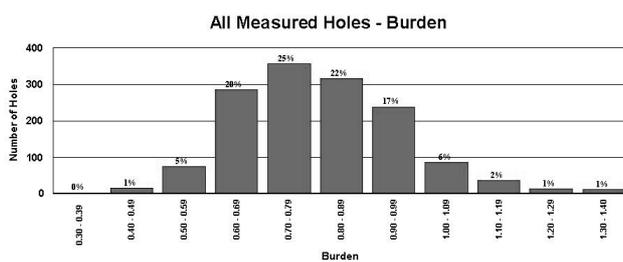
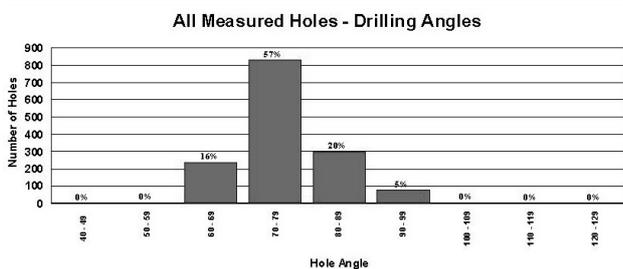
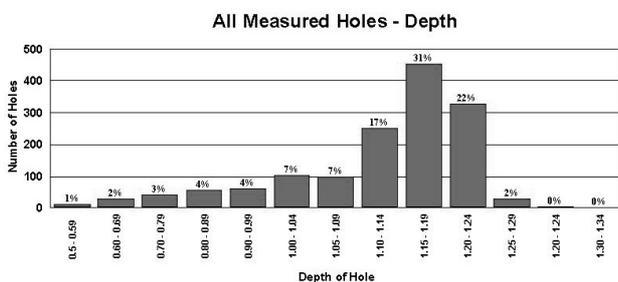




How to leverage your bottom line with good drilling and blasting practice

by R.G. Tarr, J. Fouché, T.C. Rogers, and J.W. Pocock*

During an intense and accurate study of initiation systems used on an AngloGold mine, Mine A, poor drilling practices were revealed. Graphic results of all *actual* measurements taken are shown below.



Accurate drilling of shot holes will determine whether a mining operation is payable or not and at what pay limit mining can take place. Losing 30 cm of a potential 120 cm-hole length will result in a number of consequences, i.e.:

- Higher stoping costs
- Drilling of one shot hole twice in every five shifts
- Increased explosive cost as a result
- Excess stress on hangingwall and footwall due to bad face shape
- Excessive blast damage before the area is worked out.

No wonder we have such a high-risk operation. Drilling accuracy is crucial to the profitability on any

mine as profits are directly related to the quality and utilization of the drilled shot holes.

The Solution: Stope drill rigs and EDD initiation system

Stope drill rigs



The face shape in this photograph indicates that a 100% accurate toe burden is beneficial to the face shape and therefore safety and production.

Because standard hole angle, depth and burden (*for any mine*) can be set and locked on a drill rig, hole geometry will be the same for every hole.

Therefore:

- The advance per blast is increased and more m² produced
- Explosive usage and damage to the environment is reduced
- A friendlier working environment is created.

The rig is used for two primary reasons:

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Safety

On-face man-hours are reduced due to in line thrust and remote operations.

Drilling of accurate shot holes

Control of stope widths and physical conditions are improved, therefore production is increased.

EDDs

The results of Mine A observations and those from other AngloGold mines are shown in Table I.

These are measured results. Initiation systems that have no out of sequence blasting translate into better face advance with less environmental damage.

The bottom line

Profits are greater as efficiencies increase and costs and safety payments are reduced. Greater advance per blast will have a positive impact on your bottom line.

As a result of assumptions applied to the average AngloGold shaft, we can calculate the bottom line impact of improvement in advance per blast for:

- Drill Rig panels - 23 cm / blast
- EDD only panels - 8 cm / blast
- Current operating cost - R62,219 m
- Fixed cost remains the same - R41,449 m

Table I

Average Face Advance per Blast

Mine	FIC or shock tube base	EDD current	EDD improvement
A	0,78 m	0.89 m	12%
B	0,70 m	0.83 m	16%
C	0,86 m	1.0m	14%
D	0,70 m	0.78 m	11%
E	0,87 m	0.93 m	7%
F	0,87 m	0.93 m	7%

- But variable cost increases to - R25,110 m
- Therefore total cost - R66,559 m

However monthly:

- Improved gold production - 260,5 kg
- Gold price - R50 000/kg
- Therefore improved revenue - R13,029 m
- But increased variable cost - R4,340 m
- Therefore improved contribution - R8,689 m
- Capital cost of 92 TDS drill rigs - R11,776 m
- Therefore pay back period - 1,36 months

The above figures show to what extent the bottom line profit of a mining house can benefit from accurate drilling combined with the best initiation system.

Good drilling and blasting practices are worth implementing. ♦

Please Note

The Institute is moving with effect from

3 April 2000

The postal address and telephone numbers remain unchanged

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