



Benchmarking: How do you know your EHS Program is Working

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This Presentation Covers

- **Why is Benchmarking Important**
- **Benchmarking systems used in the EHS Industry:**
 - **Key Performance Indicators (KPIs)**
 - **ANSI / ASSP Z16.1**
- **How to identify and establish “good” Metrics**
- **Provide a couple of Examples**

Why is Benchmarking Important

When done right, it can:

- **Be an advance warning system that allows a company to act before an unwanted incident occurs.**
- **Improves work efficiencies (time, material and/or labor).**
- **Identifies Cost Saving Opportunities.**
- **Another layer of protection to ensure compliance.**

Various Systems That Can Be Used

Key Performance Indicators (KPIs): A commonly used for:

- Revenue growth
- Revenue per client
- Profit margin
- Client retention rate
- Customer satisfaction

ANSI / ASSP Z16.1: More focused on EHS:

- Lagging Metrics
- Leading Metrics
- Impact Metrics

Lagging Metrics

Performance measure that represents the consequences of actions previously taken or not taken (sometimes referred to as an outcome or trailing metric). Lagging metrics frequently focus on results at the end of a time period and characterize historical performance.

Items to help develop the Lagging Metrics:

- **Previous Regulatory History (Recordkeeping / Inspections)**
- **Company Production Records**
 - **Raw Material Costs**
 - **Labor**
 - **Internal Records - Training**

There is a lot “negative connotation” with Lagging Metrics, but how do you know where you're going if you don't know where you've been.

Leading Metrics

Performance measure that is capable of influencing and/or predicting results (outcome / lagging and/or business impact metrics) and is often aimed at the prevention and control of future events or results.



Leading Metrics

Key items to consider when identifying and establishing Leading Metrics:

- Measure what matters, get input from various individuals.
- Be practical, don't establish "easy", "overly difficult", or numerous Leading Metrics.
- Be careful when using regulatory recordkeeping requirements:

Bad Metric: 100% Reporting (submitting required reports)

Good Metric: Submit Required Reports prior to their due date

- Don't get discouraged if the initial Leading Metrics doesn't work, it just might need to be "re-set".

Impact Metrics

Measures that reflect the organizational impact of EHS programs, policies, and activities. These measures can represent financial, productivity, reputational, quality, or employee morale impacts among others.

Common items used to develop Impact Metrics:

- **Improved efficiencies**
 - **Time / Labor / Turn-Over**
 - **Material Management**
 - **Maximizing Production Capabilities**
 - **Prolong Equipment Life**
 - **Cost Savings**

Impact Metrics

Key items to consider when selecting Impact Metrics:

- **If dollars are used to promote a cost savings, review with your controller or CFO.**
- **If process improvement(s) are used, review with the appropriate management.**
- **Avoid using NAICS Codes or similar systems, not all companies are “equal”.**

Example #1

A manufacturing facility was discharging a waste-water effluent that consisted of rejected RO water and process wastewater (peracetic acid based). A wastewater discharge permit was required that involved monitoring pH (5-9 units), flow rates and COD (Chemical Oxygen Demand). The City requested that the manufacturer divert their rejected RO wastewater to the storm drain because the amount of effluent being discharged overwhelm their systems. By diverting the rejected RO wastewater from the sanitary wastewater stream, pH levels frequently dipped below 5 units and the COD levels rose where the manufacturer was paying \$35-40K per quarter. Damage was starting to occur to the sanitary sewer lines and existing neutralization system.

Example #1: Identify & Establish

Lagging Metrics:

Previous history showed that the rejected RO wastewater was “masking” a potential pH / COD discharge issues. It also showed a significant number of batches where being reworked requiring additional materials and labor.

Leading Metrics:

Established a 90% first time pass rate on all production batches.

Impact Metrics:

A 90% first time pass rate will reduce re-work (the amount of raw materials being used and additional labor required) and will make the product more profitable. Also, by reducing the total amount of effluent being discharged should reduce the COD levels that will reduce the strength charge.

Example #1: Outcomes

The 90% first time pass rate metrics revealed the following items:

- Reduction in re-work, cost savings in materials & labor.
- pH still occasionally dropped below 5 units.
- There wasn't a significant reduction in the COD Strength Charge.
- A consistent and accurate flow rate was determined.

The existing neutralization system was improved:

- That kept the pH levels between 5-9 units.
- Reduced the COD levels by 75%.

Over-All Benefits

- Ensured that each case sold was profitable which increased revenue.
- The permit was amended from quarterly testing to biannual testing, a cost saving in third party testing and analytical work.
- ROI on the improved neutralization system was 18 months.
- The maintenance department was able to conduct preventative maintenance without disrupting the production schedule.

Example #2

A manufacturing facility was using a very uncommon chemical that was required to be used per FDA. This chemical was very expensive (\$5K per 55-gallon drum, minimum order of 4 55-gallon drums). Once a drum was open, the shelf life of the chemical was very short where at least half of this material had to be scrapped (50-60%). Scrapped material was very toxic and was classified as a hazardous waste. Due to the volume of material being disposed of, this manufacturer was a Small Quantity Generator (SQG).

