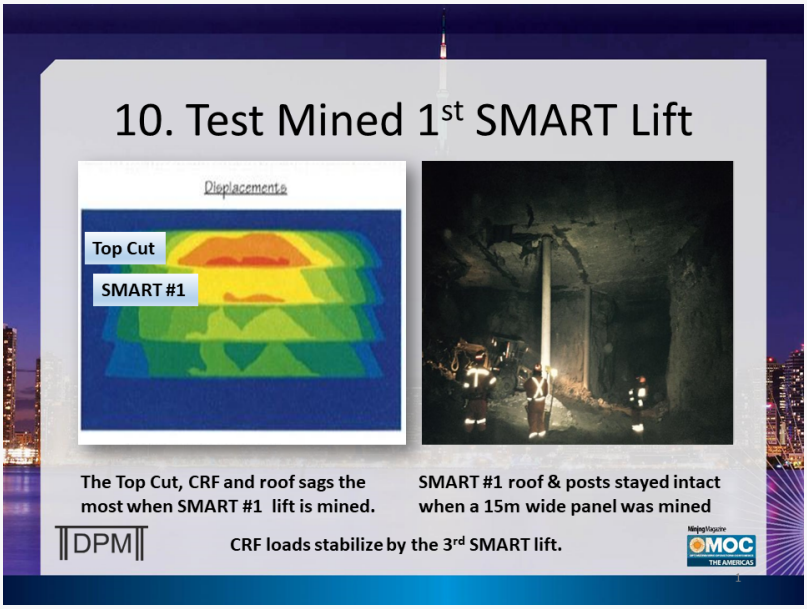
DPM Mining Inc. Announces SMART Mining Improvements in Underground Fiber Optic, Communication and Instrumentation Design

The US Bureau of Mines tried in vain for 70 years to design a system to monitor the entire life cycle of a mine. SMART can easily monitor the entire LOM.



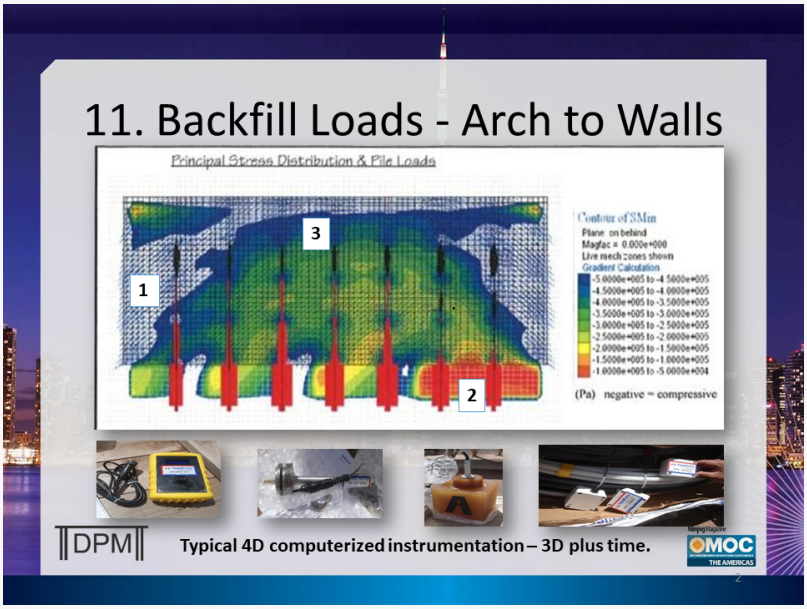
Test Mining 1st SMART Lift

TORONTO, ONTARIO, CANADA, May 4, 2021 /EINPresswire.com/ -- DPM Mining Inc is pleased to announce a key invention has been issued, Canadian Patent No. 2853584 which allows creating a SMART mining method. The easiest way to understand SMART mining is to visualize an orebody having the same shape as a large underground car parkade. Each level of the parkade becomes a SMART spread sheet with the cell dimensions being volume of ore between any 4 posts. The parkade floors are designed with a 6m post height.

The geologist using the 3D geological block modelling software selects the block size best able to accurately Krige the orebody grade, tonnage and NSR value. Normally the orebody would be carved up into stopes and pillars. SMART requires a simple conversion of the kriged geological data blocks to SMART spreadsheet cell dimensions. Depending on the specific gravity, a SMART cell contains ~1,000t of ore. Individual SMART cells can be color coded for ranges of grade or NSR dollar values.

SMART mine planning is straight forward. Print out the 6m lifts of color coded ore blocks. Colored blocks above the ore cut off grade outline the stoping plan for that lift. Top cutting installs the posts at the surveyed 3D location of each SMART cell. Top cutting can be extended on any 6m lift thus SMART can mine any shape of larger orebody independent of dip, plunge or rock quality.

SMART mining creates a true expert mining system. As you mine an orebody downward the unmined SMART kriged cell database of mining costs, grade, metallurgical recoveries and so on become more and more accurate over time. SMART mining is not just a patented concept, a successful $5,000,000 full scale “proof of concept” mining program was funded by Penoles in Mexico over a 4 year period. See EIN press releases DPM 2 & 3 for Golder modelling and Penoles test mining program.



