

Alarm Response Management

DECREASING DISASTER EXPOSURE BY ENSURING
THE CORRECT RESPONSE TO CRITICAL ALARMS



INTRODUCTION

At best, too many alarms can be a nuisance and deter productivity. But uncommon alarms requiring the correct emergency response can be dangerous, and even detrimental to your organization and customers. Alarm Response Management capabilities using GE Workflow software layers easily on top of existing HMI/SCADA systems and enables companies to take action on alarms by guiding operators through the proper steps to ensure the right response.

Alarming Statistics – A \$13 Billion Cost to Industry

The U.S. industry alone loses \$13 billion per year by incorrectly responding to alarms, according to a study by the Abnormal Situations Management group. With increased regulations, decreased operator experience, and growing volumes of information bombarding employees, we can expect these costs to increase if changes are not made.

Improper actions on alarms can lead to serious and unsafe conditions as well as the erosion of brand equity. For example, one company lost more than \$2 million in one year alone due to unsafe food production, and others have faced huge fines, negative publicity, safety risks, job loss, and even jail time for those in leadership positions.

While reducing the number of nuisance alarms can help, it does not address the root cause of the high costs. The root cause of regulatory violations and high cost accidents is ineffective response to critical alarms. The key to cost and risk reduction is to ensure correct response to the small subset of alarms that signal critical issues—improving how companies respond to critical alarms.

Today, Alarm Response Management technology helps operators make better decisions by providing information and guidance with the exact responses needed to address critical alarms. It also helps track performance and allows managers to review the results and improve the response instructions. By ensuring the correct response consistently, companies can reduce liability exposure and costs.

The Evolution of Alarm Management

Originally, alarms were wired directly to pilot lights located on the equipment. Facilities started to centrally locate these alarms on large annunciator panels to make it easier for operators to view alarms in one location. Alarm management received its first breakthrough with the introduction of computerized HMI, allowing centralized storage of alarms on a computer.

The launch of Microsoft® Windows®-based HMI/SCADA allowed alarms to be tracked and acknowledged by operators on computer workstations. As systems became less costly and easier to implement, operators have become inundated with thousands of alarms.

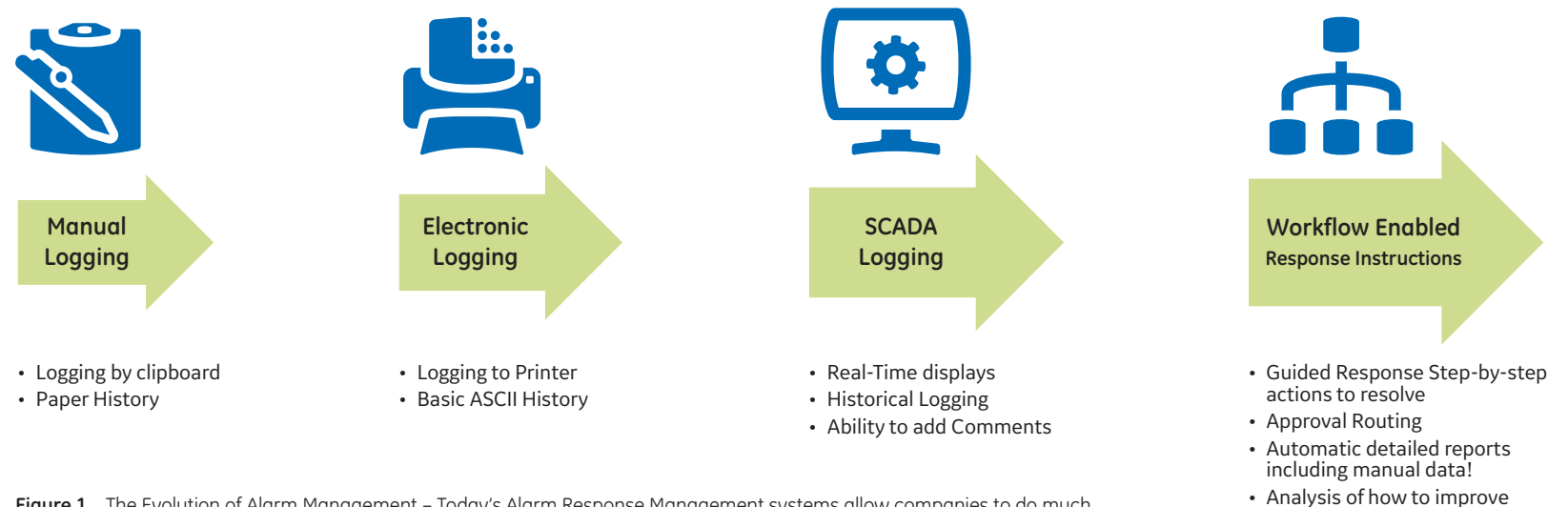


Figure 1 The Evolution of Alarm Management – Today’s Alarm Response Management systems allow companies to do much more than just acknowledge alarms by guiding operators through the proper steps to resolve alarms and take automatic action.

