

Recasting CALL

One manufacturer finds beauty in old grinders.

► BY ALAN RICHTER, MANAGING EDITOR

Grinder builders continue to make more productive and automated machines. But when it comes to large-table surface grinders, old can equal gold. That certainly has proved to be the case for a manufacturer of perforation blades, industrial knives and hardened wear parts.

The Kinetic Co. Inc., Greendale, Wis., buys old Mattison reciprocating and rotary table grinders and has them remanufactured by Dial Industries Inc., Rockford, Ill.

According to Kinetic President Joseph Masters, his company was instrumental in forming a partnership in 1997 between Dial and some of Mattison Machine Works' former technicians, who lost their jobs after the company filed for bankruptcy.

"We were Dial's first customer to have a Mattison machine remanufactured," he said. Since then, Kinetic has had two other grinders remanufactured and another one is in the works.

Although one grinder was remanufactured and reprogrammed to have full CNC capabilities, Cash Masters, Kinetic's assistant shop supervisor, said the others are manual or "semi-CNC." A semi-CNC grinder has a Fanuc control that requires no G-code

programming. It allows grinding parameters to be changed on the fly by entering the appropriate variables. Therefore, while the electronic controls ensure the precision of repetitive grinding, operators can still "feel" what needs to be done to grind a workpiece and react accordingly.

The combination of computers and craftsmanship also makes learning easier for operators. "One manual operator with 30 years of experience was initially overwhelmed by the machine, but within 2 days we couldn't keep her away from it," Masters said.

He added that since surface grinding is the company's primary application, he was able to have a grinder remanufactured for manual operation without equipping it with ballscrews. (Another type of screw mechanism was installed, saving Kinetic about \$40,000.) Masters noted that the absence of ballscrews doesn't affect the machine's accuracy.



Cash Masters, Kinetic Co.'s assistant shop supervisor, watches as a remanufactured Mattison machine grinds parts.

Locating a Candidate

When having a machine remanufactured or refurbished, end users often select an older unit that's been producing parts at their own facilities. However, the ideal rebuild candidate may be a nonfunctioning machine that's just collecting dust in an equipment

dealer's warehouse.

Masters said he scours the Internet to find the best deals on old surface grinders, with one of his favorite sources being www.locatoronline.com. Auctions also provide good deals, but the main consideration—besides the price—is the condition of the cast frame.

“When buying a grinder for rebuilding, I’m looking for just a casting, without cracks and with all the cast components intact,” he said. “I don’t want a working grinder. I want the oldest and most beat-up grinder—the one others consider to be a piece of junk.”

In addition to carrying a lower price tag, Masters explained that an older casting has been stress-relieved throughout by virtue of having gone through numerous temperature and humidity cycles. And the older, heavier cast iron grinders are better at dampening vibration when grinding hardened materials, such as tool and high-speed steels.

Some of the best castings ever made, Masters said, are found on pre-1960 Mattison humpback grinders, which sell for as low as \$5,000. In fact, Ki-

netic’s oldest grinder is a 1959 humpback, which Masters said held the tightest tolerances until the ways became scored in the mid-’90s. (If you’re considering a machine with ballscrews and servos, however, Masters recommends a post-’50s, square-column Mattison model.)

Even when the company doesn’t need another grinder, Masters keeps searching. “I’m always looking for a good deal, even if the grinder has to sit out back for a while,” he said.

Like other machine tools, not all grinders are worth remanufacturing, rebuilding or retrofitting (see sidebar, below). A surface grinder with a 14"×48" table is the smallest machine that makes economic sense to rebuild, said Ernest Plett, controls systems manager for Dial. Only when multiple smaller grinders of a similar model are rebuilt can the expense be cost-justified, since the mechanical and electrical engineering costs can be spread out.

The Rebuild Process

After Dial receives a grinder to be

remanufactured, Plett said the company performs virtually all the work in-house. That generally includes sand blasting, fiberglass filling, priming and painting the casting; installing new electronic components; replacing hydraulic systems with electric motors; replacing the down-feed DC motor and installing vector drives on the rapid-up and down-feed AC motors; hand scraping the ways, base and table; and aligning the ways. In addition, long-lasting copper tubing—rather than “fast-and-cheap” flexible rubber hoses—is installed for the lubrication system.

Although manually scraping the ways—a dying art—is more expensive than grinding them, Masters explained that hand-scraped ways are more accurate and should last the life of the machine if done correctly. He added that replacing the hydraulics with an electrical system also enhances a grinder’s accuracy, because no heat from the hydraulic system enters the machine.

Other work includes CNC reprogramming and replacing the soft start with a variable-frequency drive to adjust the speed as needed for various workpiece materials and sizes.

