

EXCELLENCE

We are accountable for our own success. We operate cost-competitive mines by applying continuous improvement and technology-driven solutions.

The Peabody Way

The Peabody Way is our philosophy and practice centered on improving how we operate, with a goal of driving best practice and standardization across the business. We rely on an outstanding workforce to demonstrate excellence in what we do and how we do it. With a keen eye on continuous improvement, we sharpen our competitiveness by leading with safety, increasing productivity, driving innovation, improving costs and measuring performance.

Continuous Improvement Across the Global Platform

Peabody believes significant value can be achieved at each step of the mining and marketing process. 2017 showed that approaching continuous improvement as a deliberate and integrated endeavor, where we look at technologies and techniques within the mining sector and other industries to drive advancements, produces results.

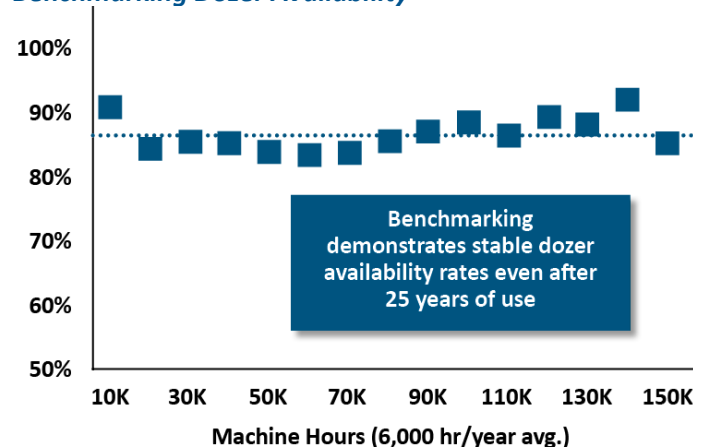
Continuous improvement strategies at Peabody operations have resulted in process and production improvements. For example, by optimizing overburden removal technologies, production efficiencies and cost savings have been achieved. Technology that uses a 3-D drone to profile the surface before cast blasting has improved efficiency 10 percentage points since 2015 at North Antelope Rochelle Mine (NARM), equating to nearly \$5.4 million in cost savings.

A benchmarking system to compare ourselves internally and against the coal industry and other industries has helped to sustain equipment availability. The chart shows dozer availability at Peabody U.S. operations. Using a sophisticated system for maintenance and asset management, including equipment rebuilds, has increased planned work on equipment and resulted in minimized breakdowns. In fact, 25-year-old dozers now boast availability rates identical to equipment that is brand new, greatly boosting returns while reducing capital expenditures.

Benchmarking individual team members has proven to raise awareness and elevate overall team performance. After a detailed scorecard to compare equipment operator proficiency was developed and tested at a Peabody Australia mine, a 30 percent improvement in the overburden removal rate on primary machines was demonstrated.

Benchmarking works to identify issues, and then targeted training programs are developed to increase individual productivity. The scorecard has since been introduced to shovel operators at NARM, where individual operator results are tied directly to employee incentive compensation and the goal is to ultimately raise productivity of the entire operation.

Benchmarking Dozer Availability



Benchmarking dozer availability, combined with core competencies around major rebuilds and superior maintenance, demonstrates sustained equipment availability over multiple years of use, which results in significant cost savings.

Transferring leading practices across the company showcases the Peabody Way. Margin ranking is a data tool that uses systematic drilling to unveil and capture analytics regarding reserves information by assigning a value to each coal block. The technique was first implemented at a Peabody Australia operation and has now been put into practice across several Americas operations. In 2017, margin ranking enabled the identification and successful access of a valuable block of coal reserves that existed above a natural gas pipeline.

Maximizing Equipment Utilization, Transforming the Way We Deploy Capital

Throughout 2017, Peabody leveraged equipment rebuilds and repairs, optimized equipment maintenance monitoring and modified procurement strategies. These practices enabled a recapitalization of the fleet and added capacity in a cost-effective way.