Sounding the Alarm – Acknowledging Problems Does Not Solve Problems

Today's alarming systems allow operators to acknowledge they have seen the alarm; it also tracks when the alarm is cleared. But it does not ensure that the proper action was taken or if the situation is resolved. The traditional system does not provide operators with information on the actions needed to resolve the alarm, and the results are not tracked to ensure accountability. Most importantly, critical information is not available to make future improvements.

Improving Responses to Alarms With Specific Instructions

An Alarm Response Management solution can help operators take actions on alarms with alarm response instructions. It can be an effective, low-cost investment to reduce operator response time by filtering alarms; ensure the right response to issues; decrease errors, rework, and waste; and automatically generate reports to measure response results. Automated reporting can demonstrate that operators have followed proper procedures, which is increasingly critical to meet evolving regulations.

For mission-critical applications, it can help ensure safer operations by avoiding false positives or false negatives, identifying critical risks, and eliminating noise and nuisance alarms.

There are many applications for Alarm Response Management, including:

Food safety—to correctly respond to alarms such as metal detector alarms, oxygen alarms, and temperature alarms, to ensure safety in the production of food

Municipal wastewater treatment—to respond appropriately to storm event warnings, avoiding the release of untreated or partially treated water

Discrete and assembly—to prevent problems before products reach customers, responding to out-of-spec alarms, invalid assembly, etc.

For example, a facility that treats wastewater uses Alarm Response Management to minimize the potential for outputting contaminated water. Instruct operators to turn off the valve that will stop the flow; tell them exactly where the valve is; and

provide them with a photo of what it looks like and specific instructions on how to turn the valve off. After the valve is off, tell the operators how much time they have until the holding tank fills up.

If the operators need additional assistance on how to correct the problem, have them shut down all of the systems supplying water to the holding tank, providing them with more troubleshooting time. Provide them with a precise list of all the systems, where they are located, and how to turn them off. Also, escalate the issue if needed.

After the problem is solved, review how long each of the steps took and if there are any improvement opportunities. Investigate why the shut off valve did not shut off automatically, and use all of the response data to create the regulatory report required.

Consider how much money a problem like this could cost if the operator does not respond correctly. What if the operator on duty is new to the facility? How much money does that open valve cost each minute? Each second?



Measure the Response

In order to improve any task, companies first have to measure their current performance. When the goal is to improve alarm response, it is critical to measure the response to each individual alarm while also comparing responses to multiple alarms.

A critical statistic is Mean Time To Repair (MTTR), which allows companies to quickly assess how long the corrective action took. By filtering MTTR by location within the facility or by operator responding, we can quickly identify trends. Why is one operator so much faster than the rest? Are they aware of a corrective action that should be incorporated into the standard response instructions?

Another metric, Mean Time Between Failure (MTBF), allows companies to look at how often an alarm is occurring. If an alarm occurs too often, this probably signals another deficiency in the system that should be addressed to keep the alarm from occurring at all.

Viewing alarms by location also enables users to view how well different areas of the facility are run. Why does one area consistently lead the facility with the least amount of alarms? What is that work crew doing that others should replicate?

