards is:

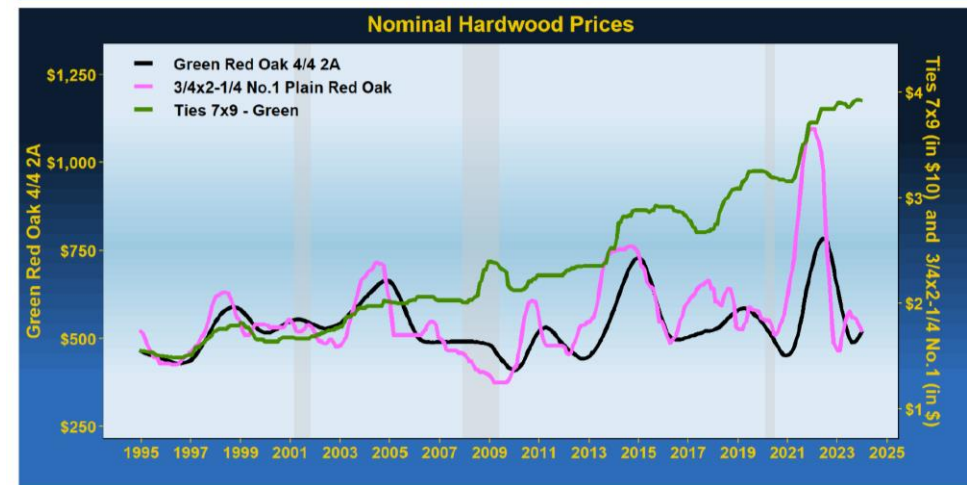
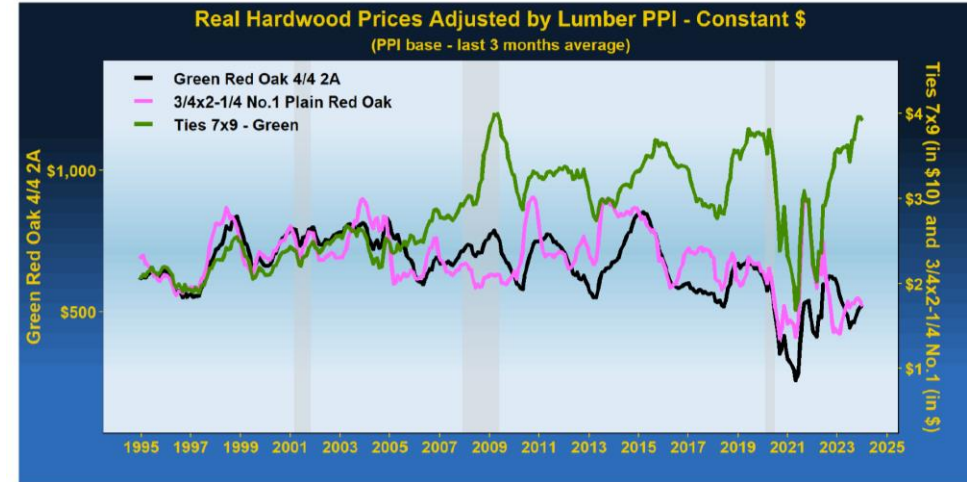


8. What is your view of crosstie competitive position relative to other hardwood products?



RTA Annualized Exhibits & Perspective Illustrations...

