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To ensure your track performs at its peak, a significant portion of a railroad’s track maintenance budget is dedicated to correct problems associated with poor track structure performance. The railroad track structure provides the supporting foundation for the safe and successful movement of trains. The track structure distributes wheel loads and rail forces while also allowing the track to drain. When this key support structure deteriorates through wear and poor drainage, the strength of the track is reduced, which increases the need for more costly corrective track maintenance.

No one offers better ballast management solutions than Loram. Loram’s equipment and services are best in class in terms of speed, performance and reliability to bring your track back to ideal working conditions. Loram provides shoulder ballast cleaning, ditch cleaning, specialty excavating, undercutting, track lifting and substructure management solutions. Let Loram work with you to provide ballast maintenance solutions that protect your track investments. Loram’s expertise and full service solutions are here for all of your ballast management needs.

SPEED. PERFORMANCE. RELIABILITY.
SHOULDER BALLAST CLEANING

Our technology. Your advantage. The Loram Difference.

Loram leads the way in effective and innovative shoulder ballast cleaning solutions. The use of Loram's advanced self-sufficient shoulder ballast cleaners greatly improves track drainage at industry leading production and speeds. All shoulder ballast cleaning is performed with little disturbance to the track and minimal impact to train traffic throughput.

Shoulder ballast cleaning removes fouled ballast from the track shoulder to restore track support and improve drainage. This restoration process prolongs ballast life and reduces the frequency and cost of track structure maintenance. Loram offers two types of shoulder ballast cleaners: SBC2400 Shoulder Ballast Cleaner and High Performance Shoulder Ballast Cleaner (HP SBC).

After shoulder ballast cleaning, the track is typically able to go back into revenue service without any speed restrictions. Compared to traditional ballast renewal methods, shoulder ballast cleaning lowers costs, increases productivity and optimizes ballast rehabilitation programs through increased system coverage. Loram’s shoulder ballast cleaning solutions are one of the most cost-effective and efficient methods to ensure a healthy track structure and improve overall track performance.

ADVANTAGES:

• Restores drainage
• Reduces substructure disruption
• Lessens track time
• Improves tie life
• Reduces costs
• Improves drainage times by 30-50%
• Inhibits vegetation growth
• Stabilizes track geometry under freeze/thaw cycle
Loram sets the standard for production, quality and reliability with our High Performance Shoulder Ballast Cleaner (HP SBC) for heavy haul, freight and commuter railroads. At speeds up to 2 mph (3.2 km/h), the self-propelled HP SBC cleans up to 1,570 yd³ (1,200 m³) of material, all without disturbing the track geometry.

The HP SBC uses twin 30 in. (76 cm) wide digging buckets to excavate the shoulder ballast. To restore drainage and break up mud pockets, scarifier teeth are directly behind the digging wheels and undercut the tie ends. A series of conveyors transfer the excavated ballast to an adjustable vibrating separator screen where fines are separated from the reusable ballast. The HP SBC redistributes the cleaned ballast along the shoulders in the shape specified by the railroad and discharges the waste material up to 29 ft (9 m) from the center of track. Afterwards the HP SBC quickly moves to the next work site at speeds of up to 48 mph (77 km/h).

**HIGH PERFORMANCE SHOULDER BALLAST CLEANER (HP SBC)**

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**ADVANTAGES:**
- Sets up and stows in 5 minutes
- Digs up to 34 in. (86 cm) below top of rail
- Undercuts up to 5 in. (13 cm) from end of tie to break up mud pockets
- Incorporates a variable incline screen
- Redistributes reusable ballast to shoulder
- Shapes finished shoulder to customer specification
- Discharges separated fines up to 29 ft (9 m) from track centerline
- Up to 5,000 gal. (37,800 L) water capacity for dust suppression
SBC2400 SHOULDER BALLAST CLEANER

For heavy haul and freight railroads, nothing performs better than our fourth-generation shoulder ballast cleaner, the SBC2400. Our cab forward design with enhanced automation and state-of-the-art technology has revolutionized our offerings by improving the speed, power and productivity of our already best-in-class shoulder ballast cleaners.

