

CONTINUOUS BARGE UNLOADERS

Thirty-Seven (37) Available Upgrades to Existing Equipment

1. Control Upgrades with State-of-the-Art 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.

2. Wear Inserts for Head and Tail Sprockets on Twin Ladder Continuous Barge Unloaders

Integrate wear inserts in root area of head and tail sprocket halves.

Benefit: Less costly. Replaceable wear inserts in lieu of replacing the entire sprocket half.

3. Upgrade to Caterpillar® Chain

Upgrades standard engineered chain to CAT® sealed chain.

Benefit: Longer life, less maintenance.

4. Stainless Steel Operator’s Cab

Benefit: Corrosion resistant, esthetically pleasing.

CONTINUOUS BARGE UNLOADERS **Available Upgrades to Existing Equipment** **continued**

5. Remote Video Camera Addition

Benefit: Provides better visibility of digging operation. Also, cameras can be used for equipment security and monitoring.

6. Flux Vector Drive for Cantilever Hoist

Replaces the contactor-based controls on machines with wound rotor hoist motors.

Benefit: Eliminates the constant maintenance and run-away problems common to wound rotor controls.

7. Rewind Wound Rotor Cantilever Hoist Motor for Vector Duty

Allows the existing motor to be reused with a flux vector drive.

Benefit: Eliminates the need for motor, motor base, and brake changes. Cost is lower than a new Vector duty motor.

8. Improved Barge Haul/Cantilever or Ladder Hoist Drum Seal

Replaces the existing felt seal with a new design seal assembly.

Benefit: Reduces oil leakage from spur gear case around drum.

9. System Upgrade to the Ladder Drive

Consists of a motor to gear box fluid coupling and a hydraulically operated caliper brake on the gear box sided.

Benefit: Fluid coupling limits drive torque and inertial load damage to mechanical components and the brake mounted on the gear box prevents loaded buckets from back-driving when the motor stops.

- Note:
- a) For twin ladder unloaders, the caliper brake makes it easier to release buckets which become accidentally jammed in the chute.
 - b) Use of fluid coupling conditional upon design review.

CONTINUOUS BARGE UNLOADERS **Available Upgrades to Existing Equipment** **continued**

10. Counterweight Hang Up Detection System

The addition of a load cell to detect motion loss of the counterweight.

Benefit: Detects loss of motion of counterweight (when the hoist motor is activated) to stop hoist and reduce likelihood of a counterweight dropping far enough to cause catastrophic machine failure.

11. Bucket Chain Slide Rails

Rollers are eliminated and replaced with a slide rail.

Benefit: Much more durable. For twin ladder CBU's eliminates constant roller replacement.

12. Man/Machine Interface (MMI)

Computer based device between the operator and a PLC control system that can provide beneficial information to the operator.

Benefit: Ability to control virtually all machine functions and provide operator with in-depth messages regarding machine status, operations, maintenance and safety.

13. Remote Troubleshooting Via Modem Interface

Benefit: Allows remote troubleshooting of PLC controllers from our Pittsburgh office.

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14. Remote Condition Monitoring

An enhanced service offered by Metso Bulk Materials Handling that allows Metso 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.

15. Self-Unlatching Maintenance Hook

Self-unlatching hook to hold boom in park position during maintenance.

Benefit: Removes load from hoist to facilitate maintenance and eliminates the need for auxiliary device to unhook when finished.

16. Slack Rope Protection

Relay and associated component addition to the control circuit.

Benefit: Positively prevents hoist rope damage due to over loosening rope during cantilever hang-up or trying to lower while in latch.

17. Break Away Joint Modification

The addition of a break away joint on the breasting arm.

Benefit: Permits lower arm to swing away under impact with barge or towboat. Thus prevents costly repairs.

CONTINUOUS BARGE UNLOADERS **Available Upgrades to Existing Equipment** **continued**

18. Counterweight Drum Jacking Modification

Procedure for counterweight drum bearing replacement. Drum bases are stiffened up, drums are line bored and jacking shafts are inserted through the drums for jacking purposes.