Example #2: Identify & Establish

Lagging Metrics:

Previous history showed it costs \$20K per quarter (\$80K yearly) that generated 528 gallons (9.6 55-gal drums) of hazardous waste. Total annual costs for using this chemical product was \$88K. Only one vendor has been identified that sold this chemical.

Leading Metrics:

Use at least 85% of the material being purchased.

Impact Metrics:

By using at least 85% of the material being purchased metrics would reduce the amount of product being disposed off. The company's Hazardous Waste generator status will go from a Small Quantity to VSQG.

Example #2: Outcomes

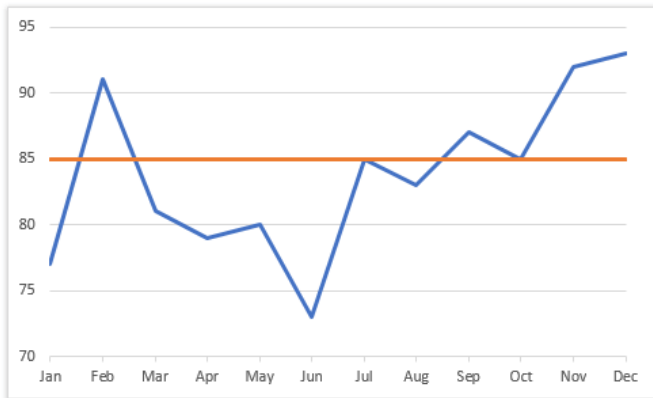
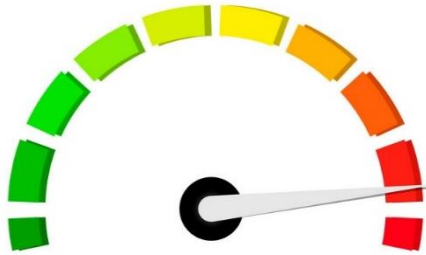
Using 85% of the material purchased metrics achieved the following items:

- 90% reduction if hazardous waste being generated.
- The company's generator status went from a small quantity generator to a VSQG status. Reduced the number of inspections (annual to once every five years), requirements and permit fees.

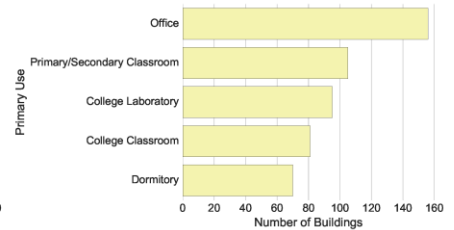
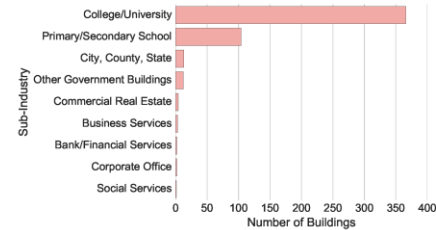
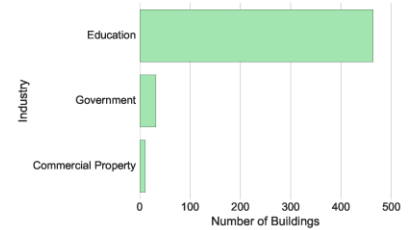
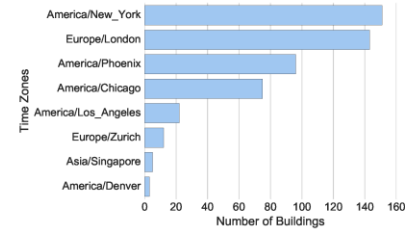
Over-All Benefits

- Found a better vendor that would work with this company, instead of buying 4 55-gallon drums, 5-gallon buckets were purchased closer to a desired volume needed.
- Going to a small container reduced the amount of material needed to be purchased.
- Workers stated that using 5-gallon buckets where easier to use than the 55-gallon drums.
- General improvements in revenue.

Visual Benchmarking Indicators

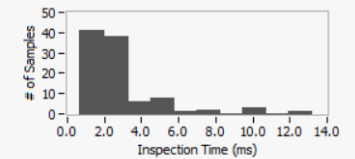


There is no “right or wrong” graphic to use, this is solely based on what works for your company



An estimation of the time required by NI Vision Builder AI to perform the inspection is: 2.711 ms or up to 368.89 parts/s.

Average Inspection Time: 2.711 ms
 Standard Deviation: 2.248 ms
 Shortest Inspection Time: 0.712 ms (#90)
 Longest Inspection Time: 13.149 ms (#98)



State/Step elapsed times based on 100 inspection run(s).

State Name	Step Name	# Iterations	Total Time	Average	Std-Dev	Shortest	Longest
Inspect		100	271.081 ms	2.711 ms	2.248 ms	0.712 ms	13.149 ms
	Read Image File 1	100	28.000 ms	0.280 ms	0.873 ms	0.000 ms	8.000 ms
	Find Circular Edge 1	100	8.893 ms	0.089 ms	0.069 ms	0.061 ms	0.693 ms
	Caliper 1	100	5.955 ms	0.060 ms	0.020 ms	0.048 ms	0.223 ms
	Display	100	91.356 ms	0.914 ms	1.155 ms	0.280 ms	7.802 ms

Visual Benchmarking Indicators

Most used visual benchmarking indicators are dashboards.



Questions