SAFE, SECURE WIRELESS BLAST INITIATION SYSTEM.

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The Mine Site Technologies, MST BlastPED ST is a wireless/remote blasting system used in more than sixty (60) mines (including two mines in Zambia and one in Tanzania) since its release in 2002.

The system consists of a controller and signal tube initiator which communicate wirelessly using spread spectrum frequency. This technique ensures a robust and secure wireless link between the controller and the signal tube initiator.

The configuration of the system ensures ease of use with all the instructions for initiating the blast printed on the equipment. This means little or no formal training is required to use the system.

The technology enables you to have your blasting point at a distance of up to 4 km, line of sight (LOS), as opposed to the traditional distance of 500m from the blast. This ensures the blast takes place from a safer and secure location.

The paper and presentation will provide the audience with the benefit of many years of international mining know-how in this technology as well as more recent local African experiences. There will be references to demonstration blasts done in South Africa, current users in Africa and elsewhere.

Practical Return on Investment (ROI) calculations and references to safe blasting practice will also be included.

1. INTRODUCTION TO MST

Mine Site Technologies (MST) is an Australian based company which has been in the mining industry since 1985. It is a solution provider, specialising in the development and supply of technologies and services to the mining industry, which includes underground communications, remote blasting systems, mine tagging and tracking systems. The focus of this paper is on the surface remote blasting system, BlastPED ST.
2. **HOW THE SYSTEM WORKS**

After connecting the pattern/bench as normal, switch on the remote receiver and connect the lead-in to the sparker of the remote receiver.

The blaster then takes the controller to the blasting point. He switches the controller on, keys in the password and sends the arm and blast commands to initiate the blast. Internal capacitors are charged on receipt of a valid ARM command. Then on receipt of a valid BLAST command, the capacitors are discharged into the signal tube sparker.

3. **SAFETY**

The BlastPED ST system uses the spread spectrum method (also known as frequency hopping), primarily for its ability to be hard to detect, hard to intercept, hard to demodulate and offers anti-jamming attributes. This provides a secure link between Controller and Remote device in the presence of other noise or fields, reducing the likelihood of accepting and thus the processing of corrupted and/or false data.

It does not embrace “FAIL TO SAFE” attitude but rather employs a” FAIL TO PROCEED” attitude in the advent of false/corrupted data, circuit failure or out of sequence signalling.

The controller and Remote transceivers are operating at a power output of up to one Watt in the band of 900MHz, and do not require licensing.

Furthermore, the miner/blaster can be up to 4km from the remote unit as long as line of site is maintained.
4. USER FRIENDLY

At one of the mines in Witbank, it took 5 minutes to show the blasting crew how the system works, after which they used the system independently on their own for over a month without any hiccups.

“Yes we have started using the BlastPED here. I have used it in Tanzania as well as on various mine sites in Australia. The guys here have picked it up very easily as it is a simple but very safe & cost effective way of initiating blasts, but like with any thing it has to be used correctly” said the blasting engineer at one of the mines in the Zambian Coppebelt.

5. COST ANALYSIS AND RETURN ON INVESTMENT

The following is the cost comparison between using a lead- in tube to a blasting point and blasting remotely. Standard blasting practice is to have the blasting point at a distance of 500m from the bench. The cost per reel of lead- in signal tube is R150.90, with each reel containing 200m of lead- in signal tube. To get to the blasting point we would therefore require three reels of lead- in signal tube.

<table>
<thead>
<tr>
<th>Number of Bench blasts per Week</th>
<th>Number of Lead In Signal Tube Reels (Trad)</th>
<th>Total Cost per Week (Trad)</th>
<th>Total Cost per Month (Trad)</th>
<th>Number of Signal Tube Reels (MST)</th>
<th>Total Cost per Week (MST)</th>
<th>Total Cost per Month (MST)</th>
<th>Total Savings per Month</th>
<th>Payback Period (Months)</th>
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Table 1 shows the difference in cost comparisons between the traditional methods of initiating the blast versus the use of BlastPED ST.

Manpower and time costs are significantly reduced as there is less interference with other in-pit processes. Increased productivity is ensured through better utilization of truck/shovel fleet.
6. CURRENT USERS

Two very common questions are:” Where else is this system being used? Or do you have DME approval?

The best reception so far has been elsewhere in Africa. This is largely because of the influx of expatriate mine personnel coming from overseers who have used the technology in their native countries. Two mines in Zambia and one in Tanzania are the case in point.

Whilst we have found that there is a reluctance to be pioneers of new technologies, we have had favourable reactions to demonstration blasts in coal, platinum and base metals in South Africa.

MST have traditionally followed the Australian legislative approval process as part of their “duty of care”. Rigorous production standards, risk assessments and formal approvals are included in that process.

The local DME is adopting similar process and has provided a “letter of no objection” whilst local approval is carried out.

7. CONCLUSION

BlastPED ST is a safe, secure remote wireless blasting system for open pit mines. It has proven significant return on investment along with Safety, Efficiency, Cost reduction in more than 60 sites including mines in Zambia and Tanzania.
Blasting personnel continue to be favourably impressed with its ease of use.

8. REFERENCES

MST brochures
User Manual, Internal Mine Site Technologies document

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