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ASSET INTEGRITY INTELLIGENCE

KEYS TO SUCCESS: HOW TO DESIGN AND USE EFFECTIVE RELIABILITY AND INTEGRITY PROGRAM ASSESSMENTS TO DRIVE SUSTAINABLE IMPROVEMENTS

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KEYS TO SUCCESS: HOW TO DESIGN AND USE EFFECTIVE RELIABILITY AND INTEGRITY PROGRAM ASSESSMENTS TO DRIVE SUSTAINABLE IMPROVEMENTS

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INTRODUCTION

Equipment integrity and reliability programs are essential for refinery and chemical facility operators. The processes of the programs are developed to ensure safety, optimize component life cycles, and promote smooth and economical operations. Yet, before such programs can be correctly built or optimized, a mechanical integrity and reliability assessment can serve as a powerful tool for improvement.

ASSESSING: THE GREATER CONTEXT

Assessments should not be confused with audits. An audit is characterized by pass/fail, it must be enforced, requires documented proof, and demands actions from findings. An assessment, on the other hand, aims at sustained improvement, taking input as fact, and ensuring that findings lead to solutions.

Overall, the purpose of an assessment is to evaluate how inspection, reliability, and all relevant parties effectively manage the integrity and maintenance at a facility. However, the assessment should never be executed without a greater understanding of program vision and implementation. As an example, if an assessment is being used to drive a significant gap closure plan, then the overall process should look as follows:

1. **Develop Vision:** Clearly define the desired state of a future program, including targeted metrics and goals.
2. **Assess Current State:** Assess the current state of the program when compared to the vision. This should be done at an effective set of representative sites, if possible.
3. **Close the Gaps:** Build and execute implementation roadmaps to close the gap between the vision and the current program.
4. **Change Management:** Administer effective change management to ensure the newly implemented program is effectively transitioned to the onsite personnel.
5. **Evergreen Program:** Manage the program using strategic key performance indicators (KPIs) that are set up to quickly identify deviations from the vision and empower targeted correction.

An assessment that neglects this wider context as listed above, will never realize its full value potential.

CASCADING SPONSORSHIP

Before starting the actual assessment, cascading the sponsorship of the wider plan across the company is crucial. This includes not only the assessment itself, but also the vision and the follow up gap closure plans that are linked to specific gaps found through the assessment.

If the assessment involves multiple sites, there needs to be sponsorship and alignment not only within the current facilities, but also properly broadcasted through the appropriate channels. This typically involves healthy collaboration between corporate stakeholders and the individuals at the site. It is often wise to bring representative site managers, engineers, and technicians into the assessment process as early as possible.

Typically, success cannot be obtained if there is not appropriate corporate and/or facility sponsorship vertically (from top to bottom) and horizontally (each site should be properly represented and incentivized). The assessment might be ineffective if any layer of the organization does not invest the time and effort to incur collaborative interaction through the entire process.

