

**E N E R G Y
S A F E T Y
C A N A D A**

ESC 2026 PSI Report Insights

Webinar

Presenters:

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Agenda

- 2026 Report Overview
- PSI Trending
- Focus - Narrative Insights
- Key Insights
- Next Steps

2026 PSI Report Overview

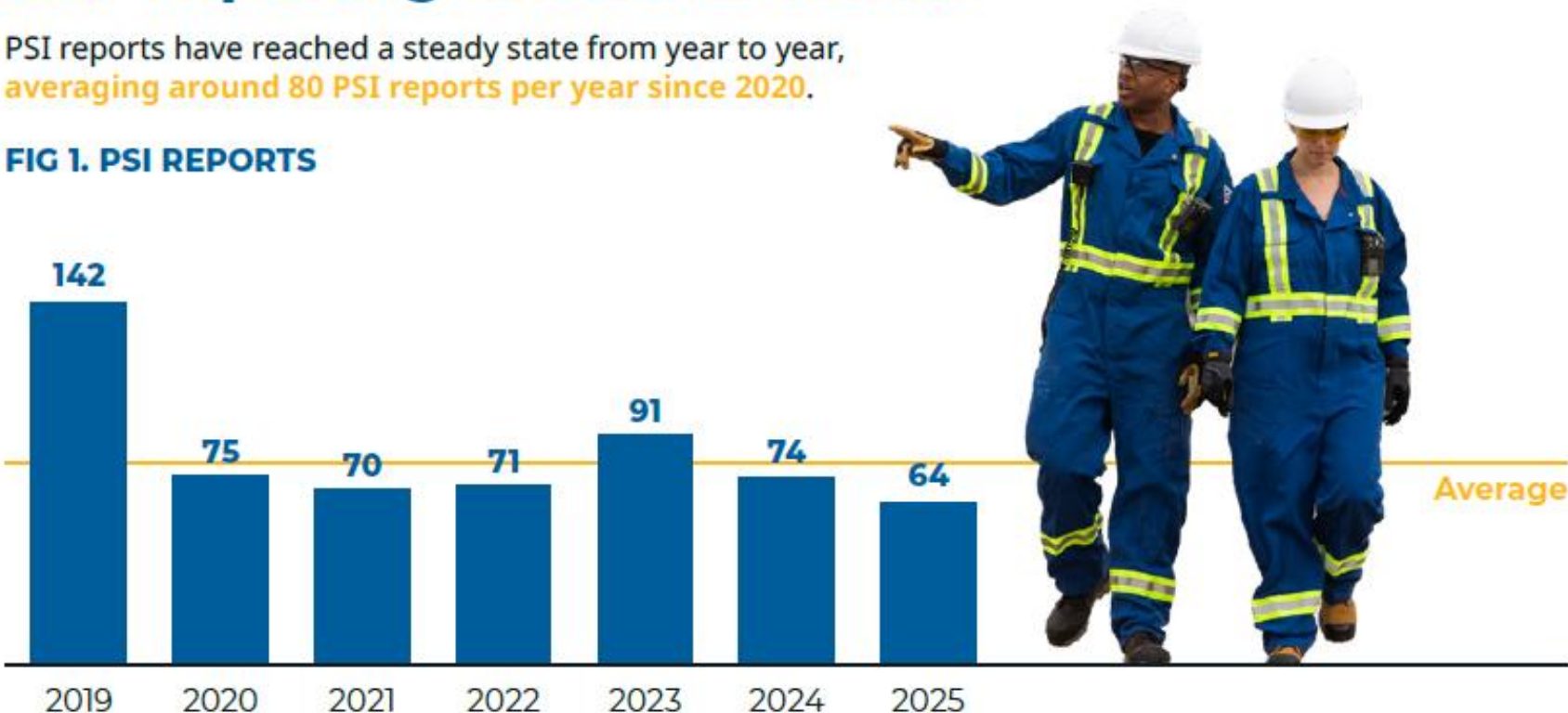
- PSI 5-year Strategy (2020) - Insights enable access to narrative dataset and encourage industry to report
- Past Reports focused on specific data event types: Falls, Caught-in, etc.
- This report leverages past successes but stands on its own given the comprehensive scope of the data.
 - Analysis of narrative data conducted on data from 2023 to 2025 (210 incidents) - note the significant data size difference and scope
- PSI data used to test the SIF actual definitions (EEI and IOGP)
- This report creates a road map on **SIF Potential** as well as focus areas for industry reflection and action.