Peabody's Columbia Rebuild Center (Columbia), based in Francisco, Ind., serves the Americas operations through full equipment rebuilds and repairs, assembly and component rebuilds and equipment core management. The facility boasts 22 highly skilled maintenance technicians across the spectrum of repair skills – welding, electrical, hydraulic and mechanical – and a lean support staff that lends critical technical expertise, maintenance planning and project management functions to Peabody sites, allowing them to maximize equipment utilization and achieve higher reliability.

When NARM purchased a used Cat 854 loader, the machine required light refurbishment and was sent to Columbia for repairs prior to being shipped to the mine site. By performing the work in-house, it is completed at a significantly lower cost and often at higher quality than by utilizing third-party shops. Columbia also refurbishes previously idled equipment, including harvesting and repairing key components from machines that are then supplied for active equipment at operations. Safety upgrades and adherence to rigorous safety standards are ensured.

The implementation of a condition-based monitoring system, which provides real-time visibility into mining operations, has helped improve equipment reliability and extend the productivity and life of equipment. Enhanced analytics detect minor maintenance issues – before they become major – so that maintenance is executed even before recommended standards. When this process is applied across the global fleet, significant cost savings may be achieved. For instance, the expected manufacturer life of a haul truck engine is around 20,000 hours. In 2017, NARM had six engines operating above 40,000 hours. At an average replacement cost of \$500,000 per engine, estimated savings are nearly \$3 million.

“Gently used” major mining equipment has also been seamlessly integrated into Peabody's fleet. Seventeen pieces of equipment were added for \$24 million in 2017, saving around \$75 million relative to new equipment pricing. Purchasing minimally used equipment brings opportunity for enhanced efficiency – by idling less-efficient equipment – and can increase productivity and volumes. For example, at NARM some of the 240-ton capacity rental fleet was replaced with 320-ton capacity trucks that enable more units per employee hour.

Project Excellence

Project Excellence is Peabody Australia's cost and productivity improvement plan that has driven initiatives critical to the platform's sustainability without compromising safety, achieving 2017 savings of about \$130 million. The platform boasted its best-ever safety performance and reclaimed more than 1,200 acres of land. Since 2012, Peabody has made significant improvements to our Australian cost structure, resulting in more than \$900 million in savings from the platform.

A key focus for Peabody coal handling preparation plants is resource optimization through recovery increases. During 2017, focus was placed on reducing fine coal loss, specifically in the froth flotation and product drying circuits. Metallurgical coal recovery improvements have resulted in up to 3.5 percent yield gains at North Goonyella Coal Handling Preparation Plant, equivalent to more than \$15 million per year.

Enterprise Optimization software was introduced at Coppabella and Moorvale to optimize the blend from the two mines, enabling production teams to enhance margins over the short and medium term while ensuring coal blends for the different pulverized coal injection products meet customer specifications. The implemented processing and blending strategies resulted in an incremental savings of \$3 million for 2017.

The Australia platform is also focusing on optimizing production performance of equipment in service. The Australian Process Group has established the Production Analytics Centre of Excellence (PACE) to automate the evaluation of real-time data and to proactively identify events to prevent production failure. PACE utilizes a range of emerging technologies to notify operations of any detrimental equipment or metallurgical conditions while also guiding operators in immediate corrections via mobile devices. PACE complements Peabody's asset management focus, helping to extend the cost-effective service life of major mining and processing equipment.

Investing in Culture Reaps Rewards at North Goonyella

A focus on improving culture and doing business better lifted the North Goonyella Underground Mine to new records for performance in safety, production and panel development in 2017. Safety results included a total recordable injury frequency rate of 1.30, 49 percent better than the mine's 2016 safety performance. A maintenance program implemented more than two years ago has improved availability of equipment like conveyors, and the shift from longwall top coal caving to conventional longwall mining resulted in higher production levels. North Goonyella's new production record ousted their 2012 record by better than 13 percent. Finally, the mine had its greatest advance ever for a single panel – 6,726 yards, besting 5,974 yards in 2010 and reducing panel move times from 48 hours to 30 hours. The team also mined through the shear zone without incident.

