



NORTHAM

PLATINUM LIMITED

ELAND PLATINUM MINE

**IN-STOPE LIGHTING
MINERALS COUNCIL PRESENTATION**

smart platinum mining



Background

Eland Mine under Glencore Operations South Africa

- ❑ The mining method used was Bord and Pillar and proved unsuccessful in part due to low volumes achieved and excessive waste mined.

Eland Mine under Northam Platinum

- ❑ The Northam team proposed to change the mining method to a Hybrid system to better suit the orebody.
- ❑ To ensure safe ground conditions and strata control, it was envisaged from the start that the support requirements would be key to successfully mining the orebody.

About Eland Mine

- ❑ Mining takes place in a shallow, tabular orebody on the UG2 reef horizon with a 1.5-meter average reef width dipping at 19 degrees
- ❑ The orebody is characterized further by an undulating shear zone of poor rock mass quality which resulted in challenging mining conditions.

To this end the following was envisaged prior to restarting the operation

1 Longer shift cycles to cater for additional support requirements resulting in a 5 day workweek

2 A relatively higher support cost as compared to industry peers

3 Improved Blasting

- Shorter Rounds
- Emulsion and Cartridge
- Hydropower drilling

4 Technology

- GPR
- Borehole radar
- Borehole camera

5 Mosh Adoption

- TARP
- In-Stope Bolting
- Entry Examination

6 Specialised Support Installation Teams

7 Areal coverage as soon as possible after the blast

8 **Illumination on the face**

Fatal Hazard Protocols

1




GROUND STRATA FAILURE

2




MOBILE EQUIPMENT

3



STORED ENERGY

4



MOVING MACHINERY

5



FIRES & EXPLOSIONS

6




EMERGENCY RESPONSE

7



CONFINED SPACES & FLAMMABLE GASES

8



LIFTING EQUIPMENT

9



WORKING AT HEIGHTS

10




INRUSH & OUTBURSTS OF WATER

11



EXPLOSIVES

12



ELECTRICITY

The Theory

Facts and Statistics



VISION

People receive about **85%** of their information via visual senses



+36% chance to have an accident in poorly lighted areas.



The quality of lighting in a workplace influences productivity (**10-50%**)



