Leading Indicators: Using Your Data to Enhance Your Future OHS Performance

Presenters:

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Leading Indicators: Predictors of Performance?

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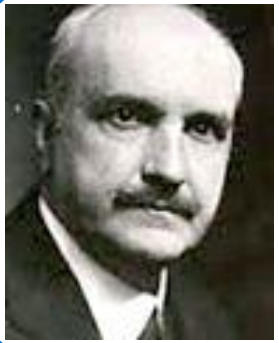
"Those who cannot remember the past are condemned to repeat it.”

George Santayana, Philosopher



Lagging Indicators

- Report on data that comes from past activity.
- Measure an organization's historical safety performance
- Reactive or trailing indicators
- Often used to identify deviations from established safety goals
- Can be both positive and negative indicators

"Rear view mirror"

Leading Indicators

“Leading indicators are proactive, preventative and predictive measures that monitor and provide current information about the effective performance, activities and processes of an EHS management system that drive the identification and elimination or control of risks in the workplace that can lead to incidents and injuries.”*

*Campbell Institute, Center for EHS Excellence, National Safety Council

Examples of leading indicators

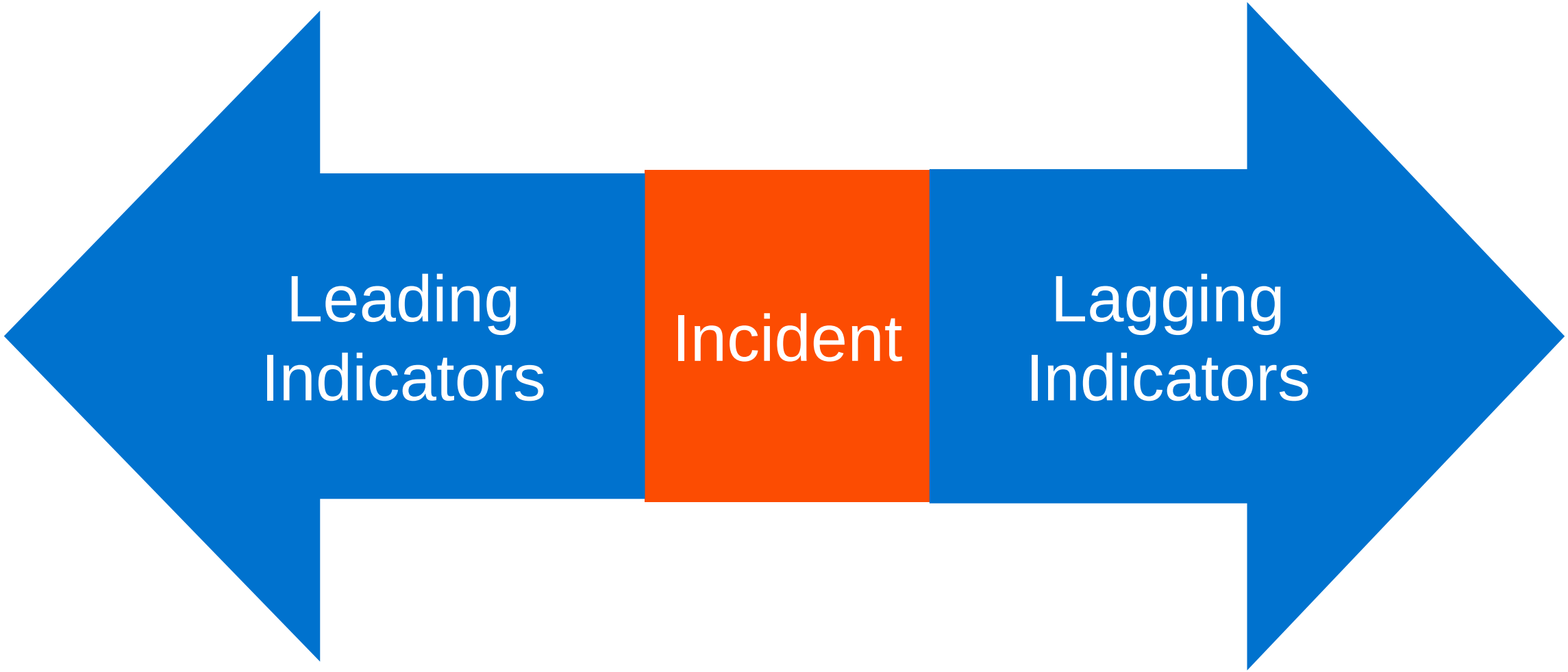
- Number of emergency response drills
- Safety meeting attendance
- Overdue Corrective Actions
- Audit completion
- Time to issue preliminary incident report
- Incidents >30 days without final report
- Procedures overdue for review
- Safety Kaizens
- Safety suggestions submitted
- Near misses
- Learning events/unusual incidents
- Ergonomic audits/assessments
- Participation in safety programs
- # of safe vs unsafe audit observations during BBS audits
- Management participation in workplace inspections

