



2021 Award Nomination

Title of Innovation:

(Dynamic Data-driven Asset Management)

Nominee(s)

Kevin Gooding, PPG

Scott Doering, PPG

Jeff Lipniskis, PPG

Category:

(select one below)

Modeling/Risk Assessment

Dates of Innovation Development:

10/2017 - Ongoing

Web site: <https://www.ppgpmc.com/resources/ppg-asset-integrity-management>

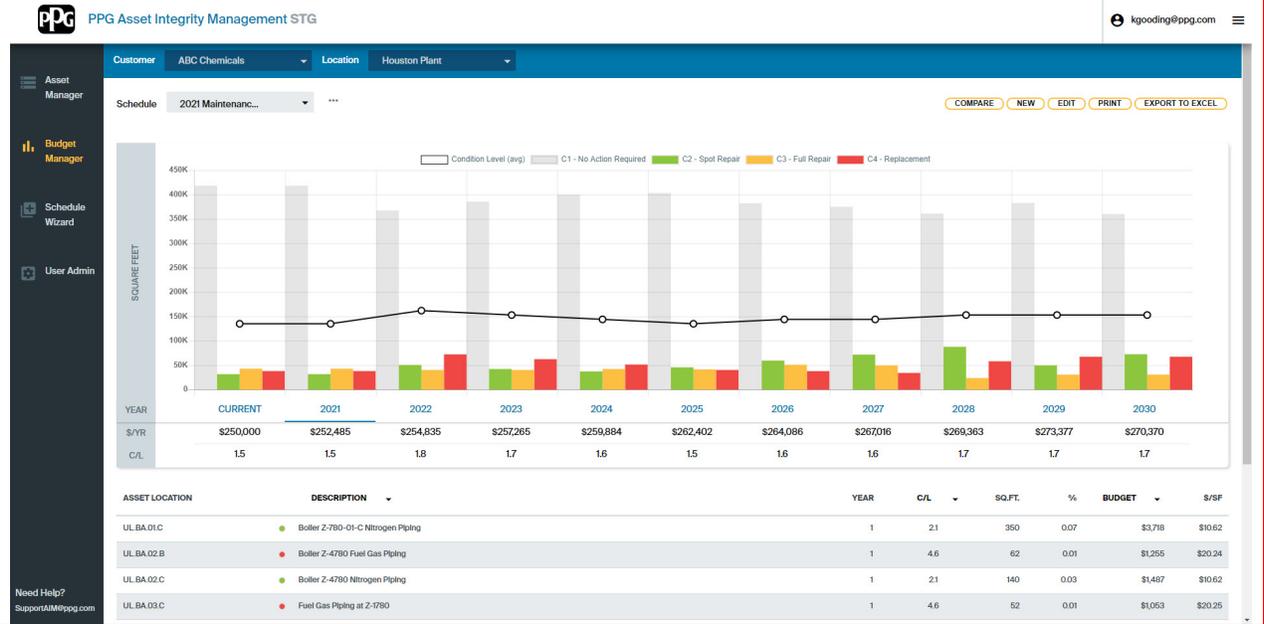
Summary Description:

Staying on top of soft asset maintenance, managing corrosion, and planning / budgeting for these activities can be a daunting challenge. PPG's innovation utilizes mobile and cloud-based computing technology to not only collect corrosion and inventory data of assets but to apply algorithms to predict future asset condition then analyze, prioritize, schedule and budget asset management activities. This information is then easily accessed through a user dashboard on an internet connected device.

Using a data-driven approach, PPG Asset Integrity Management (AIM) incorporates predictive modeling that can forecast future asset conditions by following lifecycle curves. This means at any time, you can fast forward the age of various assets and calculate the likely outcome. You can compare multiple scenarios based on different inputs and determine what plan meets your overall maintenance needs and budget.

Depending on visual inspection, evidence of corrosion, environmental factors, and predictive lifecycles – maintenance plans can be custom tailored based on budget parameters that optimize your annual maintenance spend. In the end – the condition of your assets will be improved by employing “Just-In-Time” maintenance vs. “End-of-Life” replacement.

PPG AIM offers a dynamic, reliable alternative to static spreadsheet or ad hoc asset management of protective coatings and passive fire protection, by prioritizing and ranking maintenance spend based on the greatest investment return.



Full Description:

(Please provide complete answers to the questions below. Graphs, charts, and photos can be inserted to support the answers.)

1. What is the innovation? PPG's innovation utilizes mobile and cloud-based computing technology to not only collect corrosion and inventory data of assets but to apply algorithms to predict future asset condition then analyze, prioritize, schedule and budget asset management activities. This information is then easily accessed through a user dashboard on an internet connected device.

2. How does the innovation work? PPG's Asset Integrity Management Program (PPG AIM), uses a data-driven approach to corrosion management of assets. PPG AIM incorporates predictive modeling that can forecast future asset conditions by following lifecycle curves. This means at any time, you can fast forward the age of various assets and calculate the likely outcome. You can compare multiple scenarios based on different inputs and determine what plan meets your overall maintenance needs and budget.

