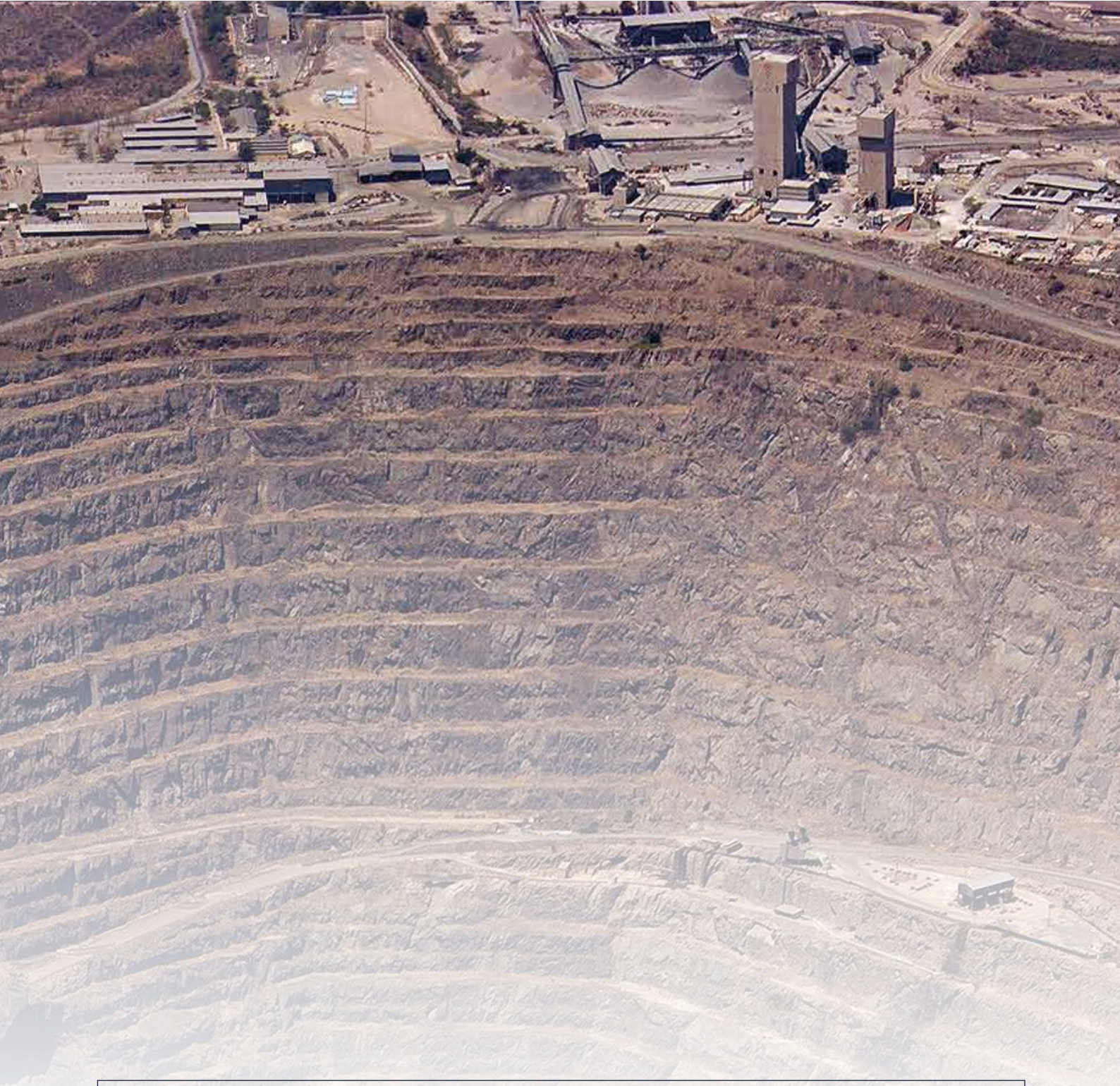
FS Ghana systems

MINING

FIRE & LIFE SAFETY SOLUTIONS

We protect lives and assets through technology



Introduction

Fire and Life Safety Systems are designed and implemented to save People, Property and Assets, and this is no different in the Mining industry. On a mine one would think that there is a greater risk of fires occurring in the tunnels and shafts but statistics will show that there is a far greater likelihood that fires will occur in substations, workshops, diesel generator bays, plant rooms, mess halls, chemical stores and administration buildings. These are critical infrastructure areas that should they be destroyed by fire could lead to a temporary halt to production which generally means huge losses in revenue.