Loram’s self-propelled SBC2400 excavates and cleans up to 3,140 yd³ (2,400 m³) of ballast per hour at speeds up to 4 mph (6.5 km/h). The four digging wheels rip through compacted ballast at a maximum depth of 34 in. (86 cm) from the top of rail and typically 30 in. (76 cm) beyond the end of the tie. The SBC2400’s separator screen incorporates an elliptical throw motion that results in a more turbulent interaction between the ballast and the screen, resulting in increased cleaning motion and greater ballast and fines separation in all conditions. The cleaned ballast is redistributed along the shoulders with automated hopper doors that improve the ballast distribution automatically by adjusting the flow of ballast, and the waste material is discharged up to 29 ft (9 m) from the center of track.

ADVANTAGES:
• Twice as productive than other shoulder ballast cleaners
• Sets up and stows in 5 minutes
• Undercuts up to 5 in. (13 cm) from end of tie to break up mud pockets
• Incorporates a variable incline, elliptical throw screen
• Redistributes reusable ballast to shoulder
• Shapes finished shoulder to customer specification
• Operates in curves up to 17°
• Discharges separated fines up to 29 ft (9 m) from track centerline
• 10,000 gal. (37,800 L) water capacity for dust suppression
UNDERCUTTING
AND TRACK LIFTING
Leading the industry with advanced solutions.
The Loram Difference.

Drainage and integrity of the ballast layer directly below the ties is an essential part of a healthy track structure. Ballast degrades over time and becomes increasingly fouled reducing its ability to drain, provide adequate load bearing support and withstand vertical, lateral and longitudinal forces. Loram’s undercutting and track lifting services and equipment are the perfect solutions to reestablish a more permeable ballast layer and a stronger structure beneath the rails.

Loram offers two automated undercutter platform solutions that have patented state-of-the-art undercutting digging wheels. As they have self supporting cut-in capabilities, Loram’s undercutters are operational in a fraction of the time of other undercutters and eliminate the need for additional support equipment that often complicate operations and add unnecessary costs. Loram’s undercutters provide industry leading productivity and speed in muddy, highly fouled conditions and for out of face undercutting projects.

A poor track foundation is often attributable to an inadequate ballast layer depth and require additional ballast. With one pass of Loram’s Track Lifter (TL) and additional ballast, a new ballast layer can be achieved while also utilizing the existing ballast as the new sub-ballast layer. Loram’s track lifting is the most productive, effective method to lift and re-ballast the track to rectify ballast depth deficiencies and sunken track topography.

ADVANTAGES:
• Restores drainage performance by renewing entire ballast layer
• Inhibits vegetation growth
• Improves tie life
• Addresses high points and low points in structure
• Stabilizes track geometry under freeze/thaw cycle
UC1200 UNDERCUTTER

As the most advanced undercutting solution of its kind, Loram’s UC1200 Undercutter Cleaner delivers high productivity and complete, single-pass ballast restoration. The UC1200 features innovative dual wheel undercutting technology, which doubles the speed and productivity compared to other undercutting options. At speeds up to 2,000 ft/hr (610 m/hr), the UC1200 is capable of handling and cleaning up to 1,550 yd$^3$ (1,200 m$^3$) of excavated ballast per hour.

A comprehensive and versatile solution to ballast maintenance, the UC1200 integrates industry-leading undercutting and ballast cleaning capabilities for heavy haul, freight and commuter railroads. A separator screen, with exclusive elliptical throw agitation and variable screen leveling, separates the reusable ballast from the dirt, mud and fines. The UC1200 then evenly redeposits the reclaimed ballast to the track, and spoils are placed onto a swing conveyor that can discharge the material up to 35 ft (11 m) from track center or into a material handling or dump car.

ADVANTAGES:

- Has patented twin rotary undercutter wheels
- Processes up to 1,550 yd$^3$ (1,200 m$^3$) per hour
- Incorporates a variable incline, elliptical throw screen
- Undercuts up to 16 in. (41 cm) below bottom of tie per pass
- Distributes reclaimed ballast directly behind the undercutter wheels
- Operates in up to 16° curves
- Displaces waste up to 35 ft (11 m) from the track center
- Pulls up to six, fully-loaded 100-ton ballast cars
Solutions for mud spot remediation, track lowering and large scale re-ballasting projects have historically been slow and highly inefficient. With its patented twin rotary undercutting wheels, Loram’s Track Lifter Undercutter (TLU) removes the low productivity barrier. The undercutting wheels allow the TLU to excel in muddy, fouled ballast conditions where full waste undercutting is necessary. The versatility of the undercutting wheels also shine for any waste-only undercutting project, as the TLU can undercut at speeds up to 2,000 ft/hr (610 m/hr).

