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YOUR ONE-STOP SOURCE FOR MATERIAL HANDLING CONTROL SOLUTIONS

MAKING THE CASE

Benefits of Upgrading Existing Cranes

Since the Industrial Revolution, overhead cranes have been put to use in a variety of diverse applications to move heavy and oversized objects that other material handling methods cannot. As your business changes with the introduction of new products or processes, so do your material handling requirements, and your existing overhead equipment may not be able to meet these demands.

Increased production requirements may demand more capacity, faster operating speeds, better controls, or automation. Reliability may have deteriorated resulting in unscheduled shutdowns and increased production costs. Parts may be obsolete, resulting in high spare parts costs and long lead times. Inspections may show excessive wear or non-compliance with current safety standards or practices.

Three options exist for equipment improvement – buy a new crane, refurbish a used crane, or upgrade the present crane.

STRUCTURAL UPGRADES ARE COST-EFFECTIVE

The original equipment manufacturers designed the structural components of their cranes to withstand mechanical forces far in excess of those encountered in normal, everyday operations, and it is not uncommon to find overhead cranes that are more than 80 years old still in operation today. Rather than scrap an outdated crane, which is still structurally sound, it is often more cost-effective to upgrade and modify the unit to meet current operational needs.

The useful life of mechanical parts such as wheels, gears, bearings, etc. is in excess of 20 years. However, even the availability of spare parts after 10 to 15 years can be problematic. Upgrading old, worn parts with modern and improved counterparts is just one advantage to modernization.

Application photos courtesy of Eric Brown, Engineered Lifting Systems, LLC

Technological advancements in engineering can extend the life of a modernized crane. For example, modern precision gearing with much closer tolerances can result in reduced vibration, less gear wear, lower maintenance, and notably quieter operation than gears common in older cranes. Utilizing modern Flux Vector Control and eliminating high-maintenance, inefficient hoist mechanical load brakes can improve performance, reduce wear on brake discs or pads, and allow gearing to run cooler.

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One of the most important crane modernization, retrofit, or repair considerations is the replacement of outdated or unserviceable crane brakes with current modern industrial braking technology.

- Brake performance has improved, and brake linings last longer especially when brakes operate in conjunction with AC adjustable frequency controls or digital DC controls. Newer brake designs include features such as automatic adjustment that compensates for lining wear and automatic equalization, which provides balanced braking and assures equal brake pad wear.
- Old hydraulic brake systems tend to leak and create maintenance and environmental issues. They can be replaced with modern "brake-by-wire" packages with foot pedal operated AC Thruster Brakes that address these issues while still providing operators with the same "feel" they had with hydraulic brakes.
- Complete modern-design "drop-in" brakes are available, which meet the performance and dimension characteristics of the original equipment brakes – often at a cost less than that of a replacement component – with significantly shorter lead times. They can operate with existing brake wheels and avoid costly brake-support modifications.
- Heavy Duty Caliper Disc Brakes with ratings from 50 to 30,000 ft-lbs are available as replacements for existing brakes in high duty cycle, high speed, or high torque stopping AC or DC applications.
- Low cost AC Thruster Brakes are often used to replace aging DC drum brakes. These brakes eliminate the need for AC-DC rectifier panels, and have optional features, such as stepless externally adjustable time delays for both brake setting and release; external torque springs to permit maintenance personnel to "dial-in" just the right amount of stopping torque for traverse motions; and automatic adjustment and automatic equalization to reduce maintenance costs.
- Motor-mounted brake-support bases can also be furnished – greatly simplifying retrofits and avoiding costly brake mounting modifications.

AC CRANE CONTROL MODERNIZATIONS

Today's Variable Frequency Controls and Flux Vector Motor Controls have become the industry standard for crane control. Recent improvements in drive technology, such as a new generation of Insulated Gate Bipolar Transistors (IGBTs), sensor-less vector control, powerful micro-processors with flash memory, and improved algorithms, have allowed the downsizing of the power platforms and the inclusion of many high-performance features.