Poll Question

Which type of performance indicators are being used in your organization?

1. Lagging indicators only
2. Mostly lagging indicators, some leading indicators
3. Equal balance between leading and lagging indicators
4. Mostly leading indicators, some lagging indicators
5. Leading indicators only
6. No leading or lagging indicators tracked

Striking the right balance



What did you learn? RCFA

Physical

Facility/Equipment failures
Hazard – sharp object, missing guard
Poor housekeeping

Human

Body part in the “Line of Fire”
Did not follow procedure
Not properly trained
Lifted heavy object

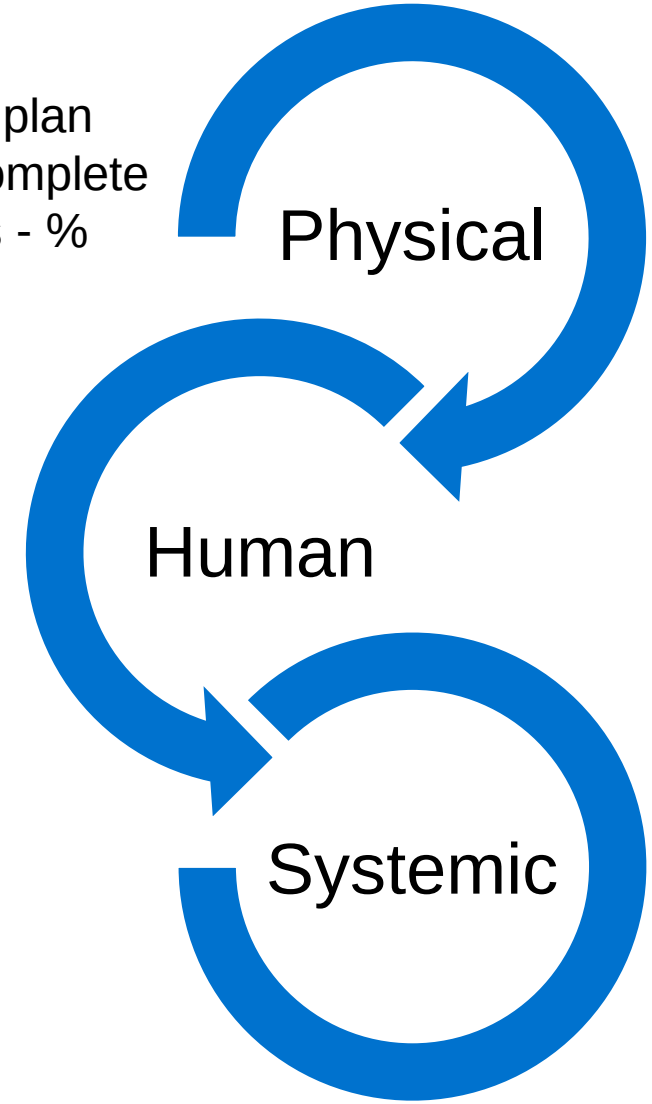
Systemic

Inadequate preventive maintenance
Procedure overdue for review/missing
Inadequate onboarding/orientation
Training overdue/missing
Inadequate audit/inspection process
Lack of hazard/risk assessment
No ergonomics program
Inadequate oversight/supervision

