Safety Metrics: Measurements That Lead to Results

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Where are you today?

- What are you doing today to measure safety performance in the workplace?
- What metrics are you using?
- How well are they working?
Safety Metrics

• The body of knowledge used to quantify and measure safety performance.
• Measurement of key processes to permit process control.
• Provide an objective basis to determine process performance.
Continual Performance Improvement

- An underlying premise for safety metrics
- Plan-Do-Check-Act should be incorporated into all safety performance programs.
Performance Measurement

• Involves:
  - Determining what to measure
  - Identifying data collection methods
  - Collecting the data.
Evaluation

• Assessing progress toward achieving performance expectations
• Explain the causal relationships that exist between program activities and outcomes
Validity

- Determine if the metric is measuring what the safety manager thinks it is measuring
Reliability

- Is there consistency in the manner in measurements are taken?
- Reliability must be confirmed before validity can be confirmed.
Establishing a Safety Metric

- Ability to accurately measure safety performance depends upon the process that is followed to quantify that performance.
  - Standardized units of measure.
  - Instruments and methods capable of measuring
  - Use of the instruments or methods to quantify performance
Four types of Metrics

- Direct measurement systems
- Indirect measurement systems
- Statistical samples
- Interviews or surveys
Establishing a Safety Performance Program

• A methodology for establishing performance measures:
  - key objectives
  - outcome measures
  - activity measures
Key Objectives

- Goals that articulate what a company expects from the safety program.
- Key objectives can be the organization’s overall safety mission.
Outcome Measures

• Reflect the company's key safety objectives
• Used to determine whether the company has reached them
• Demonstrate the final results of the safety process.
Activity Measures

- Monitor the performance of activities that are instrumental in reaching the key objectives.
The Performance Measurement Process

- Identify the process flow.
- Identify the critical activity to be measured.
- Establish performance goal(s) or standards.
- Establish performance measurement(s).
- Identify responsible party(s).
- Collect data.
- Analyze/report actual performance.
- Compare actual performance to goal(s).
- Make changes to bring back in line with goal.
Trailing Indicators

- Traditional metrics that measure past safety efforts.
- Data is collected after the performance has been achieved.
- Accident records and loss reports.
Current Indicators

• How well is the management systems are working now?
• Provide a measure of potential losses over the short term.
• Examples include measures of safe and unsafe acts.
Leading Indicators

• Measures that can be effective in predicting future safety performance.
• “Before-The-Fact Measures.”
• Assess results of actions taken before accidents occur.
Benchmarking

• Ongoing process of measuring one company's safety performance against those recognized as industry leaders.

• Serves as a measuring stick for the organization by identifying those organizations that are viewed as the best.
Control Charts

• A statistical device that can be used for the study and control of safety performance in the workplace.

• Assumes the data distribution to approximate the normal bell-shaped curve.
Assumptions

• Plotting measurements over time, one would expect to obtain measurements over time that fall in the ranges depicted on the bell shaped curve.
Use of Control Charts

• Methodology to detect significant changes in safety performance measures.

• Charts include a baseline average line, and control limits.

• The control limits act as alarm values.
Theoretical Basis for the Control Chart
Control Charts

• A control chart has a line indicating the running average and two lines indicating the upper and lower control limits.
  - Common control limits are three standard deviations above the mean and three standard deviations below the mean.
  - The calculation of the control limits depends on the type of control chart.
Trends and Control

• Purpose of a control chart is to graphically identify trends.

• When using control charts, data may be considered a “trend” or “out of control.”
Out-of-Control Criteria

• One or more points outside the limits on a control chart.
• One or more points in the vicinity of a warning limit.
• A run of 7 or more points. This might be a run up or run down or simply a run above or below the central line on the control chart.
• Cycles or other nonrandom patterns in the data.
• Other criteria that are sometimes used are the following:
  - A run of 2 or 3 points outside of 2-sigma limits.
  - A run of 4 or 5 points outside of 1-sigma limits.
Interpreting Control Charts

• When data points are consistently above the upper control limit, the control chart indicates that the data is significantly different from what would be expected.
Interpreting Control Charts

• Points above the upper control limit could indicate a problem if the data represents recordable injuries while they may indicate a good thing if the data represents the number of positive safety contacts made between supervisors and employees.
Questions?