



Edison Electric
INSTITUTE

Occupational Safety & Health Committee **Severity-Based Lagging Indicator Reporting**

December 14, 2022

Antitrust Compliance

As you all know, EEI and its members are committed to full compliance with all laws and regulations and to maintaining the highest ethical standards in the way we do business. This commitment includes strict compliance with federal and state antitrust laws.

Agenda



Limitations of current methods



SBLI defined



EEl data



Example



Long-term vision



EEl safety survey

TRIR: The (current) king of the metrics

$$\text{TRIR} = \frac{\text{Number of Recordable Incidents} \times 200,000}{\text{Number of Worker-Hours}}$$

How is TRIR traditionally used?

- *Compare* and track safety performance over time
- *Compare* performance to peer companies
- *Compare* business units
- *Compare* contractors
- *Compare* people (performance evaluations/incentives)

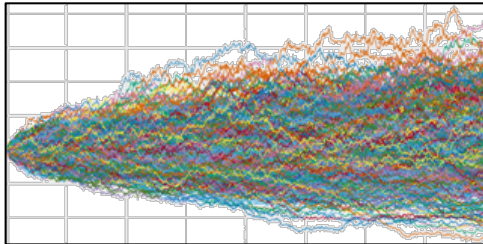
To what extent is TRIR valid?

- Generalized Linear Modeling

$$Y_i = \beta_0 + \beta_1 X_i + \epsilon_i$$

Labels for the equation above:
- Y_i : Dependent Variable
- β_0 : Population Y intercept
- β_1 : Population Slope Coefficient
- X_i : Independent Variable
- ϵ_i : Random Error term
- $\beta_0 + \beta_1 X_i$: Linear component
- ϵ_i : Random Error component

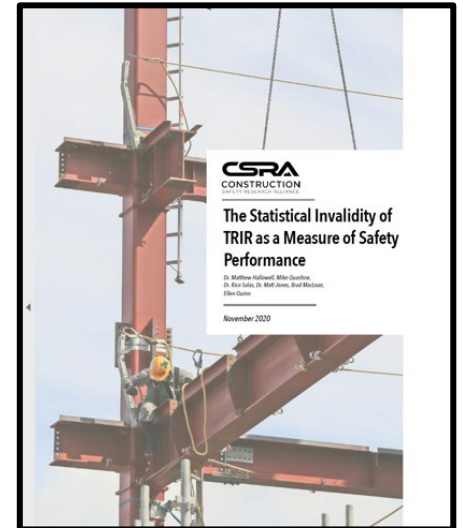
- Monte Carlo Simulations



17 YEARS OF
DATA &
3.2
TRILLION
WORKER HOURS

To what extent is TRIR valid?

- TRIR is not predictive of future TRIR
- TRIR is not predictive of fatalities
- TRIR is approximately 98% random



TRIR: Strengths and Weaknesses

Strengths

- Frequency and severity of injuries is critically important
- Highly comparable because all injuries are defined the same
- Clear and easy to understand
- Highly objective
- Years of intuition

Weaknesses

- Statistically invalid
- All recordable incidents counted the same
- Considers safety as the absence of injuries
- Underreporting
- Case management

Severity Based Lagging Indicator (SBLI)

Aggregated injury rate that weights injuries by their relative level of severity.

$$SBLI = \frac{n_{fa}100 + n_{mt}500 + n_{jtr}750 + n_{daw}1500}{e} * 200$$

- Not all incidents have equal impact or importance
- Incidents are rare and random, and the data are too sparse to yield stable results

Incident Categories

Injury Severity Level	Definition	Weight
First Aid	An injury or illness that requires medical attention that is usually administered immediately after the injury occurs and at the location where it occurred.	100
Medical Treatment	An injury or illness that does not involve death, one or more days away from work, or one or more days of restricted work or job transfer, and where the employee receives medical treatment beyond first aid.	500
Job Transfer or Restricted Duty	As the result of a work-related injury or illness, an employer or health care professional keeps, or recommends keeping, an employee from doing the routine functions of his or her job or from working the full workday that the employee would have been scheduled to work before the injury or illness occurred.	750
Days Away from Work	An injury or illness involves one or more days away from work.	1500

What about fatalities?

