



Canadian Surface Diamond Drilling Root Cause Analysis Workshop Results and Next Steps

A focused approach to improving workplace health and safety

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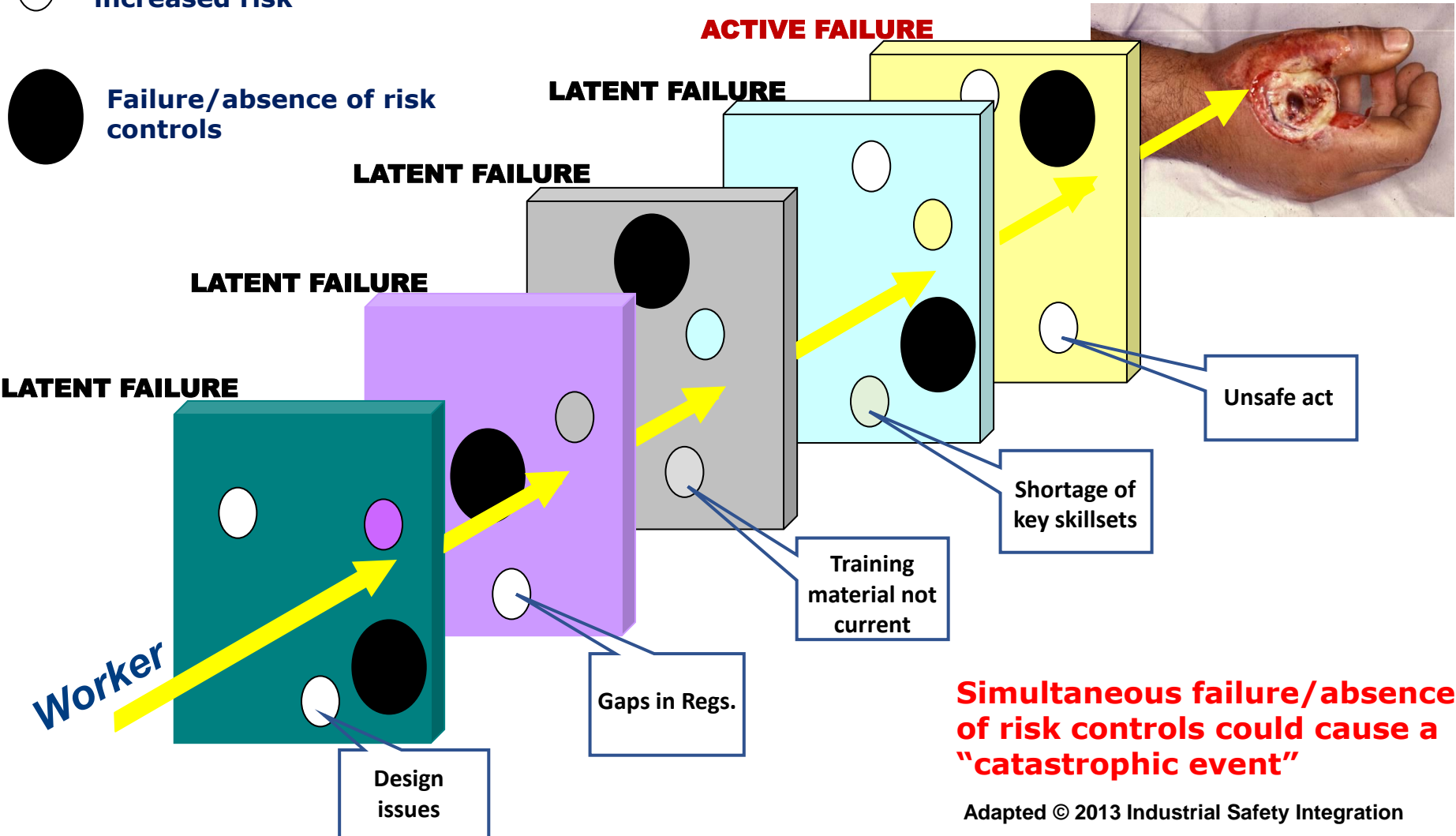
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Risk Assessment Project