...Beyond Production, Purchases and Inventories



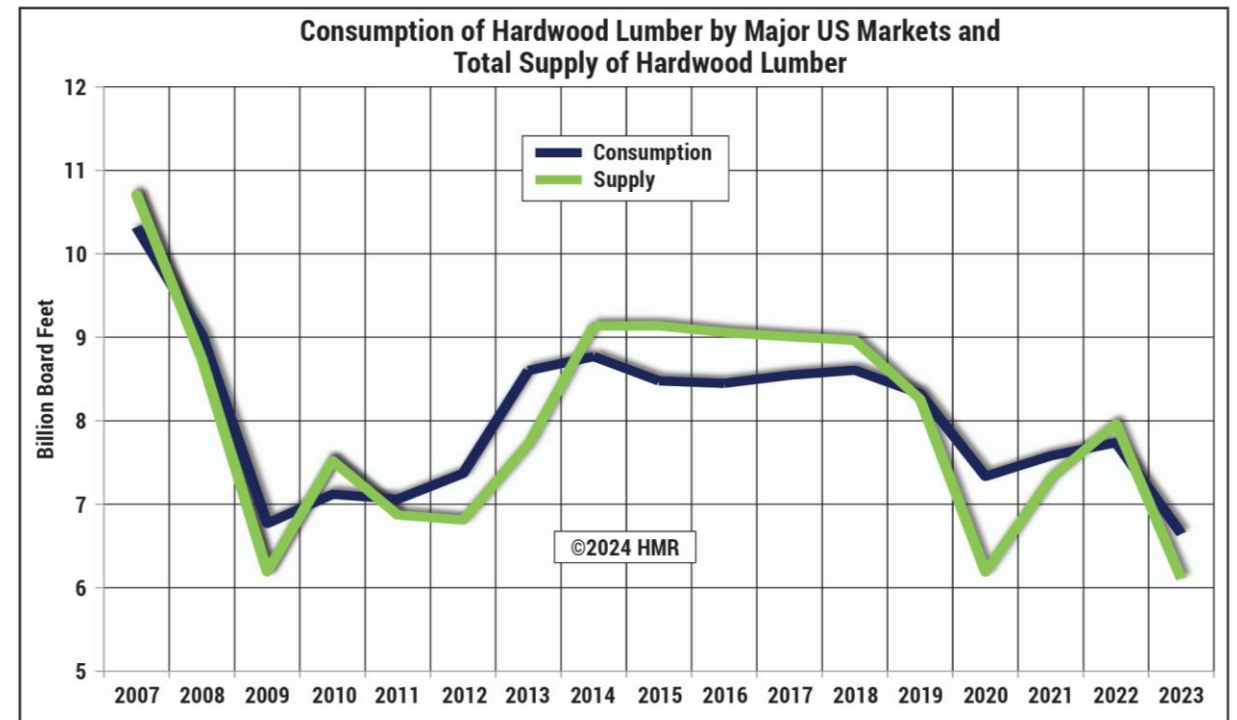
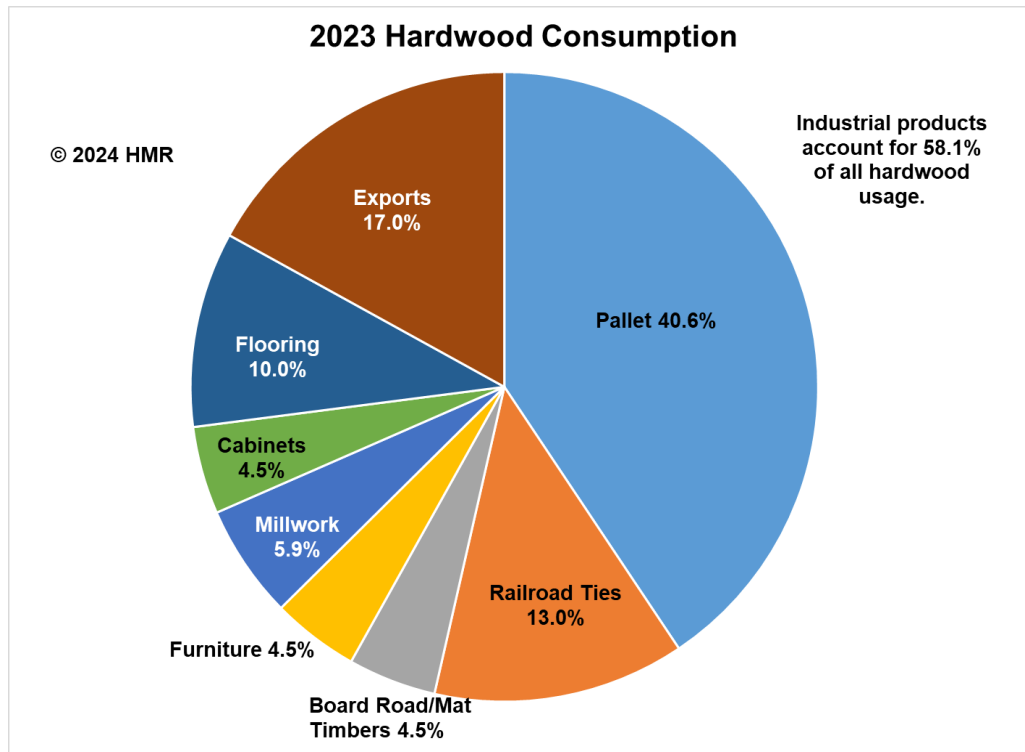
Wood Tie Market Challenges

Three Primary Production Obstacles:

- Labor Inconsistencies
- Parts/Equipment Supply Chains
- Trucking Shortages and Rising Rates

Three Primary Hardwood Commodity Pressures Since:

- Inverse Grade Hardwood Lumber Pricing
- Overall Value Proposition
- Diversified throughput (SYP)



Historical Hardwood Market Trends (Consumption)

