

AMC BOS™ doubles metres drilled per day in Chile

CASE STUDY

AMC Borehole Optimisation System™ (AMC BOS™) successfully controlled fault zones and changing formations at a gold exploration project in Chile. This innovative system was able to have a positive effect on productivity and reduce the consumption of mud and water by effectively managing and preventing lost circulation, high torque and borehole instability.

A gold exploration project located in the IV Region of Chile, some 3,500 to 5,200 metres above sea level, had issues with constant formation changes and complicated fault zones. Formations consistently produced complete or partial fluid losses. There were several soft and problematic formations resulting in lost circulation and causing issues such as hole failure, stuck rods and lost casing.

Such lost circulation problems resulted in delays to the drilling program, which delayed total progress of the project and its comparative performance against other campaigns in the same area. The client implemented reverse circulation pre-collars before diamond drilling to complete more drillholes; however, they were searching for a preventative solution to address lost circulation.



Results

- Doubled diamond coring metres drilled per day[#]
- Cost of drilling fluids reduced by up to 26%[#]
- Reduced water consumption per metre by up to 32%[#]
- Torque remained constant and controlled
- Reduced the risk of lost boreholes, stuck rods and other drilling issues through the complex fault zones
- Achieved and maintained a lubricious membrane to control the conditions of the borehole and avoid the use of wedges.

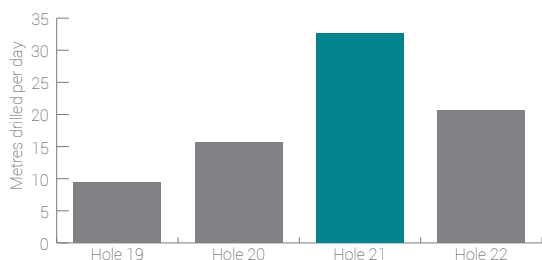
[#]Compared to holes with similar characteristics (19, 20, and 22).

AMC BOS™ CASE STUDY

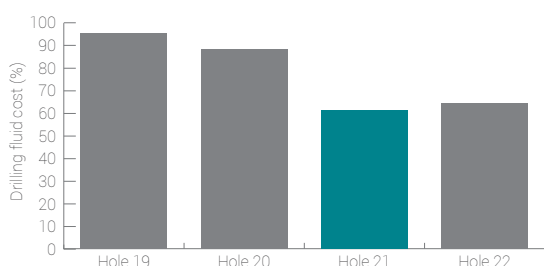
Doubles metres drilled per day in Chile.



METRES DRILLED PER DAY DOUBLED**

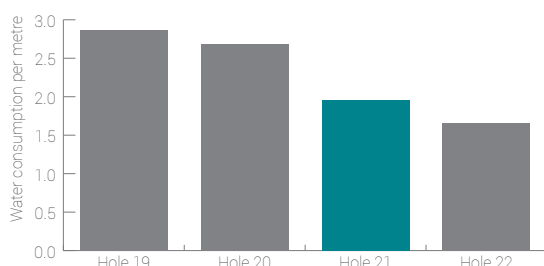


REDUCED COST OF DRILLING FLUIDS BY 26%**



Note: Cost of hole 21* includes the cost of AMC BOS FIX™.

REDUCED WATER CONSUMPTION PER METRE BY UP TO 32%**



Note: Hole number 22 presented a lithology consisting of mainly compacted ground, therefore water consumption was naturally low, while hole 21 presented a semi-compact ground with highly fractured zones.

COMPARATIVE ANALYSIS

	Average DDH	Hole 21*
Average metres drilled per day	16	33
Cost per metre (%)	100%	83%

*Numbering of the holes has been modified for confidentiality
 **Compared to holes with similar characteristics (19, 20, and 22).

TORQUE REMAINED CONSTANT AND CONTROLLED

	Average DDH	Hole 21*
Average metres drilled per day	16	33
Average torque (psi)	2161	2000
Cost per metre (%)	100%	74 %

Solution

After an initial trial with the AMC BOS™, AMC had achieved strong results. For the second trial, AMC suggested the method be implemented from the commencement of the hole as a preventative measure against lost circulation.

The AMC BOS™ comprises of a driller-operable, casing-while-drilling tool, the AMC BOS UNIT™ and lubricating rapid-fill polymer grout, the AMC BOS FIX™. Throughout the trial at hole 21*, AMC BOS FIX™ was injected at regular intervals, penetrating fractures and securing unstable rock by encasing the borehole wall with a thin lubricating membrane. AMC BOS™ was able to treat the application area, which consisted of semi-compact rock with fractured zones to improve stability, torque control and fluid losses from beginning to end.

Project Outcome

Comparing results from similar holes 19, 20, 21 and 22* (holes which were drilled using Reverse Circulation (RC) pre holes and continued with Diamond Drilling (DDH)). At hole 21* AMC BOS™ maintained a lubricating membrane down the borehole allowing for safe, constant and controlled drilling. The following aspects were able to be optimised:

- Metres drilled per day increased by an average of 200%#
- Reduced cost of drilling fluids by up to 26%#
- Torque remained constant and controlled, ranging between 1900 – 2000psi
- AMC BOS™ offered an alternative to the traditional lost circulation methods
- Avoided the use of wedges to correct hole deviations by keeping controlled conditions
- Reduced the risk of lost boreholes, stuck rods and other drilling issues through the complicated fault zones.

From the implementation of the AMC BOS™, AMC was able to achieve several improvements in drilling efficiency and was pleased with the overall result.

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