AMSA
Alberta Mine Safety Association

Building on Good Work

David and Joan Lynch
School Of Engineering
Safety and Risk Management

Collaboration

Making Serious Injury/Fatality Prevention Real….
….Taking Risk Management to the Next Level

22nd
ALBERTA HEALTH & SAFETY CONFERENCE
2025

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Supporting Safety Leadership in Alberta Mines

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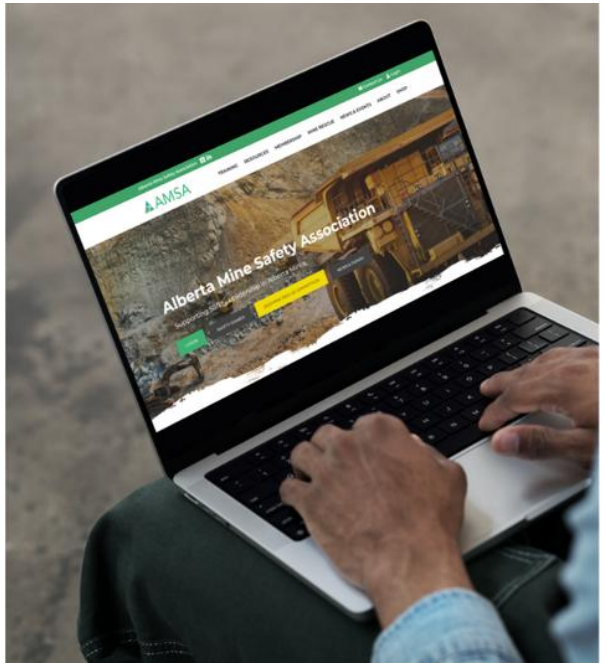

BOUCHIER
Canadian Natural
CST Coal
Dräger
FINNING CAT
BIGHORN MINING
ALBERTA, CANADA
FORT HILLS
Fort McKay Group of Companies LP
Est. 1986
GRAHAM
Hammerstone corporation
HEAVY METAL
EQUIPMENT & RENTALS
Imperial
KMC MINING
LAFARGE
ORICA
Heidelberg Materials
McKay Métis Contracting
NORTH AMERICAN
CONSTRUCTION GROUP
SUNCOR
levittsafety
Syncrude
SMS EQUIPMENT
TransAlta
Sureway
Construction Group Ltd.
WestMETAg
WESTMORELAND MINING LLC

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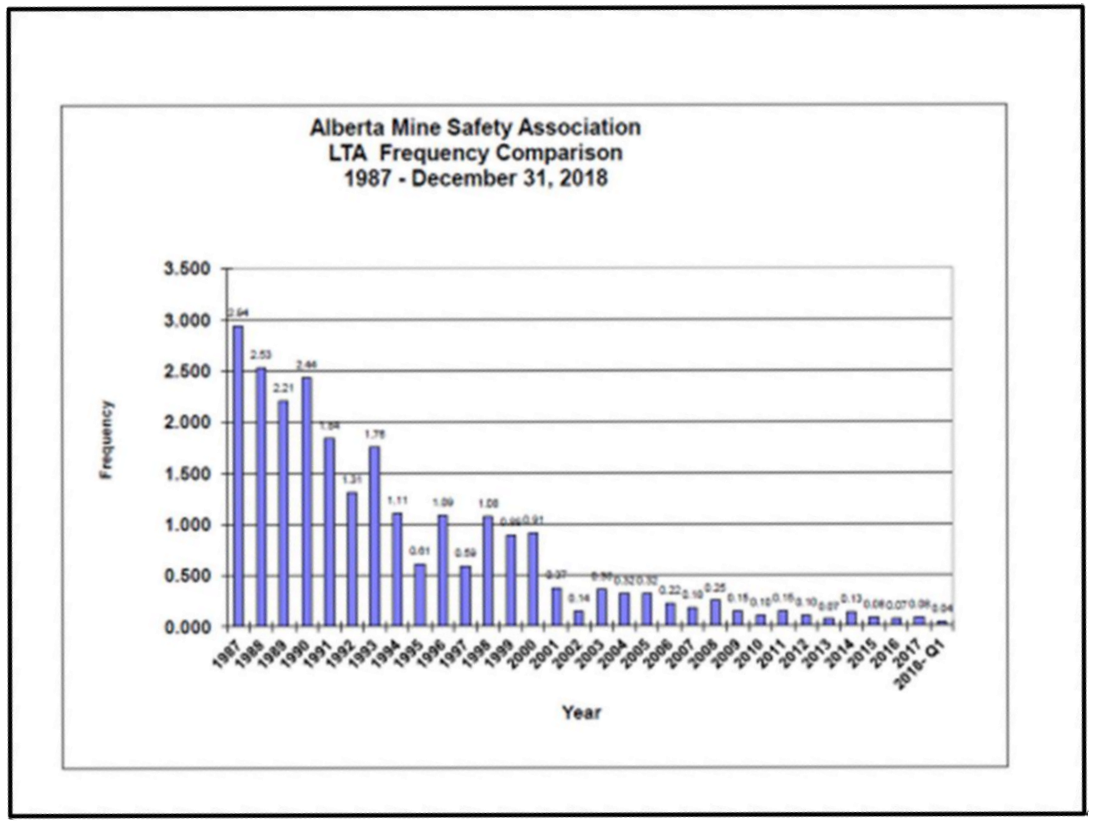
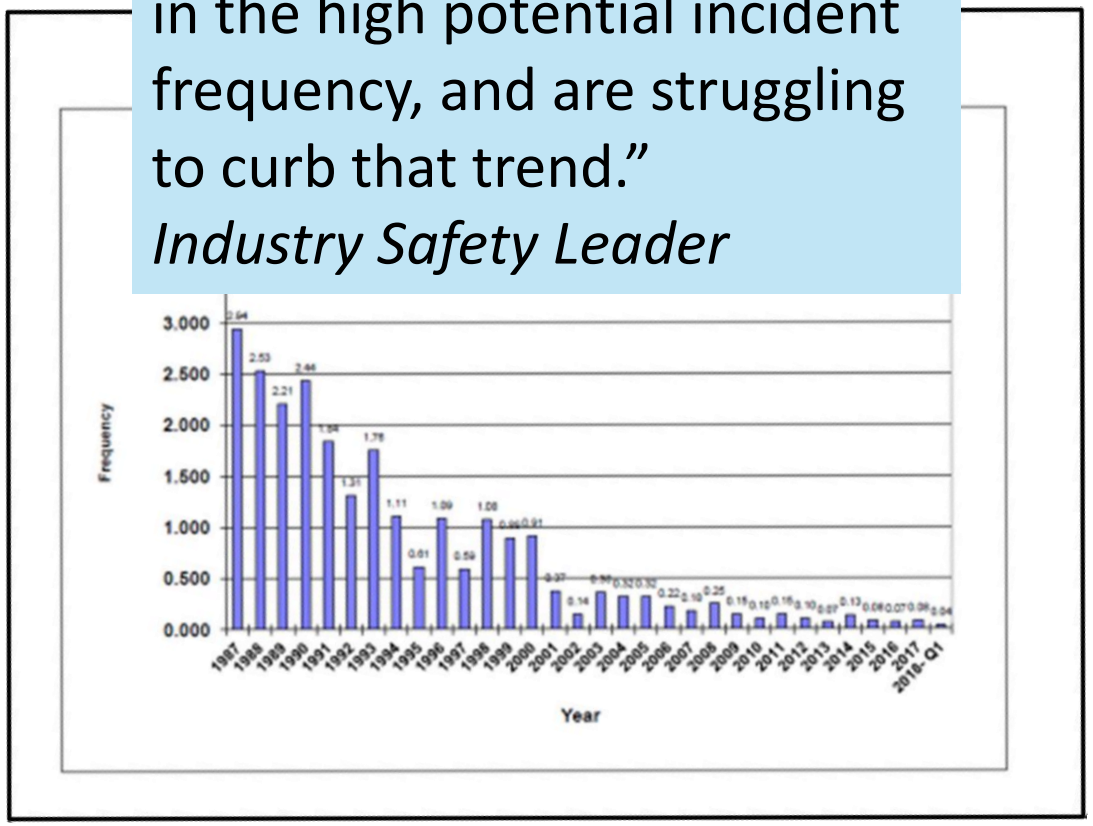


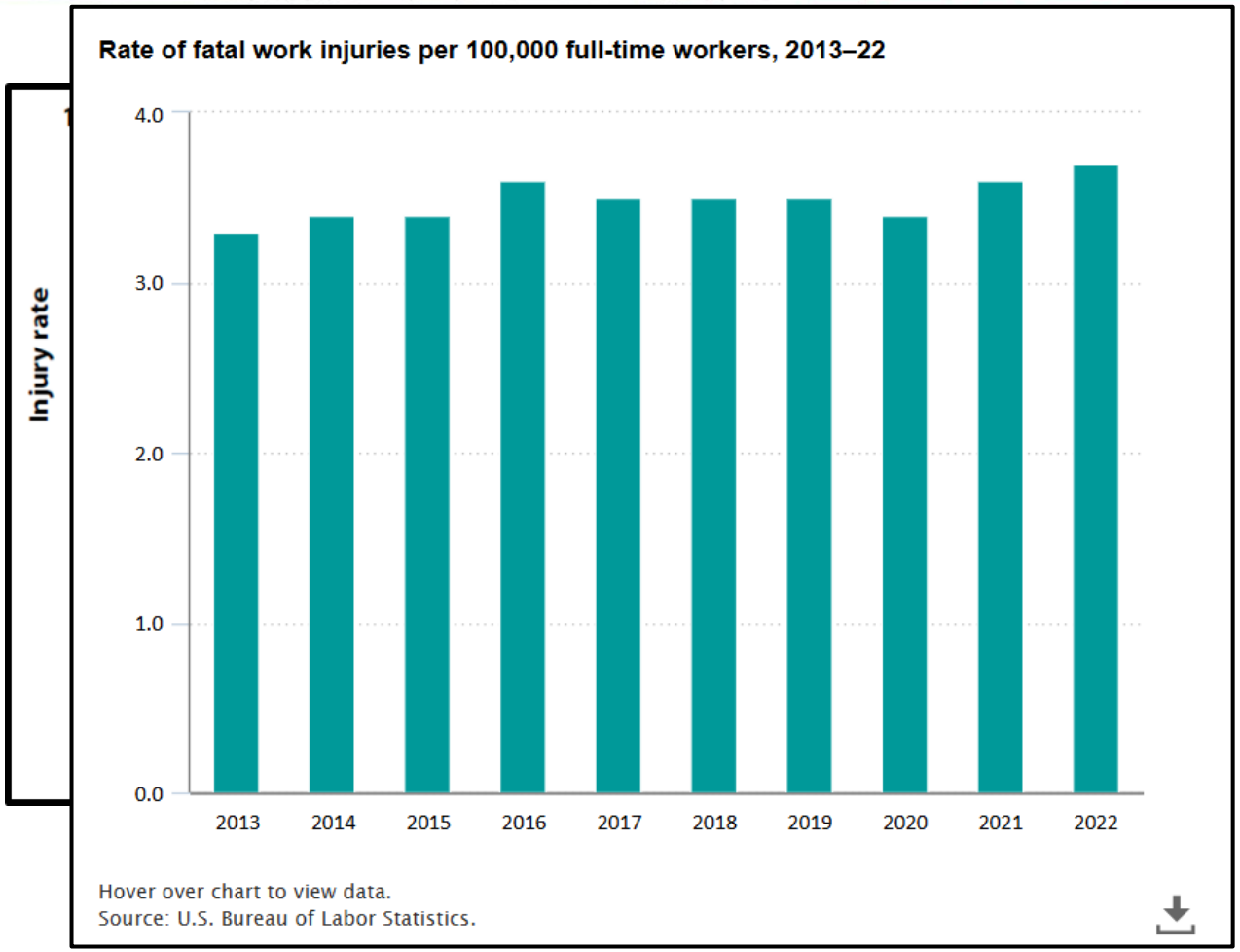
Building on Good Work

Collaboration

The Challenge

We have not seen a reduction in the high potential incident frequency, and are struggling to curb that trend."
Industry Safety Leader





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Collaboration

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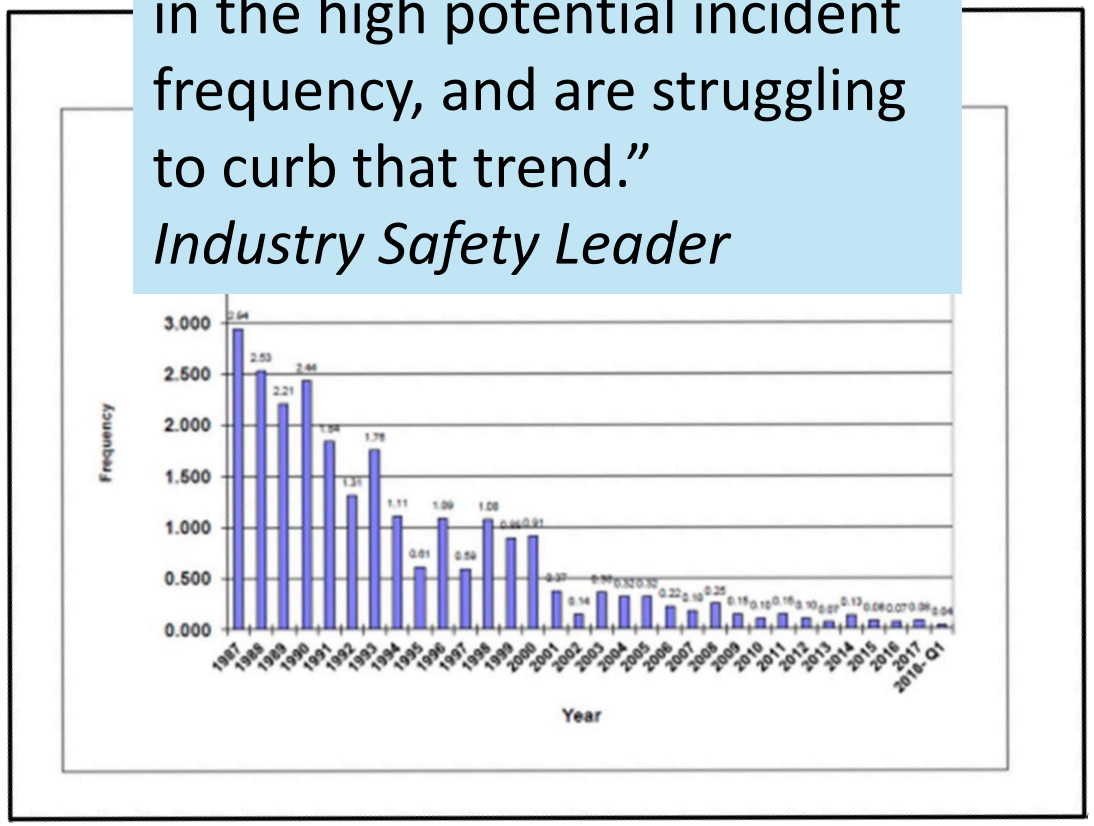
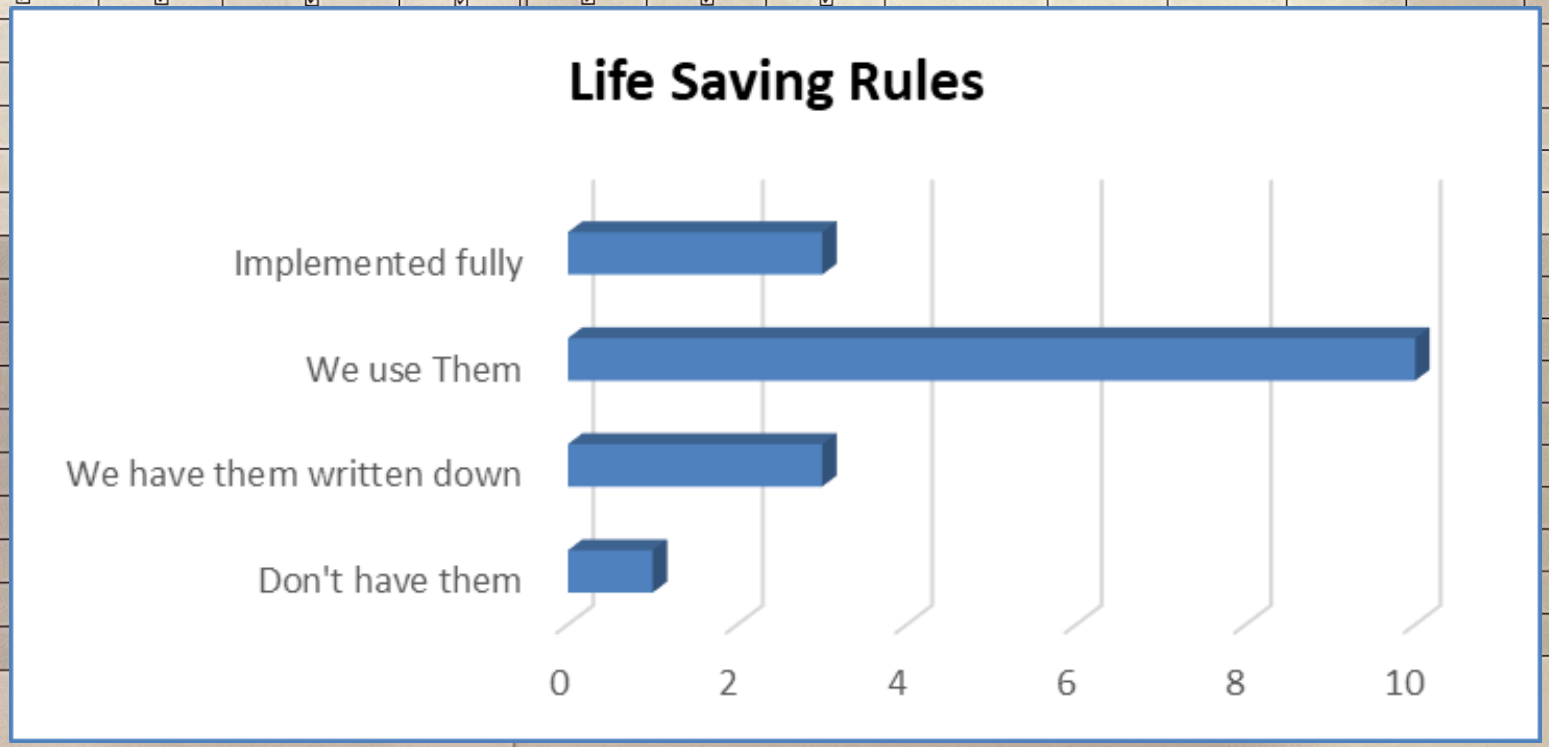


AMSA Life Saving Rule Survey and Application

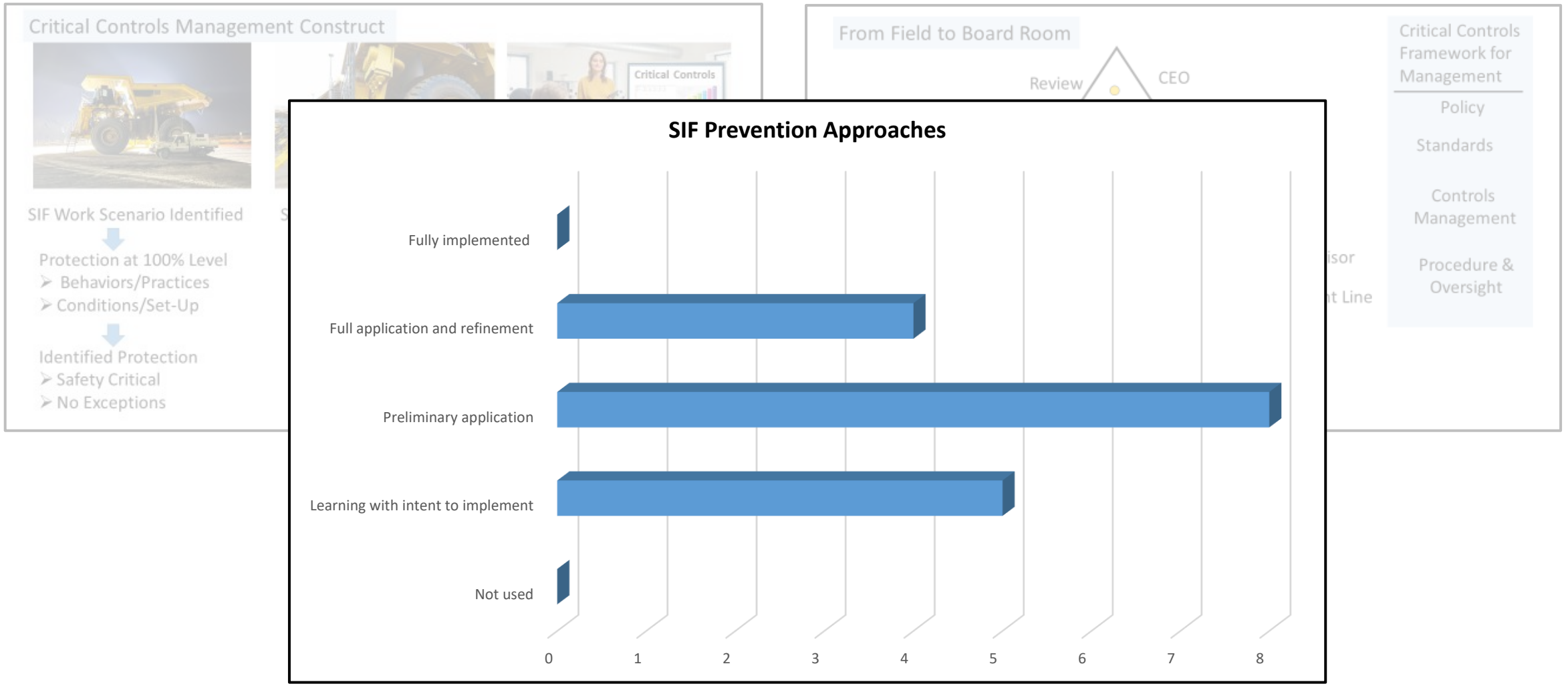
SIF 101

	Confined Space	Working at Heights	Work Authorization	Energy Isolation/Control of Work	Line of Fire	Tampering/Bypassing Safety Controls	Driving	Hot Work	Safe Mechanical Lifting	Fit for Duty/D+A	Hazard Assessment and Safe Work Planning	Equipment and Tools	Personal Conduct	Seat Belts	Breaking Containment	Critical Procedures
NACG	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑						
Suncor	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑						
Sureway	☑	☑	☑													
TransAlta		☑														
WestMet/Westmoreland		☑														
Imperial	☑	☑	☑													☑
CNRL	☑	☑	☑													
FMCOG																
Big Horn																
Finning																
Graham																
Graymont																
Hammerstone																
KMC																
Lafarge																
McKay Metis Contracting																
SMS																

