EXCELLENCE

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

A Culture of Continuous Improvement

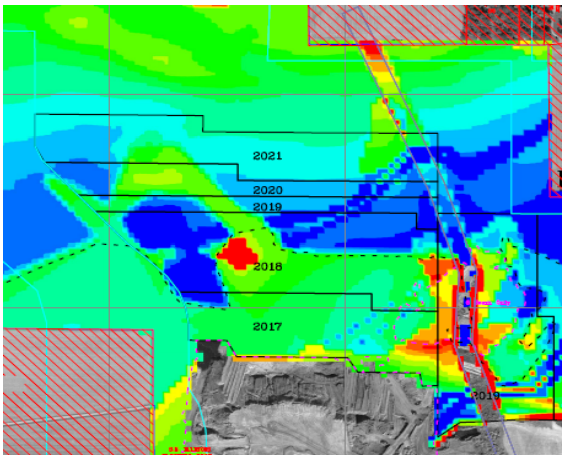
Even against a challenging industry backdrop, with Safety as its first value, Peabody worked to operate cost-competitive and cost-effective operations throughout 2016. Driving improvement in safety, productivity and costs has long been a part of Peabody's culture, and many of the most inventive ideas and technology innovations come directly from our workforce, with best practices shared across operations. In 2016 it was no exception, with several "employee-born" initiatives and companywide programs leading to advancements in our three areas of emphasis – Operational, Portfolio and Financial.

Cost Effective and Cost Competitive

Peabody's Americas division remained competitive during 2016 by driving continuous improvement efforts related to higher equipment utilization and enhanced productivity at the mining face. For instance, enhanced communications between operators, supervisors and dispatchers, like the use of real-time data and metrics to improve visibility of issues early in the shift cycle rather than at shift's end, enabled crews to gain insight on potential bottlenecks that impede shovel-truck circuit performance. This real-time reporting minimized production losses before they could occur and identified solutions that led to productivity gains. A competitive process for capital expenditures among Americas operations was also implemented in 2016, where mine management teams compete for capital dollars by demonstrating a high return on investment and quick payback, with the goal of lower unit costs.

Peabody's Data Analytics Platform shows how cost savings are achieved through advanced technology. The system collects, and through diagnostic tools, analyzes data to provide business insights for decision makers on real-time key performance indicators for Mining Operations, Safety, Production and Supply Chain Management functions. Peabody's Supply Chain Management has utilized the platform to support a Warranty Management system, which helps correct master data to identify high dollar components missing warranty masters. In 2016, more than 600,000 part numbers were vetted to correct over 4,800 records, resulting in $1.3 million in warranty recoveries. About $111 million in warranty recoveries have been realized since the system was implemented in 2012.

Continuous improvement entails the sharing of leading practices across Peabody's business platforms. First introduced at our Australian operations, an innovative margin ranking system to direct the mining of reserves is now used at several mines in the Americas. A color-coded map helps mines identify the cost associated with the activities that each type of equipment will perform on a current mining block as well as future reserves in that area, thereby maximizing the production capabilities of operators and equipment. Margin ranking is a powerful tool and has optimized productivity for each mine where it is utilized by identifying locations that will return the lowest cost per ton, and it influenced El Segundo Mine to change its medium- and long-term mine plan.



A map reflecting margin ranking becomes the basis for how Peabody will mine its reserves.

Project Excellence

For several years, Peabody has been on a journey to reposition the Australian platform with a strategic focus on our core value of Excellence. The Project Excellence program drives initiatives critical to the platform's sustainability. Without compromising safety, the goal of Project Excellence is to operate cash positive mines and embed continuous improvement initiatives like cost containment activities and productivity improvements in maintenance, labor and materials as a way of life and competitive advantage, no matter what the market conditions.

Project Excellence continues to produce results for the Australia platform, with fiscal year 2016 savings of A$248 million, 22 percent above the target of A$203 million. Strong cash generation across the platform resulted in Australia being cash positive in its own right, and its 2016 EBITDA of US$201 million produced its strongest annual result since 2012.