AC Variable Frequency Drives provide greater reliability; enhance performance; improve production throughput; prolong equipment life; and reduce maintenance costs, parts, and personnel in a variety of ways:

- They reduce the characteristic high starting currents of AC induction motors, thus minimizing the shock effect on both the load and the equipment. Features, such as programmable acceleration and deceleration produce softer stops and starts, assure smooth transitions between speed steps, and greatly reduce brake wear.
- Safety is built into modern Variable Frequency Drives. They include features, which reduce the possibility of lifting an over capacity load, minimize or eliminate dangerous load swing, prevent overheating of the motor, and provide safeguards that limit unauthorized modification of drive parameters or programming unsafe parameters.
- Most single-speed squirrel cage motors can be controlled by VFDs, including conical-rotor motors used by many European hoist manufacturers. Multiple control modes allow for changing the operation to suit the needs of specific applications or the desires of individual operators. A wider range of selectable speed choices (up to 1000:1) are available to the user compared to the fixed speed ratios provided by typical two-speed motors (2:1, 3:1, or 4:1) or micro-drives (10:1).

SOFTWARE ENHANCES PERFORMANCE, SAFETY AND PRODUCTIVITY

Simple, innovative, low-cost, application-specific software options can be added to many VFDs to meet unique application requirements and enhance performance, safety, and production

throughput including Sway and Grab / Bucket Control, Drive Synchronization, and Footbrake/Static Stepless Simulation.

Sway Control improves the accuracy of load placement and reduces material damage caused by incidental contact of swinging loads without the need for external Programmable Logic Controllers (PLCs) or costly height measurement devices.

Bucket Control lets you control the various motions of a multi-line clamshell or grapple bucket that utilize two independent open/closing line hoists without the need for a PLC or master/slave arrangement. The control provides open/close status to the operator for applications such as dredging where the operator cannot see the position of the grab or bucket.

Drive Synchronization offers increased safety by precisely controlling motion and preventing the operator from making an uneven lift. It can operate a multiple-hoist application either independently or synchronized, synchronize a cable reel to a hoist, synchronize multiple trolleys on a single bridge, or synchronize multiple motions between two or more cranes, without the use of a PLC.

Footbrake/Static Stepless Simulation allows the cab operator to use a footbrake to either augment or completely control the deceleration and stopping of the crane while at the same time providing improved "Reverse-Plugging" response; eliminating current spikes and excess mechanical torque/stress on the drive train; and allowing quick, smooth starting or changing of direction; reducing maintenance costs; and easily interfacing with existing induction masters, footbrakes, and motors.

DC CRANE CONTROL MODERNIZATION

Many find themselves today with aging overhead cranes, originally designed to perform and survive in the tough environments of steel and manufacturing plants but operating with the previous generation of high-maintenance DC motors and controls. There are some 3,000 active cranes running in North America with traditional DC controls that could be retrofitted over time.

Most of these older cranes rely on traditional electromechanical DC Constant Potential (DCCP) systems which use contactors to switch regenerative load currents to resistor banks in order to dissipate the energy. DCCP systems are maintenance intensive due to their many moving and wearing parts which must operate under severe duty and in harsh environments. Rather than scrap an outdated crane, which is still structurally and mechanically sound, it is more economical to upgrade or modernize these cranes with state-of-the art electronic controls, designed to meet present operational needs.

AC is becoming the power source of choice, especially for new installations in paper mills, steel mills, bulk materials handling, shipyards, and many more areas. However, DC motors are both efficient and robust and offer year upon year of service, providing acceptable performance for the most demanding applications. Retaining an existing DC motor and upgrading the crane with solid-state controls is more environmentally friendly and – from a commercial perspective – provides an opportunity to enhance overall system performance and reliability while minimizing the risk to production and the required capital investment, an attractive proposal in today's economic environment.

Three main control options are available for modernizing existing DC Cranes:

- Retain existing power source, dc-motors and control wiring and replace traditional contactor control or obsolete static controls with Digital DC Controls.
- Convert crane to operate on AC power retaining existing shunt-wound dc-motors and control wiring, replacing existing controls with Digital DC Controls.
- Convert crane to operate on AC power with low cost, efficient ac-motors and Variable Frequency Drives.

WHY USE REMOTE CONTROL TO UPGRADE YOUR CRANE?