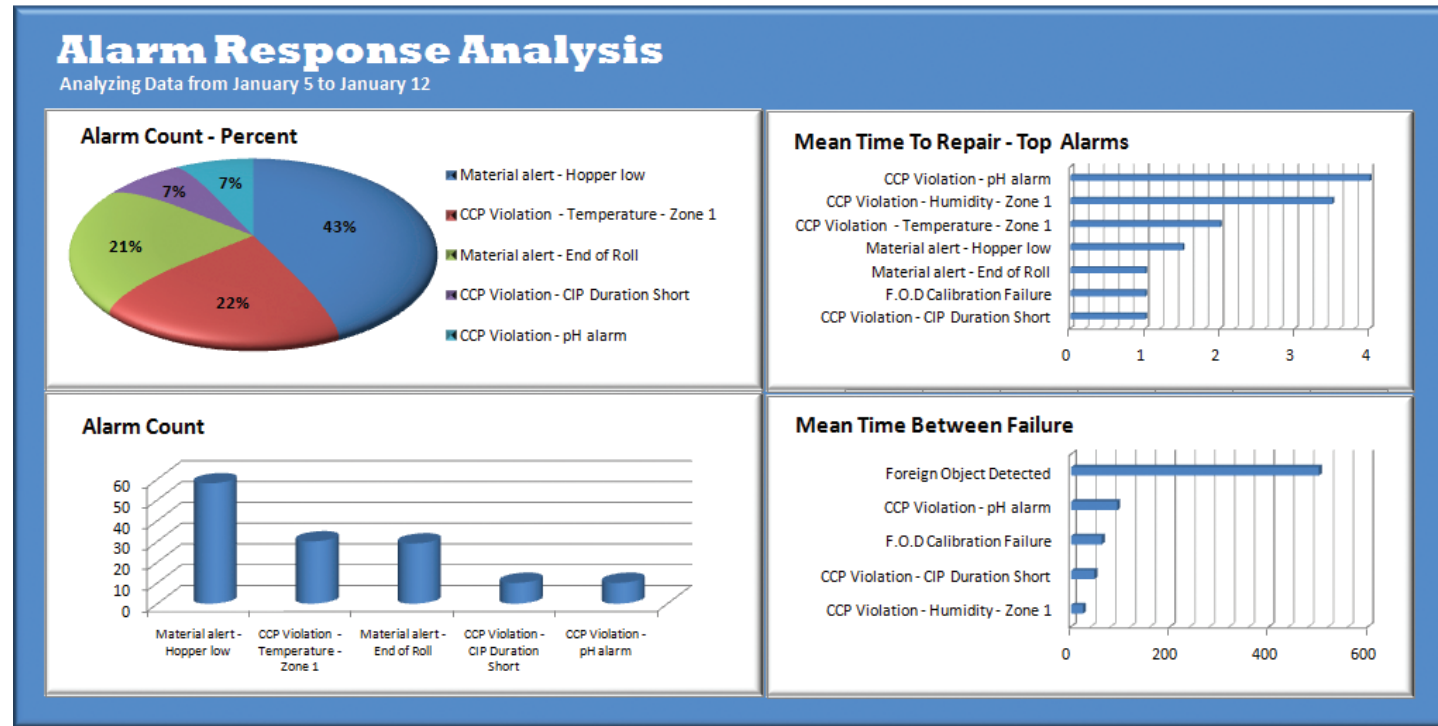


Figure 2 Alarm Analysis – With Alarm Response Management, you can track the results of your operations team—both for performance improvement and compliance.



Solutions Built With Proven Technologies

Alarm Response Management utilizes technology called workflow or work process management, which has been used for business systems for a long time. Most people are familiar with workflows used at airport kiosks or on ATM machines, whereby these systems allow users to make decisions when an expert is not available to assist or consult.

Using our proven Workflow software, SCADA users can provide operators with specific instructions and the precise information they need to make the correct decisions in critical situations.

GE's Alarm Response Management can leverage an existing SCADA infrastructure, minimizing the investment required. By utilizing existing operator stations and existing networks, companies can provide alarm response instructions to operators by adding a single server on the network and a small one-time investment by the facility's expert on responding to the critical alarms. With advanced capabilities, they can move beyond acknowledging alarms to taking the right action on alarms for improved operations.

Conclusion

As operators are inundated with more alarms and warnings than ever before, ensuring the correct response to the small subset of alarms that signal critical issues is key to helping companies reduce liability exposure and costs. While traditional systems may enable operators to acknowledge alarms, they do not help prioritize and resolve issues, which can lead to improper actions on critical alarms.

With Alarm Response Management solutions, companies can guide operators with specific instructions and precise information that ensure the right response to issues, decrease errors, and automatically generate reports to measure response results. These solutions can also integrate with existing SCADA infrastructures for significant cost savings, ease of use, and fast time to solution—helping operators deliver consistently effective and timely response while enabling companies to improve productivity, safety, and profitability for a sustainable advantage.