The undercutter wheels also allow the TLU to quickly cut in and out, eliminating the need for additional support equipment. Efficiently cutting in and out is beneficial while performing any type of undercutting, but is extremely valuable while undercutting multiple mud spots in a day. The TLU ensures more track time is dedicated to undercutting, rather than preparing the work site or transporting other equipment.

**ADVANTAGES:**
- Has patented, twin rotary undercutter wheels
- Speeds up to 2,000 ft/hr (610 m/hr)
- Undercuts up to 16 in. (41 cm) below bottom of tie per pass
- Operates in 16° curves
- Displaces all material up to 35 ft (11 m) from track center
- Capable of pulling up to 4 fully loaded 120 ton (109 tonne) ballast cars
Loram’s Track Lifter (TL) provides a more productive and cost-effective ballast restoration solution compared to traditional track lifting services. The TL is a versatile machine with automated lifting technology and industry-leading production capabilities by lifting the track up to 12 in. (30 cm) at speeds up to 4 mph (6.4 km/h). Unlike other solutions that only lift track a few inches, the Loram TL lifts the track from formation to a near finished height in a single pass.

The track lifter is also equipped with a crib-leveling bar that helps break up muddy cribs and provides a smooth, level surface after the lift, establishing a consistent foundation and creating a stable, free-flowing track structure. With the new sub-ballast and ballast layer, the Loram track lifter establishes a more permeable ballast and an overall stronger ballast support structure. By utilizing Loram’s TL, the amount of tamping needed is reduced, which then reduces ballast degradation due to tamping. Nothing matches the productivity of the TL for track rehabilitation programs.

**ADVANTAGES:**
- Speeds up to 4 mph (6.4 km/h)
- Lifts track up to 12 in. (30 cm) in a single pass
- Levels the new sub-ballast layer and breaks up muddy cribs with crib-leveling bar
- Sets up and stows in 5 minutes
- Capable of pulling up to four, fully-loaded 120 ton (109 tonne) ballast cars
- Unaffected by jointed rail or welded joints
- Reduces ballast degradation due to tamping
- Enhances track drainage through elevating track topography
SPECIALTY EXCAVATION

Handling tough problems. The Loram Difference.

Poor drainage, fouled ballast and mud spots create the same problems within special trackworks as they do on the rest of the railroad. However, maintaining areas such as tunnels, bridges, crossings, switches, yards and passenger platforms are commonly the most neglected as they create unique and difficult challenges.

Due to special trackwork areas often being busy and restrictive for mechanized machines, performing the simplest of tasks such as ballast excavation often go unperformed. Traditional methods of repairing specialty trackworks require significant resources, track outages and occasionally full reconstruction. As a result, maintenance is often delayed in these areas, resulting in a variety of debilitating ballast and subgrade problems.

The Loram specialty excavating equipment are vacuum excavators with unique flexibility that provide noninvasive maintenance solutions that allow specialty trackworks to be properly maintained. The specialty excavators provide precise control for material removal without damage to track components, which improve remediation of the track structure, increase the load bearing capacity, restore desired drainage and increase the overall maintenance completion rate in these difficult areas. These self-propelled, rail-mounted machines optimize railroad maintenance activities and avoid service interruptions.

ADVANTAGES:
- Cribbs ballast in platform and other restricted areas
- Undercuts switches, diamonds and mud spots
- Removes fouled ballast and debris from tunnels
- Cleans and installs drain tiles and culverts
- Trenches for cables and pipes
- Removes ballast from bridge decks and grade crossings
- Excavates contaminated materials
- HAZMAT remediation
- Locates and excavates near cables without damage
- Rehabilitates crossings
Loram’s exclusive Railvac® is the most versatile machine of its kind. It was developed specifically to perform within the tightest clearances and most difficult areas to reach while offering precision removal of materials without damage to track components. Railvac is a unique excavation machine that conveys material through the use of vacuum technology. Railvac features a remotely controlled manipulator arm that works in conjunction with twin engines and vacuum pumps to excavate compacted ballast, mud, water, sand and soil. The manipulator arm utilizes the high-pressure vacuum to quickly remove material through a combination of powerful suction and mechanical agitation.

