

Lincoln Industrial: *The Mining Industry's Standard*

Nearly a century of experience. Superior products. The world's best service network. In the never-stop mining industry, where huge machines must keep producing in incredibly demanding conditions, Lincoln Industrial products are the industry standard for mining companies and original equipment manufacturers alike. From automated systems like Centro-Matic®, Helios® and Quicklub® to System Sentry II control units, the Gear Spray System, PowerMaster® pumps and mobile lube trucks, the industry counts on the quality and reliability of Lincoln Industrial products and worldwide service. With Lincoln on their team, mining companies turn the increased production of mobile machines, conveyors and draglines into savings on their bottom lines.

Dan Rambo, a Kindill mine superintendent, says, "I don't think there's anything out there as good as Lincoln." Bob Gregor, chief product engineer for Bucyrus International, which has installed Lincoln Industrial systems for decades, says, "Lincoln systems have been doing

the job for Bucyrus for a long time. We haven't found anything better."

Recent independent lab tests (see page 3) reveal that the heart of Lincoln's automated systems—the precision injectors the company invented—may be copied, but never duplicated. Lincoln Industrial injectors lasted more than twice as long as the competition. In fact, all Lincoln injectors were still working when the tests ended! The tests show that anyone gambling tremendously expensive mining equipment on anything but Lincoln Industrial injectors plays a risky game of "lubrication roulette."

(continued on page 2)

"I don't think there are any lubrication systems as good as Lincoln Industrial's . . ."

*Dan Rambo
Kindill #3 Mine Superintendent,
Indiana, U.S.A.*

Dan Rambo and Kindill's Bucyrus-Erie 2550-W dragline. It boasts a 100-ton bucket and Lincoln Industrial's Centro-Matic® system.



When the mining industry has a lubrication problem, it turns to Lincoln Industrial.



Lincoln Industrial's systems take advantage of special manufacturing processes that maintain a close metal-to-metal fit for high-pressure applications. The SL injectors last over twice as long as competitors' injectors.

Lincoln Industrial installed the first automated lubrication mining systems a half-century ago. Our systems remain the industry's standard because special manufacturing processes

ensure a close metal-to-metal fit for high-pressure applications. And only Lincoln Industrial

Ingersoll-Rand blasthole drills use PowerMaster® pumps for lubrication.



manufactures Centro-Matic®—a complete single-line parallel system—plus a special end-user design guide, and a special ventmeter to find grease pumpability at different temperatures and for different applications.

Lincoln Industrial has two other huge advantages—the industry's best worldwide distribution system and innovative products that meet the industry's changing needs. Using our complete range of quality products, our distributors design and install systems that solve problems, enhance safety and save money. And our recent new products include compact, high-performance hydraulic rotary pumps and our new automatic system to deliver a special zinc/copper-based anti-seize grease to blasthole drill threads.

The final result? Unsurpassed service and product durability that keep OEMs and end-users choosing Lincoln Industrial automated systems. When the mining industry has a lubrication problem, it turns to Lincoln Industrial because we



PowerMaster® pumps have pump ratios uniquely designed for mining equipment.

provide solutions our competitors can't match. This edition of Concepts is full of examples, drawn from around the world. They show why Lincoln Industrial, by a wide margin, is number one in mining lubrication systems.



This newly-developed pump automatically delivers a special zinc/copper-based anti-seize grease to blasthole drill threads. The pump can generate and withstand 10,000 psi.

Kindill Is In Lincoln Industrial's Corner

"In my opinion, I don't think there are any other lube systems out there," says Dan Rambo, superintendent of Kindill's #3 mine in Sullivan, Indiana. "I don't think there are any lubrication systems as good as Lincoln Industrial's Centro-Matic® system."



Kindill's giant Bucyrus dragline has four PowerMaster® pumps for more than 200 lube points. The lubricating process is controlled and monitored by a System Sentry unit. Jack Ellis, K&M Specialty Systems, checks the lube system before the machines move to a new position.

Rambo's opinion is hardly unique at Kindill. In the last 18 months, his mine converted all loaders, scrapers and preparation plant machines to Centro-Matic. "Nobody knew how the other system worked," says Rambo, "and we had trouble getting parts and service."

Lincoln Industrial products are found throughout Kindill's three Indiana mines. Almost all large equipment—Bucyrus, Marion, P&H, Caterpillar, Komatsu, Hitachi—has an automated system, all Lincoln Industrial. Each mine's lube trucks have PowerMaster® pumps and Lincoln Industrial hose reels. "Pretty much every pump on the job is from Lincoln," notes Rambo.

