



DuPont Executive Forum: Reducing Operational Risk – An Imperative for the Mining Industry



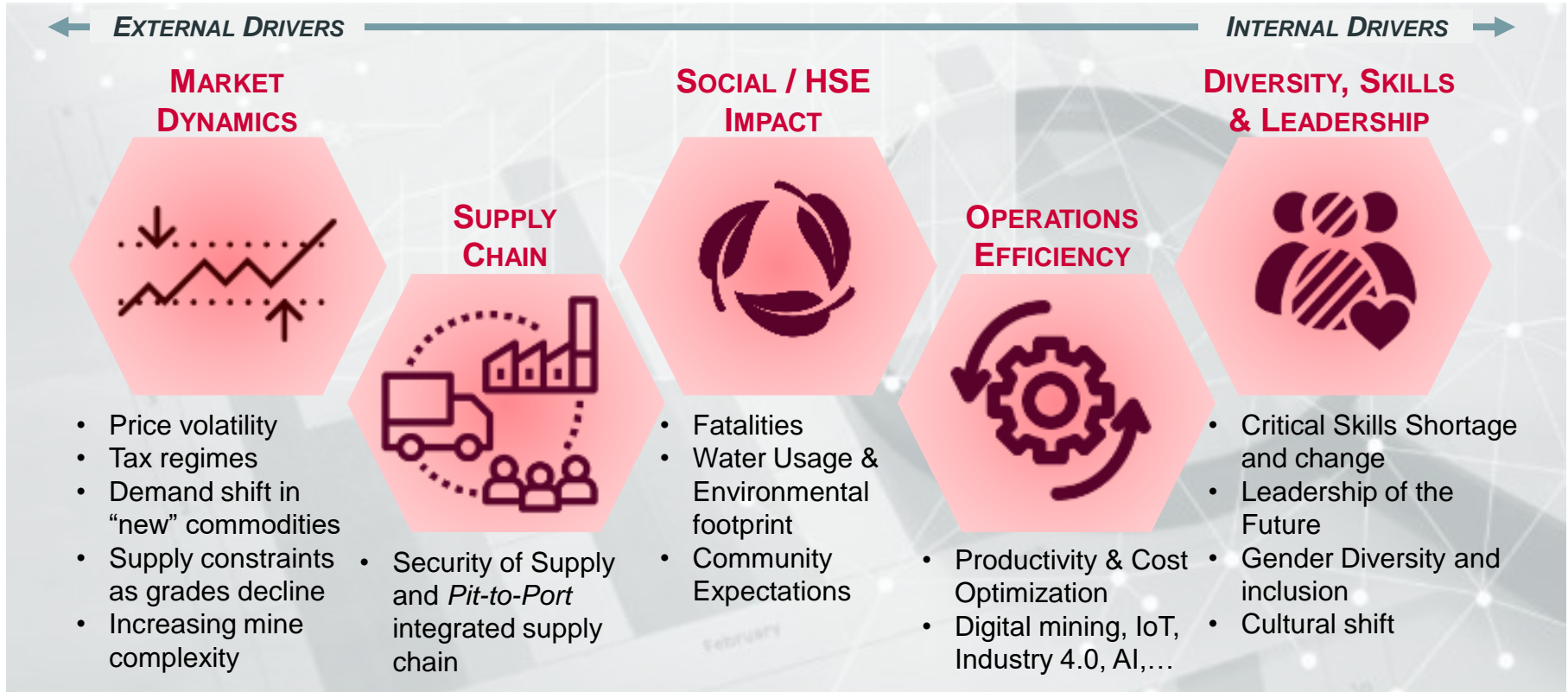
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Location: Cape Town
South Africa



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Operational Risk Management in Highly Hazardous Industries

A DSS perspective: Key Challenges

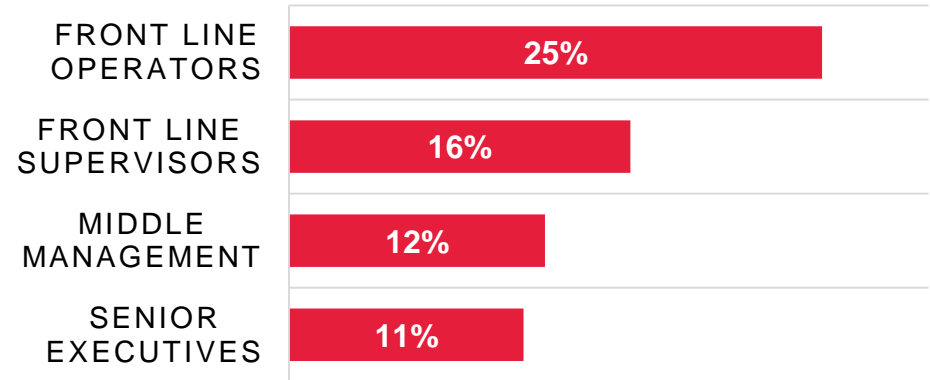


Not sufficient emphasis on risks that can lead to Large-Scale incidents

Gaps in risk management and governing processes, yet focus on adding more processes