Loram’s Railvac offers unmatched flexibility to accommodate the most restrictive and difficult of conditions. The hydraulically controlled manipulator arm can tilt 45° from vertical in any direction to reach ballast under hard to reach track structures, such as third rail and platforms. The nozzle can also work at distances up to 15 ft (4.5 m) from track centerline, maximizing the work area. The excavated material is stored in the machine’s hopper and can be discarded up to 30 ft (9 m) from the center of track or deposited in a material handling car.

ADVANTAGES:
- Removes material through mechanical agitation and airflow
- Manipulator arm tilts 45° from vertical
- Excavates material up to 15 ft (4.5 m) from track center
- Holds up to 20 yd³ (15.25 m³) of material
- Displaces waste up to 30 ft (9 m) from the track center
- Provides 5,000 PSI of nozzle force
- 10,500 CFM airflow suction
- Remotely controlled
**TRANSIT RAILVAC®**

Loram’s Transit Railvac® offers similar, robust capabilities as the Loram Railvac® but in a two-car configuration. The Transit Railvac is specifically designed for transit and commuter railroads with lighter axle loads and tighter clearances requirements. This powerful, rail-mounted, specialty excavation machine removes material through mechanical agitation and airflow. The combination of its strong manipulator arm powered by a diesel engine and its powerful vacuum pumps makes the Transit Railvac capable of excavating compacted ballast or ice encrusted ballast, mud, water, sand and soil.

The Transit Railvac has unique, dual-rotating cabs that ensures total visibility of the worksite and safer operations. Capable of rotating 60° in each direction, the cabs offer the ability to utilize one cab for the entire operation without compromising production and visibility. In areas of specialized work on one side of the track, the dual cab feature gives the operator an up-close view of the operation without having the operator on the ground.

**ADVANTAGES:**

- Removes material through mechanical agitation and airflow
- Dual cabs capable or rotating 60° in each direction
- Manipulator arm tilts 45° from vertical
- Excavates material up to 15 ft (4.5 m) from track center
- Holds up to 40 yd³ (31 m³) of material
- Side dump or conveyor material discharge options
- 10,500 CFM airflow suction
- Remotely controlled
Ditch cleaning is a maintenance practice that is crucial for maintaining the longevity and foundational strength of a railway. A properly sloped and maintained ditch is vital in diverting water away from the track and right of way. Proper ditch maintenance and moving water away from the track reduces standing water, diminishes track saturation and lowers water tables. Ditch cleaning creates a firm foundation by improving the stability of the ballast and subgrade, which is key for track performance. Ditch cleaning often reduces, or in some cases eliminates, the need for other costly maintenance activities.

Cleaned, maintained and properly-sloped ditches improve bank stability and restore functionality of drainage systems. Without a proper ditch, activities at the track to enhance drainage will not provide the desired results. Ditch cleaning has the added benefits of supporting train traffic more efficiently, increasing cycle time between expensive surfacing and lining programs and prevents premature tie deterioration. Due to other conventional solutions being more costly and time consuming, ditch cleaning is often on the bottom of most railroad's maintenance lists, but Loram’s safe, fast and cost-effective ditch cleaning solutions should be a top priority for any successful railroad.
BADGER DITCHER

Loram’s Badger Ditcher offers the most practical, cost-effective, reliable solution for cleaning ditches. Our nimble, powerful and self-propelled Badger Ditcher intercepts and diverts water away from the track to manage, remediate and prevent the damaging effects from a host of penetrating water sources, including direct precipitation, groundwater migration, springs, trapped water, saturation and seepage. Using the Badger Ditcher lets railroads improve vital drainage for the subgrade, lower the water table, control run-off and promote free flow from the ballast section that can extend the effective duration of many track maintenance cycles. Ditch cleaning with Loram’s Badger Ditcher pays for itself by reducing the need for other costly track maintenance.

The Badger Ditcher shapes the ditch to suit customer and environmental specific drainage requirements. The rail-mounted Badger Ditcher is able to work in wet or dry conditions and is capable of moving 800 tons (726 tonne) of material per hour. Loram’s ditch cleaner has an articulated ditcher head that provides a customizable ditch slope contour to optimize drainage needs. The ability to provide a custom, yet consistent ditch slope contour makes the Badger Ditcher vastly superior to any other ditch cleaning solution.

