



# **OPERATOR ROUNDS:** **THE FIRST STEP TO A PROACTIVE ASSET MAINTENANCE PROGRAM**

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# Executive Summary

Run-to-failure maintenance programs continue to enjoy a high ranking in nearly any list of preferred asset management processes. Many seasoned plant veterans see this approach as the most cost- and labor-effective. That mindset, however, is undergoing a change. More managers, directors and executives have come to understand that reactive maintenance programs end up costing far more than they save. The net results are reduced asset lifespans, lost production and increased risks. This white paper will examine the pitfalls of a reactive maintenance approach, show how more effective operator rounds can identify problems before they occur and introduce a solution to digitally transform an inefficient run-to-failure program into a cost-saving and revenue-producing proactive asset management process.

## Refinery explosion shows the need for continuous proactive maintenance

On June 21, 2019, several thunderous [early morning explosions](#) rocked the Philadelphia Energy Solutions (PES) Girard Point refinery in southwest Philadelphia. Massive fireballs lit up the sky for hours as crews battled the raging inferno. Finally, after more than 24 exhausting hours, the firefighters managed to extinguish the blaze. While no lives were lost and only a few injuries reported, company officials and federal investigators now had to sift through the smoldering remains to figure out what had happened.

[According to the U.S. Chemical Safety Board \(CSB\)](#), flammable vapor escaping from the refinery's alkylation unit found an ignition source just after 4 a.m. This started a large fire. At 4:15 a.m., an explosion ripped the alkylation unit, followed by a second blast four minutes later. At 4:22 a.m., an even greater detonation occurred when a drum containing butylene, isobutane, and butane ruptured. This explosion threw drum fragments in several directions, including a 19-ton section that flew nearly half a mile across the nearby Schuylkill River.

CSB investigators ultimately blamed [a faulty elbow pipe](#) for the disaster. The pipe transported propane, hydrofluoric acid and other hydrocarbons. Hydrofluoric acid is corrosive, and the pipe circuit underwent regular ultrasonic thickness measurements. The elbow section, however, was not included in this process. Refinery records show the elbow had been installed in 1973 and a post-incident test revealed the failed elbow measured only 7% of PES default requirement thickness. In short, the elbow was far too thin, and ultimately gave way.



PES estimated that 3,271 pounds of toxic hydrofluoric acid vapor escaped into the air during the incident; however, no onsite or offsite ill health effects have been reported to date. The vapor had the capacity to damage the skin, eyes and lungs of workers and nearby residents. On June 26, five days after the explosions and fire, PES announced it was [shutting down the refinery](#), which produced more than a quarter of the gasoline used on the East Coast. One month later [the company filed for bankruptcy](#), blaming the explosion and fire. It was the company's second bankruptcy filing within a year.

PES had announced in January 2019 that it was [scaling back](#) a planned refinery maintenance project, or turnaround, due to its financial problems. This project was to have included the alkylation unit where the June 2019 explosion and fire later occurred. It's possible the January turnaround could have discovered and replaced the faulty elbow pipe section, thus preventing the June disaster. Or perhaps not. We'll simply never know.

However, the incident does point to the need for regularly scheduled maintenance inspections and programs. By scaling back the planned turnaround, PES had no opportunity to find and repair the faulty elbow pipe until it was too late. As a result, a large swath of the unit was destroyed, the refinery was shuttered, and hundreds of workers lost their jobs. While there were few injuries and no deaths, it's unclear about the legal consequences the company still must bear.

# Operator rounds play a key role in proactive maintenance

Each day, refinery and plant technicians walk the site to conduct a process check. The goal of each check is to verify the facility's operational performance and to document any safety or equipment issues that ought to be addressed. These routine operator rounds, then, provide a valuable early warning system for potential problems. In theory, they will catch small, preventable problems before they become larger ones that could result in unplanned shutdowns, lost production and reduced revenues. As such, they are the foundation of any proactive maintenance program.

A proactive maintenance program, using an effective operator round process, may have been able to detect a problem at the PES alkylation unit before the explosion. This could have reduced the risk of a disaster and the resulting closure of the refinery.

## Problems in the operator rounds process

Generally, inspections involve the technician or operator touring the unit or plant with a preprinted paper checklist to fill out and turn in to a supervisor at the end of the round. Most industrial and manufacturing facilities assign the rounds to a more experienced operator who is familiar with the plant and its policies and procedures. Sometimes, however, in industries with high turnover, a less experienced employee may be tasked with completing the rounds, opening the door to potential errors. Companies are also being required to do more in less time, which may result in a harried operator or technician rushing through the rounds or not completing each section. This leads to potentially critical issues being overlooked or missed, defeating the whole purpose of the process.

The checklist itself can sometimes pose a problem. Perhaps it's not well thought out, is poorly organized, is confusing, or omits important datapoints. If it's a paper form, that can lead to added troubles. Paper can be misplaced, lost or get stuck in someone's inbox. An operator's handwriting can be smeared or be illegible. Notes can be confusing, contradictory or incomplete. A paper form can also be turned in unfinished or not be submitted at all, with no warning or alarm that the task remains to be completed.