Project Excellence builds upon prior cost containment activities implemented during the Australian platform's repositioning project that saved Peabody more than $680 million in recent years. Employees contributed to these efforts by integrating continuous improvement into their everyday environment. Results continue to be evidenced, with a further 4 percent cost per ton reduction in 2016 following a 24 percent cost per ton reduction the prior year, despite reduced sales volumes.

Project Excellence in Action

The process team working with the North Goonyella Coal Handling and Preparation Plant in Queensland was charged with investigating alternative solutions to reducing fine coal losses. As the majority of cost estimates had previously included building more bays into the current plant to provide additional capacity, the challenge was to increase capacity within the existing plant structure. The team designed and installed an additional coal flotation circuit inside the current plant, which increased capacity to capture the majority of lost coal from the fine coal circuit. By utilizing a low-cost supplier, 80 percent of the benefit of a full-scale major plant extension was realized for only 20 percent of the original capital cost for similar expansions.

At Wilpinjong Mine in New South Wales, a check-in/check-out tracking system at the tool store was lauded by the Australia Department of Industry as an "industry best practice" during a routine inspection. Employees who use tools are assigned tags that are then placed on a shadow board when an item is removed and replaced when the tool is returned. This very simple, yet effective system enabled a means of tool traceability, which decreased time wasted in locating the required tooling, resulting in increased productivity. The system has also helped increase the life span of tooling, in turn reducing the expenditure for replacement tools.

The maintenance team at Millennium Mine in Queensland adopted a continuous improvement mindset to save nearly $300,000 against the maintenance forecast while increasing efficiency by creating a solution for on-site repairs on large equipment. Rather than incur crane and transport expenses by moving the mine's SH1003 dipper (also known as a bucket) offsite for scheduled repairs, the machinery was pulled into location, mounted on a skid plate and pushed by an 845K wheel dozer into the mine's old workshop for maintenance. The safe, efficient and weatherproof location allows constant project oversight and also achieves savings through use of site maintenance personnel, parts and consumables. Three additional on-site bucket repairs on smaller machinery saved on average $60,000 each.

Peabody People – Innovators, Inventors

Now in its seventh year, Peabody's Safety Innovation Awards encourage employees to develop safe and ingenious solutions to common challenges. The result produces pioneering innovations that significantly improve safety and often create time and cost efficiencies, boost productivity and can be shared across the workforce and potentially the industry. In 2016, 27 original ideas and inventions were submitted by Peabody's global workforce.

Achieving First Place and Most Transferable was Wilpinjong Mine's 789D dump body stand and access platform, which creates a safe and level platform for maintenance in and access to the haul truck bed. When Wilpinjong was due to make liner package installments on their 789D dump trucks, the team needed access to the work area without exposure to risks associated with being at heights. It also required a level area and an observation position isolated from the dump truck to perform the job. Historically, the task had been completed by removing the dump truck tray from the body, incurring significant cost and posing multiple risks, including loss of balance, being under a suspended load and height exposure, given no stand at the site was capable of reaching the height required to safely gain access for the task.

When no favorable industry solution was found, the mine team created a CAT 789D dump body stand and rear tray access platform. The stand adjusts the dump body's natural resting angle to a horizontal surface, creating a level floor surface for work within the dump body. It is installed by a forklift, negating any manual handling risk and allowing the installer to avoid crush risk under a suspended load. The access platform, which is moved via forklift, aligns perfectly with the truck tray to eliminate any gap or trip hazard, creating a safe and compliant access point to the dump body. Its gates are designed to prevent exposure to open edges or stairs.

