

## **Longwall Boot End Conveyor Belt Guarding**

### **BMA Coal Gregory Crinum Mine**

#### **Problem or Initiative**

Design a simple guarding system that does not interfere with normal longwall processes and to prevent persons falling into exposed belt at the Longwall Boot End.

#### **The Solution**

Improve the existing guarding in front of the longwall belt boot end area to allow operators to walk past the section of conveyor belt where the structure has been removed, safely and to give a Hard Barrier for improved protection to all persons from coming into contact with the conveyor belt. The existing guarding is approximately 1m high and about 300mm from the floor giving some protection but is not ideal. It is a plastic mesh and is flexible; it has to be manually adjusted every time the longwall advances 1metre to allow it to be kept taut. The existing barrier has to be disconnected when the structure is removed then refitted once the structure has been removed. The new hard barrier guard gives an improved level of protection at all stages of the longwall operation as well as increasing the efficiency of specific longwall tasks. It is not required to be removed for removal of the belt structure.

Part of the retreating longwall operation is to remove approximately 12 metres of belt structure at the inbye end of the conveyor belt directly in front of the track mounted belt boot end each shift. When this structure is removed it leaves a 12m gap between the last bay of structure and the boot end. This area presents high potential for someone to fall into the belt system. A means of guarding is required to prevent this from happening. Previously this was achieved by using a flexible plastic mesh approx 1metre high retained on a spindle fastened on the boot end that can be unwound and secured at the last bay of structure, this would then act as a barrier. This method of control has been the accepted method in use at the mine and through out the industry to date. Crinum Longwall operators came up with the concept of running a rigid mesh barrier suspended by monorail on arms extending out from the existing monorail rigid trays as a means of improving this area.

The initial concept was the idea of Mick Parsons a longwall operator, with help from members of his crew and a few sketches. This idea was presented to the Longwall Superintendent and the Longwall Maintenance Coordinator with sketches on bits of paper. From these sketches they were given the go ahead to pursue this project. Using old equipment from site a proto type was built to see if the concept could be further developed. The prototype identified the potential for it to be developed further as it gave improved protection to operators walking past this area.

Our monorail vendor, Macquarie Manufacturing was engaged to assist with the development and design of this project and the manufacture and supply of the guarding system.

At all stages of the development of this project the Longwall operators were included in reviewing the design drawings for their continual feed back to ensure the guarding was acceptable and effective before manufacturing.

The guard had to be light enough so as not to put undue stress on the rigid sections of the existing monorail. It required to allow for the removal of 4 bays of structure without having to be dismantled. It needed to be adjustable vertically and horizontally so that it did not come into contact with the floor and the belt structure. To overcome the need to dismantle the system a lightweight monorail system was devised to allow the guard to move to allow access to the structure.

To overcome the need to have a long length of monorail to accommodate the removal of up to 4 bays of structure a double monorail system was manufactured that allowed the guard to be opened and closed like curtains, which cut down the length by half. This would operate by moving the guard fully outbye to expose the inbye structure sections, once removed the guard would be pushed all the way inbye to expose the outbye sections of structure once removed the guard would be fully opened up and locked together, to guard the completely exposed conveyor belt

To allow for the undulations of the floor there are two means of adjustment: chains at the top of the monorail attached to the cross members and a 200mm section at the bottom of the guard sections that can be lowered or raised.

The outrigger cross members have incremental holes along its length that allow for any horizontal adjustment required.

### Benefits/Effects

The benefits are that this innovation has removed the potential to come into contact with or fall into the belt at all times. In addition the guard system is fixed to the monorail trays that are part of the Beam Stage Loader, when the Longwall advances the full length of the guard advances with it. This means that there is no need to manually move anything until the longwall has advanced sufficiently that structure is required to be removed. The design of the guard then allows structure to be removed by sliding the guard fully outbye for access to two bays of structure. Once these two bays have been removed the guard is moved all the way inbye to access the rest of the structure. Once this has been removed the guard is opened up and locked in position until structure is again required to be removed then the process is repeated. Hence manual handling is also reduced through the implementation of the monorail system.

### Transferability across Industry

This system has the potential to be used throughout the industry at places like conveyor loop take ups, tripper drives.

## Figures



Figure 1. Previous guarding



Figures 3 - 4 Underground set up



Figure 5 Mock set up of system prior to delivery

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