SBLI Example

Month	Hours	First Aid	Medical Treatment	Job trans. Or restr.	Days away cases
		100	500	750	1500
1	379,357	12	2	1	0
2	361,289	4	1	0	1
3	355,706	6	0	0	0
4	311,243	8	0	1	0
5	389,435	12	2	0	0
6	300,345	6	0	0	0
7	360,706	1	0	1	0
8	385,288	4	0	0	0
9	364,589	18	0	0	0
10	377,514	2	0	0	0

Data from OSHA
300 Log

SBLI Example

Month	Hours	First Aid	Medical Treatment	Job trans. Or restr.	Days away cases	Score
		100	500	750	1500	
1	379,357	12	2	1	0	2950
2	361,289	4	1	0	1	2400
3	355,706	6	0	0	0	600
4	311,243	8	0	1	0	1550
5	389,435	12	2	0	0	2200
6	300,345	6	0	0	0	600
7	360,706	1	0	1	0	850
8	385,288	4	0	0	0	400
9	364,589	18	0	0	0	1800
10	377,514	2	0	0	0	200

For a period:

- Multiply the number of injuries at each severity level by the number of points for that severity level
- Add up the total number of points

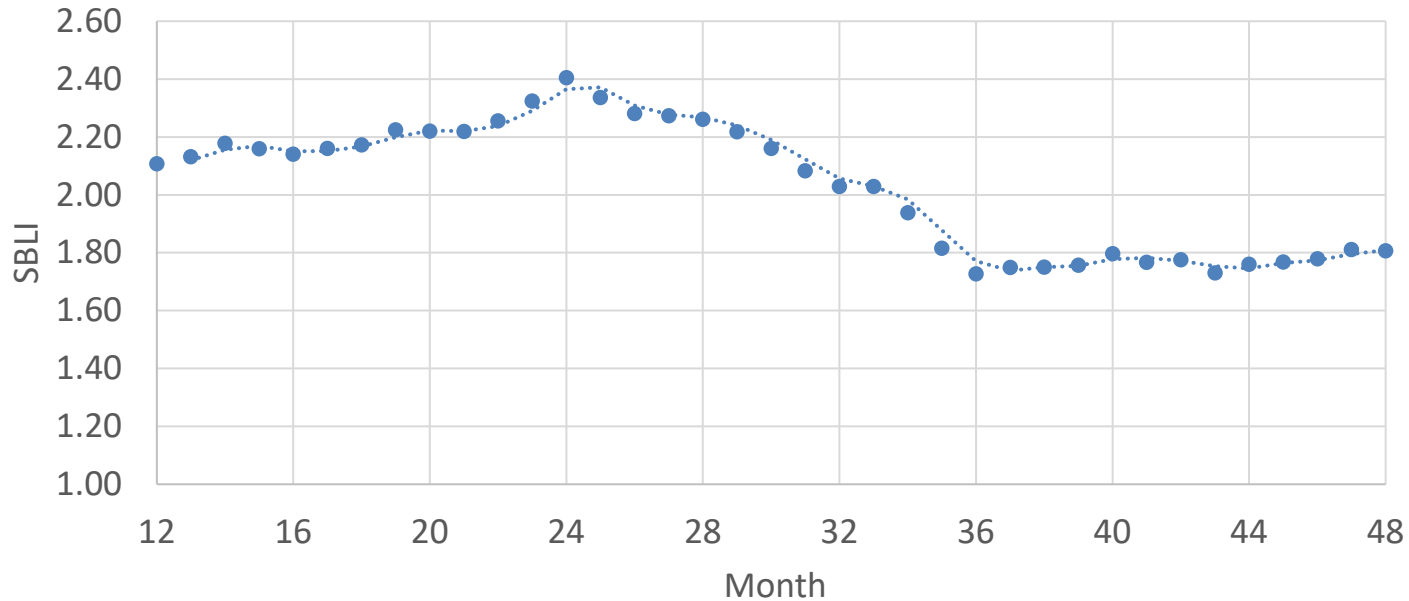
SBLI Example

Month	Hours	First Aid	Medical Treatment	Job trans. Or restr.	Days away cases	Score	SBLI
		100	500	750	1500		
1	379,357	12	2	1	0	2950	1.56
2	361,289	4	1	0	1	2400	1.33
3	355,706	6	0	0	0	600	0.34
4	311,243	8	0	1	0	1550	1.00
5	389,435	12	2	0	0	2200	1.13
6	300,345	6	0	0	0	600	0.40
7	360,706	1	0	1	0	850	0.47
8	385,288	4	0	0	0	400	0.21
9	364,589	18	0	0	0	1800	0.99
10	377,514	2	0	0	0	200	0.11

- Divide the score by the number of worker hours in the period
- Multiply by all by 200 to get a number that is easy to interpret