"We're seeing the culmination of efforts this team has made to change how North Goonyella operates." ~ Peter Baker, Senior Vice President Underground Operations-Australia

Peabody People – Innovators, Inventors

Peabody Safety and Health Innovation Awards prompt employees and contractors to collaborate, develop and execute risk reduction ideas. In 2017, nearly 30 original ideas and inventions were submitted by Peabody's global workforce, resulting in a three-way tie and additional category winners, and showcasing how team members exemplify the Peabody Way. Peabody people – engineers, haul truck operators, roof bolters, production technicians and others – are creators, innovators and leaders, changing the mining industry for the better.

First Place Tie and Most Transferable

Shop personnel at Millennium Mine noted that routine maintenance of blowing or scraping dust out of collectors or cabinets on haul trucks could present a potential health risk due to respirable dust becoming airborne. To mitigate risk, the team modified a Liebherr T282C haul truck air filter box to allow better access with an industrial vacuum unit capable of handling heavily compacted fine dirt and mud. The vacuum unit is also successful in cleaning HV cabinets on other model haul truck fleets and heavy earth moving mobile equipment.



Cleaning with an industrial vacuum allows the task to be carried out with minimal exposure to dust.

First Place Tie

Two-point, non-retracting seat belts are currently found in many pieces of mining equipment at Peabody. Yet, even while an operator is restrained with this traditional lap belt system, unforeseen events like sudden jolts, dramatic truck load shifts and rare rollovers create potential for injury, often with little to no warning.

To better restrain drivers in truck seats, Peabody's Somerville Complex launched an effort to find a solution, identifying a Schroth-manufactured auto-retracting, three-point seatbelt system. The system had never been utilized in mining machinery before, requiring the mine to bring in an engineer to develop a bracket that would attach to a truck seat, enabling the three-point-harness to function correctly. As the Schroth test site for mining in the Americas, the system was tested several times at Somerville and was ultimately installed in eight Peabody haul trucks.



A Schroth auto-retracting, three-point seatbelt system in a CAT 785 truck.

Peabody's goal is to replace all two-point systems in its equipment with a three-point harness system, providing additional safety for every service vehicle operator. Somerville contacted several seat manufacturers and ultimately sourced Bostram Seats to work with Schroth in creating a system for equipment retrofits.

An updated three-point safety belt system earned Peabody recognition for using existing technology in a new way by the U.S. National Institute for Occupational Safety and Health, in conjunction with the U.S. National Mining Association.

First Place Tie

At North Goonyella Underground Mine, crews desired a means of safely and continuously installing supplementary roof support bolts in the conveyor belt roadway of the longwall panel while it was producing coal. Because of the conveyor belt, installing roof support bolts required erecting scaffolding above the operating conveyor to reach the full span of the roadway roof. When one section was finished, bolting equipment had to be taken down from the scaffolding, the scaffolding dismantled, and everything manually moved along the conveyor to be re-erected at the next position.



A mobile bolting platform, pictured, enables continuous operation of the conveyor belt and minimal disruption to production at the longwall face.

The process was inefficient, posed a manual handling risk, and disrupted continuous operation of the conveyor belt as well as production at the longwall face. A solution involved designing and building a mobile platform that can easily move along above the conveyor belt without significant disruption to operation. The unit is modifiable to suit any floor-mounted conveyor structure and is controlled by a friction winch and fitted with a secondary fail-safe brake system. Benefits of the innovation include significantly reducing conveyor belt disruption, improving safety, using less labor, and creating savings due to improved installation rates.

Most Cost-Effective Safety Solution

At Twentymile Mine, to ensure roof support, I-beam arches must be placed firmly against roof tunnel liners to close voids. These 16-foot beams were previously manually lifted and installed by six or more employees, posing potential risks associated with pinch points, back and shoulder strain and entering red zones.