Consumption of Hardwood Lumber by Major US Markets											
© 2024 HMR	Billion Board Feet									%	%
	1999	2016	2017	2018	2019	2020	2021	2022	2023	Change 2022	Change 1999
Pallets	4.5	3.265	3.063	3.314	3.527	3.018	3.116	3.365	2.699	-19.8%	-40.0%
Furniture	2.6	0.442	0.431	0.451	0.472	0.387	0.373	0.364	0.298	-18.1%	-88.5%
Exports	1.2	1.659	1.885	1.727	1.375	1.300	1.404	1.412	1.130	-20.0%	-5.8%
Millwork	1.3	0.428	0.473	0.483	0.495	0.431	0.453	0.439	0.389	-11.4%	-70.1%
Cabinets	1.2	0.431	0.457	0.461	0.443	0.401	0.412	0.368	0.299	-18.8%	-75.1%
Flooring	1.4	0.776	0.813	0.827	0.733	0.657	0.716	0.682	0.667	-2.2%	-52.4%
Railway Ties	0.7	1.091	1.057	0.956	0.860	0.843	0.844	0.827	0.862	4.2%	23.1%
Board Road/Mat Timbers	NA	0.357	0.368	0.389	0.422	0.297	0.261	0.279	0.302	8.2%	N/A
Total Estimated Consumption	12.9	8.449	8.547	8.608	8.327	7.334	7.580	7.736	6.646	-14.1%	-48.5%

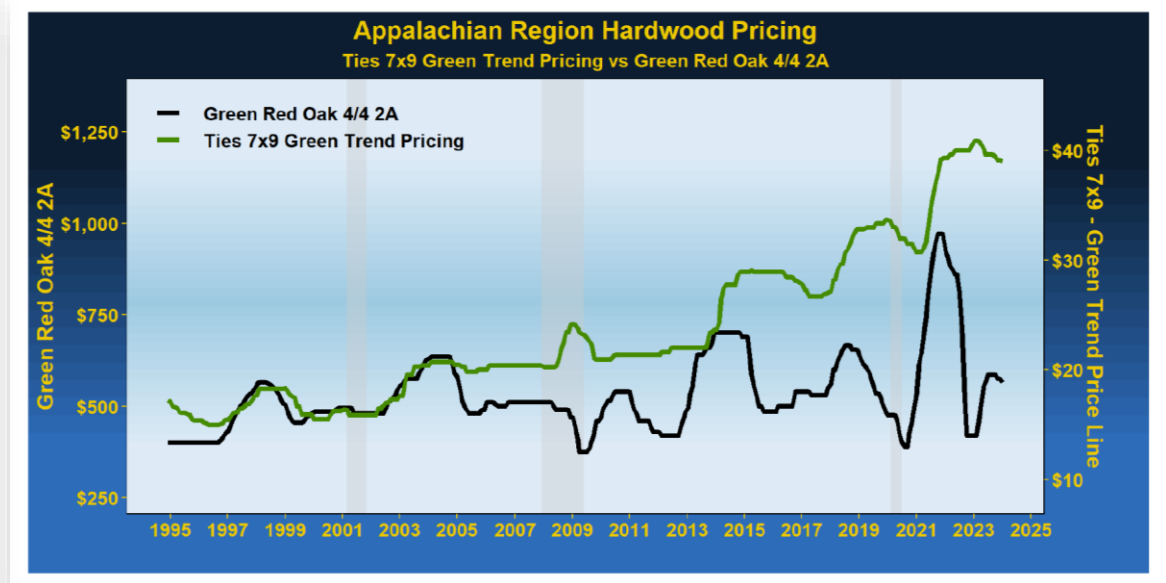
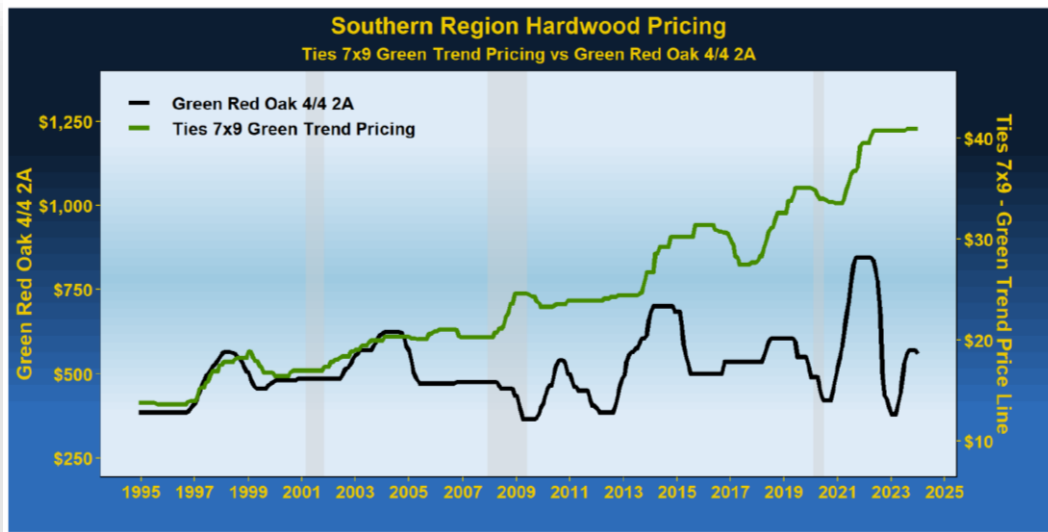
Hardwood Market Trends (Demand)