○ Examples that could lead to increased risk

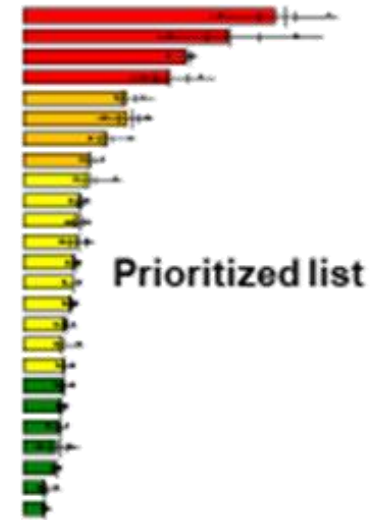
● Failure/absence of risk controls



Simultaneous failure/absence of risk controls could cause a "catastrophic event"

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Workshop: A Tripartite and Collective Process



Workshop: A Tripartite and Collective Process

Workshop process was open, transparent, and collaborative:

- Ensured perspectives/viewpoints were heard
- Responses were respected, not freely edited
- Final list shared with participants before workshop
- Workshop results reviewed/validated by participants

Finding acceptable solutions that all members can support:

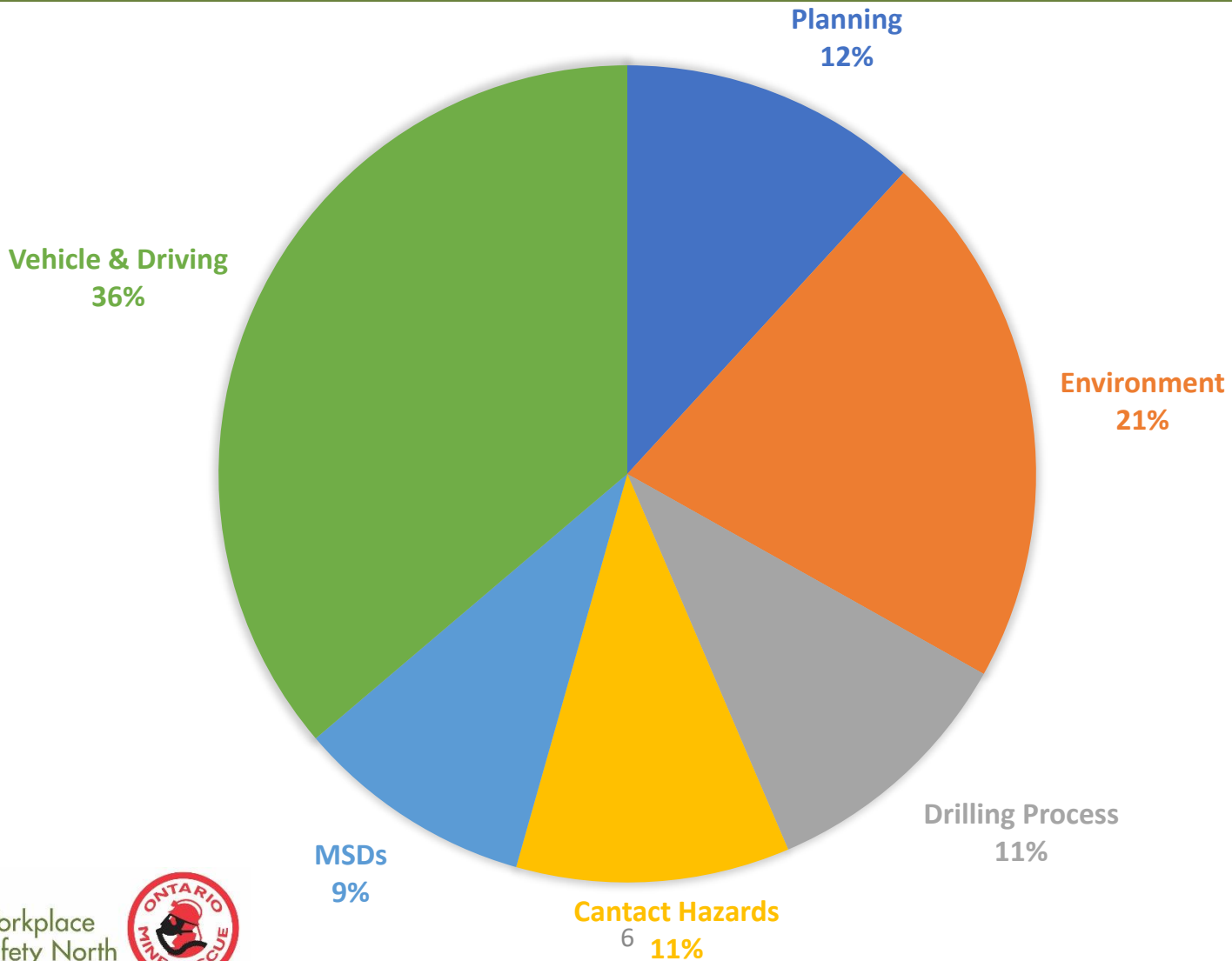
- Only industry experts ranked the risks
- Process was NOT about consensus (although results demonstrate a significant degree of convergence)

