Serious Injuries and Fatalities: A Case Study of Organizational Factors in Heavy Mining

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AMSA — Alberta Mine Safety Association | UNIVERSITY OF ALBERTA | Individual & Team Performance Lab | UNIVERSITY OF CALGARY

Background

- The heavy mining industry remains a high-risk sector where **Serious Injuries and Fatalities (SIFs)** persist despite stringent safety policies.
- This study aligns with Safety II and Human and Organizational Performance (HOP) frameworks, emphasizing proactive and systemic approaches to improving safety.

Research Question

How do human and organizational factors contribute to Serious Injuries and Fatalities (SIFs)?

Methods

102 Interviews — Managers & Hourly Employees

265 Surveys — Hourly Employees

- **Study Design:** A mixed-method socio-technical field study was conducted at an open-pit mining facility in Alberta, Canada in 2024.
- **Surveys Measured:** Safety culture, crew trust & collective self-efficacy, pressure to perform, access to PPE, and safety attitudes & behaviours.

Survey Results

Strengths (High-performing Areas)
- **Access to PPE:** Adequacy of access to personal protection equipment
- **Collective Efficacy:** Crews believe they can perform work safely.
- **Knowledge Sharing:** Willingness to share information with others.

Moderate Areas
- **Crew Trust:** Trust among crews to make decisions & behave safely.
- **Crew Safety Norms:** Holding each other accountable for safety.
- **Equity of Work Contribution:** Individual contributions to crew workloads.

Development Areas (Opportunities for Improvement)
- **Respite:** Perception of sufficient rest & relief on off-hours.
- **Learning from Mistakes:** Post-incident reflection & learning.
- **Job Security:** Confidence in keeping their job in the future.

Safety Survey Results

Average Score (1–5 Scale)

- Access to PPE — Strong Area — 4.2
- Crew Trust — Moderate Area — 3.5
- Respite — Development Area — 3.0

Scan for this poster & references!

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Interview Results

Thematic Analysis revealed 17 themes across organizational levels.

Top 3 Themes
1. **Management & Safety Leadership:** Employees want more transparent communication from leadership. Lack of responsiveness reduces trust.
2. **Safety Department & Training:** Calls for better training consistency and dedicated trainers. Desire for more safety team presence in daily operations.
3. **Crew & Team Dynamics:** Supportive teams enhance safety. Some crews struggle with conflict resolution and peer accountability, which influence safety norms.
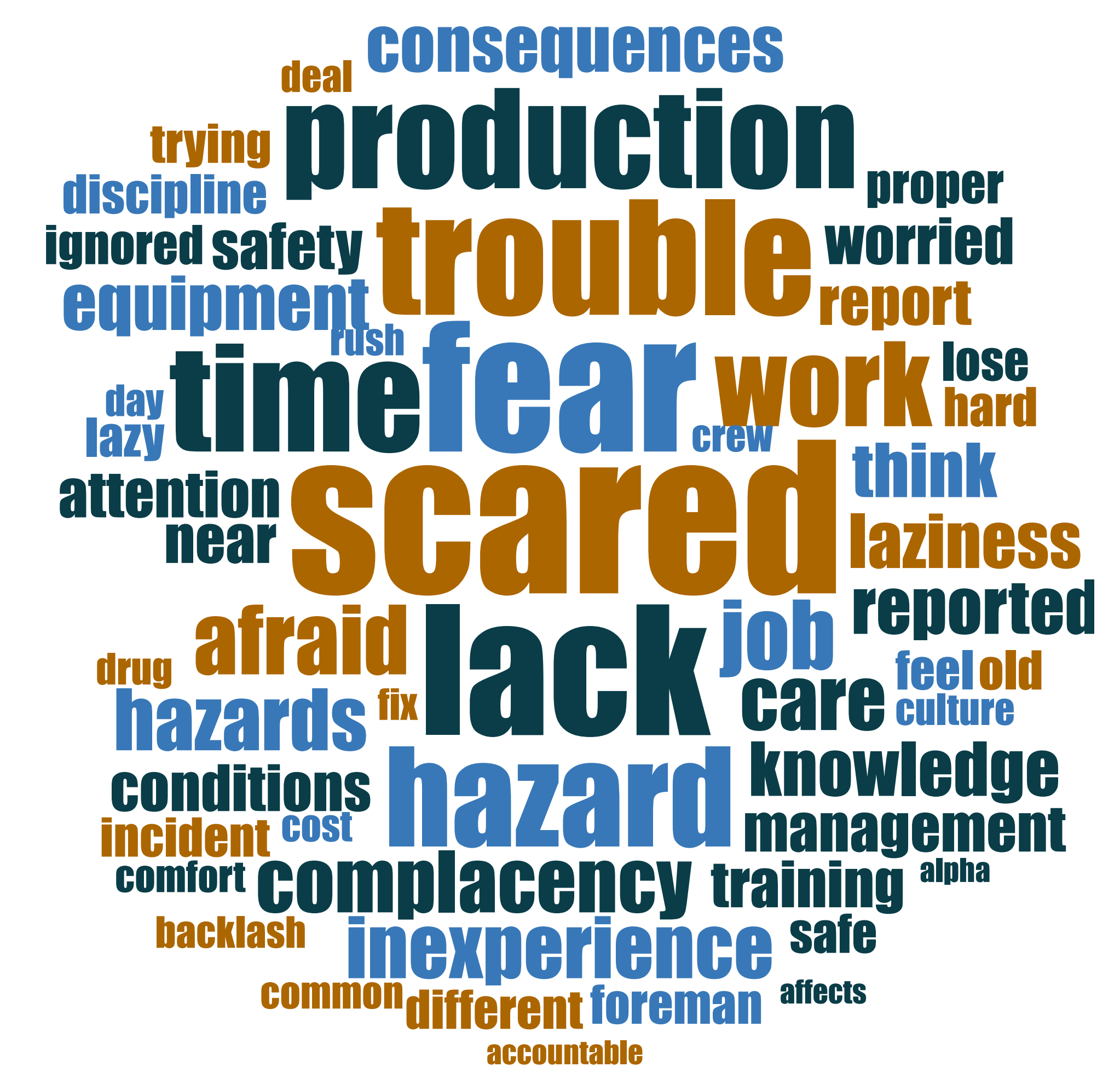

Figure 1. Responses to *"What are the top three reasons why hazards are not identified or reported?"*

Takeaways & Recommendations

- **Enhance hazard reporting systems** to ensure follow-through and employee trust.
- **Increase leadership visibility** and engagement with front-line workers.
- **Improve cross-crew communication** to break down silos.
- **Revise training strategies** to emphasize proactive learning and mistake management.
- **Encourage safety culture reinforcement** through incentives and recognition.