



Implats – Impala Rustenburg operations

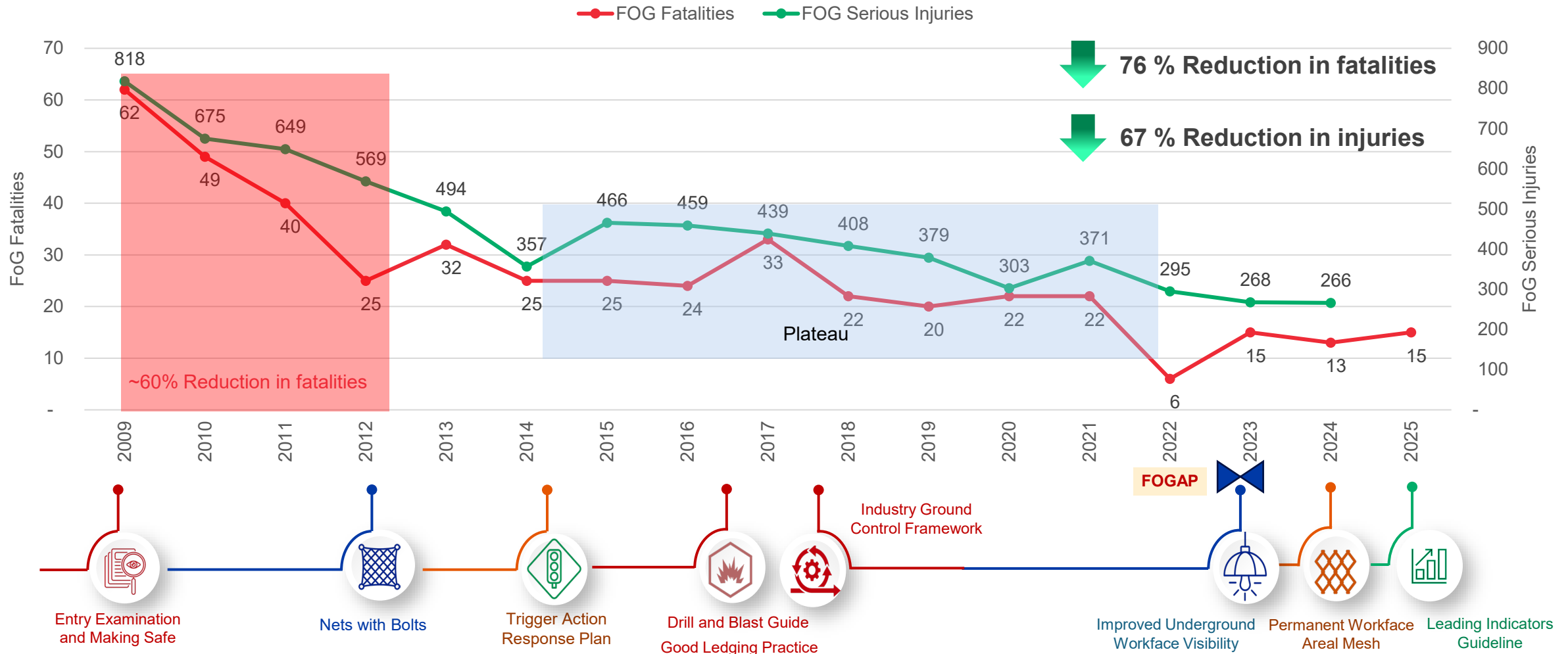
Guideline for FoG Leading Indicators

FOGAP Day of Learning – 27 March 2026

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FoG Leading Practices and Initiatives



Integrated With Industry Initiatives

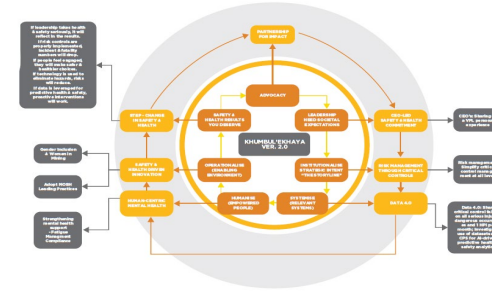
FOGAP



Khumbul'ekhaya 2.0

Key Elements: VFL, CCM, AI Analytics, Mental Health

Contribution: Drives leadership accountability and human-centric safety culture



Industry Ground Control Framework (IGCF)



The Enabling Mining Environment (Beehive App) FOGAP Pillar 5



WHY Leading Indicators?