ADVANTAGES:

• Excavates 800 tons/hr (726 tonne/hr)
• Provides a consistent, continuous ditch
• Excavates a variable cutting width ranging from 30–54 in. (76–137 cm)
• Ditches at speeds up to 2 mph (3 km/h)
• Excavates up to 6 ft (1.8 m) below the top of the rail and 22 ft (7 m) from track center
• Discharges excavated material up to 35 ft (11 m) from track center
• Controls slope and contour to enhance ditch volume
• Facilitates vital drainage from the ballast section of the track
• Manages the effects of penetrating water sources
• Reduces or eliminates water-saturated track soils
Predictive maintenance. The Loram Difference.

To accompany Loram’s top-of-the-line ballast management equipment, Loram provides geotechnical substructure actionable intelligence. Actionable Intelligence is confidence in knowing the condition of your entire track structure to make informed decisions that optimize maintenance programs and investments. Loram HyGround Geotechnical Services diagnose and solve problems that affect the condition and performance of railway tracks by seamlessly combining expertise in track roadbed materials, maintenance techniques and data analytics. The result is an advanced diagnostic profile of the health of your track today and identifying trends over time to establish a proactive future substructure maintenance program. Pairing HyGround’s track geotechnical problem solving and analytics expertise with Loram’s highly-productive ballast maintenance equipment results in the most effective and efficient substructure maintenance management programs on the market.
HYGROUND

HyGround’s advanced ground penetrating radar (GPR) system provides continuous measurements of the unseen conditions below the ties, including layer configuration, moisture content and ballast fouling conditions. A full-width assessment of the substructure, typically at depths of up to 8 ft (2.4 m) below the tie, allows railroads to understand and map any substructure issues that are present. HyGround surveys can be performed via hi-rail vehicle or the equipment can be installed on railroad geometry cars.

In addition to GPR surveying, HyGround collects LiDAR topography data, digital video and images to further evaluate the right-of-way and track conditions. The evaluation of substructure issues is enhanced through integrating data from several track measurements. HyGround’s railway geotechnical engineers are experts in providing actionable intelligence based on the interpretation of disparate railway information. HyGround has also pioneered the advanced treatment of routine track geometry data. The analysis of geometry data provides not only an understanding of track roughness deterioration trends but also insight into the root-cause of track problems through evaluation of the geometry roughness signature.

ADDITIONAL SUBSTRUCTURE MAINTENANCE SERVICES:
Field Geotechnical Services - site reconnaissance, instrumentation and geotechnical testing
Asset Mapping - track asset mapping and digital terrain models (DTM) for analysis and improvement designs
Slope Stability - evaluation of right-of-way slope stability factors-of-safety and methods of improvement
Desk Study - evaluation of background railway and geotechnical information for initial understanding of track substructure problems
Handling more. The Loram Difference.

One of the primary cornerstones of track maintenance productivity is capacity. Additional capacity allows maintenance activities to be optimized by extending work windows while also providing enhanced capabilities for proper, timely placement of various materials. Loram’s Material Handling Car (MHC) allows railways to maximize the value of ballast rehabilitation and track construction efforts. The MHC provides additional capacity and logistics solutions for spoils, new ballast and other track materials.

Loram’s robust MHC provides superior material throughput in the most challenging of material conditions. Other features of Loram’s MHC design architecture include scalability, modularity and maintainability allowing equipment customization to fulfill any required need. Loram’s MHC can be a stand-alone unit, coupled to other material handling cars or coupled to any of Loram’s ballast management equipment to provide additional productivity gains.

**MATERIAL HANDLING CAR**

**ADVANTAGES:**
- Scalable design to accommodate clearance and weight requirements
- Standard material casting distance of 23 ft (7 m) from track center
- Standard 1,308 yd³/hr (1,000 m³/hr) material throughput
- Designed for easy maintainability that enhances reliability and ease of use
Loram provides a full line of substructure and ballast management solutions to keep you ahead. Contact us today to see how we can work for you.

800.328.1466  |  sales@loram.com
SHOULDER BALLAST CLEANING

UNDERCUTTING AND TRACK LIFTING

SPECIALTY EXCAVATING

DITCH CLEANING

SUBSTRUCTURE MANAGEMENT