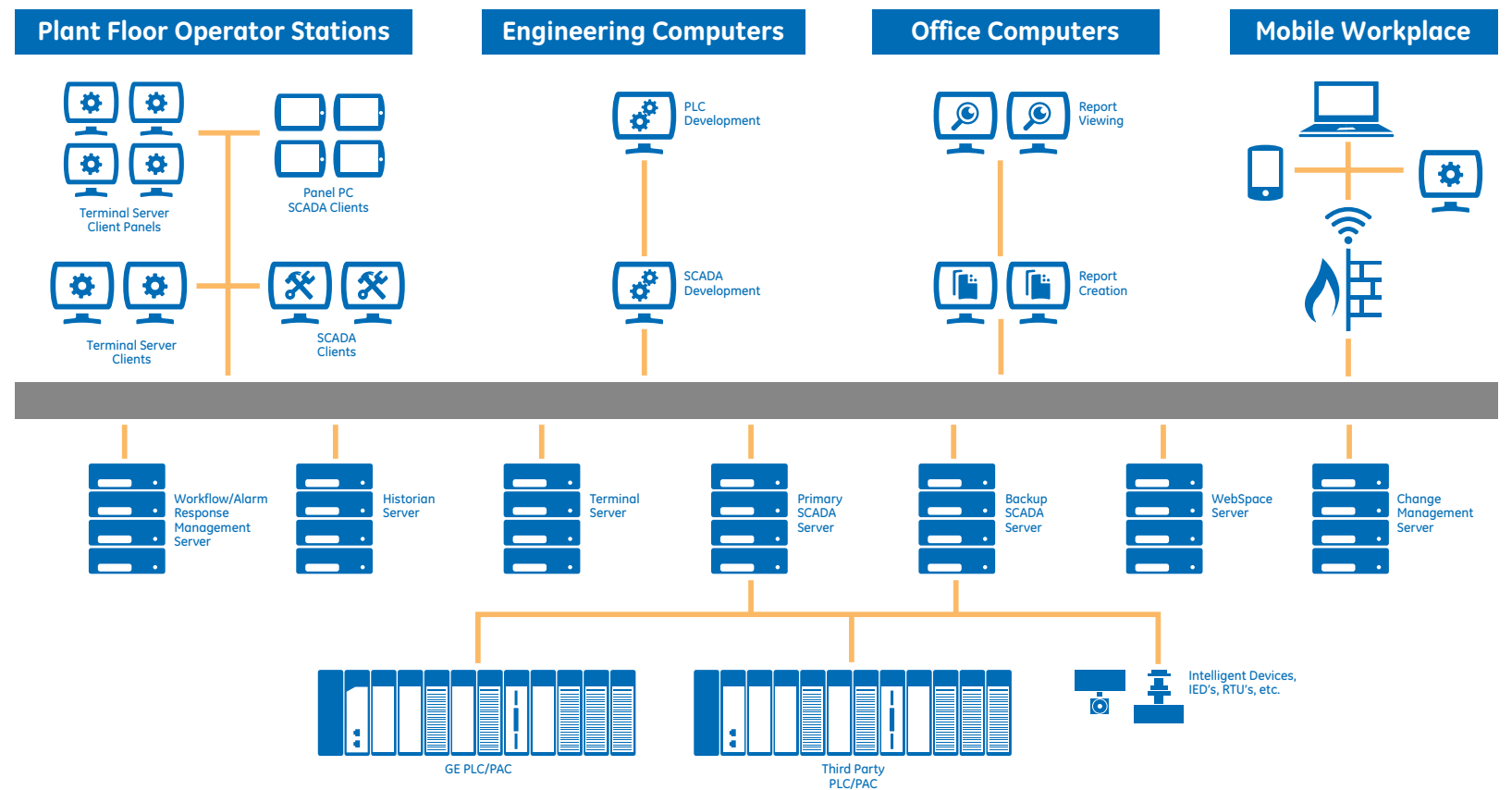


Figure 3 Adding Alarm Response Management – By utilizing existing operator stations and existing networks, you can provide alarm response instructions to operators by adding a single server on the network.



ABOUT GE

GE (NYSE: GE) is the world's Digital Industrial Company, transforming industry with software-defined machines and solutions that are connected, responsive and predictive. GE is organized around a global exchange of knowledge, the "GE Store," through which each business shares and accesses the same technology, markets, structure and intellect. Each invention further fuels innovation and application across our industrial sectors. With people, services, technology and scale, GE delivers better outcomes for customers by speaking the language of industry.

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