Lagging Indicators

- Energy already released
 - Backward-looking
 - Focus on past incidents
- Limited foresight in potential future failures

Examples:

Lost Time Injury Frequency Rates (LTIFR), Total Recordable Injury Frequency Rates (TRIFR), fatalities, and reported incidents.

Leading Indicators

- Energy still contained
 - Forward-looking
 - Early warning
- Detect and mitigate potential failures proactively

Examples:

Number of safety audits conducted, inspection compliance and monitoring of critical control effectiveness.

Leading indicators shift us from asking 'what happened?' to 'what is about to happen?'

FOG Leading Indicators



Support
Compliance

1



Mine to
Design

2



Entry
examination,
making Safe,
and Trigger
Action
Response
Plan (TARP)

3



Monitoring

4



Human
Factors

5

Support Compliance

This indicator ensures ground support installations meet specified standards.

Monitoring Guidelines:

- Routine checks on support quality & compliance.
- Independent audits to verify compliance.
- QAQC processes.

Measurement Guidelines:

- Number of identified defects..
- Close-out timeframe.
- Support material within specifications.

Mine to Design

This indicator measures compliance with the mine design.

Monitoring Guidelines:

- Survey offsetting.
- Reconciliation of plan versus actual.
- Use of digital tools to visually identify deviations.
- Configuration and sequencing.

Measurement Guidelines:

- Deviation from planned dimensions.
- Measured in meters or percentage of area where excavation deviates from design.
- Spatial compliance, sequencing and mining rates.

Entry Examination, Making Safe, and Trigger Action Response Plan (TARP)

This focuses on the effectiveness of entry workplace examinations, the use of Trigger Action Response Plan and the integrity of safety barriers like barricades and exclusion zones.

Monitoring Guidelines:

- Planned Task Observations and inspections.
- Verification of safe declaration documentation.
- TARP processes.

Measurement Guidelines:

- Number of deficiencies identified during observations.
- Quality and accuracy of the EEMS process.
- Compliance to TARP.

Monitoring

This indicator tracks the use of technology to detect ground movement and provide early warning.

Monitoring Guidelines:

- Regular health checks of the monitoring system(s).
- Response time and effectiveness when alarms are triggered.

Measurement Guidelines:

- Availability and accuracy of the system(s).
- Coverage and compliance of the system(s).
- Effectiveness of emergency drills.

Human Factors

This addresses the impact of workforce well-being, competency, and supervision on safety.

Monitoring Guidelines:

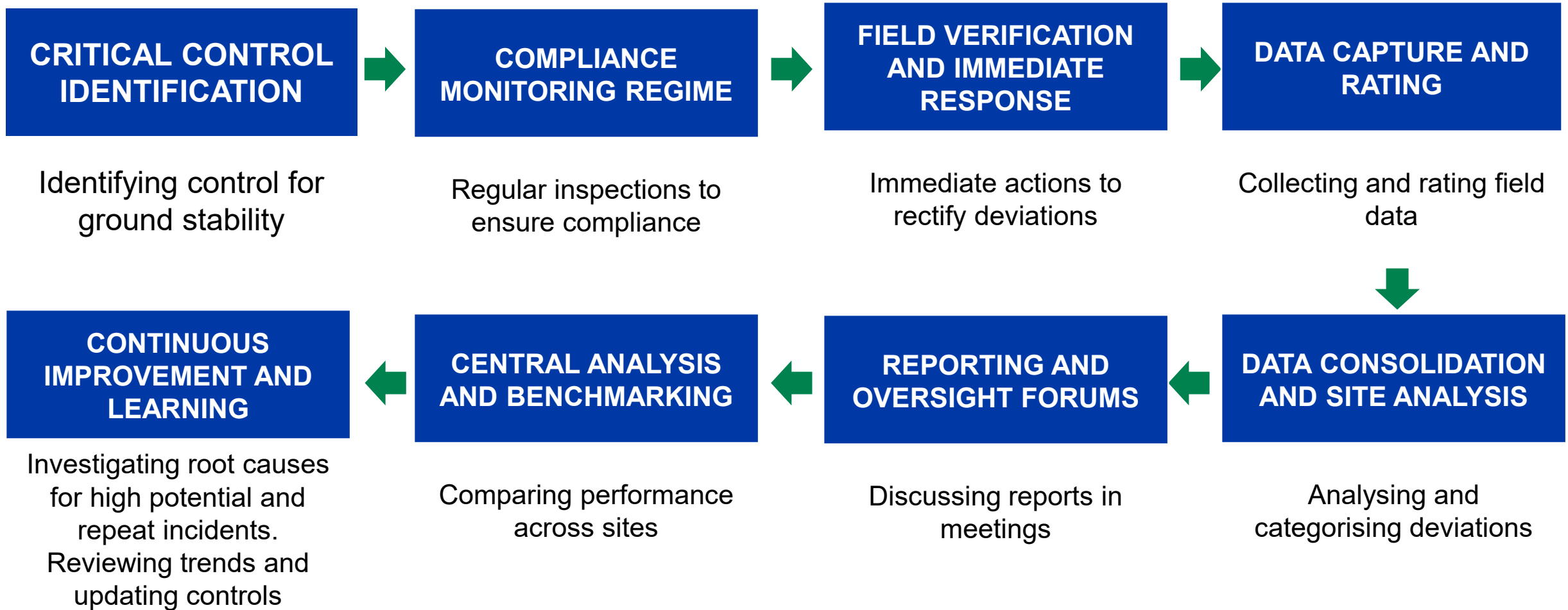
- Fatigue.
- Absenteeism.
- Crew composition and completeness.
- Training and competency.
- Supervisor Presence & Engagement.
- Morale.

Measurement Guidelines:

- Hours at work.
- Absenteeism rate, hand-over and change management processes.
- Crew compliment checks.
- Training completion rate.
- Supervisor safety interactions.
- Engagement in safety initiatives.



Monitoring Leading Indicators – Process Flow



FOG Leading Indicators Implementation Checklist

PHASE 1: PLANNING AND PREPARATION	
<input type="checkbox"/>	Review the FoG Bowtie analysis and identify site-specific Material Unwanted Events (MUEs).
<input type="checkbox"/>	Map existing controls to IGCF technical and behavioural elements.
<input type="checkbox"/>	Conduct a gap analysis using the Beehive App to assess enabling environment maturity.
<input type="checkbox"/>	Define roles and responsibilities for control verification, monitoring, and reporting.
PHASE 2: INDICATOR DEVELOPMENT	
<input type="checkbox"/>	Identify controls for FoG risk (e.g., support compliance, mine-to-design, entry examination).
<input type="checkbox"/>	Define Key Performance Indicators (KPIs) for each control using ICMM Step 5 guidance.
<input type="checkbox"/>	Establish compliance thresholds and document justification for each.
<input type="checkbox"/>	Align leading indicators with both technical and behavioural elements.
PHASE 3: SYSTEM INTEGRATION	
<input type="checkbox"/>	Digitise control verification processes using tablets, sensors, and real-time dashboards.
<input type="checkbox"/>	Integrate leading indicator tracking into existing safety management systems.
<input type="checkbox"/>	Ensure Beehive App usage is standardised across departments and sites.

PHASE 4: MONITORING AND ASSURANCE	
<input type="checkbox"/>	Schedule routine inspections and verification activities for each control.
<input type="checkbox"/>	Monitor leading indicator performance and escalate deviations as per defined protocols.
<input type="checkbox"/>	Consolidate assurance reviews into streamlined reporting structures.
<input type="checkbox"/>	Use dashboard outputs to inform management decisions and interventions.
PHASE 5: CONTINUOUS IMPROVEMENT	
<input type="checkbox"/>	Conduct quarterly reviews of leading indicator trends and control effectiveness.
<input type="checkbox"/>	Facilitate cross-functional workshops to share learnings and refine indicators.
<input type="checkbox"/>	Update KPIs and thresholds based on operational changes or incident learnings.
<input type="checkbox"/>	Report progress to senior leadership and align with Zero Harm commitments.



Call to Action



Let us, the South African Mining Industry, move from reactive to proactive FoG risk management.

T H E C L I M B T O Z E R O



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