PSI Trending

02 // Reporting Rates and Trends

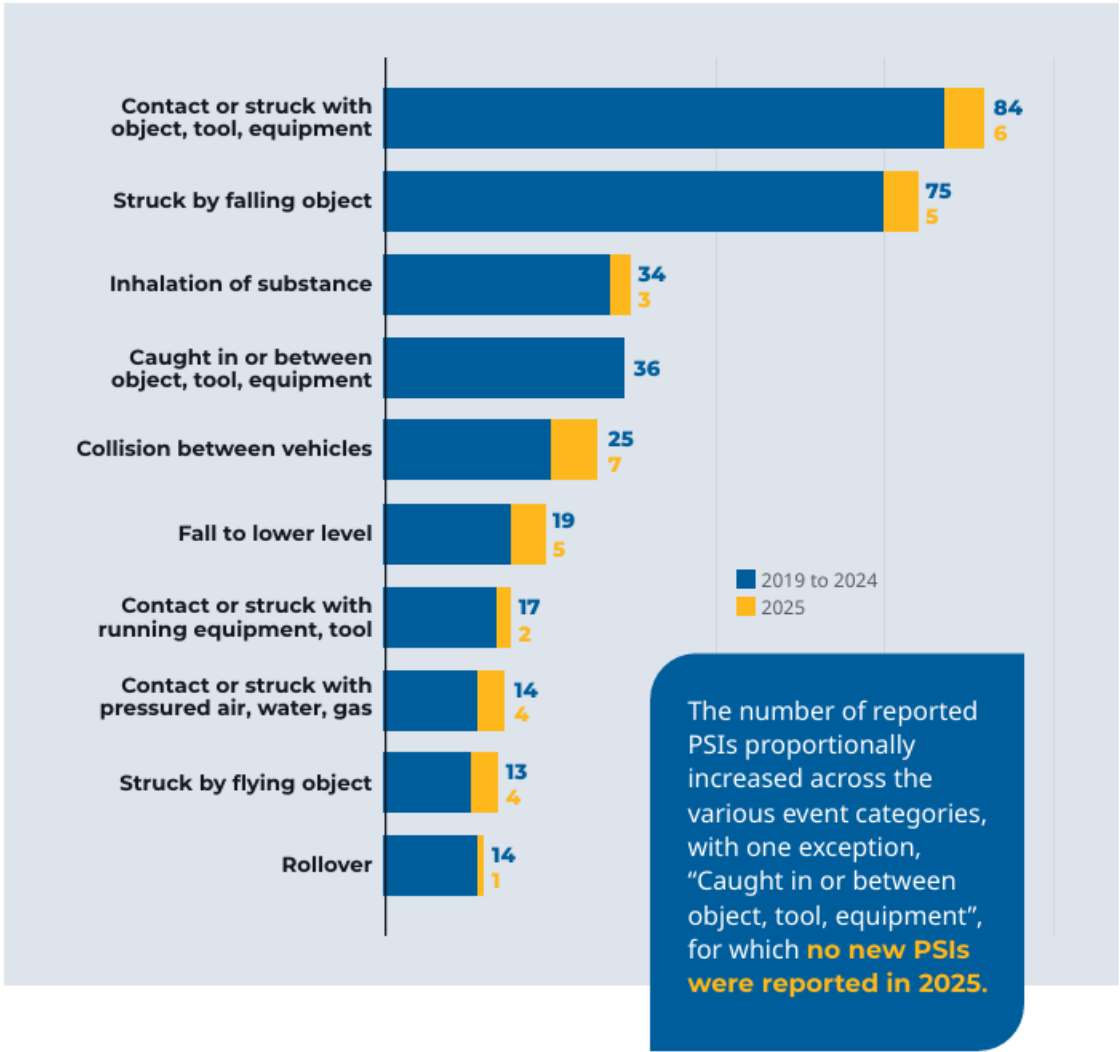
PSI reports have reached a steady state from year to year, averaging around 80 PSI reports per year since 2020.

FIG 1. PSI REPORTS



Top 10 Incident Types

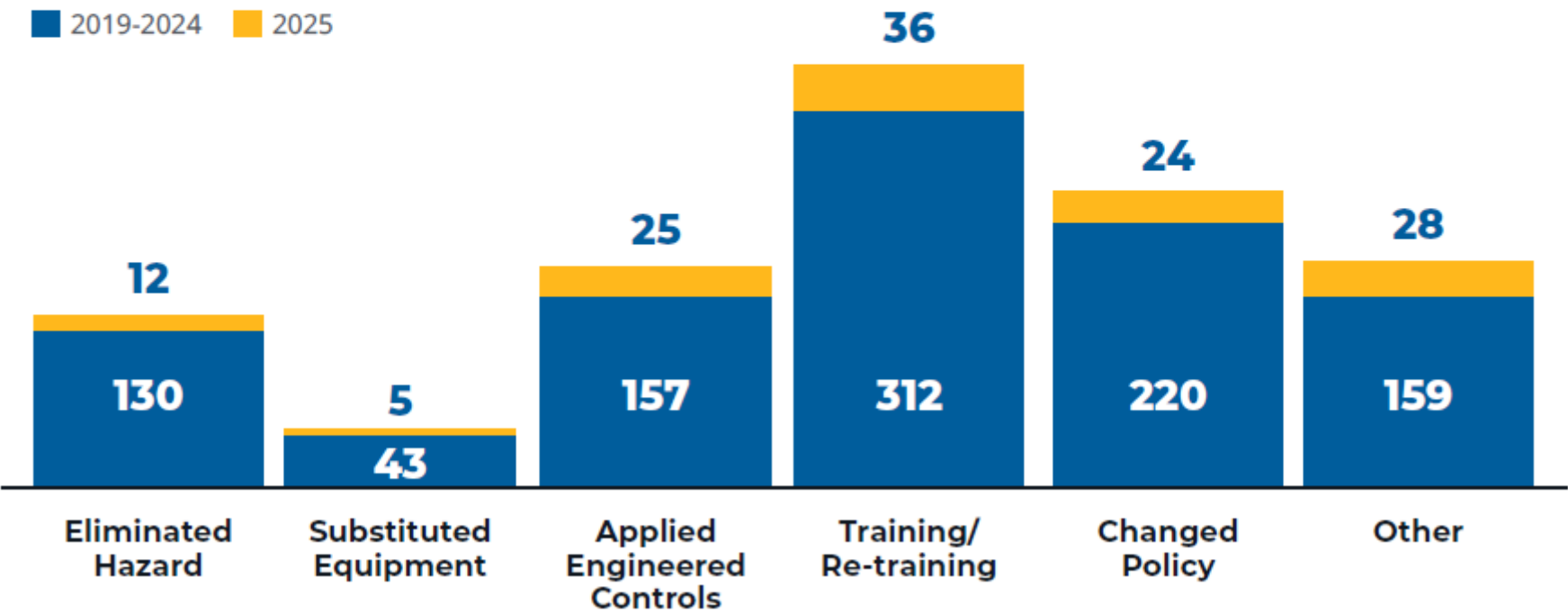
FIG 2. PSIs BY TYPE (2019 TO 2025)



Follow-up Actions

The administrative controls are the most used type of control. These are considered “soft” controls, in contrast to engineering controls, which are typically referred to as “hard” controls.

FIG 3. PSI FOLLOW-UP ACTIONS



What is a SIF?

The differences reflect varying perspectives and highlight the need for a common definition of Serious Injury, and industry data, to improve the resolution to the picture.

The two SIF actual models (EEI and IOGP) were tested across the PSI 2023-2025 data.

FIG 4. TOP THREE INCIDENTS BY TYPE ACROSS VARIOUS DATA SETS (2023 TO 2025)

PSI (AB OH&S)	AB OH&S SERIOUS INCIDENT NOTIFICATION	SERIOUS INCIDENTS (WCB 50+ DAYS)	FATALITIES
Struck/Contact with Objects	Struck/Contact with Objects	Bodily Reaction/Overexertion	Vehicle/Transportation
Vehicle/Transportation	Fire/Explosion	Falls - Same Level	Chemical/Substance Exposure
Chemical/Substance Exposure	Falls - Same Level	Struck/Contact with Objects	Struck/Contact with Objects

Serious Injury and Fatality Model

Edison Electric Institute

Detects seriousness closer to the incident
“Was this serious when it happened?”



within 24–72 H

THRESHOLD EFFECT

- Higher injury threshold
- Life-threatening / life-altering detected soon after incident (typically within 24-72 hours)



More Actuals

DATA VOLUME

- Larger actuals dataset
- Better trend visibility and statistical power



15 Criteria

CRITERIA EFFICIENCY/THOROUGHNESS

- 15 criteria
- Efficient framework
- Focused on what drives early detection and action



Fast Loop

LEARNING IMPACT

- More events, faster feedback loop
- Enables quicker action to prevent recurrence

Focus on early detection to drive immediate action.

