

Telescopic Barricade

Xstrata Zinc – George Fisher Mine

The Problem

The primary use of chain barricading is to prevent harm to personnel through the restriction of access and travel to firing zones and high hazard areas, and for supplementary purposes such as the protection of critical infrastructure. This method of barricading is effective only to the extent that our personnel consistently and unfailingly perform the function. Though as we know, the discretionary nature of human behaviour can pose an unacceptable risk to personnel if not properly countered or managed by optimal equipment and process design. At Xstrata Zinc's George Fisher Mine, there persisted the risks of incorrect installation of chain barricades, manual handling injury, and the risk of heavy equipment becoming a projectile when transported in the operators' units.

The Solution

Driven by the need to mitigate these unacceptable risks to the safety and health of our personnel, a more permanent barricading solution was sought. Borne of an internal joint initiative between the Mine Manager and Irata Tofinga, a Servicemen, a steel barricade was conceptualised, and a prototype fabricated onsite and trialed.

The trial consisted of a series of installations, using a success/fail criteria which was measured by the ability of the barricading to remain in place and the amount of equipment damage occurring. The trial was monitored and recorded for one month until design changes were evident and the final design conceptualised and completed. The final design allowed for the recess of the barricade into the side wall, to ensure that the control was completely effective and damage was prevented to the structure.

The installation was presented at the Zinc Safety Leaders' Forum to all supervisors, superintendents and managers. It was also communicated throughout the George Fisher Mine using our LCD screens to ensure exposure to personnel of the process from concept, design, and through to installation. Encouraging feedback was provided at both operational and supervisory level. The fabrication of the final design was then outsourced to a local manufacturer and the Telescopic Barricade was implemented throughout the ore body in both the North and South mines.

The Telescopic Barricade works by eliminating the risk of the barricading falling down, a common occurrence with chain barricading. Further, the innovation eliminates the risk of manual handling and vehicle transportation issues during the construction and transport of the chain barricading equipment. Telescopic Barricading has to be physically retracted which allows for the installation to meet our barricading requirements by incorporating the relevant signage. It also further enhances the safe work environment at George Fisher Mine by ensuring the structures permanently remain in place.

It reaches up to and including 8.5m in length, and a production drill hole is drilled into the wall at 110mm diameter 4.5m/5m in depth to accommodate the outer tube. The receiver is bolted to the wall on the opposite side of the drive and has a locking mechanism to allow the barricade to be locked into position. The structure consists of lightweight aluminium and is designed with a wiper ring to allow for cleaning through retraction, thereby eliminating the susceptibility of the retractable pole to block through material build up. The Telescopic Barricade is wholly interchangeable through the design including 6 bolts that allow for the complete change out of all working mechanisms should damage occur after installation.



Photo 1: Components of the Telescopic Barricade

Photo 2: Telescopic Barricade installed but not grouted



Photo 3: Permanent barricade installed into the sidewall in "closed position"



Photo 5: Telescopic Barricade locked into receiver on opposite sidewall



Photo 4: Telescopic Barricade in "opened position"

Benefits / Effects

The overarching agenda of George Fisher Mine in undertaking this initiative is, as it has always been, the wellbeing of its personnel. The mine is entering a new era in safety performance, and this is supported by a significant decline in recordable injuries. In improving the permanency of the barricading used throughout the mine, George Fisher has been further able to fulfil this agenda in a number of ways –

- Telescopic Barricade equipment is lightweight. Operators are no longer required to transport heavy chain barricading equipment in their units, or carry the equipment from units to barricade location – heavy manual handling and improperly secured load (projectile) risks removed;
- The sign hanger cannot be removed and the attached sign holder allows for signs to be readily hung task-dependent – risk of harm or injury by inadvertent removal of signage removed;
- Firings have a negligible effect on barricade stability, ensuring the barricade remains at all times to serve its purpose of protecting personnel – risk of serious harm or injury by unintended deconstruction of barricading removed;
- The Telescopic Barricades are recessed into the sidewalls – risk of damage minimised.

Deployment of the Telescopic Barricade throughout the mine has been incident free. During the display of innovations at the Xstrata Zinc Safety Leaders Day, the Xstrata Zinc Lead Smelter saw the potential to utilise this barricading technique within the plant.

Transferability

The design is limitless in its application across the resources industry. Indeed, there are further innovations planned for George Fisher Mine and the Lead Smelter with current efforts focused on the development of an intrinsically safe LED version of the barricades.

Innovation

To the extent of Xstrata Zinc's knowledge and research, this is the first type of this barricade within the industry. While Telescopic Barricade technology is commercially available, the point of difference is the design features of this barricading for use and application in the underground mining environment.

Approximate Cost

The cost of construction of the barricade is \$2800, with installation costs at approximately \$700. Concept and design costs for the entire process were completed utilising George Fisher Mine personnel time and experience.