EI Averages

EI Rolling 12-month Average - SBLI

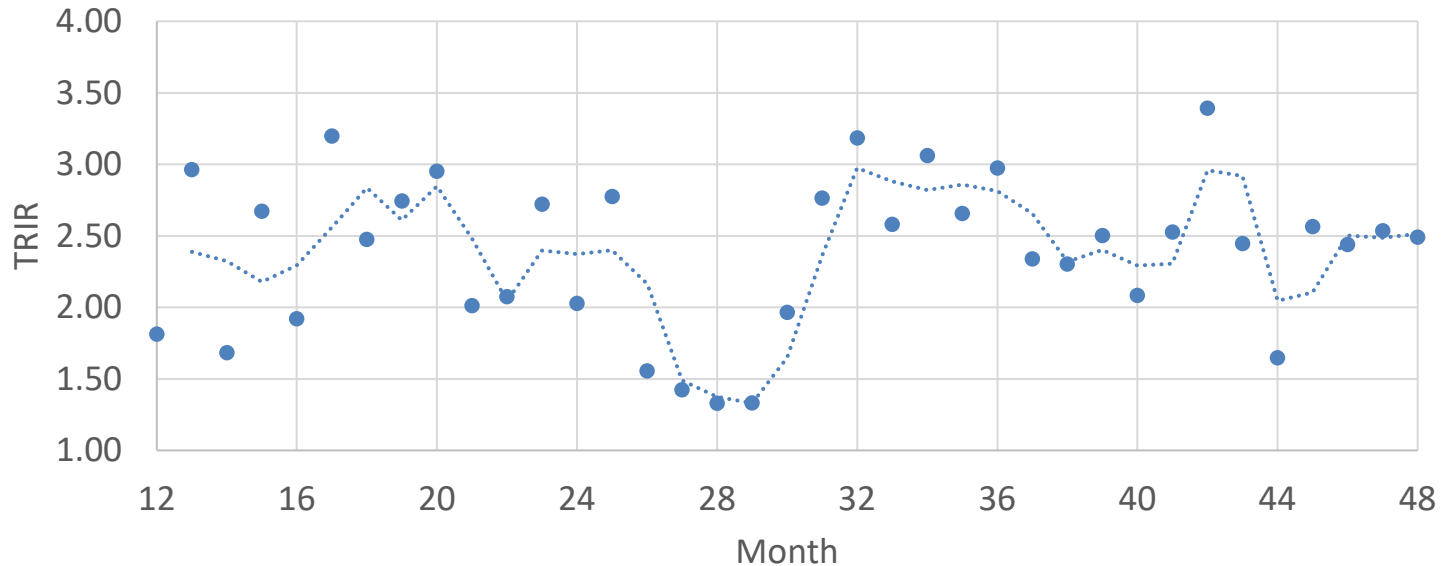


Company X

Year	Month	Month (#)	Hours	FA	MT	JR	DA
2018	Jan	1	1221702	5	5	3	4
2018	Feb	2	1069571	4	5	2	4
2018	Mar	3	1172202	10	7	5	5
2018	Apr	4	1294607	6	5	2	2
2018	May	5	1338205	7	4	2	6
2018	Jun	6	1180342	5	5	3	3
2018	Jul	7	1208402	12	8	3	5
2018	Aug	8	1209507	7	7	4	6
2018	Sep	9	1104894	6	5	2	6
2018	Oct	10	1428938	6	7	3	8
2018	Nov	11	1165845	7	5	4	3
2018	Dec	12	992878	5	4	1	4
2019	Jan	13	1079722	6	9	2	5
2019	Feb	14	1069142	1	3	1	5
2019	Mar	15	1347523	3	7	2	9
2019	Apr	16	1146182	4	5	2	3
2019	May	17	1188637	5	7	6	6
2019	Jun	18	1130852	7	7	2	5
2019	Jul	19	1165991	4	6	4	6
2019	Aug	20	1219845	3	7	4	6
2019	Sep	21	1291779	2	4	3	6
2019	Oct	22	1253453	5	5	2	7
2019	Nov	23	1102620	2	5	5	5
2019	Dec	24	1085198	2	5	1	4

