

Innovating for a Safer Workforce: Addressing an Aging Industry With Sophisticated Technology

Hazards are ever-present in the steel plant environment, and a heightened awareness and emphasis on safety is a necessary priority for our industry. This monthly column, coordinated by members of the AIST Safety & Health Technology Committee, focuses on procedures and practices to promote a safe working environment for everyone.



Author

Peter Bigwood
vice president of sales and marketing,
Brokk Inc., Monroe, Wash., USA,
peter@brokkinc.com

Much of the incoming millennial workforce doesn't want to take the time to brew a cup of coffee when they could just use a coffee pod. Where before they would need to hail a cab, they now press a button on their phone and a car comes directly to them. And why go to a restaurant when food can be ordered by just sending a pizza symbol on Twitter? This tech-savvy generation craves efficient tools to achieve the fastest results in whatever they do. While some of it may seem lazy and self-serving, it's a theme that has industries such as steel mills and foundries, along with construction and mining, changing their ways.

At the same time, the existing workforce is aging. Nearly half of all workers will be 55 or older by 2018, according to the U.S. Bureau of Labor Statistics. Construction industry jobs are expected to grow by 19% between 2008 and 2018. That combination drives a pressing need to recruit more young workers to fill the gaps left by retirees. Add in the increasing burden of workers' compensation claims due to workplace injuries, and employers are scrambling to find ways to cope. Not surprisingly, technology may point to a better way.

A History of Accidents

Safety is the first issue to address. Manual labor in steel mills, foundries, construction and mines has long included pneumatic tools, such as rivet busters and paving breakers, with heavy vibrations that can lead to injuries such as carpal tunnel syndrome, nerve damage and hand-arm vibration syndrome after prolonged use. Workers are also constantly at

risk of falls, falling debris and toxic air. The U.S. Occupational Safety & Health Administration reported 874 construction workers were killed in 2014 — 20.5% of all private industry deaths. The leading causes were falls, followed by electrocution, being struck by an object, and being caught in or between objects. In the meantime, there were 201,000 cases of work-related injuries and illnesses in construction; 10,300 in foundries; and 6,500 in mining, not including oil and gas. Of all those, about 80,000 resulted in days away from work.

While experienced workers suffer less-frequent injuries than their younger counterparts, the *Epidemiologic Review* reported that those injuries are more severe and costly and require more time away from work. An *American Journal of Industrial Medicine* study showed that expense claims for workers 65 and older were about triple those of their 18- to 24-year-old co-workers. The high price tag is largely due to lost wages paid to workers for days away from work, disabilities and physical limitations. In addition, employers incur extra costs when hiring and training new workers to replace injured or retiring employees.

Technology for Safety and Productivity

The risk of many of these injuries could be reduced if the worker had a way to do tasks while avoiding hazards. That accounts for the increasing popularity of remote-controlled equipment. Remote-controlled machines allow workers to operate and monitor their work from a safe distance in applications such as tearing out refractory in a

Comments are welcome.

If you have questions about this topic or other safety issues, please contact safetyfirst@aist.org.

Please include your full name, company name, mailing address and email in all correspondence.

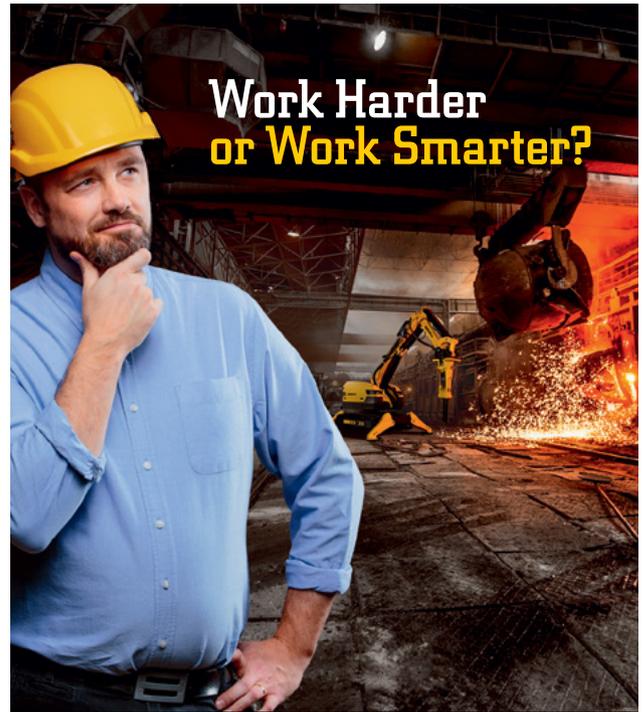
furnace or ladle, removing baked-on sand from large castings, or breaking rock in mines or tunnels. This keeps operators away from hazards and improves productivity by virtually eliminating physical strain and fatigue. Many remote-controlled demolition machines are electric powered and are able to run with zero emissions in confined spaces.

A steel mill in Ohio recently brought in a 12-ton remote-controlled demolition machine to take on a variety of tasks in their plant. Safety was a primary driver for the decision to purchase, along with productivity gains. Management was concerned about the level of injuries they were seeing among the workforce, and so by introducing this equipment, they addressed a number of issues at once. First, they were able to move their operators farther away from the furnace. Second, by taking advantage of the improved boom geometry and reach, they were able to take on additional tasks and operate in areas that were previously inaccessible. Finally, they were able to reduce the number of workers involved in the processes, further minimizing the risk of serious injury. The steel mill had an older remote-controlled demolition machine on-site, so they were well-acquainted with the underlying concepts. Their new machine offers greater finesse and “touch,” while the boom geometry allows for easier access to more problematic areas in the mill.