When one considers the high-power consumption of the sophisticated equipment being used in the mining environment, combined with the harsh environmental elements, the risk of fires increases exponentially. Mines are very dusty, sometimes hot and humid and potentially explosive.

The mining industry is a key focus of FSG Systems as we recognize the serious risk fire poses to business continuity for any mine. Fire solutions are custom engineered to minimize the spread of fire and limit the damage to affected areas and risk to human life.

FIRE DETECTION SYSTEMS

FSG Systems offer peace of mind through the system provision of early warning devices to alert duty staff and occupants in the event of a fire and ensure orderly evacuation if needed. Our systems are designed for the challenging industrial environment and range from simple yet effective point type detection to high sensitivity, fast response custom smoke, fire, flammable and poisonous gas detection systems. Systems can be linked to an evacuation, firefighting, building management, PSIM and fire brigade systems.

Our Fire Detection solutions can comprise of the following:

- Conventional or Addressable point type, heat, smoke, flammable or noxious Gas Detectors
- Various types of warning devices, sounder and flashing lights
- Manually operated call points and emergency pull stations
- Detection devices for special risk applications, such as Optical Flame Detectors, Linear Heat Detection Systems, Long Range Optical Smoke Detectors, Conveyor Belt Ember Detection Systems, High Sensitivity Aspirating Smoke Detectors, Video Based and Combustion Detectors
- A wide range of programmable input / output modules and relays for interfacing into third party systems such as SCADA, PLC, BMS, Access Control or Video Surveillance systems.
- Intrinsically Safe devices for all abovementioned applications
- State of the art, internationally recognized Fire Alarm Control Panels supporting a wide array of popular detection system and field server protocols.

A Voice Evacuation system is designed using fire resistant materials, is fully battery backed and the speaker placement is carefully designed so as to broadcast clear messages without being overpowering. The system is designed to give clear verbal instructions in a language(s) relevant to the site.

FSG Systems can design systems and solutions compliant to various codes and standards, including explosive and intrinsically safe areas.

FIRE SUPPRESSION SYSTEMS

Our Fire Suppression systems are designed to automatically extinguish a fire in a protected space and ensure that the re-ignition of the fire is delayed long enough for the first responders to take appropriate action.

The Fire Suppression systems are designed to do one or both of the following:

- Reduce oxygen levels in the protected space,
- Inhibit the reproduction of heat in the combustion process by method of:
  - Heat exchange
  - Inhibition of the chemical reaction

The type and design of Fire Suppression system proposed will be determined by the classification of the fire risk in the protected space, with 4 primary non-self-oxidizing risk types: Class A to Class F.

Our Fire Suppression systems are comprised of the following:

- Appropriate fire detection system as per SANS10139.
- Inclusion of a Gas Control Unit in addition to the Fire Alarm control panel to operate the Fire Suppression cylinders / containers.
- The programming of a “Double Knock” / “Coincidence” operation of at least 2 detectors in the protected space to cause the discharge of the gas.
- Computer aided design to calculate gas quantities, pipework, and nozzles to discharge the gas efficiently into the protected space.
- Suitable fire and atmospheric containment measures to provide suitable room integrity, thereby ensuring that sufficient suppression gas remains in the protected space minimizing the chances of re-ignition.

FSG Systems Fire Suppression Capabilities include:

- Modular FM200 Systems
- Engineered FM200
- Inergen (IG541)
- Novec 1230
- Aerosol systems
- Local application / Special risks

FSG Systems designs systems and solutions compliant to various regional and international codes and standards. Computer-generated (CAD) designs of the systems will be developed to ensure compliance with the selected Code of Practice.

Water Deluge System for Underground Magazines

Keeping explosives underground in close proximity to operations poses a serious risk to the safety of miners. FSG Systems has developed and installed a fully functional, quick response, electronically actuated Water Deluge system for an Underground Explosives Magazine. The system is designed so that all sprinklers in the area will discharge water in the event of a confirmed fire event, resulting in complete saturation of the entire area.

By installing Industry leading flame and heat detection equipment configured in double knock operation, the system will provide the highest fire detection sensitivity capabilities will providing maximum immunity against false alarms.

Furthermore, the deluge system is connected via Fiber Optic components into the site wide fire detection network allowing full off site monitoring at the mine's Security and Safety Control Room. Further integration into the mine's Data Collection Systems is possible through software level integration using the Fire Control Systems' onboard MODBUS over tIP capabilities.