Effective management of “inputs” will reduce failures will reduce failures and improve management systems

Equipment list – % with PM plan
Hazard assessments - % complete
Initiate housekeeping audits - % scheduled vs completed
Approved tool list

Job Cycle Check schedule (procedures/training)
Human factor analysis



Establish preventive maintenance schedule
Tracking of overdue procedures
Defined onboarding/orientation
Training and refresher training schedule
Audit/inspection metrics (schedule, action items)
Completed hazard/risk assessments

What gets measured, gets improved.

- Peter Druker

Characteristics of effective leading indicators - SMART

Simple, but specific - easily understood, closely connected to the outcome/results

Measurable objectively and reliably

Actionable and achievable

Relevant - Broadly applicable across company operations or site specific

Time-based – Collection schedule, easily and accurately communicated

Additional tips in choosing leading indicators

- One size does not fit all
- Start small – choose fewer to start
- Use things that are important to your site based on your culture
- Use existing data where possible, start collecting new data, determine technology to track it
- Start with leadership interaction
- Include leadership metrics
- Expect it to evolve as you determine what is working

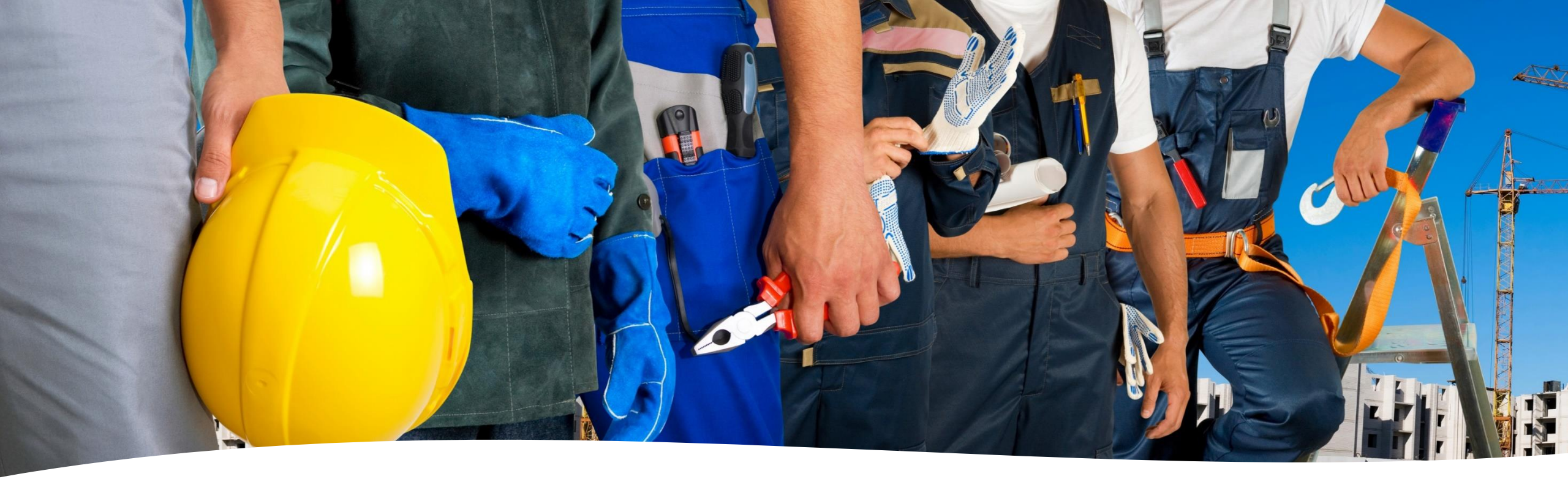
Don’t Forget Health and Wellness!