Backfill Loads Arch to Walls

Golder had set up then FLAC 3D computer mined an 8 cell wide x 8 cell long by 6 lifts high orebody. Individual computer runs were performed using 10 different types or strengths of backfill. Jammed 6% cemented rock fill (500MPa CRF) had the correct combination of strength vs stiffness to be self supporting when allowed to move while being confined and supported by a continuous concrete floor plus a grid of compressible 400t capacity posts.

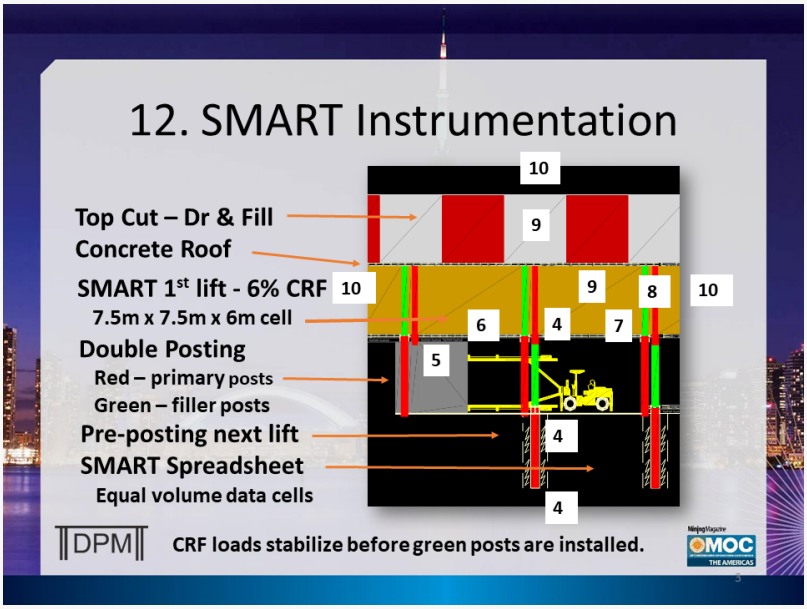
> Lord Kelvin stated, “if you can not measure it, you can not improve it”. "SMART monitors all CRF and structural components in real time thus continuous cost and technical improvements are possible.""
>
> *Charles Gryba, Mining Engineer, Inventor quotes*

Snap shots of Golder data results were captured every 15 minutes, each run took 45 hours. This data was used to design the Penoles test mine components. Post loading was 250t on the 1st lift and loads stabilized to 150t by the 3rd lift. Mining a 15m wide panel, on the 1st SMART lift was successful, 3200t of CRF was supported, the roof and posts stayed intact. See Images 10 and 11.

The Golder FLAC 3D modelling also showed that CRF loads arch multiple times then finally arch to the stope walls (1) where friction along the walls supports the CRF weight. Post loading is also variable, from high compression loads in the panels being mined (2) to high tensile loads when posts are surrounded by CRF (3). From a safety viewpoint the main item to be instrumented is the dynamic loading of concrete posts as one goes through the mining and backfill cycles. However, this alone will not provide a snapshot of what is happening within the CRF backfill or is the CRF separating from the stope back while the backfill arches.

This type of questioning soon lead to developing a list of SMART cell components that could be monitored. The list was discussed with Yield Point owner Andrew Hyett PhD of Kingston Ontario

who designs and manufactures a wide range mining geotechnical instrumentation. Each instrument that leaves the Yield Point factory is calibrated with its own on board computer and battery power supply. Data files from each instrument could be transmitted to Golder to update the FLAC 3D model using mine data.



SMART Instrumentation Locations

The SMART structural design is a dream layout for geotechnical and mining engineers. See Image 12 for instrumentation locations:

1. The combination of conduit pathways caste into SMART posts plus burial in concrete floors allows fiber optic cabling to be extended to multiple load cell locations and/or communication hubs. See SMART pathway (4) which allows multiple concrete roof & post rebar load cells to be monitored, for example (6, 7 & 8) or 3D load cells installed in the CRF (9).
2. One of the main benefits of the SMART design is that all instrumentation can be installed lift by lift without having to do extra rockwork – for example, the wall monitoring instrumentation in the back and walls of the orebody(10).
3. When round (5) is blasted the stacked compression pads bolted to the bottom of the red post immediately expand. The pad assembly can be designed to host a Wi Fi hub, video, lidar or any other type of instrumentation as or where required.

By monitoring a range of load cells in computer recorded real time, SMART can recalibrate the FLAC 3D model with production generated data. This allows the mine to continuously improve the design and cost of every SMART component. SMART not only increases the productivity and safety using conventional mining equipment plus is easily scalable from 1,000 to 15,000tpd, with the added benefit of ~0% dilution and ~100% ore recovery which maximizes the orebody NPV.

SMART also solves many of the main obstacles holding back mechanical cutting, remote or robotic mining, including the elimination of the falls of ground, standardization of work, and having video & Wi Fi immediately available at the production face.

Rather than keeping the SMART technology confidential 10 EIN press releases will be issued to explain SMART to both the mining and financial market. To quantify some of the 40 or so SMART platform advantages, 4 well known mines will be re-designed. Mining or financial companies interested in the SMART technology can contact DPM Mining.

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