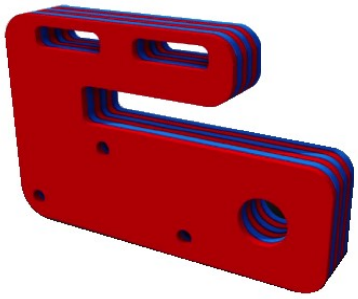
The dump body stand and access platform boast castor wheels for ease of mobility on a concrete floor, adjustable stabilizer legs to align the access platform with the tray and eliminate trip hazards, forklift tine slots for maneuverability, slide-out handrails and access gates that are designed to open inward, preventing unwanted exposure to edges and stairs.

Second Place Honors

At Colorado's Twentymile Mine, a multi-stage pump longwall ventilation system was invented in response to risk of spontaneous combustion.

Through a borehole piped into the mined-out area, harmful mine gases can be removed from behind the advancing longwall directly to the surface, eliminating the risk of employees traveling into an area with low oxygen or high methane, carbon monoxide and carbon dioxide, and reducing spontaneous combustion risks. This first-of-its-kind system uses technology and design that is safer and more effective than the solution that was mandated by the Mine Safety and Health Administration. It also boasts millions of dollars in cost savings versus other fixes and could be used at other longwall mines with a high propensity for spontaneous combustion.

Third Place and Most Original



When a shovel is stuck in soft material that is inaccessible by tools and cranes, retrieval means individuals must crawl under machinery to install a 200-plus pound tow hook, a procedure that is complicated by ground conditions, poses multiple hazards, and at Peabody's North Antelope Rochelle Mine in Wyoming, contributed to a reportable injury when a finger was pinched.

To solve this, the mine partnered with a vendor to design a shovel tow hook that is split into six individual, half-inch laminate layers that are then bolted together to make the three-inch-thick device pictured here. The individual 40-pound pieces reduce manual lift, and an engineered hand-hold built into each piece make installing and removing the hook far less likely to cause injury.

Most Cost-Effective Safety Solution

After a tray on a Komatsu 830E truck suddenly dropped while dumping due to cracking and failure of the hoist cylinder trunnion, the original equipment manufacturer advised the only means to verify cracking was to completely remove the hoist cylinders from the trunnions, complete a full inspection of the part and refit the cylinders, which would require two fitters and eight hours to complete. Mine employees at Moorvale devised a solution to save time, avoid the risk of working beside a suspended load and reduce manual handling exposure risks by creating a trunnion extension. The part bolts on to the hoist trunnion and allows the hoist cylinder to slide across, providing sufficient room to crack test the hoist trunnion, while also allowing more frequent inspections to monitor for potential failures. The design and concept afford transferability, as it may be applied to any truck haul fleet.

Most Effective Safety Solution

Wilpinjong Mine was asked to partner with the University of Queensland and Caterpillar to develop a semi-autonomous tractor system in a pivot push dozer trial. The innovation, recognized as Most Effective Safety Solution, means a remote operator station can be used for pivot push dozing capability, using non-line-of-site remote control technology. With the operator isolated from the machine, exposure to unhealthy levels of whole body vibration and noise are reduced, as is exposure to dozer-related injury from accessing machinery and other mine hazards.

Various components installed on a semi-autonomous dozer enable it to be controlled from a remote station, promoting a safer, more efficient work environment.