Some suggestions:

- Participation rates in H&W activities
- Dollars allocated to H&W initiatives
- Amount spent on H&W per employee
- Employee retention rates

Increasing Leadership Involvement

- Safety KPIs reviewed at leadership meetings
- Participation in safety programs, e.g. audits, safety meetings, training
- Communications on safety
- Site visits
- Safety recognition events
- Leadership EHS training



Example: Reducing Contractor Injuries

- Prequalification – % based on safety performance, safety management systems assessment
- Verification of training – individuals provide documentation
- Safety Orientations – site rules and procedures, expectations
- Audits – % completed per schedule/type
- % with annual assessment of performance

Additional Resources

American Petroleum Institute

API RP 754 Process Safety Indicators for the Refining and Petrochemical Industries

ANSI

Proposed ANSI/ASSE Standard Z16 “Safety and Health Metrics and Performance Measures”

ASSE

Supervisors as Leading Indicators of Safety Performance

Campbell Institute

Transforming EHS Performance Measurement Through Leading Indicators

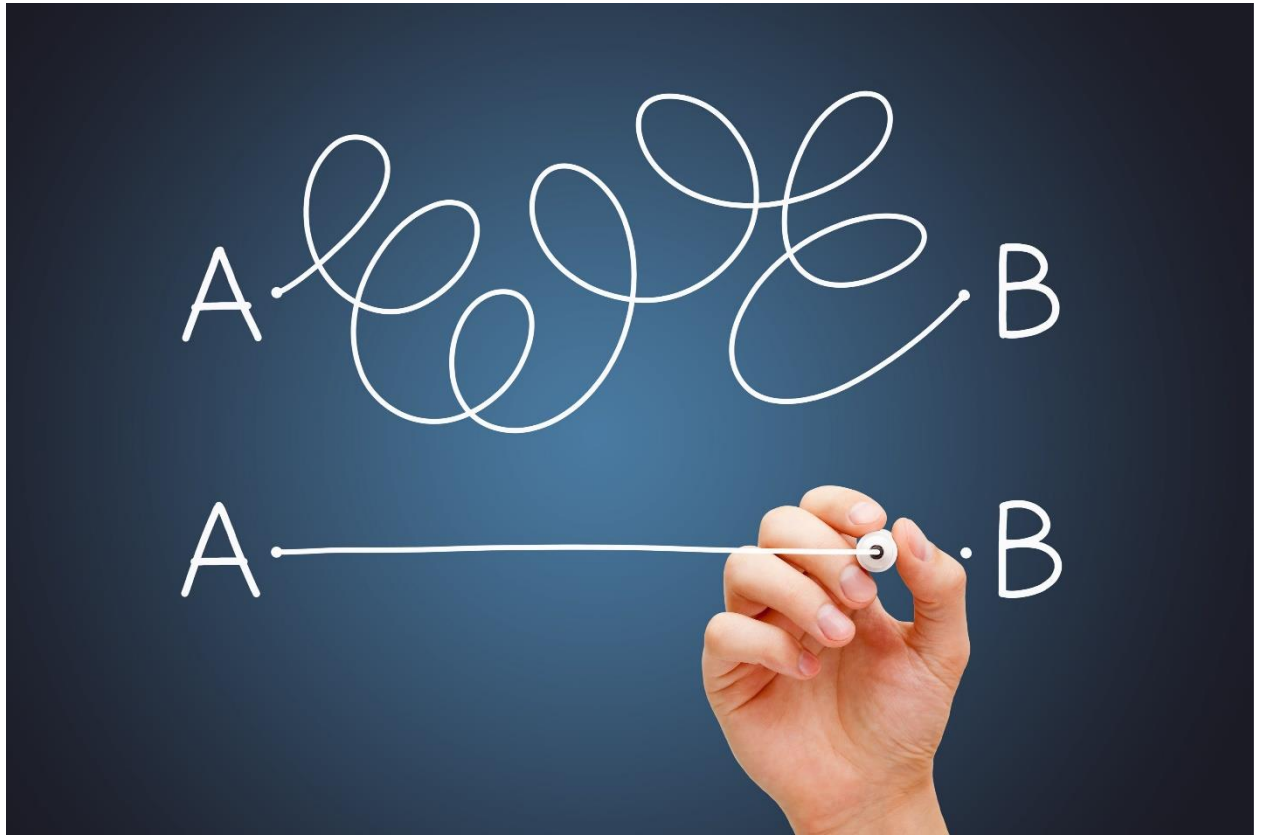
Beyond Safety: Leading Indicators for Health and Well-being