Case Example – Company X

Company X - Standard TRIR Trend

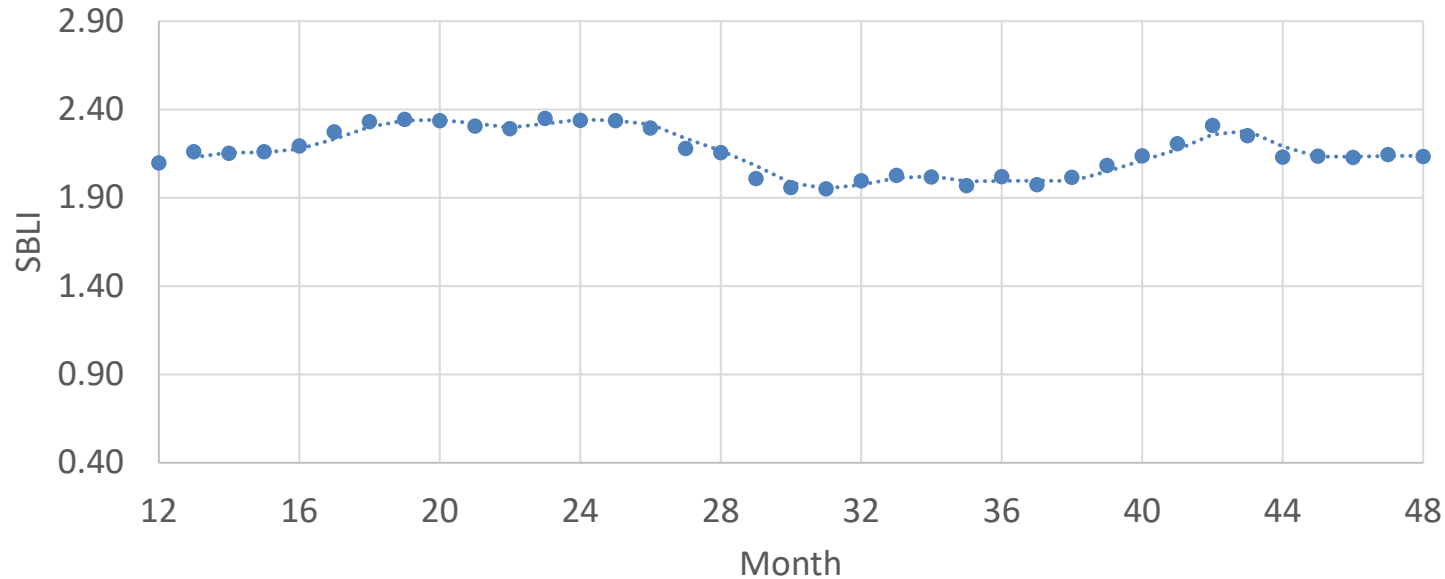


Compute SBLI, then roll the averages

Year	Month	Month (#)	Hours	FA	MT	JR	DA	TRIR	SBLI	12-mo Rolled SBLI
2018	Jan	1	1440072	13	4	2	6	1.62	1.83	
2018	Feb	2	1398025	12	3	2	4	1.38	1.57	
2018	Mar	3	1650432	13	5	3	7	1.80	2.03	
2018	Apr	4	1523429	12	4	2	6	1.58	1.78	
2018	May	5	1580291	17	6	2	8	2.08	2.38	
2018	Jun	6	1457137	16	4	3	8	2.02	2.39	
2018	Jul	7	1376252	17	5	3	7	2.15	2.40	
2018	Aug	8	1541195	17	6	3	9	2.21	2.52	
2018	Sep	9	1430885	15	4	2	8	1.94	2.32	
2018	Oct	10	1636698	14	5	3	8	1.98	2.19	
2018	Nov	11	1462055	11	4	2	7	1.77	2.07	
2018	Dec	12	1251350	9	3	2	5	1.54	1.82	2.11
2019	Jan	13	1467866	13	4	2	7	1.85	2.12	2.13
2019	Feb	14	1435583	10	4	3	7	1.85	2.13	2.18
2019	Mar	15	1619873	10	4	2	6	1.61	1.80	2.16
2019	Apr	16	1507955	12	4	1	5	1.36	1.56	2.14
2019	May	17	1585936	13	6	3	10	2.33	2.62	2.16
2019	Jun	18	1429813	15	4	2	9	2.10	2.53	2.17
2019	Jul	19	1454832	15	5	2	11	2.50	3.02	2.22
2019	Aug	20	1568029	14	5	3	9	2.13	2.47	2.22
2019	Sep	21	1484185	13	4	2	8	1.93	2.31	2.22
2019	Oct	22	1625734	12	6	3	10	2.31	2.64	2.26
2019	Nov	23	1496872	9	4	3	11	2.39	2.89	2.33
2019	Dec	24	1293497	8	4	1	10	2.25	2.79	2.41

