



Control Effectiveness Workshop

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Why are we here?



Top 10 Hazards in Underground Mines



1. Interaction with mobile equipment - collision with other equipment
(large vs small) - traffic control



6. Exposure to airborne hazardous substances



2. Interaction with mobile equipment and pedestrian



7. Interaction with mobile equipment - collision with infrastructure
(conveyors, towers, etc.)



3. Adoption of new technology: Battery electric vehicle fires or explosions injure workers or mine rescue personnel



8. Inadvertent contact with stored energy



4. Worker suffers manual handling or repetitive strain injury



9. Hearing loss



5. Ground control failure causing injury



10. Major fire underground from mobile equipment

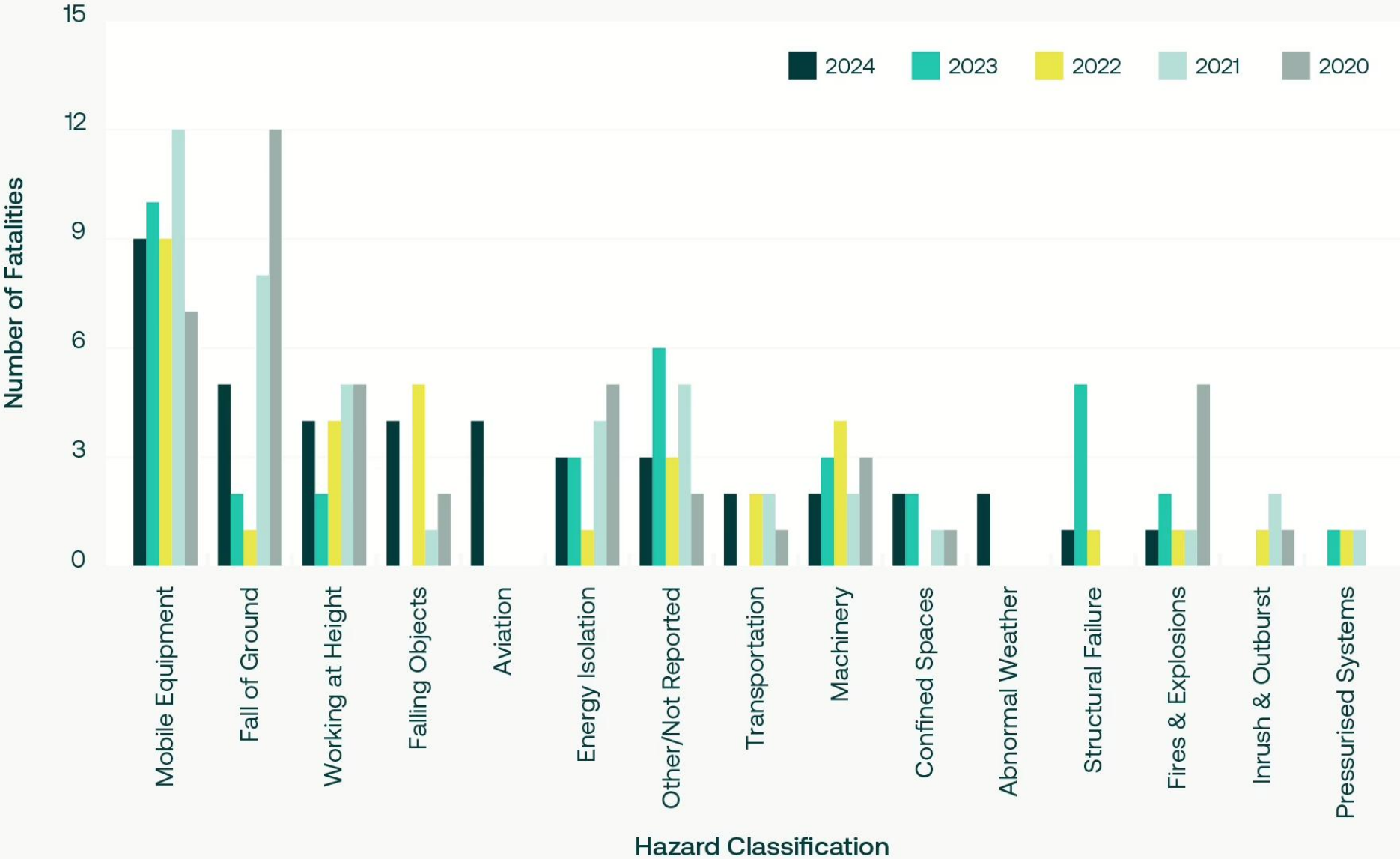


Graph 2 : ICMM Member Location and Associated Hazards Attributed to Fatalities (2024)





Graph 3: ICMM Member Associated Hazards Attributed to Fatalities (2020-2024)





Do we need more controls?



How much time do we spend on risk assessment and identifying controls?

We know the risks.

We know the controls.

Where do we go from here?