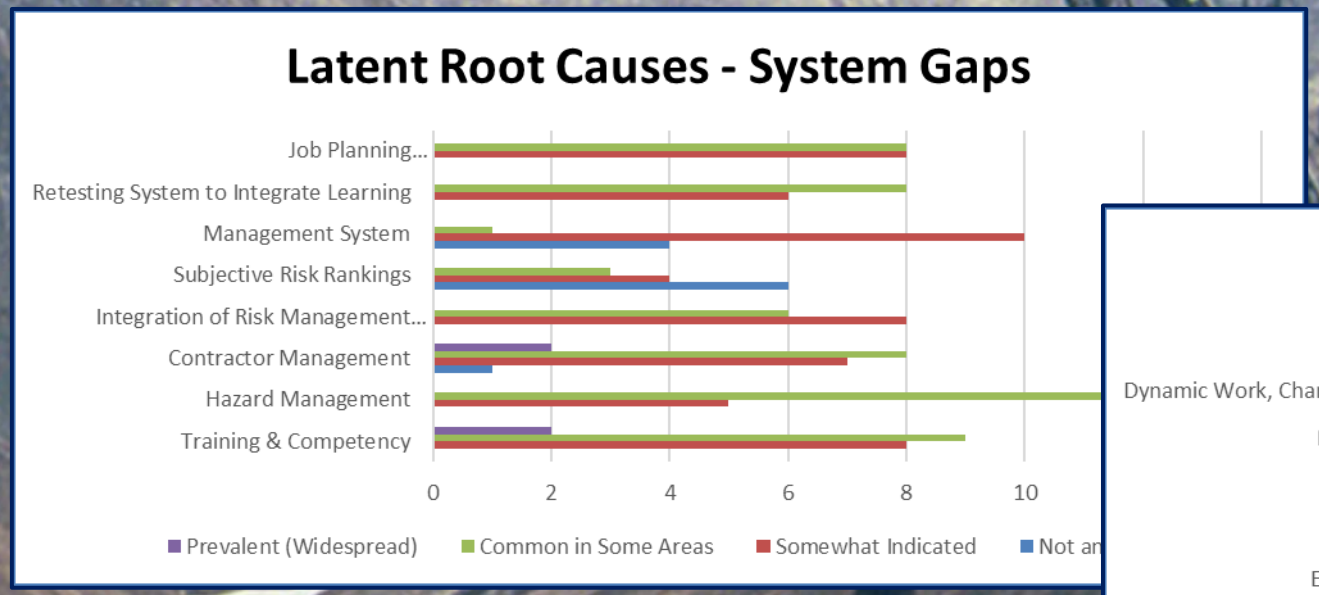


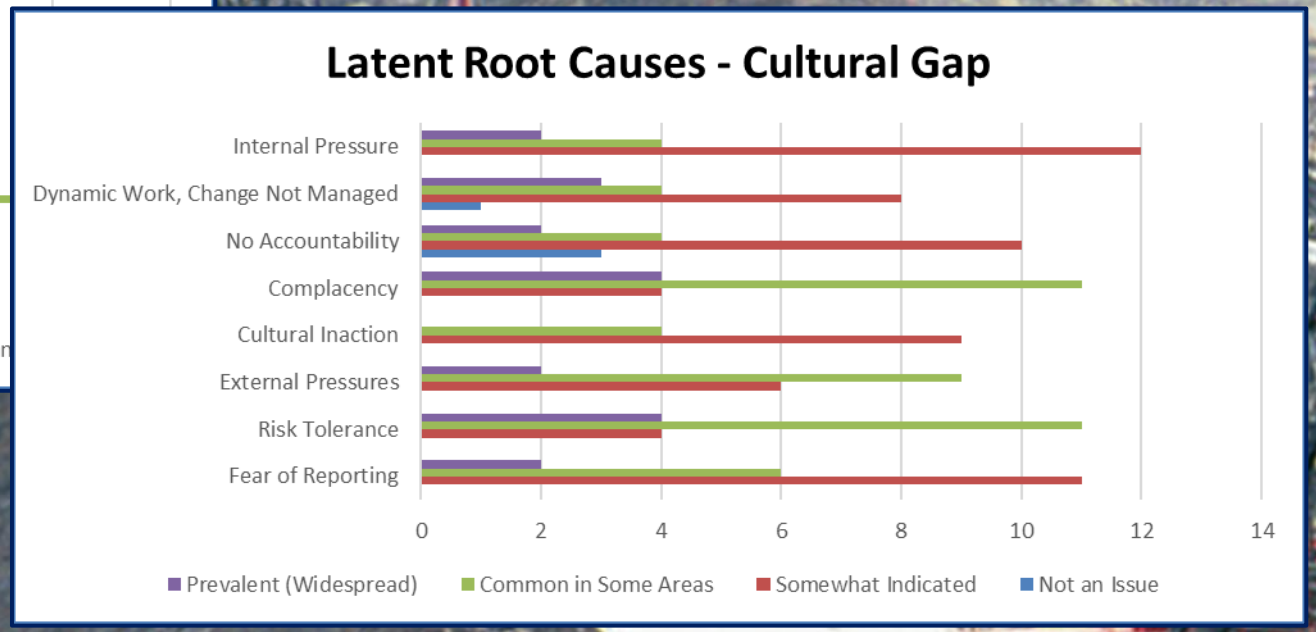
AMSA SIF Prevention Implementation

SIF STATUS



Building on Good Work……Learning from Others





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Making Serious Injury/Fatality Prevention Real….
….Taking Risk Management to the Next Level

- Exxon/Imperial Oil/Kearl Oil Sands
- Westmoreland Mining
- Suncor Energy
- Bird Construction
- Construction Safety Research Alliance/University of Colorado
- Suncor/Syncrude Aurora Operation (2006)
- SMS Equipment
- CIM Connect 2024 Conference
- Cementation Corporation
- Nutrien Saskatoon
- Finning/CAT
- University of Calgary
- CIM Health & Safety Society Inaugural Conference 2024
- CNRL Horizon
- CNRL Albian
- Syncrude
- Fort Mckay Group
- University of Alberta
- Mine Safety Round Table

AMSA
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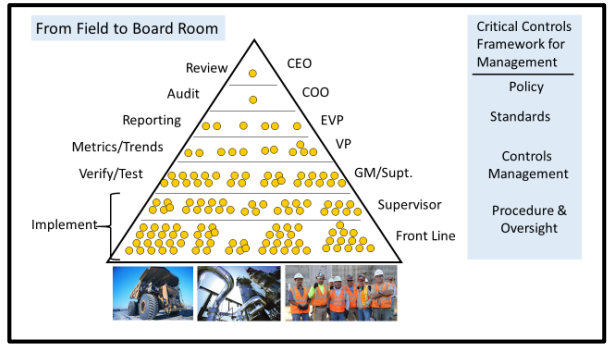
Syncrude
Operated by Suncor

Shaping the Safety Culture

Targeting Tasks with SIF Potential and Implementing Rigorous Controls, Critical Control Assurance, and Performance Reporting to Support Sustained Mitigation



Two Known Methodologies to Prevent SIF Incidents

Safety Culture Focus

Critical Task Management

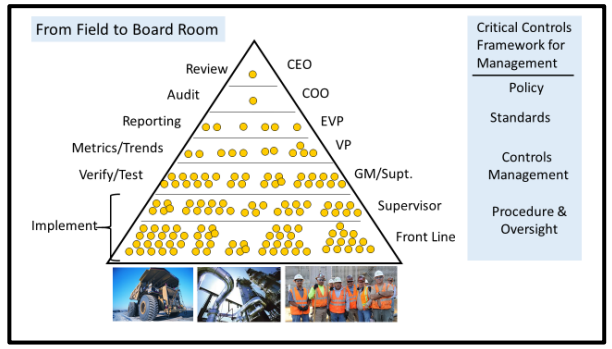
Supervisor Time in Field 69.5 %

AMSA
Alberta Mine Safety Association

Imperial

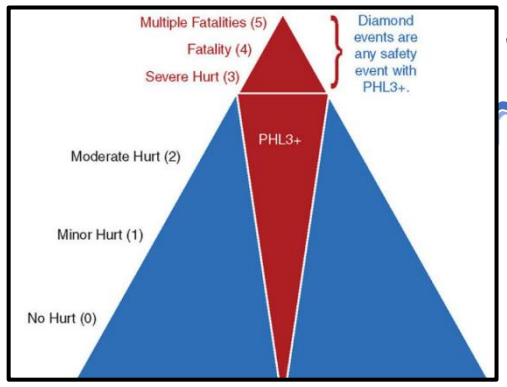
Shaping the Safety Culture

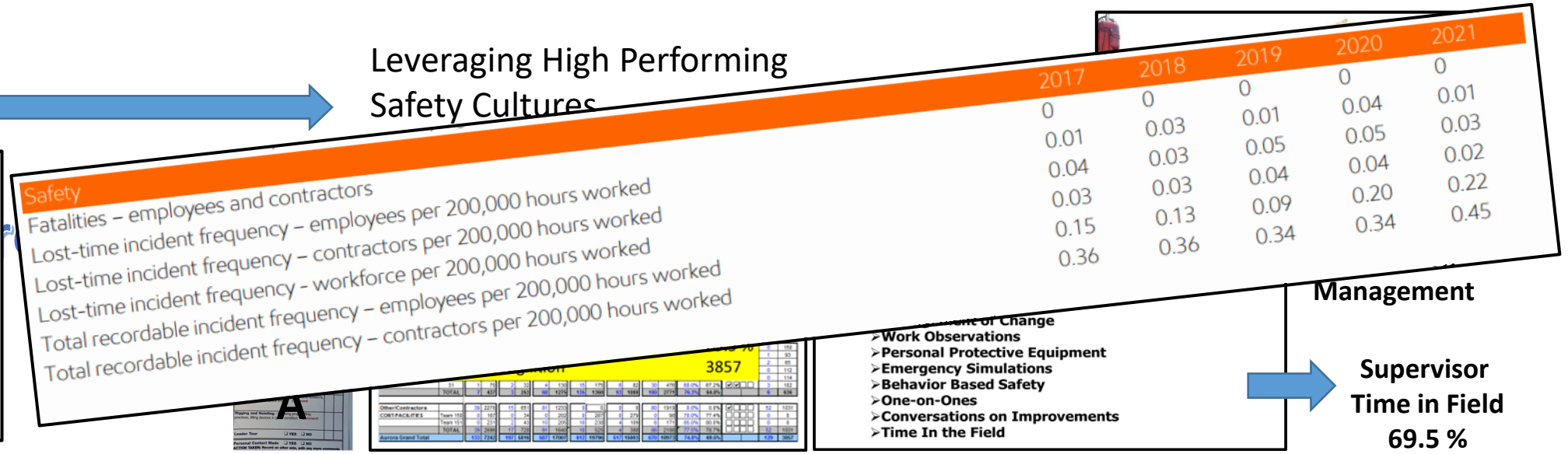
Targeting Tasks with SIF Potential and Implementing Rigorous Controls, Critical Control Assurance, and Performance Reporting to Support Sustained Mitigation



Two Known Methodologies to Prevent SIF Incidents

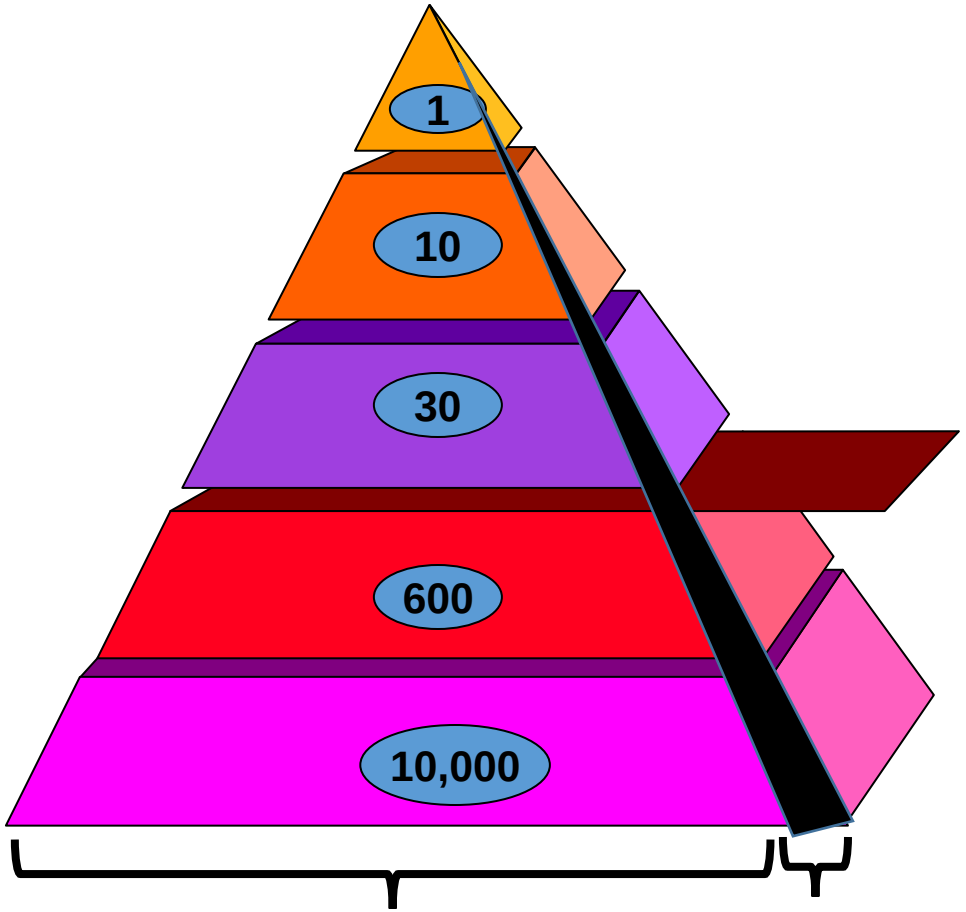
Leveraging High Performing Safety Cultures

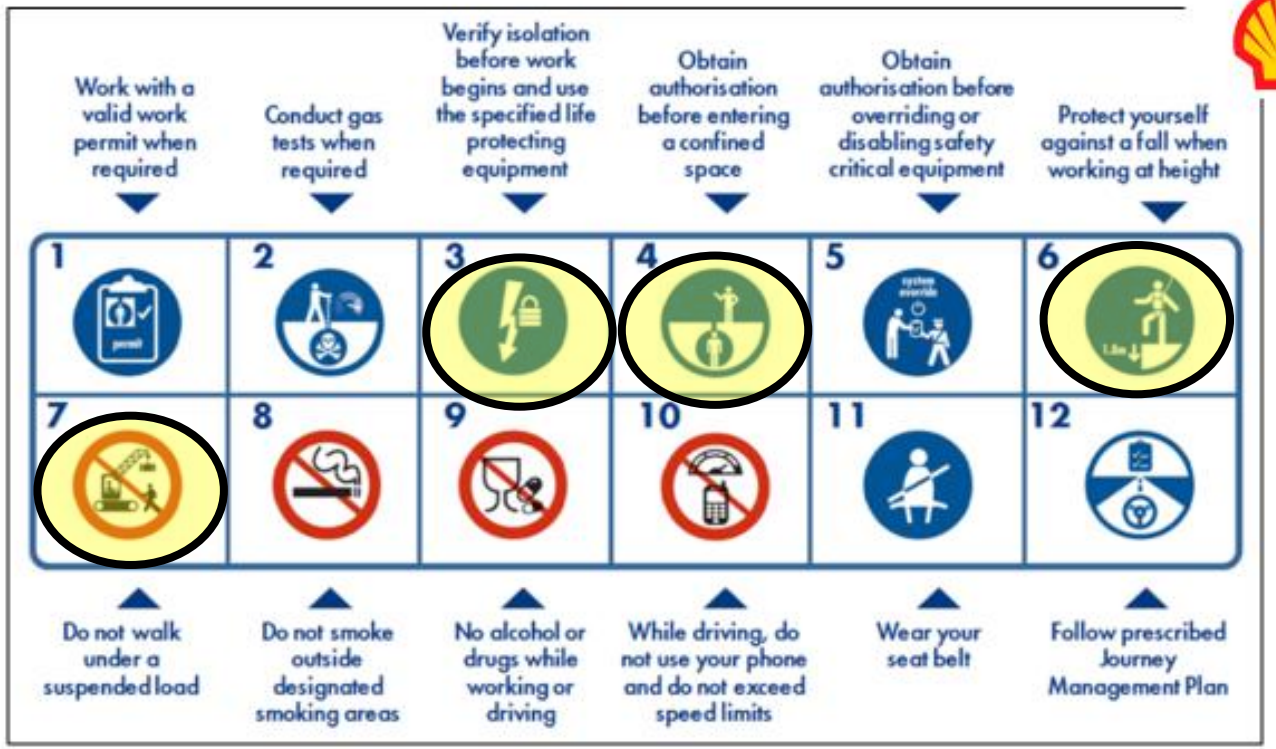




Supervisor Time in Field 69.5 %


Looking Back on Life Saving Rules





Life Saving Rules – One Misstep from Fatality:

- Lack of Fall Protection
- Walking Under Suspended Load
- No Isolation/Lockout
- Unauthorized Confined Space Entry

SIF 101

International Association of Oil & Gas Producers

Core Rules

1. Obtain authorisation before entering a confined space

2. Protect yourself against a fall when working at height

3. Do not walk under a suspended load

4. Wear your seat belt

5. While driving, do not use your phone and do not exceed speed limits

6. Follow prescribed Journey Management Plan

7. Work with a valid Work Permit when required

8. Verify isolation before work begins and use the specified life protecting equipment

Supplementary Rules

9. Prevent dropped objects

10. Position yourself in a safe zone in relation to moving and energised equipment

11. Obtain authorisation before starting excavation activities

12. Conduct gas tests when required

13. Wear a personal flotation device when required

14. Do not work under or near overhead electric power lines

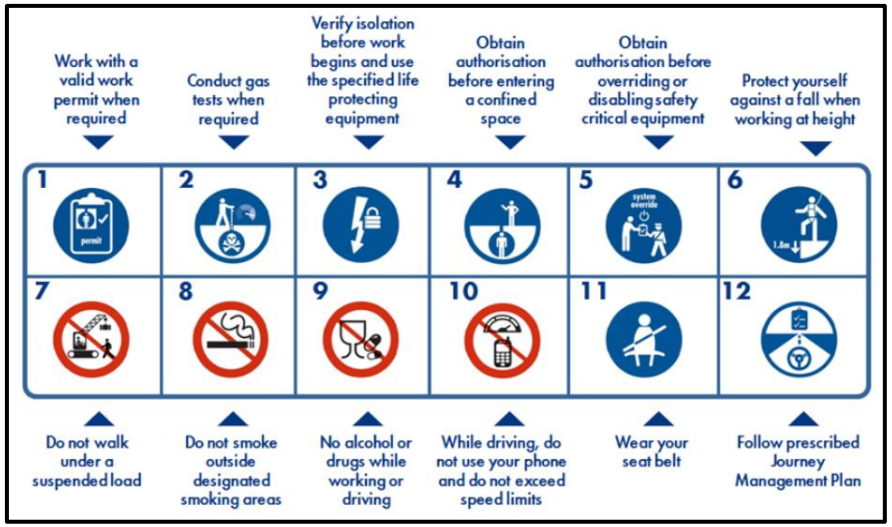
15. No alcohol or drugs while working or driving

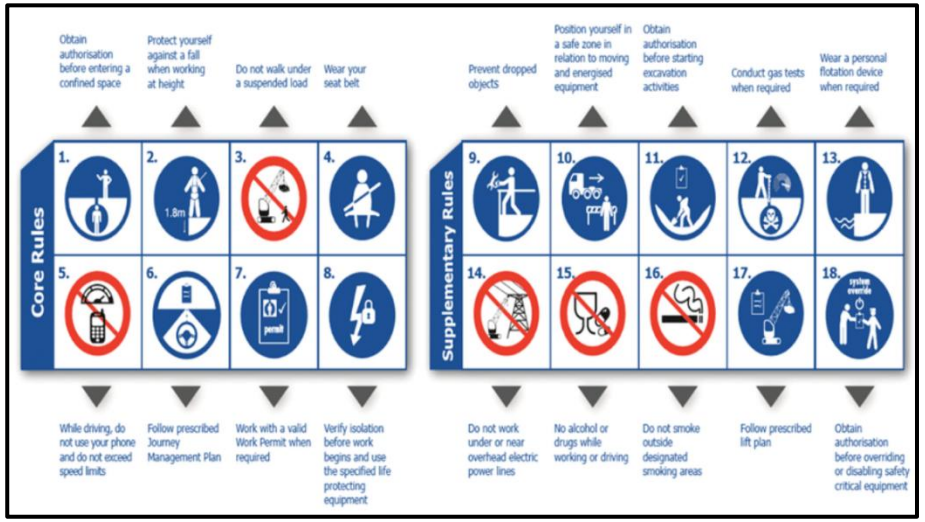
16. Do not smoke outside designated smoking areas

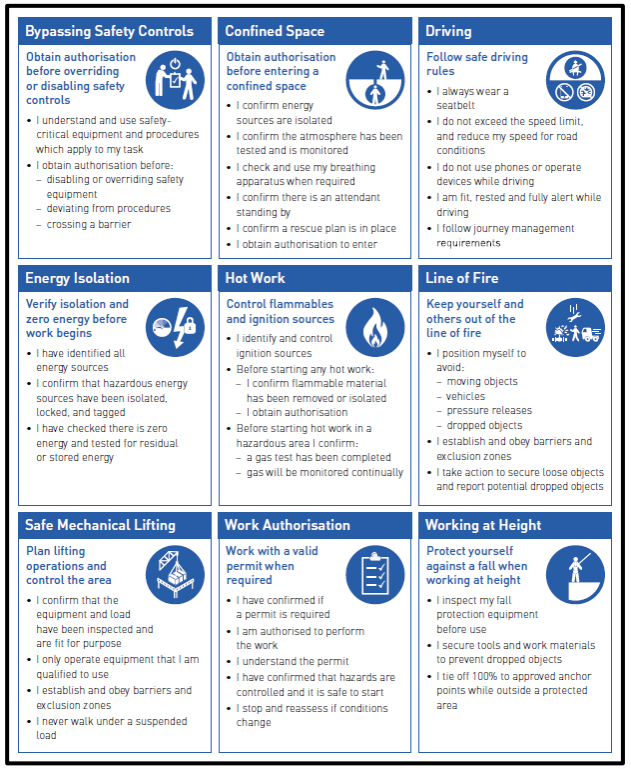
17. Follow prescribed lift plan

18. Obtain authorisation before overriding or disabling safety critical equipment

Life Saving Rules Overview







International Association of Oil & Gas Producers

International Association of Oil & Gas Producers

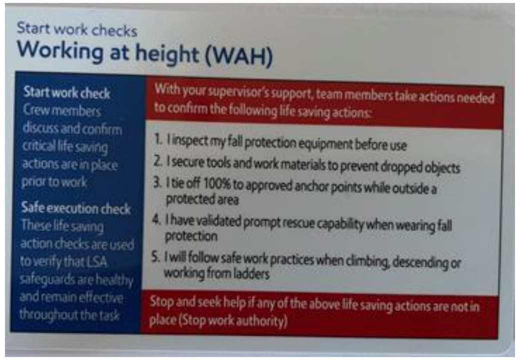
Imperial

Kearl Oil Sands

Working at Height

Protect yourself against a fall when working at height

- I inspect my fall protection equipment before use
- I secure tools and work materials to prevent dropped objects
- I tie off 100% to approved anchor points while outside a protected area


Start work checks

Working at height (WAH)

Start work check Crew members discuss and confirm critical life saving actions are in place prior to work	With your supervisor's support, team members take actions needed to confirm the following life saving actions:
	1. I inspect my fall protection equipment before use 2. I secure tools and work materials to prevent dropped objects 3. I tie off 100% to approved anchor points while outside a protected area 4. I have validated prompt rescue capability when wearing fall protection 5. I will follow safe work practices when climbing, descending or working from ladders
Safe execution check These life saving action checks are used to verify that LSA safeguards are healthy and remain effective throughout the task	Stop and seek help if any of the above life saving actions are not in place (Stop work authority)

Kearl Oil Sands

Imperial

Working at Height

I will follow safe work practices when climbing, descending or working from ladders

