Alarm Rationalization

Validating and Justifying Alarms

In older control systems, hardwired panels limited the number of alarms and a great deal of thought was put into what alarms needed to exist for the operator to run the plant safely. As operator interfaces changed to computers and historians became prevalent, adding alarms was easy and in many cases less thought went into what alarms were really necessary. Unfortunately, having more alarms doesn't mean the system is better protected. In fact, it often means that alarms are ignored, and alarm flooding becomes more common which confuses operators to a point where they ignore the alarms and focus on other indicators for information about what is occurring.

Examples of alarm rationalization problems include Three Mile Island Nuclear accident in 1979 where important alarms were missed and the Texaco Milford Haven accident where operators received over two hundred alarms at a high rate of speed. These accidents and many more require us to utilize a disciplined approach to alarm management starting with the process under control. Careful analysis of PFDs, P&IDs, and process safety documentation is necessary to rationalize which alarms are necessary and actionable, versus informational.

While an alarm system with well-designed alarms is a critical tool for managing the operation of process plants, well designed and maintained systems may become ineffective, leaving many plants vulnerable in terms of safety and financial loss. In order for an alarm system to be an effective tool, alarms must be relevant, unique, timely, prioritized and understandable.

Kenexis uses the ANSI/ISA 18 Standard to help our clients make their alarm systems effective. We assist in the design and ongoing mechanical integrity programs, including alarm prioritization and rationalization studies, mechanical integrity program / test plan development, and alarm performance assessments.

Symptoms of Poor Alarm System Design:

- Minor upsets generate a significant number of alarms
- When some alarms activate, the operator is unsure how to respond
- There are active alarms when the process is operating normally
- Alarms occur that do not require any operator response
- Routine operations result in numerous alarms to do not seem to serve any purpose
- Alarms remain active for very long periods of time
- There are no plant-wide guidelines for how alarms should be implemented

ISO 9001:2008 Certified

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A good alarm system design begins with a prioritization and rationalization study. The study determines which of the proposed alarms are truly necessary and what priority should be assigned. The priority of the alarms then serves as a basis for mechanical integrity programs and the design of annunciation systems.

Mechanical Integrity Program Development

Process safety regulations, such as the OSHA Process Safety Management Standard, require that a mechanical integrity program be developed to ensure their safe operation. Kenexis will help you design and maintain your mechanical integrity program, including written test procedures for testing the alarm system including both the field sensors and annunciation equipment.

Alarm System Performance Assessment

Alarm system optimum performance can degrade from unforeseen operating conditions, inadequate equipment performance, and inadequate change management. Additionally, alarms tend to creep in overtime without following a rigorous alarm prioritization and rationalization process. Poor performance manifests itself in detectable patterns including alarm floods, nuisance alarms, chattering alarms, standing alarms, correlated alarms, and disabled alarms. Kenexis helps to identify alarm system problems by using a variety of data mining software tools, and then to assist in developing solutions to the root causes of alarm problems.

> Kenexis Alarm Management Solution™ helps to ensure the ongoing integrity of your alarm systems by risk-based design, mechanical integrity programs, and continuous performance assessment.

About

Kenexis is a full-service process risk management company with expertise in process engineering. Because we know process design, equipment performance limitations, and process hazards, we can offer more comprehensive solutions than simply deleting or re-ranging alarms that may have a safety critical purpose.