

# BHP Billiton Optimizes Train Loading Performance at Australian Coal Mine

## Case Study

Honeywell met Mt. Arthur Coal's requirements and provided a Train Load-Out system that is completely automatic. Operator interaction and monitoring of the system is now from the central control room.

### Background

BHP Billiton is one of the world's largest producers of major commodities, including iron ore, metallurgical coal, copper and uranium, and has substantial interests in conventional and unconventional oil and gas and energy coal.

A wholly owned subsidiary of BHP Billiton, the Mt. Arthur mine produces thermal coal used for power generation that is sold in both the domestic and export markets, and has a full production capacity of 20 Mtpa (million tons per annum) of raw energy coal.

### Challenge

BHP Billiton was seeking to move from a manual, operator-controlled Train Load-Out (TLO) system to an unmanned, fully automated train loading capability. This effort included sub-systems such as conveyer feed belt magnet cleaning automation, coal sampling, dozer supervisory control and data acquisition (SCADA) interfaces, and production reporting.

The Mt. Arthur site not only required automation to enhance weight consistency and loading times from that of manual loading, but it also wanted to improve the safety of the TLO process with IEC 61508 Safety Integrity Level (SIL)-rated systems for wagon under-load and spillage detection, as well as safety sensing for other abnormal conditions.

The site project team performed a risk assessment as per the process of AS61508 and determined that wagon under-loading was a hazard with a significant consequence. The process determined that a SIL2-rated system was needed to mitigate this risk.



*BHP Billiton's Mt. Arthur coal mining operation in Australia.*

***The TLO Implementation at Mt Arthur provided the following key benefits:***

- *Improved loading accuracies significantly*
- *Avoided penalties imposed by its rail haulage operator*
- *Realized cost reductions by minimizing manning requirements*
- *Improved Safety*

### **Other sub systems of the TLO Solution**

- Locomotive/mine communication system
- Wagon type, position and door-open detection
- Gross weighbridge
- Train speed/derailment/arrival/approaching detection
- SIL-rated wagon under load, spill, and Emergency Stop detection
- High object/locomotive detection
- Hydraulic power pack upgrade to achieve SIL rating
- Human-machine interface (HMI) operator station terminal
- Video monitoring for remote loading
- Train Manager™ reporting and quality control

### **Solution**

BHP Billiton chose Honeywell to assist with implementing an improved train loading capability for its Mt. Arthur mining operation. The upgraded system was a mixture of third-party equipment, which Honeywell added to or replaced.

The new SIL2-rated TLO solution is an inline, wagon-loading control system, which consists of the several sub-systems including:

- Train speed detection
- Automated interface to rail haulage operator for weight reconciliation
- HMI operator station on six stockpile dozers linked by a radio interface
- Automation of conveyor feed belt magnet cleaning
- Automation of coal sampling
- Coal tracking to allow the rail bin to be left empty at the end of the train

The new TLO system requires **minimal intervention by the operator**, who only has to initiate loading from the SCADA screen. The sequence runs automatically, with operator input only in the event of an abnormal situation. In such cases, all devices have a manual mode to allow the operator to start, stop, open or close devices and systems from command buttons on the SCADA screen or from a joystick on the operator console. Emergency stops are hardwired, independent of the SCADA system.

The project timeframe was short with only small outages of several days for system implementation and integration. Honeywell was able to provide the TLO expertise to design an optimized system within the constraints of the existing site loading infrastructure. The implementation was achieved with only minor production delays, and our experienced mining and materials engineers are providing on-going support.

### **Benefits**

By implementing an advanced TLO control system from Honeywell, the Mt. Arthur mine has achieved consistent and accurate coal loading performance. This solution enables quicker load times, higher productivity, less spillage and a more competitive overall operation.

For example, typical error rates for manual loading can be in the order of 2-5%. Honeywell's TLO solution has helped the Mt. Arthur facility achieve loading accuracies of 0.5%.

In addition, by meeting agreed loading tolerance accuracy, the mine has avoided penalties imposed by its rail haulage operator. Over-loading can cause uneven wear on wagon bogies, and under-loading can lead to train derailment at high speeds due to instability.

Automation of the TLO function provided additional cost reductions by minimizing manning requirements. Elimination of an external operator for the system was key to significant savings.

Additional enhancements were also achievable to the TLO system in response to changes in train configuration, reporting systems, and increased safety devices with the introduction of new technology.

### **For More Information**

Learn more about how Honeywell Solutions, visit [www.honeywellprocess.com](http://www.honeywellprocess.com) or contact your Honeywell Account Manager.

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