Case Example – Company X

Company X - Rolling 12-Month SBLI

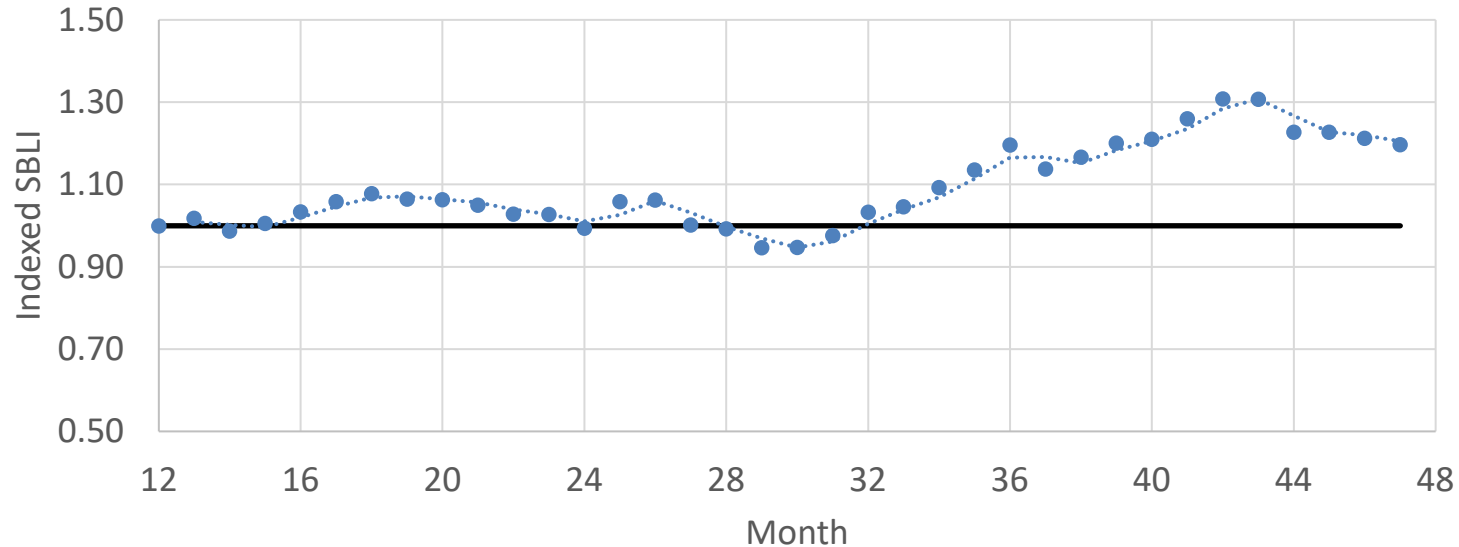


Indexing

- Divide the company monthly rolling SBLI value by the EEI average rolling SBLI value
 - 1 means that its equal to the average
 - Above 1 is proportionally higher than average
 - Below 1 is proportionally lower than average

Case Example – Company X

Company X - Indexed SBLI
(based on EEI Average)



What did we really change?

Not too much, but something...

1. More severe incidents are weighted more heavily (e.g., a two-stitch cut to the finger is no longer the same weight as a fatality). This makes SBLI more predictive.
 2. More events are included, which makes the metric more statistically stable (100k worker hours needed to reach stability instead of >1M)
- Note that you can roll TRIR as well...you just need about 24 months of data to develop the rolling baseline and it won't be as sensitive to short-term changes

SBLI: Strengths and Weaknesses

Strengths

- Frequency and severity of injuries is critically important
- Highly comparable because all injuries are defined the same
- Highly objective
- Incidents are weighted by actual severity
- More statistical stability

Weaknesses

- Inconsistency of first aid reporting
- More challenging to explain
- *Considers safety as the absence of injuries*
- *Underreporting*
- *Case management*