WHEN TO COMPLETE – Before the start of any WORKING AT HEIGHT activities

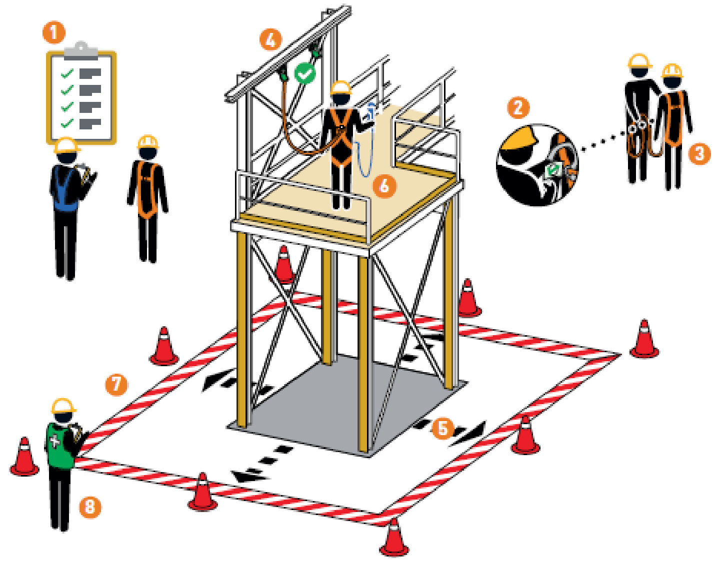
Confirm each control/ safeguard below before starting work	Guidance for confirming each control/safeguard	Person(s) Performing Work	Star Veri
I HAVE CONFIRMED:			
1 The hazards are identified, controlled, and it is safe to start	• Complete a task risk assessment specific to the scope of work • Discuss hazards with the work team prior to the start of work • Check for simultaneous operations that may introduce additional hazards		
2 My fall protection equipment is: • certified • inspected • rated • fit for the task	• Fall protection equipment includes fall arrest and/or fall restraint systems • Full body harness is load rated to support the weight of the worker • Check every strap, buckle, fitting, and/or grommet for signs of wear on fall protection harness • Fall arrest system contains a self-retracting lifeline or shock absorbing lanyard • Fall restraint contains a fixed lifeline configured to prevent the worker from reaching the edge and falling • Fall arrest is shorter than the potential fall distance Note: Stop and notify supervisor if the fall protection equipment has excessive wear/damage/		
3 The fall protection harness is adjusted to fit	• Harness straps are not twisted • Harness body straps are adjusted for close body fit (i.e., no slack) Note: Use of body belts is not allowed		
4 The approved anchor point(s) are in place for 100% tie off	• 100% tie off can occur outside of protected areas (such as an elevated work area not enclosed by hand rails) • The anchor point meets regulatory/company requirements • Pull on the connecting device to test if attachment is secure Note: Confirm anyone working at height is 100% tied off at all times (e.g., at least one hook must be anchored at all times)		
5 If a fall occurs, the fall path is clear	• Fall protection is fit for purpose to protect the worker if they fall • Fall arrest distance is shorter than fall distance to first obstruction • If the worker is likely to swing, check that the path is free of obstructions • Mobile obstructions have been removed from fall path		
6 The tools/materials being used at height are secured	• Tools used at heights have securing wire/lanyards/tethers (e.g., work at height tool register)		
7 Barriers and drop/exclusion zones are in place	• Identify drop/exclusion zones • Control access to drop/exclusion zones during work at height (e.g., attendant or physical barriers)		
8 The rescue plan is in place and is ready to be used	• The work crew has discussed the rescue plan, including: - is available - is aware of specific hazards related to this task - can execute the rescue plan		

I inspect my fall protection equipment before use

I tie off 100% to approved anchor points while outside a protected area

I secure tools and work materials to prevent dropped objects

I have validated prompt rescue capability when wearing fall protection



Mechanical Lifting

Safe Mechanical Lifting

Plan lifting operations and control the area

- I confirm that the equipment and load have been inspected and are fit for purpose
- I only operate equipment that I am qualified to use
- I establish and obey barriers and exclusion zones
- I never walk under a suspended load

Start work checks

Lifting and rigging (L&R)

Start work check Crew members discuss and confirm critical life saving actions are in place prior to work	With your supervisor's support, team members take actions needed to confirm the following life saving actions:
Safe execution check These life saving action checks are used to verify that LSA safeguards are healthy and remain effective throughout the task	1. I confirm that the equipment and load have been inspected and are fit for purpose 2. I only operate equipment that I am qualified to use 3. I establish and obey barriers and exclusion zones 4. I never walk under a suspended load 5. I understand lift plan prior to starting work and keep hands off load unless authorized 6. I establish and maintain communication with lifting and rigging personnel
	Stop and seek help if any of the above life saving actions are not in place (Stop work authority)

WHEN TO COMPLETE – Before the start of any MECHANICAL LIFTING activities

Confirm each control/ safeguard below before starting work	Guidance for confirming each control/safeguard	Person(s) Performing Work	Start-Work Verifier
I HAVE CONFIRMED:			
1 The lift has been planned	• The lift method, equipment, and number of people required has been assessed and determined • When required, an approved lift plan or procedure is in place and has been evaluated by a competent person • The lift has been assessed for: – load weight – load size – center of gravity (e.g., lifting points) • The lifting equipment's current capacity and condition has been assessed • Equipment operator and lifting crew have discussed the written lift plan prior to lifting		
2 The hazards are identified and controlled	• Complete a task risk assessment specific to the scope of work • Discuss hazards with the work team prior to the start of work Note: Consider how to apply "hands-free lifting" (e.g., use of push poles and/or taglines)		
3 Workers involved with the lift are qualified to perform their task	•		
4 The lifting equipment is stable and potential for unplanned movement has been assessed	• Lifting appliance is level and/or placed on stable ground • Mast(s) has been assessed for stability and is level for the lifting equipment • Outriggers are deployed • Loads have been assessed for stability, taking into account: – load securing – workplace conditions		
5 The lifting and rigging equipment is: • certified • inspected • rated for the lift	• The rigging equipment has been inspected prior to lift • The rigging equipment is rated for the lift Note: If load chart does not exist, assume equipment is not rated for the lift; stop work and identify alternative lifting equipment that is rated for the load		
6 A communication plan and responsibilities are agreed to by the lift crew	• Communication method(s) (e.g., hand signals, radio) have been agreed to and tested • The signaler for the lift has been identified (bank man/flagman/dogman/spotter)		
7 The load has been inspected prior to lift	• Every load has been inspected for integrity and stability (e.g., center of gravity) – The load and its packaging can withstand the forces/motion caused by the lift • Loose objects have been secured or removed prior to lift		
8 Barriers and exclusion zones are in place	•		

I understand the lift plan prior to starting work and keep hands off load unless authorized

I only operate equipment I am qualified to use

I confirm that the equipment and load have been inspected and are fit for purpose

I establish and maintain communication with lifting and rigging personnel

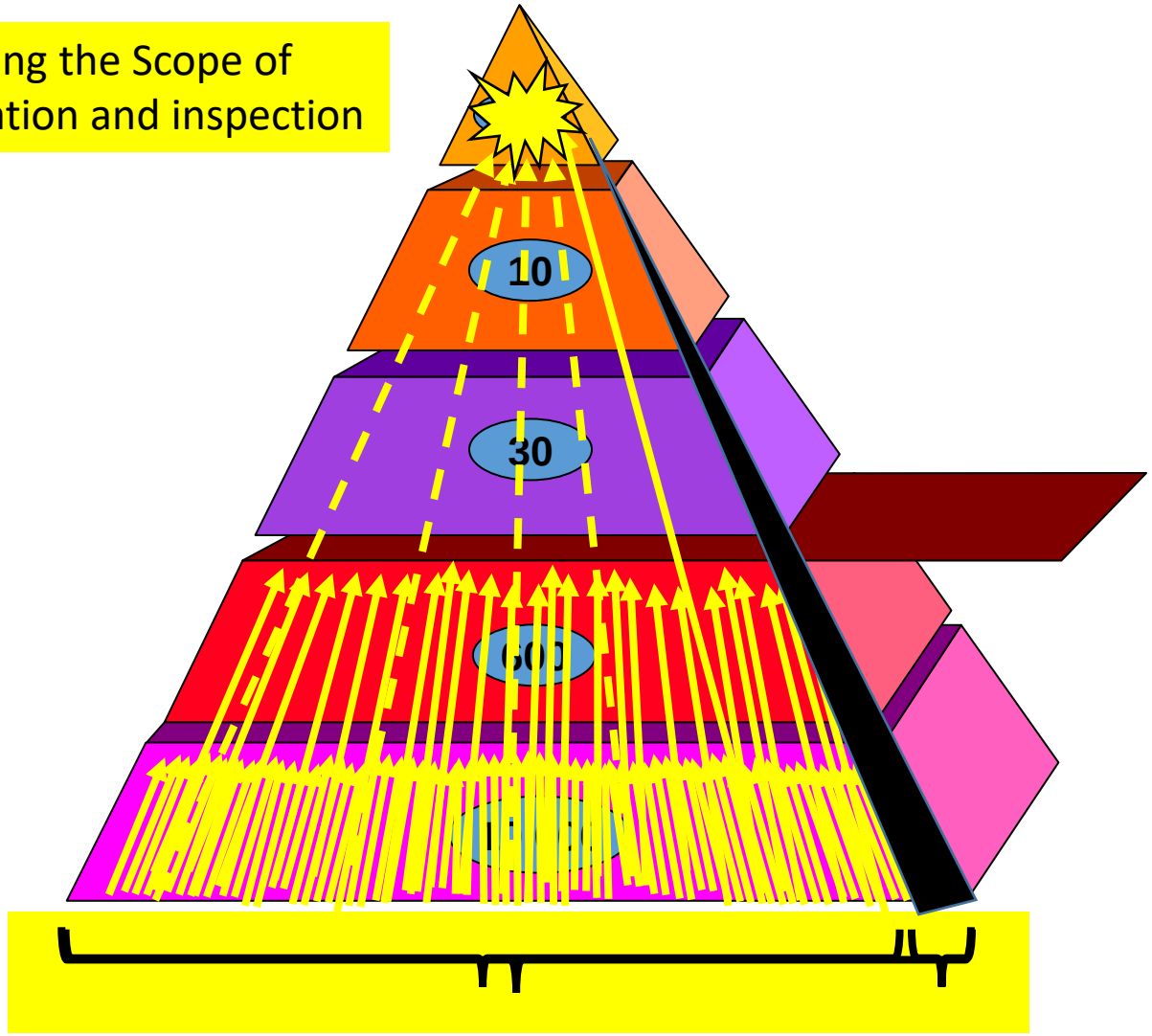
I establish and obey barriers and exclusion zones

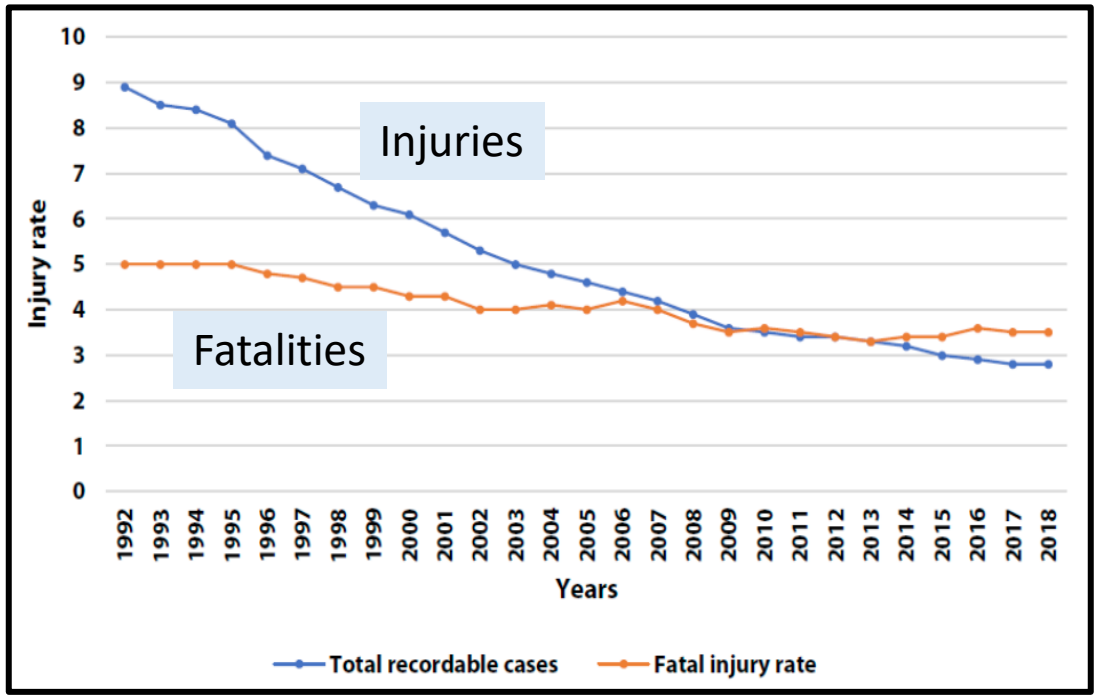
I never walk under a suspended load

Kearl Oil Sands

Imperial

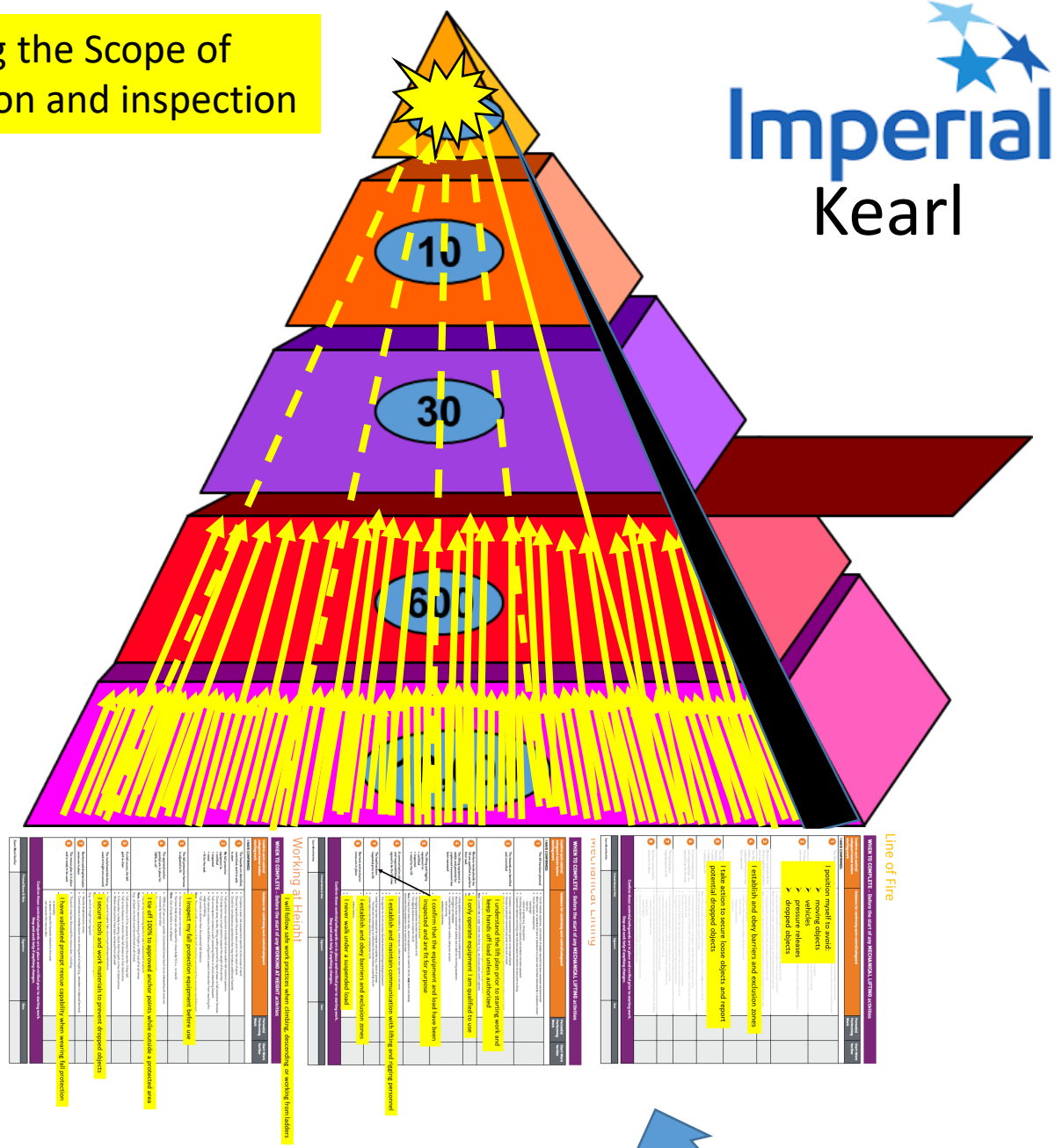
Widening the Scope of Application and inspection





Widening the Scope of Application and inspection

Imperial Kearl



Line of Fire

WHEN TO COMPLETE – Before the start of any MECHANICAL LIFTING activities

Mechanical Lifting

WHEN TO COMPLETE – Before the start of any MECHANICAL LIFTING activities

Working at Height

I will follow safe work practices when climbing, descending or working from ladders

WHEN TO COMPLETE – Before the start of any WORKING AT HEIGHT activities

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2 My fall protection equipment is: • certified • inspected • rated • fit for the task	• Fall protection equipment includes fall arrest and/or fall restraint systems • Full body harness is load rated to support the weight of the worker • Check every strap, buckle, fitting, and/or grommet for signs of wear on fall protection harness • Fall arrest system contains a self-retracting lifeline or shock absorbing lanyard • Fall restraint contains a fixed lifeline configured to prevent the worker from reaching the edge and falling • Fall arrest is shorter than the potential fall distance Note: Stop and notify supervisor if the fall protection equipment has expired or damaged		
3 The fall protection harness is adjusted to fit	• Harness straps are not twisted • Harness body straps are adjusted for close body fit (i.e., no slack) Note: Use of body belts is not allowed		
4 The approved anchor point(s) are in place for 100% tie off	• 100% tie off can occur outside of protected areas (such as an elevated work area not enclosed by hand rails) • Pull on the connecting device to test if attachment is secure Note: Confirm anyone working at height is 100% tied off at all times (e.g., at least one hook must be anchored at all times)		
5 If a fall occurs, the fall path is clear	• Fall protection is fit for purpose to protect the worker if they fall • Fall arrest distance is shorter than fall distance to first obstruction • If the worker is likely to swing, check that the path is free of obstructions • Mobile obstructions have been removed from fall path		
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8 The rescue plan is in place and is ready to be used	• The work crew has discussed the rescue plan, including: – is available – is aware of specific hazards related to this task – can execute the rescue plan		
Confirm these controls/safeguards are in place and verified prior to starting work. Stop and seek help if anything changes.			
	Printed Name & Role	Signature	Date
Start-Work Verifier			

I inspect my fall protection equipment before use

I tie off 100% to approved anchor points while outside a protected area

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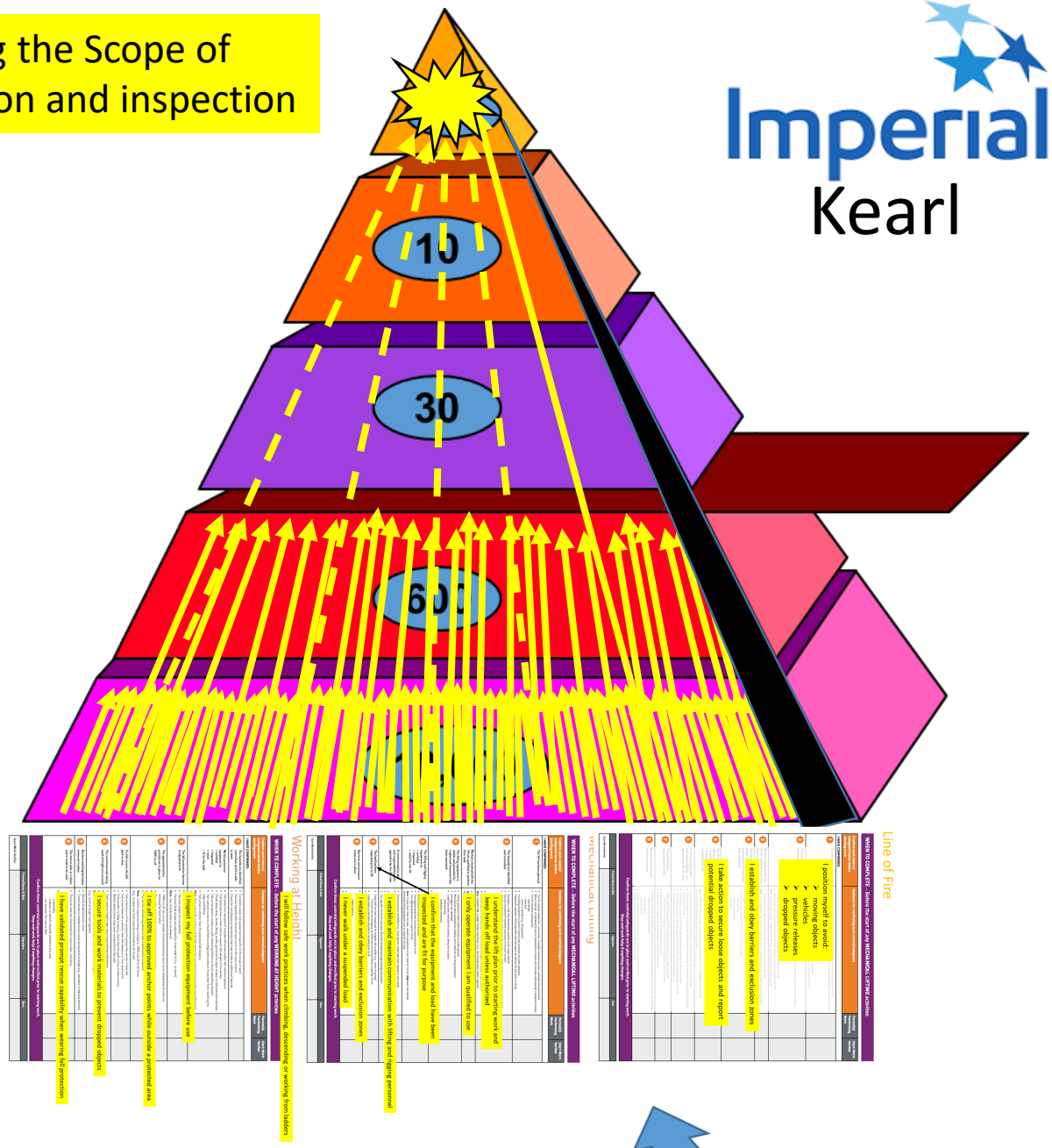
Widening the Scope of Application and inspection



Imperial Kearl

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Stop and seek help if anything changes.