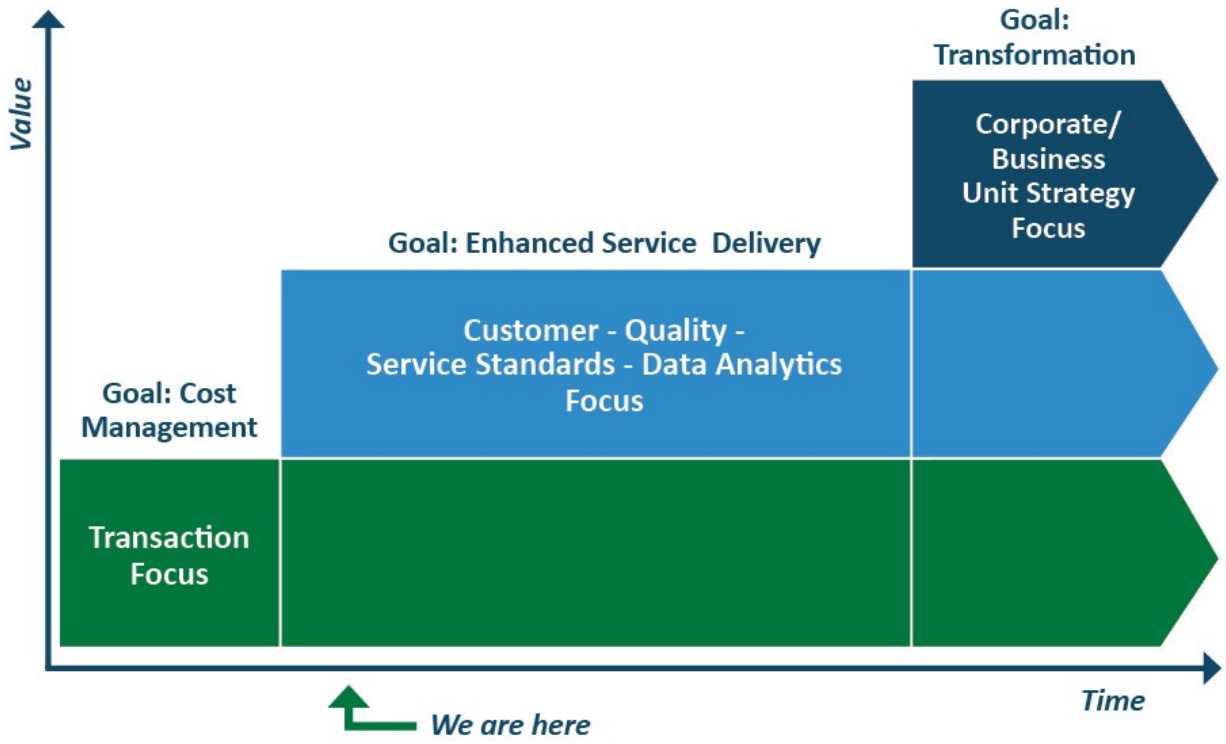
Shared Services Solutions

With a focus on operational excellence and financial discipline, in 2015 Peabody redesigned its operating model to create a global shared services platform that standardizes core processes throughout the company. The launch of Peabody Business Services (PBS) marked the company's shift toward increased efficiency and productivity worldwide by providing scalability and a lever to support strategic company initiatives.

In 2016, Peabody realized further benefits of PBS, as additional activities in procurement, sales accounting, human resource operations and benefits administration were transitioned in for global implementation. PBS was repositioned to an end-to-end, cross-trained organization. Investing 3,000 training and development hours into its people and simultaneously focusing on standardized transaction processing has enabled PBS to achieve impressive cost savings. In 2016, it operated approximately $1 million below budget, captured $5.6 million in annual run rate savings, identified another $2.5 million in sustainable cost savings and avoidance and mitigated working capital leakage from vendors.

A series of continuous improvement initiatives were launched by PBS in 2016 to accelerate process transformation and begin the next multi-year step in the shared services journey, focusing on enhanced value-driven service that will help PBS achieve its vision of being a trusted global partner to the business.

Peabody's Journey to a Shared Services Model



Building a shared services organization inside a corporation as large as Peabody is a process that takes years. PBS spent its first year focusing on centralizing transactions to achieve cost savings. During 2016, PBS began transforming into a value-driven service, closing expectation gaps with enhanced timeliness and accuracy, a higher level of customer service, transparency in requests and issues, bench strength, knowledge transfer, data insight and self-service access.

Exceeding Goals Energizes Employee

A major goal of the Workflow Management Team for 2016 was to find Peabody $300,000 in cost avoidance. Using skillful auditing and due diligence to ensure Peabody was being charged correctly for services rendered on invoices, the team hit the million-dollar mark in cost avoidance by the end of December, shattering their goal.

