# Railcar dumper system upgrades

Significantly improve **reliability**, **maintenance efficiency**, and **safety** with our range of customized retrofit solutions.

metso
Expect results

As your production goals evolve, so should your equipment. For the latest technology and efficiency, you don't have to look very far. Your existing assets have the potential to take on significant improvements. Our team of experts can support you throughout, from identifying retrofit options to implementation.

**Ask about our full range of retrofit options and custom railcar dumper solutions.**

## The Metso solution

Whether you want to improve maintenance efficiency, safety, or equipment reliability, we have you covered. Discover our range of custom-engineered upgrades for your:

- Dumper cage and clamp
- Trunnion assemblies
- Drive units and hydraulic systems
- Electrical, instrumentation, & controls

## Why partner with Metso

As an OEM, Metso has been designing equipment, parts, and retrofit solutions for railcar dumpers since 1905. We've combined the best features from our industry-leading legacy brands with modern technology to bring innovative and reliable solutions.

With the use of advanced engineering tools, we ensure accurate and high-quality manufacturing that meet Metso's strict standards and tolerances.

## Brands we support

- Metso
- Svedala
- Dravo
- McNally Wellman
- McDowell Wellman
- Mukand McNally
- Strachan & Henshaw
- Stephens Adamson

**Also available for select non-Metso equipment*

## Benefits

- Maximize equipment performance with a cost-efficient solution
- Gain new functionality with modern technology
- Ensure equipment reliability and longevity
- Improve ease and timeliness of maintenance activities
- Reduce safety risk and prevent major structural damage to your machine

## Improve reliability, maintenance efficiency, and safety with

# Metso railcar dumper system upgrades

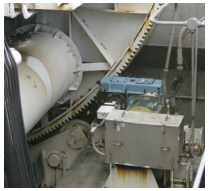
Incorporating modern technology without major investment

### Dumper cage and clamps

Extend the life of your dumper by upgrading to rolled T end rings. Protect your equipment and rolling stock by conversion to breakaway car clamps, UHMW wear strips on your blocking and addition/upgrade of buffers for dumper rotation.

### Trunnion assemblies

Upgrade to a dual, triple or quad wheel trunnion design to increase your end ring, rail, and trunnion wheel life. Innovative design minimizes downtime through quicker and safer maintenance.



### Drive units and hydraulic systems

Improve your safety and availability with drive and hydraulic upgrades. Options include: raising dumper drives units to track level, converting to dual drives, installing a spindle operated dumper latch, relocating hydraulic manifolds and check valves to the rear side of the dumper, and moving hydraulic power units off board.

### Electrical, instrumentation, and controls

From upgrading individual sensors to a complete electrical, instrumentation and controls (EI&C) package, many upgrade options exist to maximize throughput and ensure smoother operation. Improve system diagnostics and/or make advanced controls more operator friendly.

Discover our service portfolio: **metso.com/mining-services**

| Metso premium components and parts | | |
|---|---|---|
| **For rotary car dumpers** | **For train holding devices** | **For railcar positioners** |
| Cage | Gripper | Rail & rack |
| End ring | Gripper bars | Track |
| End ring rails | Truck lock | Arms |
| Hydraulic, gravity or chain clamp | Holding arm | Support & guide roller |
| Gear racks & pinions | Retarder | Draft gears & buffers |
| Chains (drive or clamp) | Clicking stop | Haulage drums |
| Trunnion roller | Hydraulic systems and components | Wire rope & sheaves |
| Drivetrain (motors/gearbox) | EI&C | Drivetrain (motors/gearbox) |
| Hydraulic systems and components | | Hydraulic systems and components |
| EI&C | | EI&C |
| | | Festoons & power track |

## More for your railcar dumper system

**Inspections:** From quick visual and vitals to detailed custom inspections for your railcar dumper and it's key components.

**Optimization studies:** Evaluate potential for capacity increases through time cycle optimization and retrofit components. Predict useful life and preventative maintenance requirements with life cycle analysis.

**Field service support:** 1500+ global team of service experts to carry-out installations and perform repairs.

**Life Cycle Services:** Custom, progressive, service packages focusing on parts supply and inventory, maintenance, process optimization, and more.