THE LOGISTICS AND PROCESS

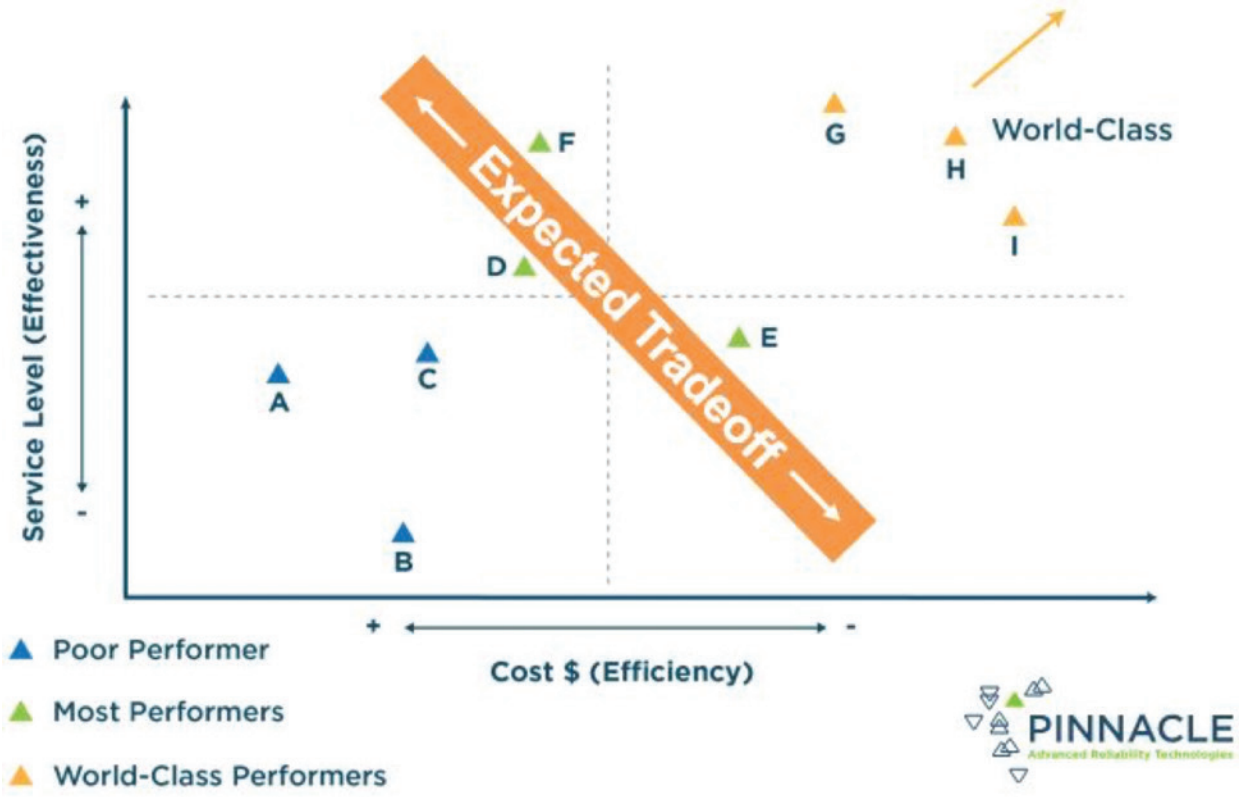
Assessment logistics, if not done correctly, can end up significantly compromising the value produced by the assessment effort. These simple, but critical, logistics include:

- Establishing a vision,
- agreeing to the assessment methodology,
- providing pre-assessment documentation and data,
- requesting key sampling metrics,
- obtaining proper buy-in, and
- properly scheduling assessment personnel (whether the assessing team or the site personnel) interviews.

For that reason, it is important to develop a plan with key milestones, dates, and measurement criteria to ensure proper execution.

Regarding the assessment information gathering process, it is intended to extract key processes and metrics from each facility's program and compare that characterization with industry best-in-class benchmarks to determine the effectiveness of the site's mechanical integrity and reliability program. The information gathering process should be both quantitative, including data sampling, and qualitative, including interviewing key personnel.

In addition, assessments should be organized into different segments for repeatability and efficiency. Typical segments include



leadership, planning and scheduling, equipment reliability, equipment integrity, technology utilization, data management, continuous improvement, knowledge and document management, materials management, and project management (shutdown, turnaround, and capital projects).

Assessments can also be characterized as "self" or "third-party." Combining both types can provide insight into the organization's self-awareness and true understanding of best practices. This allows targeted discussions of differences, which help to ensure that the final results are truly accurate. Additionally, the practice of utilizing both types of assessments can help with the accuracy of subsequent self-assessments during improvements and evergreening.

Either type of assessment typically consists of a brief self-assessment, followed by a formal assessment. Participants are encouraged to rationalize the discrepancies between self-perception and self-assessment first, then discuss and target close-gap measures. Also, there should be minimal subjectivity between assessors when it comes to clearly defining best practice characteristics and performance levels.

While not required, using a software tool to facilitate the data gathering process can help protect your data and reduce inefficiencies associated with shuffling between documentation and spreadsheets. An assessment can typically take a couple days to complete if it is primarily focused on assessing the systems, major processes, and primary KPIs.

KEY PERFORMANCE INDICATORS: THE KEY TO OBJECTIVE GROWTH

When formulating an assessment process, the guidance team should identify a set of strong KPIs that provide insight into the current state and enable the program to gain insight for self-correction moving forward. KPIs can generally be categorized as gauging either program effectiveness or program efficiency. Effectiveness refers to the successful achievement of the desired objective, and efficiency refers primarily to the cost to achieve the objective. Real performance can be measured by the relationship between these two KPIs.