Disconnect and misalignment, in particular with regard to perception and management of risks and expectations

MISALIGNMENT WITHIN ROLES (SOURCE DSS 2018 ORM RESEARCH)



- **83% of Senior Leadership** agree it is the hearts & minds of their employees that they need to influence...
- ...but only **11% believe they do a good job** in engaging employees.

FOUR PRIORITIES

FOR SUSTAINED

RISK REDUCTION

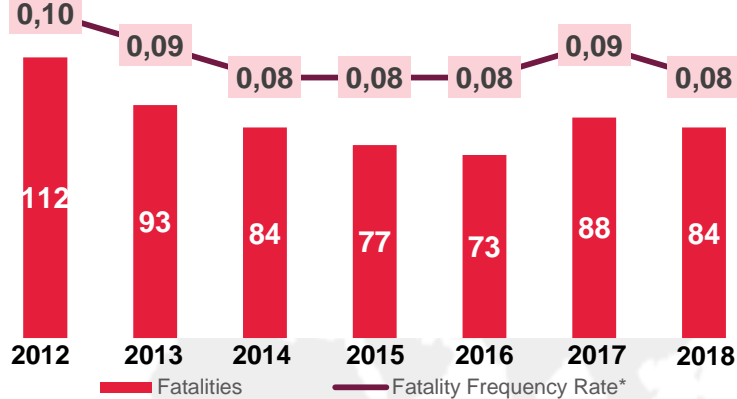
AND PERFORMANCE IMPROVEMENT

- 1** Effective risk-based approach, with focus on fatal risks and large-scale incidents
- 2** Integrate risk into the operating rhythm across the organization
- 3** Strengthen leadership skills from top to front line
- 4** Leverage technology to de-risk mining operations and insights from data for better decision-making

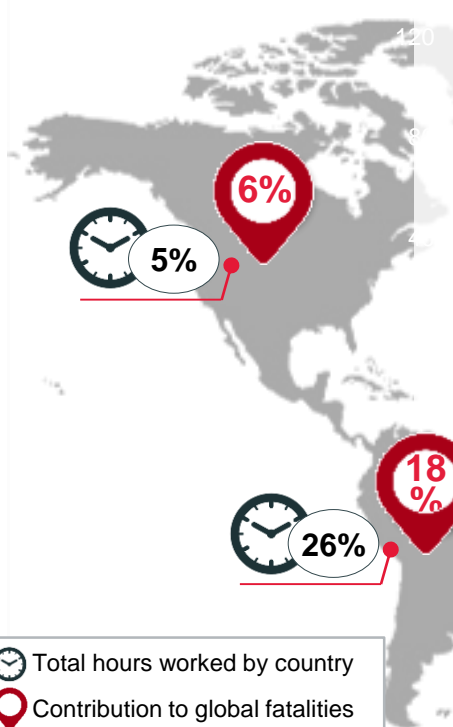
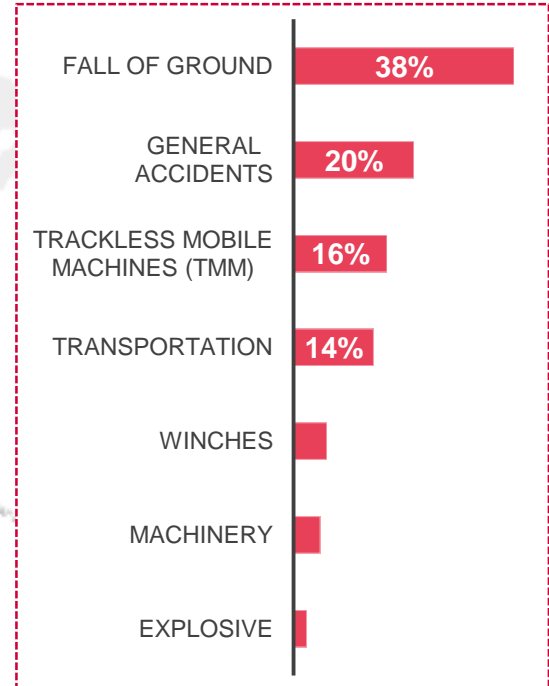
Topic #1: The Current State of Safety in the Mining Industry



