

# The Influence of work pressure on worker attitudes towards health and safety

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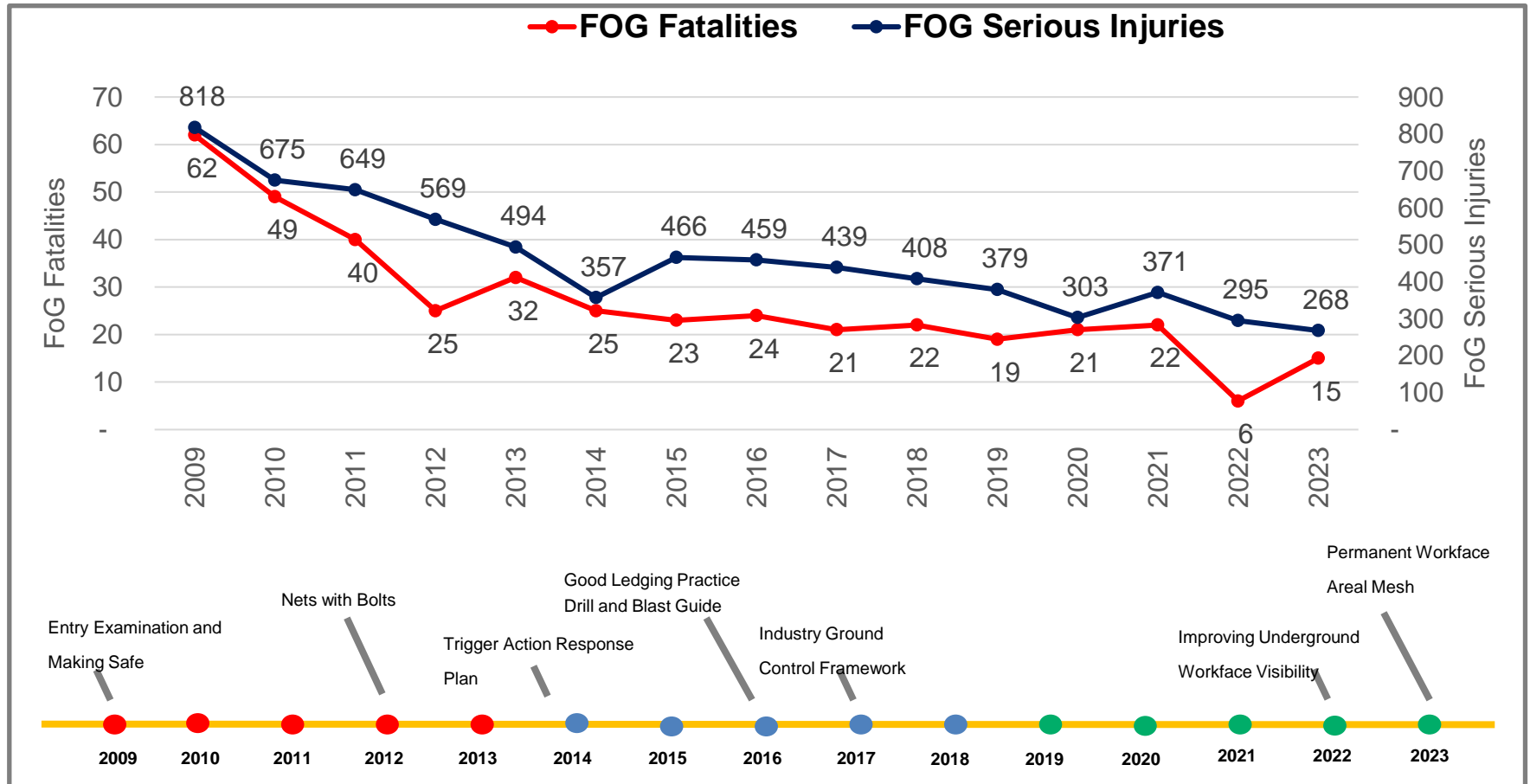
# INTRODUCTION

