

CASE STUDY

WEBGEN™ ENABLES SAFER UNDERCUTTING IN BLOCK CAVING OPERATIONS

NEW AFTON MINE, BRITISH COLUMBIA, CANADA

“ WEBGEN™ REDUCES SLOT DRIVE DEVELOPMENT BY EIGHT METERS PER DRIVE. NEW AFTON ESTIMATES DEVELOPMENT COST SAVINGS OF MORE THAN \$1 MILLION CAD ACROSS 18 UNDERCUT DRIVES. ”

SITE PROFILE

TNew Afton mine is located 10km west of Kamloops and 350km northeast of Vancouver, British Columbia. The deposit consists mainly of gold and copper mineralization with approximately 70,000 ounces of gold and 85 million pounds of copper extracted annually. The mine is divided into four block caves: block 1 and 2 (western and eastern caves), block 3 (referred to as “B3” zone), and “C” zone, located 600m, 760m and 1200m below surface, respectively.

THE SITUATION

New Afton mine utilizes a block caving mining method. Block caving first involves developing an undercut beneath the orebody. Slots blasted upwards, followed by ring blasting from many lateral drives create a void that initiates caving. This is followed by development of an extraction level by which “draw bells” are excavated in order to pull or extract the muck from the caves above.

New Afton’s conventional method involves two slot blasts charged and fired separately, followed by ring blasting to establish the cave. The slot blasts are offset to enable re-entry to connect wired detonators and to ensure optimal void for each blast.

Located south of the ore contact is a zone of rock known as Picrite. Picrite is a very fine, weak host rock and is challenging to mine through in New Afton’s “C” zone. Alternative slot placement options were considered in order to minimize risk and mining cost associated with the picrite contact, but these compromised recovery and increased dilution and development costs. Furthermore, all options required detonator retrieval and exposure of personnel to the brow.

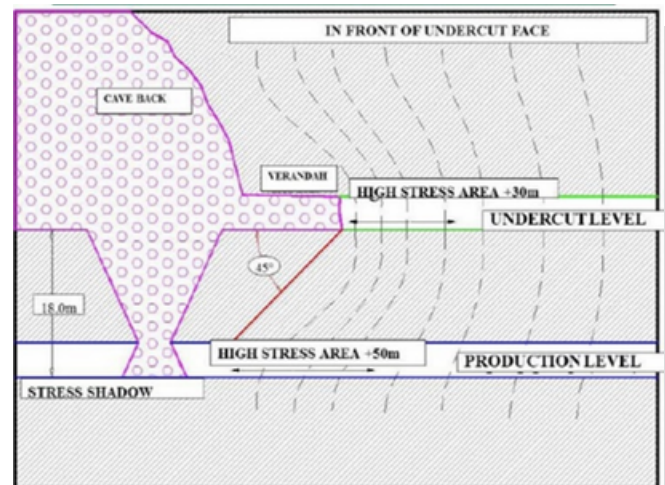


Figure 1 - An undercutting method utilized at New Afton mine.

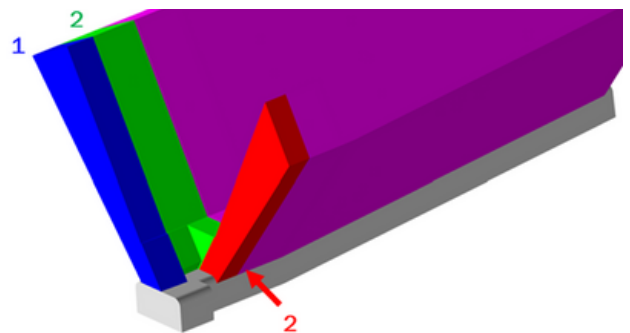


Figure 2 - The conventional design offsets blasts 1 and 2 so miners can re-enter to connect the initiation system for blast 2. The green drill rings can then be blasted into the void created by the slots.

TECHNICAL SOLUTIONS

To improve safety and recovery within the operations, New Afton approached Orica's WebGen™ Team in July of 2022 and presented the challenges associated with mining in this zone. A collaborative effort was made to create a new blast design for New Afton mine using adjacent slot blasts charged together but fired separately. Such a design is conventionally impossible without the use of WebGen™ wireless detonators because there is no way for workers to re-enter to connect the electronic detonators for the second blast. Therefore, the initial slot would be loaded with i-kon™ wired detonators, and the second slot would be loaded with WebGen™ wireless detonators.

WebGen™ initiates blastholes wirelessly through rock, air and water, and eliminates blasthole connections. Wireless initiation makes the new method feasible, as there is no need for re-entry following the initial blast.

The slot design for this application was conventional – utilizing 4" holes around a V30 for initial void and holes 27m in length. Both slots were separated by a row of backbreaker holes in order to encourage break between the slots. A robust peer review between Orica and New Afton personnel was carried out and careful consideration was taken during the design phase of this project as the risk of overbreak into the backbreaker holes and holes adjacent to the V30 was significant due to spacing constraints. Distance between the two slots was minimal, measuring 1.7m apart, collar to collar.

Therefore, conservative collars were maintained in the backbreaker holes (3.0m) and adjacent holes (2.5m) to protect the primers in the event of overbreak following the i-kon™ slot. Furthermore, the toes of the primary box holes required adequate spacing in order to prevent intersection with the V30, similar to other slot applications.