Fatality & Permanent Impairment Model

International Association Of
Oil & Gas Producers'

Confirms seriousness based on long-term outcome
“Did this become life-altering?”



Up to 180 Days

LAGGING OUTCOME EFFECT

- Lower injury threshold
- Outcome (permanent impairment) determined up to 180 days



Fewer Actuals

DATA VOLUME

- Smaller actuals dataset
- More statistical noise



24 Criteria

CRITERIA EFFICIENCY/THOROUGHNESS

- 24 criteria
- More detailed and granular
- Focused on capturing all relevant permanent impairments



High Certainty

LEARNING IMPACT

- Fewer events and delayed confirmation
- Lessons emerge later but with higher medical certainty

Focus on long-term outcomes with high medical certainty.

SIF Considerations

- System Thinking - Change the system to change the focus.
- Learning Focus - Learn from SIF potential not just SIF outcomes. Leverage a system that encourages the sharing of gifts (SIF-P).
- Conditions & Controls - Focus on critical controls and the conditions capable of defeating, degrading or bypassing them.
- Understand Interactions - SIF emerges from combinations of conditions - Transparency - Psychological safety
- Learn from Normal Work - The conditions for SIF exist in normal work
- Leading Indicators - Measure the actions that enable SIF prevention
- Work Planning - Identify and address SIF exposure before work begins and verify as the work unfolds.

2026 Focus - Narrative Analysis



Energy Type and Magnitude

PSIs were analyzed by energy type and magnitude of hazardous energy. Energy magnitude was grouped into <100 Joules (First Aid), <500 Joules (Medical Treatment), <750 Joules (Restricted Duty) and equal to or greater than 1,500 Joules (Days Away from Work) based on the EEI Severity Based Lagging Indicator.



Energy Contact

To better understand how close the energy came to people (Contact or Proximity) energy contact was classified into three categories: 'No Contact', 'Contact without Injury' and 'Contact with Injury'.



Proximal Cause (Trigger)

Proximal cause was broken down into four categories that best capture the most immediate contributing factor to occur with a PSI recognizing that with most serious injuries and fatalities there are numerous contributing factors. These categories are Work Process, Equipment, Human Performance and Environment and are adaptations from ESC's Process Safety Metrics and Event Reporting Guide.



Critical Control Verifications

Verification that critical controls are in place to prevent reoccurrence is key to the management of SIF risk. "Verification Indicated" means that some type of ongoing verification was indicated in the PSI follow-up actions, such as inspections, leadership observations, audits, etc.

Poll Questions

Question #1: Who currently uses energy magnitude in determining if there was a SIF-P event (PSI)?

- a) Not currently
- b) Varies across company
- c) Yes, limited to vehicle motion, dropped objects, etc.
- d) Yes - Use across all energy types
- e) Unsure

Question #2: What Energy Magnitude do you use to define a SIF-P (PSI)?

- a) Not used at my company
- b) Varies
- c) ~750 Joules
- d) 1,500 Joules
- e) ~7,500 Joules

SIF and Energy

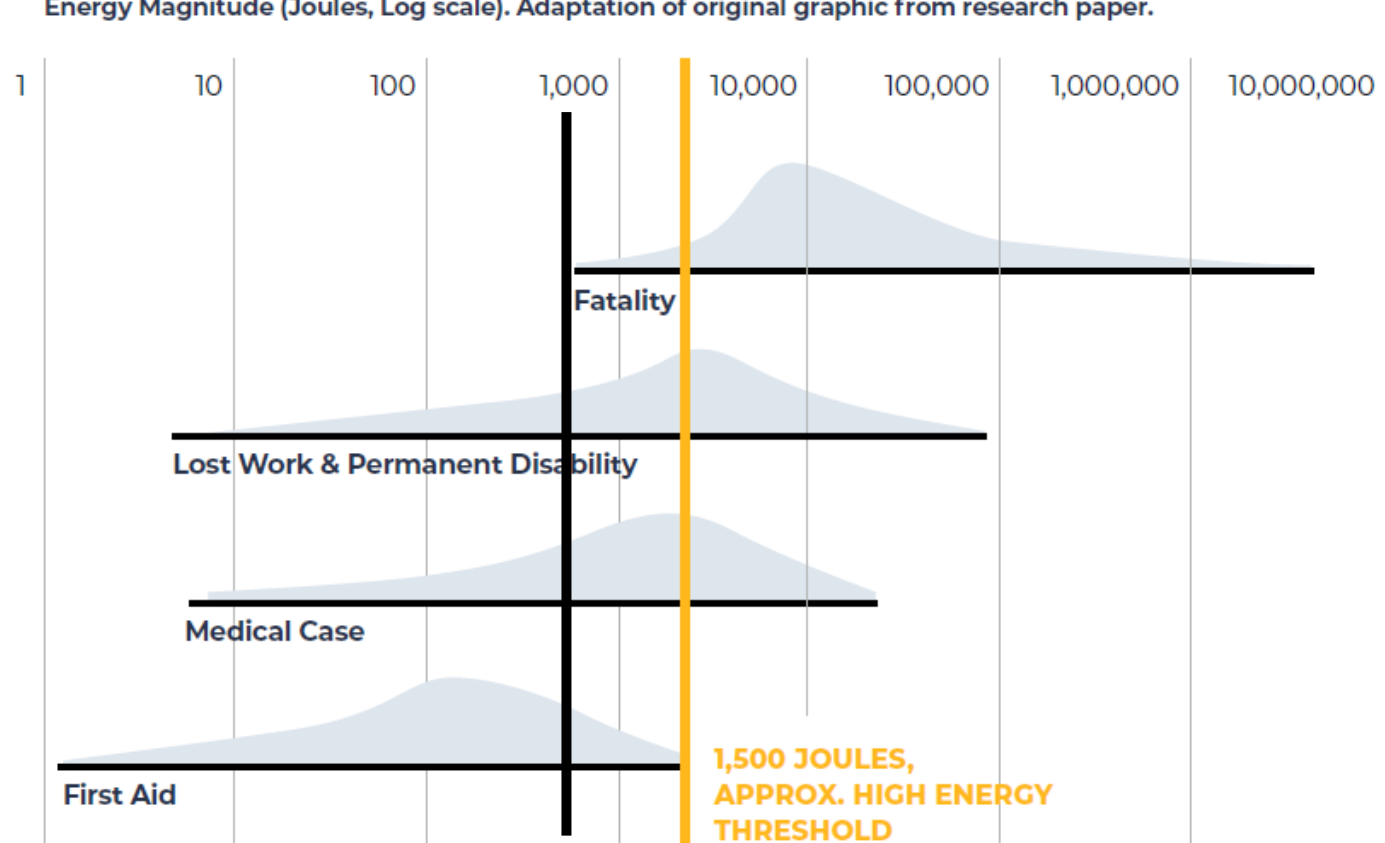
Energy is one delineator between SIF and less serious injuries.