The system complies to best engineering practices and current regional mining regulations.

Early Warning Fire Detection and Automatic Clean Agent Fire Suppression System for Electrical Infrastructure

FSG Systems developed and installed an ASD Early Warning Smoke Detection System combined with a pre-engineered FM200 Gas Suppression System with electrical actuation for 12 critical electrical infrastructure rooms.

25 FM200 Cylinders, 12 EN54 approved Combination Detection and Gas Control panels, 9 Aspirating Smoke Detectors and 150 Optical Smoke Detectors were installed on this project. The equipment selected for the installation is robust enough to deal with the harsh weather conditions in West Africa. The extinguishing gas used for the site will not cause damage to the electrical equipment in the protected space or be hazardous to people who may in the area should the system discharge.

A bespoke integration pack was developed and deployed for the customer to interface all systems into their on-site PLC system. Furthermore, linear heat detection cable was fitted to all cable ladders underneath the structures to provide warning of fires in cable tunnels that may approach the protected spaces.

A comprehensive maintenance schedule was adhered to at this, given the harsh environment into which it is deployed. We are pleased to report that at the time of publishing this brochure that all the systems have been fully functional with no down time for over 2 years.

Site Wide Fire Detection and Emergency Voice Evacuation System

FSG Systems has developed and installed various Fire Detection and Emergency Voice Evacuation Systems within key buildings and remote sites across entire mines, with Securiton's Linear Heat Detection for mission critical areas such a Diesel Generator Bays.

Mining operations usually encompass large areas with one or several Control Rooms. Reaction time to fires is often lengthened because of the vast areas that need to be covered. For these reasons it is vitally important that the solution and equipment selected is interfaced and networkable. With the lack of infrastructure on mines it is always advantageous to have integrated security systems running on the same platform and in this case the Fire Detection and Emergency Voice Evacuation System.

These Fire and Voice Systems are integrated with 3rd party services, all alarms and alerts are relayed back to the Main Control Room and displayed on graphical maps.

The Emergency Voice Evacuation systems allows mines to quickly and reliably communicate emergencies across site in real time, and handle emergencies efficiently.

Fuel Tank Farm Fire Detection Systems

Keep operations running by protecting mission critical infrastructure such as Fuel Tank Farms and Diesel Generator Bays from the risk of fire or explosion.

Fuel fires give off excessive amounts of heat, Infra-Red or Ultraviolet radiation, depending on the types of fuel involved. By selecting the correct device, fires can be detected at a very early stage and by using the correct integration pack, emergency shut down of the pumping systems can be initiated and the appropriate fire suppression materials can be discharged over the risk area while emergency response teams are notified of the incident.

FSG Systems has developed and installed various systems as a fast and efficient detection solution to these environments, such as:

• Copper Based Digital Linear Cable Heat Sensing Systems
In confined spaces or in areas with high levels of dust, vapours and other contaminants which may render optical detection systems ineffective, the risk area can be fitted with a heat sensing cable connected to a remote controller. In the event of a fire, the controller will detect a short circuit as a fire event and create the necessary alarm condition on the Fire Control System.

• Fiber Optic Based Linear Heat Detection Systems
As an advanced option, this system provides real time data on temperature levels at intervals of 1 meter for the entire length of the cable. Not only will the system create a Fire Alarm Event should temperatures rise to predetermined levels, but the operator can monitor temperatures along the length of the entire system, providing critical information on the performance pumps and pipe routes along the system.

• Optical Flame Detection Systems
Fast response flame detection devices tuned to specific radiation wavelengths common to fuel fires can be installed in areas where a complete view of the tank farm and liquid bunds are available. As these devices monitor specific forms of visible and nonvisible light radiation, they are immune to broad spectrum sources such as lighting or solar radiation. These devices are used in areas where fuel, oils and lubricants are in use. A variation tuned more to the ultra-violet spectrum can be used for the detection of “invisible” fires which occur with various alcohol and hydrogen fires.

All the above systems are fully integrated into most plant SCADA systems using popular communications protocols.

Conveyor Drive Gear and Mill Gearbox Heat Monitoring

Prevent injuries and downtime on conveyor systems with early warning detection of overheating components, embers and fires.

All mines rely on powerful electric motors to drive conveyors belt systems that transport ore from the crushers to the ore processing plant where even more powerful motors are needed to turn over massive mills. Gear boxes, bearing cases and idler rollers are subject to high frictional forces which produce significant heat.

