LEADING INDICATOR "CLIFF" NOTES

OSHA and Leading Indicators

- In June 2019 OSHA published a guide on leading Indicators designed to help and encourage organizations to leading indicators in their safety program ("Using Leading Indicators to Improve Safety and Health Outcomes").
- In November 2019 OSHA held what appears to be its first-ever public meeting on Leading indicators in Washington D.C.
- OSHA has announced it is moving away from relying on past employer safety data, or lagging indicators, to focus its enforcement efforts on what it defines as leading indicators (OSHA Embraces Leading Indicators, EHS Today, Nov 2019).

Practical Guide to Leading Indicators: Metrics, Case Studies & Strategies
(Campbell Institute, National Safety Council; 2015)

- A strong correlation (R=.86) was found to exist between number of training hours and decline in incident rate (Cummins).
- Digital safety observation system available to all employees maximizes the eyes and ears on all operations (Honeywell).
- Detailed and specific activity codes describe what was happening when an incident occurred (NASA).
- Safety audit rating system (SAR) provides objective way to objectively compare and contrast sites (USG).
- Leadership is expected to walk the site, at least once weekly, with the sole purpose of assessing safety conditions (Fluor).

Elevating EHS Leading Indicators: From Defining to Designing
(Campbell Institute; National Safety Council; 2015)

- Any successful safety management system will have a balance of leading and lagging indicators.
- Leading indicators should tell an organization something meaningful and actionable in order to justify its continued tracking.
- A good way to get started with leading indicators is to determine if what is already being measured could be predictors of future incidents.
- Organizations should not spend time trying to find the "perfect" leading indicator since it does not exist.
- Start small and simply.
- There is a difference of opinion on whether near misses reported should be used as a leading indicator.
- Getting C-suite focus on leading and lagging indicators is a key to success (Johnson Controls)
- In addition to celebrating the number of days or months since a recordable incident, celebrate the number of observations, total number of training hours and safety innovations (Schneider Electric).
- A leading indicator to consider is measurement of training effectiveness via quizzes two, three or four months after training has been completed (Schneider Electric).
- Unintended / unwanted behaviors are possible with any metric – leading indicators are no exception (Exxon Mobil).
- Consider giving local safety leadership a role in selecting their leading indicators (United States Steel).
- Leading indicators should be evaluated every few years to confirm their effectiveness at preventing injuries (Flour).
- Building upon existing metrics is a simple way to begin using leading indicators (Cummins).

Transforming EHS performance measurement through leading indicators.
(Campbell Institute; National Safety Council; 2013)

- Leading indicators are proactive, preventative and predictive measure while lagging indicators measure EHS performance.
- Leading indicators are not so much the opposite of lagging indicators, but are instead a facet of safety present prior to a negative event.
- Lagging indicators tend to receive greater emphasis at the corporate-level while leading indicators tend to be more focused at the site-level.
- Leading and lagging indicators need to be connected (cause and effect; statistical link).
- Consistency in metrics between corporate-level and site-level is important with flexibility to use site-specific metrics.
- Major types of leading indicators organizations track at the corporate-level:
  - Behavior-based observations (e.g., safe or unsafe behavior)
  - *Near-miss incidents* (e.g., incidents with serious or fatality potential)
  - *Audits* (e.g., tracking overdue audit items, monitoring the speed of closing action items)
  - *Training* (e.g., EHS training for workers, managers, executives)
  - Meetings (e.g., EHS committee, management review, action planning)
  - Other Actions (e.g., noncompliance, *incident investigation*, EHS ideas and suggestions)

Leading Indicators for Workplace Health and Safety
(Alberta Government, 2015)

- Lagging indicators are a record of things that have already happened. They inform a reactive health and safety culture.
- Lagging indicators don't explain the "Why" behind the bottom line.
- Lagging indicators measure negative or unwanted outcome.
- Since lagging indicators record unwanted outcomes, people are naturally reluctant to be counted in. The information that is reported for lagging indicator outcomes may be tainted by personal bias or diluted through fear of punishment.
- Incentives to report can also skew the results in the opposite direction.
- To be effective, the link between a leading indicator and the desired outcome must be clear.
- Non-compliance may have more to do with a perceived need for speed than a lack of safety training. A strong health and safety culture will not put productivity ahead of worker health and safety. Addressing worker perception (leading indicator) should improved compliance – and avoid incidents (lagging indicator).
- Leading indicators measure the inputs that people are making to the safety management process. They measure the presence of safety as opposed to the absence of injury.
- Leading indicators are a relatively new addition to the safety tool box.
- The level of effort and resources required to introduce, track and leverage leading indicators can be substantial.

