Understanding the Impact of Changing Safety Metrics

(Outside Line Electrical Construction)

May 25, 2023

This session is eligible for 1.25 Continuing Education Hours.

For these hours to appear on your certificate, you must:

- Have your badge scanned at the door
- Attend 90% of this presentation
- Fill out the online evaluation for this session

Online Evaluation

Use of Safety Metrics

- Used by OSHA
  - Collected by Burrough of Labor Statistics (BLS)
  - Used to establish industry benchmarks
  - Used to target enforcement initiatives
- Used by insurance companies
  - Determines rates and premiums
- Used by host employers to assess contractor safety
  - Collected by host employers or third-party administrators
  - Used to access and qualify (pre-qualify) contractors

What's Changing for Contractors

- Host Employers | Contractor Assessment Criteria
  - Focus on Serious Injuries and Fatalities (SIFs)
  - Increased Inclusion of Leading Indicators

Pre-Metrics 101

Advantages

- Identify areas that need improvement
- Track progress and identify trends
- Can identify potential problems before they occur

Disadvantages

- Time-consuming
- Can be difficult to interpret
- Can be misused/misinterpreted
- **Can take focus away from the injured**

Metrics 101

- Metric | A system or standard of measurement
- Reliability and Validity | Determines the quality of the metric
- Reliability | The consistency of a measure (reproduce same results under the same conditions)
- Validity | The accuracy of a measure (measures what it is intended to measure)

Lagging & Leading Indicators

- Lagging Indicator | An output measurement. Measures the occurrence and frequency of events that occurred in the past, such as the number or rate of injuries, illnesses, and fatalities.
- Leading Indicator | A predictive measurement. Proactive and preventative measures that can impact a future outcomes.
  - Number Safety Observations : Number of Accidents

Lagging | Traditional OSHA Metrics

- TRIR | Total Recordable Incident Rate
- DART | Days Away, Restricted, Transferred Rate
- LWCR | Lost Workday Case Rate

$$\frac{\text{Number of Reported Cases} \times 200{,}000}{\text{Employee Total Hours Worked}}$$

* Normalization | Rescaling the data to arrive at values relative to some size variable.

Industry Benchmarking Data

NECA and INTEC, INC.

2021 Safety Recognition Data

SUMMARY REPORT - Lineman (District 10)

Code	Total Number of Hours	Employees	(G) Deaths	Total Transfer, Restricted and Days Away Cases	(H) Days Away Cases	(I) Job Transfer or Restriction	(J) Other Recordable Cases (medical	Total	Lost Work	(K) Total Days OTJ Transfer or Restriction	(L) Total Days Away	Total Days Transfer, Restricted and Away	Total Recordable Incidence Rate	DART Incidence Rate	Lost Work Day Case Rate	Severity Rate
347	42,056	21											.00	.00	.00	.00
393	735,928	333	1	7	1					143	107	250	2.45	1.90	.54	29.08
411	2,177,140	1,051		2						144		144	.55	.18	.00	.00
514	46,860	28											.00	.00	.00	.00
533	368,692	177											.54	.00	.00	.00
537	117,361	60											.00	.00	.00	.00
TOTAL	3,488,037	1,670	1	9	1					287	107	394				

Percentile Table

D1	0.00	0.00	0.00	0.00
Q1	0.00	0.00	0.00	0.00
Q2	0.27	0.00	0.00	0.00
Q3	0.71	0.33	0.05	2.42

Peer Group Rate			
0.92	0.52	0.11	6.14
Column Average			
.59	.35	.09	4.85

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

BLS Data

TABLE 1. Incidence rates(1)of nonfatal occupational injuries and illnesses by industry and case types, 2021

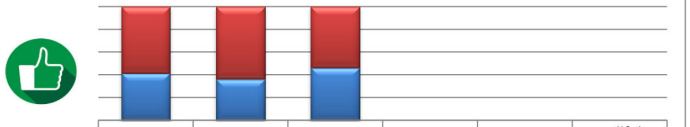
BLS BUREAU OF LABOR STATISTICS U.S. DEPARTMENT OF LABOR

Industry(2)	NAICS code(3)	Total recordable cases	Cases with days away from work, job restriction, or transfer			
			Total	Cases with days away from work(4)	Cases with days of job transfer or restriction	Other recordable cases
Construction		2.5	1.6	1.1	0.5	0.9
Construction	23	2.5	1.6	1.1	0.5	0.9
Construction of buildings	236	1.9	1.1	0.7	0.3	0.8
Residential building construction	2361	1.9	1.1	0.9	0.2	0.8
Nonresidential building construction	2362	1.9	1.0	0.6	0.4	0.9
Heavy and civil engineering construction	237	2.1	1.3	0.9	0.5	0.8
Utility system construction	2371	1.8	1.2	0.7	0.4	0.6
Water and sewer line and related structures construction	23711	2.9	2.0	1.2	0.8	0.9
Oil and gas pipeline and related structures construction	23712	0.5	0.3	0.2	0.1	0.2
Power and communication line and related structures construction	23713	1.6	1.0	0.6	0.4	0.6

* OSHA Metrics: Most Valid and Reliable Metric | May not measure the quality or effectiveness of a safety program

Current Lagging Indicators

Incident Summary Data



	TRIR Rate	DART Rate	E.M.R.	Fatalities	Repeat Violations	Willful Violations
INDUSTRY	3.40	2.80	1.00	0	0	0
COMPANY	2.40	1.60	0.86	0	0	0

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

Current Lagging Indicators

2021 NAICS Code: 23713 Power and communication line and relared structures construction				
TRIR	DART	EMR	Deaths	Willful
< 1.6	< 1.0	< 1	0	0

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

Serious Injuries & Fatalities

The Evolution of SIF Metrics and Prevention Strategies

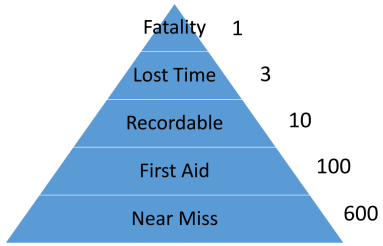
SIF Presentation Outline

- BST/Mercer ORC Study
- Response to SIF
- Applied Solutions
- Actual SIF Event Criteria

Definition of SIF

- Life Threatening Injury
  - An injury that if not immediately addressed is likely to lead to death. Usually requires the intervention of emergency response personal providing life-sustaining support.
- Life Altering/Permanent Disability
  - An injury that results in permanent or long-term impairment.
- Work Related

Traditional Model (Paradigm)



Heinrichs Triangle

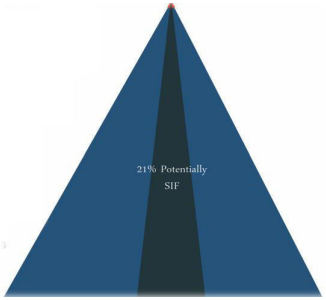
- Traditional prevention strategies based on Heinrichs Triangle.
- Reducing incidents at the bottom of the triangle corresponds with a proportional reduction at the top.
- Reducing recordable cases will reduce serious injuries.