FSG Systems, by using either optical heat monitoring systems, copper or fiber based Linear Heat Detection systems ensures that “hot spots” can be detected, and the right personnel notified to attend to the problem before any major failures or even fires occur.

Modular E-Houses

Early Warning Smoke Detection and Automatic Gas Suppression Systems are custom built for both fixed and mobile modular e-houses for applications such as Transformer and PLC rooms.

FSG Systems has custom built these systems complete with fire alarms, smoke detectors, manual actuators, audiovisual indicators, and portable fire extinguishers. This also allows interconnection with the control system of the plant with the heating, ventilation, and air conditioning system so that in case of a fire, the HVAC equipment is immediately shut down, reducing the possibility of the fire spreading faster.

Custom Integrations

FSG Systems has implemented various custom integration packs which are fitted to allow all the fire protection systems to integrate into the site PLC or Data Acquisition systems. Integration can be done via simple potential free contacts that change state under certain conditions or via complex field server protocols such as Modbus or BacNet. These integrations can be used to automate emergency shut down procedures in the event of a fire event or activate secondary standby systems should the need arise.

Integrations are also done into most building management, safety and security systems found in mining, industrial or commercial operations and include:

• Public Address or Voice Alarm Systems

The Fire Alarm System is integrated into a Public Address or Voice Alert notification system thereby allowing customized voice or alert messages to be played through the site's speaker system.
The integration is zoned so that only the areas directly affected by and adjacent to the fire event are alerted to evacuate.

Custom Integrations

• Video Surveillance Systems

The Fire Alarm System is integrated into the site's video surveillance system (video system dependent) thereby allowing any fire event to cause the video feed from surveillance cameras to automatically display in the site control room. This will provide the Operator with enhanced situational awareness of the problem and the ability to verify if a fire is present.

• Access Control and Elevator Management Systems

By integrating the Fire Detection system into the Access Control system, a confirmed fire event can cause certain access control points to open for unrestricted egress while other points can lock down for added security. Fire systems are integrated into the lift management systems which, in the event of a Fire Event, will cause all lifts to "home" to a specific floor not affected by fire (normally the ground floor) and cause them to become inoperable thereafter.

• Electrical, HVAC, Smoke and Mechanical Fire Management Systems

The Fire Alarm system is integrated into various building systems which cause the movement of air. This is carefully controlled to avoid transporting smoke to non affected areas, bring smoke extraction systems into operation, shut down electrical systems that could propagate the fire, manage and monitor water deluge systems that may come into operation, and even cause fire doors or dampers to close to contain the fire.

Integration of the fire system into any one of these systems can be done via simple dry contact connections, complex field protocols interfaces or event software level API integrations.

MINING PROJECTS & SOLUTIONS

Harsh Environments




Protect industrial sites and equipment by providing early warning smoke detection to prevent fires and minimize damage. In extremely harsh environments where most detectors are rendered useless, Linear Heat and Aspirating Smoke Detection is used which provides higher sensitivity and very early warning capabilities.

FSG Systems has developed and installed various Linear Heat and Aspirating Smoke Detection systems for applications such as:

- Industrial switchgear
- MCC cabinets
- Motor housings
- Cable tunnels, trays and trenches.
- Electrical Substations
- Electrical switch rooms
- High voltage transformer rooms
- Plant rooms

Whether the challenge in the environment is dust, dirt, water, corrosive chemicals, extreme low or high temperatures, or is a hazardous location, this type of detection has the ability to survive these conditions.

Poisonous Gas Detection

Prevent, control and mitigate the risk of buildup of gasses by detecting them before dangerous or explosive levels are reached.

Numerous poisonous or flammable gasses are always present in the mining process. By selecting the correct type of detector and siting the detectors in the correct locations, FSG Systems can ensure that a buildup of gasses can be detected before dangerous or explosive levels are reached.

These detectors can be used as stand-alone warning devices, be integrated directly into PLC systems using popular 4-20ma protocols or from part of a wider fire and gas detection system for the site.

This type of detection is used to monitor toxic gasses during day to day operations such as blasting, excavation, and from diesel engines.

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About FSG Systems

FSG Systems Limited provides end-to-end fire & electronic security solutions through West Africa. FSG Systems is a subsidiary of FS Systems International Limited which has successfully executed turn-key solutions for various global mining operations in Sub-Saharan Africa and LATAM. We offer engineered solutions matched with one-on-one service adapted to best it to our clients' operating environment and build long term partnerships of trust and mutual respect with clients, suppliers, and major international partners.