At one large foundry in Quebec, Canada, workers were using rivet busters to remove the baked-on sand/metal mixture adhering to the large castings. Wrist, back and shoulder injuries were a constant source of concern, along with lost-time accidents. It didn't help matters that it would typically take about six hours to completely remove the defects from the heavy cast plates. By introducing a small, one-ton remote-controlled demolition machine, management was able to simultaneously eliminate the risk of injury and cut the amount of time taken for the operation by more than half. Overall, the savings in lost time and injury and improved productivity will help pay back the capital investment in just 18 months.

Perhaps the biggest development in remote-controlled demolition machines over the last several years is the increase in the number of models available for different applications. This wide range of sizes and power sources — both electric and diesel — mean that plant managers can take a fresh look at areas where hand labor is still in use, with its inherent risks, or where older, outdated equipment is being deployed. A growing number of metal-processing plants are applying these new machines with positive results.

These same advantages help reduce costs for contractors as well. Coring and Cutting Group, a collective of concrete sawing, drilling and breaking contractors with 25 locations spread across 12 states, has used remote-controlled saws and remote-controlled demolition machines for precision demolition for about



Work Harder or Work Smarter?

Hard work is not enough. Successful process projects require finding new, more efficient ways of doing the work in order to increase profits and outsmart the competition. You know that all too well.

That's why you see a growing number of Brokk remote-controlled machines in iron and steel plants around the world. It's the intelligent demolition powerhouse that combines power, precision and flexibility in a unique, safe way.

Whether you are cleaning a ladle, EAF, torpedo car, BF runner, converter mouth, tundish, or blast furnace, the remote-controlled Brokk machine gets the job done with minimal plant shut down time and maximum ergonomics. Brokk. The smartest maintenance solution when the heat is on.

BROKK[®]

Intelligent Demolition Power

Brokk Inc. | Monroe WA | 1-360-794-1277
info@brokkinc.com | www.brokk.com

15 years. They have been able to reduce injuries and improve profits by making the switch. A combination of factors — including the new equipment, a drop in surgery costs and more competitive insurance markets — lowered annual demolition workers' compensation claims by about 50%. The group of companies also saves about US\$40,000 to US\$50,000 a year, or around 25%, in injury costs since the switch.

The Coring and Cutting Group said the most common injury claims had been lower back strains. The heavy and repetitive lifting that caused the strains was replaced with a lightweight remote-control box to operate the robotic equipment. Before the new equipment, Coring and Cutting Group tried to cut back on wear on their employees by focusing on cutting and not breaking. The safety and lack of physical strain from remote-controlled demolition machines allowed the group to add breaking back in, reducing the amount of diamond blades they needed to use for cutting.

Precision Cutting & Coring in Kansas City, Kan., has seen much of the same. The first of the company's three remote-controlled demolition machines was purchased five years ago, and they've helped to reduce pneumatic tool use by 60–70%. The improved safety offered by the new machines has also helped reduce the company's workers' compensation claims as well as their experience modification rate, or EMR, every year. Insurance companies calculate the EMR by looking at a company's safety record and using it to gauge future chances of risk. The higher the EMR, the costlier the insurance premiums. In addition, productivity on the job is at least 50% higher than it was before they bought the remote-controlled equipment.

Drawing a Younger, Savvier Crowd

In addition to improving safety, new technology is pivotal to enticing a younger workforce. The new generations have been raised on advanced technology and have a strong desire to avoid manual labor. Cutting-edge robotics that appeal to the sense of technology and reduce or nearly eliminate manual labor will be much more successful in attracting younger workers.

The Coring & Cutting Group used robotic demolition and sawing equipment to adapt its group of 25 companies to millennials and, as a result, the average age of its team of about 300 workers is just 25 years old. The group cut its turnover rate from 33% before the new equipment to 23% today. Productivity, including the speed the group completes jobs and the amount of new work coming in, increased 17% over the past three years. The group keeps the younger workers excited and eager to work by holding regular training sessions and spending money on new technology. The group made the choice to invest in the machines after realizing insurance costs were getting too high and that it would be difficult to attract new employees to eventually replace their much older crew if they continued their traditional approaches to their strenuous work.

Turnover is low at Precision Cutting & Coring as well, and about half of the 45 employees are 25 or younger. Younger workers are drawn to the high-tech equipment and are naturals at using it. As a result of using the machines for a portion of the work, the workers don't need to use handheld tools, and experience the associated wear, as often. The robotic equipment also helps to extend the careers of older workers, as they can limit the more physically demanding aspects of their work. The result is that the company benefits from keeping experienced workers around longer.

Solutions From Unique Tech

New, fresh-faced workers are demanding safe and efficient methods instead of unnecessary hard labor in their daily tasks. By choosing new technology, such as remote-controlled demolition machines and cutting equipment, contractors, foundries and operations in other tough industries can reduce workplace injuries and workers' compensation claims. They can then use the return on investment to pay for the new equipment. In addition, the investment can improve morale, lower turnover rates and attract a young generation of workers eager to learn to do their work in a unique, cutting-edge new way. ♦