Leading Indicators for Workplace Health and Safety (continued)
(Alberta Government, 2015)

- Examples of leading indicator metrics:
    - Focus on compliance
        - Are action items being completed within defined timelines?
        - Are works assessed for knowledge of hazards specific to their job task?
        - What percent of the workforce has completed organization-specific health and safety training?
    - Focus on improvement
        - Percent of leadership that is meeting job observation targets?
        - Percent of job descriptions with specific health and safety accountabilities?
        - Number of near misses reported compared with the total number of recorded incidents?
        - Number of equipment inspections (including vehicles) completed vs. targeted?
    - Focus on continuous learning
        - Percent of action items from health and safety perception surveys that are completed?
        - Percent of workers meeting peer-to-peer observation targets per month per 100 workers?
        - Number or percent of near miss findings communicated to organization?
        - Percent of health and safety meetings led by management compared to target?
        - Percent of near misses that have been scheduled for follow-up and have had responsibility assigned?

Below is the collective knowledge of leading indicators and associated metrics as practiced by Campbell Institute members and partner organizations (Practical Guide to leading Indicators; Metrics, case studies & strategies; 2015).

Risk Assessment – Identification of the tasks, hazards, and risks of a job prior to work, and the implementation of the protective measures to ensure work is done safely,
Associated Metrics
1. Number of assessments conducted per plan
2. Percent of assessments completed per plan
3. Ratio between the levels of risk identified (high, medium, low)
4. Scoring the steps of an operation on severity, exposure and probability
5. Number of assessments communicated
6. Number of risks mitigated or controlled
7. Number of assessments validated by EHS manager
8. Percent of assessments reevaluated and revalidated
9. Percent of routine tasks identified
10. Percent of tasks identified
11. Percent of risk assessments completed per schedule / plan
12. Number of assessments to evaluate potential severity

Hazard Identification / Recognition – Evaluations and assessments (not necessarily audits) through management and employee observations to identify potential hazards.
Associated Metrics
1. Number of near miss reports
2. Number of unsafe observations (conditions or behaviors)
3. Number of safe observations (conditions or behaviors)
4. Number of unsafe observations per inspection
5. Number of unsafe observations reported per employee per time period
6. Number and percent of previously unknown or uncategorized hazards discovered
7. Inspection count (collection of observations)
8. Rate of safe to unsafe observations
9. Weighted percent safer observations
10. Frequency of 100% safe
11. Number of checklists filled out
12. Number of comments for unsafe observations that clarified nature of the hazard
13. Number of people trained in hazard identification
14. Number of unsafe observations recorded by a trained person

Risk Profiling – A review of the collected hazard identification data, prioritization of preventive and corrective actions, and identification of areas for continuous improvement.
Associated Metrics
1. Correlation rate between leading and lagging indicators
2. Number of reviews and comparisons (to check quality of the process)
3. Number of repeat findings
4. Number of gaps in hazard identification process
5. Number of incidents with a root cause related to inadequate risk assessment
6. Number of root causes not previously categorized or identified in risk assessment
7. Number of assessments deemed unacceptable
8. Percent of life-threatening risks, low severity risks, etc.
9. Percent reduction in overall risk score
10. Number of risks by specific category (e.g., fall protection, confined space, housekeeping, etc.)

Preventive and Corrective Actions – Any measure to correct behavior that could result in failure or defect, as well as any proactive measure to prescribe safe behavior and prevent non-conformance.
Associated Metrics
1. Average days to close
2. Number of days to completion
3. Percent closed on time (within x hours or by due date0
4. Number of open issues that need to be closed
5. Number of open issues that haven't yet had a correct action assigned
6. Percent of preventive and corrective actions communicated
7. Number of effective corrective actions verified by managers
8. Number of corrective actions for critical issues validated for effectiveness by managers
9. Number and percent of issues in conformance with recommended corrective actions
10. Percent or ratio of corrective actions at each level or control (according to hierarchy or controls)
11. Percent or ratio of corrective actions according to hazard type (e.g., confined space, fall protection, etc.)
12. Number of issues flagged at 30 days, 60 days, etc.
13. Number of corrective actions prioritized by risk (e.g., high severity, low severity, life-threatening, etc.)
14. Number of divisional targets that have dropped below a 90%-completed rate

Management of Change Process – Formal process to ensure appropriate planning around HR activities, union negotiations, seasonal changes in employment and changing management.
Associated Metrics
1. Percent of tasks completed
2. Number of facilities running 10% overtime
3. Number of facilities experiencing x% turnover
4. Number of gaps in management of change review
5. Number of new assessments for changes in processes or equipment
6. Number of new trainings for operators

Learning System – Any activity or program (such as training, communication, coaching, and on-the-job training) to teach employees and management about EHS issues and procedures (skills, knowledge and values) and learn from prior incidents.
Associated Metrics
1. Number and percent of completed training goals (by individual, group or facility)
2. Percent compliance versus goal
3. Number of training hours (hours worked per facility / BU / corporate or per time period)
4. Number of training hours (per employee, per site, per time frame)
5. Number of incidents with a root cause that includes lack of training
6. Number of certified trainers
7. Dollars spent per year on training
8. Number of new employees who complete orientation
9. Number and percent of positive post-training evaluations