Risk Assessment Workshop Results:

Top 10 risk categories based on highest risk within that category

Rank	Category	Event (Situation/Condition) that could result in Injury or Illness OR <i>“What could keep you up at night?”</i>
1	Planning	Inadequate emergency response to a medical emergency has adverse effects on workers
2	Environment	Struck by Chicot (dead trees)
3	Drilling Process	Drilling on ice cover
4	Contact Hazards	Pinch Points
5	Environment	Exposure to extreme weather event, Contact or exposure to lightning event, over exposure to sun, contact with plant life or insects, contact with wildlife, contact by falling tree
6	Musculoskeletal Disorder Hazards	Repetitive work resulting in injury
7	Vehicle & Driving	Travel to and from drills by UTV and Snowmobiles
8	Vehicle & Driving	Travel (to, from and on drill sites) Drowsy driving
9	Vehicle & Driving	Helicopter material transport. Fly Program/Crew change, Crash and contact with rotating blades
10	Vehicle & Driving	Heavy duty mobile equipment

Top 10 Surface Diamond Drilling Risks



Analysis of Top 10 Risks

Risks and undesired outcomes identified in the following overall ranking/categories

Rank	Risk Category	Contributing Factor	Result
1	Planning	Inadequate emergency response	Inadequate emergency response to a medical emergency has adverse effects on workers
2	Environment	Struck by Chicot (dead trees)	Injured worker or damage to equipment
3	Drilling Process	Drilling on ice cover	Injury to worker Damage to Equipment/environment
4	Contact Hazards	Pinch Points	Injury to a worker
5	Environment	Exposure to extreme weather event, Contact or exposure to lightning event, over exposure to sun, contact with plant life or insects, contact with wildlife, contact by falling tree	Injury to a worker
6 - 10	Vehicles & Driving	Travel to and from drills by Utility Task Vehicle and Snowmobiles Travel (to, from and on drill sites) Drowsy driving Helicopter material transport. Fly Program/Crew change, Crash and contact with rotating blades Heavy duty mobile equipment	Injury to a worker Damage to Equipment/environment

Root Cause Analysis Workshop: Participants

SUBJECT MATTER EXPERTS		
#	Name	Company/Representative
1	Shannon Bennett	JS Drilling, Ontario
2	Jim Butler	Hy-Tech Drilling, British Columbia
3	Gerry Cooke	Team Drilling, Saskatchewan
4	Clare Foladore	WSN, Formerly Vale – Exploration, Ontario
5	Wesley Keating	Hy-Tech Drilling, British Columbia
6	Kelly Lavis	Major Drilling, Saskatchewan
7	Barry Nabese	Hy-Tech Drilling, British Columbia
8	Mike Patenaude	Foraco, Ontario
9	Zach Purdy	Major Drilling, Manitoba
10	Ashton Van Gool	Team Drilling, Saskatchewan

