Supplemental Project Notice

RISK-BASED INSPECTION FRAMEWORK AND MANAGEMENT TOOLKIT

Research Project

PROJECT HIGHLIGHTS

- A Framework for implementation of a holistic Risk-Based Inspection (RBI) Program for Utilities using leading practice approaches and operational experience.
- Development of RBI Program Management Toolkits to support utilities in the implementation and management of such a program for their Utility.
- Development of an operational experience Knowledge Base integrated with the RBI Database to enable continuous improvement
- Develop RBI Maturity assessment capability as part of the overall Risk-Based Asset Management (RBAM) approach.
- Research to expand the RBI concept from pure Vessels Under Pressure to other equipment and components in the Power Station plant.

Background, Objectives, and New Learnings

Over the last few decades maintenance activities have evolved from the traditional time-based preventive maintenance approach to more evolved processes like condition based/predictive monitoring and reliability centered maintenance.

Traditional approaches to maintenance have been found to have several shortcomings and do not always consider the challenges for utilities on how to best expend limited maintenance funds in the most optimal manner by taking more risk-informed decisions. As such, the concept of Risk-Based Asset Management (RBAM) and decision making are increasingly gaining ground. RBI is seen as an invaluable part of the RBAM approach and has gained industry acceptance as the standard approach used for prioritization of static pressure equipment. It has also gained significant traction in the Nuclear industry where Probabilistic Safety Assessment processes are used to rationalize requirements and regulations and to optimize resource utilization.

The objective of this project is to provide EPRI Members with the RBI Framework, implementation & management tools, which may aid in better managing plant assets from a RBAM perspective. EPRI researchers intend to:

- Develop leading-practice RBI Framework and Methodology to enable an effective RBI Program or optimize existing Programs.
- Develop the required management and automation capability through RBI Program management toolkits.
- Develop implementation and leading practice RBI guidelines (Knowledge Base) for members who want to implement or optimize their RBI program(s).
- Investigate technologies that can assist with the trending and prediction of potential failures; as well as technologies that can better test and monitor degradation.
- Conduct research into expanding RBI practices into Balance of Plant areas beyond the conventional RBI Program scope (pressurized equipment).
- Create an EPRI RBI Program maturity assessment framework to enable benchmarking and continuous improvement drives and establish baseline reporting, benchmarking and trending capability for RBI performance reviews.

Benefits

This project aims to improve the overall availability and reliability of equipment that can benefit from a more risk-based asset management approach using the RBI process and methodology. Implementation of a holistic RBI program may also improve asset lifecycle versus lifecycle costing decisions and enable members to better meet the demands of a changing utility operating model that requires more flexible operations and ability to maximize remaining useful life of plant assets through more risk-informed approaches.

Project Approach and Summary

1. Research leading practice in RBI and define a best-practice strategy and implementation approach within the larger EPRI RBAM Framework for Utilities.
2. Provide technical guidance and toolkits that can enhance the RBI capabilities and expertise within RBAM Program approaches.
3. Leverage existing EPRI asset management tools and collaboration with other appropriate EPRI Programs to define best practices and methodologies around life estimation and RUL management.
4. Develop RBI Framework and its associated Toolkits as a prototype and mature/enhance it through proof-of-concept collaborations with EPRI members who join the supplemental project.

Deliverables

Funders will participate in prioritizing the deliverables below based on total funding:

- RBI Framework and Implementation Guideline, underpinned by an RBI Knowledge Base and Benchmark database.
- RBI Toolkits to support the management, optimization, reporting and trending of the RBI Program.
- Recommended templates and guidelines fordevelopment and management of Risk Treatment Plans (RTP).
- Phase I of the research project and scope of work will be confined to pressurized systems and equipment (vessels and piping).
- Integration of the developed RBI Framework as a core input into the bigger Risk-Based Asset Management (RBAM) Program Framework.
- Research report on opportunities to expand the RBI Program beyond conventional vessels under pressure application.
- Research report on technologies that can improve the analysis, trending and prediction of potential failures; as well as technologies that can better test and monitor degradation.
- Research report on approaches and opportunities to improve RBI results (for example the use of robotics and AI to improve the capturing and quality/ consistency of inspection data used in RBI assessments and risk quantification).

Price of Project

$80,000 USD per funder. This project is eligible for self-directed funds (SDF) and tailored collaboration (TC) funding

Project Status and Schedule

January 2024 – June 2025 (Phase I).

Who Should Join

Owners and operators of Power Plants that can benefit from a risk-based asset management approach for their pressurized equipment (vessels, piping, etc.) and structural elements.

Contact Information

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