The trend in the industry today is to operate overhead cranes from the floor rather than from a traveling operator's cab, or in many instances, have an option for controlling the crane from either

location. Because of the high cost of labor, it is more economical to remove the operator from the cab and free him up to do other tasks. This is typically done by adding a wired pendant pushbutton station or radio remote control.

Pendant pushbutton stations suspended from the hoist or on a separate festoon track bring the crane operator closer to the load and eliminate the need for a separate person to "hitch" or "signal"; however, they are often in the wrong place for safe or efficient operation, forcing the crane operator to dodge obstacles or untangle cords. Remote wireless control solves these problems.

Remote wireless control of overhead cranes and hoists has been around for over 50 years, and technology has changed significantly in recent years, allowing remote control manufacturers to bring products to market that are safer, more reliable, ergonomically designed, extremely versatile and flexible, and now affordable for even the smallest crane or hoist application.

Remote control can be transmitted by either Radio Frequency (RF) signals or by infrared light. The use of RF signals is the decidedly more popular option in the U.S., where it accounts for approximately 98% of remote control transmissions.

Modern Radio Remote Controls employ state-of-the-art technologies such as Graphic Displays with two-way feedback and various types of wireless communication including Synthesized Frequencies, Time Multiple Sharing and Frequency Hopping Spread Spectrum (FHSS).

WHY MODERNIZE WITH AUTOMATION?

Technological advancements in control products and engineering have enabled us to convert outdated manually controlled overhead cranes, hoists, and monorail systems into modern production tools with an extended life cycle. The automated material handling system, for example, offers a wide range of benefits including space savings, lower building costs, improved productivity, more efficient material flow, accurate positioning, fewer personnel required, safer operations, reductions in inventory, increased reliability, reduced operating costs, and better return on investment.

Highly developed solid-state logic and computer-regulated control systems define what automation is today. Flexibility and networking capabilities of Programmable Logic Controllers (PLCs) and other computers allow easy integration of related systems. They can be linked to production management computer systems, thereby providing better inventory control, improved process control, and feed-back of important management data on the operation.

The ability to integrate standard components such as Variable Frequency Drives with their built-in innovative electronic control functions has revolutionized the industry and driven down the cost of automated systems. Variable Frequency Drives not only provide speed control but can aid in positioning.

With high-speed serial communication, VFDs provide reliable digital linkage among various crane system peripherals, including Modbus, Modbus Plus, Profibus, and Ethernet. Radio Frequency as a communications tool adds another dimension that simplifies wiring and adds flexibility to the system. Technology exists to do remote diagnostics and provide direct feedback to the operator, maintenance department, or crane service provider. In addition, using sophisticated wireless transmitter/transceivers, the crane operator can obtain data feedback such as load weights, order-picking information, processing instruction, etc.

While many operations would benefit from employing automated cranes regulated by programmable controllers or other computers, not every application requires this degree of sophistication. Many existing operations can be enhanced by utilizing application-specific software such as Grab / Bucket, Sway, Motor Synchronization, and Static Stepless Simulation Control which can be simply added to Variable Frequency Drives.

Other systems such as auto-dispatch, distance detection and collision avoidance systems, skew control, and zone control use simple relay logic and limit switches or involve stand-alone accessory packages. These concepts, whether part of a complete automation system or as stand-alone systems, should be considered as part of any modernization plan and can offer

immediate, tangible improvements in productivity, safety, and/or performance and deliver a rapid return on investment.

CHOOSING AN AUTOMATION PARTNER

The decision to incorporate automation into overhead cranes and hoists in manufacturing applications is often intimidating. Consideration must be given to increased capital expenditures, lead times on equipment acquisition, "debugging" and setup periods, and operator training.

When choosing a supplier, designer, or integrator of an automated material handling system, the importance of partnering with an experienced designer of material handling control systems cannot be overemphasized. Choosing the right systems provider is the first step in assuring a successful modernization project. Material handling automation requires a team of skilled engineering specialists, fully qualified in their field and trained in crane applications.

Choose a supplier with real material handling experience that can provide turn-key service, from project evaluation, project management, installation services, and field start-up, to operator training and system support. Request customer testimonials and evaluate their installation and system experience in detail.