The Twentymile team used their recycled scrap metal to design and fabricate an I-Beam Arch Lifter (IBAL) on site, resulting in an installation process that is far less labor intensive and much safer. The IBAL is comprised of a steel platform with a rest for an I-beam arch, as well as fork holes for stabilization and transport. To install, a scoop inserts forks under the IBAL, and then a uniloader from the opposite side picks up and places an I-beam arch on it. The uniloader then exits so that a spotter, avoiding red zones, can guide the I-beam arch to be lifted and set to the roof.

Most Effective Safety Solution

At NARM, mine impoundments require regular surveying to verify each reservoir's storage capacity is adequate to hold runoff from a potential 10-year/24-hour major storm event. Failure to adequately contain runoff could result in discharge of improperly treated water, damage to the integrity of – or even failure of – an embankment, and potential regulatory action. Until recently, impoundment surveys involved portage of a heavy aluminum boat and required two people to float the reservoir while one served in a safety role on shore. Measurement of the impoundment bottom was done by rowing a grid across the pond and periodically extending a rod over the side until the reservoir bottom was contacted. The process was inefficient, posed potential safety risks and collected insufficient data due to the limited number of reservoir depth points that could be measured.

To minimize risk, reduce labor and eliminate time-consuming maintenance, NARM implemented the use of HyDrone technology. This survey system is a one-man, echo-sounding catamaran unit that is lightweight and portable, operated by either a remote control or a laptop connected through a telemetry link. Data gathered from the system is precise and reliable, resulting in accurate impoundment capacity calculations. The HyDrone is applicable at all Peabody operations where surveying water body depths is required.



A HyDrone at NARM is an example of a safety enhancement that was added preemptive of a potential injury. Bryan Hansen, Environmental Engineer-NARM and School Creek Mine, remotely operates a HyDrone from land, virtually eliminating risk associated with drowning.

Most Original

The process of washing coal results in a byproduct of fine refuse material, called tailings, which is transferred and stored in surface mine areas that have been mined out. In Australia, as part of the rehabilitation process, tailings are required to be capped with earth material so that the land may ultimately be restored as grassland capable of supporting grazing activities. At times, however, unpredictable foundation stability of tailings may make it difficult for standard earthmoving equipment to be adequately supported during the capping process.

At Wilkie Creek Mine in Queensland, currently in rehabilitation, team members created a solution to cover tailings by modifying an existing agricultural silt scoop and tethering it to two dozers. The process involves pulling earth material over the tailings surface using a back-and-forth dozer methodology that ensures the earthmoving equipment remains on stable foundation.

Fabrication of the dozers to improve project efficiency and safety included adding tow eyes, a flexible support arm to help manage cable slack, mesh screen to provide operator protection and cameras for operator-assisted vision of the cable during operation. This type of capping system has not been used previously in the industry and is easily transferrable and adaptable to suit various conditions.

SAFETY

CUSTOMER
FOCUS

LEADERSHIP

PEOPLE

EXCELLENCE

INTEGRITY

SUSTAINABILITY



To efficiently and safely cover a tailings surface, an excavator scoops earth material into an agricultural silt scoop, which is attached by cable to both a return dozer (bottom left) and lead dozer (top right). The scoop is then towed forward and backward from the loading area to the dump point, allowing dirt to be slid out over the surface.

Peabody Business Services Focuses on Operational Excellence

As technology advances, customer expectations grow and cost pressures remain, the work of Peabody Business Services (PBS), a global shared services team, continues to uncover opportunities to focus on operational excellence and financial discipline. PBS efficiently and effectively processes core business services for Peabody employees, vendors and customers to ultimately deliver scalable, value-oriented service to the business.

Lina Young, Senior Vice President, Chief Information Officer and head of Peabody Business Services and her team are focused on delivering great customer service and becoming a scalable strategic lever of Peabody's operating model by providing high-volume, transactional and value-add services to the corporation and business units. Lina was named Gateway to Innovation's Technology Leader of the Year Award in 2017, a designation given to an individual in the St. Louis region who has achieved notable success in leading change, increasing productivity and effectively managing and executing business and information technology strategies.



The Gateway to Innovation Award for Lina Young (pictured second from left) is a credit to the PBS cross-functional team, pictured here, who leverage technology and standardize processes across the Peabody global platform.