SIF | Cause of Action

- Emerging Statistical Pattern
  - Recordable and Lost Time Accidents Are Going Down
  - SIF Accidents are Leveling or Increasing
- Prevention Strategies Inadequate
  - Not Addressing Their Worst Injuries
  - Not Addressing Fatalities
- BST/Mercer ORC Study
  - 7 Top Performing Organizations Participated
  - New Statistical Model, Metrics and Strategy Emerged

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

BST/Mercer ORC Study



- Reducing less serious incidents MAY NOT reduce SIF events
- Traditional Safety Triangle is not predictive for SIFs
- Not all incidents have SIF potential
- Focus on incidents with high SIF potential

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

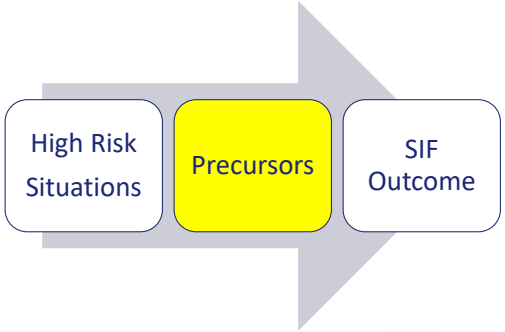
BST/Mercer ORC Study

- SIF incidents have different causes and correlates than less serious incidents.
- Causes of SIFs are most often related to Cardinal and Life-Saving Rules. (e.g., minimum approach distance)
- Less serious incidents are not related to Cardinal and Life-Saving Rules.

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

SIF Model (Paradigm)

High Risk Situations give rise to Precursors which are followed by Serious and Fatal Injuries.



NSPC NECA SAFETY PROFESSIONALS CONFERENCE

SIF Prevention Plan

Review Events/Cases

Classify SIF's | High SIF Potential

Identify & Mitigate Precursors

A Precursor is an unmitigated High-Risk condition that will eventually result in a SIF if allowed to continue.

SIF Classification/Determination

- Two classification or determination systems were identified from the study
  - Judgement Based Narrative Review
  - Event Based Decision Chart

- Procedure to identify incidents with SIF Potential. Actual and Potential SIFs were classified the same.

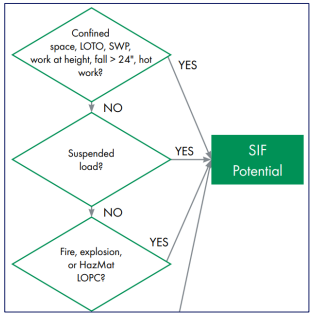
Judgement Bases Narrative Review

- Raters agreed upon definitions and participate in calibration exercises to achieve maximum reliability
- Raters read the complete accident narrative to understand context and circumstances in order to determine SIF Potential.

- Relies on professional judgment of the raters
- Suited for organizations with a small team of raters who review and classify all incident on a regular basis and engaged in frequent calibration exercises.

Event Based Decision Chart

- Activities w/SIF Potential
  - Confined Spaces
  - Suspended Loads
  - Elevations
  - 90% Reliability



Summary: SIF Prevention Plan

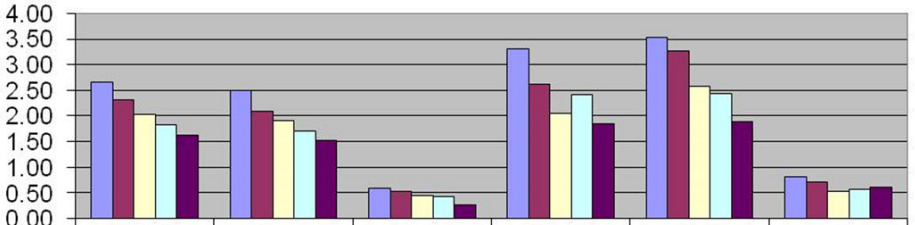
Review Events/Cases

Classify SIF's | High SIF Potential

Identify & Mitigate Precursors

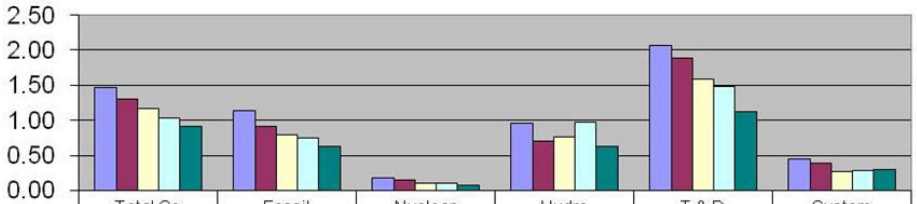
NSPC
NECA SAFETY PROFESSIONALS CONFERENCE

Total Recordable Incident Rate



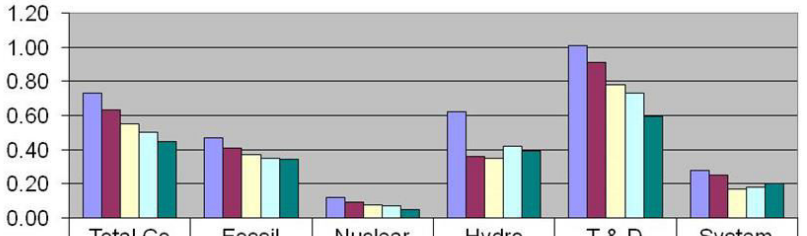
	Total Co	Fossil	Nuclear	Hydro	T & D	System
2007	2.66	2.49	0.58	3.31	3.53	0.82
2008	2.32	2.10	0.52	2.61	3.26	0.72
2009	2.02	1.91	0.44	2.04	2.59	0.54
2010	1.82	1.71	0.43	2.42	2.43	0.57
2011	1.63	1.53	0.27	1.84	1.89	0.60