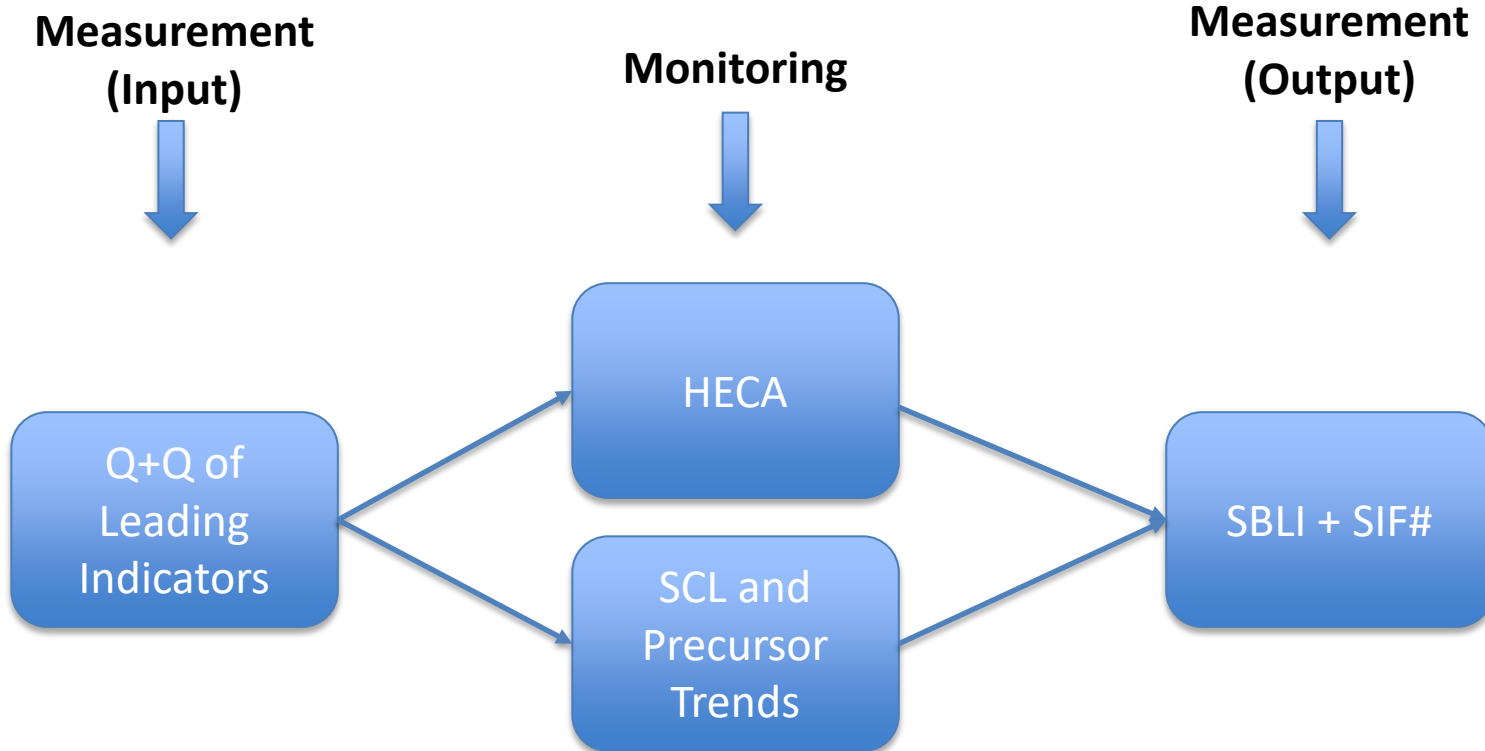
Conclusions

SBLI is a (a little bit) better metric than TRIR for statistical and philosophical reasons, but it still suffers from many of the same limitations.






We need viable leading and monitoring metrics to use along with lagging indicators to tell a valid story and make effective decisions.



Measurement and Monitoring: *A system approach*



State of Methods

Method	 Define	 Pilot	 Calibrate	 Baseline	 Integrate
SCL Model	X	X	X	X	X
SBLI	X	X	X	X	
HECA	X	X			
Leading Indicators	X	X			

Your thoughts and questions?

EEl Safety Survey

Your participation in the EEl Safety Survey will assist us in indentifying industry benchmarks that will better define and align our expectations for occupational safety and health.

Each year, participants must register to participate.

When available, click the Register or Login areas below to access the survey.

Registration and data submission for the 2022 EEl Safety Survey will begin on **Sunday, January 1, 2023** and conclude on **Saturday, February 25, 2023**.

Let's get started



Data Collection

Use this form to assist in collecting data.



Register

Registration is not yet open. Registration begins Sunday, January 1, 2023



Login

Access your account

Have a question we haven't answered?

Check out our Help (top right of this page) to learn more about this application. Use this form to send us a message

[CONTACT US](#)

Disclaimer & Disclosure

Data collected in the EEI Safety Survey is for the internal use of the Edison Electric Institute (EEI) and participating companies. It is not to be quoted, reproduced or distributed without the advance, written permission of EEI.

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I UNDERSTAND AND AGREE

Safety Survey Registration

Please complete the following items in order to create an account.

Company Name

Company Address

City/State/Postal Code

Contact Name

Contact Email

Contact Phone

GO BACK

CONTINUE

My Company Profile

Company Name INTEC

Company Address P.O. BOX 163
WAVERLY, PA 18471

Contact KEITH WILLIAMS

Contact Email KWILLIAMS@INTECWEB.COM

Contact Phone (570) 342-8464

Company Type Electric

Profile Status 

[UPDATE COMPANY PROFILE](#)

[Change My Password](#)

Survey Entries

A complete entry consists of at least one completed OSHA section. To begin, click the Add New button and select the year you wish to begin.

Year	Status	Action
2022	In Progress	View/Edit Delete Report

[Add New ...](#)



OSHA Data (Year Detail)

A complete entry consists of at least one completed and valid OSHA Data Entry. Motor Vehicle and Injury Details are optional.

Year	Area	Status	Action
No data to display			

∨ Add New ...

Injury Details (Workmans Comp)



Entering Injury Details is an optional part of the safety survey. To enter details, select the data area from the Add New button below.

Year	Area	Action
No data to display		

∨ Add New ...



Motor Vehicle Accident Data

+ ADD DATA



Preventable Motor Vehicle Accident Data

+ ADD DATA

SBLI Data



Errors exist in your data. Please correct these before submitting your final data.

+ ADD DATA

OSHA Data (Year Detail)

A complete entry consists of at least one completed and valid OSHA Data Entry. Motor Vehicle and Injury Details are optional.

Year	Area	Status	Action
No data to display			

Injury Details (Workmans Comp)

Entering Injury Details is an optional part of the safety survey. To enter details, select the data area from the Add New button below.

Year	Area	Action
No data to display		



▼ Add New ...