We want to resist the temptation to chase the tails as this is what we have been doing in safety traditionally.

Reflection: Are we interested in 'worst-case scenario' or 'worst-credible outcome'?

FIG 7. DISTRIBUTIONS OF ENERGY MAGNITUDE WITH RESPECT TO INJURY SEVERITY

Energy Magnitude (Joules, Log scale). Adaptation of original graphic from research paper.



Insights - Energy

Energy Types

- Gravity, Motion and Chemical energy types make up 80% of PSIs.

Energy Magnitude

- 81% of the PSIs involved energy equal to or greater than 1,500 Joules

Reflection: How coupled should a serious injury to a fatality be concerning energy magnitude?

FIG 11. DISTRIBUTION OF ENERGY TYPES ACROSS PSIs (2023-2025)

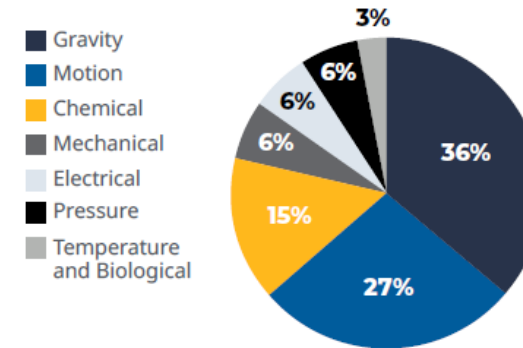
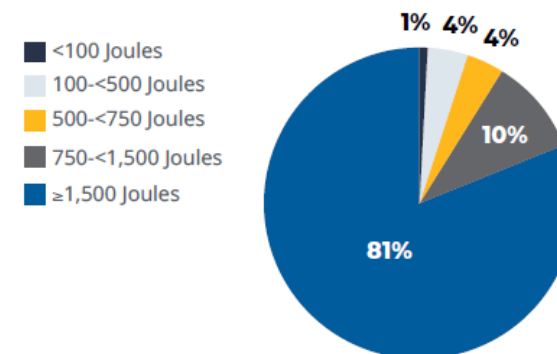


FIG 12. DISTRIBUTION OF ENERGY MAGNITUDE (2023-2025)



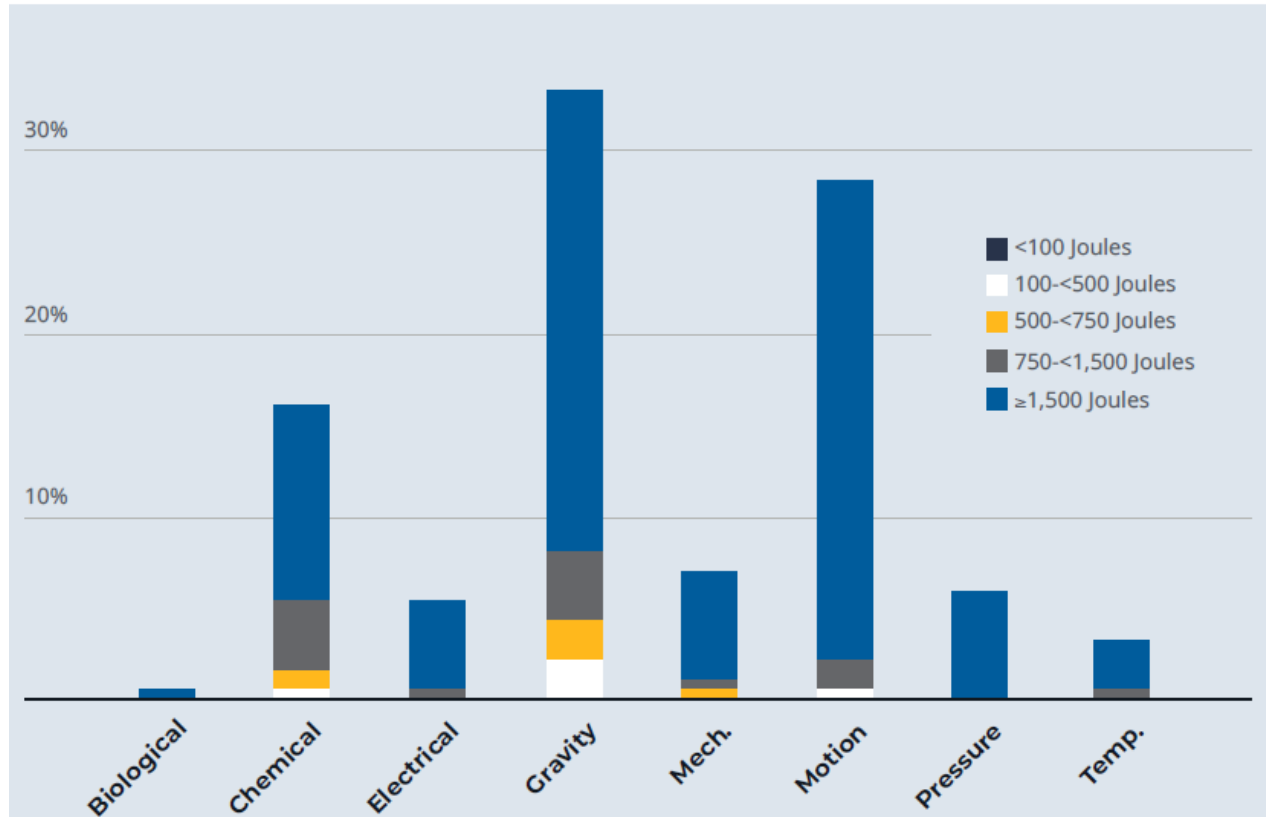
Insights – Energy

Energy Type/Magnitude

- Energy at lower magnitudes were more prominent in Chemical, Gravity and Motion energy types.
- The prevalence of energy types in PSI reporting may not directly represent the prevalence of exposure to those energy types.