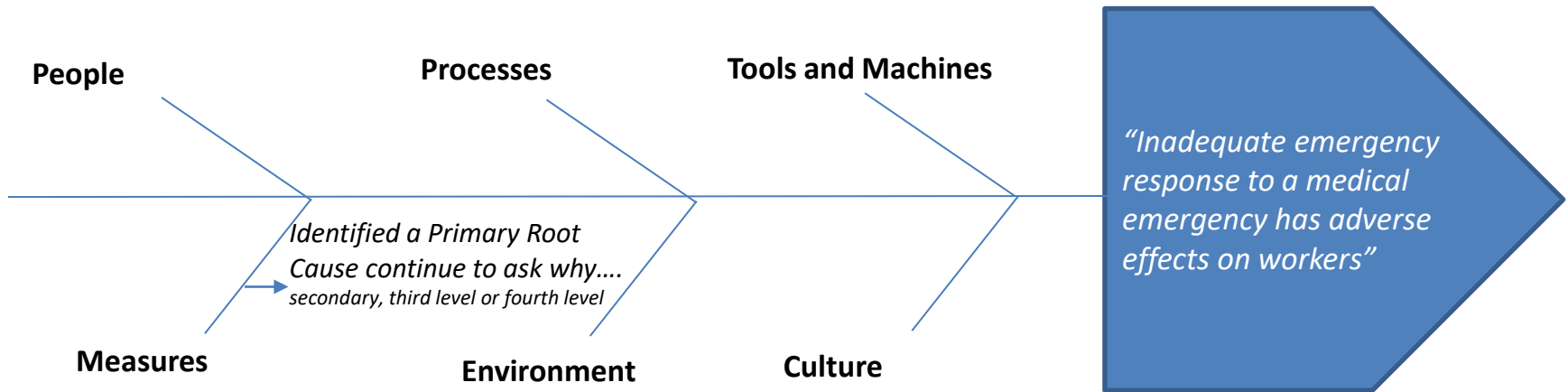
WORKSHOP PARTICIPANTS		
#	Name	Company/Representative
11	Louise Lowe	Canadian Diamond Drilling Association
12	Scott Secord	Ministry of Labour, Immigration, Training & Skills Development
13	Harsim Kalsi	Ministry of Labour, Immigration, Training & Skills Development
14	Rick Schulist	Ministry of Labour, Immigration, Training & Skills Development
15	James Johnstone	Workplace Safety North: Facilitator
16	Tom Welton	Workplace Safety North: Director
17	Tiana Larocque	Workplace Safety North: Tech Support
18	Tricia Valentim	Workplace Safety North: Tech Support

Root Cause Analysis: Risk Statement

Based on risk assessment results and further analysis, the Root Cause Analysis working group confirmed and developed the following risk statement using the “**Fishbone**” approach addressing