Rachel Minor, a specialist in PBS Service Management, says the team took their role in the project very seriously, and very personally. "The feeling I got when saving Peabody over $140,000 in cost avoidance on one invoice was like winning the lottery. Our goal was to find $25,000 a month, and the day I found this error already in February laid the groundwork to want to save Peabody as much as I could, and to exceed every goal we had moving forward," says Rachel, who discovered a supplier was double billing the company.

"When we think of Peabody's money as our own, it makes it that much more important to save as much as possible," says Rachel.

Rachel Minor

Continuous Improvement Enhances Culture

At the North Antelope Rochelle Mine (NARM) in Wyoming's Powder River Basin, an employee saw an opportunity to improve overburden truck shovel dig rates, which were performing below target for productivity and had been steadily declining for yards per productive hour since mid-2016. Jon Weslin, as a participant in Peabody's Leadership and Development Program, was tasked with identifying a variety of mechanisms to stop the downward trend.

As solutions were identified and implemented, the dig rate steadily and positively improved, and so did the mine's culture. "Changing culture for the sake of considering improvements is the first and foremost continuous improvement step," said Jon. "A big positive is that both are happening."

Learn how another innovative solution born out of Peabody's Leadership and Development Program – to reduce coal loss from over-drilling – has since become a priority for NARM in our People section.

A Challenge Overcome with Technology and Communications

Peabody continues to pioneer and enhance technical advances in mining, using technology and equipment to maximize safety and efficiency. At Millennium Mine, blasting in close proximity to a neighboring company's operation requires world-leading technology and increasingly complex patterns, using electronic detonation to manage vibration and dust. Millennium is located adjacent to Carborough Downs, an underground operation in Queensland's Bowen Basin. To access economic resources close to Carborough, Millennium needed to assume blasting inside the industry-standard exclusion zone of 600 meters. By using a new approach to communication and testing technical components, Millennium achieved access to lower cost reserves that would otherwise not have been available to them.

Embedding Communications: To ensure the safety of both operations' employees, Millennium's blasting crew introduced clear communication protocols and built trust to prove their efficacy. The mine advises Carborough at least 24 hours prior to a blast and meets with their senior personnel early on the day of a proposed blast to discuss vibration and fume management and wind direction. In the afternoon, balloons are released on Carborough's mining lease and are taken through a wind monitoring program to determine whether or not to fire a shot, a decision that is made as a joint responsibility. A leading practice in electronic detonation provides the highest levels of accuracy in modeling and predicting vibration, demonstrating that Millennium can comply with strict vibration limits and ensure the safety of underground portals and workings, offices and exhaust fans located on the lease boundary.

Enhancing Technology: Too much vibration during blasting poses hazards, like tripping a neighboring operation's ventilation system. So Millennium went to work on identifying enhancements to former blast management practices. To lessen vibration, the size of holes are reduced and multiple decks are used in the holes; rather than being condensed, explosives are spread over a longer column and each deck within a column is fired with an extended timing delay. The mine also switched to an electronic detonator system, which allows for more complex timing and vibration modeling during detonation. The biggest shot in close proximity involved 5,200 electronic detonators, sequentially firing during a total timeframe of 10 seconds to reduce the compounding effect of each detonation over time. Modeling technology that involves the projection of a blast's vibration was also introduced, and the vibration model has been calibrated to more accurately reflect actual vibration results, which are monitored by both operations at critical locations.

Results: Peabody mined an additional 2 metric tons of reserves close to Carborough in 2016, and the potential to continue blasting within up to 300 meters of the mine is being investigated, potentially creating access to an additional 1 metric ton of low-cost reserves. Environmental compliance for blast management has improved, and the enhanced blast management modeling technology and systems used are applicable for close proximity blasting at other Peabody operations.

Millennium Mine blast team members mined an additional 2 metric tons of reserves in 2016 due to innovations they introduced for close proximity blasting.