Kindill's performance depends on the service provided by K&M Specialty Systems, Lincoln Industrial's distributor. K&M installs automated lubrication systems on mobile equipment, updates dragline



The Hitachi 1800 uses a hydraulic Centro-Matic® system with a 55-gallon drum. The Dart truck has a Quicklub® system.

systems, does preventive maintenance, and checks and rebuilds pumps when necessary. "It's a high level of service they can't get elsewhere," says K&M's Jack Ellis. Rambo agrees. "Parts are readily available through K&M and that's a big plus," he says. "I think they do a great job. They've certainly never let us down."

Seven PowerMaster® pumps are on each Kindill lube truck. Some also have a lower ratio pump tube for transferring oil.



Tests Show Lincoln Industrial Injectors the Industry's Best

Recent independent lab tests showed the superiority of Lincoln Industrial injectors. Here were some results:

- All Lincoln Industrial injectors were still working when tests ended after 200,000 lubrication cycles.
- 90% of one competitors' injectors failed before completing 100,000 cycles; 30% didn't make 50,000 cycles.
- 60% of a second competitors' injectors failed before completing 100,000 cycles; 50% didn't make 50,000 cycles; one injector failed before 25,000 cycles.

Lincoln Industrial pumps are still the best, too. When we evaluated competitors' pumps, we discovered pump ratios inadequate for use in automated lubrication systems, especially in cold climates. Competitors' pumps are also difficult to adapt to mining equipment.

Liebherr Makes **Lincoln Industrial Its Logistics Partner**

“Lincoln Industrial is able to service its products all over the world.”

Dieter Mitreiter, Liebherr's Chief of Design at Colmar, France

Lincoln Industrial, Walldorf, Germany, has supplied lubrication systems for Liebherr Group's excavators for decades. A major reason, says Dieter Mitreiter, chief of Liebherr's design office at its plant in Colmar, France, is that “Lincoln Industrial is able to service its products all over the world.” Now, because Lincoln has the products and flexibility to solve

problems for Liebherr's customers, the company is making Lincoln its management “partner” at Colmar. “We've accepted the added responsibility of managing the entire lubrication process for Liebherr's mining products manufactured at Colmar,” says Herbert Kannegiesser, vice director, sales, Lincoln Industrial, Walldorf.

The responsibility will be substantial. Lincoln Industrial, Walldorf, will not only manage all lubrication sub-suppliers that used to work directly with Liebherr, Lincoln will also

negotiate prices with Liebherr customers. Lincoln employees will work on-site, preinstalling and prebending everything so systems are ready to install.

Lincoln Industrial's value-added service package will also include preparation of system drawings and parts lists, ordering parts and coordinating all parts deliveries. “Our relationship has totally changed,” notes Kannegiesser. “We were a sub-supplier and now we're an integral part of Liebherr's organizational structure.”

One reason for the change was Lincoln's ability to team with Liebherr and its largest customer, the Dutch company Shipyards De Donge, to end the costly bolt and bearing failures caused by a grease problem because the large dredgers often work under sea water. Because Lincoln Industrial has the industry's only stainless steel blocks, it could help an OEM adapt quickly to solve the end-user's problem.

Liebherr's Litronic 996 was introduced at the Bauma show in Munich. Lincoln Industrial designed the lubrication system and delivered its major components.



Two hydraulic barrel pumps on Liebherr's 996 excavator.



“Lincoln Industrial systems have been doing the job for Bucyrus and doing it very well for a long time.”

Bob Gregor, Bucyrus Chief Product Engineer

Lincoln Industrial Systems Are Standard at Caterpillar and Komatsu

Caterpillar and Komatsu, the leading manufacturers of large mining equipment, have been fitting Lincoln Industrial automated lubrication systems on their machines at the factory for over a decade. And on smaller machines, where lubrication systems are optional, if one is installed, it's a Lincoln.