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Start-Work Verifier			

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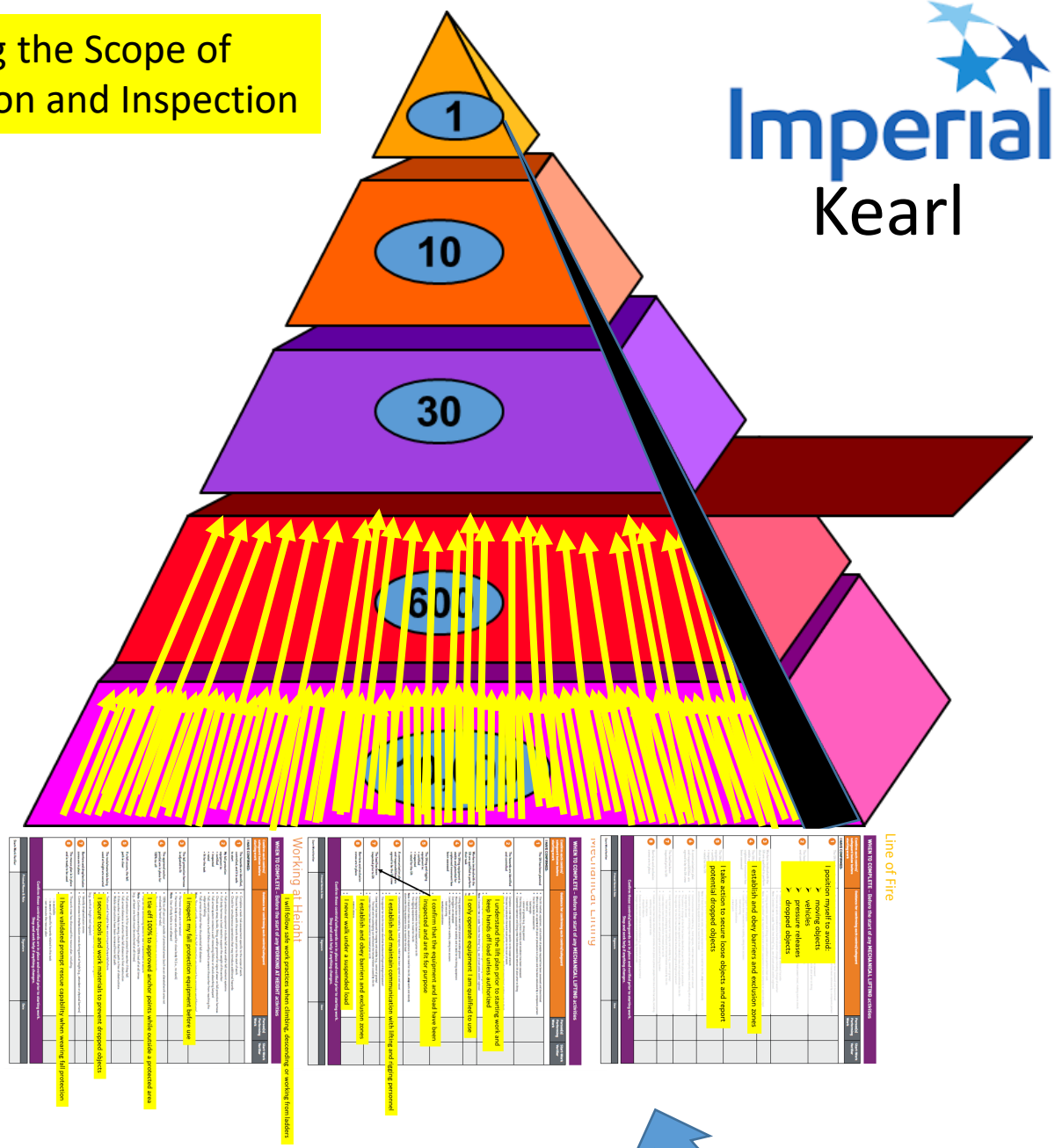


Imperial Kearl

Line of Fire

WHEN TO COMPLETE – Before the start of any MECHANICAL LIFTING activities

Mechanical Lifting

WHEN TO COMPLETE – Before the start of any MECHANICAL LIFTING activities

Working at Height

I will follow safe work practices when climbing, descending or working from ladders

WHEN TO COMPLETE – Before the start of any WORKING AT HEIGHT activities

Confirm each control/ safeguard below before starting work	Guidance for confirming each control/safeguard	Person(s) Performing Work	Start-Work Verifier
I HAVE CONFIRMED:			
1 The hazards are identified, controlled, and it is safe to start	• Complete a task risk assessment specific to the scope of work • Discuss hazards with the work team prior to the start of work • Check for simultaneous operations that may introduce additional hazards		
2 My fall protection equipment is: • certified • inspected • rated • fit for the task	• Fall protection equipment includes fall arrest and/or fall restraint systems • Full body harness is load rated to support the weight of the worker • Check every strap, buckle, fitting, and/or grommet for signs of wear on fall protection harness • Fall arrest system contains a self-retracting lifeline or shock absorbing lanyard • Fall restraint contains a fixed lifeline configured to prevent the worker from reaching the edge and falling • Fall arrest is shorter than the potential fall distance Note: Stop and notify supervisor if the fall protection equipment has expired or damaged		
3 The fall protection harness is adjusted to fit	• Harness straps are not twisted • Harness body straps are adjusted for close body fit (i.e., no slack) Note: Use of body belts is not allowed		
4 The approved anchor point(s) are in place for 100% tie off	• 100% tie off can occur outside of protected areas (such as an elevated work area not enclosed by hand rails) • Pull on the connecting device to test if attachment is secure Note: Confirm anyone working at height is 100% tied off at all times (e.g., at least one hook must be anchored at all times)		
5 If a fall occurs, the fall path is clear	• Fall protection is fit for purpose to protect the worker if they fall • Fall arrest distance is shorter than fall distance to first obstruction • If the worker is likely to swing, check that the path is free of obstructions • Mobile obstructions have been removed from fall path		
6 The tools/materials being used at height are secured	• Tools used at heights have securing wrist/lanyards/tethers (e.g., work at height tool register)		
7 Barriers and drop/exclusion zones are in place	• Identify drop/exclusion zones • Control access to drop/exclusion zones during work at height (e.g., attendant or physical barriers)		
8 The rescue plan is in place and is ready to be used	• The work crew has discussed the rescue plan, including: – is available – is aware of specific hazards related to this task – can execute the rescue plan		

Confirm these controls/safeguards are in place and verified prior to starting work.
Stop and seek help if anything changes.

	Printed Name & Role	Signature	Date
Start-Work Verifier			

I inspect my fall protection equipment before use

I tie off 100% to approved anchor points while outside a protected area

I secure tools and work materials to prevent dropped objects

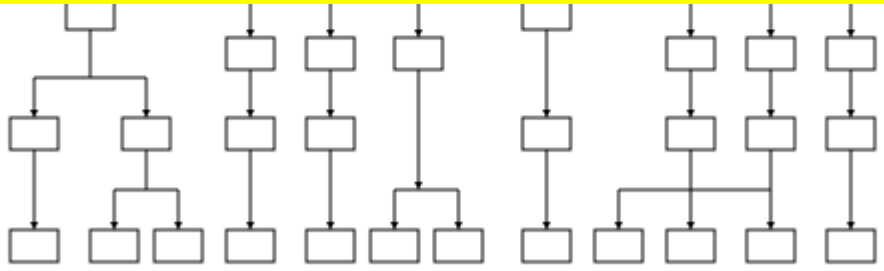
I have validated prompt rescue capability when wearing fall protection

A New Paradigm – Life Saving Rules
Start Work Checks Identify SIF Exposures and Support Control Verification

And when the control isn't in place……Context Dependent

International Association of Oil & Gas

Moving From Life Saving Rules to Life Saving Choices



Unclear Procedures — 23%

Capability & Resources — 30%

Labelling, Alarms or Tool Issues — 30%

Other — 12%

A New Paradigm – Life Saving Rules
Start Work Checks Identify SIF Exposures and Support Control Verification

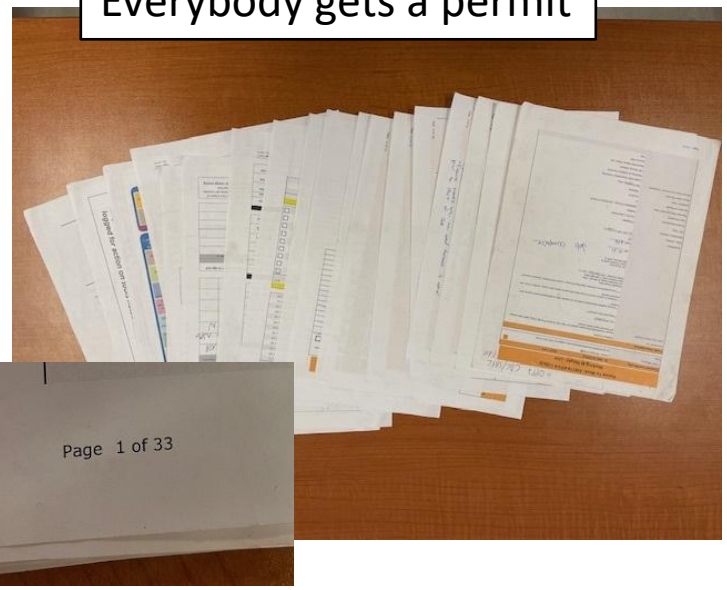
Variance is a source of learning to identify causal roots and provide a source of trending to drive strategy

How It was Done

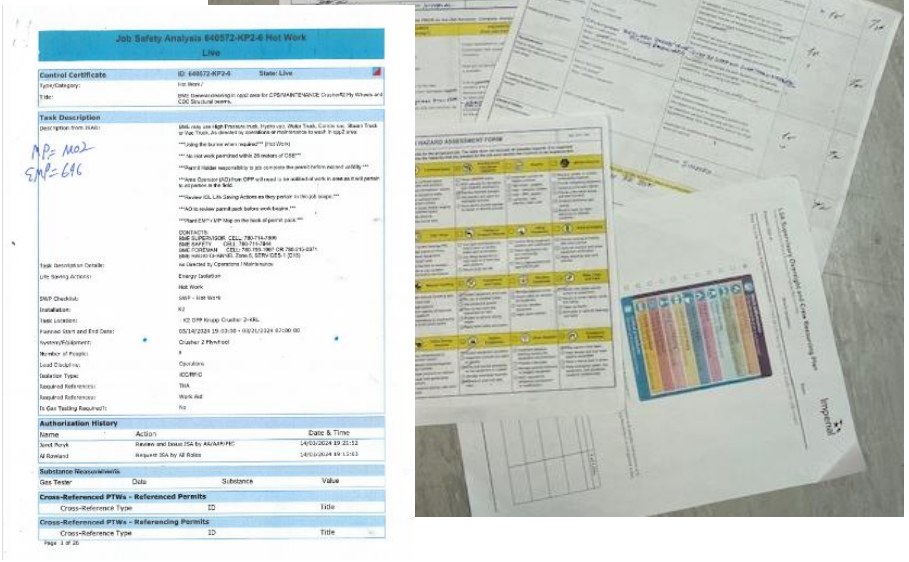
Safety in the Morning
Generic Safety Share
Talk of safety –what did people see – quota
Work permit for all
Authorization
Trigger plans (fall protection, etc.)
Develop JSA – stored
Supervisor sign-off on JSA
Includes reviewing life saving rule list
Above 2 often done in the shack – paper intensive
In field – stop and think before work cards and questions

In good teams cycle in on critical focus areas
Then field confirmation

Everybody gets a permit



Encyclopedic JSA



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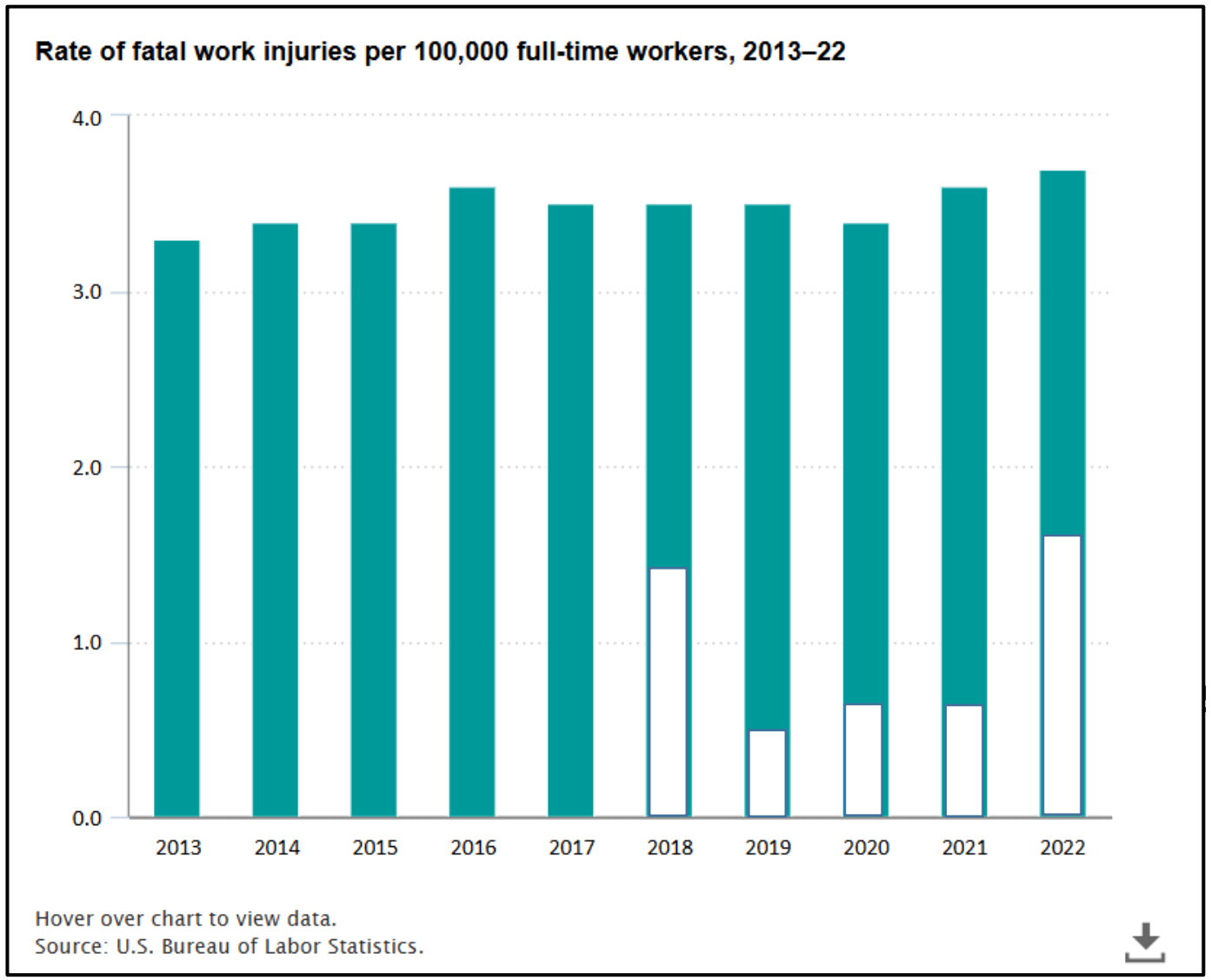

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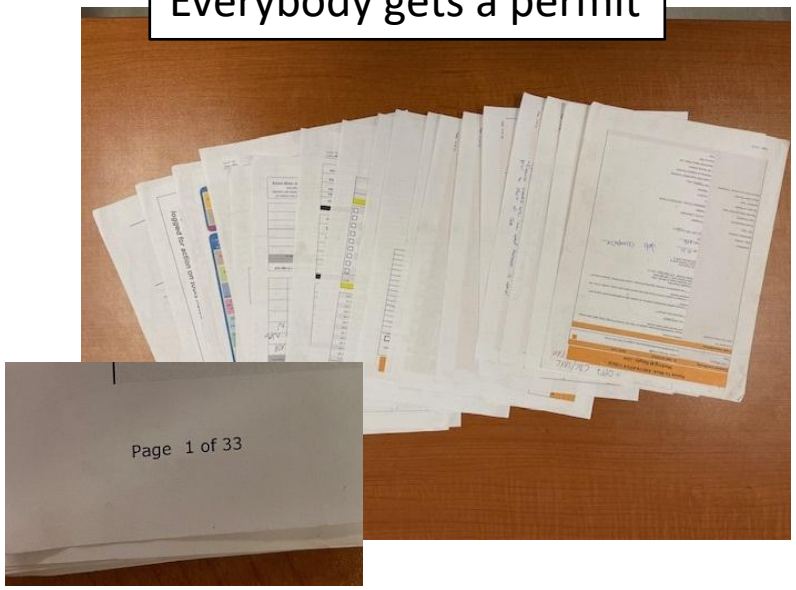
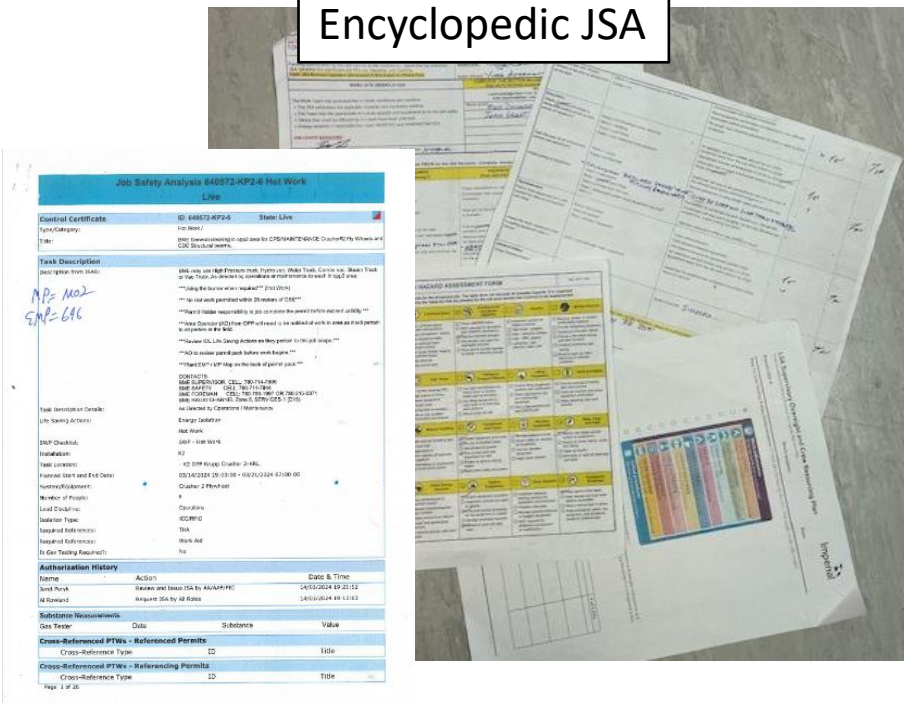


Encyclopedic JSA



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FACULTY OF ENGINEERING
UNIVERSITY OF ALBERTA

Imperial

PSMS Personnel Safety Management System

Exxon Personal Safety Management System

- Life-saving rules and actions with Start Work Checks
- Human Performance
- Culture of Health
- Training

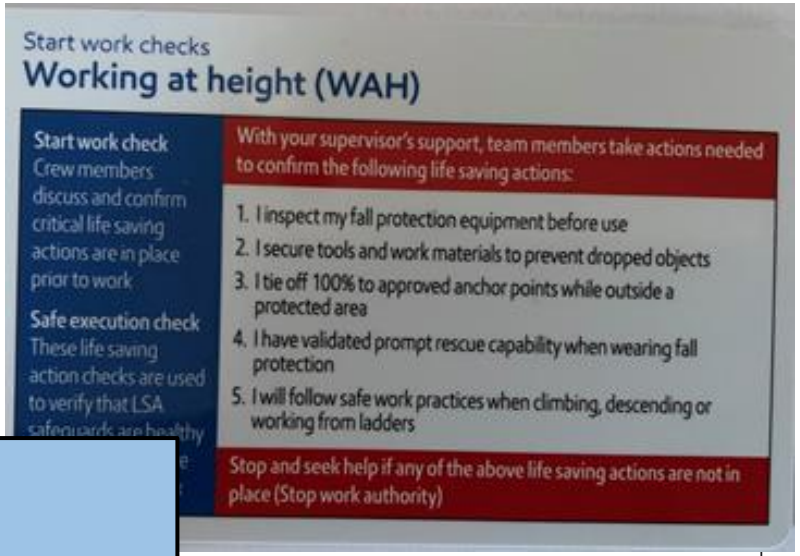
Life after with PSMS

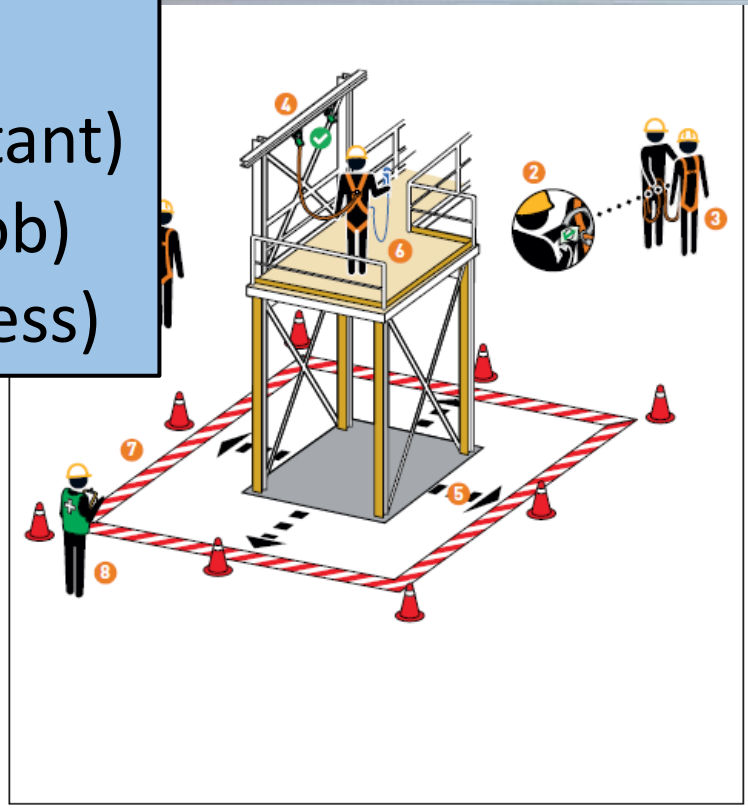
Safety in the Morning
Generic Safety Share
Talk of safety –what did people see – quota
Work permi
Authorizatic
Trigger plan
Develop JSA
Supervisor s
Includes rev
Above 2 often done in the shack – paper intensive
In field – stop and think before work cards and questions

All In good teams cycle in on critical focus areas
Then field confirmation on controls

Making Systems Real……

- Relevant (Part of the Job at Hand)
- Targeted (Primary Focus on the Important)
- Action (Controls in Place or Stop the Job)
- User Oriented (Set People Up for Success)





The Design View

Environment, Health and Safety Management System (SMS)

- Program Management and
- ncy;
- enance;
- ess;
- nt;
- ement;
- Program Promotion

Making Cultures Real…..