DART Rate



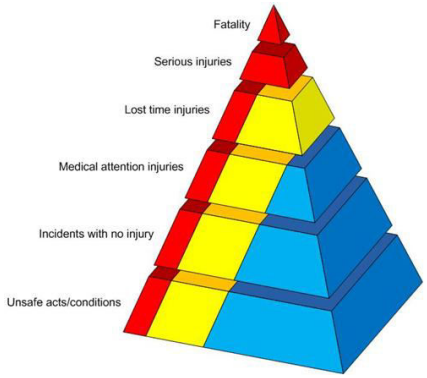
	Total Co	Fossil	Nuclear	Hydro	T & D	System
2007	1.47	1.14	0.18	0.96	2.07	0.45
2008	1.30	0.92	0.15	0.70	1.88	0.39
2009	1.17	0.80	0.11	0.76	1.58	0.27
2010	1.04	0.75	0.11	0.97	1.48	0.28
2011	0.91	0.63	0.08	0.63	1.13	0.30

LWDC Rate



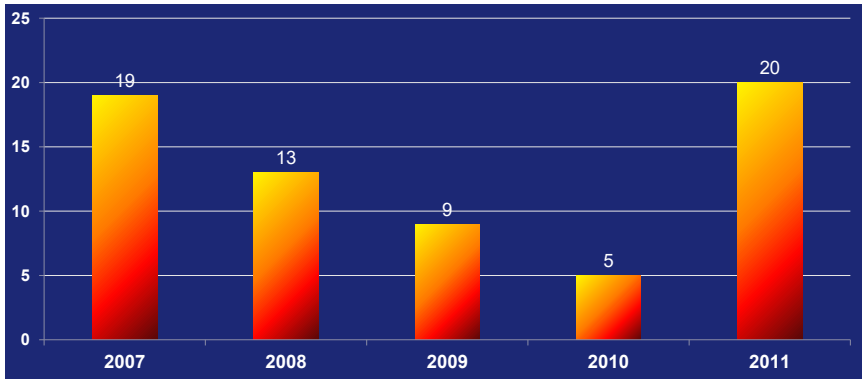
	Total Co	Fossil	Nuclear	Hydro	T & D	System
2007	0.73	0.47	0.12	0.62	1.01	0.28
2008	0.63	0.41	0.09	0.36	0.91	0.25
2009	0.55	0.37	0.08	0.35	0.78	0.17
2010	0.50	0.35	0.07	0.42	0.73	0.18
2011	0.45	0.35	0.05	0.39	0.60	0.20

Traditional Model | Heinrich's Triangle



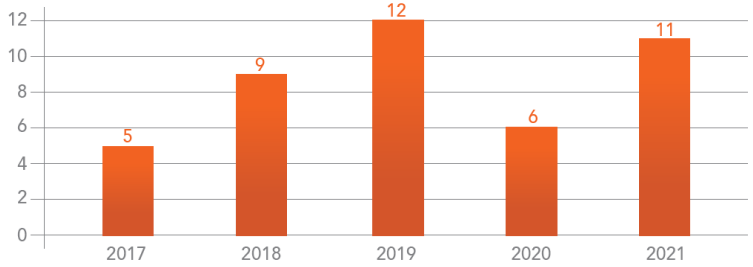
Reducing incidents at the bottom of the triangle corresponds with a proportionate reduction at the top of the triangle.

Total Company Fatalities



NSPC
NECA SAFETY PROFESSIONALS CONFERENCE

TOTAL COMPANY FATALITIES



Call to Action

- Why was this occurring?
- What can be done?

- No actionable data
- No mechanism to collect actionable data

- No understanding of the SIF Paradigm

NSPC
NECA SAFETY PROFESSIONALS CONFERENCE

Industry Response

- 2012 | Safety Survey (define, collect, and track actual SIF data)
- 2018 | SIF Precursor Project
- 2019 | SCL Model (SIF Classification and Learning Model)
- 2021 | SIF Learning Center (online application)
- 2020 | Industry Metrics Team
- 2022 | Leading Indicator Project
- 2022 | SBLI Data Collection and Analysis
- 2022 | HECA Development and Testing
- 2022 | Contractor Benchmarking Survey
- 2023 | Contractor Safety Guidelines

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

New Lagging Indicators

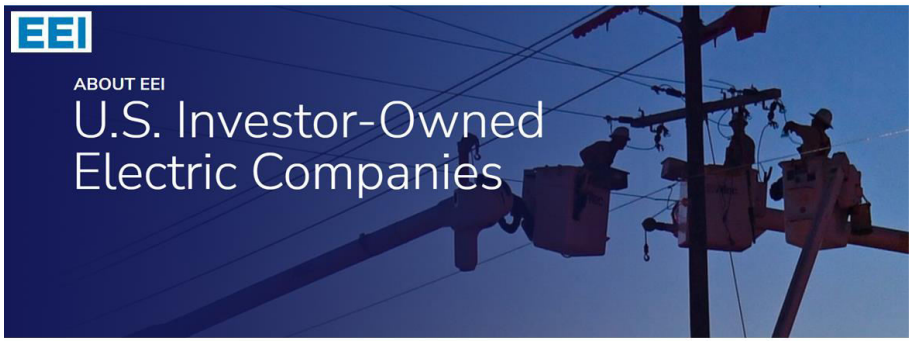
- SIF | Serious Injuries and Fatalities
- SCL Model | SIF Classification and Learning Model
- SBLI | Severity Based Lagging Indicator

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

SIF | Serious Injuries and Fatalities

- OSHA Severe Cases
  - Fatality, Amputation, Eye Loss, Hospitalization
- EEI SIF Criteria
  - Occupational Fatality
  - Life Threatening or Life Changing Injury

NSPC NECA SAFETY PROFESSIONALS CONFERENCE



- Investor-Owned Utilities
- Members provide electricity for about 220 million Americans
- Operate in all 50 states and the District of Columbia (and more than 90 countries)
- Supports more than 7 million jobs in communities across the United States

EEI Edison Electric INSTITUTE

Occupational Safety & Health Committee

Serious Injury & Fatality Criteria (SIF)

Effective Date: January 1, 2023

Serious Injuries and Fatalities

What is a SIF?
SIF was developed to be a metric that better defines serious injuries and fatalities. They include work related fatalities, life-threatening and life-altering injuries.

Defining Work Related
If the injury is OSHA recordable, it should be considered work-related.

EEI SIF Reporting Criteria

- Fatalities
- Amputations (involving bone)
- Concussions and/or cerebral hemorrhages
  - Include all cerebral hemorrhages and only severe concussions resulting in a loss of consciousness and/or symptoms lasting more than 24 hours.