FATALITY TREND - SOUTH AFRICA



KEY HAZARDS

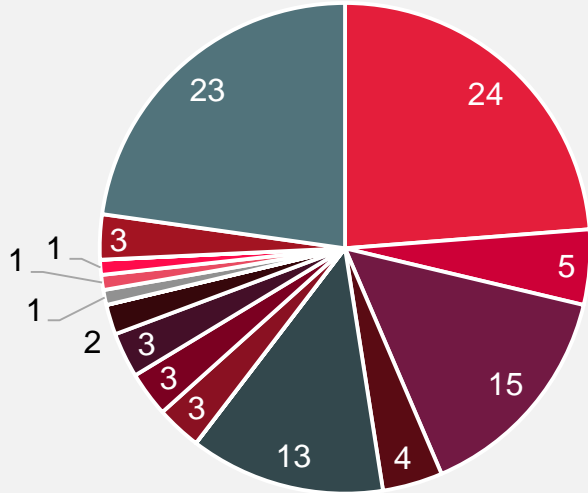


Source: Mineral Council South Africa - Department: Mineral Resources. Republic of South Africa, Mine Health and Safety Inspectorate

Across ICMM members, in 2017, South Africa accounts for nearly half of the mining fatalities, although constituting only 24% of the total work hours

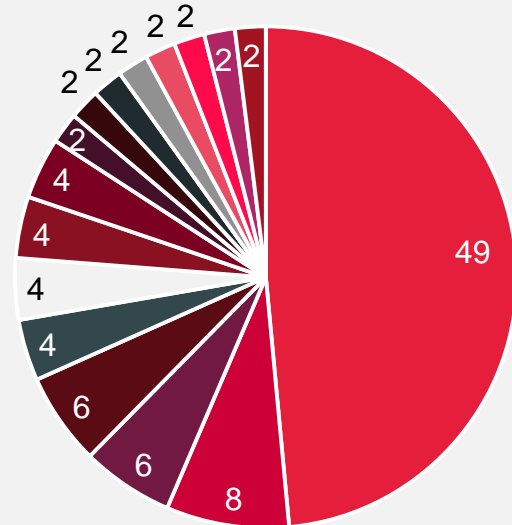


Percentage of total hours worked by country in 2017



- South Africa
- Peru
- Chile
- USA
- Indonesia
- Kazakhstan
- Canada
- Ghana
- Niger
- Norway
- Spain
- Zambia

Percentage of fatalities by country in 2017



- Australia
- Bolivia
- Italy
- Japan
- Rest of world

Topic #2: The Promise & Risks of New Technologies in the Mining Industry



New technologies can effect step-change improvements at mining operations...

SAFETY & RISK



Monitor location, movement, health and environment



Proximity detection and collision avoidance



Remote operation and inspection



Planning & risk identification



Augmented training & maintenance

PRODUCTIVITY & COST



Optimized planning



Workforce allocation



Route optimization



Decision making



Process automation



Optimized maintenance



Stock level optimization



Deep mines, along with reliance on traditional labour-intensive mining methods make South African mines more hazardous than others



Deep mines and their associated hazards

- Most deep level underground mines in South Africa are aging with travel times to the face sometimes reaching an hour or more. Consequently, with increasing depth and distance from the shaft, actual drill time at the workface has contracted, accounting for greater health and safety challenges
- Deep South African mines are therefore prone to seismic events – making them some of the most dangerous in the world. **Eight of the 10 deepest mines in the world are in South Africa**



Labour intensive mining methods

- According to Fin24, a financial daily, South Africa has been mined commercially for over a century and many operators still rely on older, labor-intensive mining methods such as hand drilling



Safety vs production and profitability

- According to John Kane-Berman, former CEO of South African Institute of Race Relations - pressures to increase production had led to inadequate supervision and attention to safety in South African mines. He also mentioned that penalties for breaking safety rules are not as stringent in South Africa
- According to Daily Maverick, a South African daily - challenging profitability may encourage slips in safety standards, as mining companies in South Africa increasingly try to keep up in an industry that is inherently unsustainable



DuPont Sustainable Solutions

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