

SmartShot[®] Initiation System assists with Improving Stope Productivity at Sunrise Dam



Project Summary

LARGER STOPES FIRED WITH THE SMARTSHOT INITIATION SYSTEM HELPS TO IMPROVE PRODUCTIVITY AND REDUCE MINE OPERATING COSTS PER OUNCE

Production performance from the Sunrise Dam underground mine was being hampered by the mining of geologically complex orebodies using selective narrow open stopes.

In order for the mine to increase mine production and reduce mine operating costs it was evident the mine needed to move to larger and more productive stopes.

Moving to larger stopes required a rethink of their blasting practices. Dyno Nobel was able to provide them with a solution that involved the implementation of our SmartShot electronic initiation system. Paired with our bulk emulsion TITAN[®] 7000, the mine had a blasting solution to help improve productivity and reduce operating costs, as well as, reduce the risk of misfires and provide a flexible initiation sequence with millisecond precision.

Background

AN UNDERGROUND MINE WITH COMPLEX MINERALISATION

Located 55 kilometres south of Laverton in Western Australia, the Sunrise Dam Gold Mine consists of an underground mine below a large open pit. The mine is owned and operated by AngloGold Ashanti Australia Ltd.

The underground mine has two access declines with portals located in the open pit walls, and is being progressively developed to simultaneously explore and exploit multiple orebodies. It is currently developed to a depth of approximately 700m below the land surface.

Due to the complex nature of mineralization at Sunrise Dam, original underground ore production was derived from narrow and highly selective open stopes, which proved to be slow and expensive. The low ore grades, loss of blasted ore and need for permanent pillars reduced the yield of gold per meter of development.



In addition, the process of selective mining of the complex orebody was proving to be, at times, unpredictable, making it difficult to produce an accurate mine schedule. It was also susceptible to production delays and had high operating costs. It was clear that the mine needed to do things differently.

Project Goals

IMPROVE PRODUCTIVITY AND REDUCE DIRECT MINING COSTS PER OUNCE

The project goal was simple: Improve productivity and reduce direct mining costs to reduce the operating cost per ounce of gold extracted.

Mining of small narrow stopes was:

- resulting in lower productivity;
- more susceptible to production delays;
- resource intensive, requiring an increased level of engineering input and support to maximize recovery from these small stopes.

For the mine to consistently achieve the required production targets it was necessary to increase the size of open stopes and extract multiple mineralized zones at once. Such a change involved a rethink of the drill and blast practices that were being used for the narrow small stopes.

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Technology Applied

SMARTSHOT INITIATION SYSTEM FACILITATES THE BLASTING OF LARGER STOPEs

The requirement to accurately control the blast initiation sequence and eliminate the potential for misfires due to cutoffs meant it was necessary for the mine to move to an electronic initiation system. Accordingly, Dyno Nobel's SmartShot electronic initiation system was implemented to facilitate the blasting of larger stopes.

The SmartShot system is a state of the art electronic initiation system that enables the user to design and implement complex blast designs with ease. The SmartShot system is user friendly, fully programmable, secure, and reliable. It provides the operator with a firing window of up to 20,000ms in millisecond increments with millisecond accuracy. Flexible timing, a total burning front and longer available delays mean larger and more complex blasts can be fired, as was the requirement at Sunrise Dam.

Value Added

LARGER STOPEs RESULT IN IMPROVED SAFETY, HIGH PRODUCTIVITY AND LOWER OPERATING COSTS

The SmartShot electronic initiation system has allowed Sunrise Dam to move towards larger longhole open stopes. In the Cosmo orebody, these have consistently produced excellent results, with minor overbreak and underbreak, high productivity, low operating costs and gold recovery in excess of initial expectations.

Reducing the total cost per ounce of gold poured has lowered the economic cut-off grades required, increasing the proportion of in situ mineral resources which can be economically extracted.



The mine has been able to design blast timing to utilise dynamic void creation, where the required void is progressively formed during the blast, rather than available from the outset.

The SmartShot system has given the mine the ability to mass fire stopes over multiple levels allowing the mine to deliver:

- increased broken ore stocks and improved fragmentation, resulting in an increase in production rates;
- a significant reduction in direct mining costs through efficiencies in the production cycle;
- improved mining efficiencies through superior conventional/tele-remote bogging ratios (up to 85% of blasted ore has been extracted via conventional methods from some stopes);
- reduced exposure of personnel to hazards.

The system has also proven to reduce the risk of misfires which can be a serious safety risk in an underground mine environment.

Overall a great result for the mine.



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