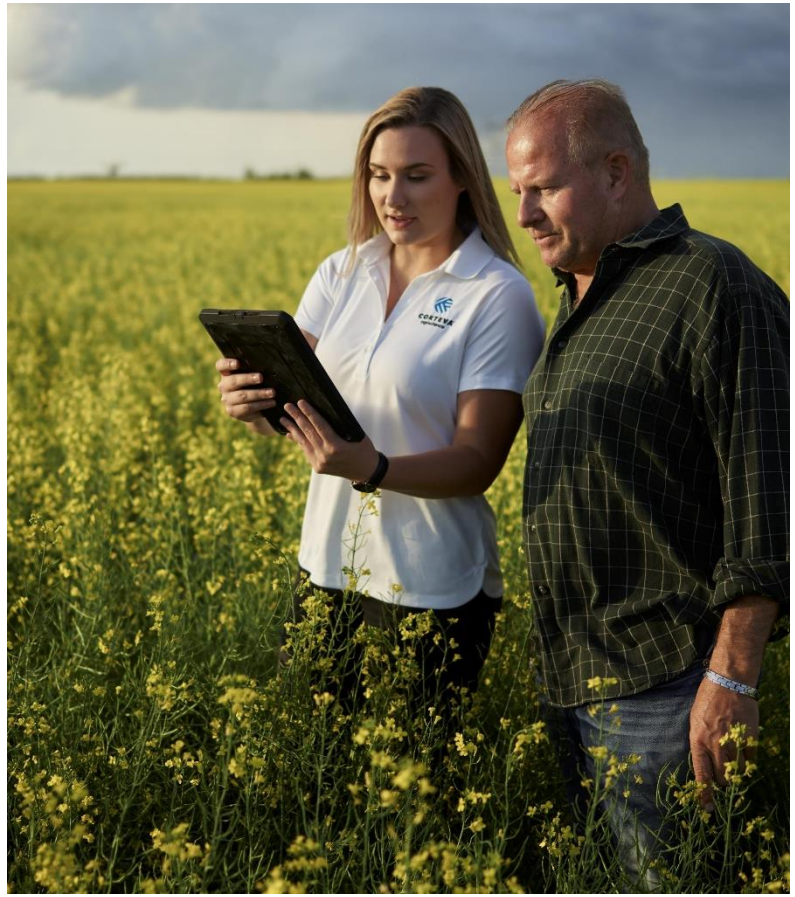
US OSHA

Using Leading Indicators to Improve Safety and Health Outcomes

“If you always do what you’ve always done, you’ll always get what you’ve always got.”

– Henry Ford (1863-1947, American founder of the Ford Motor Company)





