

# Bulk Materials Handling Grab Unloaders





# Grab Unloaders

Water transportation has long been the first choice for economical delivery of bulk materials, and grab bucket unloaders have traditionally served as the most viable means of unloading ships and barges.

Maximizing these economies involves careful evaluation of many elements: physical constraints of the unloading site; types of bulk materials handled; size and configuration of vessels to be unloaded; fluctuation in water levels; environmental control requirements; and, most importantly, the total capital and operating costs.

For over half a century, the Metso family of grab unloaders has offered versatility and dependability in matching unloading capacity with facility operating requirements. Handling a broad range of products at rates up to 3,400 tph, Metso traveling and fixed grab unloaders service ports throughout the world, unloading barges and ocean bulk carriers.

## Metso Grab Unloaders Offer: Dependability

For minimized capital investment, Metso equipment provides years of dependable service with design and technology that meets the most demanding unloading facility requirements.

### Versatility

Metso grab unloaders are designed to unload various size vessels at the same station, and our system for changing grabs makes handling different types of bulk materials simple. Further, our equipment provides unloading capabilities that accommodate fluctuation of water levels.

### Low Operating Costs

Metso bucket control facilitates unloading of vessels with hatches and coaming. With the help of a front end loader, virtually all material in the vessel is recovered.

### A Tradition of Excellence

Metso's family of grab unloaders includes those of our predecessor companies:

- Svedala Industries
- McNally Wellman
- Dravo - Engineering Works Division
- McDowell Wellman
- Dravo Wellman
- Products Engineering (PECO)
- Mead Morrison/McKiernan Terry (MKT)
- Lakeside Bridge & Steel

### Rope Life:

#### A Consideration in Day-to-Day Operation

Recognizing rope replacement as an operating expense for grab unloaders, Metso expertly designs reeving systems that maximize rope life and minimize cable replacement time.

### Design Features Include:

- Hardened drum and sheave grooves that reduce wear and extend rope life
- Minimal rope angle from drums and sheaves
- Controlled acceleration that minimizes surges in rope tension and prevents sudden impact of the grab jaws upon closure
- Rope pattern between bucket and trolley that protects rope at stress points and helps ensure bucket stability
- Hold and close drums with ample spare rope capacity for economic and efficient rope advancement of new rope into the system

In addition, Metso provides unloader operator training, maintenance training, and inspection to promote longer service life of the unloader components

### Grab Unloaders are Built for Service

#### Safety Features Include:

- Safe and easy access to areas requiring routine maintenance as well as stairs and optional elevator to main areas of the unloader
- Spud locks, tie downs, and rail clamps for safe storage during maintenance or adverse weather conditions
- Operator's cab safety restraints and a redundant caliper brake on the boom hoist cable drum



## Metso's ABC System: Optimum Safety and Efficiency

Today's high-speed grab unloaders feature short duty cycles and large capacity grabs for greater unloading volume and efficiency.

Because of the increased demand for speed in performing exacting, repetitive tasks, operators of manually controlled grab unloaders are subject to fatigue. Operator fatigue results in error, accidents, compromised efficiency - and higher operating costs. Metso grab unloaders offer a sophisticated but user-friendly control automated system that minimizes operator fatigue. By completely automating grab unloading operations, overall performance is maximized over longer periods of time with minimal operator stress.

The Automatic Bucket Control (ABC) system utilizes state-of-the-art control system hardware and software with the most advanced features in grab control.

### The ABC System features:

#### Man-Machine Interface (MMI)

Computer-based graphics system links the operator and the PLC control system in a user-friendly, on-screen format. The MMI system gives the operator the ability to control virtually all machine functions and it provides detailed messages regarding machine status.

#### Bucket Trajectory Control

Prior to each unloading cycle, the grab controller calculates the grab trajectory for the most efficient unloading cycle time. Continuous monitoring of this trajectory and modulated acceleration and deceleration rates of the hoist and trolley motions ensure trouble-free unloading and accurate delivery of material into the hopper.

#### Microprocessor Logic Control

Improves overall operation and lends assistance in troubleshooting. Working in conjunction with the MMI, the control logic program instantly pinpoints areas of the grab unloader system that require attention.

#### Grab Return Control

The Metso ABC System allows the operator to adjust the return position of the grab through predetermined increment buttons.

#### Automatic Grab Closing

Provides the control capability to automatically close the grab while in the material.

#### Grab Fill Control

This control varies the amount of torque on the hold drive during grab closing operation. The operator can easily adjust how deep the grab will sink into the material and control the bucket fill for each lift.

#### Grab Load Monitor System

This system monitors bucket load at the beginning of each cycle and alerts the operator in the event of an overflow condition.

#### Hold and Close Drive Coordination While Hoisting

In manual, semi-automatic, and automatic modes, this monitor and attendant circuitry balances the loading on the hoisting equipment, thus eliminating long term rope and hoist damage from unbalanced drive loading. Speed synchronization prevents slack rope lines while lowering and ensures that the bucket is fully open.

#### Ship Height Monitor

A position sensor continuously monitors changes in the location of the ship's deck that result from material removal and/or tide changes. This information allows the control system to adjust for ship height without interrupting unloading operations.

#### Operator Control Cab

From a spacious, ergonomically-designed operator chair with arm-mounted controls, the operator views a video monitor that displays status information for each grab unloader drive, up-to-the-minute help messages for fine tuning the unloading cycle, and ongoing equipment diagnostics that minimize the need for detailed troubleshooting.



## Expect results

Expect results is our promise to our customers and the essence of our strategy. It is the attitude we share globally. Our business is to deliver results to our customers to help them reach their goals.



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