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

EEI SIF Reporting Criteria

- Injury or Trauma to Internal Organs
  - Injuries should be classified as serious if objective medical evidence indicates significant or sustained (beyond initial event, acute treatment and testing) organ damage, or progressive changes in organ function or anatomy.
- Bone Fractures
  - Include fractures of the fingers and toes only if they are open, compound, or comminuted (crushed). Include all bone fractures of the face, skull, or navicular wrist bone. Exclude any hairline fractures unless described above
- Tendon, ligament, and cartilage tears
  - Complete tendon, ligament, and cartilage tears of the major joints (e.g., shoulder, elbow, wrist, hip, knee, and ankle)

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

EEI SIF Reporting Criteria

- Herniated Disks (neck or back)
- Lacerations
  - Lacerations resulting in severed tendons and/or a deep wound requiring internal stitches. Do not include severed tendons and/or deep wounds requiring internal stitches to the fingers and toes.
- Burns
  - 2nd (10% body surface) or 3rd degree burns

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

EEI SIF Reporting Criteria

- Eye Injuries
  - Eye injuries resulting in eye damage or loss of vision.
- Injections of Foreign Materials (e.g., hydraulic fluid)
- Severe Heat Exhaustion and All Heat Stroke Cases
  - Severe heat exhaustion cases are those where all of the following symptoms are present: profuse sweating, nausea, and confusion. If confirmed fainting occurs due to the heat exposure, this is an automatic severe case.

EEI SIF Reporting Criteria

- Dislocation of a Major Joint (shoulder, elbow, wrist, hip, knee, and ankle)
  - Count only cases that required the manipulation or repositioning of the joint back into place under the direction of a treating doctor
- Other Cases
  - The "Other Injuries" category should only be selected for reporting injuries not identified in the existing categories.

EEI SIF Reporting Criteria

- Serious Injury Incidence Rate (SIIR)

$$\frac{\text{Number of Reported Cases} \times 200{,}000}{\text{Employee Total Hours Worked}}$$

EEI Precursor Analysis Study

- Research process revealed 13 Precursors
- Focuses on conducting field safety engagements prior to beginning work
- Uses a scorecard to assess potential for a SIF potential

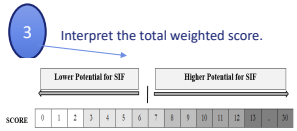
EEI Precursor Analysis Study

PRECURSORS	(check if present)	WEIGHT
Safe Work Procedure		3
Hazard Recognition		2
Departure from Routine		3
Plan to Address Change		1
Safety Attitudes		1
Rules and Procedures		3
Familiar with the Task		2
Risk Normalization		3
Productivity Pressure		3
Perceived Safety Culture		3
Stop Work Execution		2
Workers Inactive in Safety		2
Pre-Task Plan		3
	TOTAL WEIGHTED SCORE:	SUM

SIF Precursor Scorecard

EEI Edison Electric INSTITUTE

1. Check the precursors that were present before any intervention was made.
2. Find the sum of all the weights for the selected precursors.
3. Interpret the total weighted score.



NSPC NECA SAFETY PROFESSIONALS CONFERENCE

SBLI | Severity Based Lagging Indicator

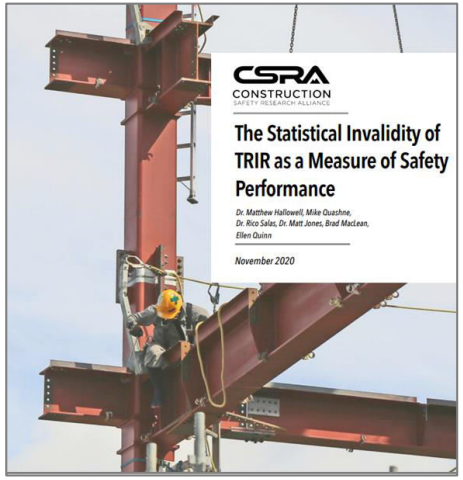
- Developed to be an improved lagging indicator.
- SBLI is an aggregated injury rate that weights injuries by their relative level of severity and aggregates them into one number.
- SBLI produces a more statistically stable and representative indication of safety performance.
- What was the perceived need for this metric?

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

CSRA CONSTRUCTION SAFETY RESEARCH ALLIANCE

University of Colorado Boulder

Safety Through Science.



Invalidity of TRIR

- Not a valid measure of safety performance.
- The occurrence of recordable injuries is rare and random, making it statistically unstable even over long timeframes.
- It is not predictive of itself or of more severe injuries.

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

Severity-Based Lagging Indicator

Table 1 – Injury Severity Category Weightings

Injury Severity Level	Symbol	Assigned Weight
First Aid	FA	100
Medical Treatment	MT	500
Job Transfer or Restricted Duty	JTR	750
Days Away from Work	DAW	1500
Fatality	F	NOT WEIGHTED

Table 2 – SBLI Computation for Company X

Year	Month	Month (#)	Hours	FA	MT	JTR	DAW	SBLI
2018	Jan	1	1221702	5	5	3	4	1.84
2018	Feb	2	1069571	4	5	2	4	1.94
2018	Mar	3	1172202	10	7	5	5	2.69
2018	Apr	4	1294607	6	5	2	2	1.17
2018	May	5	1338205	7	4	2	6	1.97
2018	Jun	6	1180342	5	5	3	3	1.65
2018	Jul	7	1208402	12	8	3	5	2.47
2018	Aug	8	1209507	7	7	4	6	2.68
2018	Sep	9	1104894	6	5	2	6	2.46
2018	Oct	10	1428938	6	7	3	8	2.57
2018	Nov	11	1165845	7	5	4	3	1.84
2018	Dec	12	992878	5	4	1	4	1.86

$$SBLI = \frac{n_{fa} * w_{fa} + n_{mt} * w_{mt} + n_{jtr*} w_{jtr} + n_{daw} * w_{daw}}{e} * 200$$