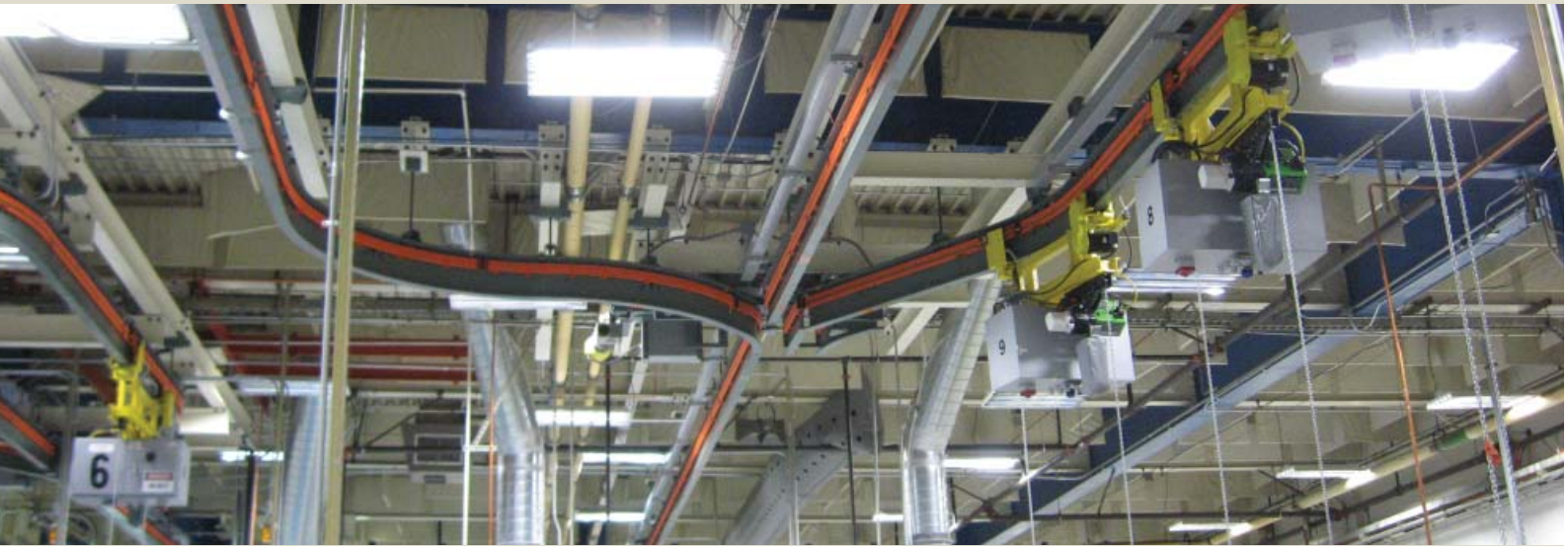
CONCLUSION

Overhead cranes represent a significant investment in capital. The Material Handling Institute (MHI) reports that "Companies spend billions of dollars annually on material handling and logistics, representing anywhere from 20 to 30% of their overall cost of doing business."

Therefore, rebuilding and modernizing these assets with new modern parts and electric controls is economically prudent, since doing so protects and prolongs the life of these investments, while saving as much as 30% to 40% of the cost of new equipment.

Just a few years ago, cranes relied solely on contactors and static controls for their operation. Today, AC and DC drives are the preferred method of control – but modern cranes utilize not only VFD technology but automation as well – providing users with a wide variety of options to increase productivity, improve reliability and safety, enhance performance, and prolong equipment life, while affording many opportunities to increase profits and obtain a significant return on investment. All are good reasons to consider upgrading your material handling equipment.

To download the full version of Magnetek's Benefits of Upgrading Existing Cranes whitepaper go to www.magnetekmh.com/pdfs/Marketingtool_3_4_10_FINAL.pdf.