Reflection: Does energy type influence PSI submission?

FIG 13. DISTRIBUTION OF ENERGY MAGNITUDE ACROSS ENERGY TYPES (2023 TO 2025)

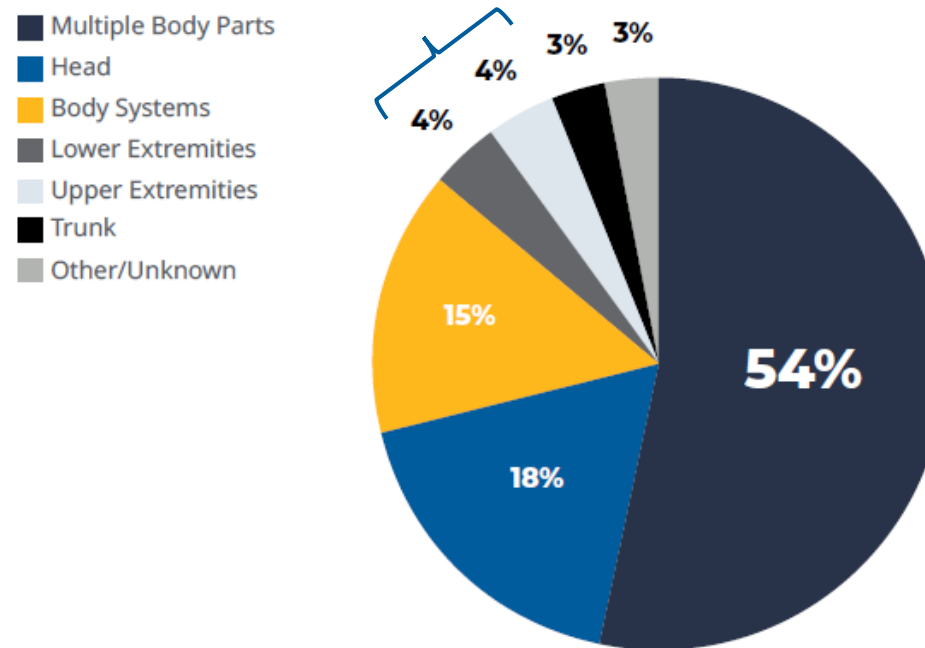


Insights – Body Parts

Body Parts

- SIF Actual definitions (EEI or IOGP) did not materially impact SIF Potential
- Multiple Body Parts, Head and Body Systems accounted for 90% of PSIs
- 8% of PSIs are exclusively associated with ‘serious injury’ not ‘fatality’ risk
- **Limitations:** PSI data cannot validate a SIF actual model. AI Tool testing underway.

FIG 16. DISTRIBUTION OF BODY PARTS AT RISK OF PSIs (2023-2025)



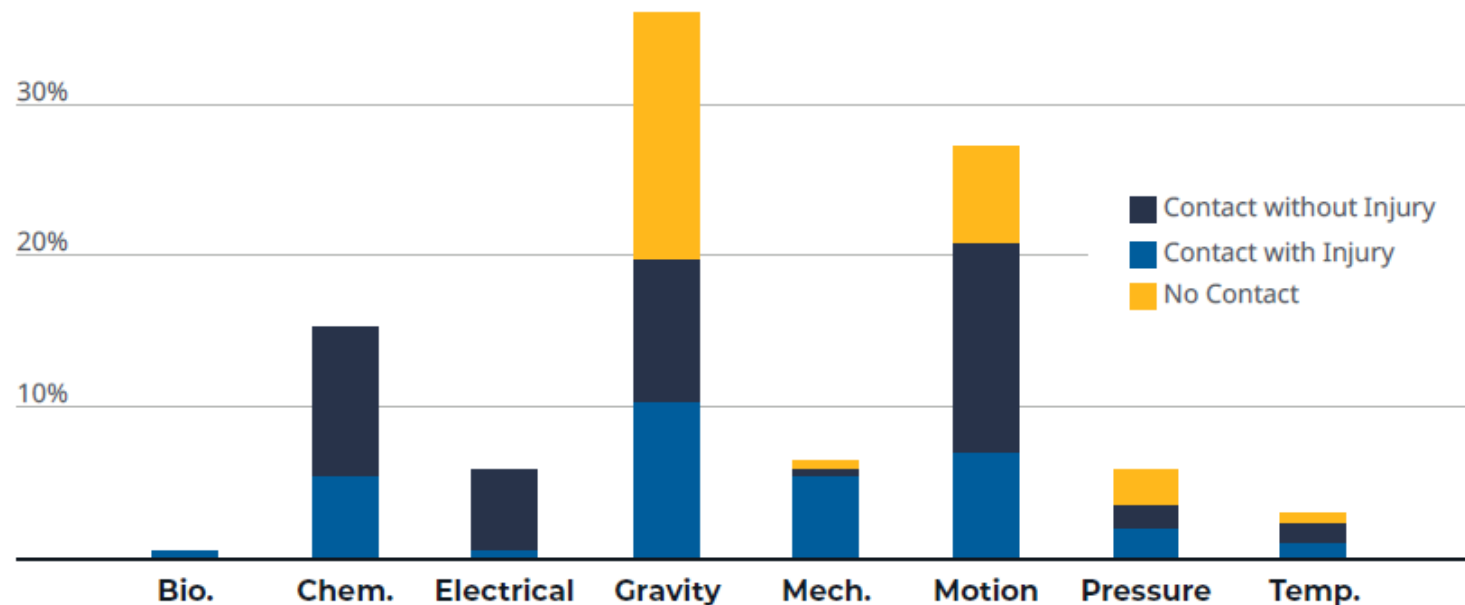
Insights – Energy Contact

Energy Contact

- No contact is dominated by Gravity, Motion and Pressure
- Contact with injury is dominated by Mechanical, Chemical and Gravity.

Reflection: Why do some energy types mostly result in injury PSIs?