Lincoln Industrial's partnership with the two companies is worldwide. A Lincoln Centro-Matic® system is fitted on all Caterpillar mass excavators and large hydraulic shovels made at facilities in the U.S.A., Belgium and at a joint venture with Mitsubishi in Japan. While lubrication systems are optional on smaller equipment—haul trucks, wheel loaders and hydraulic excavators—the only choice is Lincoln's Quicklub®. Lincoln also fits Quicklub on Caterpillar's Elphinstone underground loaders in Australia and is working with Caterpillar on

Bucyrus Stays with Lincoln Industrial for Nearly 40 Years

For nearly four decades, Lincoln Industrial automated systems have lubricated Bucyrus International's mining equipment. Find a Bucyrus machine and you'll almost always find a Lincoln Industrial system. Bucyrus currently installs most Lincoln systems on Bucyrus draglines, shovels and drills right at the company's factory. The only time that doesn't happen is by customer request—an extremely rare occurrence.

“Lincoln Industrial systems have been doing the job for Bucyrus and doing it very well for a long time,” says Bob Gregor, the company's chief product engineer. “We just haven't found anything better. Our reputation is on the line when our equipment goes out there. We rely on Lincoln systems to keep our equipment functioning at peak efficiency year after year. I also like the fact that Lincoln doesn't stand still. Recently, they supplied us with a new control unit, the System Sentry II. It works better and costs less, too. Performance and service—that's a tough combination to beat.”

Lincoln Industrial lube systems are factory-fitted on Bucyrus draglines, shovels and drills.



how Lincoln Industrial systems will fit on Cat's new G-series wheel loaders.

The story is the same at Komatsu. Whether it's Demag-Komatsu large hydraulic shovels made in Germany, large Haulpak haul trucks made in Illinois, or hydraulic excavators made in Japan, the factory-fit lube system is always by Lincoln Industrial.



992G Cat loader uses Centro-Matic® grease system with a hydraulically operated pump.

“Komatsu WA800 and WA900 wheel loaders equipped with Centro-Matic® systems now average an additional hour of work per week.”
Masaaki Shibata, Todaka Mining, Japan.



A System Sentry II installed at the Placer Granny Smith Gold Mine exposed numerous faults in a competitor's system; JSG completed a Lincoln Industrial solution with mine engineers.



Lincoln Industrial, JSG Replace the Competition in Australia



HSA spray nozzles for open gears are used at the Tanami Gold Mine.

Lincoln Industrial and its distributor, JSG Industrial Systems Pty Ltd., are solving the huge Australian mining industry's lubrication problems—often by replacing the competition.

At the Ti-West Mineral Sands Processing Plant in West Australia, for example, JSG replaced a competitor's system on a rotary kiln with a Lincoln Industrial Radial Multi-Line

215 Pump controlled by a System Sentry II. The old system faulted regularly, almost destroying the bearing sealing face through excessive wear. The Lincoln Industrial system provided the first wet seal in years and extended the seal's life six months, allowing replacement to be delayed until a planned shutdown. The system provided savings of 30 percent and will be expanded.

JSG also replaced competitors' systems with Lincoln Industrial products at Nabalco Gove NT (three Open Gear Spray Systems with SL-1 injectors and System Sentry monitors) and the Tanami Gold Mine

(HSA Monitored Nozzle System made by Lincoln GmbH, Germany). And at Mount Isa Mines, one of the world's largest, JSG designed an automated system to eliminate bearing failure in a pressurized hyperbaric chamber. The system worked so well that one will also be installed on a second chamber.



A competitor's lube system on a Ti-West rotary kiln faulted regularly; it was replaced by a Lincoln Industrial Multi-Line 215 pump controlled by a System Sentry II.

Lincoln Industrial Leads Move to Centralized Systems in Poland



HJ2 manual grease pump system installed on a Fadroma LK2 Wheel loader.

Polish mines are modernizing with cost-effective, centralized Lincoln Industrial lubrication systems. KGHM "Polska Miedz" SA (Polish Copper), which employs 45,000 people in Silesia, is an example. Fighting water, dust, salt, copper and other corrosive agents 1,000

meters (3,000 feet) underground, improper lubrication damaged many KGHM machines and led to a lot of downtime before centralized systems.

Through the efforts of Lincoln Industrial's Polish distributor, Jutech Sp. z o.o., 500 KGHM machines are now equipped with Quickclub® systems. KGHM

is so happy with the results that it requires four OEMs—Legmet, Fadroma, Zanam and Boart-Lena—to install Quickclub as standard equipment. The OEMs do the same for other customers, too.

Jutech and Lincoln Industrial provide Poland's mining industry with its only complete lubrication service, including consulting, installations, and 24-hour service—plus the only operations manuals and catalogs in Polish.



Quickclub® pump system on a Boart-Lena SWWN 7H drilling machine.