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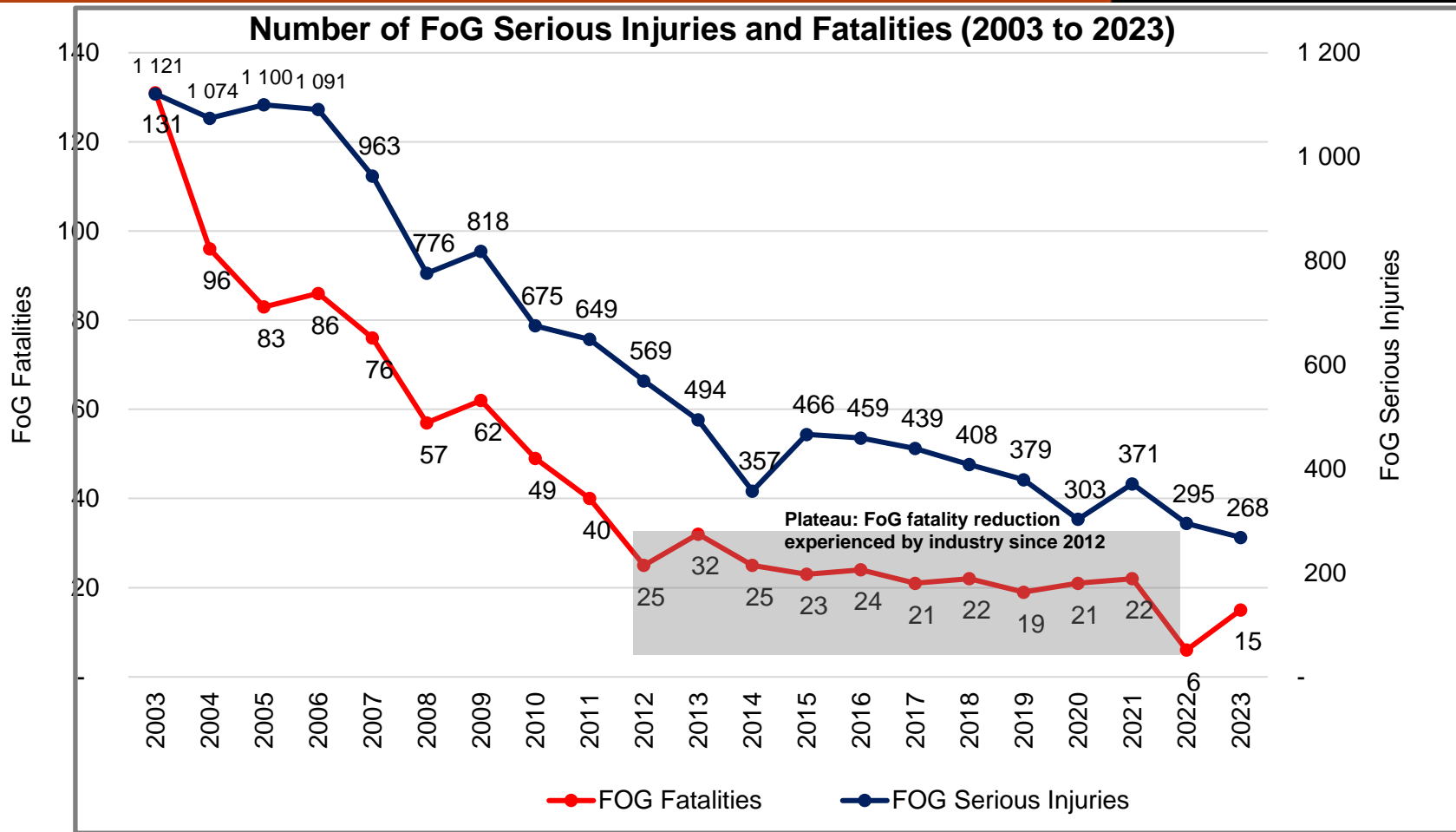


- The following slides highlight the South African Mining Industry's (SAMI) Falls of ground safety performance from 2003 to 2023
- The data indicates a significant reduction in FoG accidents from 2003 to 2012,
- However, the industry reached a plateau in 2012