Severity-Based Lagging Indicator

Figure 2 – Rolling 12-month average SBLI for Company X

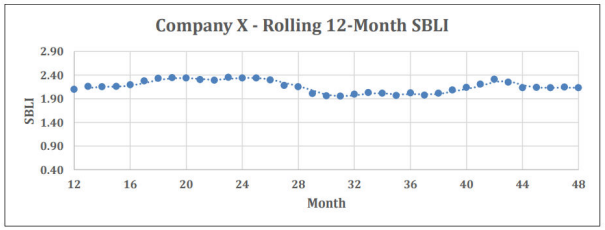


Table 3 – Company X Rolling SBLI Data

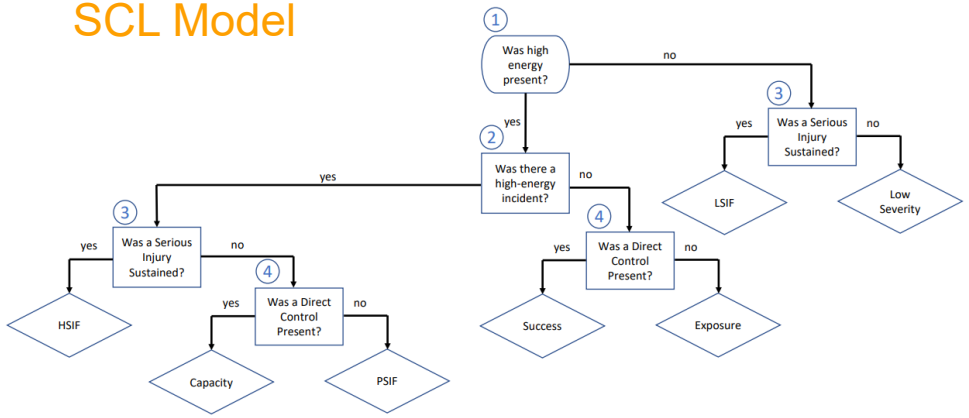
Month (#)	SBLI	12-month SBLI
1	1.84	-
2	1.94	-
3	2.69	-
4	1.17	-
5	1.97	-
6	1.65	-
7	2.47	-
8	2.68	-
9	2.46	-
10	2.57	-
11	1.84	-
12	1.86	2.10
13	2.61	2.16
14	1.84	2.15
15	2.79	2.16
16	1.55	2.19
17	2.94	2.27
18	2.33	2.33
19	2.64	2.34
20	2.59	2.34
21	2.08	2.30
22	2.39	2.29
23	2.53	2.35
24	1.74	2.34

Safety Classification and Learning (SCL) Model

- Uniform System for Classifying Incidents and Observations
- Underpinned by Participant Approved Definitions
- Supported by Flowchart, Icons, and Energy Wheels
- Tracked though an online database application

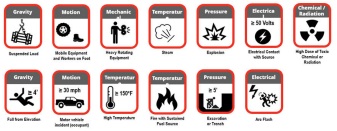
NSPC
NECA SAFETY PROFESSIONALS CONFERENCE

SCL Model



SCL Model Question #1

- **Was High-Energy Present?**
  - Refer to icons below or energy assessment charts



NECA SAFETY PROFESSIONALS CONFERENCE

SCL Model Question #2

- **Was there a High-Energy Incident?**
  - An instance where the high-energy source was released and where the worker came in contact with or proximity to the high-energy source.

NECA SAFETY PROFESSIONALS CONFERENCE

SCL Model Question #3

- **Was a Serious Injury Sustained?**
  - Refer to EEI SIF criteria for a complete categorization and description of SIF events.

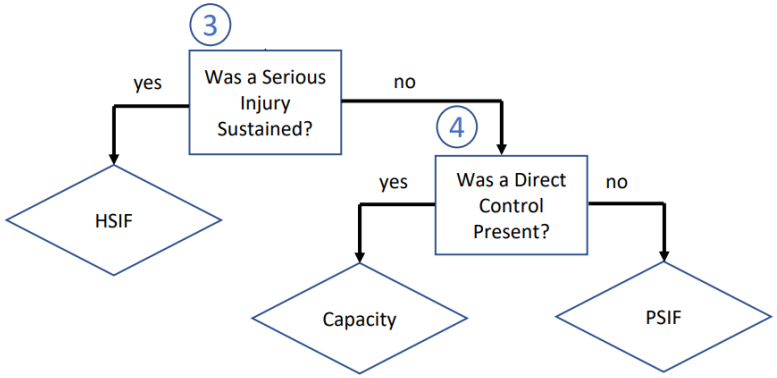
NECA SAFETY PROFESSIONALS CONFERENCE

SCL Model Question #4

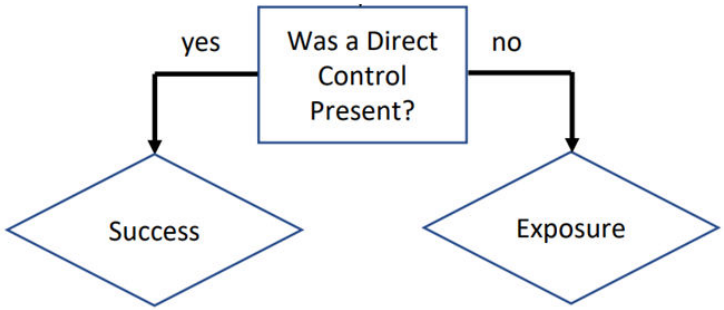
- **Was a Direct Control Present?**
  - The control is specifically targeted to the high-energy source
  - The control effectively mitigates exposure to the high energy source when installed, verified, and used properly
  - The control is effective even if there is unintentional human error during the work period (unrelated to the installation of the control)

NSPC
NECA SAFETY PROFESSIONALS CONFERENCE

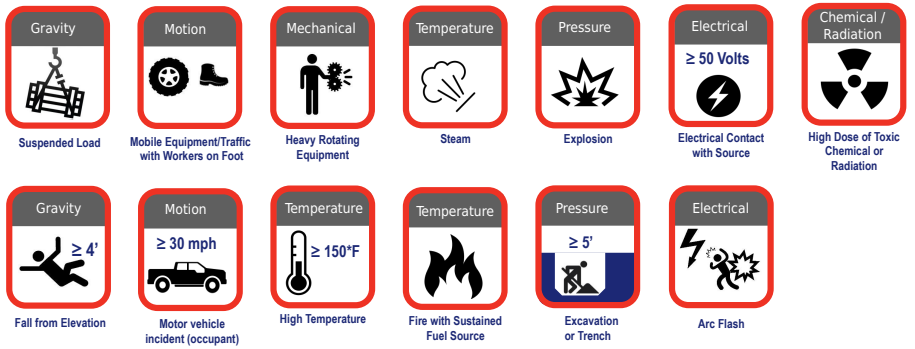
Yes | High Energy Incident (release)