Boguslaw Urbanowicz from our Polish distributor Jutech Sp. z.o.o. speaks the language of our customers in Poland.



Arch Coal Relies on Lincoln Industrial System House



Don Fithian, Lincoln Industrial National Accounts Manager, Construction and Mining, looks into the open gear lubrication on a Bucyrus 1570 dragline's hoist rope.

For nearly 20 years, Lincoln Industrial systems house Lubrication Systems, Inc., has solved Arch Coal's lubrication problems in five West Virginia mines. From the Centro-Matic® systems LSI recently installed on five Caterpillar loaders to handle pin wear problems, to the Quicklub® systems on a three-mile overland beltline, Arch relies on LSI for quality products and service.

LSI's Dayle Hess says, "We look at each customer's needs. We make recommendations for automated systems, do installations, and inspect equipment to make sure systems keep running. We built our business on service."



Wabco 830 rock truck uses an air-operated Centro-Matic® grease system.

And on Lincoln Industrial products. The list used by the Hobet mine reads like Lincoln Industrial's product catalog. The Bucyrus-Erie 1570 dragline and 495 shovels have Centro-Matic® systems, as do Wabco rock trucks, Caterpillar loaders, Dart coal haulers, and the 12-mile belt system (which also uses Quicklub® pumps



Belt transfer point uses a Quicklub® 203 electrical pump.

and divider valves). The mines' lube trucks feature PowerMaster® 12:1 Oil Pumps, 75:1 Grease Pumps, and Lincoln Industrial 82206 Reels. And what gets grease into lube truck bulk tanks? Lincoln Industrial PileDriver® Pumps.

South African Company Sticks with Lincoln Industrial

Sasol, which first developed fuel from coal, mines 45 million tons annually in South Africa. When it came time to refit lubrication systems, it chose Lincoln Industrial. Here's why:

- ◆ Lincoln Industrial systems kept Sasol's giant reclaimers running 97% of the time for 17 years.
- ◆ Lincoln Lubrication SA provides unsurpassed service.
- ◆ Lincoln Industrial's lubrication system is user-friendly under extreme conditions.
- ◆ Lincoln Industrial systems comply with Sasol's award-winning safety standards.

Todaka Mining Chooses Centro-Matic® for Safety

Todaka Mining Co. produces 1.3 million tons of limestone per month for Japan's steel and cement industries. The company and its union wanted to automate the dangerous job of hand-lubricating its Komatsu dump trucks and wheel loaders. Todaka chose Centro-Matic® for the job because of its proven results on mining machines, and because Komatsu, experienced with other systems, only recommends Centro-Matic® for its mining machines.



Masaaki Shibata (left) and Tahito Koyama oversee Todaka's mining vehicles. Todaka's Komatsu HD785 and HD985 dump trucks increased their working time a half-hour each week with Centro-Matic®.

While safety was the most important factor in Todaka's decision, the company also received a savings "bonus" by choosing Centro-Matic. Masaaki Shibata, assistant manager for mining vehicles, says Todaka's fleet of wheel loaders now averages one additional hour of work per week, while its dump trucks are now on the job a half-hour more each week.

Lincoln Industrial Systems *Beat Canada's Extreme Conditions*

Mining Canada's tar sands demands tough equipment. Temperatures can drop to -50°F (-45°C) but machines can't take a break. The northern Alberta tar sand mining companies—Syncrude Canada Ltd. and Suncor Energy Inc.—use Lincoln Industrial systems extensively.

Lincoln Industrial distributor Motion Canada provides Syncrude with Lincoln automated systems exclusively. "It's just a fact that Lincoln Industrial systems are on all Syncrude's mobile equipment," explains Ward Westgate, MC's vice president of marketing. "If they're not there, we put them on. If there's some other system, we replace it with one from Lincoln."

Syncrude's two new O&K RH 400s, the world's largest hydraulic excavators, are lubricated by a two-line automated system designed and installed by a team from Lincoln Industrial, Walldorf, Germany, and German system



The RH 400 "dwarfs" regular excavators. Lincoln Industrial keeps it going.

house ZS. "The machines are running well," says Syncrude's Peter Marshall. "Everyone's satisfied."

O&K installs Lincoln Industrial's two-line high-pressure lube system on its RH 400 excavator. The system has two hydraulic pumps, a 220-pound container, a hydraulic reversing valve, and VS high-pressure metering valves.



"Lincoln Industrial systems are on all mobile equipment at Syncrude."

*Ward Westgate,
Motion Canada*

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