- Values Based (Safety a Moral Imperative)
- Care (People Matter)
  - HOP (Human and Organization Performance)
  - Psychological Safety
- People as Solutions (Capacity to Contribute)

A Robust Safety Culture

=

A Culture with the Receptor Capacity to Sustainably Use the SMS to Achieve Intended Levels of Risk Reduction

The Design View

Environment, Health and Safety Management System (SMS)

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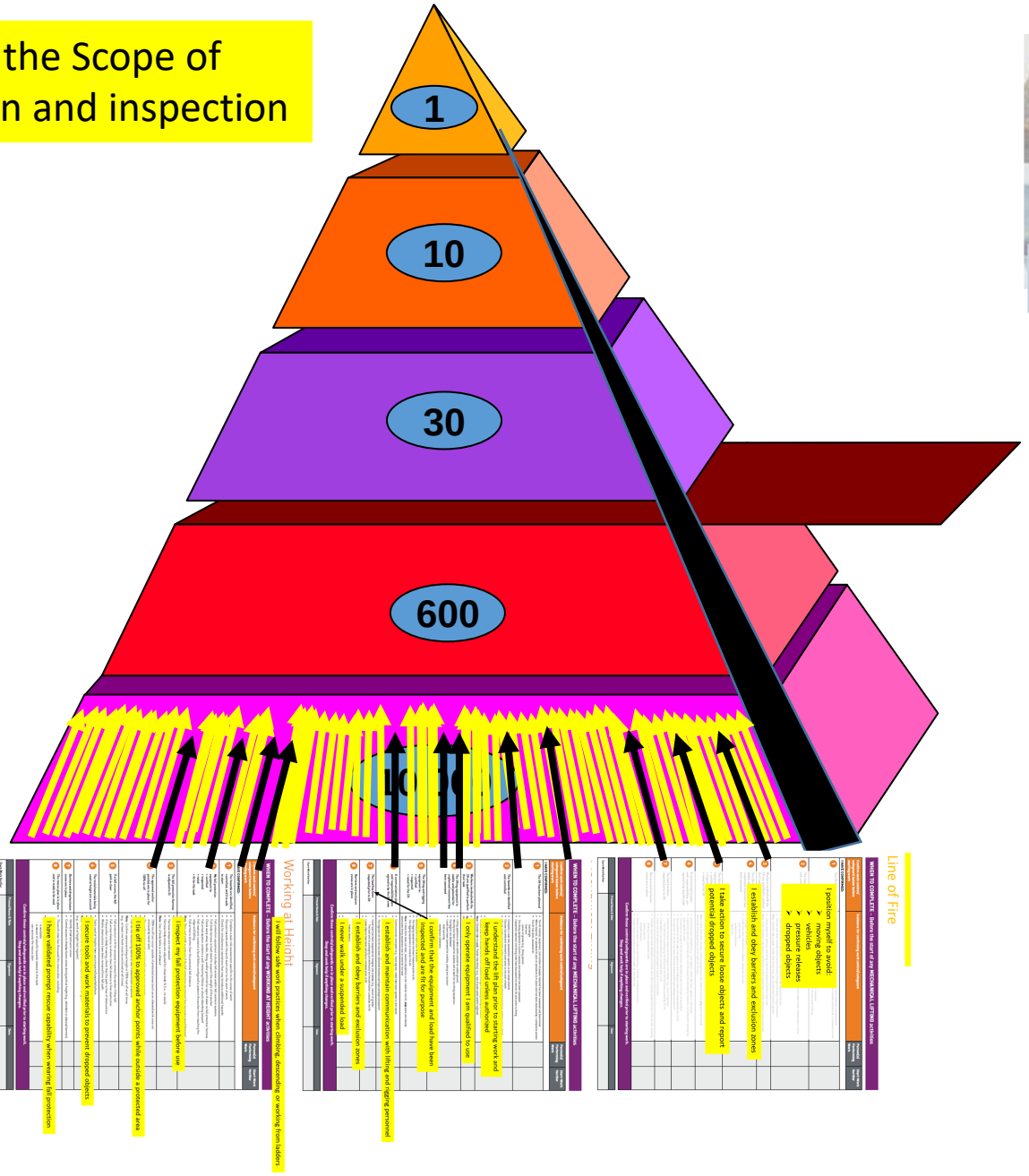
Widening the Scope of Application and inspection



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CIM ICM

CIM Health & Safety Society

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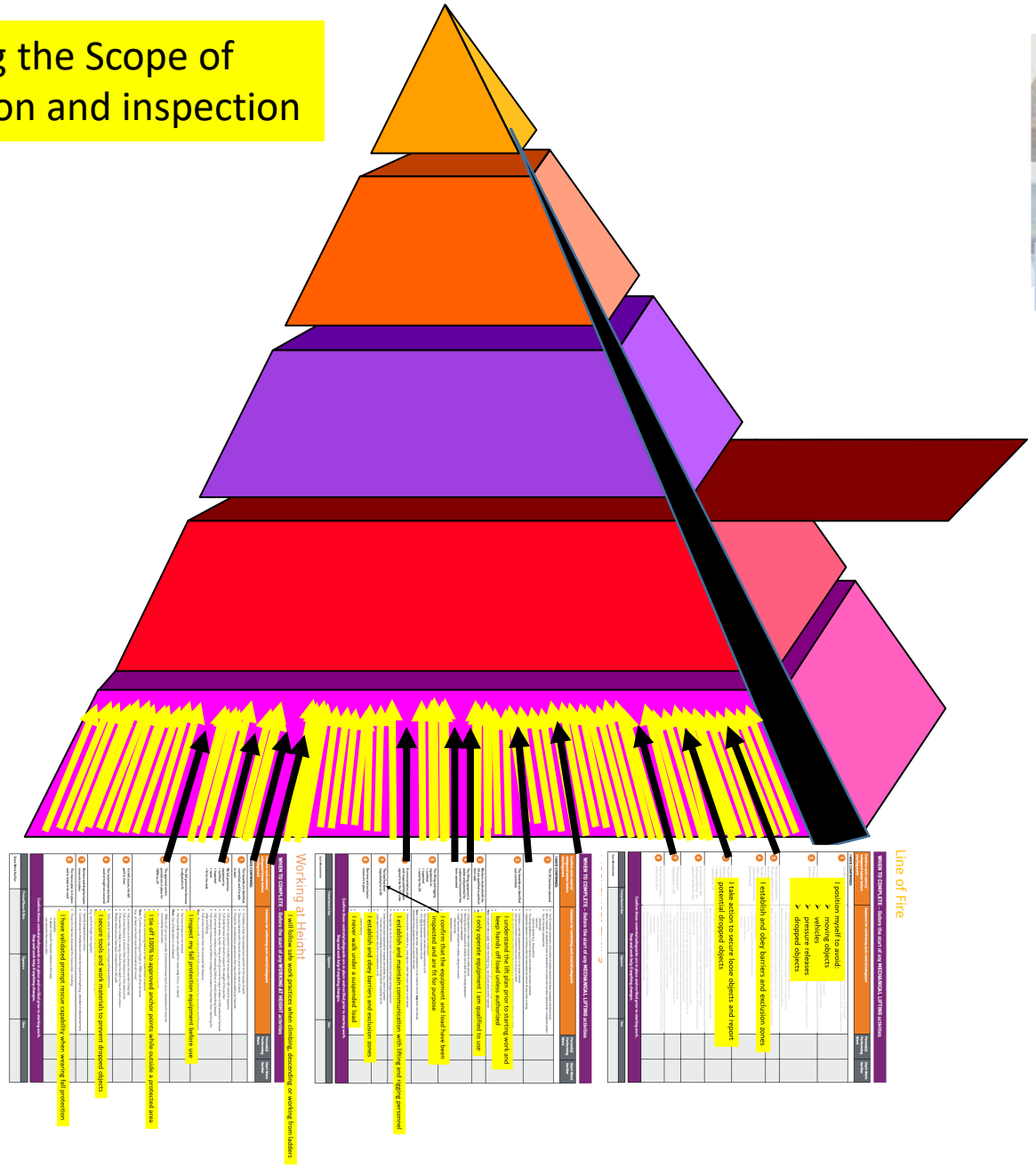
Widening the Scope of Application and inspection



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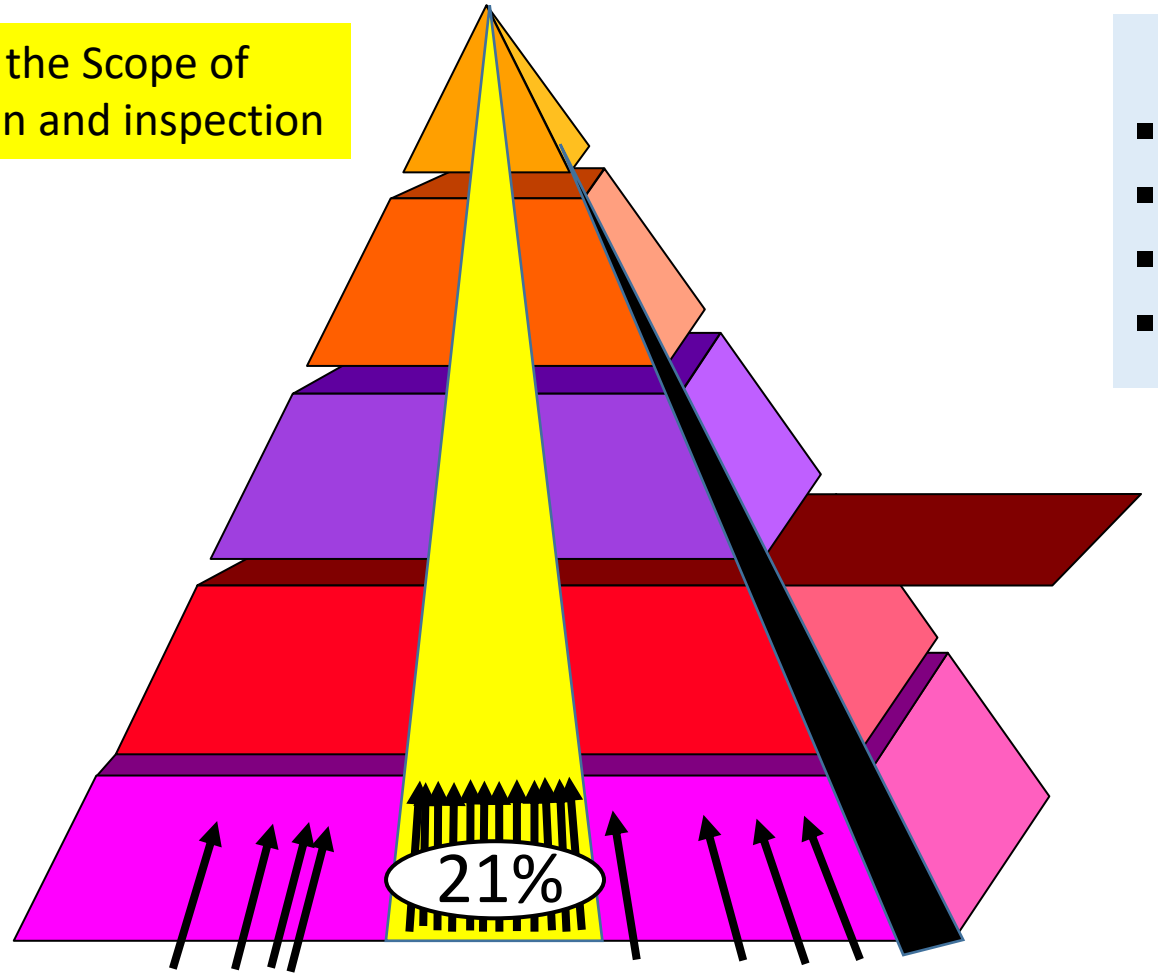
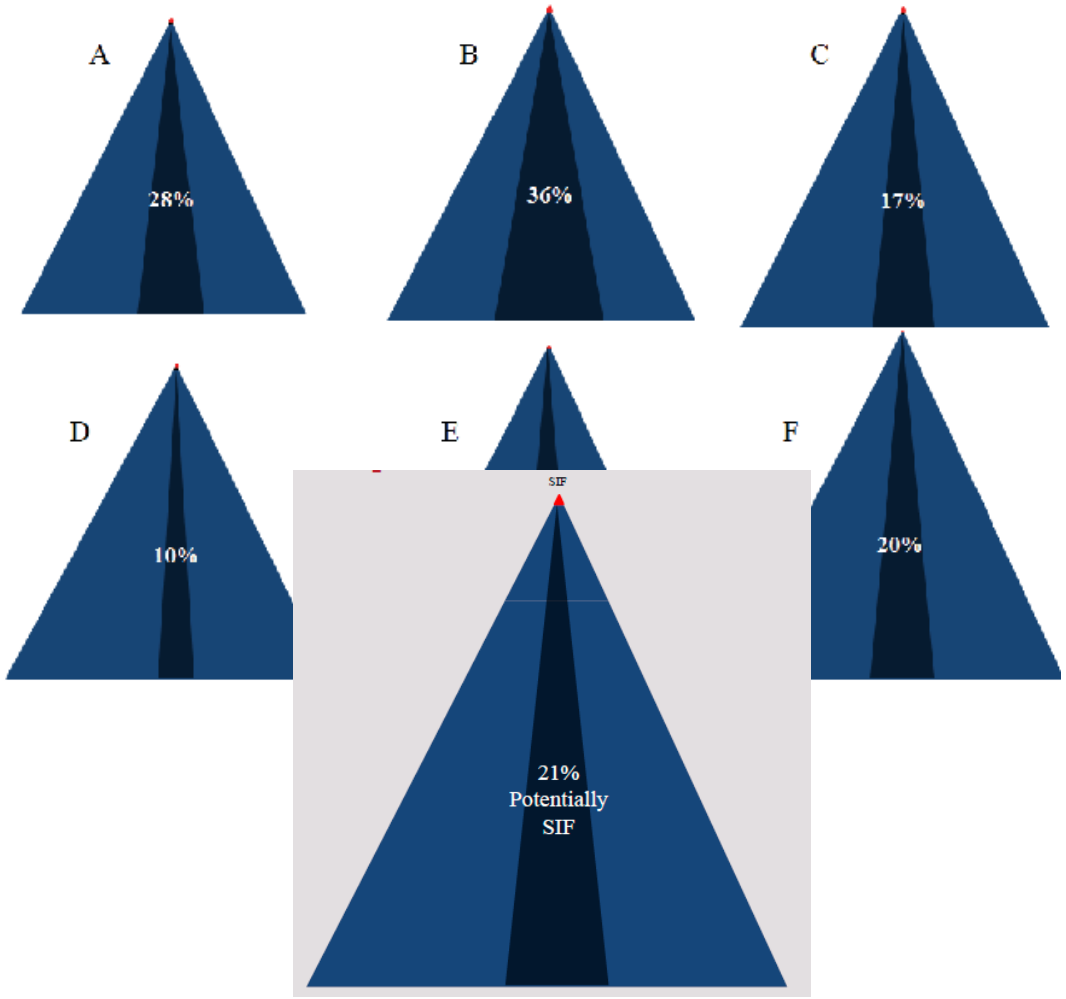


Multinational Organization Study

- Ore Mining
- Crude Petroleum
- Natural Gas Extraction
- Industrial Gas Mfg.
- Organic Chemical Mfg.
- Marine Cargo Shipping
- Grain Farming



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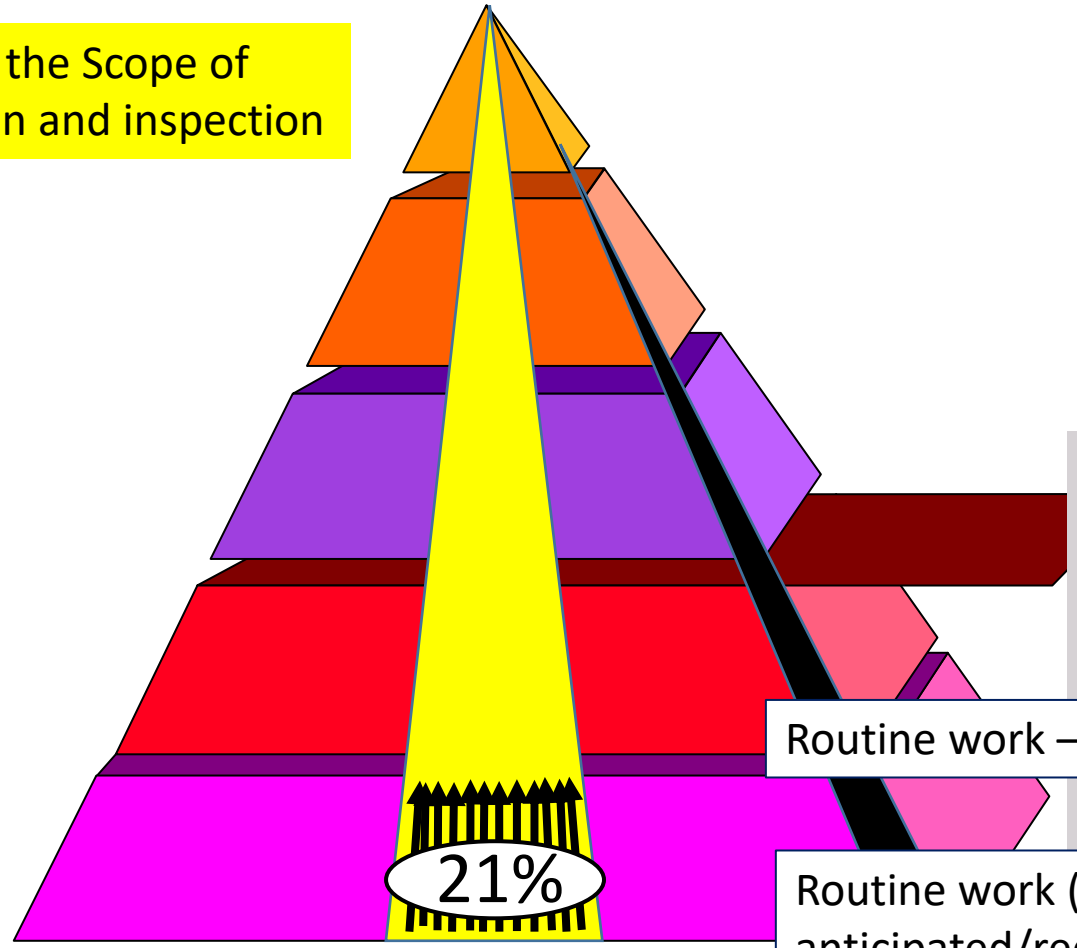

Multinational Organization Study

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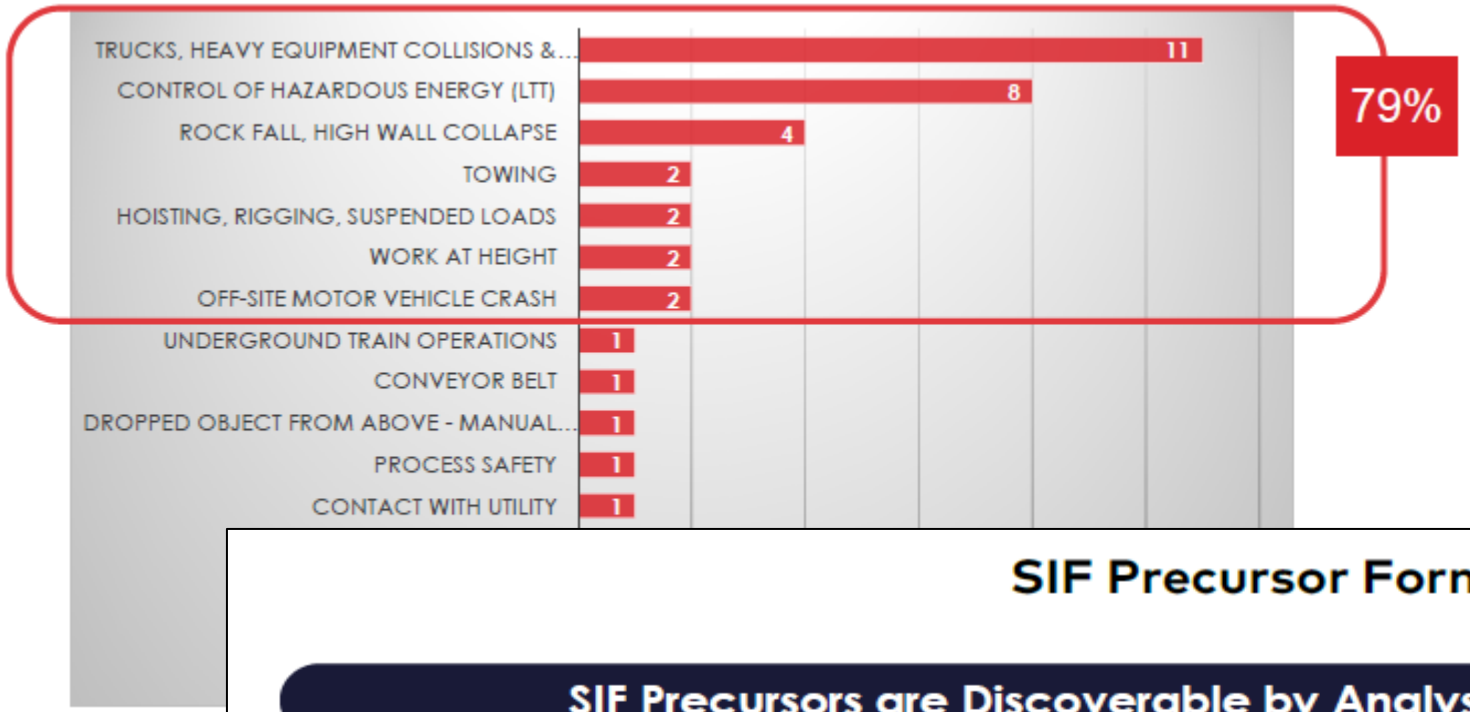
Injury Cause Themes

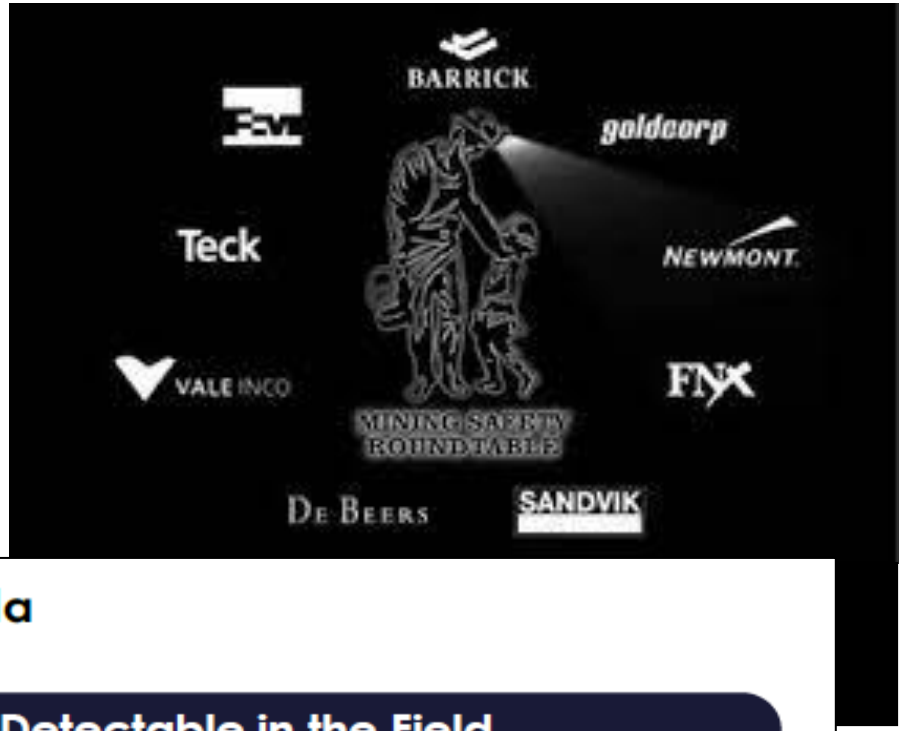
Theme	SIF or SIF potential incident (n = 55)	Non-SIF potential incident (n = 35)
Performing a routine operation/production or a established life safety rule program/process	42%	0%
Performing a routine operation/production or a prevented by an effective pre-task risk assessment (PTRA) process	29%	17%
maintenance/repair task	11%	74%

Routine work – breakdown in life saving choices program

Routine work (nonLSC) – change from normal not anticipated/recognized/controlled – PTRA likely prevent

Routine work (nonLSC & where PTRA not normally used) - other human factors





SIF Precursor Formula

SIF Precursors are Discoverable by Analysis, Detectable in the Field

SIF Risk Situations + **SIF Critical Controls & Protection Systems** + **Persistence in the Work Environment**

SIF Risk Profile

- Pareto Analysis
- 81% Routine Work

Breakdowns

- Non-conformance
- Ineffective Design
- Not in Place

Culture & Leadership

- Don't See
- See but Don't Recognize
- Recognize but Don't Act
- Organizational Issues Beyond Control of On-The-Ground Persons

Critical Controls Management Construct

SIF Work Scenario Identified

Protection at 100% Level
- Behaviors/Practices
- Conditions/Set-Up

Identified Protection
- Safety Critical
- No Exceptions

SIF Work Verifications

- Test for Implementation and Understanding
- Work Stopped Until Protection in Place

Report on Compliance and Effectiveness

SIF Work Reviews

Senior Management and Executive

Bias/Urgency for Action
- Otherwise We Choose to Operate with High Risks in Evidence

Cementation
WE BUILD MINES. SAFELY.