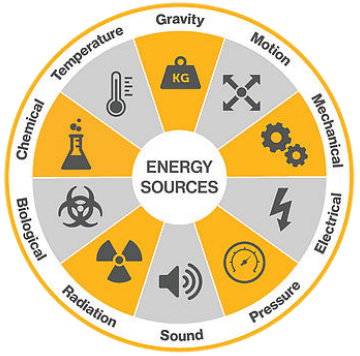
No | High Energy Incident (release)

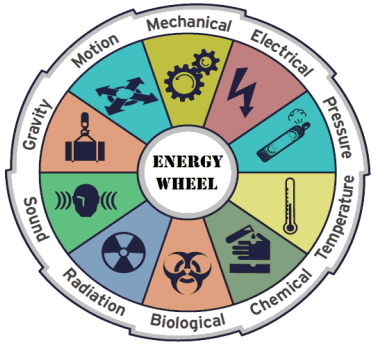


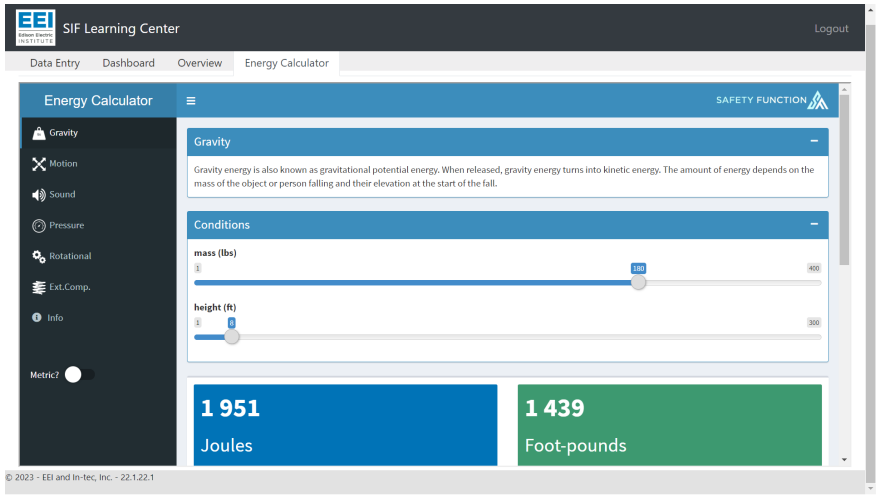
High Energy Icons



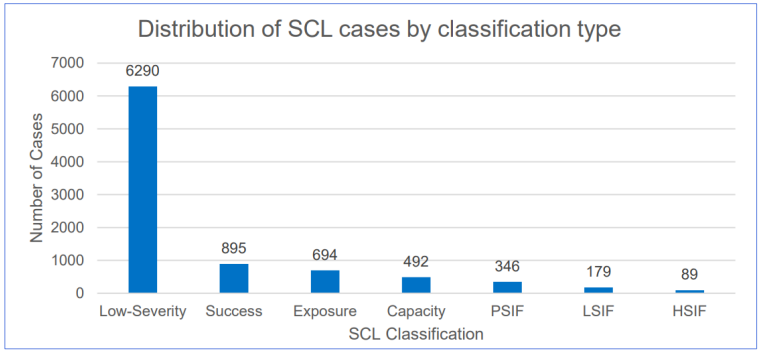
SIF Energy Wheels







SCL Classifications



Types of Leading Indicators

- Leading Indicator | A predictive measurement. Proactive and preventative measures that can impact a future outcomes.
- Active Leading Indicator
  - Can be readily changed during work
  - Increase number of observations to reduce number of accidents
- Passive Leading Indicator
  - Implemented before work begins and remains relatively static
  - Written Programs and Safety Management Program
  - Best Practices are a form of passive leading indicator

NSPC
NECA SAFETY PROFESSIONALS CONFERENCE

Common Leading Indicators

- Company Safety Committee
- Safety Professional Ratio
- Compliant Written Programs
- ET&D Partnership Best Practices
- Safety and Health Management Program
  - Collection of Leading Indicators/Best Practices

Safety & Health Management Program

May 25, 2023

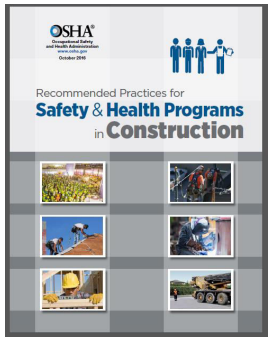
Safety Management Standards

A system that is designed to manage safety risk at the workplace. Program elements detect and correct workplace hazards.

- ANSI Z-10 | Occupational Health And Safety Management Systems
- ISO 45001 | Occupational Health and Safety Management Systems
- OSHA | OSHA Safety & Health Management Guidelines

Safety & Health Management Program

- System of passive leading indicators
- Collection of Best Practices (leading indicators)
- Historical Base: OSHA 4 Point Plan
  - Management Commitment & Employee Involvement
  - Workplace Analysis
  - Hazard Identification and Control
  - Training



Safety & Health Program Guidelines

- A program is required to detect and correct workplace hazards
- Provides recommended guidelines for an effective safety and health program.
- Contains best practices and leading indicators

NSPC
NECA SAFETY PROFESSIONALS CONFERENCE

OSHA Safety Management Guidelines

- Leadership & Participation
- Hazard Identification
- Hazard Control
- Information & Training
- Subcontractor Management
- Program Improvement

OSHA

NSPC
NECA SAFETY PROFESSIONALS CONFERENCE

Safety Management Program Evaluation

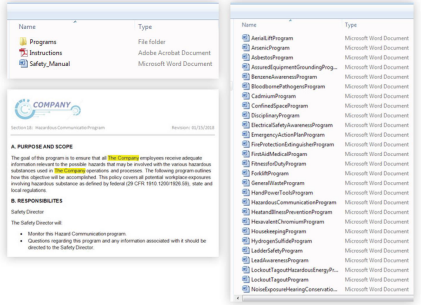
- Review program elements address regulations, consensus standards and best practices
- Assessments typically performed by third-party
- Specific language required
- Third-parties assess programs using safety pro, admin, scoring rubric, computer app or combination of these

NSPC
NECA SAFETY PROFESSIONALS CONFERENCE

Safety Management Program Evaluation

Standards

- Required criteria
- Branding/Customization needed
- Unique organizational structure, procedures, & resources?