HMR DEMAND INDEX (HDI)

	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	
Cabinets	Strong	Strong	Good	Strong	Strong	Good	Fair/Steady	Fair/Steady	Slow	Slow	Fair/Steady	Very Slow	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady
Residential Flrg.	Good	Strong	Strong	Strong	Strong	Good	Fair/Steady	Fair/Steady	Slow	Very Slow	Very Slow	Very Slow	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady
Truck Trailer Flrg.	Good	Strong	Strong	Strong	Strong	Good	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Fair/Steady	Fair/Steady
Upholst. Furniture	Good	Strong	Strong	Good	Good	Good	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Very Slow	Very Slow	Very Slow	Fair/Steady	Fair/Steady	Fair/Steady	Very Slow	Very Slow	Very Slow	Very Slow	Very Slow	Very Slow	Very Slow	Very Slow	Fair/Steady
Wood Furniture	Good	Strong	Good	Good	Strong	Good	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady
Moulding/Millwork	Strong	Strong	Strong	Strong	Strong	Good	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady
Wood Components	Good	Strong	Strong	Strong	Strong	Good	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady
Board Road	Fair/Steady	Fair/Steady	Slow	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Slow	Slow	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady
Pallets	Strong	Strong	Strong	Strong	Strong	Good	Fair/Steady	Good	Good	Good	Good	Good	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady	Fair/Steady
Railroad Ties	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Good	Good	Strong	Strong	Strong	Strong	Strong	Strong	Good	Good	Good	Good	Strong	Good	Good	Good	Good	Good	Good



Hardwood Market Trends (Segmented)



Presentation Overview

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Railway Tie Association Annual Events



Tie Grading Seminar

- March 18-21, 2024
- ~ 40 students from across the industry (sales to grading)
- 3 days of classroom, treating plant, and track-side tie instruction



Members-Only Field Trip

- June 10-13, 2024
- 40 max registrants
- Site visits, networking and fun fellowship event



Annual Conference

- October 7-10, 2024
- 2.5 days of technology transfer, networking and engaging with customers in a relaxed, harmonious atmosphere

RTA Annual Tie Grading Seminar

2024 TIE GRADING SEMINAR

March 18-21, 2024
Birmingham, AL



3 DAYS OF INTENSIVE, HANDS-ON INSTRUCTION:

- ✓ ENGINEERING
- ✓ SPECIES
- ✓ DEFECTS
- ✓ OPERATIONS
- ✓ INSPECTION POINTS
- ✓ INSECTS & FUNGI
- ✓ DRYING & TREATING
- ✓ AND MUCH MORE!

REGISTRATION OPENS JANUARY 2024:
RTA.ORG/GRADING-SEMINAR




TIE GRADING SEMINAR

2023 Tie Grading Seminar Draws Largest Class Ever

Held in the spring instead of fall this year, RTA's Tie Grading Seminar took place in Little Rock, Ark., drawing the largest class ever with registration filling up in record time.


The seminar included three days of intensive classroom and hands-on instruction. Attendees commented how much they learned beginning on day one and continuing throughout.

A reception sponsored by **Brewers** kicked things off on Monday night. A big thank you to Mike Gaudin and **Brewers** for the sponsorship and contribution!



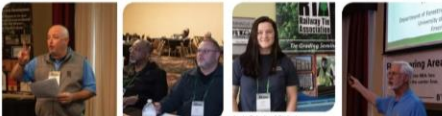
DAY 1

They also focused on classroom instruction, beginning with engineering principles and how to create tie into the railroad system. An introduction to defects and grading followed. After lunch, attendees put their learning to the test with a rebar-replacement grading quiz. Wood species classes came next with small and big trucks and a species test.



DAY 2

They had intensive classroom instruction beginning with insects, fungi, air drying, and a grading presentation and demonstration. An overview presentation of operations and inspection points followed with a review before concluding the classroom portion of day two. The students then took a trip to the Koppers North Little Rock plant for hands-on work with full-scale ties and a facility tour.



CROSSTIES • MARCH/APRIL 2023

TIE GRADING SEMINAR






DAY 2

They had intensive classroom instruction beginning with insects, fungi, air drying, and a grading presentation and demonstration. An overview presentation of operations and inspection points followed with a review before concluding the classroom portion of day two. The students then took a trip to the Koppers North Little Rock plant for hands-on work with full-scale ties and a facility tour.