EHS Management System Component Evaluation – An audit of an organization's safety management system to assess conformance with system expectations and goals.
Associated Metrics
1. Maturity score (percent of system component compliance)
2. Number and frequency of audits performed
3. Number of findings (instances of non-conformance)
4. Number of corrective actions
5. Number of management system root causes identified by incident investigations

Recognition, Disciplinary and Reinforcement Program – The recognition of safe behavior or the correction of unsafe behavior to reinforce the objectives of the EHS management system.
Associated Metrics
1. Percent of personal EHS systems goals met
2. Number of disciplinary actions
3. Number of incident root causes tied to disciplinary actions
4. Number of recognitions for safe behavior

Leading Indicator Component Evaluation – Correlation and trend analysis of key performance indicators to evaluate the outcomes of leading indicator implementation.
Associated Metrics
1. Year-over-year analysis of correlation rates
2. Annual analysis of correlation rate
3. Number of comparisons with predictive measures to performance outcomes
4. Number and percent of predictive measures meeting predictive goals
5. Number and percent of predictive measures meeting performance goals

Communication of Safety – Sharing of information to stakeholders, employees and management regarding safety metrics / indicators and EHS policy.
Associated Metrics
1. Number of users of EHS dashboard
2. Number and frequency of employee meetings
3. Number of tailgates / pre-shift safety talks completed
4. Number of bulletin boards with current / relevant information
5. Percent conformance with communication expectations / needs
6. Frequency of communication to stakeholders, employees and management
7. Number of website hits
8. Percent completed and communicated
9. Number of page views of safety blog

Safety Perception Survey – Polling employees on impressions and perceptions of management and / or organizational safety performance.
Associated Metrics
Number and frequency of perception surveys
Percentage of employees polled
Response rate
Percent of positive / negative poll results
Employee-management gap analysis

Training – Any event that attempts to enrich or increase knowledge, skills, and ability to prevent incidents and / or control hazards.
Associated Metrics
1. Ratio of training hours to work hours per month
2. Number of safety talks and safety training sessions
3. Number of assessments to determine the type of training needed

Compliance – Adherence to standard operating procedure.
Associated Metrics
1. Number of regulatory inspections without findings (not necessarily fines)
2. Percent of defect-free agency inspections

Prevention Through Design – Implementation of design elements to eliminate defects and ensure only one safe way of performing a task.
Associated Metrics
1. Number or percent of designs that pass validation or quality test

Leadership Engagement – Leaders' behavior and actions that demonstrate their extra effort and commitment to ensuring safety.
Associated Metrics
1. Number of employee suggestions implemented by leadership
2. Number of employees volunteering for initiatives
3. Number of managers / supervisors participating in critical design reviews
4. Percent of positive ratings of managers and supervisors by employee

Employee Engagement and Participation – Employee behaviors and actions that demonstrate their extra effort and commitment to ensuring safety.
Associated Metrics
1. Participation rate
2. Number of on-the-job observations from employees
3. Number of off-the-job observations from employees
4. Number of employees personally engaged by supervisors in walk-around
5. Percent of coached observations
6. Percent of employees documenting observations
7. Number and quality of comments
8. Percent job turnover
9. Number of grievances submitted
10. Number of employees leading safety meetings

At-risk Behaviors and Safe Behaviors – At-risk behaviors or safety violations that are observed by individuals, supervisors and management.
Associated Metrics
1. Number of observations
2. Ratio of positive to negative observations
3. Number of observers
4. Percentage of supervisors meeting observation goals
5. Ratio of peer-to-peer observations to supervisory observations
6. Hazard severity of observations
7. Ratio of high-risk observations to low-risk observations
8. Percent of coached observations

Area Observations / Walk Around – A workplace tour to observe the safety performance of people (e.g., activities, behaviors, work tasks).
Associated Metrics
1. Number of walk arounds
2. Number of supervisors meeting goals
3. Percent meeting safety performance standard
4. Percent deviating from safety performance standard

Off-The-Job Safety – Efforts aimed at managing, tracking, and reducing incidents and injuries that occur outside the workplace.
1. Number of off-the-job observations from employees.

Permit-To-Work System – Formal written procedures to control types of work that are potentially hazardous.
Associated Metrics
1. Number of safety inspections and audits
2. Number of gaps in completion
3. Number or percent of supervisors and managers who have completed training in permit-to-work systems

Equipment and Preventive Maintenance – Identification of critical pieces of equipment for more frequent maintenance when it's nearing the end of its "life".
Associated Metrics
1. Percent of maintenance time spent on planned versus unplanned maintenance
2. Number of defects found in equipment