Plett said it takes Dial 22 to 24 weeks to remanufacture a large surface grinder, which costs about 60 percent of a new unit. But the performance of a rebuilt machine isn’t 60 percent less than a new machine. “A rebuilt grinder is better than new when we’re done with it,” he boasted.

Of course, before making the final payment and taking delivery, Masters verifies the grinder’s performance by visiting Dial and having the machine grind a run of parts. He also tests the motor on a dynamometer to check its power consumption and speed.

Once the grinder is accepted, a final step remains before it can begin producing parts: constructing an isolated foundation for it. Masters said that for each grinder, Kinetic builds a 3'-deep, reinforced-concrete base with form board between the floor and foundation for extra vibration absorption. A foundation costs about \$6,000, but it’s money well spent to maintain the factory-specified tolerance of ± 0.0002 " across the entire table.

Deciding whether to remanufacture, rebuild or retrofit

You have an old grinder that needs work, but you’re not sure whether it needs to be retrofitted, rebuilt or remanufactured—or even what’s involved with each process. To clarify, here are definitions for each provided by Dial Industries Inc. (See main article.)

Retrofit. Retrofits are electrical, hydraulic or lubrication system updates made to a remanufactured, rebuilt or other existing machine. Electrical system retrofits involve the replacement of an older machine control with a new one or the addition of a CNC to a manual machine, with new servodrives and ballscrews when required. Hydraulic retrofits generally involve adding new hydraulic units and plumbing, and replacing or repairing hydraulic rams and valves. Lubrication system retrofits are updates or replacements of a grinder’s lube system to one that is newer and more efficient.

Rebuild. Rebuilds usually require per-

forming work on a certain part of the grinder so that it operates to customer specs. This might include remachining and scraping a table and base, or reconfiguring a hydraulic or electrical system. Rebuilds generally do not carry a warranty. However, performance guarantees are made on a case-by-case basis.

Remanufacture. A remanufactured grinder is disassembled completely and the way surfaces are machined, manually scraped and flaked. All hydraulic and electrical systems are replaced, and the machine heads are disassembled and rebuilt, with old parts replaced when needed. In addition, spindles are reconditioned or replaced with new ones. A remanufacture may also include installing a new CNC, including servodrives and ballscrews. Remanufactured machines come with warranties and complete documentation.

—Information supplied by Dial Industries. To contact Dial, call (815) 397-7994.



Before-and-after photos of a 45-year-old Mattison grinder that Dial Industries remanufactured.

“Without the isolated foundation, a reciprocating table grinder will rock back and forth slightly while operating,” he said.

Maintenance Matters

A grinder with a high-quality casting can usually be rebuilt a couple times, Plett said, but the actual number depends on the end user’s maintenance practices. And Kinetic makes sure its grinders are well-maintained. Masters said all operators are trained on maintenance and oil-change procedures, and are required to spend 5 to 10 minutes each shift cleaning their grinders.

Daily maintenance includes wiping clean the way covers, top of the base, wheel guard, head-slide area, dresser and cross-slide telescoping guards; removing any wheel grit and excess grease from the entire cross-slide area; flushing the inside of the table; washing the telescoping guards on the vertical column; and checking the Trabon lube reservoir and filling it if needed.

“While grinding, operators have to

wipe up the machines and keep their work areas clean,” Masters said. “They don’t just sit around.” He noted that this daily cleaning makes it quicker and easier for an operator to spot, for example, an oil leak.

Since coolant can add to the level of grime on a grinder, Kinetic has a mist-collection system to help keep the machines—and workers—clean. Masters said the company uses synthetic coolants stored in a central system, particle-filtered to approximately $5\mu\text{m}$ and maintained at $74^\circ\text{F}, \pm 2^\circ\text{F}$, year round. “A fully synthetic coolant lasts a couple years, if it’s kept clean,” he said.

And this level of cleanliness isn’t reserved just for the machinery, as practically every surface in Kinetic’s production facility looks suitable for eating off of—including the floor.

Final Recommendations

Close proximity to suppliers is important, even in today’s global marketplace. Unless a foreign OEM or builder has a nearby distributor or

branch location, delays can occur when parts and service are needed. When it comes to grinders, Masters likes his suppliers to be local. He recalled buying a grinder from a European builder that wouldn’t respond to his requests for information.

Being comfortable with a rebuilder extends to how the rebuilder delivers its service—not just when. Masters said to look for a rebuilder that is easy to work with and will perform the services you want.

“I have dealt with a couple of rebuilders who have tried to tell me what is best for me and I can’t stand that,” he said.

Masters also recommends working with a rebuilder that is familiar with the grinders they remanufacture, allowing input about the pros and cons of a particular make and model.

“Many rebuilders have the attitude that a machine is a machine,” he said, “and if they have rebuilt one make of grinder, they can do them all. Simply put, that is not the case.” \triangle