CROSSTIES • MARCH/APRIL 2023

Crossties

MARCH/APRIL 2023

THE MAGAZINE FOR PRODUCERS & USERS OF TREATED WOOD CROSSTIES & RELATED PRODUCTS

2023 Tie Grading Seminar Draws Largest Group Ever



2023 RTA Tie Grading Seminar


KOPPERS

North Little Rock, Arkansas

REGISTER FOR FIELD TRIP PG. 6

SPECIAL REPORTS:

- Industry Updates, Plant News & More
- RTA Preps For 2023 Field Trip
- Save The Date: RTA Conference Oct. 16-19, 2023
- Neterville: Sawmill Member Profile
- RTA Preservative Research Update
- Tie Grading Seminar Recap In Photos
- Tie Procurement Trends & Statistics




Current and Prospective R&D Projects



FOREST AND WILDLIFE RESEARCH CENTER
DEPARTMENT of SUSTAINABLE BIOPRODUCTS

Fourteenth Annual Evaluation of MSURTA Alternative Preservative Study

Submitted To:

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August 22, 2022



MISSISSIPPI STATE
UNIVERSITY

FOREST AND WILDLIFE RESEARCH CENTER
DEPARTMENT OF SUSTAINABLE BIOPRODUCTS

Tenth Annual Evaluation of Phase II MSURTA Alternative Preservative Study

Submitted To:

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July 11, 2022



In brainstorming current and future needs, multiple approaches were hypothesized, some including:

- Accelerated testing of small samples in a laboratory setting
- Encompass an array of experimental designs simultaneously: small sample, large sample, test plot & in-track considerations, etc.
- Include additional alternative wood species beyond the original scope
- Examine existing methodology for analyzing wood protection techniques and models and likewise preservative systems in use today

Wood Crosstie Research Collaboration

The Railway Tie Association (RTA) recently visited Mississippi State University's department of Sustainable Bioproducts to review the collaborative ongoing wood crosstie research and development study and discuss the potential for adding a phase 3. The original project was founded in 2008, with a second phase added in 2012, and each maturing in 2034 and 2043, respectively. Wood crossties were installed in two sites: at Dorman Lake just outside of Starkville, MS, and in the south part of the state near McNeill, MS. The project is labeled *Alternative Wood Preservative Research Project* (RTA-AWPRP), and both phases include wood crossties treated with multiple preservative systems in stand-alone and dual treatment configurations. The study is the largest of its kind, with the unique robustness of the simultaneous duplicative alternative preservative experimental groups, and with the utilization of full-size wood crossties rather than small-scale representative samples. The two primary objectives aspire to 1) assess the relative performance of new preservative systems in direct comparison to existing creosote and borate/creosote systems in both refractory and non-refractory species, and 2) concurrently duplicate the research in a location where the Formosan subterranean termites are active (McNeill, MS site).

The wood crossties in the study are visually evaluated each year, and every third year a sampling is sawn for further analysis. The preliminary results are presented each year to the RTA annual fall technical symposium attendees. Conclusions will assist the railroad industry in refining the state-of-the-art preservative systems and species matrix to further prolong wood crosstie service life in track. This research is critical to provide better ratings in our nation's critical railroad track infrastructure and tells a great wood sustainability/stewardship story in the process. RTA will invite the original project participants (wood treaters and railroads) to come visit the Dorman Lake study site in the early spring for the 2023 evaluation session. With a potential to add an additional experimental group, i.e. phase 3, RTA and MSU will continue this collaboration several decades into the future.



Dr. Nate Irby, RTA

Dr. Kevin Ragon (MSU-Extension Service) & Dr. Nate Irby (RTA)

Dr. Nate Irby (RTA) & Dr. Beth Stokes (MSU-Principal Investigator, AWPRP)

MSU/RTA AWPRP Dorman Lake Site Visit, Review of Project Status, Discuss Initial Steps to add Phase 3

Alternative Wood Preservative Research Project/AWPRP:

- The original project was founded in 2008, with a second phase added in 2012, with crossties installed in two sites: Dorman Lake just outside of Starkville, MS and in south part of the state in Saucier, MS.
- The project is labeled *Alternative Wood Preservative Research Project* (RTA-AWPRP), and both phases include multiple preservative systems in stand-alone and dual treatment scenarios.
- The study is the largest of its kind, with the simultaneous duplicative alternative preservative experimental groups, and the utilization of full-size crossties in test.
- The two primary objectives aspire to
 - 1) assess the relative performance of new preservative systems in direct comparison to existing creosote and borate/creosote systems in both refractory and non-refractory species, and
 - 2) concurrently duplicate the research in a location where the Formosan subterranean termites are active (Saucier, MS site).

