

ROTARY CAR DUMPERS / POSITIONERS

Thirty (30) Available Upgrades to Existing Equipment

1. Dual Wheel Trunnions/Quad Wheel Trunnions*

Replaces single wheel trunnions with double wheel trunnions. Very popular where heavier railcars are being considered.

Benefit: a) Distributes the load seen by the end ring to 8 points as opposed to 4 points.



b) Reduces fatigue loading of each cycle on the end ring, thus increasing dumper life four fold.
c) Rail and trunnion wheel surface wear life is improved.

* Quad wheel trunnions are suited to heavier usage applications, such as bulk export terminals where typical usage exceeds 15 to 20 million tons per year.

2. Rolled "T" End Rings

Conventional end rings were constructed from a separate flange plate welded to the end ring web. This weld was located immediately beneath the end ring rail and subject to very high wheel loads (including flanging). This critical weld often cracked prematurely leading to end ring failure. By constructing the flange and a portion of the web from a standard structural "T" shape, this critical weld is eliminated.



Benefit: Much longer barrel life. Special five year warranty is offered by Metso Bulk Materials Handling on rolled "T" end rings.

3. Flux Vector Drives

Replaces existing single speed and two speed dumper controllers with a true four quadrant adjustable speed controlled torque drive system.



Benefit: 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. Minimizes brake wear in that the stopping of the dumper is accomplished by regenerative motor torque. Dumping cycle can be decreased by increasing motor speed without changing gearing. Also permits an initial slow speed dump of the first car when the hopper is still empty.

4. Programmable Logic Controllers w/ Human Machine Interface

Engineered PLC systems with Human Machine Interface (HMI) for improving operation, providing beneficial information and lending troubleshooting assistance to the operator on your dumper/positioner. Features custom designed software and pre-wired control panels to interface with your existing system. The system integrates multiple devices to fully automate the coordination of the complex functions of the dumper/positioner.



Benefit: Eliminates relays and timers, etc. Reduces duty cycle times by compensating for train dynamics. In addition, troubleshooting is performed electronically where a message center displays the machine status/problem. Hence, the PLC with HMI upgrade provides greatly improved diagnostics and operator help messages to walk new or inexperienced operators through the necessary steps to run the equipment. It provides the operator with the ability to control virtually all machine functions and provide operator with in-depth messages regarding machine status, operations, maintenance and safety.

5. Laser Positioning System for Positioners

Laser distance measuring device used to determine positioner location. Replaces the fifth wheel assembly and encoder system for positioner operation.



Benefit: Eliminates all moving parts. Mounted off-board the positioner, so it is not subject to the shock and stresses of the positioner's movement. Also, eliminates slippage of fifth wheel during inclement weather conditions and needs no re-calibration.



6. Dumper Blocking with UHMW Wear Strips

UHMW wear strips bolted to existing blocking mechanism.

Benefit: Facilitates spring relief friction factor on blocking and minimizes wear on aluminum railcar siding. Bolted on segments for easier replacement.



7. Conversion to Breakaway Car Clamps

Head of existing clamp is cut off and replaced with a new breakaway clamp assembly by Metso Bulk Materials Handling.

Benefit: The new breakaway clamp assembly employs a vertical pivot that allows the clamp head to rotate out of the way when struck on the side. This would be typical of the way a car would hit it if it was down when a car entered the dumper. The clamp is held in place by a small shear pin. After an accident, the clamp is rotated back to its proper position and the shear pin replaced. Quick and easy! Not only does this protect the clamp, but more importantly, the entire barrel is protected.



(Very popular upgrade.)

8. Remote Troubleshooting Via Modem Interface and Remote Condition Monitoring

Modem interface allows Metso to troubleshoot your PLC controller(s) from our Pittsburgh office.

Remote condition monitoring is an enhanced service to assist your Maintenance Department through the periodic downloading and evaluation of selected equipment operating data, such as, motor current, speeds, and material throughput on a monthly basis.

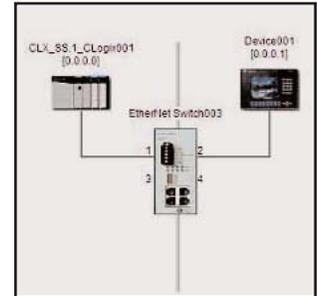


Benefit: The review of operating data will permit Metso to identify potential equipment problems and to recommend solutions to avoid consequential equipment downtime. Identification of an equipment problem by maintenance personnel, in advance of a component failure, can result in significant cost savings since measures can be taken to avoid costly equipment downtime.

9. Control Upgrades with State-of-the-Art DeviceNet Communications

Upgrade existing controls to reduce maintenance and troubleshooting efforts.