Critical Risk: Entanglement and Crushing

Critical Control Checklist (CCC)

Date: ___ / ___ / _____ **Shift:** Day / Night **Duration:**

Work Team: **Operation:** **Task:**

Blocking for Maintenance Work	Yes	No	NA
How you followed the procedure on how to perform effective mechanical blocking?	☐	☐	☐
Are the mechanical blocks certified and safe for use?	☐	☐	☐
Have you checked that the number and type of mechanical blocks to be installed match the requirements of the procedure?	☐	☐	☐

Equipment Isolation and Lockout	Yes	No	NA
Has an approved Isolation Matrix/Procedure been executed?	☐	☐	☐
Have all energy sources associated with the Equipment been isolated, de-energized and locked/tagged out as required by the Isolation Matrix/Procedure?	☐	☐	☐
Has the 'Try Step' for isolation of process flows been conducted as required by the Isolation Matrix/Procdure?	☐	☐	☐
Do the number of locks described in the plan match the locks used in the field isolation process?	☐	☐	☐
Has the isolation been field verified by doing a 'walk down' of involved personnel?	☐	☐	☐

Guards, Barriers and Barricades	Yes	No	NA
Are guards, barriers and/or barricades installed on the moving parts of fixed equipment?	☐	☐	☐
Are guards, barriers and/or barricades secure and robust enough to provide adequate protection in the event of an incident?	☐	☐	☐
Have you tested all deadman switches, emergency stops and pull cords to ensure they are functional prior to work commencing?	☐	☐	☐

Verification of Zero Energy	Yes	No	NA
Have you checked the matrix to ensure that a zero energy verification been done for all types of energy identified in the risk assessment including bleeder valves, drain points, vent ports, pushbutton starters and ignition key slots?	☐	☐	☐

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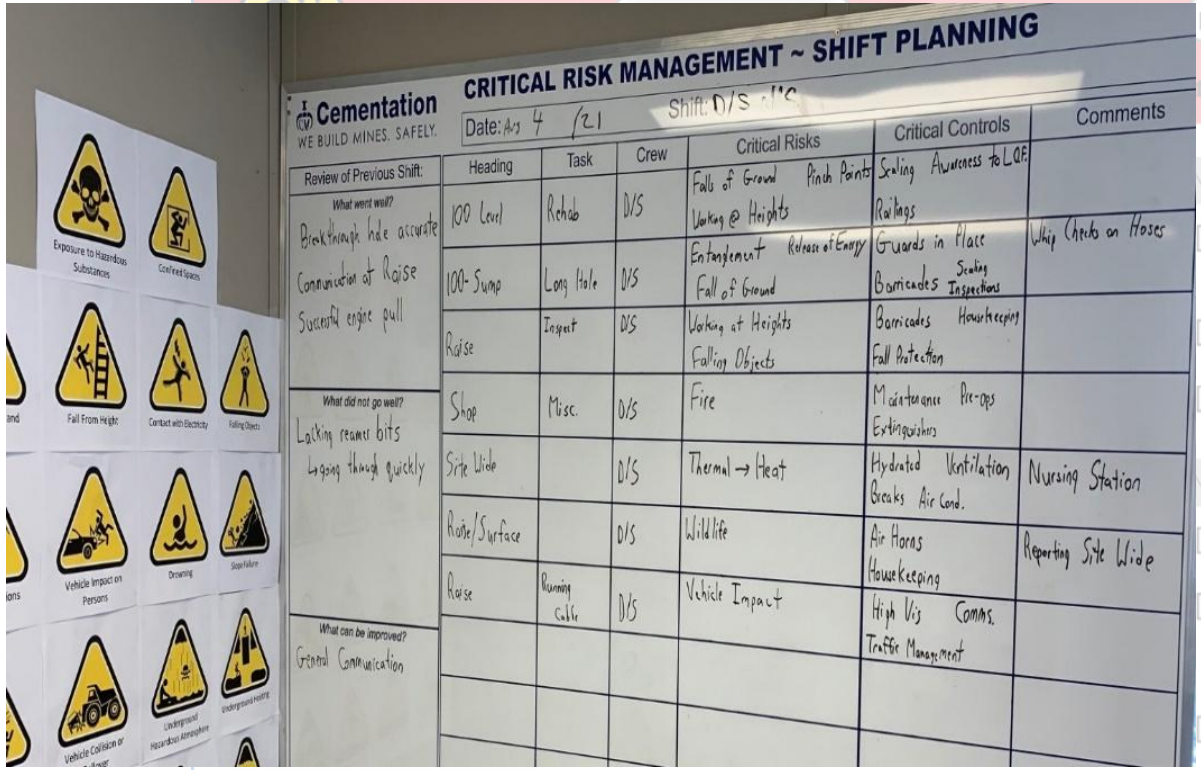
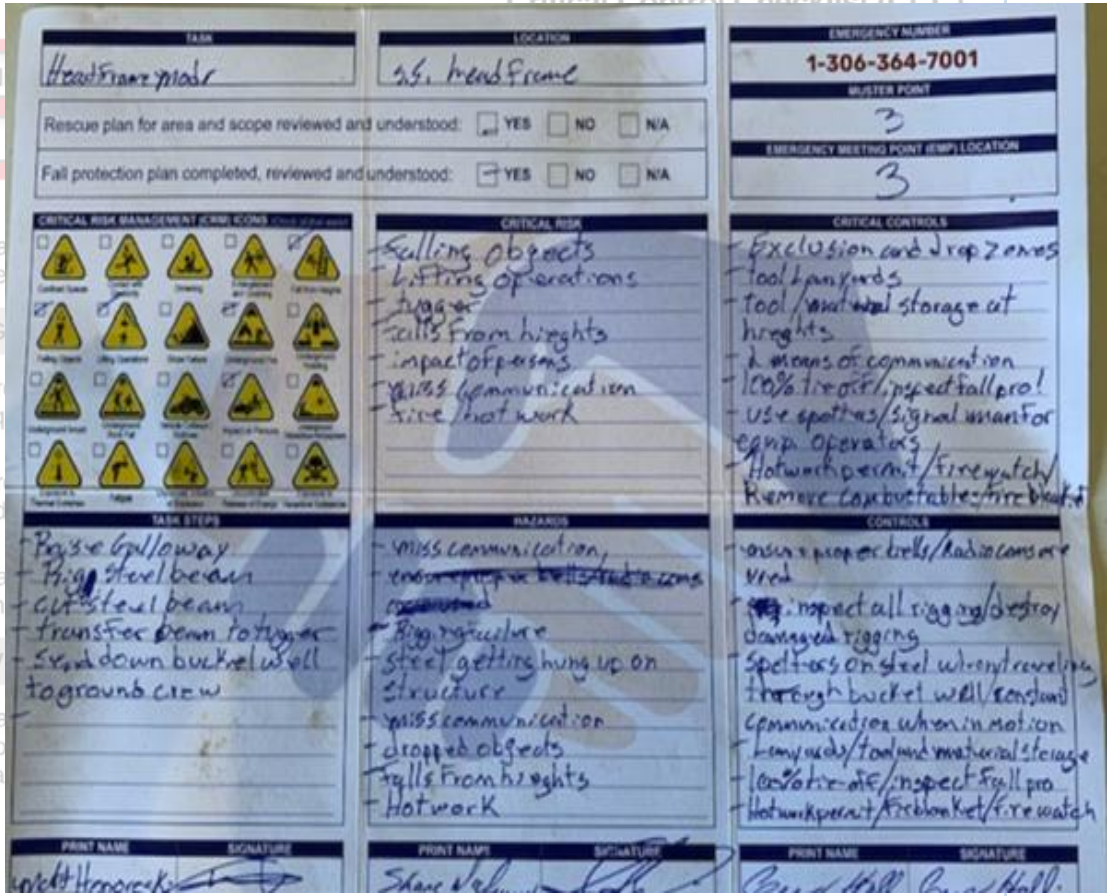
Critical Risk: Entanglement and Crushing

Critical Control Checklist (CCC)





Do the number of locks described in the plan match the locks used in the field isolation process?

Cementation
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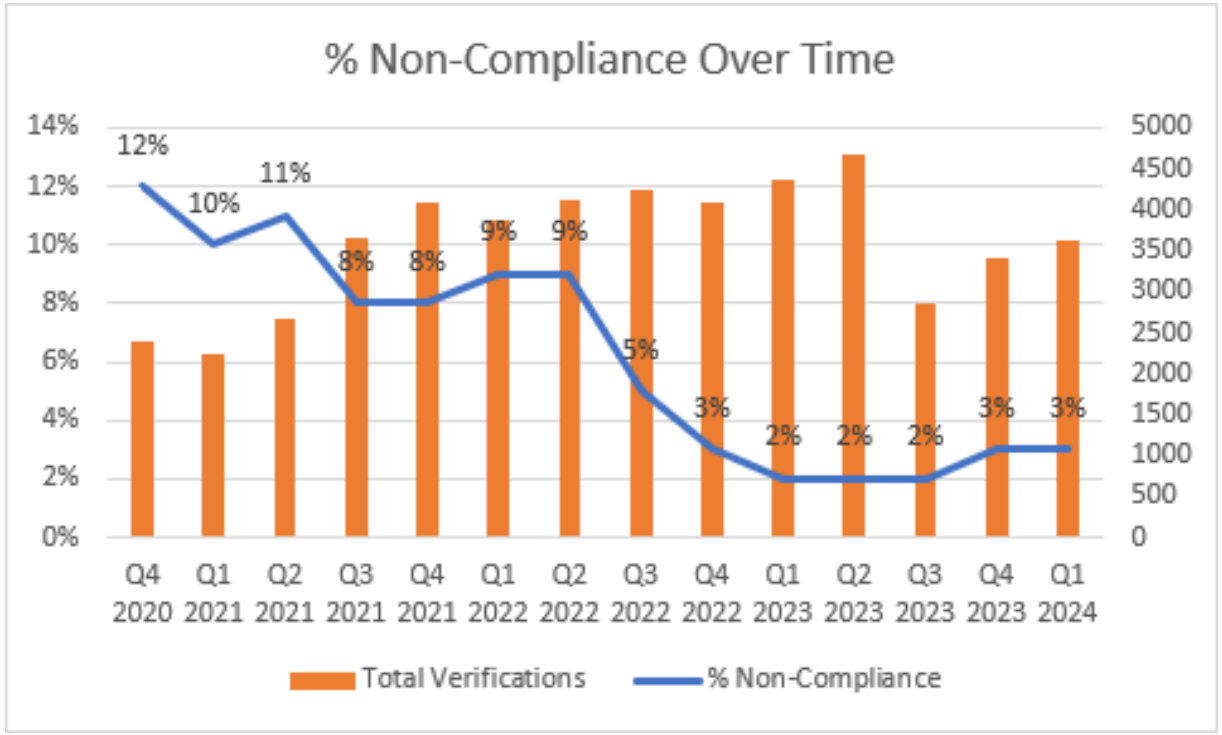

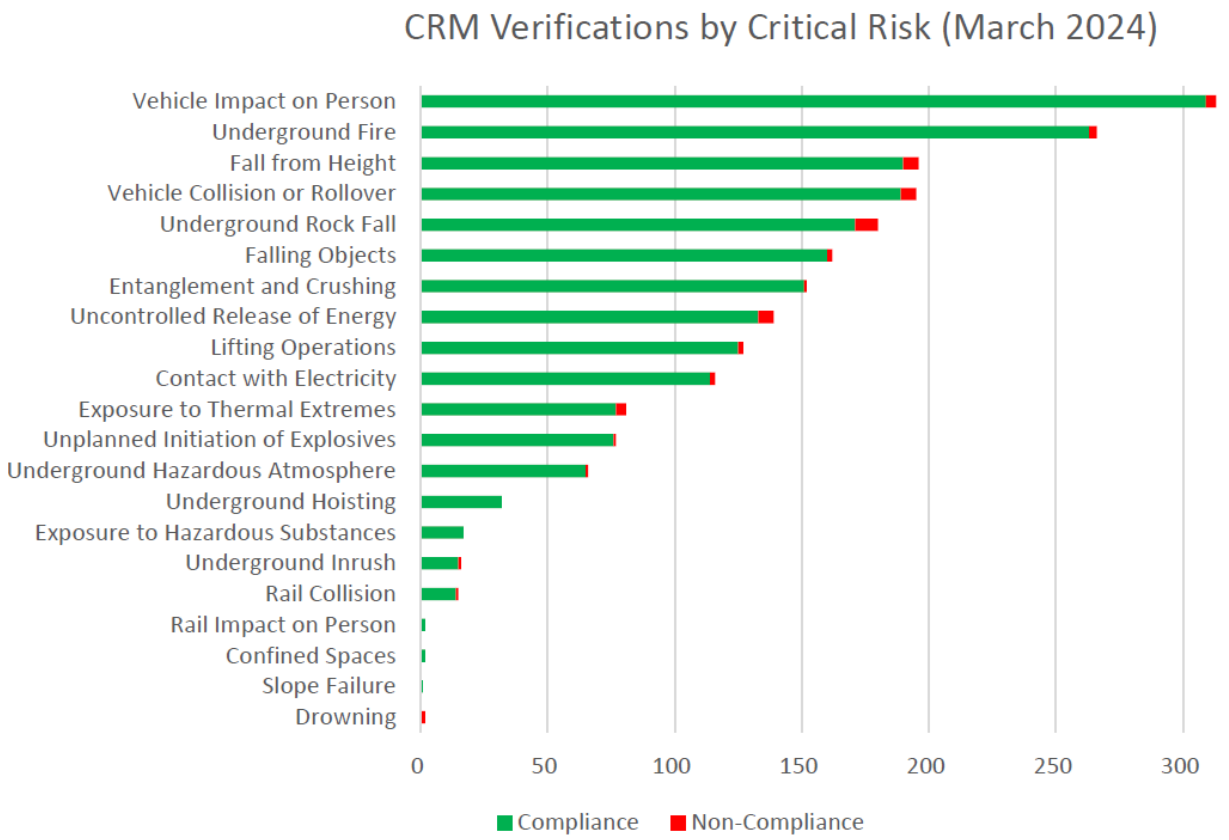

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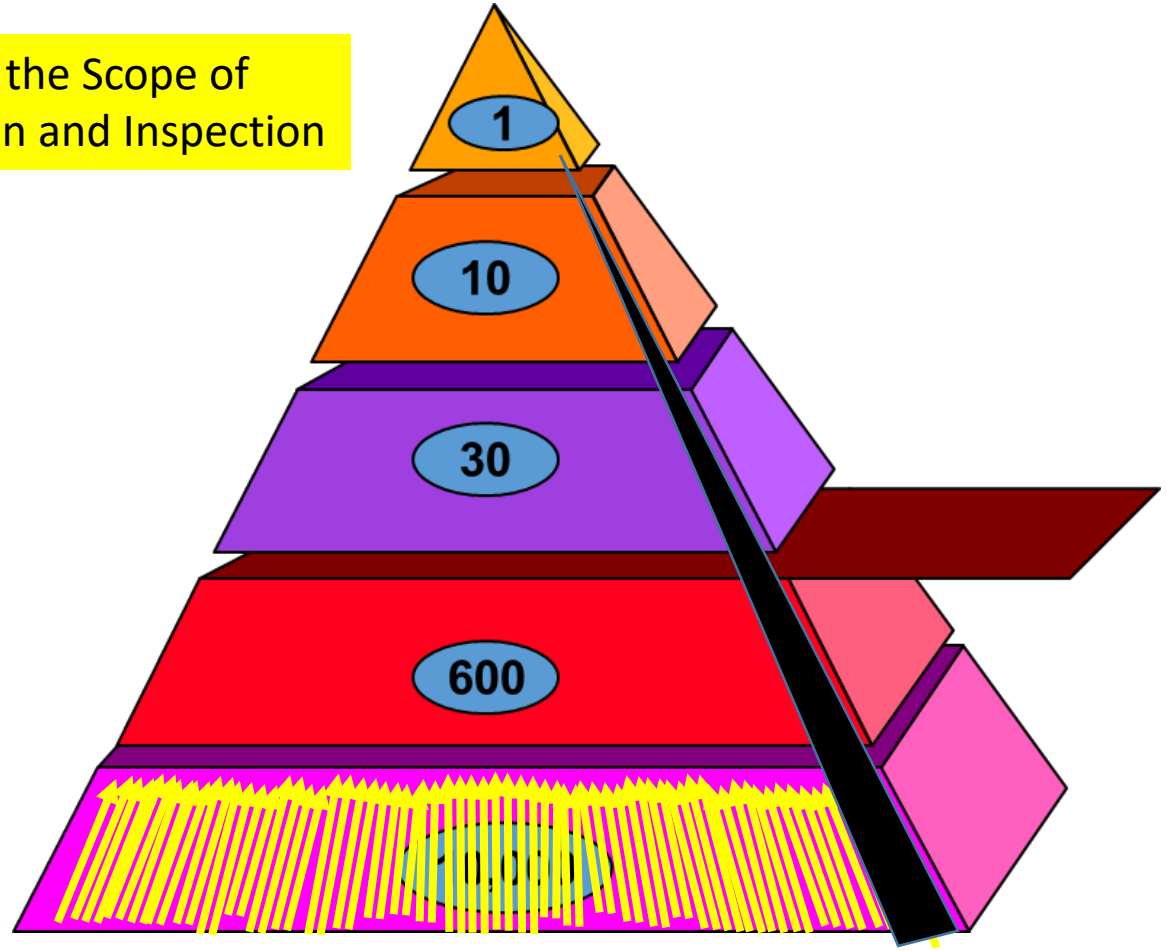
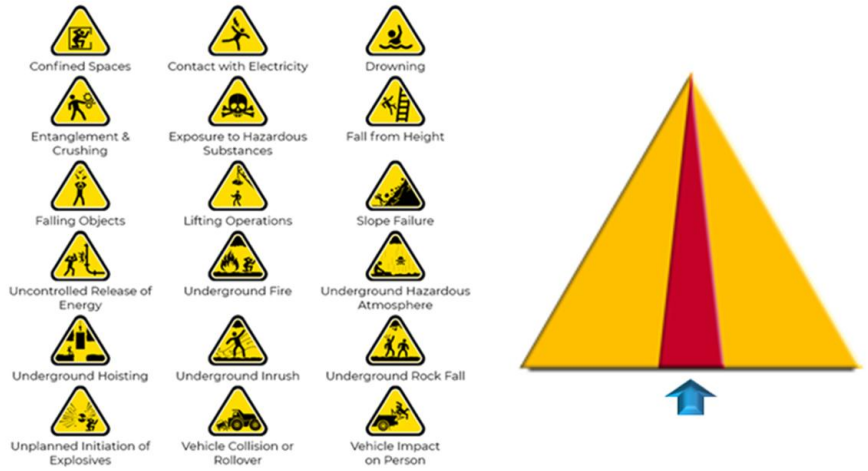
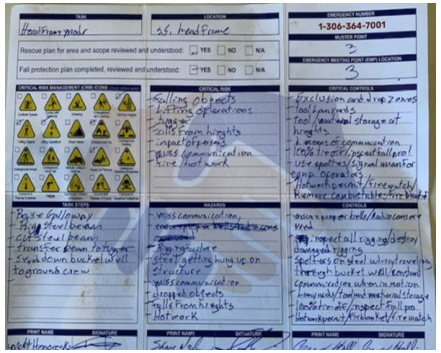
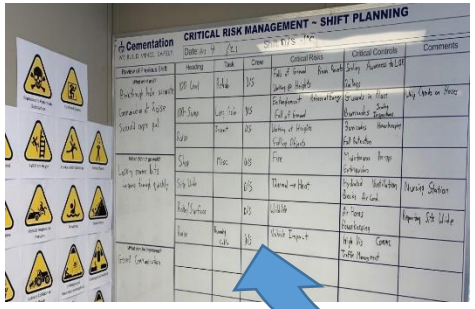
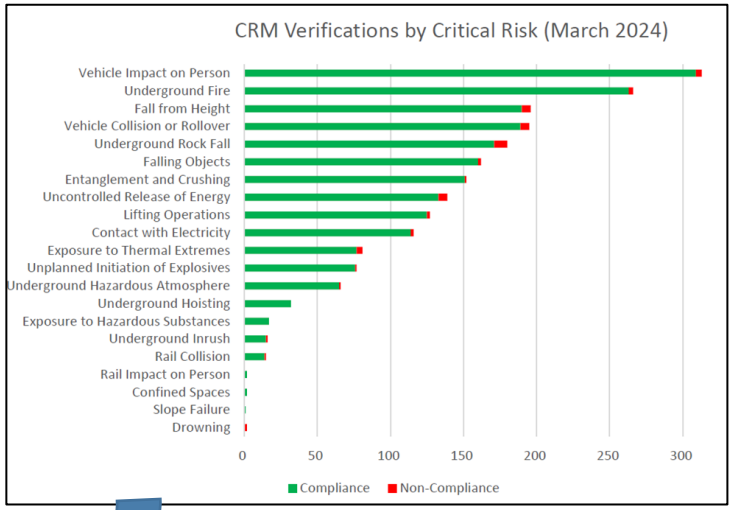


Underground Mining Reality









From Field to Board Room

Critical Controls Framework for Management

Policy

Standards

Controls Management

Procedure & Oversight

INGAA FOUNDATION

Leading Metrics

Indicator	Metric	Why is this Important?
1) % Completed Corrective Actions (SIF incidents)	(# Completed corrective actions / Total corrective actions) X 100	Drives SIF Exposure reduction and corrective action implementation
2) Overdue SIF Corrective Actions	# Overdue corrective actions on SIF potential incidents	
3) Near Misses with SIF potential	# Near misses with SIF potential	Early intervention and encourages reporting
4) % of FVCC completed vs. Target	(Total FVCC / Target FVCC) X 100	Measures leader engagement in SIF Prevention efforts
5) Supervisors use of Field Verification of Critical Controls (FVCC)	Total number of supervisors FVCC / Total number of jobs with SIF exposure	Shapes the culture via field interaction to reduce SIF exposure and improve critical controls
6) SIF Critical Controls Protected Percentage	# Protected critical controls / Total critical controls observed (protected + exposed)	Ensures that the critical controls are in place and functioning