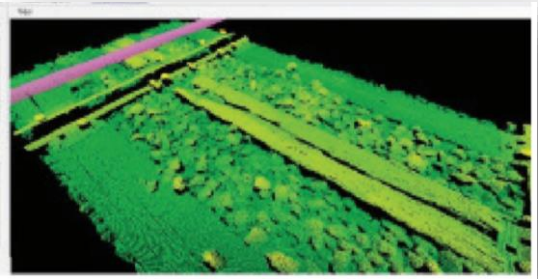
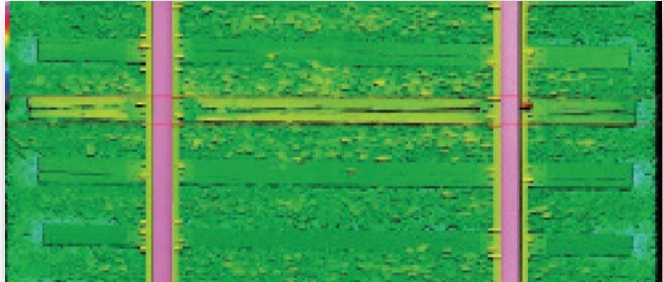
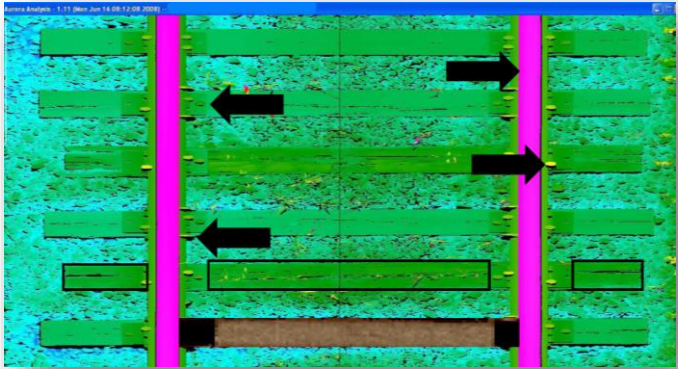
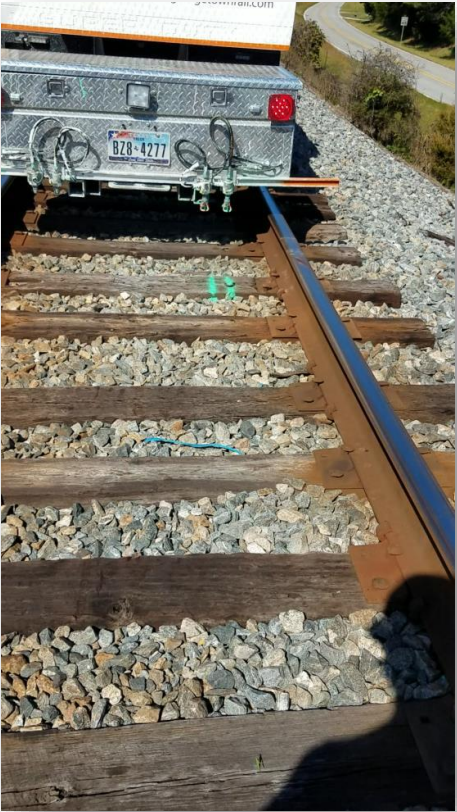
Potential:

- Nondestructive Acoustic Velocity device for tie buyers at point of purchase
- X-Ray at tie processing facility
- Mechanical Property Assessment of Under-utilized species and the potential for allotment on track



Figure 3 – Nondestructive mechanical property data collection via Director HM-200 and Smart Thumper