Mining Industry Perspective

7,709
Total Participants

6,445
Workers

819
Supervisors

294
Middle Managers

151
Senior Managers





ICMM – International Council on Mining and Metals





Health and Safety Critical Control Management

Good Practice Guide

ICMM – International Council on Mining and Metals

April 2015 – Critical Control
Management Good Practice Guide

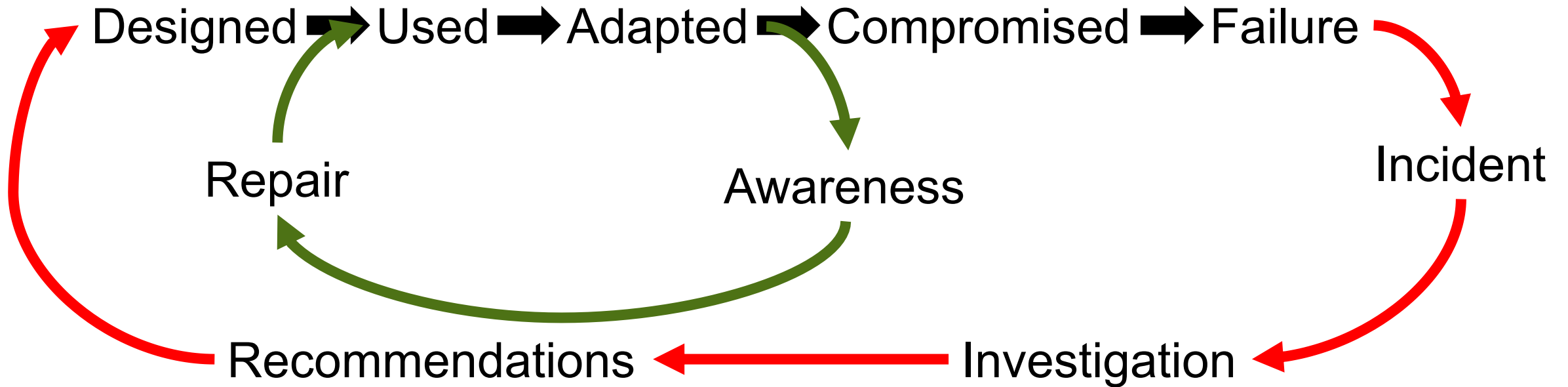


What is Control Effectiveness?

It's not about if a control exists
– it's about if it works.



Lifecycle of a Control





Applying this concept practically.

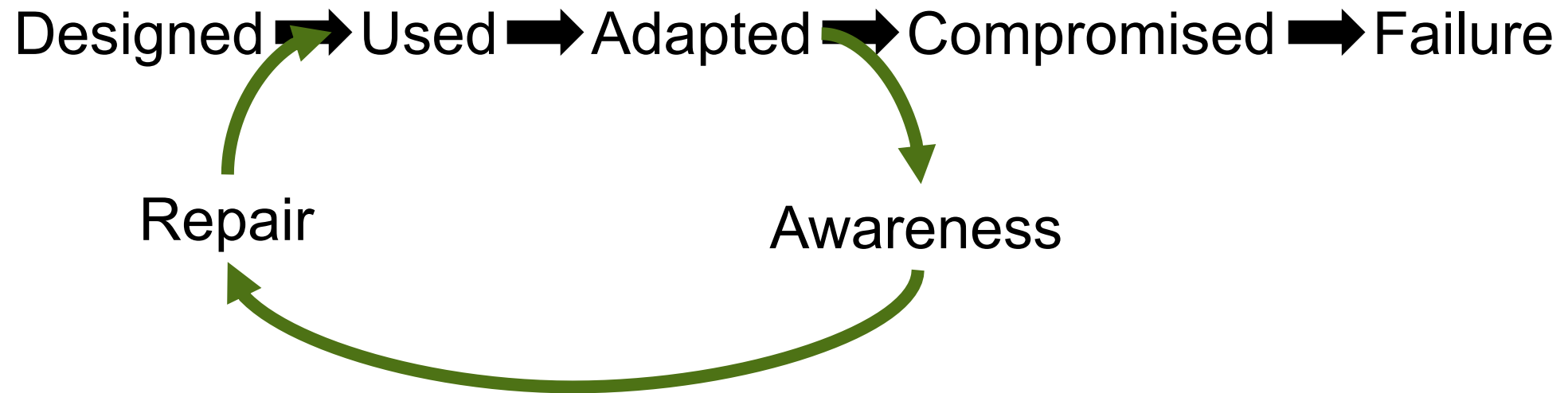
Knowing what our controls are vs. understanding them

**What is the
control supposed
to do?**

**What needs to be
in place to make
it work?**



Moving to the awareness part of the lifecycle.





Moving to the awareness part of the lifecycle.

What does the control look like brand new?

What are the early warning signs its beginning to fail?

What could control failure look like?



Moving to the awareness part of the lifecycle.

What does the control look like brand new.

What are the early warning signs its beginning to fail?

What could control failure look like?

- Guard is solidly installed and correctly designed for the task
- Fully prevents access to moving or hazardous parts
- Cannot be easily removed without tools
- Interlocks function as designed (equipment won't run if guard is off)
- Guard allows clear sightlines or safe access without removal



Moving to the awareness part of the lifecycle.

What does the control look like brand new.

What are the early warning signs its beginning to fail?

What could control failure look like?

- Guard removed briefly during setup or adjustments
- Guard propped open “just for this task”
- Fasteners replaced with quick-release alternatives
- Interlock overrides introduced during maintenance
- Guard slightly damaged, bent, or loose but left in
- Phrases like:
 - “It’s only off for a minute”
 - “It slows the job down”



Moving to the awareness part of the lifecycle.

What does the control look like brand new.

What are the early warning signs its beginning to fail?

What could control failure look like?

- Guard routinely removed or not reinstalled
- Interlocks permanently bypassed
- Guard missing sections or no longer secure
- Equipment operates with full access to moving parts
- Hazard only “managed” by keeping hands clear
- Workers exposed during normal work, not just abnormal tasks



**How can we start to shift
that mindset?**



Closing Reflection