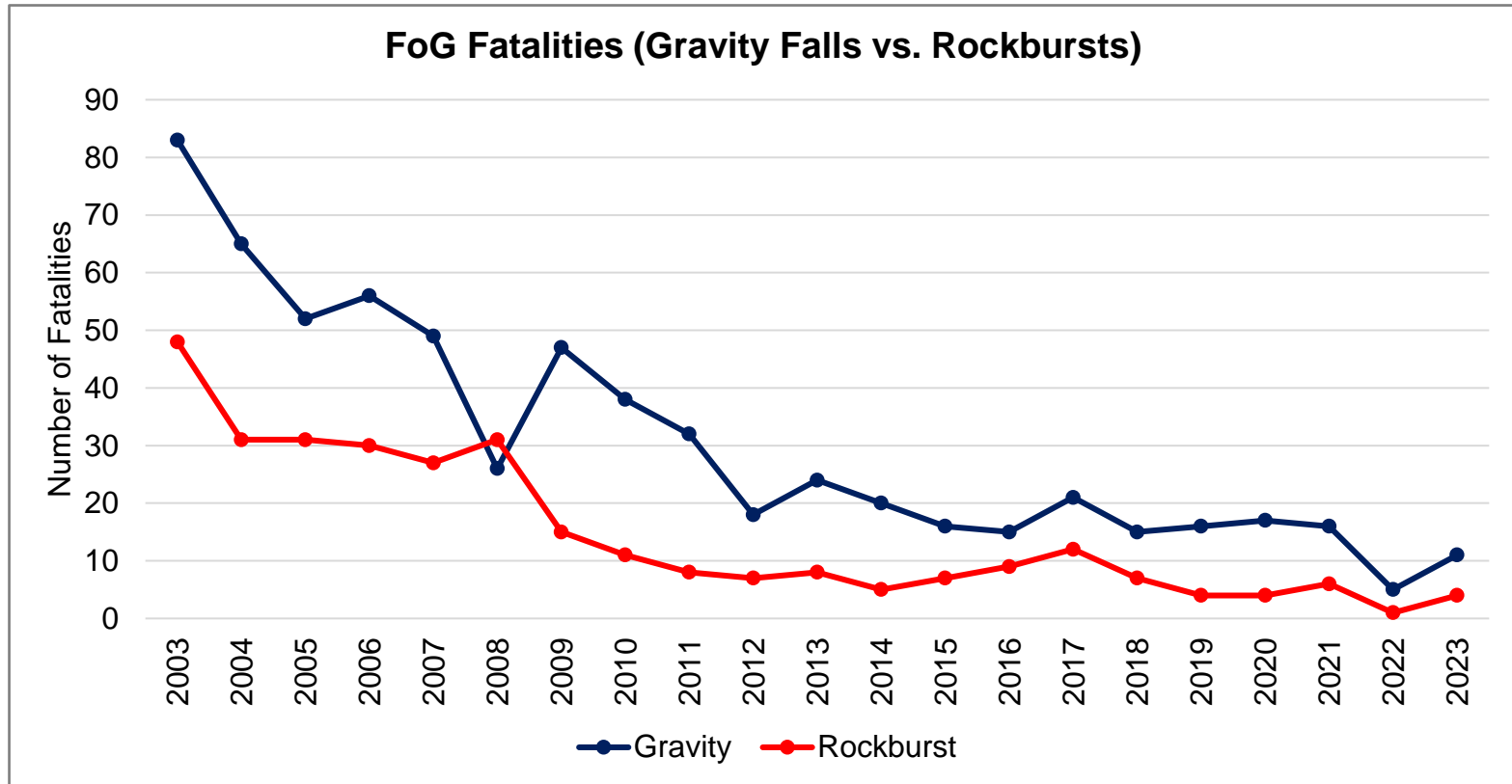
# FOG INDUSTRY LEADING PRACTICES AND INITIATIVES (2009 TO 2023)



# NUMBER OF FOG SERIOUS INJURIES AND FATALITIES (2003 TO 2023)



# FOG FATALITIES (GRAVITY FALLS VS. ROCKBURSTS)



# BACKGROUND

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80 – 90% of all accidents or incidents that occur are a result of human behaviour – Phillip Frankel 2013