- Company Totals
- Fossil Data
- Coal Data
- Gas Plant Data
- Nuclear Data
- Hydro Data
- T & D Data
- System / HQ
- Lineman
- Apprentice Lineman
- Meter Reader
- Trouble Man
- Mechanic
- Substation Electrician
- Transmission

Plant Data

Vehicle Accident Data

SBLI Data

Errors exist in your data. Please correct these before submitting your final data.

+ ADD DATA

Co

Institute and Intec, Inc.

DATA FOR COMPANY FOR YEAR 2022

Include data for all employees and associated personnel that support the business, and are included in the budget.

Based on year end OSHA logs (OSHA Form #300), please enter the TOTALS for the following entries. Note that the responses correspond directly to the column numbers from OSHA Form #300. Report your total hours of exposure for the year. In most cases you should be able to report the total actual hours worked for your non-exempt employees. For your exempt employees, if you do not have the actual hours, report the estimated hours by taking the number of exempt employees times 2000, adding that number to your non-exempt hours to equal the "TOTAL EXPOSURE" field required below. If you can not report actual hours for any category, then take the total number of employees times 2000, enter that number as your "TOTAL EXPOSURE" field required below.

Include data for all employees and associated personnel that support the business, and are included in the budget.

TOTAL NUMBER OF COMPANY EMPLOYEES:

20

TOTAL EXPOSURE (FOR EXEMPT, NON-EXEMPT) HOURS:

40000

SUMMARY CASE, DAYS DATA

# of Deaths (Column G)	# of Cases with Days Away from Work (Column H)	# of Cases with Job Transfer or Restriction (Column I)	# of Other Recordable Cases (Column J)	Total # of Days Away from Work (Column K)	Total # of Days of On Job Transfer or Restriction (Column L)
0	1	1	2	2	4

INJURY OR ILLNESS DATA

# of Injuries (Column M-1)	# of Skin Disorders (Column M-2)	# of Respiratory Conditions (Column M-3)	# of Poisonings (Column M-4)	# of Hearing Loss (Column M-5)	# of All Other Illnesses (Column M-6)
3	0	1	0	0	0

COVID-19 ILLNESS DATA

# COVID-19 Cases				
1				

* COVID-19 cases should also be included in your Injury and Illness Data

International Data included in submission

Gas Data included in submission

Alternative Energy included in submission



Serious Injuries and Fatalities

I wish to participate in the collection of Serious Injuries and Fatalities.

TOTAL NUMBER OF COMPANY EMPLOYEES:

20

TOTAL EXPOSURE (FOR EXEMPT, NON-EXEMPT) HOURS:

40000

SUMMARY CASE, DAYS DATA

# of Deaths (Column G)	# of Cases with Days Away from Work (Column H)	# of Cases with Job Transfer or Restriction (Column I)	# of Other Recordable Cases (Column J)	Total # of Days Away from Work (Column K)	Total # of Days of On Job Transfer or Restriction (Column L)
0	1	1	2	2	4

INJURY OR ILLNESS DATA

# of Injuries (Column M-1)	# of Skin Disorders (Column M-2)	# of Respiratory Conditions (Column M-3)	# of Poisonings (Column M-4)	# of Hearing Loss (Column M-5)	# of All Other Illnesses (Column M-6)
3	0	1	0	0	0

4

4

INJURY OR ILLNESS DATA

# of Injuries (Column M-1)	# of Skin Disorders (Column M-2)	# of Respiratory Conditions (Column M-3)	# of Poisonings (Column M-4)	# of Hearing Loss (Column M-5)	# of All Other Illnesses (Column M-6)
3	0	1 ←	0	0	0

COVID-19 ILLNESS DATA

# COVID-19 Cases				
1 ← * COVID-19 cases should also be included in your Injury and Illness Data				



Serious Injuries and Fatalities

I wish to participate in the collection of Serious Injuries and Fatalities.



Serious Injuries and Fatalities

I wish to participate in the collection of Serious Injuries and Fatalities.

of Fatalities

0

of Amputations

0

of Concussions

0

Include concussion and/or cerebral hemorrhages

of Internal Organs

0

of Bone Fractures

0

excluding fingers and toes, compound bone fractures for fingers and toes

of Tendon and Ligament Tears

0

of Other

0

The "Other Injuries" category should only be selected for reporting injuries not identified in the above list. Please use the Description box to briefly describe the nature of the injury. If SIF Injuries are included in this category you may be contacted and asked to provide additional information on the event.

Other Description:

Total Cases

0

SAVE DATA

CANCEL

OSHA Data (Year Detail)

A complete entry consists of at least one completed and valid OSHA Data Entry. Motor Vehicle and Injury Details are optional.

Year	Area	Status	Action
No data to display			

∨ Add New ...

Injury Details (Workmans Comp)

Entering Injury Details is an optional part of the safety survey. To enter details, select the data area from the Add New button below.

Year	Area	Action
No data to display		

∨ Add New ...