FIG 15. DISTRIBUTION OF ENERGY CONTACT ACROSS ENERGY TYPES (2023-2025)

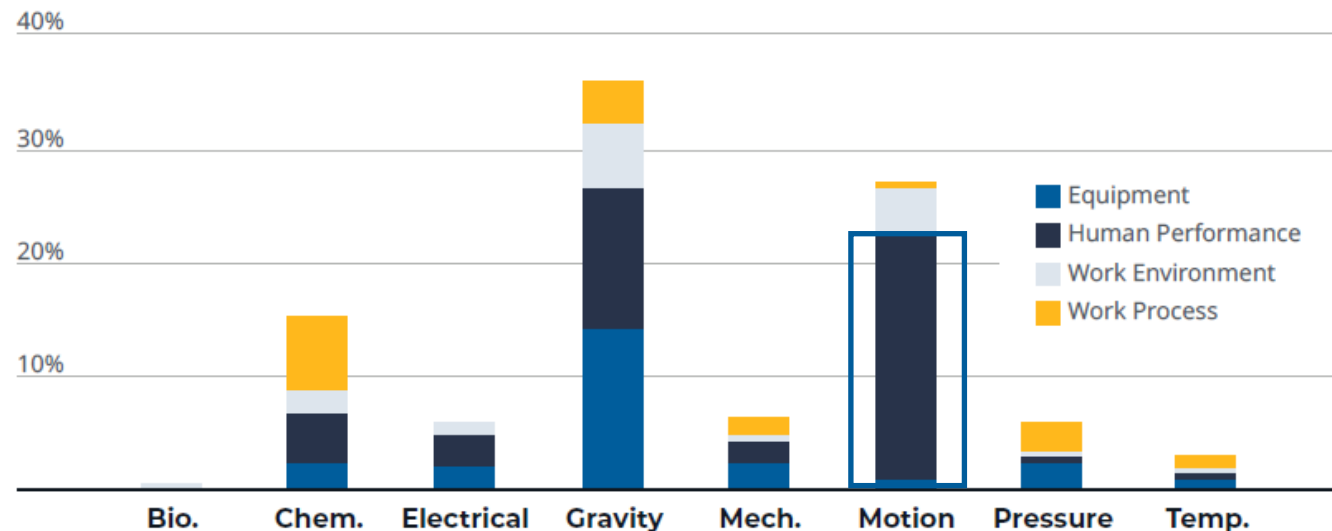


Insights – Proximal Cause

Proximal Cause

- Human Performance dominates (43%), followed by Equipment, Work Process and Environment.
- Gravity-related PSIs are equally represented by Human Performance and Equipment proximal causes.
- Motion energy is almost entirely compromised of Human Performance proximal causes.

FIG 18. PROXIMAL CAUSE ACROSS ENERGY TYPES (2023-2025)



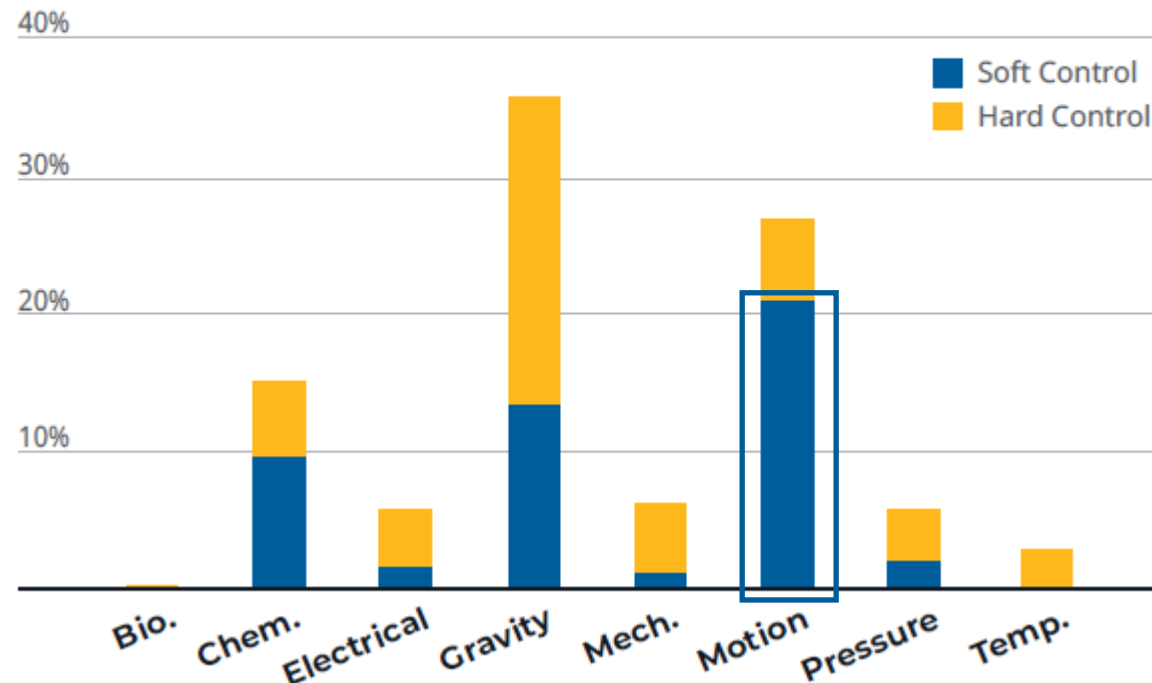
Insights – Controls

Hard/Soft Controls

- Hard Controls are more prevalent with Temperature, Mechanical, Electrical and Pressure energy types.
- Soft controls make up majority of Motion PSIs.