Benefit: It is easier to jack up the drums to change bearings and leave counterweight ropes in place. The advantage is a savings of downtime.

Note: This modification can only be used after shafts have been ultrasonically tested and approved.

19. Improved Counterweight Drum Bearings/Seals

Replaces existing bearings with larger ones and integrates split lip seals.

Benefit: Reduces contamination entrance to bearings and improves life.

20. Jib Crane

Modification of the existing jib crane to a larger unit with longer reach and a heavier capacity.

Benefit: Significantly improves the crane's coverage of areas requiring service.

21. Upgrade Barge Haul Control

Replaces existing obsolete, hard to maintain barge haul controls with a state-of-the-art SCR drive.

Benefit: More stable hold back motor control and prevents motor over-speed.

22. Caliper Disc Brake Retrofit for Cantilever or Ladder Hoist Drum

Replaces brake band and weight with caliper disc brakes.

Benefit: Easier to set up and more reliable than band brake actuated by a thruster.

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23. Improved Drive and Tail Sprocket Seals/Bearings (Twin Ladder Machines)

Replaces existing bearings with larger ones, integrates split lip seals and revises sprocket to incorporate replaceable wear inserts.

Benefit: Reduces contamination entrance to bearings and improves life.

24. Programmable Control

The addition of a PLC to operate the ladder drive and/or barge haul drive systems.

Benefit: Eliminates many relay problems. Provides safer more reliable control. Also provides greatly improved diagnostics and operator help message.

25. Motor Driven Lubrication Pump on Ladder Drive Gear Box

Pre-lubricates all internal bearings and gearing on ladder drive prior to activating the machine.

Benefit: Saves maintenance and extends gear and bearing life.

26. Improved Skirtboard System on Gathering Conveyor

Replaces existing skirtboard system with improved design Flexiskirt system.

Benefit: Reduces spillage.

27. Over Hoist Power Limits

The addition of a limit switch to prevent over hoist.

Benefit: Prevents structural damage due to collision, limit switch failures, etc.

28. New Operator's Cab

Benefit: Better visibility, improved control layout and room.

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29. Special Tool for Chain Assembly and Disassembly

Hydraulic operated tool package for chain maintenance.

Benefit: Reduces time required to service the chain, avoids chain damage.

30. Hydraulic Assisted Take-Up for the Gathering Conveyor on the Take-Away Conveyor

Screw type take-ups are replaced with hydraulic take-ups.

Benefit: Avoids problems with pulleys and shafts caused by inadvertent over-tensioning of the manual, screw type take-ups.

31. Improved Torque Link Bushing for Ladder Drive Reducer

Existing torque link bushing is replaced with an upgraded design replacement bushing.

Benefit: Reduced clearance on bushing reduces shock loading on torque link.

32. Flow Switch for Ladder Drive Reducer Pressure Lubrication System

The addition of a flow switch in the existing lube line to detect low oil flow.

Benefit: Shuts down drive (in sequence) if flow is lost - saves bearings and gearing.

33. Split Seal Assembly for Ladder Drive Output Shaft

Replaces existing one piece seal retainer with new split seal assembly.

Benefit: Leaking seal can be changed in place. Avoid costly downtime and prevents severe loss of oil.

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34. Diesel Driven Hydraulic Power Unit on Shuttle Barge

Installation of a small diesel generator used as the power supply on the shuttle barge.

Benefit: Eliminates the entire cable reel arrangement.

35. Oil Loss Protection Retrofit

Installation of a shut off valve assembly that automatically closes if a large loss of oil is detected.

Benefit: Prevents a large loss of oil from the shuttle barge hydraulic unit supply lines in event of a hose failure.

36. Low Level Alarm Retrofit

Installation of an alarm system on the existing shuttle barge hydraulic unit reservoir that shuts the unit down at a pre-determined low oil level.

Benefit: Shuts unit down to prevent system damage if fluid level is too low.

Note: The retrofit can be engineered to interface with an alarm system.

37. New Barge Haul Drive

Replaces existing with digital state-of-the-art SCR drives that are easy to troubleshoot and do not require periodic adjustments.

Benefit: Reduces maintenance and less troublesome.