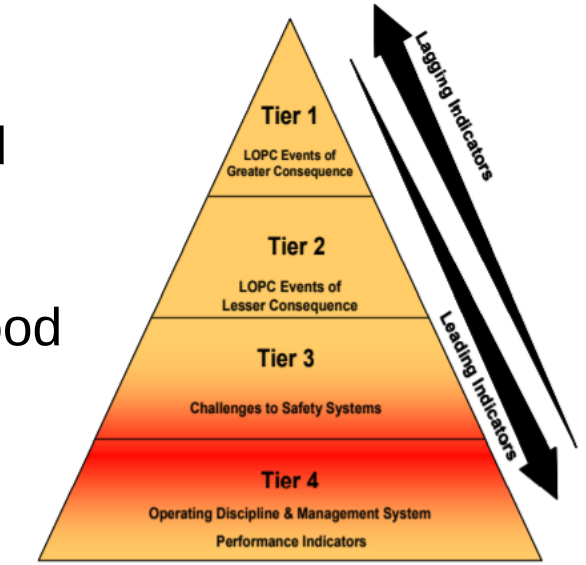
Thank you!

Backup Slides

API Recommended Practice 754 Performance Indicators

Performance indicators identified in API RP 754 are based on the following guiding principles:

- Indicators should drive process safety performance improvement and learning
- Indicators should be relatively easy to implement and easily understood by all stakeholders (e.g., workers and the public)
- Indicators should be statistically valid at one or more of the following levels: industry, company, and site
- Indicators should be appropriate for industry, company or site level benchmarking



Characteristics of Leading Indicators

1. Actionable — metrics that have measurable steps
2. Achievable — setting goals that are obtainable
3. Meaningful — obtaining information that justifies continued tracking
4. Transparent — metrics that are clearly understandable
5. Easy to communicate
6. Valid — relevant to the organization's objectives
7. Useful — metrics that are beneficial to the organization's safety goals
8. Timely — distributing information that is still relevant to the organization

- Campbell Institute

CIAC Responsible Care – leading indicators

Leading indicators

1. Near misses (Total and closed)
2. Behaviour Based Safety (BBS) Reporting
   - Total # of observations
   - Safe vs unsafe observations
3. Leadership Visibility
   - Management participation in workplace inspections
   - Frequency of participation in workplace inspections

Leading Indicators

Chris Banbury, CRSP

June 3, 2020

NOVA Chemicals

Responsible Care®
Our commitment to sustainability.

ANSI Z16 - Safety and Health Metrics and Performance Measures

August 2017 work began

American Foundry Society
American Industrial Hygiene Association
American Society of Safety Professionals
Arthur J. Gallagher & Co.
Ashley Home Stores, LTD
Carli Consulting, LLC
Centers for Disease Control & Prevention
CHS, Inc
Colorado Safety Association
Concurrent Technologies Corporation
Continental
Covestro LLC
Deere & Company
Eastman Chemical Company
Edw. C. Levy Company
Elite Comfort Solutions
Gulf Coast Authority
Huntsman International
J.D. Abrams, L.P.
Jordan Foster Construction
Lake Effect Technologies
Lockheed Martin Corporation
Nova Chemicals
ORCHSE Strategies, LLC
United Steelworkers
UPS
Wire Reinforcement Institute
Zurich Insurance Group
U.S. Department of Labor-OSHA

Purpose

- Provide an approach to understand and assess the impact and value of safety and health on an organization using leading, lagging, and value-based metrics
  - The establishment of an effective measurement system supports organizational safety and health governance, management, operational effectiveness and continual improvement.
- Focuses on the use of a balanced set of metrics that includes leading metrics with identified relationships to lagging metrics and value-based outcomes to assess capacity for safety and health success, and to encourage activities that promote improved safety and health performance
  - Such metrics support business performance and help the organization achieve its goals and objectives.