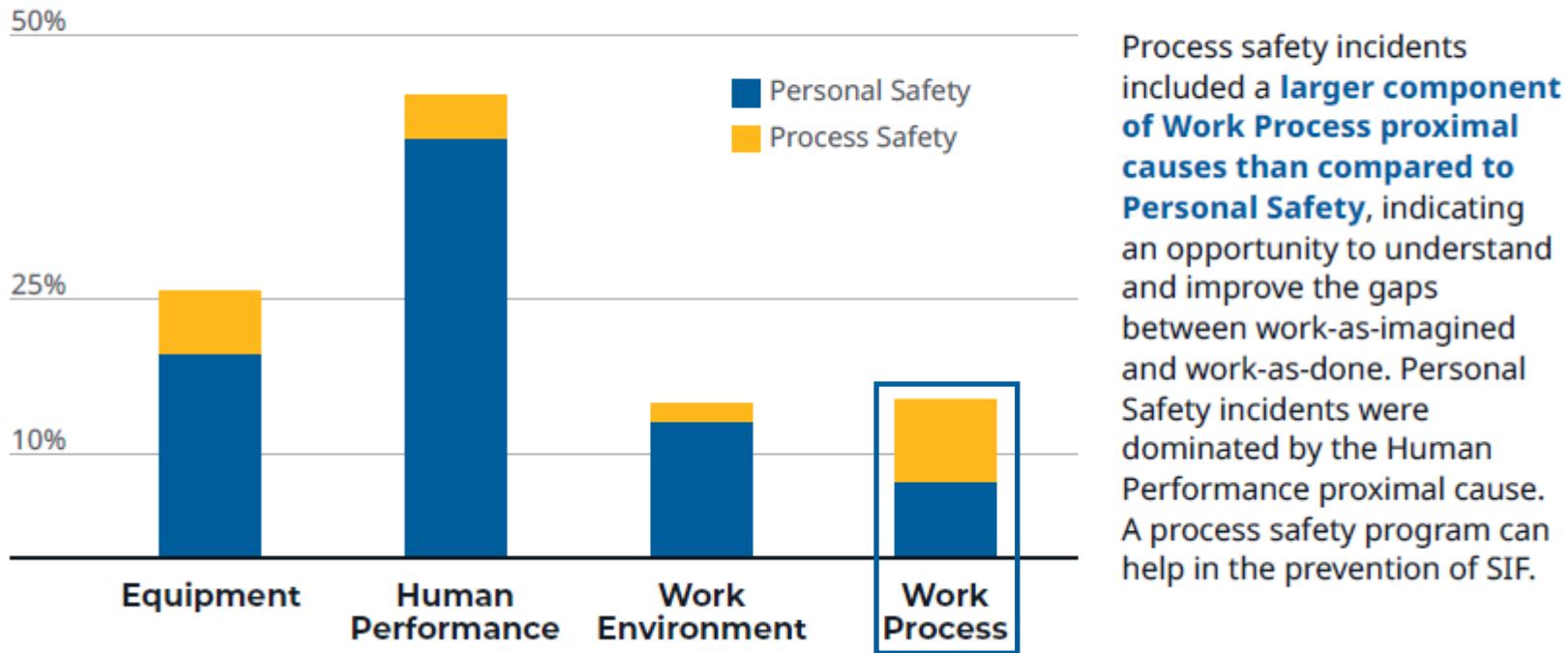
Reflection: What is it about Motion energy that makes it so hard to control?

FIG 22. DISTRIBUTION OF HARD AND SOFT CONTROLS ACROSS ENERGY TYPES (2023-2025)



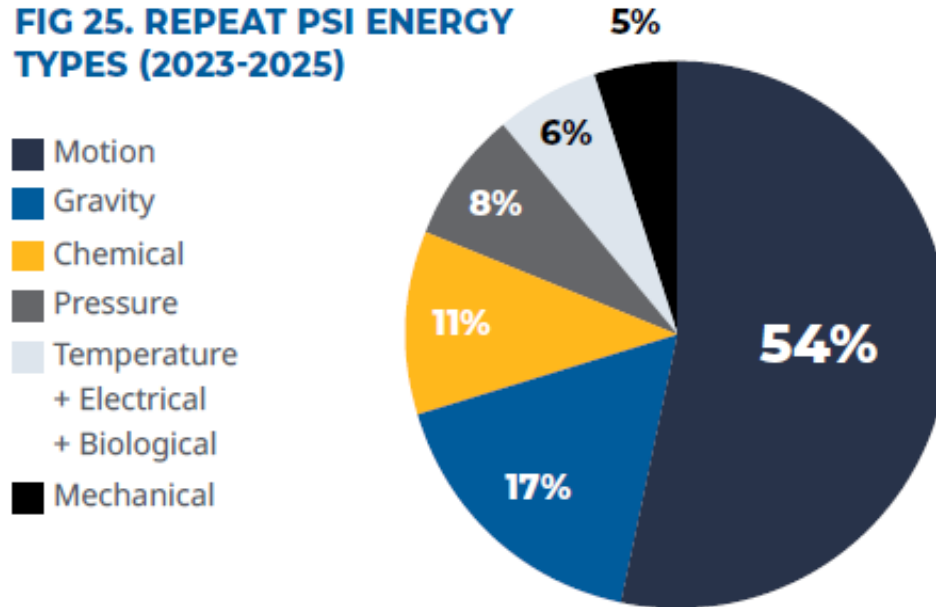
Insights – Process Safety

FIG 20. PROXIMAL CAUSE ACROSS PERSONAL AND PROCESS SAFETY INCIDENT TYPES (2023-2025)



Insights – Repeats

FIG 25. REPEAT PSI ENERGY TYPES (2023-2025)



The energy ‘Motion’ was the most significant contributor to Repeat PSIs.

Top three repeats:

- **Vehicle to vehicle incidents** involving haul trucks, dozers, graders and light-duty trucks
- **Struck by objects** involving pipe, rocks and tow cables coming through the unguarded windows of excavators, dozers and heavy-duty tow vehicles
- **Runaway haul trucks** where the park break was not applied.



1/3 of PSI were repeats

Poll Question

Question #3: Are Line of Fire risks from objects coming through the window of excavators, dozers and tow vehicles part of your existing risk/hazard assessment?

- a) Not currently
- b) Not Sure
- c) Yes - Risk deemed to be acceptable
- d) Yes - Policy and procedures in place
- e) Yes - Engineered Control Present

Insights – Repeats

Most of these PSI submitting companies installed protective cages in the windows of excavators, dozers and tow vehicles.

Reflection: Is this being considered in your company's work planning?



Insights – Verification

Critical Control Verification was Indicated proportionally less when the PSI involved an Injury. This observation is significant and counterintuitive.