Good lighting can decrease errors by **30-60 %**



Good lighting improves circadian rhythms

Normal Practice



Traditionally, a cap lamp is the only light a stope worker has



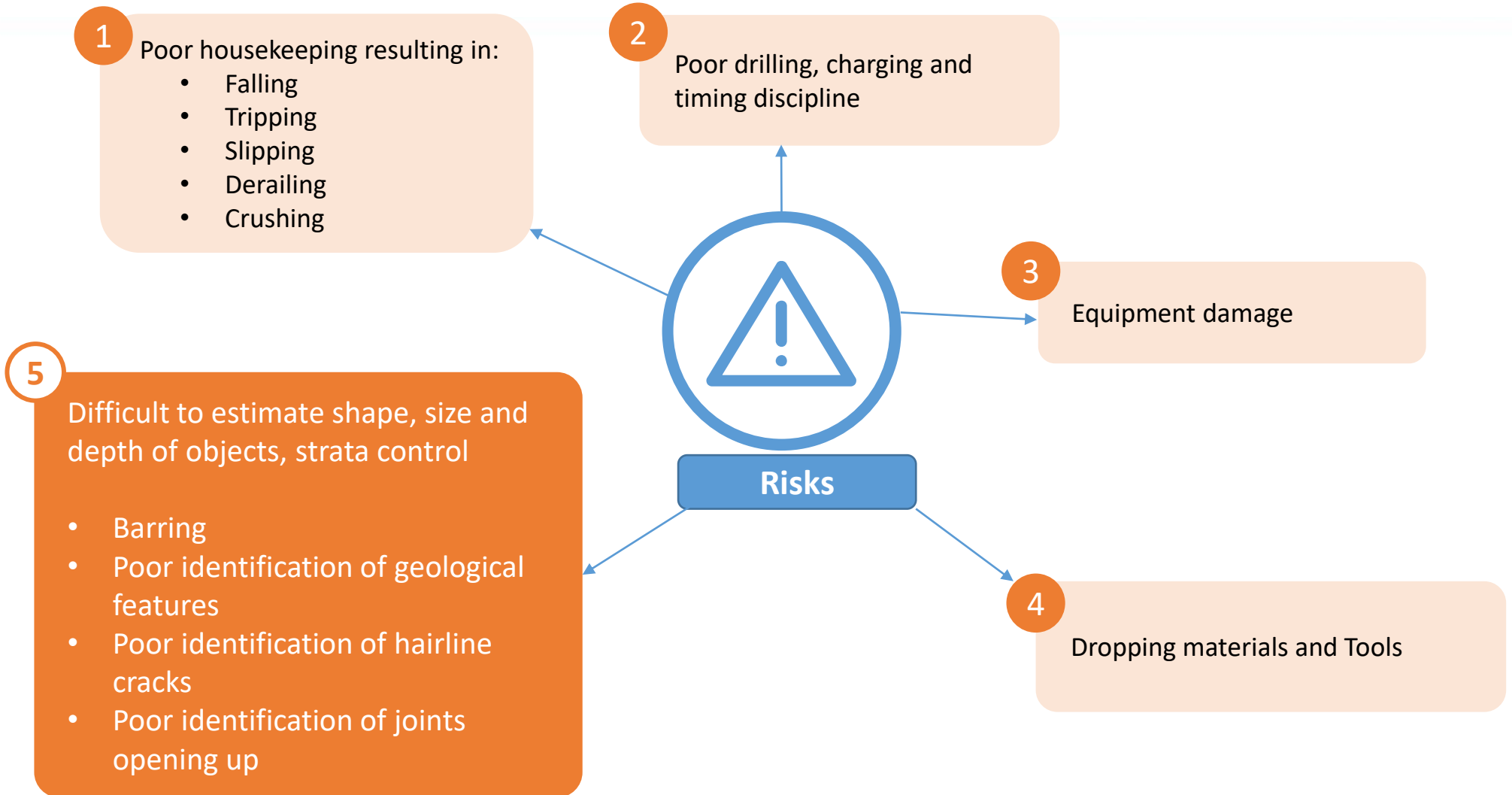
Cap lamps have a small arc of vision



The worker has to direct their head towards items they want to see

“Poor lighting is a health and safety hazard”

Risks due to poor illumination



Benefits of illumination



Safety and Productivity

- Increased visibility of moving machinery
- Better drilling & Blasting discipline, leads to better ground conditions
- Safety instructions and safety signage easier to read
- Identification of sub standards improved
- Roadway/Haulage obstructions easier to see
- Can spot deterioration of ground conditions easier
- Housekeeping improves
- Improved circadian rhythm
- Reduces fatigue
- Improves concentration and the mood/energy of the people in the work place



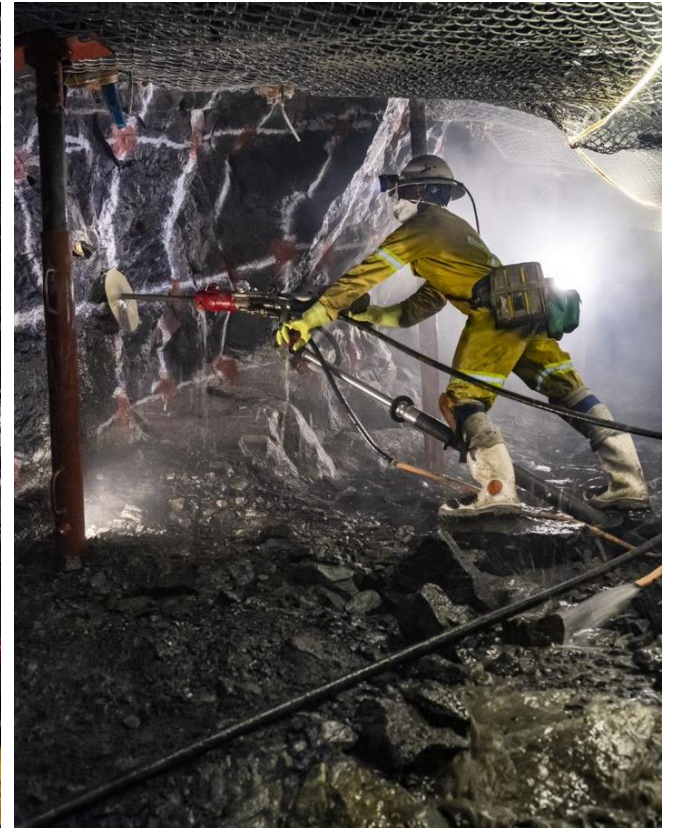
Health

- Reduces Headaches
- Reduces Eye strain
- Reduces Neck, back and shoulder strain from straining to see items because of poor lighting
- Reduces depression in case of gloomy or insufficient light
- Reduces stress and anxiety, in more highly pressurised work environments