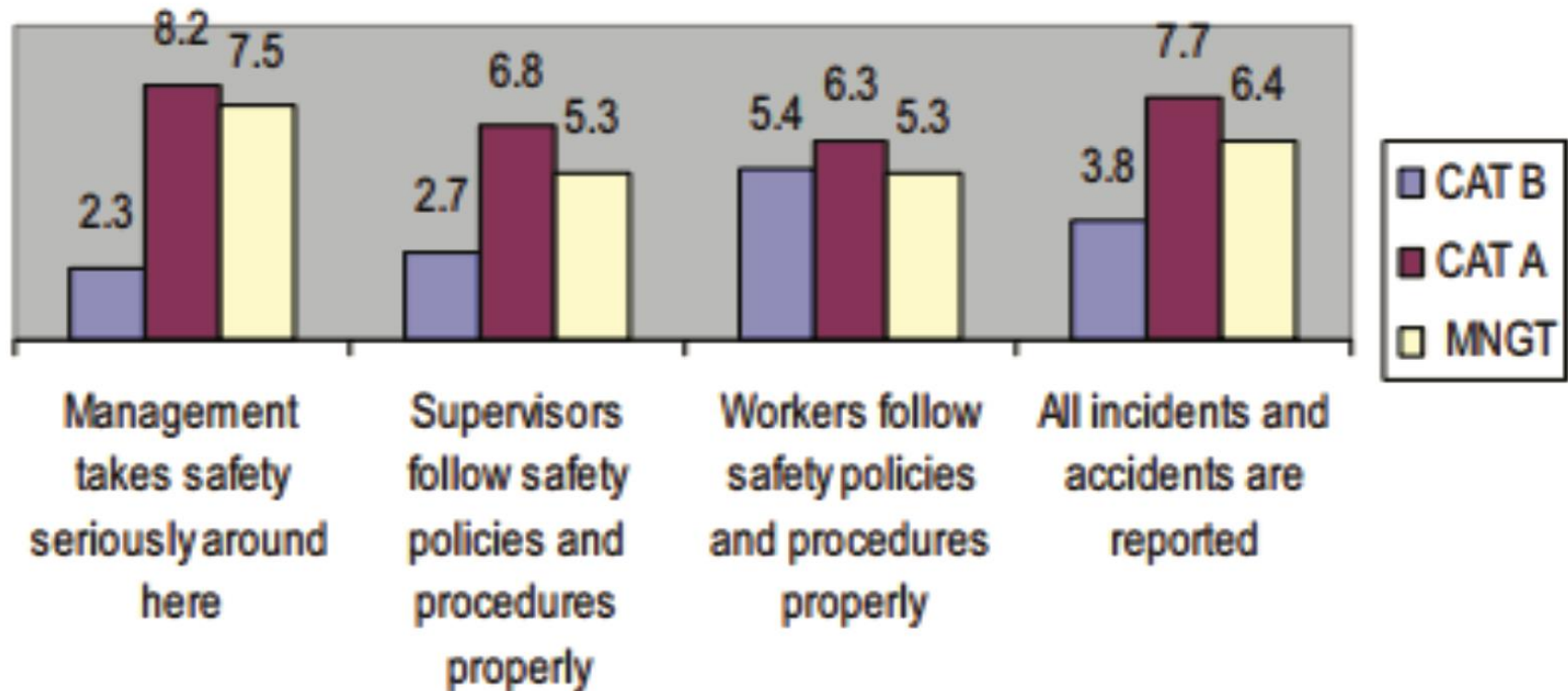
Employees' perception of management is that they don't care about their welfare and happiness and their willingness to work safely and productively - Block 2012

Economic pressures have resulted in employers striving to improve production by setting high targets, and then employees overlook safety procedures to achieve these targets