FIG 26. VERIFICATION INDICATED IN PSIs (2023-2025)

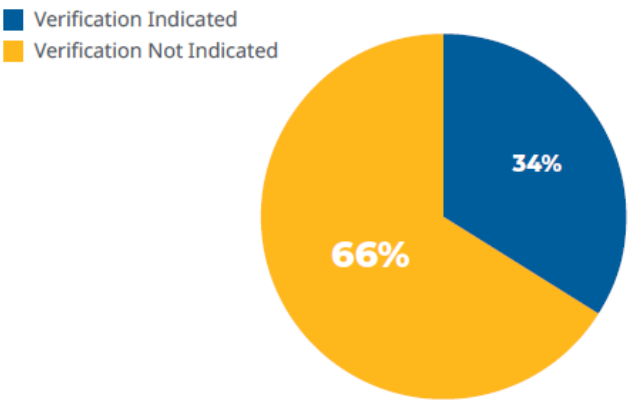
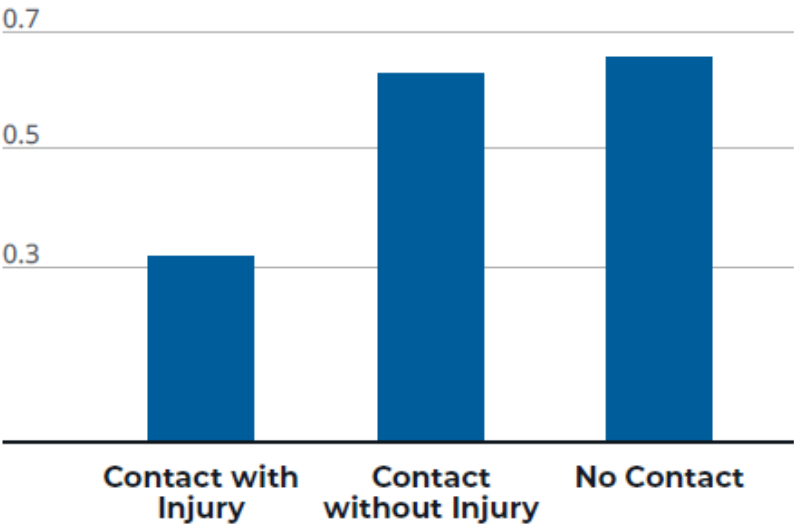


FIG 28. CRITICAL CONTROL VERIFICATION RATIO TO ENERGY CONTACT TYPE (2023-2025)



2x
as unlikely when a PSI involves an injury.

Reflection: What is it about Injury PSIs where Critical Control Verifications are less frequent?

Insights – Verification

Verification activities occur more frequently with some types of energy than others.

50% of the Electrical PSIs compared to **17%** of the Temp. PSIs

FIG 29. CRITICAL CONTROL VERIFICATION ACROSS ENERGY TYPES (2023-2025)

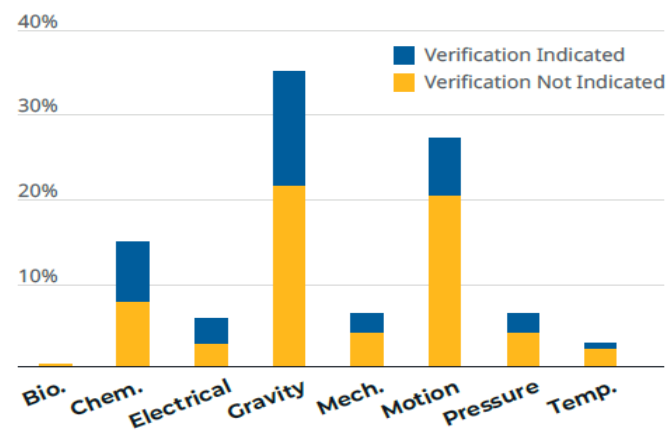
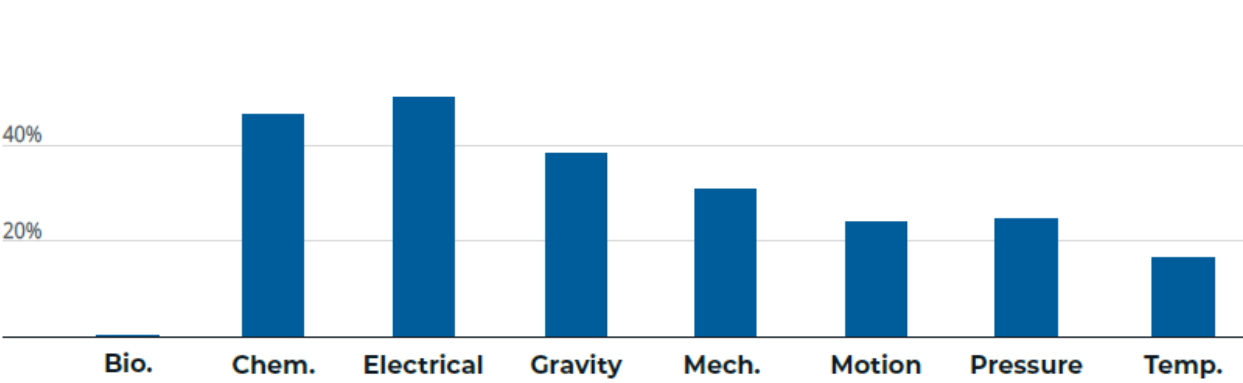


FIG 30. CRITICAL CONTROL VERIFICATION PERCENTAGE WITHIN ENERGY TYPE (2023-2025)



Reflection: Why do some types of energy PSIs include verification more often while others do not?

Key Insights

By the Numbers:

- **81%** of PSIs involved energy equal to or greater than 1,500 Joules
- **80%** of PSIs involved Gravity, Motion, or Chemical energy
- **43%** of PSIs identified Human Performance as the primary proximal cause
- **1 in 3** PSIs were repeat incidents.

Key Insights:

- Build prevention strategies around energy exposure, direct controls, and verification.
- Motion Energy is emerging as a critical risk area.
- Should 'Motion Energy' become a dedicated focus area for industry?
- Focus on sharing effective controls and lessons learned across industry.

Key Insights (con't)

By the Numbers:

- 34% of PSIs indicated Critical Control Verification as follow-up actions
- 20% of PSIs were process safety incidents with a larger component of 'Work Process' proximal causes

Key Insights:

- Strengthen industry understanding and visibility into control performance
- Understand the gap between work-as-imagined and work-as-done

What This Means for Industry

The findings suggest that industry's greatest opportunity is not discovering new hazards, but learning collectively from hazards that are already well understood.

By focusing on:

- Repeat incidents
- Motion Energy exposures
- Direct controls
- Critical control verification
- Cross-company learning

Industry can strengthen its collective approach to serious injury and fatality prevention.

Thank you

Questions