Finally, there's the review and approval process. With a paper-based system, the form can languish in a supervisor's inbox, unacted upon for hours or days. Or it can be still in the clipboard at the operator's station because he or she was suddenly called away before the form could be submitted. Worst of all, it may have fallen out of the clipboard behind a piece of equipment and no one either knows where it is or that it's even missing.

# An electronic solution for more effective operator rounds

The digital transformation revolution offers a better way to conduct performance and operational inspections. Using native mobile technology, industrial manufacturers and process plants can now perform faster, more accurate and thorough operator rounds. A digital inspection system also offers greater real-time visibility, enhances communications and speeds the approval process. There's no paper form to lose, no handwriting to decipher, nothing to pass along and nothing to file. Everything is digitally stored.

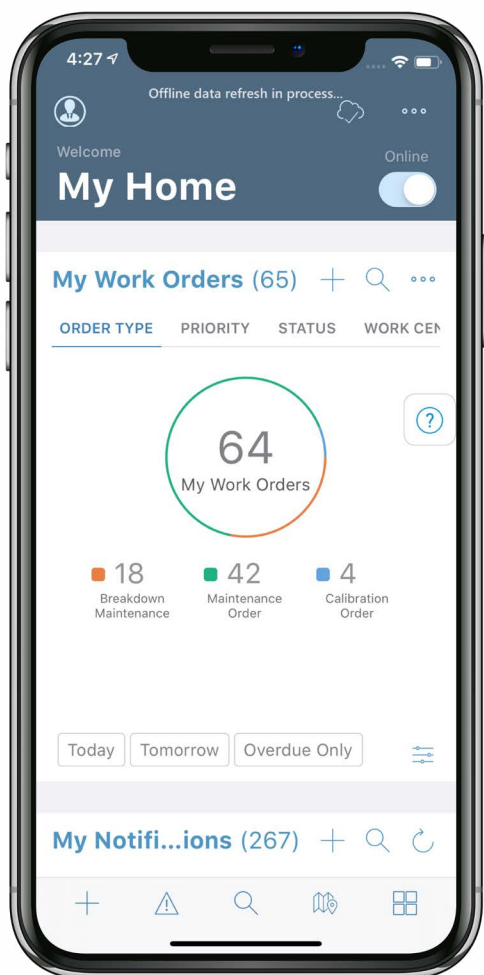
Supervisors, managers and directors have immediate access to mission-critical information via handy mobile device or desktop apps. This means they can respond quickly to trends and problems, enabling them to solve maintenance issues before they result in lost production, or worse, plant shutdown. Leadership can make more informed decisions based on field-verified facts rather than experience or intuition. With fast and accurate data, labor and resources can be deployed more effectively, reducing duplication of effort and waste. Finally, with immediate access to key information, technicians can fix the problem the first time, cutting inefficient and time-consuming reworks.

With an effective operator round process in place, a reactive maintenance program can now become proactive. Rather than simply waiting for a piece of equipment to fail, supervisors, planners and schedulers have an efficient information resource that will allow them to take control of the maintenance process instead of the process controlling them. Accurate data results in better strategies, optimum use of resources and labor, less downtime and greater revenues. Ultimately, the company has a better managed, more productive and safer plant.

## Innovapptive can make this possible

Innovapptive, a digital transformation provider, offers a robust electronic tool that can make your operator rounds more effective, easing your switch from reactive to proactive maintenance. Our [mWorkOrder](#) delivers an easy-to-use, customizable solution to improve your operator rounds, giving greater visibility into the current operational status of your refinery, plant or industrial facility.

**mWorkOrder** includes a powerful feature that enables users to reconfigure and customize electronic forms, such as an operator rounds checklist or a safety report. Perhaps one of these forms is missing a key field. A super user (such as a plant manager or supervisor) can add this field or create an entirely new form on the fly using a desktop computer or mobile device. **RACE™** Dynamic Forms requires no programming or coding knowledge to use. A form can be created or altered in as little as 30 minutes. Once completed, it's available for immediate use enterprise wide via **mWorkOrder**. RACE can make operator rounds checklists more detailed and accurate, allowing for more proactive maintenance and better risk assessment.



## **mWorkOrder users have reported:**

# 90%

**reduction in downtime and production delays.**

# 90%

**drop in preventable failures.**

# 25%

**improvement in technician wrench time and work capacity.**

# 15% to 20%

**fewer reworks.**

# 35%

**cut in maintenance backlogs.**

# 60%

**less technician overtime.**

## About Innovapptive

Innovapptive is a global leader for industrial connected worker solutions with a purpose to help improve people's lives with the next generation **Connected Workforce Platform™**. The platform digitally connects the entire industrial workforce, executives and back office to minimize plant outages and improve operational excellence. By engineering a platform that fuels innovation and collaboration, Innovapptive is transforming the experience of the industrial worker to increase revenues and margins for its customers. Innovapptive is headquartered in Houston, Texas with offices in Australia, Netherlands and India. Learn more at [www.innovapptive.com](http://www.innovapptive.com).

## More Information

To learn more about mWorkOrder and how it ensures effective operator rounds, proactive maintenance, greater productivity and enhanced safety, schedule a free demo today by calling 844-464 6668 or clicking [here](#).



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