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## Railcar dumper system upgrades

# Dumper cage and clamp

### Rolled T end rings

Traditional end rings are welded under the end ring rail and are subject to high wheel loads. This critical weld often cracks prematurely, leading to end ring failure.

Metso constructs the flange and a portion of the web from a standard structural T shape, eliminating the critical weld. As a result, the high load zone has a rolled section with a large radius and the full penetration weld is removed to a low stress zone. This leads to a significantly longer operating life for the end ring.

### UHMW wear strips for blocking system

UHMW wear strips are used to cushion the side of the railcars and eliminate scrubbing of the side walls. The UHMW material has a lower friction factor which reduces loads into the blocking structure and prolongs cage life. It also minimizes wear on the railcar siding. To make replacement simpler, the wear strips are bolted on in segments which improves maintenance efficiency.

If the existing blocking wall is not suitable or is worn out, a new blocking support structure can be provided to replace the existing one. Full length blocking can also be provided if required.

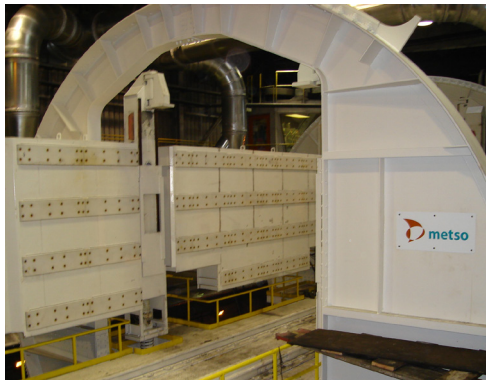
### Breakaway car clamps

The breakaway clamp assembly employs a vertical pivot that allows the clamp head to rotate out of the way when struck on the side such as by a railcar or a locomotive. Both the clamp and the whole dumper cage are protected.

The clamp is held in place by a small shear pin designed to fail in the event of a collision. After a failure, the clamp head is rotated back into place and the shear pin replaced.

### Buffer for dumper rotation

The buffers are designed for an uncontrolled tip or high-speed return of the dumper. It absorbs the energy during unexpected stops in operation due to a drive or brake failure. As a result, damage is minimized to the dumper and dumper drive equipment and components.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## Railcar dumper system upgrades

# Trunnion assemblies

### Trunnion design

Metso's innovative trunnion design uses a self-contained, pre-assembled and pre-lubricated AP bearing design that reduces maintenance costs and increases reliability. A proven double sealing arrangement minimizes dust ingression and ensures correct lubrication to the wheel bearing.

Trunnion wheels are available in a range of materials to provide optimum wear life for the end ring rails. Individual wheels are housed in a dual wheel equalizer frame and can be independently replaced just by removing two screws.

The complete equalizer frame (dual or quad) slides out to one side without having to pull a pin. Jacking pads can also be supplied to facilitate removal. Compared to alternative methods, this design significantly simplifies maintenance.

Enable trouble-free adjustment of your trunnion assemblies and ensure correct alignment and proper support of the dumper cage by using a Metso designed dumper trunnion arrangement complete with base frames.

### Dual, triple, or quad wheel trunnions

Adding more trunnion wheels to your dumper system will better distribute the end ring load. This reduces the fatigue loading of each cycle on the end ring, thus extending dumper life significantly. End ring rail and trunnion wheel surface wear life are also increased due to reduced stress.

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## Railcar dumper system upgrades

# Drive unit and hydraulic systems

### Relocating drive to grade

Relocating drive units to upper floor (track level) avoids dirt and grime from the dumper pit area. This helps minimize material accumulation on the drives and promotes easier maintenance and service.

### Conversion to dual drive

By converting to a dual drive, the material load is dispersed approximately in half which can help extend drive life. The second drive also holds the cage during drive failures thus preventing a cage runaway, and can be used to continue dumping until the train is completed.

Upgrades differ depending on your machine's configuration: If driven from one end only, a second drive is added on the opposite end to eliminate the large torsional forces in the dumper cage. This lengthens cage life by minimizing shear stresses in front and rear girders and bolted connections.

If driven by a single drive with two pinions, the single drive is replaced adding drives at either end. This removes the requirement need for an extended cardan shafts and delivers a safer system and easier maintenance.

