

Safe, secure and productive mining through efficient communications

Due to the numerous benefits that it brings in improving safety standards and increasing productivity, the use of suitable critical communications systems has become a standard within the mining industry. TETRA has evolved into one of the industry's leading de-facto standards for critical communications in open cast mining environments.



In the past six months, fatalities have been recorded in recent incidents in the South Africa's mining sector. Beyond question, if ever mine operators in South Africa - if not in Africa as the whole - have been taking safety measures lightly, these high-profile events should be a sufficient clarion call for them to reassess their approach. In relation to South Africa's mining sector, according to the Department of Mineral Resources, among the November - December 2017

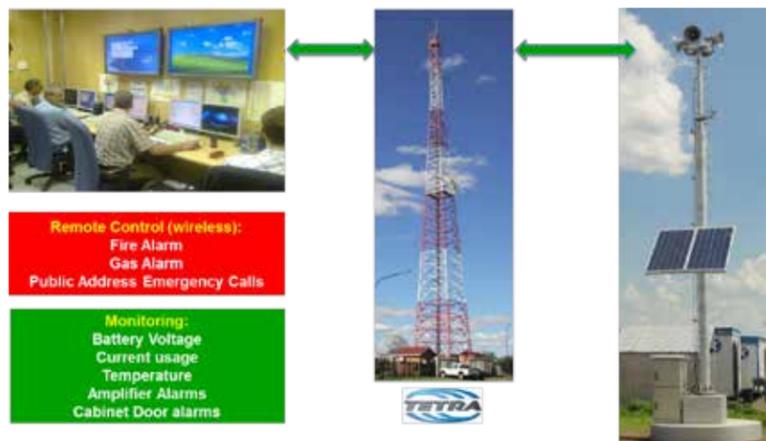
most important steps that mines are obliged to take to ensure a safer working environment for their employees is investing in safe and secure communications tools. Adequate and appropriate radio communication tools ensure safety, security and operational productivity.

In a sequel to an interview, he had with *African Mining Brief* in 2016 on the issue of safety in open cast mines, Johan Hoolsema, MD for Expert System Solutions (ESS),

underscores the significance of making the right choice when purchasing mining-specific wireless communication tools. "It is not just a matter of buying communication tools, but right tools for specific requirements," he states. "Since mining sites are often in geographically remote areas with very little infrastructure, choosing and installing a suitable radio communication system should be one of the first decisions to be considered."

The value of Communication Consulting Services

ESS offers expert advice to the industry, considering the correct suitable wireless communication systems to support the mine operational and safety requirements. ESS, as an experienced communication system consultant in Southern Africa, can assist in evaluating operational user, system and safety requirements to ensure a sound foundation on which



available communication systems and its capabilities can be identified, evaluated and selected for implementation.

In no doubt, oversights made during defining system requirements, specifications and procurement can have serious financial implications, even leading to safety, security and operational risks.

From experience of almost 20 years of consulting on wireless communications systems in the industry and based on various successful installations. Johan Hoolsema concluded that the cost of consulting services accounts for only a couple of percentage points of the project costs. A small cost that

contributes significantly to the success of the balance of project expenditure.

The value of Terrestrial Trunking Radio (TETRA) systems

Johan Hoolsema recommends Terrestrial Trunking Radio (TETRA) Systems as a suitable critical communications system that can be considered for high volume of voice and data traffic. Tracking of miners has become an excellent means to enhance mine safety. As an example, during an incident the miner can simply press the emergency button and emergency services are immediately notified with the location of the miner.

TETRA is an industry's leading standard for critical communications due to the numerous benefits that it brings in improving safety standards," he says, referring to a number of features which make TETRA appropriate for rugged mining environments.

Open standard

TETRA's open standard (interoperability) means that network operators and end users are free to choose from the many manufacturers and suppliers offering TETRA infrastructure and radios for solution to meet their precise needs. The unrivalled TETRA interoperability certification Process (IOP), managed by the TCCA, gives TETRA users complete confidence that certified interoperable TETRA equipment will work seamlessly in multi-vendor systems.