Lighting Considerations

- Calming yellow lights are good for residential spaces **2700 – 3000** light spectrum
- Energizing white light is recommend for work areas **3500 – 4800** light spectrum
- Daylight white **5000** and above light spectrum is recommended for precision areas such as hospitals or lab research areas.
- Eland In-Stope lights offer **above 5000** light spectrum equivalent to midday sun shine
- There are a number of products available in the industry, however the following is very important to note in choosing a suitable product for underground
 - An OEM certification from industry recognised institutions
 - Must be safe, robust, durable and easy to install and remove
 - Must be energy efficient for example
 - Low voltage 12 LED's/metre **2.5 watts/min**
 - High voltage 60 LED's/metre **9.0 watts/min**
 - Guarantees
 - **5** years low voltage at Eland
 - **2** years high voltage at Eland
 - Eland has been using these LED lights in haulages and development for **3** years and in stopes for **2** years
 - The lights are dust and water resistant
 - Dust repellent to maintain the **“White light”** does not fade due to dust collection

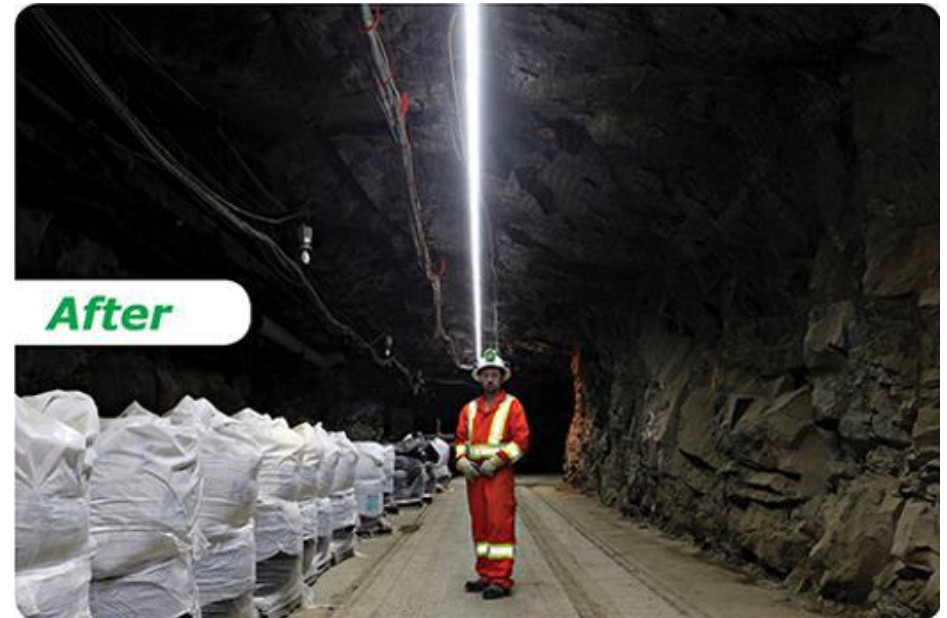
In-Stope Low Voltage Lighting



In-Stope Lighting System (24 LED/Meter-36 Volts)

- Connects to the winch starter box
 - Starter boxes need to be **modified** by the OEM to incorporate the connector and transformer to 36 V.
- The Eland system is **40m** long and extends for up to **20m** from the winch and **20m** up the face.
- The system is installed with the **entry** examination
- Our cycle is a **two panel cycle** and both panels have a lighting system
- The system is easy to install
- Eland is not a **Fiery** Mine
- The Eland In-stope system has a **5** year warranty
- Eland uses the **X-GLO** system
- The In-stope system is an additional cost
- Costs approximately **R 24 500** per panel excluding starter box modifications.
- Power supply 36 V approximately **R 2 500**
- To date we have **not** replaced any of the systems – 2 Years

High Voltage System



High Voltage System in Roadways



High Voltage System (72 LED/METER-22-0V)

- Utilises normal installation methods
- The system comes in **50m** long sections
- The sections can be replaced **individually**
- The system is easy to install
- The Eland high voltage system has a **2** year warranty
- Eland uses the **X-GLO** system
- The high voltage system is an additional cost if you are replacing your old system
- The high voltage system cost is comparable to the traditional systems taking the following into account.
 - **Labour cost** to install, the LED system is easy to install
 - **Accessories** - Cables, light boxes, joints, coupling, globes etc
 - The LED consumes significantly **less power**
- Costs approximately **R 24 000** per 50 m length.
- No **external** power source needed.
- To date we have not replaced any of the systems – **3** years

THANK YOU