Scope

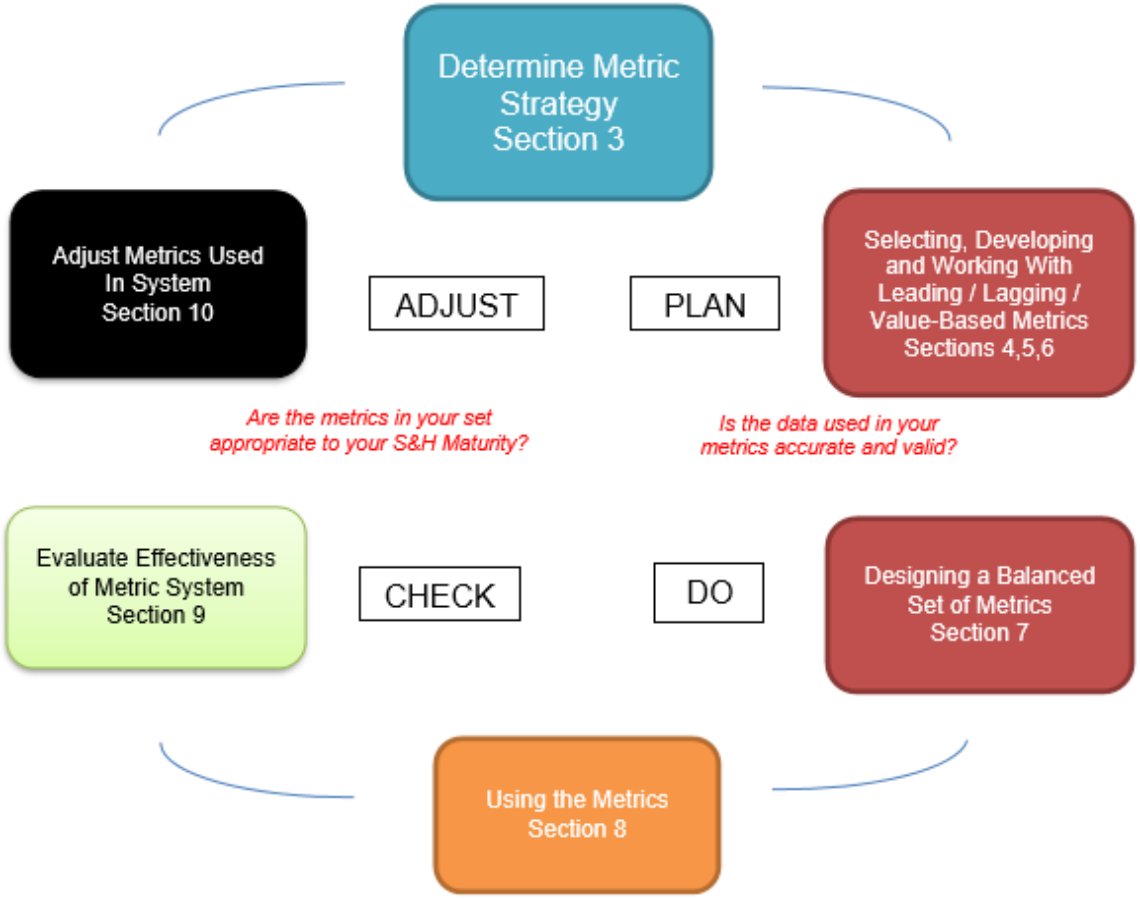
- Intended to define requirements for organizations to establish effective measurement systems that assess safety and health performance, identify gaps in safety and health managements systems, and drive needed improvements
- Intended to apply to all organizations and provide flexibility based on their size, type of management system and organizational risks

Scope Continued

- Through using a balanced application, this standard broadens the scope of metrics beyond traditional trailing indicators (I.e. employee injuries/illnesses and incident rates) to include but not limited to:
  - property damage
  - party loss
  - business interruption
  - fleet losses
- It also promotes the use of metrics related to positive impacts like:
  - productivity
  - worker well-being
  - absenteeism
  - company reputation
  - financial health
  - shareholder value which have not been fully utilized.

Z16

- The outline of the Z16 standard encourages integration with organizational management systems using the elements of a Plan-Do-Check-Adjust (PDCA) model to facilitate continual improvement.



NOTE: DRAFT Version –yet to be published. Subject to change or amendments.

ANSI Z16 - Safety and Health Metrics and Performance Metrics

- Consideration For Application

Considering this… What Could Go Wrong?

An event to provoke REAL change

- Cutting firewood.