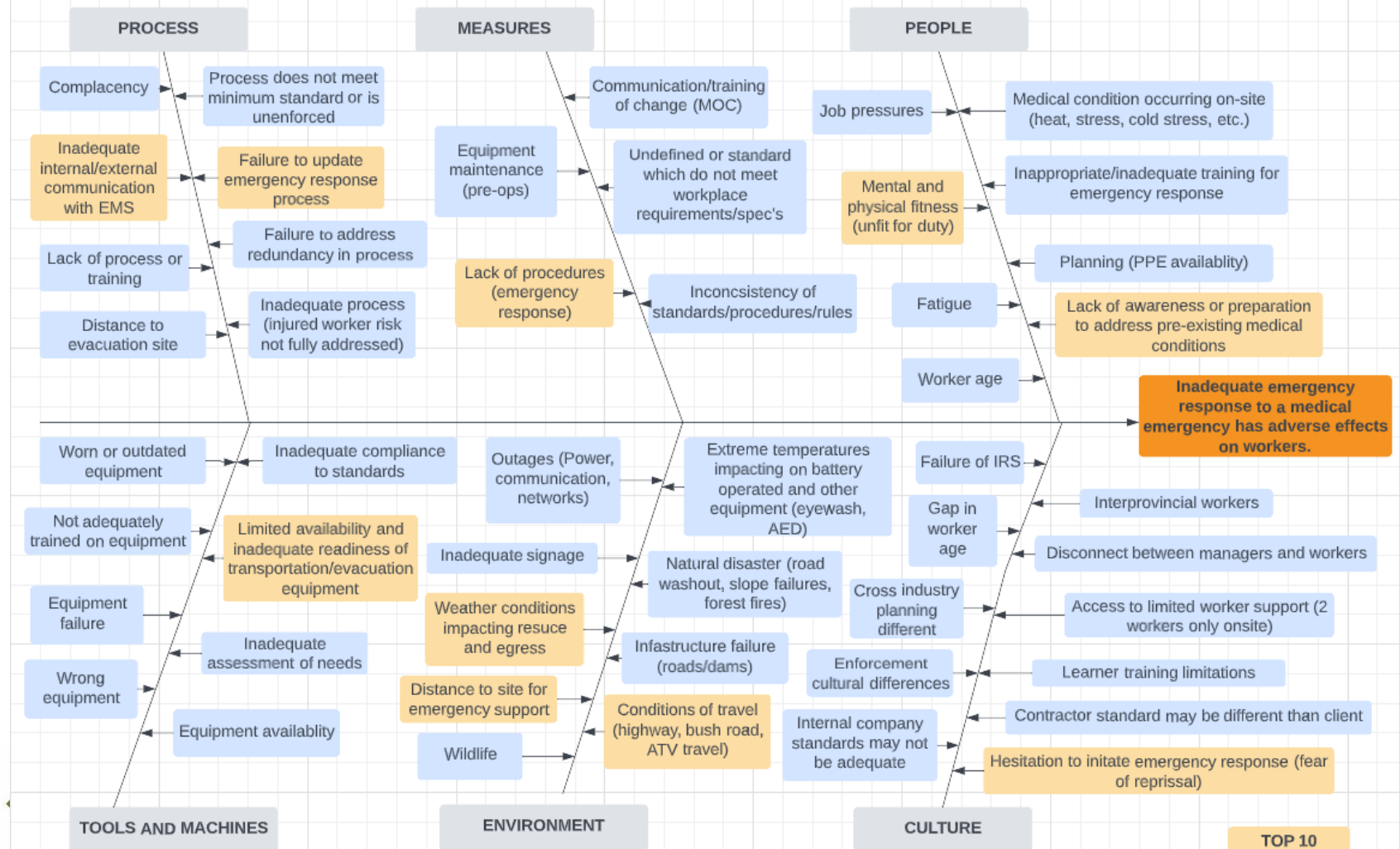
“Inadequate emergency response to a medical emergency has adverse effects on workers.”

Fishbone Diagram



PRIMARY CAUSES

Surface Diamond Drilling Root Cause Analysis - PRIMARY CAUSES



Top Primary Causal Factors

Ranking	Category	Primary Root-Cause
1	Processes	Inadequate (internal/external) communication (pre-planning) with Emergency Services
2	Tools and machines	Limited availability and inadequate readiness of transportation/evacuation equipment (transportation/evacuation of injured worker)
3	Measures	Lack of/inadequate emergency response procedures
4	Culture	Hesitation to initiate emergency response (for fear of reprisal; uncertainty as to when to do so)
5	People	Lack of awareness of OR lack of preparation to address crises from pre-existing medical conditions
6	People	Mental and physical fitness (unfit for duty)
7	Environment	Inclement/volatile weather conditions impacting rescue and egress
8	Environment	Excessive distance to emergency support (time, proximity)
9	Environment	Travel conditions (highway, bush road, ATV trail) affecting emergency response
10	Processes	Failure to update emergency response process

Top 10 root causes of inadequate emergency response in surface diamond drilling sector

As identified by workers, supervisors, and employers in the surface diamond drilling industry through a Workplace Safety North-facilitated root cause analysis workshop with the support of the Canadian Diamond Drillers Association.



1. **Inadequate emergency response planning with Emergency Services and workers**



6. **Mental and physical health (fit for duty)**



2. **Limited availability and low readiness of transportation and evacuation equipment (to transport injured worker to transfer point)**



7. **Bad weather conditions preventing evacuation**



3. **Lack of, or inadequate, emergency response procedures**



8. **Lengthy travel distance for emergency services**



4. **Hesitate to call for emergency response (not sure when to call; fear of reprisal)**



9. **Evacuation travel conditions delay emergency response time (highway, bush road, ATV trail)**



5. **Lack of awareness or preparation to address an emergency from pre-existing medical conditions**



10. **Failure to update emergency response process**

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List of Solutions and Controls for the Top Primary Root Causes

Notes:

- Scope of this exercise does not include assessment of listed controls.
- List provides information on specific controls and/or activities that support a control.
- Control performance should be **specific, measurable, observable, and auditable**

Next Steps: What should we focus on immediately?