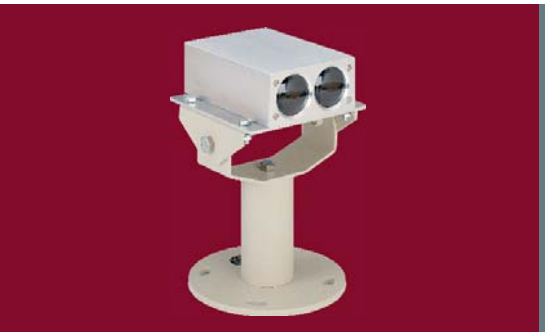
Magnetek Provides 'Green' Regenerative Braking Options for IMPULSE® Drives

As government sponsored energy rebate programs arise and many businesses are challenged to reduce their carbon footprint, we'd like to remind you that Magnetek can provide alternative solutions to dynamic braking resistors. Dynamic braking is the traditional solution to removing excessive regenerative energy, but greener regenerative braking options are available for recycling the power back to the grid. Magnetek's regenerative braking controls can help lower your energy bills. Magnetek has the capability to harness regenerative energy from 3.7 kW to 1.2 MW in 230, 460 and 575 V applications. The range varies by voltage. For assistance in applying our regenerative control product, contact your local Magnetek Material Handling sales representative.

Cost Effective Drive Selection
AMP vs. HP

Be sure to remember to make drive selections based on motor AMP ratings and duty cycle vs. HP ratings alone. In many cases, if you focus on HP, you could be purchasing a more expensive drive than is necessary for your application. The HP rating should only be used as a guideline, as it may not be accurate for all applications and motors. Please contact us at 800.288.8178 with any questions.

Magnetek's Collison Avoidance Systems Feature Comparison



Magnetek's Collision Avoidance Systems can help you prevent accidents before they happen, protecting your company's people, facility and cranes. Our systems enhance performance by preventing crane-to-crane or crane-to-object collisions. Magnetek offers one of the largest selections of collision avoidance systems available: ReFlx® 120, ReFlx® 120 "Plus" and LaserGuard™. We have a system that will meet your application needs.

The chart highlights just some of the important product features of Magnetek's line of Collision Avoidance Systems.

Contact Magnetek at 800.288.8178 or your local Magnetek sales representative for more information.

	LaserGuard	ReFlx 120	Reflx120 "Plus"
Voltage	110/220 Vac	120/240 Vac	120/240 Vac
Distance Set Points	3	2	3
Operating Distance	10 feet to 150 feet	20 feet to 120 feet	1.5 feet to 120 feet
Fault Output	1	N/A	N/A
Lost Target Detection	Yes	No	No
Self Monitoring	Yes	No	No

Magnetek Introduces
New MagnePulse™ Digital Magnet Control

We are excited to announce the launch of our new MagnePulse™ Digital Magnet Control (DMC) for the operation of DC industrial lifting magnets. Built on Magnetek's proven OmniPulse DDC platform, this microprocessor based, solid-state, DC-to-DC control combines advanced safety and performance features to improve productivity and reliability in your facility.

MagnePulse DMC provides digital control of the magnet's demagnetizing current, so the magnet cleans the load faster and more consistently, increasing throughput. Its exclusive OmniBeam™ feature allows the operator to enable any combination of up to four unique magnets to precisely match individual load requirements. Magnet power is automatically removed during a fault event, preventing damage to the drive and magnet.

MagnePulse DMC is fully compatible with IMPULSE®•Link 4.1 Basic and IMPULSE•Link 4.1 Wireless Diagnostic System (WDS) allowing users to upload, download and monitor parameters using a hardwired or wireless link to a PC. It can be easily retrofitted into your current framework, using existing operator controls and connections. We can provide a pre-engineered panel with all the components needed to provide complete magnet control, or MagnePulse DMC may be added to one of our custom panels, designed and built to your exact specifications.

Visit www.magnetekmh.com/controls_magnepulse.htm for more information or contact one of our Inside Sales application professionals at 800.288.8178 or sales@magnetek.com, or call your local Magnetek Sales Representative.

SBP2® Pendant Pushbutton Stations Now DC Rated

Magnetek's SBP2 Pendant Pushbutton Stations have always provided optimum control and performance with less operator effort and fatigue than traditional pendants. Now our products offer even more flexibility with switches rated 2 Amp, 24 Vdc and 3 Amp, 250 Vac, making them suitable for AC or DC applications. The SBP2 can be used on industrial low voltage control systems that run at 24 Vdc. The SBP2 allows the operator a wide range of movement, providing improved visibility and handling.

Visit www.magnetekmh.com/powerdelivery_sbp2-main.htm for more information on this lightweight, ergonomically designed pendant.

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