As a part of my seasonal preparation, I spend several days cutting firewood every October in order to prepare for the winter months.

My PPE was typical (gloves, safety glasses, CSA work boots and hearing protection)

I'm fortunate enough to be able to gather the required firewood from my neighbors' land (120 acres of forest with trails throughout), so it's a quick quad ride to wherever I need to be.

For company, I always bring my oldest daughter (age 10 at time of incident) so they can play at a distance as I cut and gather wood.

As I learned from my father, I'd been doing this same task for years the same way he did and felt very confident in my abilities and I also felt that I was managing the risk…

What Could Go Wrong?

Error Precursors
short list

Task Demands	Individual Capabilities
• Time pressure (in a hurry)	• Unfamiliarity w/ task / First time
• High Workload (memory requirements)	• Lack of knowledge (mental model)
• Simultaneous, multiple tasks	• New technique not used before
• Repetitive actions, monotonous	• Imprecise communication habits
• Irrecoverable acts	• Lack of proficiency / Inexperience
• Interpretation requirements	• Indistinct problem-solving skills
• Unclear goals, roles, & responsibilities	• "Hazardous" attitude for critical task
• Lack of or unclear standards	• Illness / Fatigue
Work Environment	**Human Nature**
• Distractions / Interruptions	• Stress (limits attention)
• Changes / Departures from routine	• Habit patterns
• Confusing displays or controls	• Assumptions (inaccurate mental picture)
• Workarounds / OOS instruments	• Complacency / Overconfidence
• Hidden system response	• Mindset ("tuned" to see)
• Unexpected equipment conditions	• Inaccurate risk perception (Pollyanna)
• Lack of alternative indication	• Mental shortcuts (biases)
• Personality conflicts	• Limited short-term memory

Predicting Errors using Human Performance Measurement Tools
https://bushcohpi.com/wp-content/uploads/2017/06/PredictingErrors.pdf

Practically Speaking

Sequence of events:

- I finished a cut on a log which was laying on the ground, I did not engage the saw brake as I had to move over just slightly to make another cut
- I began to move over to the left about 12”, during this time the saw was “free-wheeling at a slow speed”
- While moving, my left foot caught on a root and I momentarily stumbled
- During this time, as the chainsaw made contact with my left thigh above the knee (about 2” away from the femoral artery)
- The saw immediately tore open my denim pant leg where contact was made
- After inspection; the wound ended up in a very small scratch but could have been MUCH worse.

Reflections and Bouncing Forward

Practically Speaking

Task Demands	Individual Capabilities
• Time pressure (in a hurry)	• Unfamiliarity w/ task / First time
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Reflections and Bouncing Forward

Error Precursor	Learning and Action
Repetitive actions/monotonous	Take breaks, engage with my daughters, switch up tasks (limbing vs cutting)
Irrecoverable acts	Error will likely be significant, what happens if I fail? Preplan risk management
Lack of or unclear standards	Biased - This is the way my father did it. Compare with best practices
Unexpected equipment condition	Idle was too high and required adjustment.
Imprecise communication habits	Working alone (help was not readily available). Create a working alone plan.
Habit patterns	This is the way I was taught and have done it for years
Complacency / over confidence	Nothing has ever happened nor do I expect it to. My PPE was adequate based on my experience and knowledge. Full PPE gear now.
Mindset (“tuned” to see)	Complacent of the risks. Discuss details about success and failing safely.

Value-Based Metrics

A balanced set of metrics shall incorporate value-based measures that quantify, measure, anticipate, track and trend the financial and business impact of safety and health performance on the organization.

- Value-based metrics provide a comprehensive overview of the impact of safety and health performance on organizational capacity, efficiency, and financial success.
- Dollars are an easily understood unit of measurement that can be used to normalize the data.
- Value-based metrics help the safety and health professional measure safety and health performance using the organization's business tools and the language of its professionals (financial, engineering, marketing, etc.)

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Thank you!

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