

Application of steel bollards for managing the hazards associated with open stopes, Waihi Underground Operations

C E Gawith¹

1. Underground Mine Manager, OceanaGold Ltd, Waihi Waikato 3610.
Email: _Charles.gawith@oceanagold.com

ABSTRACT

The Waihi underground mining operation currently mines epithermal veins ranging from two metres up to ten metres in width using a 'Modified Avoca' stoping method. This method consists of long-hole bench stope mining at 15m to 18m sublevel spacing. The bulk of production drilling and blasting is top down with the extraction length of a typical stope panel nominally being 18m to 20m along strike. A stope panel is usually taken in two blasting cycles followed by the remote bogging of the stope ore. The panel is backfilled in-cycle using unconsolidated waste rock material which is tipped into the void from the upper level using a Caterpillar R2900 or R1700 sized underground loader.

The underground mine first commenced production in 2008 and up until 2016, as was typical of many open stope mining operations at the time, an underground loader was used to place a waste rock bund at the top brow of the open stope. This rock bund was the principal means of protecting people and equipment from this hazard. In 2016 there was a fatality at the mine when a loader that had been tasked with building this rock bund fell into the stope void. Immediately post incident all mining and processing operations were suspended for a week to allow colleagues to grieve, to observe cultural protocols and to begin the investigation into this event. During this period senior operators, supervisory and technical staff developed an innovative system which used steel bollards to protect this open edge. With development over the following months this bollard system has eliminated this hazard from the Waihi underground mine.