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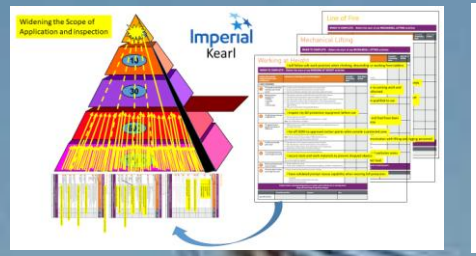
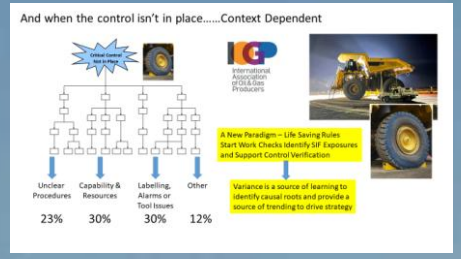
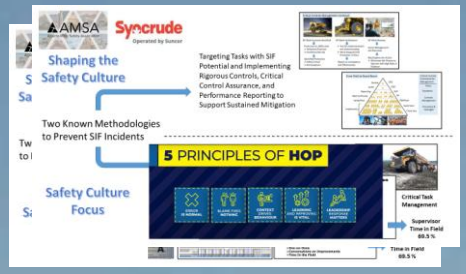
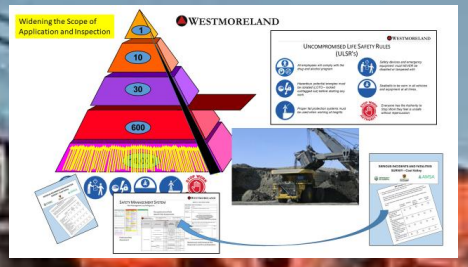
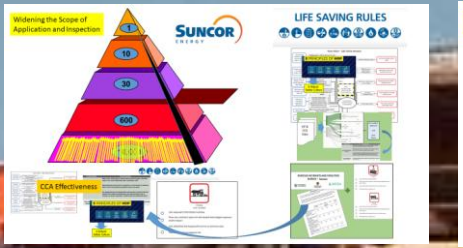
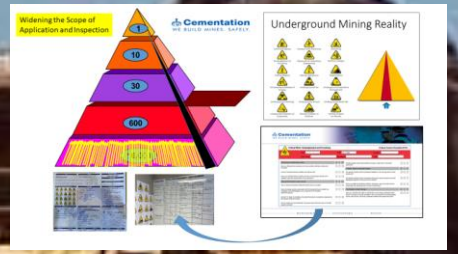


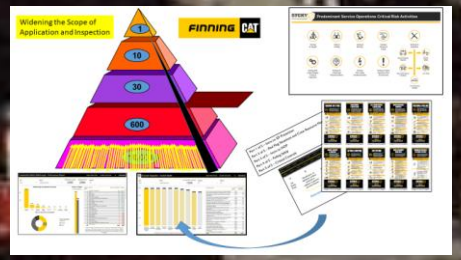


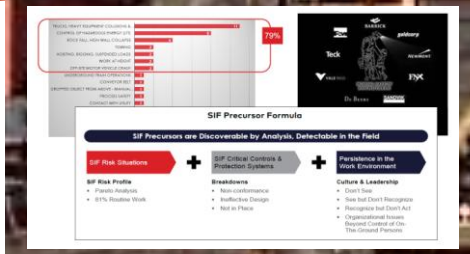


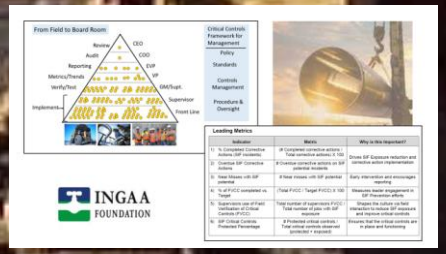


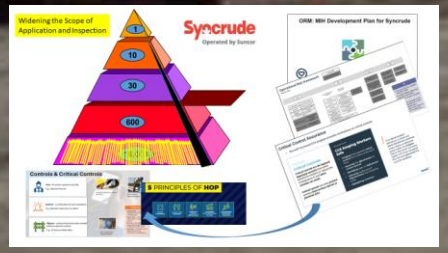




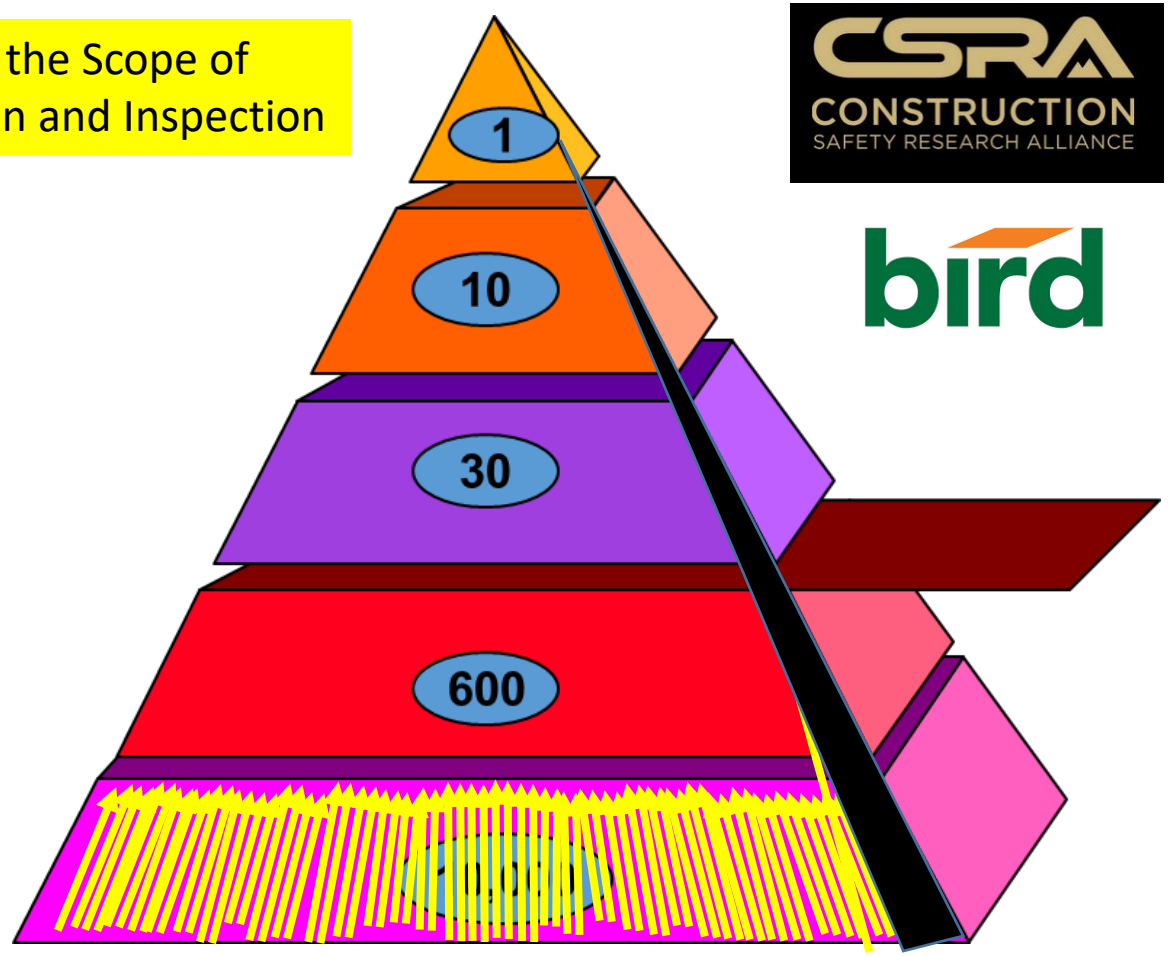






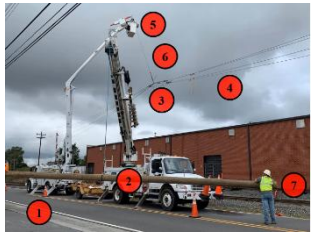
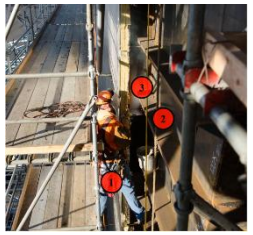


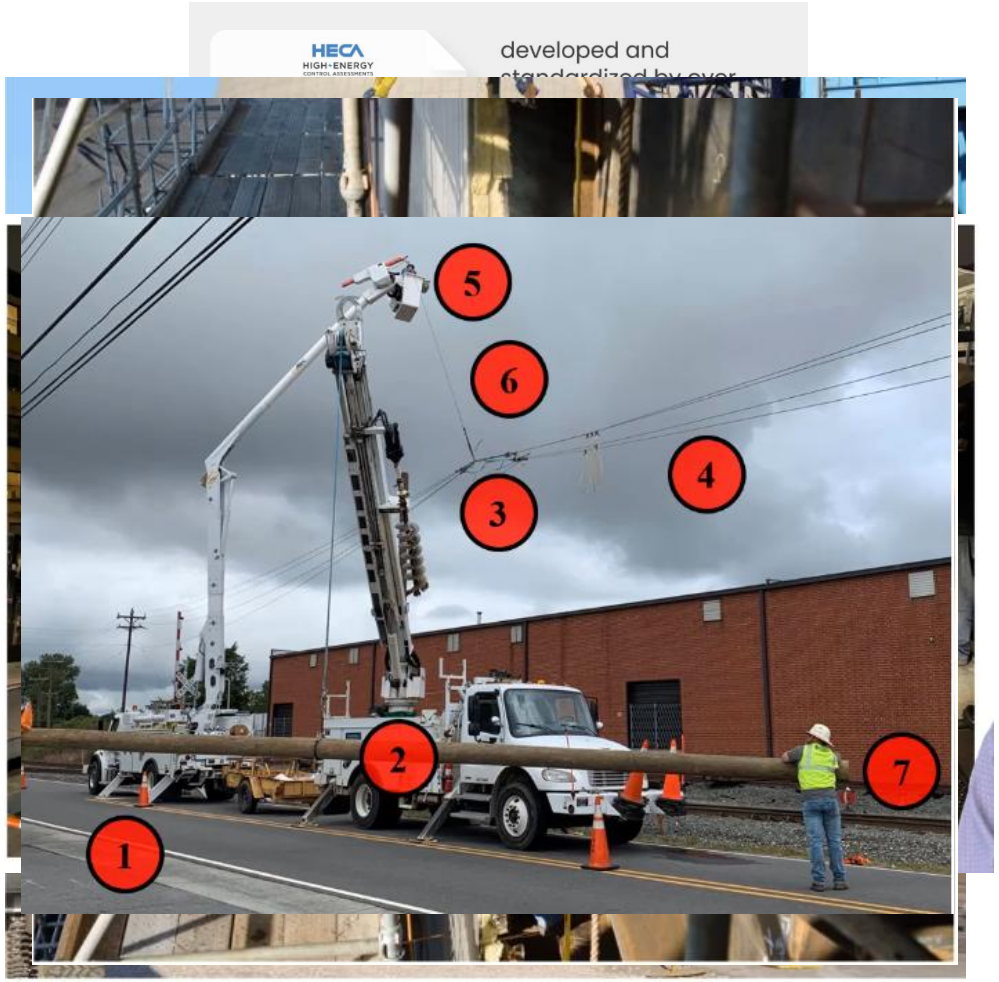
Widening the Scope of Application and Inspection



CSRA CONSTRUCTION SAFETY RESEARCH ALLIANCE

bird

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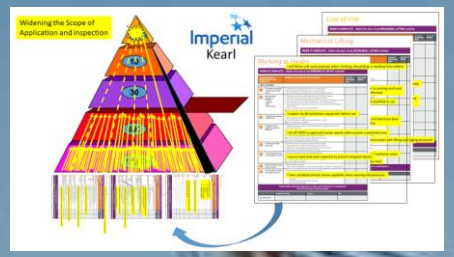
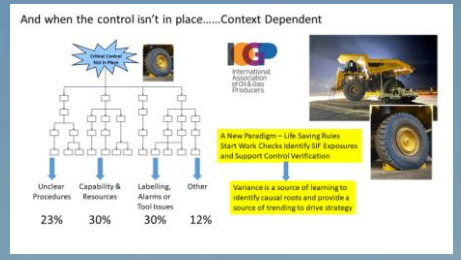
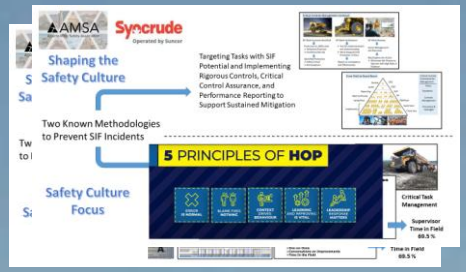
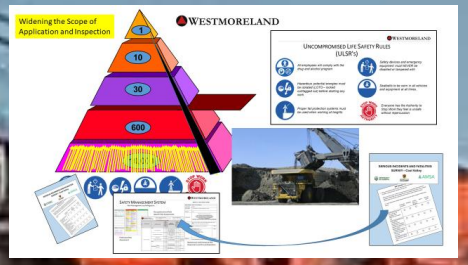
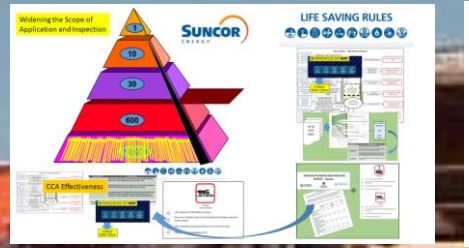
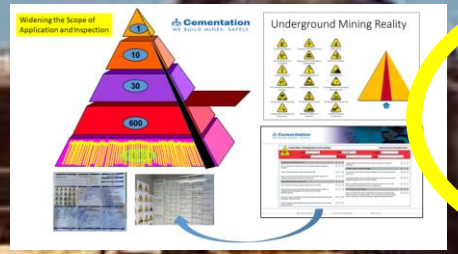


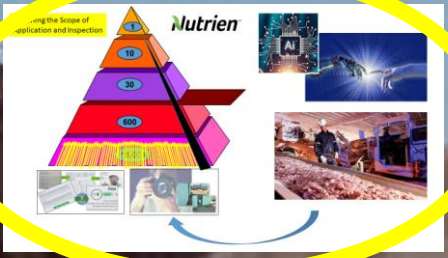


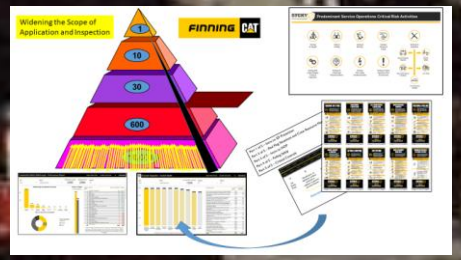


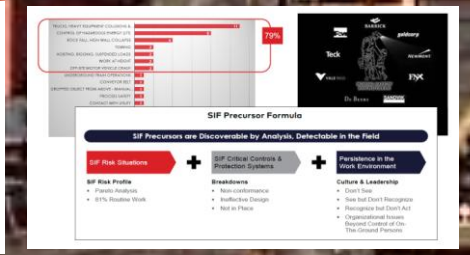


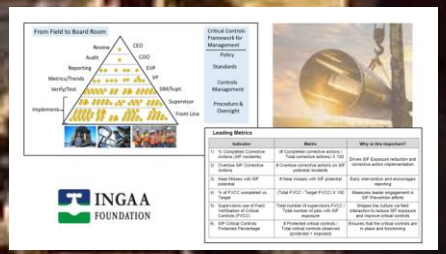


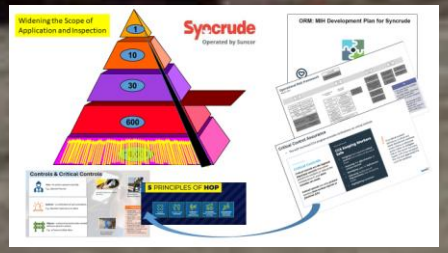




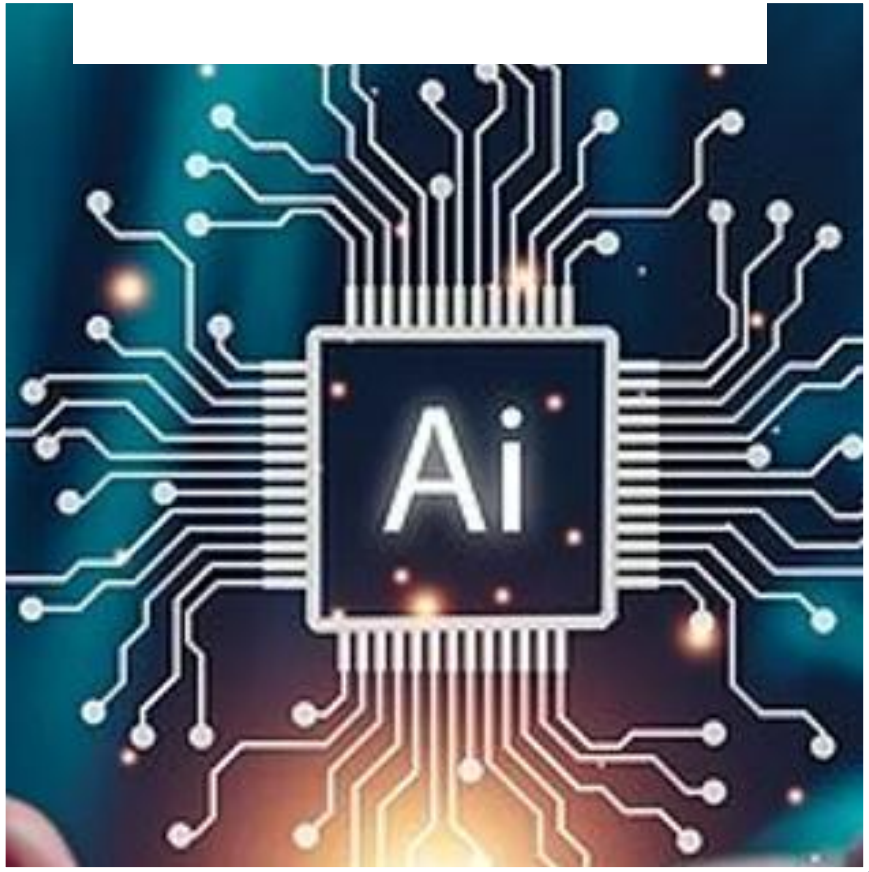








Nutrien™



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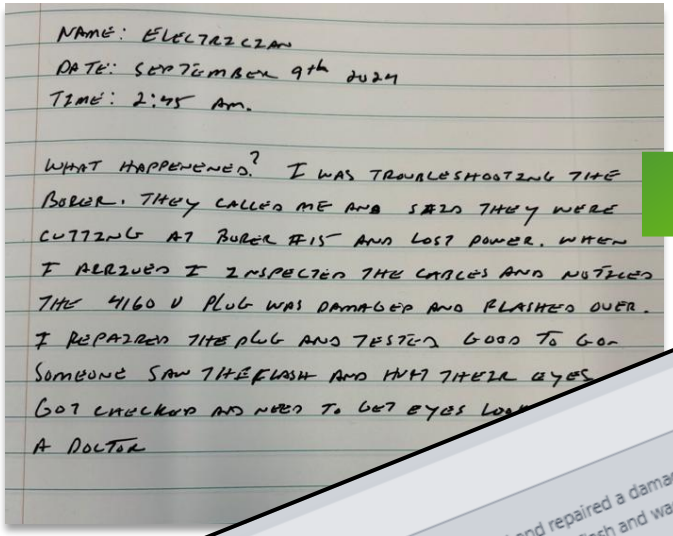
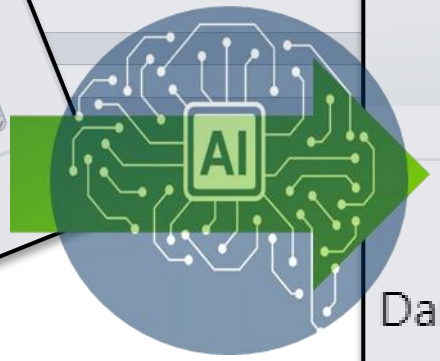

NAME: ELECTRICIAN
DATE: SEPTEMBER 9th 2024
TIME: 2:45 AM.

WHAT HAPPENED? I WAS TROUBLESHOOTING THE BORER. THEY CALLED ME AND SAID THEY WERE CUTTING AT BORER #15 AND LOST POWER. WHEN I ARRIVED I INSPECTED THE CABLES AND NOTICED THE 4160 V PLUG WAS DAMAGED AND FLASHED OVER. I REPAIRED THE PLUG AND TESTED GOOD TO GO. SOMEONE SAW THE FLASH AND HAD THEIR EYES GOT CHECKED AND NEED TO GET EYES LOOKED AT A DOCTOR

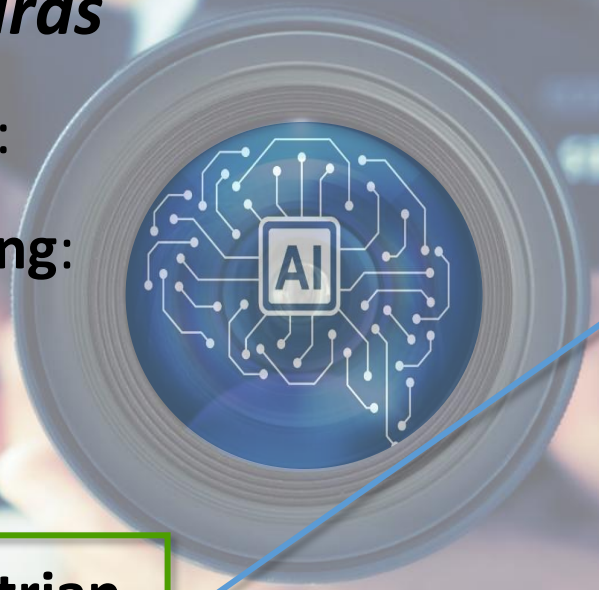


Nutrien™

Photos taken on a SIF in a Routine tour

AI Identified Hazards

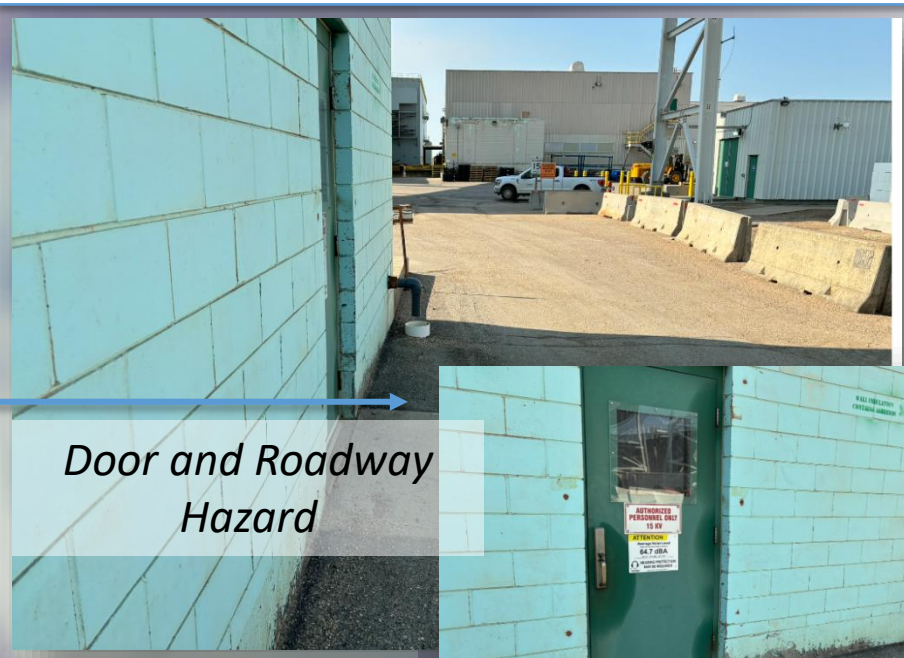
1. **Asbestos Warning**:
2. **Noise Level Warning**:
3. **Trip Hazard**:
4. **Restricted Access**:
5. **Vehicle and Pedestrian Interaction**:
6. **Signage Visibility**:



1.Vehicle and Pedestrian Interaction:

1. **Hazard**: The proximity of the door to the roadway where vehicles are present can lead to potential accidents.
2. **Mitigation**: Install barriers or guardrails to separate pedestrian walkways from vehicle paths. Implement clear signage to alert drivers of pedestrian areas and vice versa. Consider adding speed bumps or other traffic calming measures to reduce vehicle speed in the area.

AI Identified Hazards and mitigations



Door and Roadway Hazard

Many other hazards were identified including those shown here.
No training was provided to the model. Model used was GPT 4o.