THE RESULT

New Afton successfully trialed the method in March 2023, firing the blasts 4 days apart. The trial proved the new method using WebGen™ eliminates re-entry risks, improves recovery and dilution, and reduces slot drive development by eight meters per drive. New Afton estimates development cost savings of more than \$1 million CAD across 18 undercut drives. The WebGen™ system has proven itself to be a key tool in modifying existing mining methodologies and provides substantial improvements in safety, schedule and cost reduction.

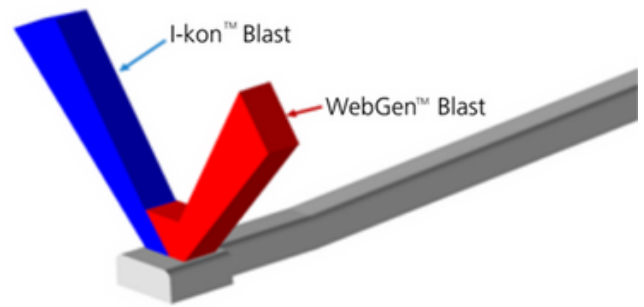


Figure 3 - With WebGen™ adjacent slots can be fired separately and without re-entry.

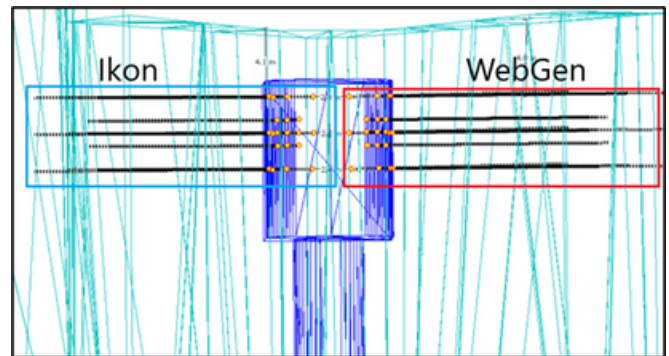


Figure 4 - Plan view of WebGen™ improved slot layout.

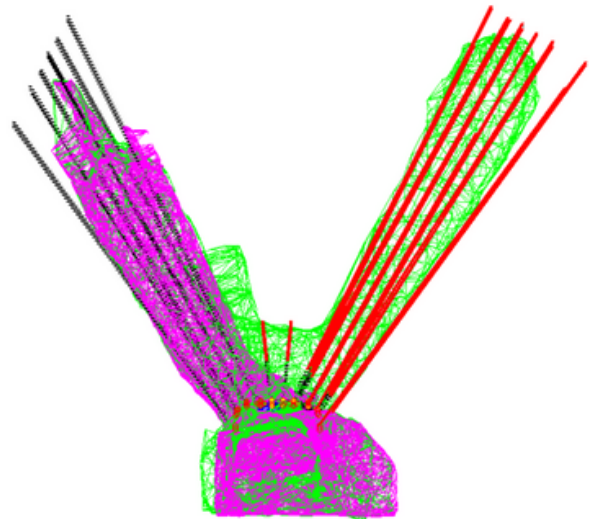


Figure 5 - Final CMS results from the original WebGen™ (depicted in green) trial in March of 2023.

TESTIMONIAL

“Our engineers applied wireless initiation to improve safety in the way we slot the undercut. By reducing development costs and improving recovery and dilution, New Afton mine becomes a more efficient and cost-effective operation.

Utilizing WebGen wireless primers has opened a whole new approach to challenging conditions and has given us a powerful new tool to work with. WebGen has the opportunity to unlock value in otherwise unfeasible designs, and potential rethink our design philosophies in a big way..”

Josh Parsons
Senior Mine Engineer,
New Gold Inc- New Afton.

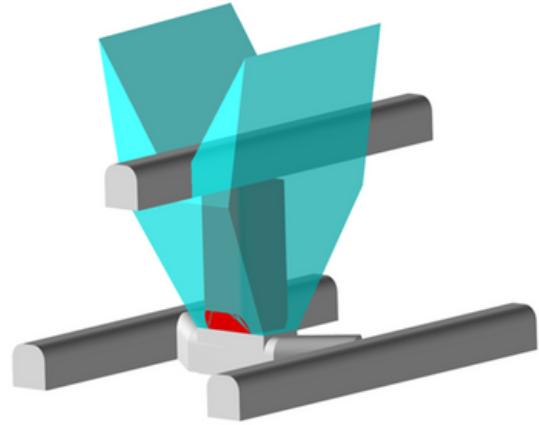


Figure 6 Conceptually, WebGen™ enables multi-lift drawbell blasting.

OTHER OPPORTUNITIES

New Afton sees other applications for WebGen™. Pre-charging or pre-loading in the undercutting sub-level caving rings can reduce exposure to open brows and eliminate the need to shotcrete the muck pile to protect workers, improving cycle time. Additionally, utilizing WebGen™ in these rings could reduce the risk of ring/material loss due to overbreak or brow peeling. Furthermore, multi-lift drawbell blasting with WebGen™ promises to improve the drawbell success rate by enabling multiple blast sequences in order to capitalize on void.

ACKNOWLEDGEMENTS

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