Emerging Technology: Tie In-Track Scanning

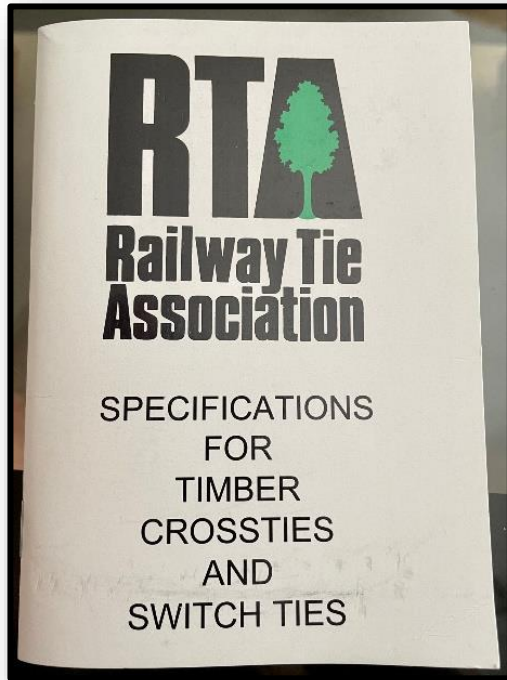


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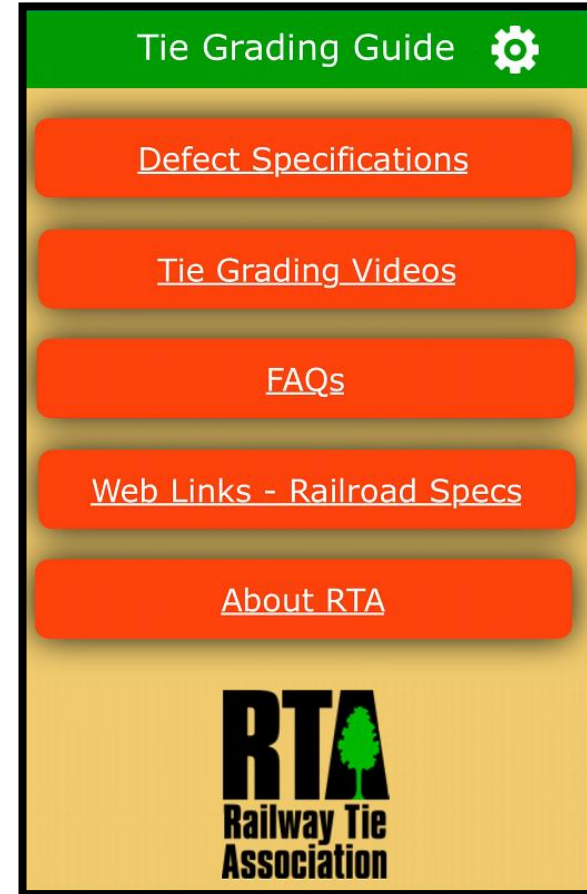
RTA Tie Grading Smartphone App



Grade ties on the go!

Great resource for new and seasoned professionals.

Images, specifications, and the ability to ask for clarity all in one location at your fingertips!

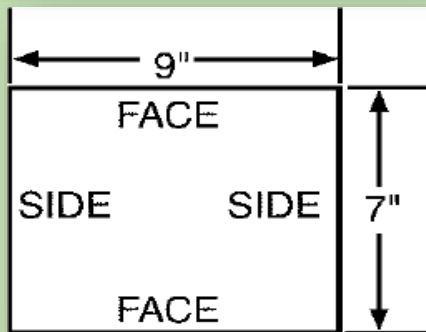
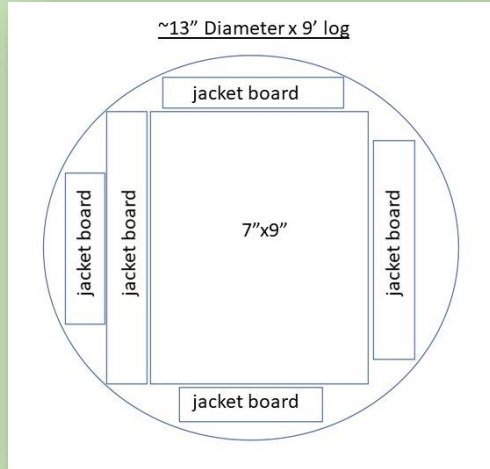


Basic “Grade” Considerations

- **Grade Tie**
 - Tie meets all customer or AREMA specifications.
- **Industrial Grade (IG)**
 - Tie does not meet customer or AREMA specifications but is still good enough to be used in yards or short lines.
- **Cull**
 - Tie is no good.
 - Sold to pallet manufacturers or treated and used to stack on.

Grade 5 Crosstie Dimensions

Example Wood Crosstie Render:



The grade shall be determined at the point of most wane on the top face of the tie within the rail-bearing areas.

The top of the tie shall be the narrowest face and/or the horizontal face farthest from the heart or pith center.

Heartwood Orientation



Rail-Bearing Area: RBA

For 8', 8' 6", or 9' ties, the RBA lies 20" to 40" from the center line.