The figure below demonstrates this premise, in addition to showing that while mediocre performers cycle between high effectiveness / low efficiency or low effectiveness / high efficiency, the top performers demonstrate both high effectiveness and high efficiency.

Below is a list of several KPIs that are common in both assessment and ongoing project management:

- Overall Equipment Effectiveness (OEE)
- Annual Unplanned Losses as a Percent of Capital Replacement Value

- Availability Percent
- Annual Total Maintenance Cost as a Percent of Capital Replacement Value
- MRO Inventory Value as a Percent of Capital Replacement Value
- Equipment Type Specific MTBF Hours
- Equipment Type Specific MTTR Hours
- Maintenance Cost as a Percent of Capital Replacement Value
- Breakdown Maintenance (Schedule Breaks) as a Percent of Man-Hours
- Planned Maintenance – Percent of all work (man-hours based)
- Maintenance Schedule Compliance Percent (man-hours based)
- Craftsman per Planner
- Maintenance Overtime Percentage
- Maintenance Wrench Time Percentage
- MRO Inventory turns
- Maintenance Call-Outs per month per unit
- Man-Hours Charged to Work Orders (including TA) Percentage
- MRO Inventory Value as a Percent of Capital Replacement Value
- Percent of Assets That Are Medium to High Risk
- Percent of Assets That Are Moving to Medium or High Risk Within Five Years
- Percent of Assets That Have Less Than Five Years Remaining Life
- Percent of TML That Show Growths
- Loss of Containment Events in Non-Low Risk Assets
- Number of Current Overdue Asset Inspections
- Number of Asset Inspections That Will Be Overdue in Three Months

When a strategic set of KPIs is being framed by the guidance team, it is helpful to tie major KPIs to secondary KPIs. Then, if one major KPI showcases a performance or efficiency gap, underlying causes can be more quickly exposed by diving down to the secondary KPIs. This provides more streamlined reporting and less wasted time managing and reviewing a large set of KPIs on a frequent basis.

It's important to note that a good set of KPIs should be linked to an organization's program practices. While there may not be a one-to-one relationship between KPIs and the organization's program practices, these relationships should be defined in the guidance team's planning process. It is these relationships that will dictate gap closure plans in the wake of the assessment and also in the future life of the program.

SUMMARY

To gain the full value from an assessment, an organization needs to incorporate the assessment into a greater plan (including vision, gap closure, and sustainability), emphasize cascading sponsorship through the organization, plan the appropriate logistics, and execute it on a strategic methodology that uses strong KPIs and related practices.

When done correctly, a reliability assessment will empower an organization to drive its practices forward through both concentrated gap closure initiatives and systematic run and maintain corrections. This results in higher plant availability, reduced loss of containment risk and overall program costs, and increased program compliance. ■

For more information on this subject or the author, please email us at inquiries@inspectioneering.com.

PinnacleART's article, "Keys to Success: How to Implement Reliability and Integrity Program Assessments," is part of PinnacleART's "The Story of Reliability" webinar series that will share best practice tips and strategies on how to build and implement a comprehensive reliability and integrity program. To learn more, visit pinnacleart.com/webinars.

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With more than 25 years of experience in reliability and maintenance excellence, Walter Sanford (Walt) serves as President and COO for Pinnacle Advanced Reliability Technologies (PinnacleART™), and is responsible for the development, oversight and growth of all company services and products. During his extensive tenure in reliability, Walt has served in a variety of roles, including as an operations, maintenance and integrity strategy and process advisor for several global energy companies. He is currently a Task Force Steering Group member for the development of API Draft Standard 691, Risk-Based Machinery Management. Walt received a BSc in Physics from Mansfield University, and earned extensive post-graduate engineering training from the U.S. Navy Nuclear Power School and Prototype.

MAURICIO OLIVARES

As a senior member of Pinnacle Advanced Reliability Technologies' Solutions Department, Client Solutions Engineer Mauricio Olivares partners with clients to help them develop custom asset integrity and reliability programs for their facilities. With more than six years in the industry, Mauricio has worked in a variety of lead roles at PinnacleART™, including Project Manager where he oversaw a corporate-wide mechanical integrity / RBI project across seven wholly-owned refineries for a major U.S. refiner. Born and raised in Peru, Mauricio moved to the United States and attended Texas A&M University, where he graduated with a Bachelor of Science and a Master of Engineering in Industrial Engineering.

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