Benefit: This upgrade reduces control wiring from field devices to the electrical house PLC panel. The upgrade eliminates long wiring runs for ease of troubleshooting. The upgrade can be supplied in two different methods:



- Connect existing field devices, motor controllers, operator consoles and other equipment to a common communication link. Control wiring is eliminated from the first connection box to the electrical house. The equipment is connected to a DeviceNet platform.

- This method places I/O modules out at the junction boxes connected to field devices or "remote I/O." Control wiring from the junction boxes to the electrical house is drastically reduced. Trouble-shooting of wiring is reduced to "device to I/O modules" local to the device.

10. Off Board Hydraulic Power Unit Retrofit

For use on dumpers with individual HPU's for each clamp cylinder operator. The retrofit replaces the four individual units with (1) one main unit located off of the dumper and away from the material flow area. This retrofit also includes the use of the wet pin solenoids noted as Item 20 of this upgrade list.



Note: As an option, this upgrade is available with a back-up pump system to eliminate train delays.

Benefit: Improves fluid cleanliness, does away with the leakage problem of the rotary breathers, enhances troubleshooting ability, and betters system reliability.

11. Dump Latch

Positive mechanical latch to lock dumper during maintenance of drives.

Benefit: Simple. No more tie downs, saves labor, improves safety.



12. Raise Dumper Drive Units to Track Level



Relocate drive units to upper floor (track level).

Benefit: Moves the drives out of the dirt and grime of the dumper pit area. Minimizes coal accumulation on the drives and promotes easier maintenance and service.

13. New Dump-Through Platen

The dump-through platen modification includes a full grizzly for full-car-width dump. The upgrade comes complete with an added platform and handrail for servicing hopper gates. The rear girder and car clamps are repositioned to facilitate the walkway for servicing/opening hopper doors. Car clamp heads are lengthened and a safety rack latch is provided to lock the dumper from rotation.

Benefit: Allows for handling both bottom dump and rotary dump railcars.

14. Conversion from Single to Dual Drives

For those dumpers currently driven from one end only, a second drive is added on the opposite end.

Benefit: Eliminates the large torsional forces in the dumper barrel. This lengthens barrel life by minimizing shear stresses in front and rear girders and bolted connections. Each drive takes half the load for longer drive life. The second drive also holds the barrel during drive failures thus preventing a barrel runaway, and can be used to continue dumping until the train is completed.

15. Hydraulic Manifolds and Check Valve Relocation

Benefit: Locating the manifolds on the rear side to keep clear of the dusty atmosphere of the dump side. Also locating check valves on the cylinders as opposed to the stack manifolds prevents any effect to the cylinder should hose breakage occur.



16. Resolver to Replace Dumper Drive Encoder

Benefit: The encoder for this location generally requires a reducer to maintain less than one full revolution. Replacing the encoder with a resolver eliminates the need for the reduction gearbox, thus no longer requiring an explosion proof box.



17. Resolver to Replace Cam Limit Switches

A resolver mounted to an extension of the rotate reducer shafts sends rotational impulses to a programmable limit switch located in the "clean" electrical control room. This upgrade is used to lock and release car clamps at specific settings during rotation of the dumper. Replaces the dumper cam limit switch.

Benefit: Very easy to set. Exact degrees are programmed on the built-in keyboard. Solid state outputs eliminate contacts in a bad environment. Easy to change output settings.

18. Proximity Limit Switches

Incorporates the use of epoxy potted limit switches for all dumper and positioner applications.

Benefit: No external moving parts. Eliminates the many problems that stem from corrosion and condensation.



19. Integral Platen Weigh Scale

Replace existing platen with a new platen with integral load cells. This modification requires some major changes to the dumper barrel and supporting members of the platen.



Benefit: The integral weigh platen allows cars to be weighed before and after dumping without the need of separate

track scales. The scale will have an accuracy of 0.1% and will meet railroad requirements for such devices. Weighing does not interfere with the dumping operation. (Note: This scale is used on random operations only. Unit train coupler forces interfere with scale accuracy, and hence scales on these type of dumpers will not meet most customer requirements.)

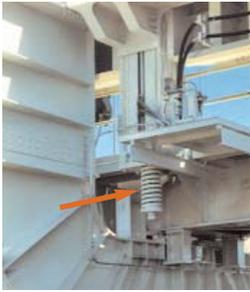
20. Replace D.C. Mill Brakes and Solenoid Operated A.C. Brakes with A.C. Thruster Type Brakes

Benefit: More reliable, self-adjusting air gap, limit switch for positive release indication and no cumbersome electronic packages.



21. Car Spring Relief Modification

a.) Addition of mechanical car clamp relief springs allow the entire car clamp assemblies to rise within the support structure.



b.) Addition of a hydraulic accumulator allows the cylinder actuator rod to extend during rotation of the dumper.