### Off board HPU unit

One single main HPU unit designed to replace individual units per clamp cylinder. The unit is installed external from the dumper, away from the material being handled. This helps improve fluid cleanliness and eliminates leakage from rotary breathers. The upgraded unit also offers enhanced troubleshooting, better system reliability, and simplified maintenance. A standby pump is recommended to ensure availability.

### Spindle operated dumper latch

A positive mechanical latch that is spindle operated to engage the rack. This allows the dumper to be secured during maintenance of the dumper and dumper drives. It can also be interlocked with the dumper control system to prevent accidental start up of the dumper.

### Hydraulic manifolds & check valves

Manifolds are relocated to the rear side of the dumper to keep clear of dust from the dump side. Check valves are installed on the cylinders to protect the cylinder in case a hose breaks.

### Dual hydraulic relief valve for car clamps

Enables clamping at low pressure and raising of clamps at high pressure. The valve also reduces the clamping load on the sill of the railcar and helps prevent damage.

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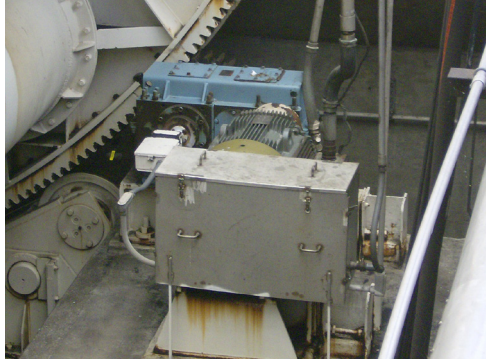

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## Railcar dumper system upgrades

# Electrical, instrumentation, and controls

### Laser positioning system

A laser distance measuring device used to accurately determine positioner location. Mounted off-board the positioner, the device is not subject to the shock and stresses of the positioner's movement. It also eliminates slippage of fifth wheel during inclement weather condition and does not require re-calibration.

### Limit switches

Traditional fork lever and arm actuated limit switches experience several problems originating from corrosion to broken trip devices and arms. To avoid these issues, Metso has developed many non-contact replacements for older type position sensors.

### Resolver

Metso's resolver upgrade is a replacement for a dumper drive encoder and cam limit switches. It eliminates the need for a reduction gearbox and enables car clamps to be locked and released at specific points of the dumper rotation. This makes the resolver very easy to set and change.

### PLC controls and HMI interface

Engineered PLC systems with Human Machine Interface (HMI) providing critical information and enhanced troubleshooting assistance. This upgrade features custom designed software and pre-wired control panels to interface with the existing system. The system integrates multiple devices to fully automate the coordination of the complex functions of the dumper/positioner. The operator gains full control of all machine functions and receives in-depth messages regarding machine status, operations, maintenance, and safety.

### Control system

To gain the latest technology and functionality, Metso has many system upgrades available:

- Upgrade PLC processor to latest version processors. Re-use existing I/O modules, upgrade to latest version I/O modules or upgrade for systems or machines in stages
- Upgrade PLC communication network to Ethernet/IP, ControlNet and DeviceNet, or wireless platforms
- Remote I/O upgrades to minimize wiring
- Replace analog and digital I/O interface to motor controllers. Replace existing field device I/O with distributed I/O or with PLC platform communication ready devices

### Variable speed drives

Replaces existing single speed and two speed dumper controllers with a true four quadrant adjustable speed controlled torque drive system. It provides controlled acceleration and deceleration which softens the impacts that occur during speed changes and at the beginning and finish of the dump/return cycle. Brake wear is minimized as stopping of the dumper and positioner is accomplished by regenerative motor torque. Dumping cycle can also be decreased by increasing motor speed without changing gearing.

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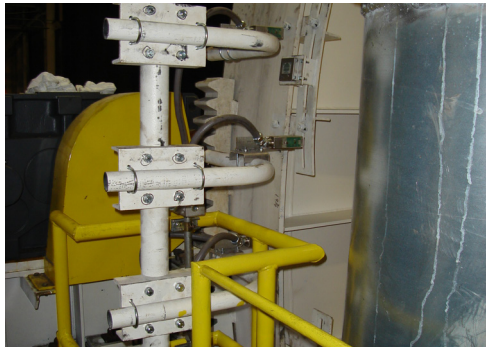

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