NSPC
NECA SAFETY PROFESSIONALS CONFERENCE

Safety Management Program Evaluations

- Score provided based on matching content with required language
- Most content generic based on common host employer needs regardless of contractor work
- Third party evaluators may have individual requirements based on a specific host employer

NSPC
NECA SAFETY PROFESSIONALS CONFERENCE

LEADERSHIP & PARTICIPATION	90%
Safety Policy	75
Safety Goals	66
Resource Allocation	100
Roles/Responsibility	100
Disciplinary Policy	100
Communication	100
Performance Reviews	n/a
Recognition Program	n/a

HAZARD CONTROLS	97%
Information Exchange	100
Selection of Controls	100
Control Plans	100
Application of Controls	100
Preventative Maintenance	100
Emergency Plans	75
Emergency Equipment	100
Medical Services	100

EDUCATION & TRAINING	93%
Training Matrix	100
Orientation Training	100
Site Specific	100
Program Implementation	100
Refresher / Ongoing	66

SUBCONTRACTOR MANAGEMENT	58%
Subcontractor Selection	66
Subcontractor Oversite	50
EEI-CSP Participation	^

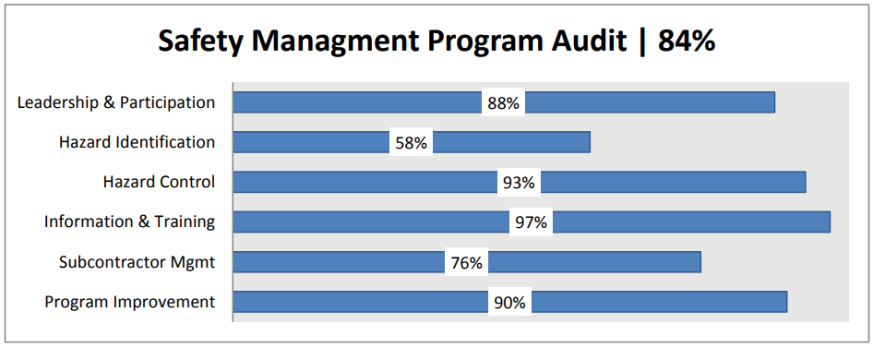
PROGRAM IMPROVEMENT	88%
Monitor and Verify Program	100
Identify Program Deficiencies	100
Implement Improvements	66

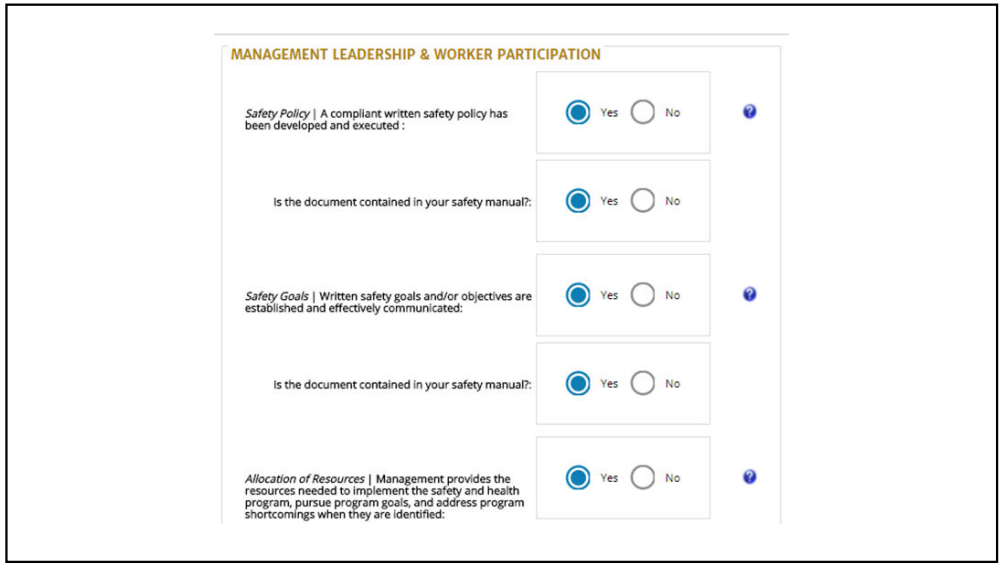
HAZARD IDENTIFICATION	76%
Hazard Assessments	100
Job Briefings	75
Change Analysis	66
Inspections	60
Reporting Systems	66
Corrective Actions	75
Accident Reporting	100
Accident Investigation	80
Incident Tracking & Trends	66
Job Hazard Analysis	n/a
SME Assessments	n/a
Observation Program	n/a
Near Miss Reporting	n/a
Other Hazard Id Progams	n/a

Corrective Actions	Systems are in place to effectively address corrective actions	75%
	• Corrective actions are documented and tracked	1
	• Hazard corrections are addressed in a timely manner	1
	• Corrective actions, once implemented, are communicated to the workers	0
	• Employees are trained and encouraged to take corrective actions	1

Accident Reporting Policy	Systems are in place to provide workers with the means to report accidents without fear of retaliation	100%
	• Procedures have been developed for workers to report accidents	1
	• Workers are encouraged and trained to report accidents	1
	• Reported accidents are documented	1

Accident Investigation	An accident investigation system has been developed and is effectively implemented	80%
	• Investigations are documented and the results recorded on required forms (OSHA 300, 301)	1
	• Sensitive and personal information are not disclosed on investigation reports as required	1
	• Investigations are objectively performed with a focus on identifying program deficiencies	1
	• Investigative teams are trained on investigation techniques including underlying and root cause determination	0
	• The results of investigations are communicated to managers, supervisors, and workers to prevent recurrence	1





EEI Leading indicator Study

- Leading Indicator: Measure of safety-related practices that are indicative of future performance and can be used to trigger positive response.
- Effective indicators share some fundamental attributes. In the recent EEI study, all identified indicators met specific criteria.

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

Leading Indicator Attributes

- Observable and Measurable
- Unidirectional
- Actionable
- Predictive
- Standardized (reliable)

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

Leading Indicator Attributes

- **Observable and Measurable**
  - The indicator must be readily observed and objectively measured.
  - Leading indicators can be measured frequently so they are not subject to the same statistical limitations as rarely occurring lagging indicators.

NSPC NECA SAFETY PROFESSIONALS CONFERENCE

Leading Indicator Attributes

- **Unidirectional**
  - Indicators must have one direction (e.g., higher score is always better or lower score is always better).
  - This criterion renders some commonly used indicators like stop work authority and near miss reporting inviable.

Leading Indicator Attributes

- **Actionable**
  - It must be possible to take management action based on an observed measurement or trend.
  - If the frequency of safety observations were to drop, additional observations could be mandated before an injury occurs.

