Rhomberg Sersa Second Life System®
Extending Performance Life of Timber Ties

Stephen Atherton
Rhomberg Sersa North America , Jacksonville , USA

Chris Grill
Rhomberg Sersa Rail Group, Bregenz, Austria

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Infrastructure owners and maintainers around the world face ongoing challenges from high axle loads and increasing traffic volumes, which subject rail tracks to elevated vertical and horizontal forces—ultimately leading to component fatigue and failure. The **Rhomberg Sersa Second Life System®** (SLS) offers a proven, **cost-effective, and environmentally sustainable solution** that **extends the service life and performance of wooden ties**. It also enables the restoration of track geometry in traditionally complex and costly assets such as switches, turnouts, timber deck bridges, and curves.

By enabling early intervention, the system utilizes a precision-engineered mechanical insert that prevents screw fasteners from loosening, along with a specialized resin compound that repairs internal wood fiber damage and splits. This combination allows for accurate realignment of the track, reducing dynamic forces and ensuring that baseplates are repositioned to their correct lateral and vertical positions.

When applied as part of a preventative maintenance strategy, the SLS process can add up to five years of additional service life to timber ties—delivering significant performance, cost, and sustainability benefits.

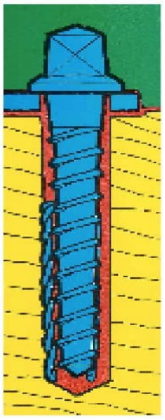

Figure 1. SLS Detail

Figure 2. SLS Installed in Old Ties

Objectives & Installation Process

Through a structured, step-by-step process, this **innovative screw-hole rehabilitation method** offers a sustainable and effective solution to reduce track maintenance needs and operational disruptions. Once completed, the rehabilitated track can **be reopened within 15 to 20 minutes**.

The **Second Life System®** (SLS) re-establishes the critical frictional connection between the tie plate and wooden tie—eliminating the need for full tie replacement. By restoring this connection, SLS enables infrastructure owners to **regain the original track geometry**, effectively correcting issues such as vertical and horizontal misalignment, cross-level irregularities, and gauge defects caused by deteriorated tie conditions.

The process begins with cleaning the damaged tie hole, followed by the installation of a precision-engineered SLS insert. A specialized resin is then injected, which seals the tie hole against environmental elements such as water ingress—one of the primary accelerators of tie deterioration. This resin not only protects the tie from further degradation but also enhances the bond between the tie and the fastener, significantly improving overall strength and long-term performance.

Results

Independent laboratory testing of the **Second Life System® (SLS)** was conducted by the **Technical University of Dresden (Germany)** in accordance with **EN standards**, and by **MxV Rail in Pueblo, Colorado (USA)** in line with **AAR/AREMA standards**. These tests confirmed that **pullout forces for screw fasteners in SLS-renovated ties were comparable to those in new wooden ties**, indicating equivalent holding strength and performance.

Additional testing included: - **Lateral restraint tests**, - **Fastener uplift tests**, - **Tie wear/deterioration simulation**, performed over **3 million loading cycles** to assess the system's ability to maintain stiffness and integrity under repeated stress. Both institutions observed: 1) **No spike hole elongation** or **cracking**, 2) **No fastener system failure**, 3) **No significant loosening of screw fasteners, 4)** The rail **remained firmly seated** in the tie plate, unable to move without loosening the fasteners

The tie, tie plate, and fasteners exhibited **normal wear** consistent with operational use. Moreover, there was **no evidence of excessive tie plate cutting** throughout the testing duration.

Overall, **SLS-repaired ties met or exceeded EN and AREMA standard performance benchmarks** and showed **equal or improved results** compared to historical wood tie test data at MxV Rail.

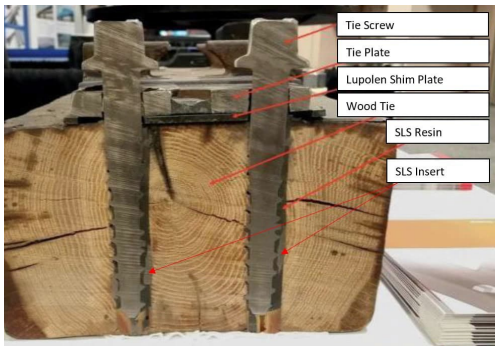

Figure 3: SLS Cross Section Through a Tie

Conclusions

Since the introduction of the **Second Life System®**, thousands of turnouts and many kilometers of timber track ties have been successfully rehabilitated worldwide. The system **has extended the service life of wood tie superstructures by four to ten years**, delaying the need for costly renewals.

This extension not only delivers significant **cost savings** but also **frees up budgetary resources** for other critical infrastructure improvements. In **North America**, Class 1 freight railroads have independently verified that:

1) **No alignment issues** were reported after installation, 2) The system **significantly extended the service life** of turnouts (carrying ~35 MGT annually) and bridge decks, 3) **Renewals could be confidently postponed** until scheduled maintenance windows.

The **Rhomberg Sersa Second Life System®** is a **proven, sustainable, and innovative solution** for extending the performance and lifespan of timber ties across turnouts, curves, plain line, and bridge decks.

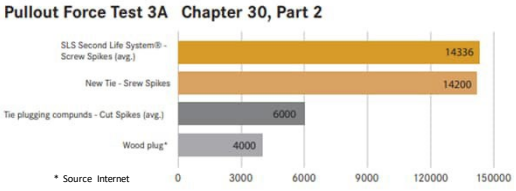

Figure 4: Pull-out Force Comparisons
SLS to Alternative Products

References

Anker, T. & Fengler, W. (2014). Tests on Screw-Hole-Refurbished Wooden Sleepers for the Approval of the Renovation Method for the Austrian Federal Railway. Technische Universität Dresden, Germany.

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Acknowledgments

Rhomberg Sersa extends sincere thanks to our valued partners across the global rail infrastructure industry for their continued collaboration and support in making the **Second Life System®** a proven success.

Above all, we are grateful to our clients worldwide for the trust they have placed in the **Second Life System®** — a legacy of innovation and performance since **1969**.

For further information please contact:
Steve Atherton, Rhomberg Sersa North America, steve.atherton@rsrg.com

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