Based on controls identified for the Top Primary Causal Factors, it would be beneficial, as a start, to focus right away on the following systemic weaknesses:

Ranking	Category	Primary Root-Cause
1	Processes	Inadequate (internal/external) communication (pre-planning) with Emergency Services
2	Tools and machines	Limited availability and inadequate readiness of transportation/evacuation equipment (transportation/evacuation of injured worker)
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4	Culture	Hesitation to initiate emergency response (for fear of reprisal; uncertainty as to when to do so)
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Next Steps: Proactive efforts of the Mining Legislative Review Committee (MLRC)

Following a results presentation to the MLRC, a committee-specific to Surface Diamond Drilling Sector to conduct a detailed review of workshop results. Based on identified primary causal factors, several areas are being looked at to support the establishment of effective controls, including:

- Industry leading practices
- Knowledge of legislation & standards

Thank you for attending today's presentation and helping make workplaces safer.

Questions?

Workshop Contacts

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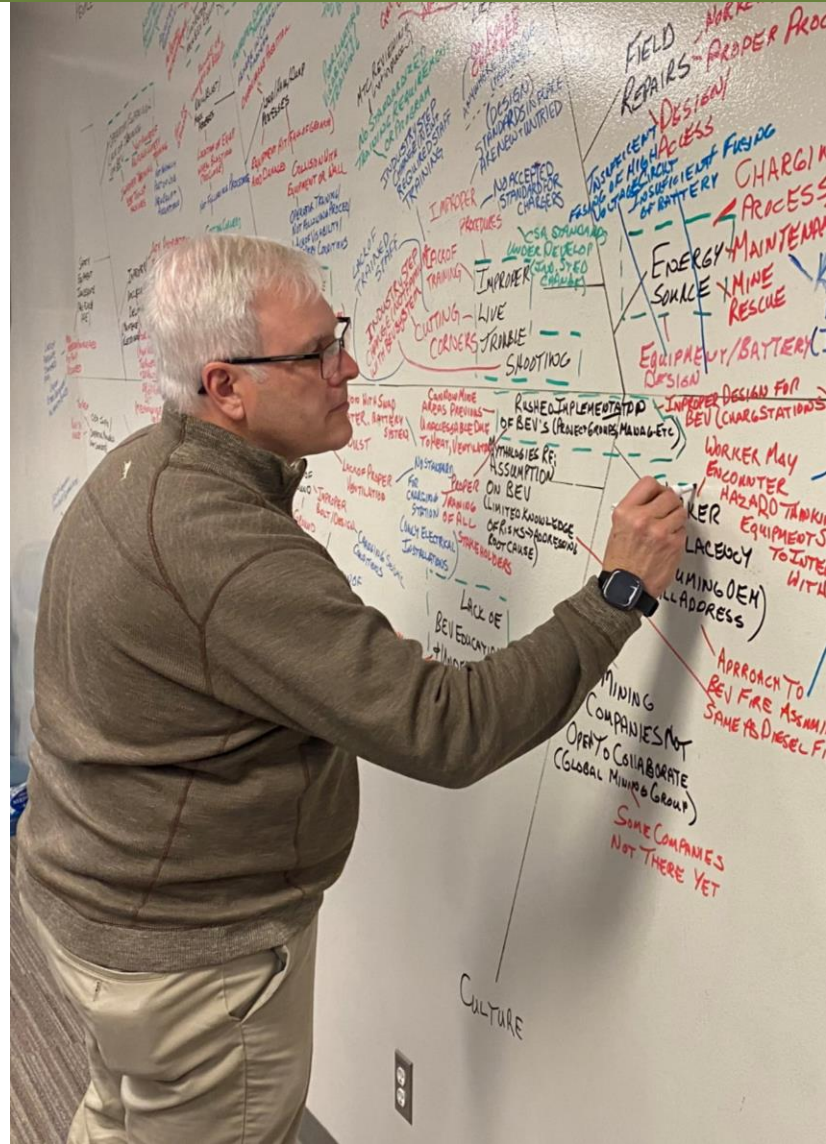
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