Value adds-on suitable for hazardous environments

TETRA's value adds-on, makes the system capable of dealing with the everyday operational tasks and maintenance of the site, sometimes in extremely hazardous conditions. The TETRA standards include the following features: cellular radio network architecture (like cell phone GSM); frequency efficient (2 x better than conventional radio or GSM); digital 4 slot TDMA(6.25 kHz equivalent) no audio noise like in analog;

25kHz radio bandwidth: full duplex capabilities; voice and data service simultaneously; automatic call hand-over between cells; fast call set-up network-wide; and scalable with high level security options (authentication, encryption), makes it one of the must have in order to guarantee safety as well as productivity.

Excellent voice quality and integrated voice and data services over an IP network

TETRA provides excellent voice quality, elimination of background noise. TETRA's voice capabilities are second to none, with instant connection and excellent voice clarity. Besides, TETRA delivers integrated voice and data services over an IP network. TETRA enhanced data services (TEDS) is the wideband solution delivering higher speed data transfers for richer applications interworking within the secure TETRA communications environment. What's more, TETRA offers status messages and short data service (SDS) which can be organised and stored.

Trunked Mode Operation (TMO) and direct Mode Operation (DMO)

TETRA also has the options for Trunked Mode Operation (TMO) and Direct Mode Operation (DMO). Trunked Mode provides full TETRA's capability within the radio coverage of the entire network. Direct Mode is used for direct communication between users and groups without the use of a TETRA network. DMO is also used for extending the range of TETRA, especially for telemetry applications that are not in reach of the TETRA coverage area.

Sharing single infrastructure

Centralised control makes it possible to provide virtual TETRA networks providing efficient method of sharing a single infrastructure by different mines in case of mine emergencies, share of services between other mines is again improving the mine safety in general.

GPS for easy location

TETRA devices can be equipped with internal GPS receiver to receive and decode data from GPS satellites and establish the geographic location of the device. If the event of an emergency, the miner will activate the



High volume GPS
In comparison with other digital radio technologies, TETRA is a much better carrier of high volume GPS and other data messages such as Telemetry/Telecontrol data transmission.

Data archiving
TETRA provides another important safety feature that is archiving of all the voice and data messages (e.g. GPS, Telemetry/Telecontrol etc.) that can be used for incident and accident management investigations.

Telemetry and Telecontrol

TETRA provides an ideal data transport layer for Telemetry/Telecontrol application that can be used for monitoring and control. As an example, the ESS Remote Terminal Unit (ESS-RTU) has a build-in TETRA modem and provides various digital inputs, digital outputs and analogue instrumentation inputs. The ESS-RTU applications in the mining sector is for water utility, power utility, security applications and aid for production monitoring and control.

Informed choice is vital

Taking everything into account, since communication tools are integral to increasing safety, security and productivity, the burden is on mine operators to buy the right product. Nevertheless, the question is: How do you choose the right communication systems and tools for your critical requirements and operations amid piles of similar products awash in the market? In order to address this challenge, Hoolsema urges mines, considering new or the upgrading of existing communication systems, to ensure that a clearly specified communication user requirement is defined. From a mine production and safety point of view this is an important building block in its planning and project development process.

There are quite a number of mines in South Africa that have adopted TETRA as their mission critical communication system for improving production and mitigating safety risks. This allows for valuable "peer group" information sharing and support between various mines.

emergency button and the control room will know exactly where the incident is taking place, and accordingly dispatch help from the closest emergency personnel. Most importantly, the GPS location data can be transmitted during emergencies and used to track missing and potentially endangered personnel.



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Experienced and Expert Engineering Consultant for Trunked Radio Telecommunication and Telemetry/Telecontrol systems.

Tel: +27 12 819 1487; Cell: +27 82 400 4567
E-mail: sales@e-s-s.co.za; Web: www.e-s-s.co.za