# SAFETY PRECEPTIONS (BLOCK 2012)



## SAFETY



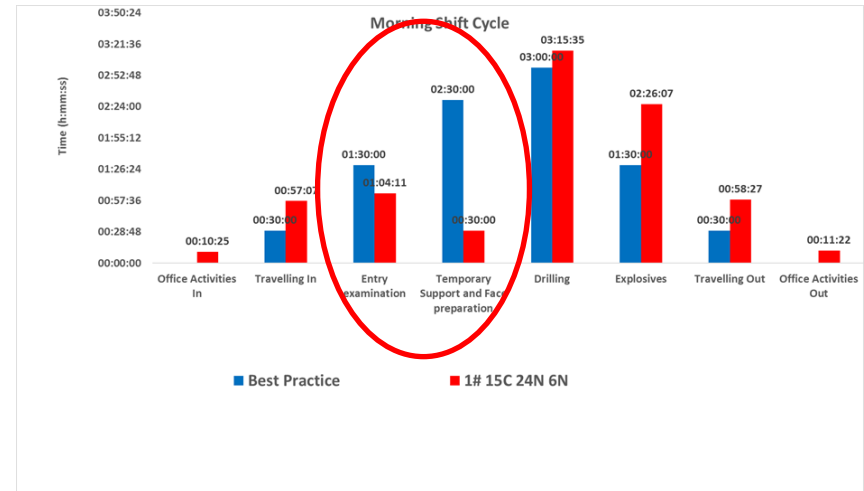
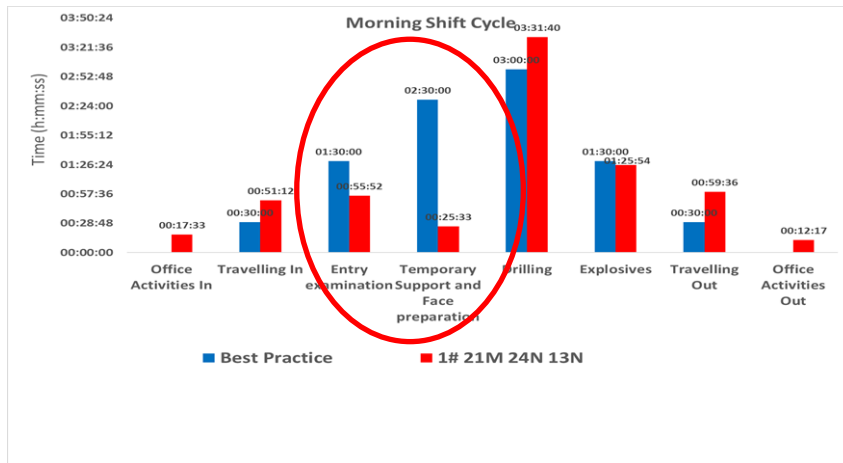
# TIME AND MOTION STUDY



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- A time study was conducted to measure the amount of time spent on each activity compared with the required time as prescribed by the best practice
  - The best practice planned times for each activity (represented in blue), compared to the actual time it takes to complete the task (represented in red).
  - This research focuses on health and safety-related activities, which are “entry examination”, “Temporary support, and face preparation”, circled in red.



# ACTIVITIES IN PANEL

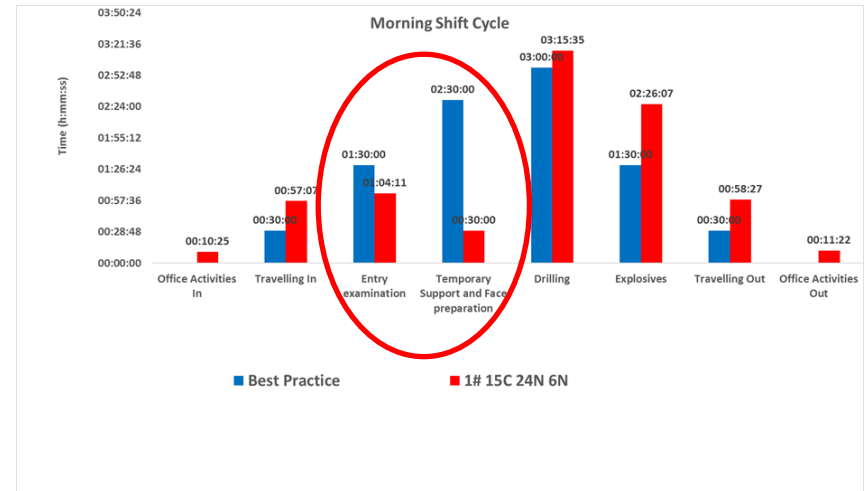
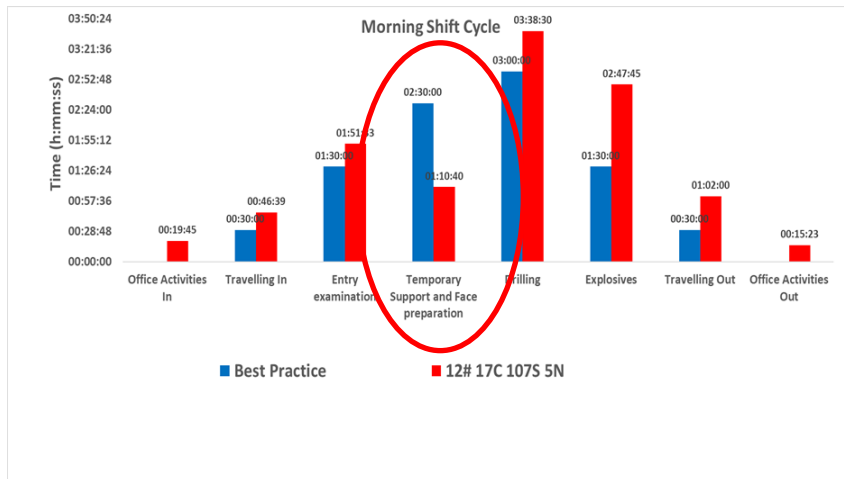


