GRAB UNLOADERS

Twenty-One (21) Available Upgrades to Existing Equipment

1. Replacement of Obsolete Controls

Benefit: Better spares availability for AC and DC systems, improved operation and increased production.

2. 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.

3. Remote Troubleshooting Via Modem Interface

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

4. 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.

5. Redesigned Hard Groove Drums and IWRC Cable

Benefit: Significantly improves wear life and durability by replacing the hoist drum with a new hard groove drum (or modifying existing drum to accept hard groove lagging) and cable is upgraded to IWRC (Independent Wire Rope Core) design. This greatly improves cable wear life and both the cable and drum are significantly more durable.

6. Addition of Countertorque Control for AC Drive Unloaders

Benefit: Less brake wear, smoother control, energy is depleted from system electrically.

7. Replace DC Drives with Digital SCR Drives

Benefit: Modern, low maintenance - eliminates motor generator set, improved diagnostics, more positive adjustment, and increased production.

8. 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.

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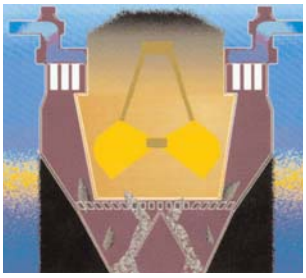
9. Dust Control System



An integrated dust containment system built into the confines of the existing hopper structure. The system collects the dust and discharges it back into the system at the point where it is generated.

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

10. Addition of a Programmable Logic Controller (PLC)

Benefit: Provides semi-automatic dump cycle, portal protection, and greatly improved diagnostics and operator help message features.

11. Stainless Steel Operator's Cab

Benefit: Corrosion resistant, esthetically pleasing.

12. Composition Rail Padding Under the Trolley Runway Rails

Can be provided for new machines as well as for upgrades on older equipment.

Benefit: Reduces shock caused by rail section transitions, distributes loads more evenly into the rail and eliminates fretting between the rail and supporting structure.

13. Rewind Wound Rotor Motors for Vector Duty

Allows the existing motors to be reused with flux vector drives.

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

14. Microprocessor Based Field Control Regulators

Allows the existing MG set to be reused.

Benefit: Eliminates the amplidynes or other outdated controllers. Cost is lower than new SCR drives.

15. Electrical Load Balance of Hold and Close AC Wound Rotor Motors

Benefit: Provides load sharing to prevent overloading and overheating of one motor (for two drum AC hoist drive system).

16. Portal Protection Through the Use of a PLC with Encoders or the Use of Limit Switches

Benefit: Protects structural members during operations.

17. New Control Cab

Benefit: Better visibility, modernized controls, more operator room and increased machine safety. Controls can also be added to the arms of the operator chair for comfort and ease of operation.

18. Control Cab Rebuilds

Benefit: Modern controls reduce equipment size. Relocate less used equipment to improve operator concentration and help provide more reliable and safer operations. Reduce operator fatigue.

19. Grab Copy Limit Switch

Benefit: For bucket opening control - controls opening and closing without shock loading against end stops. Note: Not necessary when a PLC system and encoders are used.

20. Rope Advance System for Single Drum Hoists

Benefit: Hold line rope advance provides for purchase of the wire rope in reel lengths. As the rope wears, it is advanced in short moves allowing for complete use of the rope rather than changing a complete rope with only the center (bucket section) worn.

Single rope advance for the hold and close lines will provide additional savings as the close line rope will be moved with the hold line providing complete rope wear.

21. Flux Vector on Hold, Close, Travel and/or Trolley Drive

Addition of flux vector duty motor and drive for each operation.

Benefit: Smoother acceleration and deceleration yielding less wear and tear on the drive components. Less maintenance.