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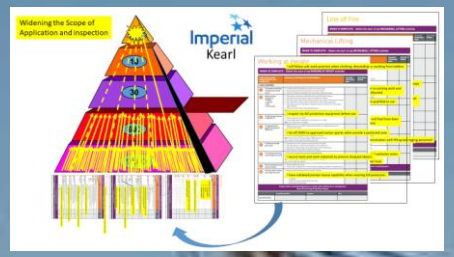
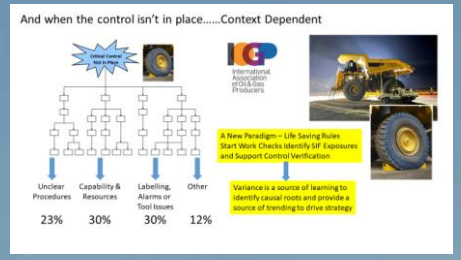
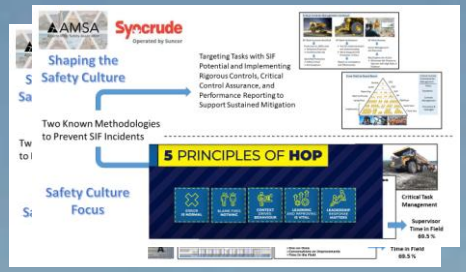
Building on Good Work

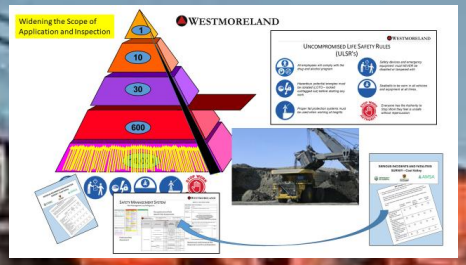
David and Joan Lynch
School Of Engineering
Safety and Risk Management

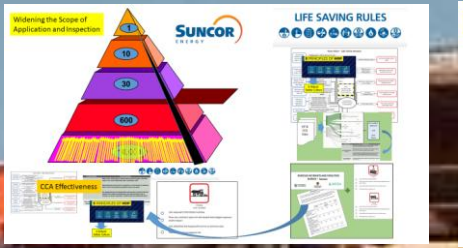
Collaboration

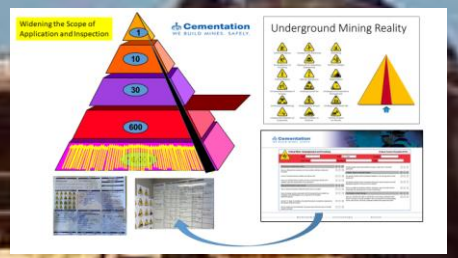


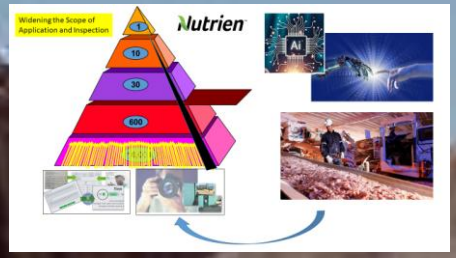


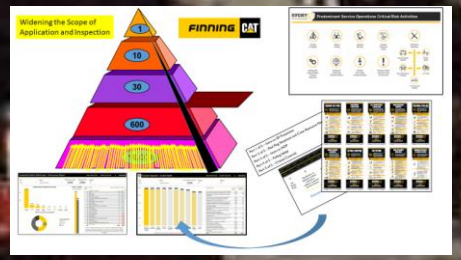


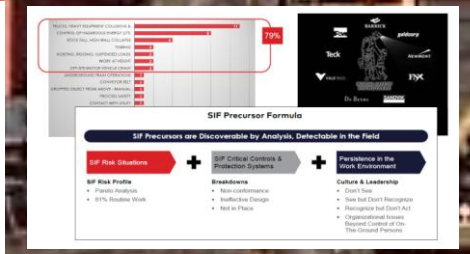


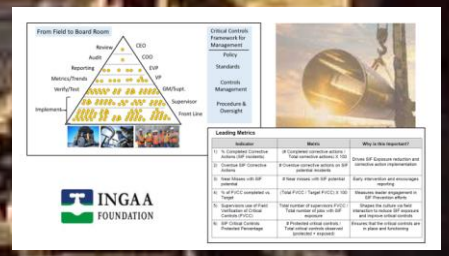


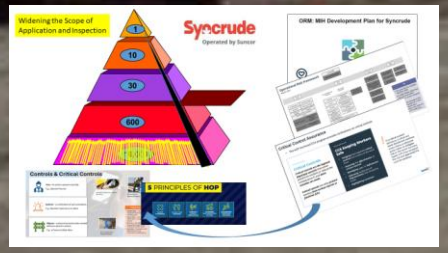


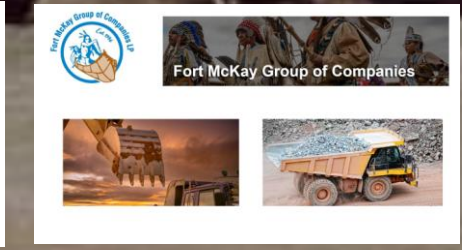












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Systemic Comprehensive Management System

Environment, Health and Safety Management System (SMS)

- Program Management and Leadership;
- Hazard Management;
- Training and Competency;
- Inspections and Maintenance;
- Incident Management;
- Emergency Preparedness;
- Contractor Management;
- Environmental Management;
- Program Evaluation
- Program Promotion

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Systemic Comprehensive Management System

Robust Safety Culture

↓

Safety is a Value (DNA)

↓

Safety – from Words to Action – Making Safety Real

↓

Safety is an Imperative

↓

Courage to Care

Courage to Confront

Courage to Change

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Critical Controls Management Construct

SIF Work Scenario Identified

Protection at 100% Level
- Behaviors/Practices
- Conditions/Set-Up

Identified Protection
- Safety Critical
- No Exceptions

SIF Work Verifications

- Test for Implementation and Understanding
- Work Stopped Until Protection in Place

Report on Compliance and Effectiveness

SIF Work Reviews

Senior Management and Executive

Bias/Urgency for Action
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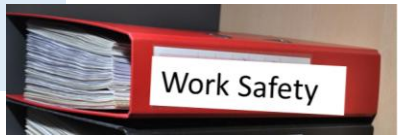

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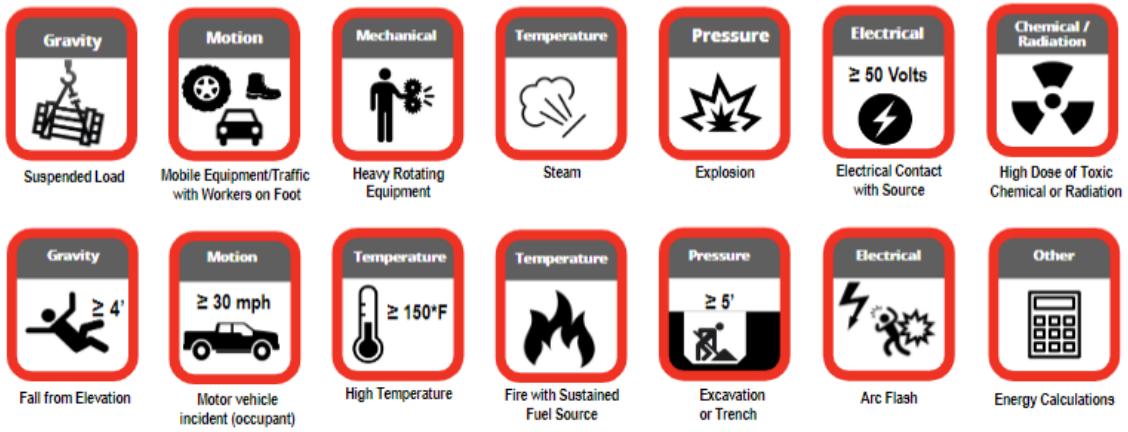
Common High Energy Hazards

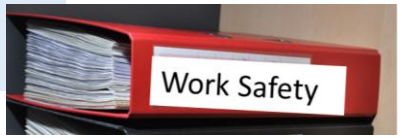


16 Global Fatality Risks in Mining

- Event in a confined space
- Contact with electricity
- Fall from height
- Uncontrolled release of energy
- Fall of ground – surface
- Fall of ground – underground
- Vehicle/pedestrian interaction – underground
- Vehicle/pedestrian interaction – surface
- Vehicle interaction – offsite
- Vehicle collision (heavy and light) – surface
- Heavy Vehicle event – rollover, over edge
- Uncontrolled load during lifting
- Entanglement in rotating equipment
- Underground fire and explosion
- Incident during tire handling
- Struck by falling object

Infographic designed by StrataBlue

Systemic Comprehensive Management System



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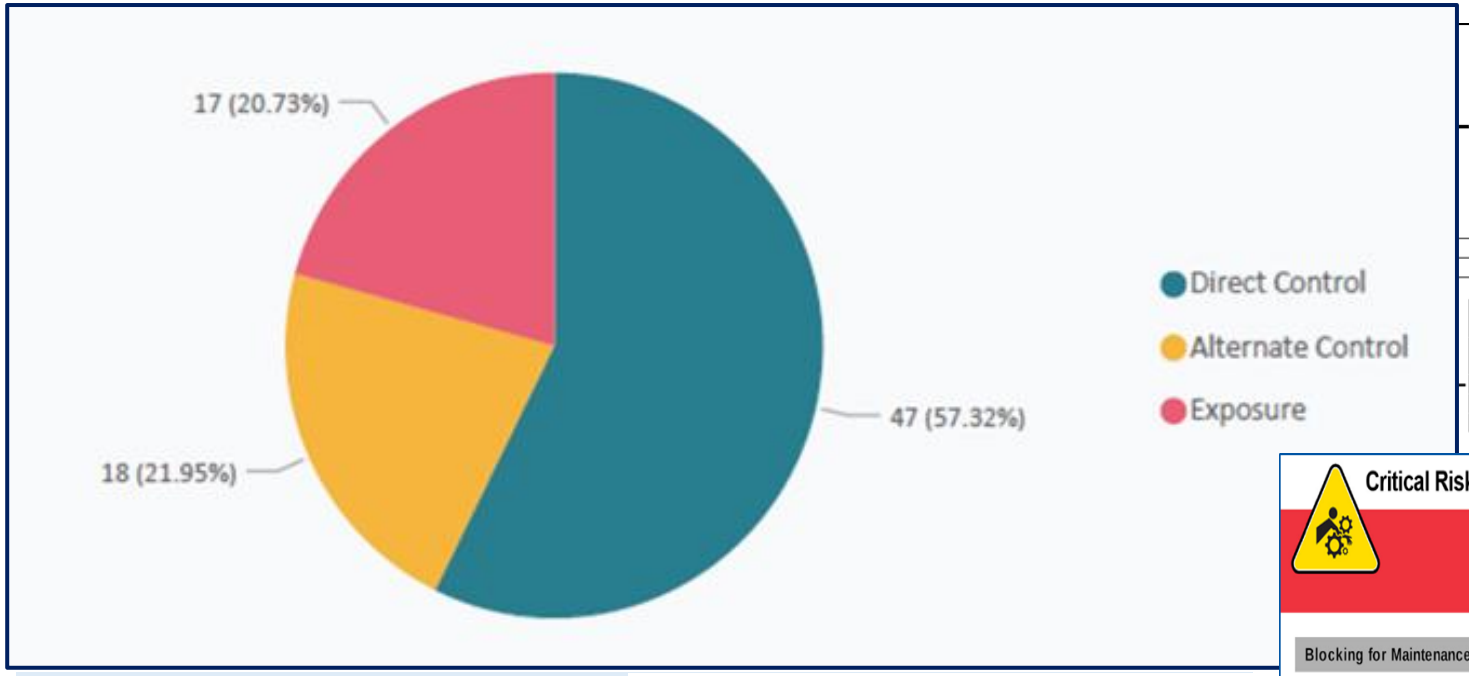

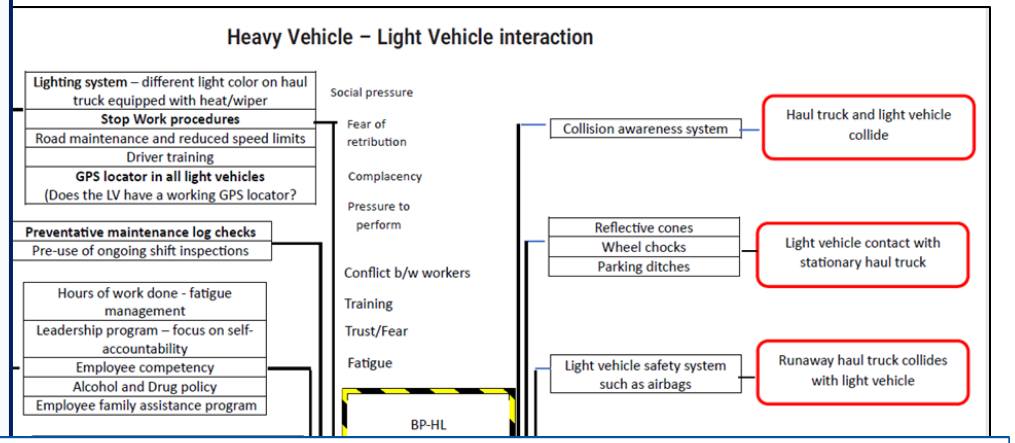

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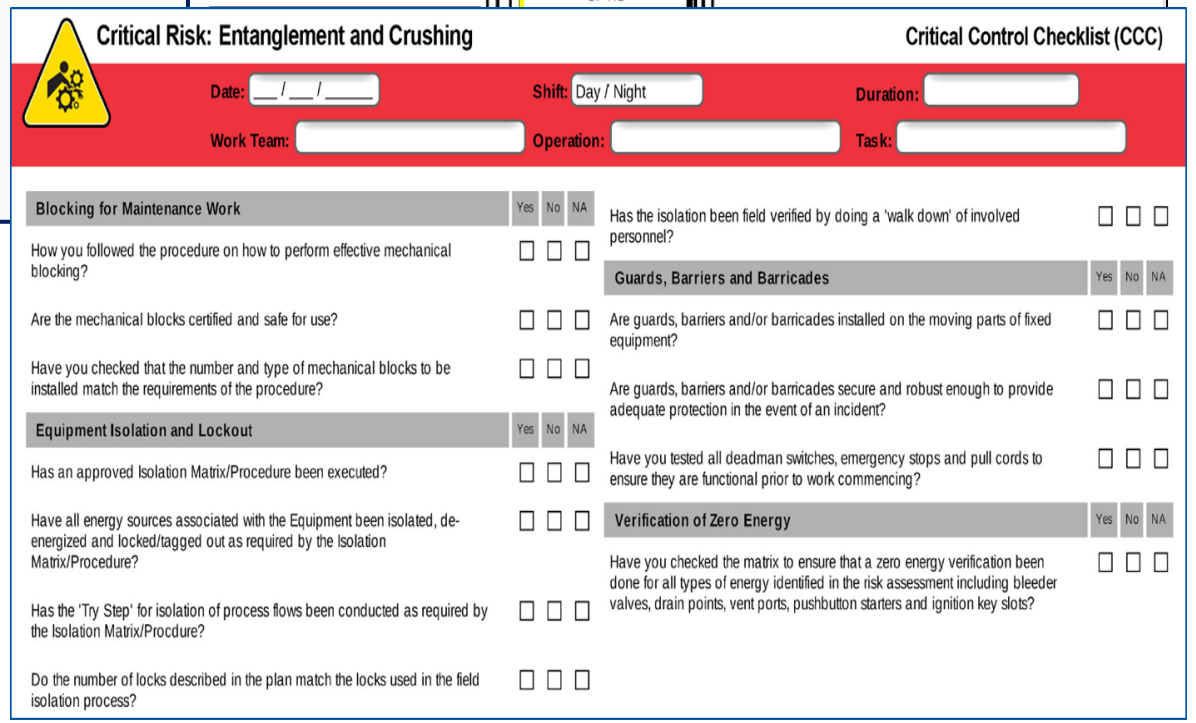

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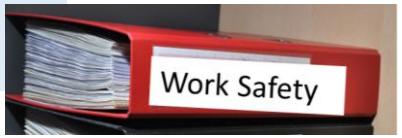

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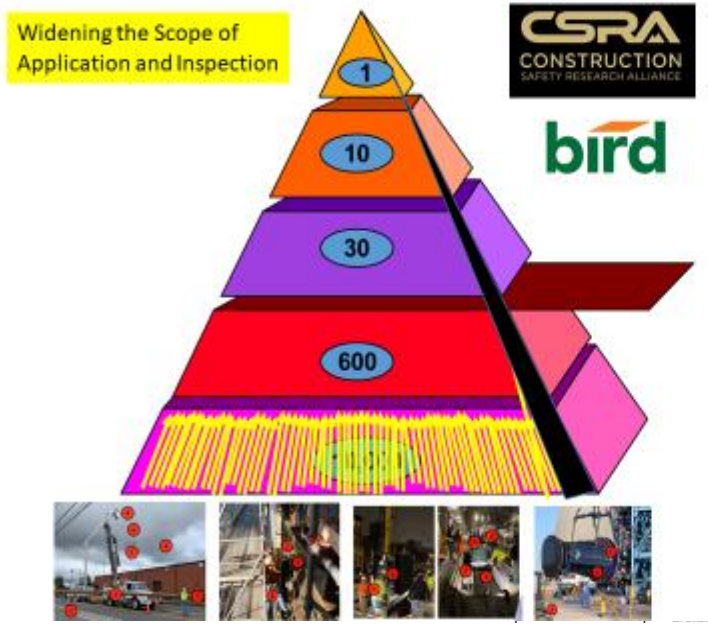
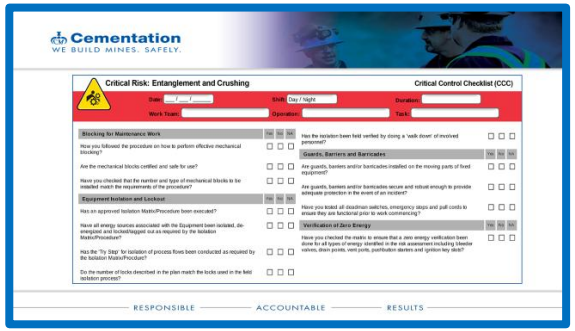


Identification Critical Controls



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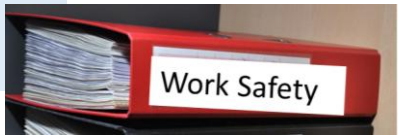

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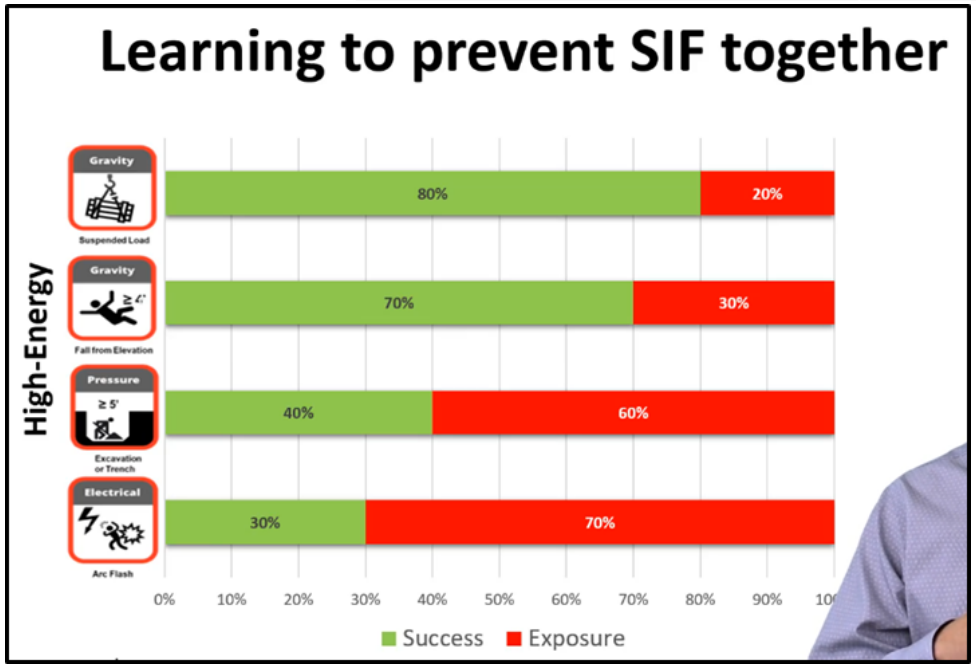
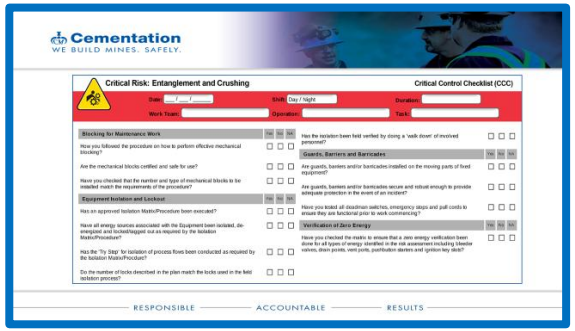


Leading Metrics

Indicator	Metric	Why is this Important?
1) % Completed Corrective Actions (SIF incidents)	(# Completed corrective actions / Total corrective actions) X 100	Drives SIF Exposure reduction and corrective action implementation
2) Overdue SIF Corrective Actions	# Overdue corrective actions on SIF potential incidents	
3) Near Misses with SIF potential	# Near misses with SIF potential	Early intervention and encourages reporting
4) % of FVCC completed vs. Target	(Total FVCC / Target FVCC) X 100	Measures leader engagement in SIF Prevention efforts
5) Supervisors use of Field Verification of Critical Controls (FVCC)	Total number of supervisors FVCC / Total number of jobs with SIF exposure	Shapes the culture via field interaction to reduce SIF exposure and improve critical controls
6) SIF Critical Controls Protected Percentage	# Protected critical controls / Total critical controls observed (protected + exposed)	Ensures that the critical controls are in place and functioning

Identification Critical Controls Integration



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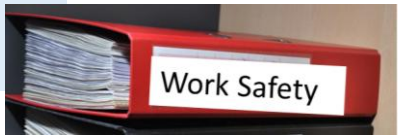

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From Field to Board Room

Critical Controls Framework for Management

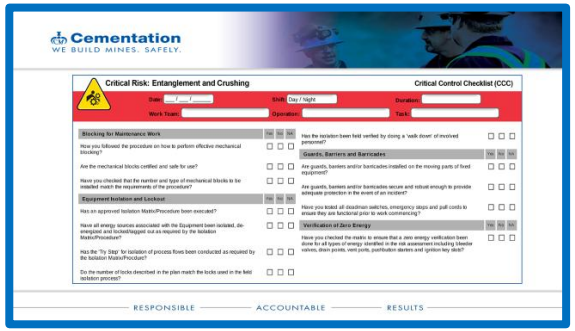
Policy

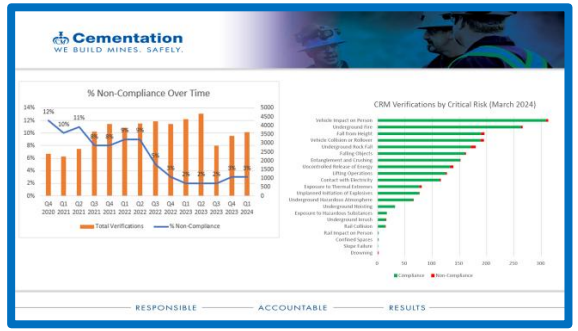
Standards

Controls Management

Procedure & Oversight

Identification Critical Controls Integration Status/Verification





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Thank You!

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