Benefit: Either type will allow the car clamp hook to raise

enough to alleviate the structural entrapped forces of the car against the clamps caused by the unloading of the car wheel springs. This also helps prevent stress cracking in the end rings and cuts down on the possibilities of derailment during return rotation of the barrel.

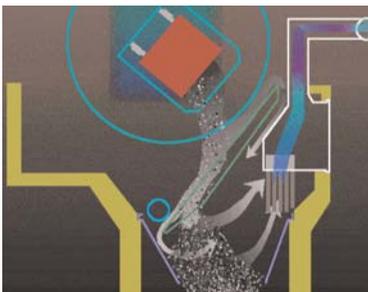
22. Positioner Optimizing Controller (POC)

A micro-processor based system of sensors and interfaces coupled with software that automatically adjusts the point and rate of deceleration for a train positioner. The ability of automatic real-time adjustment allows each positioner cycle to be optimized instead of optimizing for the worst case scenario as was previously done. It also gives the positioner ability to adjust to nearly any configuration of trains without manual adjustment.



Benefit: Faster unloading times. Able to accept 286 kip, slackless drawbar or standard coupled railcars without damaging positioner drives. Eliminates the need for engineering studies and manually changing ramps each time a train configuration changes.

23. Integrated Dust Containment



Integrated dust containment system built within the confines of the existing structure. Collects the dust and discharges it back into the system at the same point where it is generated.

Benefit: Minimizes dust generation at its source and requires less ductwork, less CFM and less HP. Thus, it is less costly to install, operate and maintain than conventional bag house type systems.

Note: Inherent with a PLC system.

24. Removable Trunnion Bases

A retrofit which is frequently purchased when the weldment which holds the trunnion wheels must be replaced. In "older" style dumpers the sill beam was integral with the two wheel supporting brackets. This modification generally consists of cutting off the bracket from the existing sill beam, adding stiffeners and replacing with a new trunnion assembly that is bolted independently to the sill beam. This design is common on most "newer" style dumpers.

Benefit: Permits the use of shims and chock blocks to adjust the location of the trunnion wheels and makes for easier alignment. It also makes replacement of the bracket much easier in the event of damage due to an accident. Help ensures proper barrel support for longer life.

25. Shock Absorbing Stop for Dumper Rotation

Absorbs energy during sudden stops in operation due to drive or brake failure.



Benefit: Minimizes damage to dumper drive equipment and components.

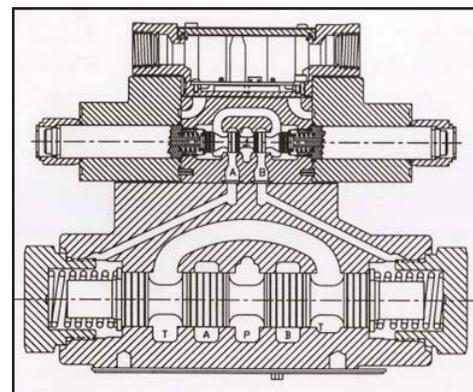
26. Dual Hydraulic Relief Valve for Car Clamps

Addition of a dual hydraulic relief valve to control pump pressure. This allows clamping at low pressure and raising clamps at high pressure.

Benefit: Reduces clamping load on sill of railcar during dump cycle. Reduces potential damage to railcars.

27. Wet Pin Solenoid Valves

Replaces "old style" non-overriding, belled end, explosion proof car clamp solenoid valves.



As solenoid pins are immersed in oil, this helps to prevent the valve from sticking due to corrosion. It also reduces mal-

functions and coil burn-out. (Note: These are also explosion proof valves.)

Benefit: Maintenance aid. Provides ability to override the solenoid valve and operate the clamp on location.

28. Proportionally Actuated Retarders

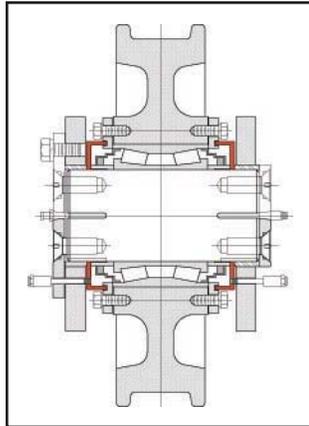
The addition of a proportional directional valve and electrical control card to control the retarders.

Benefit: Gives operator better control of the car. Lessens the shock on the structure by gradually decelerating the rail car instead of a sudden stopping of the car.

29. AP Bearing with Double Seal Upgrade

Incorporates a grease dam around the bearing seal.

Benefit: Prevents water wash and contamination from entering the bearing seal area.



30. Pressure Transducer Retrofit

For use on dumpers with PLC's. The retrofit replaces the car clamp pressure switches with analog pressure transducers.

Benefit: Gives a better indication of actual pressures in the car clamps, eliminates the sometimes unreliable clamp pressure switches and provides in infinitely adjustable dead band.