Leading Indicator Attributes

- **Predictive**
  - The best indicators have shown to predict future performance.
- **Standardized**
  - They must be measured and reported consistently by all stakeholders.

Leading Indicator EEI Study

- Observations
- JSA Document Review
- Pre-job document Review
- Pre-job discussion Review

Leading Indicator EEI Study

Observations

- Identify controls, behaviors, and safe work practices
- Not peer-to-peer observations
- # Observations / Manhours by Month

Leading Indicator EEI Study

JSA Document Review

- Meet minimum standards = # “acceptable”
  - Detailed and complete description of tasks/procedures
  - Hazards listed with at least one control
  - All high-energy hazards identified with direct controls or alternative safety plan noted
- Metric
  - Description %
  - # Hazard / # Control %
  - # High Hazard / # Control %

Leading Indicator EEI Study

Pre-job Briefing Document Review

- Job Briefing Documentation
  - Job Location
  - Job task
  - Hazard Identification
  - Mitigations/Controls:
  - Clearly identified person in charge
  - Emergency response plan
- % of above completed

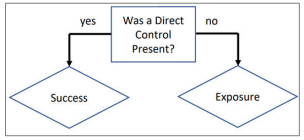
Leading Indicator EEI Study

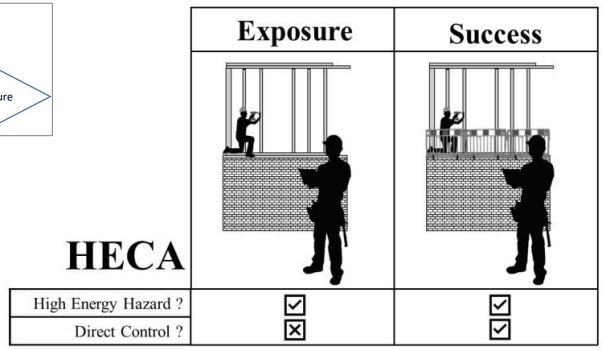
Pre-job discussion Review

- Quality of job briefing conversation
  - Score card
    Pre job Scorecard 8.28.21 (colorado.edu) (Inside)

HECA | High Energy Control Assessment

- Created from the SCL Model
- Target observations to access high energy hazards
- Determine if energy hazards have corresponding direct controls
- HECA **Monitoring** Metric
  - % of high energy hazards have a corresponding direct control





HECA Success Rate: 5/9 = 56%

How Are Contractors Being Assessed?

- Lagging Indicators
  - OSHA Rates, EMR, OSHA Violations
- Leading Indicators
  - Written Programs

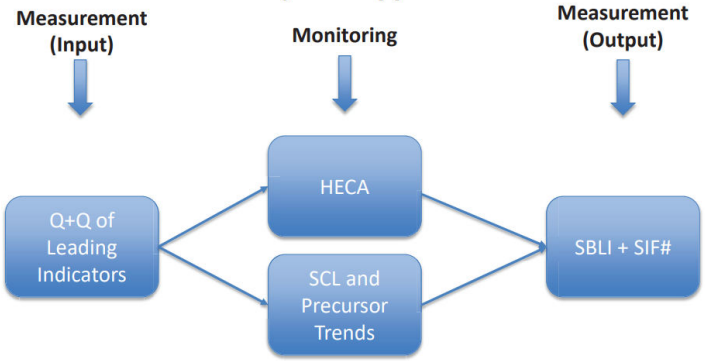
How Will Contractors Be Assessed?

- Lagging Indicators
  - OSHA Rates, EMR, OSHA Violations
  - Serious Injury and Fatalities (SIF)
  - Severity Based Lagging Indicators (SBLI)
- Leading Indicators
  - Written Programs (Site Specific Plans)
  - Safety Management Systems
  - SIF Control Assessments

EEI
Edison Electric INSTITUTE

Measurement and Monitoring:

A system approach



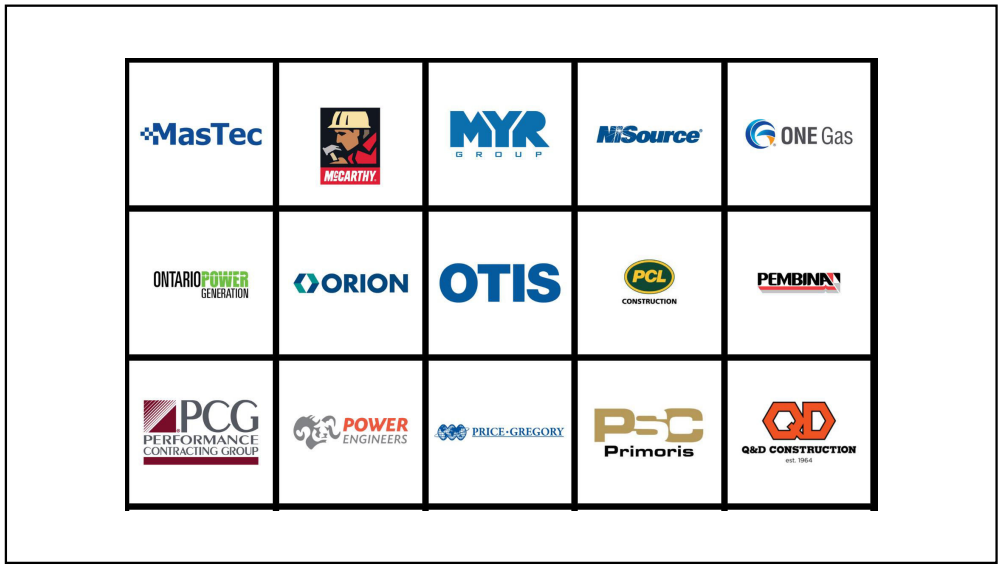
CSRA
CONSTRUCTION
SAFETY RESEARCH ALLIANCE

University of Colorado Boulder

Safety Through Science.

ACIG · Adolfson & Peterson Construction · Allan Myers · Ameren · American Electric Power
Ames Construction · Artera · Barnard · bird · Brasfield & Gorrie General Contractors
California Resources Corporation · CAT · CenterPoint Energy · Centuri Construction Group · Cheniere

Clark Construction · CLECO · Comfort Systems USA · ConocoPhillips · conEdison
Davey · DPR Construction · Enbridge · Energy Safety Canada · entergy
Ergon · Eversource · exelon · FirstEnergy · Flynn



Please complete the Online Evaluation

NSPC
NECA SAFETY PROFESSIONALS CONFERENCE