3. Describe the corrosion problem or technological gap that sparked the development of the innovation. How does the innovation improve upon existing methods/technologies to address this corrosion problem or provide a new solution to bridge the technology gap?

The best way to extend the life of individual assets is to apply corrosion-protective coatings and complete other related maintenance activities when it is most economically efficient. Using its predictive modeling software, the PPG AIM system helps to objectively identify those times. Although other corrosion-management programs are available today, the data most use are based on condition analyses gathered through visual inspection of assets, conducted every three to four years, by plant personnel and only provide a snap-shot in time of the assets. In addition to being highly subjective, even for maintenance departments with consistent asset-evaluation standards and little staff turnover, ongoing scope creation and project estimating using such criteria is both time- and labor-intensive. Another problem is that the data collected through such evaluations is static. Consequently, programs using this input cannot account for factors that may accelerate corrosion of key assets between inspection intervals, nor can they account for the many variables covered by PPG's advanced estimating tool. PPG AIM mitigates these drawbacks. Using data collected by PPG at customer facilities, the program helps maintenance professionals implement dynamic "just-in-time" coatings maintenance programs that objectively predict—years in advance—when to apply or reapply coatings at optimal times in an asset lifecycle and using the data, create a scope of work and accurate budgets to complete it. Once the work is complete, the asset's condition is updated in PPG AIM and with

its built-in corrosion curves, gives the asset owner a dynamic corrosion monitoring system that is always up to date.

4. Has the innovation been tested in the laboratory or in the field? If so, please describe any tests or field demonstrations and the results that support the capability and feasibility of the innovation. PPG AIM has been adopted by over a dozen asset owners in both the US and Canada since the launch in 2019. PPG corrosion technicians collected corrosion related data, environmental conditions, available surface area of each asset, and uploaded pictures using mobile devices. This information is sent to PPG servers in the cloud where PPG AIM applies corrosion related algorithms to prioritize maintenance activities based on the asset owners goals.

5. How can the innovation be incorporated into existing corrosion prevention and control activities and how does it benefit the industry/industries it serves (i.e., does it provide a cost and/or time savings; improve an inspection, testing, or data collection process; help to extend the service life of assets or corrosion-control systems, etc.)? While many asset owners realize the benefit of comprehensive corrosion prevention programs, one of the most common pitfalls associated with their failure is an inability to stay the course and realize their full economic value. The PPG AIM system is an industry-first software-based system created specifically to help asset owners avoid such hazards by making scheduling, budgeting, and optimizing corrosion prevention programs easier to do than ever. Implementation of the PPG AIM system begins with a visit to the customer site. In addition to mapping the plant, PPG staff conduct a corrosion assessment and quantity survey, then enter collected data into the system's digital asset management tool. Once this "digital twin" of the facility is constructed, PPG timestamps and analyzes the current condition of inventoried assets using criteria published in NACE technical paper 509, one of the industry's most authoritative texts on corrosion management. PPG AIM software then uses the timestamps and corrosion assessments to model future asset conditions.

The asset management tool also acts as a master catalog and user interface for facility managers, providing on-demand access to asset-related materials such as timestamped photos, condition analyses, plots, inspection reports and other related documents.

The main benefit of the *PPG AIM* system is its advanced schedule manager software. Using modeled asset conditions created with the program's corrosion-forecasting algorithm, the tool enables asset managers to plan and budget maintenance schedules adjusted to any time horizon requested by the system operator.

Another feature that sets the *PPG AIM* system apart is the sophistication of its estimating tool. Unlike competitor systems, this component calculates man-hours, production rates, materials

and other costs based on surface area, type, and condition at time of maintenance, then uses this data to apply a difficulty factor based on project scale, elevation, and access. The estimating tool also incorporates other cost modifiers such as abatement, containment, and multiple color schemes into its model.

Finally, using a viewer-friendly graphical display, the software identifies the best time to perform maintenance on every asset in the program’s inventory and provides inflation-adjusted cost estimates for when that work is scheduled.



The schedule manager software provides a graphical display of current and future conditions for assets, including inflation-adjusted costs for maintenance.

If plans change due to budget increases, cuts, project delays, extreme weather or other variables, the estimating tool and schedule manager enable program users to game out multiple corrosion maintenance scenarios and adapt maintenance schedules and spending accordingly.

6. Is the innovation commercially available? If yes, how long has it been utilized? If not, what is the next step in making the innovation commercially available? What are the challenges, if any, that may affect further development or use of this innovation and how could they be overcome? PPG AIM is commercially available since its launch in March 2019.

7. Are there any patents related to this work? If yes, please provide the patent title, number, and inventor. There are several innovations that are currently under review with the US Patent

& Trade Office.