

Feeder Blockage Removal Device

BHP Billiton Mitsubishi Alliance (BMA) Saraji Mine

The Problem or Initiative

They say necessity is the Mother of invention, and that was certainly the case for the Saraji Mine Coal Handling and Preparation Plant (CHPP) in terms of developing the Feeder Blockage Removal Device (FBRD). In February 2008, a member of the CHPP Team was injured when attempting to unblock a feeder under the Crushed Coal Stockpile. A serious injury to a fellow worker raised an awareness of the hazards previously associated with this particular task, and brought home the reality that we need to work towards hard controls in our Business to address the risks associated with everything we do.

Feeders operate under both the Crushed and Product stockpiles in the CHPP at Saraji Mine and work to draw down coal from the stockpile, onto conveyor belts. At times, coal builds up around the mouth of the feeders and prevents the smooth flow of coal onto conveyor belts in a continuous process. These blockages must be removed in order to facilitate continuous supply of coal to the Plant for processing or train load out facility.

The Solution

The Project was implemented in three phases:

- development of a range of hand tools that could be used to manually remove blockages
- development of a range of trial high pressure water based lances
- installation and automation of best performing trial lance

A team of personnel from the Department have worked together over the past year to develop the FBRD. The team initially worked to develop an interim solution to the issue of blocked feeders, and followed up with a long term, engineered solution.

Phase I of the Project involved the development of a range of tools that could be used to manually remove blockages, whilst removing personnel from the hazard associated with coal release once a blockage was cleared.

Now all feeders under the crushed coal stockpile have been fitted with one of a number of trial, high pressure water based lances (Phase II). The lances are air operated and certain units can be activated from the access to 3S-conveyor tunnel, thereby also reducing the need for personnel to directly access this operational area. They can be left to operate and once a blockage has been cleared, generally provide a visual surface indication on the stockpile that normal feeder operation can recommence.

Moving forward, Phase III of the Project will involve full automation of the FBRDs. The best performing trial unit will be replicated across the other feeders, when the new units are installed in the upcoming CPP annual major shutdown (May/June 2009). The FBRDs will then be operated from the Control Room and personnel will no longer be required to access 3S-conveyor tunnel in order to remove a blockage. As an additional benefit, this will reduce the exposure of personnel to a high noise, high vibration operational area of the CHPP.

Benefits/Effects

The project has delivered an engineered solution to an operational hazard that has caused harm to employees in the past. The cost is estimated at approx. AU\$25000-30000 for the entire project.

A timely, low cost solution was imperative in delivering a suitable outcome to the challenge of developing an engineered solution to this issue. Hence personnel had to work with a minimal budget (Phases I and II totalled approx. AU\$2000-5000) and were encouraged to implement a solution in as timely manner as possible in order to remove personnel from the hazard.

Therefore, it represents a highly effective outcome when consideration is given to the costs involved.

The only external assistance (outside BMA Saraji Mine) required in order to complete this project was engineering validation of the device trial design.

Transferability across Industry

This project can be applied to any Site in which feeders draw material from either a stockpile or a bin. In this case, the devices operate as high pressure water lances, but in a dry application, air could be used to achieve a similar outcome.

The findings of this project have been shared extensively within BMA and BHPB Billiton as a result of the replication potential from this low cost, engineered solution. The project has been shared via quarterly CHPP Managers' and Maintenance Superintendents' meetings, via Saraji Mine's quarterly 'Coal Chisel' magazine, via BMA's regular 'BMAG' magazine and also via the BHP Billiton intranet as it has applicability to so many Sites throughout the World.

Design and installation has commenced on feeder installations across the other BMA assets as a result of this information sharing and is already yielding benefits in terms of reducing similar hazards across a number of Sites.

The opportunity to participate in the Queensland Mining Industry Health and Safety Conference this year via the Innovation Awards process would enable the Saraji CHPP team to share their learnings and solution with the broader Industry. Exposure via the Awards process would enable others to make contact with Saraji personnel directly in order to obtain specifics regarding the FBRD design, drawings, specific applications and success in practice.

Innovation

The Feeder Blockage Removal Device was developed by a team of Operational personnel at the Saraji CHPP. The team consisted of Electricians, Fitters, Boiler Makers and Operators. The team members applied their trade and operational knowledge in developing the interim and long term engineered solution to the problem of feeder blockages under stockpiles which has existed for more than 30 years.

The first hand tools were fabricated using parts from the CHPP lay-down area. The trial high pressure water based lances were fabricated in a similar method. Personnel used materials and equipment readily available to them to experiment with different potential solutions.

New feeders will be installed in the upcoming CHPP annual major shutdown and these have been designed with bolt-on plates that will facilitate easy fitting of the most successfully trailed water lance.

The high pressure water lance design, as developed by members of the CHPP team, was tweaked and certified by Group Engineering to ensure it conforms to Australian Standards, statutory and BHP Billiton's Fatal Risk Protocol requirements.

In establishing the corrective/preventative actions following the incident in 2008, the CHPP team sought information from across BMA, BHP Billiton and the broader Industry in terms of how other Sites have engineered solutions to the hazard of unblocking feeders under stockpiles. The information available was limited and no solutions previously devised could be readily replicated for the specific Saraji application.

In addition, when the feeder Manufacturer was approached regarding the subject, little consideration had previously been given from a design perspective to the issue of unblocking feeders once installed in an operational environment.

Saraji Mine personnel have now worked closely with the equipment supplier to ensure that customers have the option of installing unblocking devices on their new installations. This is a great demonstration of how this innovation has assisted the Industry as a whole in sharing learnings and improvements in design and operation for the benefit of all who operate such equipment.