Motor Vehicle Accident Data

+ ADD DATA

Preventable Motor Vehicle Accident Data

+ ADD DATA

SBLI Data



Errors exist in your data. Please correct these before submitting your final data.

+ ADD DATA

SBLI Data

Please provide full 2 years of data.

All columns of injury severity level (first aid to fatality) should be mutually exclusive in that one incident fits in one, and only one level, EXCEPT OSHA Total Recordable Cases.

These counts are based on actual severity, not potential severity.

Leave the first aid section blank if you do not collect the data. All other fields are required.

The hours should be the total number of hours worked that you would use to compute TRIR.

To start: Double-click in a cell to begin editing. You may then use the tab key to proceed through the grid. Month/Year data cannot be changed. You may also press F2 to begin editing if a cell is highlighted.

Month	Year	Hours	First Aid Cases	# of other recordable cases (Medical Treatment)	# of cases with job transfer or restriction	# of cases with days away from work	# of deaths	Total OSHA Recordable Cases
January	2021	0	0	0	0	0	0	0
February	2021	0	0	0	0	0	0	0
March	2021	0	0	0	0	0	0	0
April	2021	0	0	0	0	0	0	0
May	2021	0	0	0	0	0	0	0
June	2021	0	0	0	0	0	0	0
July	2021	0	0	0	0	0	0	0
August	2021	0	0	0	0	0	0	0
September	2021	0	0	0	0	0	0	0
October	2021	0	0	0	0	0	0	0
November	2021	0	0	0	0	0	0	0
December	2021	0	0	0	0	0	0	0
January	2022	0	0	0	0	0	0	0
February	2022	0	0	0	0	0	0	0
March	2022	0	0	0	0	0	0	0
April	2022	0	0	0	0	0	0	0
May	2022	0	0	0	0	0	0	0
June	2022	0	0	0	0	0	0	0
July	2022	0	0	0	0	0	0	0
August	2022	0	0	0	0	0	0	0
September	2022	0	0	0	0	0	0	0
October	2022	0	0	0	0	0	0	0
November	2022	0	0	0	0	0	0	0
December	2022	0	0	0	0	0	0	0



- Instructions Provided
- 24 Months of Data
- EEI SBLI Definitions

Month	Year	Hours	First Aid Cases	# of other recordable cases (Medical Treatment)	# of cases with job transfer or restriction	# of cases with days away from work	# of deaths	Total OSHA Recordable Cases
January	2021	0		1	0	0	0	0
February	2021	0		0	0	0	0	0
March	2021	0		0	0	0	0	0
April	2021	0		0	0	0	0	0
May	2021	0		0	0	0	0	0
June	2021	0		0	0	0	0	0
July	2021	0		0	0	0	0	0
August	2021	0		0	0	0	0	0
September	2021	0		0	0	0	0	0
October	2021	0		0	0	0	0	0
November	2021	0		0	0	0	0	0

August	2022	0		0	0	0	0	0	0
September	2022	1	▲▼	0	0	0	0	0	0
October	2022	0		0	0	0	0	0	0
November	2022	0		0	0	0	0	0	0
December	2022	0		0	0	0	0	0	0

SAVE CHANGES

CANCEL CHANGES

RETURN TO DASHBOARD



My Company Profile

Company Name INTEC

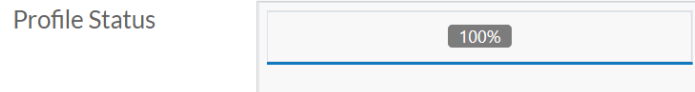
Company Address P.O. BOX 163
WAVERLY, PA 18471

Contact KEITH WILLIAMS

Contact Email KWILLIAMS@INTECWEB.COM

Contact Phone (570) 342-8464

Company Type Electric



UPDATE COMPANY PROFILE

Survey Entries

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Year	Status	Action
2022	In Progress	View/Edit Delete Report Confirm

∨ Add New ...



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Profile Status

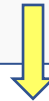
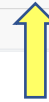
100%

UPDATE COMPANY PROFILE

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Year	Status	Action
2022	Confirmed	View/Edit Report

∨ Add New ...



Unread 1-2 of 2

EEI Safety Survey A. EEI 2022 SAFETY SURVEY CONFIRMATION 4:31 PM

INTEC.pdf

SAVE DATA



Log In

Please enter your username and password. Please go [here](#) if you don't have an account.

If you do not remember your password, you can [request](#) a new password be emailed to you.

Account Information

Username:

Test

Password:

••••

Keep me logged in

LOG IN





Let's get started

Click on a box to access that section



Definitions

Not sure what a term means? Check out our list of definitions.



Instructions

Instructions to help you navigate the EEl Safety Survey application process.



Orientation

View our Orientation seminar to learn more about this application.



SIF Reporting Guide

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Annual Safety Survey

Keith Williams

800-745-4818

kwilliams@intecweb.com