# STUDY RESULTS



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- The results presented above indicate that less time is spent on health and safety-related activities, and more time is spent on production-related activities,
  - The observations indicate that crews rush through the health and safety procedures for more time for production-related activities.
  - According to the observations, some of the steps, such as flammable gas detection and air velocity measuring, are not done as required.
  - Checklists for equipment such as winches are often completed at the waiting place when the procedure requires their completion upon inspection.

# ACTIVITIES IN PANEL



# ACTIVITIES OF MORNING SHIFT



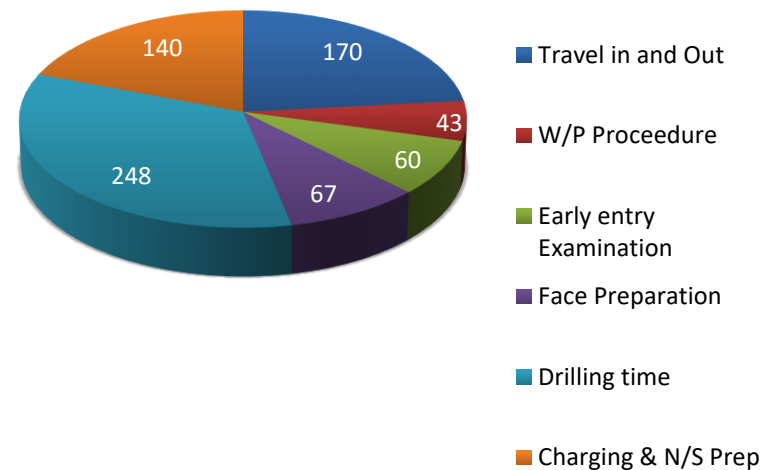
Estimated hours per shift based on 12 shifts

Legal hours	Panel A	Panel B	Panel C	Panel D	Panel E
08:20:00/shift	10:36:52	08:39:38	10:55:55	13:01:27	09:33:15
45:00:00/week	52:07:00	43:30:00	54:45:00	65:12:00	47:50:00

## Day Shift Actual Minutes (727) Gold Mine

Results from 2018 actual time spent on mining a 30m panel (gold)

Target            500 minutes  
 Merensky        552 minutes  
 UG2                624 minutes