8' 6" Crosstie

Species Groupings

- **Oaks/Hickory**
 - RR source 60%+
 - Lowry Treatment
- **Mixed Hardwoods**
 - RR source ~20-40%
 - Reuping Process
- **Softwoods**
 - Bridge/Specialty Ties
 - Some RR source for crossties
- ***Excludable Species**
 - Varies by RR



AREMA Sets Standards for Allowable Defects



- Wane
- Shake
- Rot/Decay
- Holes
- Knot
- Split
- Check
- Slope of Grain
- Bark Seam
- Manufacturing Defects
- Bow/Sweep/Twist

Numbers

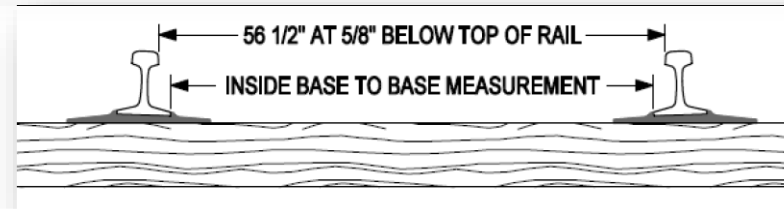
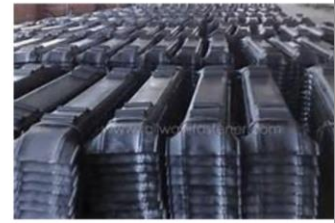
Approximately 3,240 ties per mile.

500,000,000 ties in track.

Between 18 and 21 million ties purchased annually.

Approximately 90% of ties are purchased to maintain existing track.

Wood makes up 93% of ties purchased each year, with concrete at 6.5%, steel 0.5%, resins <0.5%, and Glue-Lam <0.1%.



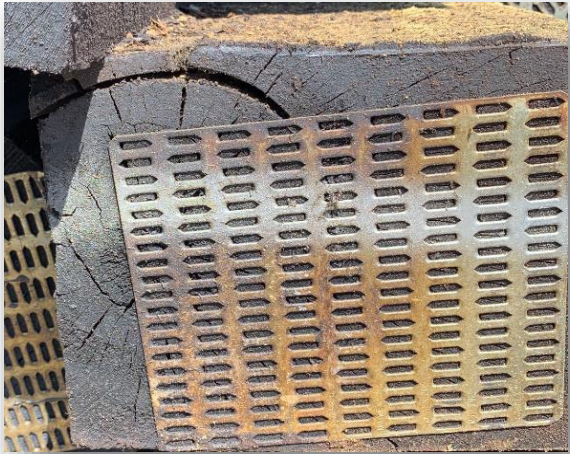
In-Service Modes of Tie/Timber Failure



← **Wane**



Shake



Rot



Modes of Failure

Knot/Hole

The knot below allowed water to get in, causing decay. The spikes had pulled completely out of the tie.

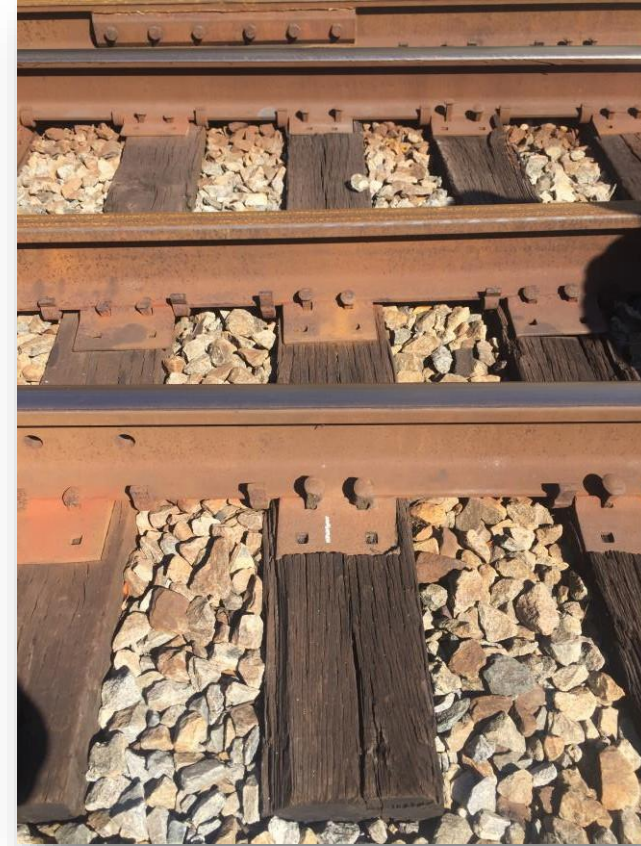


Modes of Failure



Split/Check

Split on the end led to water getting in, allowing decay to spread and causing the spikes to fail. This was a "Down" tie.



Modes of Failure



Bark Seam

This tie never made it to track. It was rejected on site. The tie would have broken during installation.



Presentation Overview

- History and Market Scope
- Data and R&D
- Outreach and Education
- Tie Grading Intro
- **Summary**



SUSTAINABLE RENEWABLE COST EFFECTIVE SAFE

- **RTA Mission: Economic and product development research**
- **Advancing new technologies for industry propulsion**
- **Wood remains optimal choice for 90%+ for all operational track.**
- **Other continents should revisit wood for best life cycle performance.**

Please visit us at RTA.org