# DELAYS THAT MODIFY BEHAVIOUR

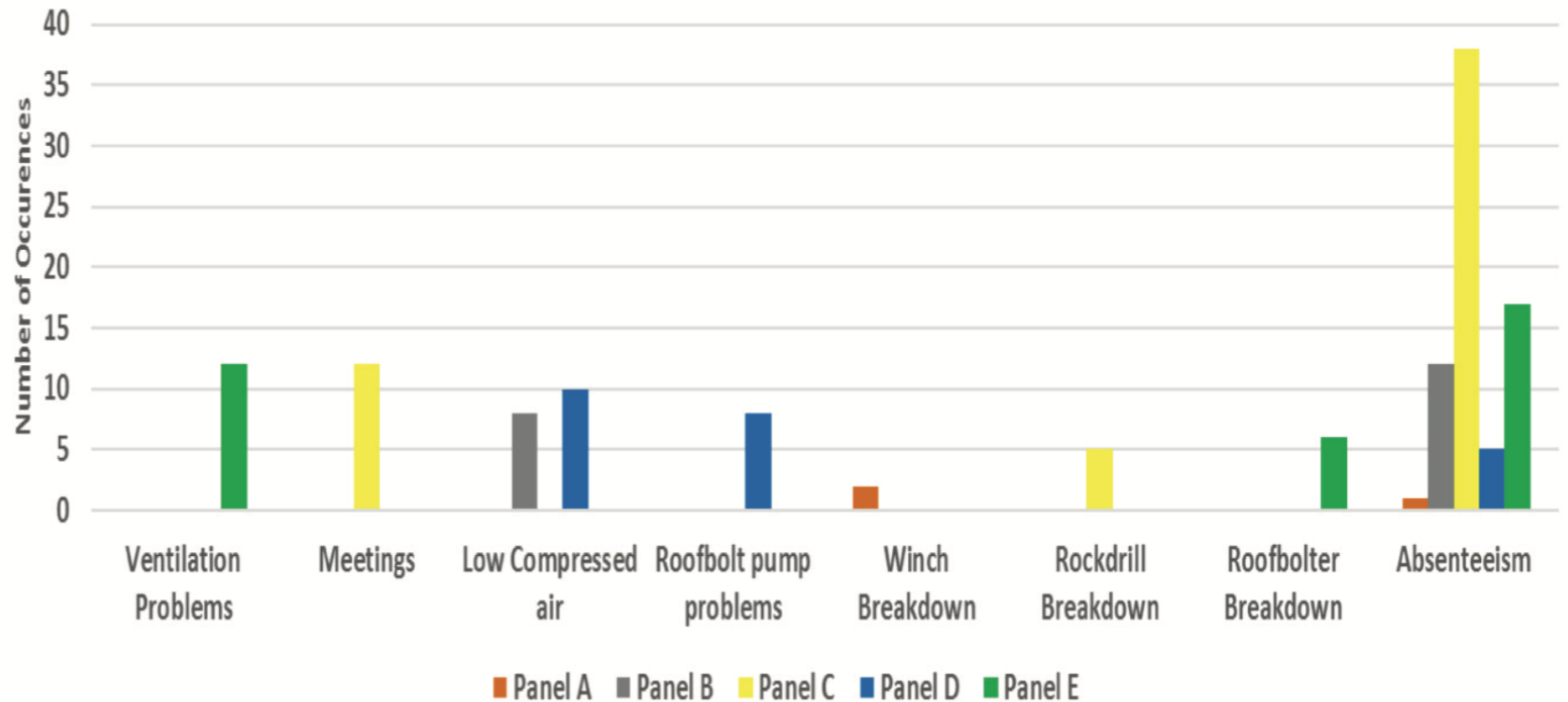


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- Absenteeism
  - Compressed air
  - Ventilation
  - Meetings
  - Breakdowns

# CAUSES OF DELAYS



Causes of Delays



# CAUSES OF DELAYS



- Absenteeism
  - Unscheduled absence of employees results in insufficient labourers at work, requiring the workload to be spread to the remaining workers, often resulting in fatigue and sickness and taking shortcuts in safety procedures
- Compressed Air
  - Low air pressure affects the efficiency of pneumatic rock drills, reducing the penetration rate of the rock drill, resulting in longer drilling periods – additional time required for drilling found by reducing time spent on safety
- Ventilation
  - Poor ventilation results in high stope temperatures, which impacts worker's efficiency and safety. Poor airflow and extreme temperatures increase the risk of accidents

# CAUSES OF DELAYS

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- Meetings
  - Meetings are conducted on every shift. Meetings can only commence once all workers arrive at the waiting place (i.e. travelling time). Also, with high absenteeism, more time is spent at meetings trying to resolve the absenteeism problem
- Breakdowns
  - Breakdowns tend to delay the start of shift or work activities. The breakdowns result in crew members rushing through health and safety activities to carry out the production related activities



# OTHER ISSUES AS IDENTIFIED BY THE MINERAL COUNCIL

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- The application of safety training
  - sometimes discouraged in pursuit of higher production tonnages
- A belief that there is a reduction in safety supervision during night shift and the principles enforced during morning shift are not enforced during day shift
- Production-driven mining culture
  - pressures of production override the culture of safety
- Inadequate or poor supervision
  - Supervisors are unable to spend enough time with their crews as they must visit many excavation

# CONCLUSION



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- Data suggests work behaviour is driven by work pressure to produce
    - Production-related activities take priority, while health and safety-related activities are secondary
  - Fewer hours are spent on entry examination and face preparation, and more time spent on drilling and blasting activities
  - The current mining cycle **may not** support a daily panel blast within the allotted 8h20m (500 minutes) period.
    - Although introducing new technology, such as electro-hydraulic rock drilling, may reduce a particular section of the mining cycle, holistically, the message is clear that modifications to the current mining cycle are required.

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# ACKNOWLEDGEMENT

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  - Priscilla Nelwamondo
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