FAST/TOOLS

Alarm System Performance Analysis (ASPA)

FAST/TOOLS ASPA analyzes and supports the improvement of the alarm system performance on an operational FAST/TOOLS system in accordance with the EEMUA 191 directives.
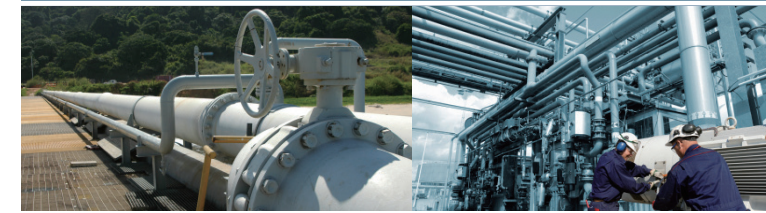
Synaptic Business Automation™

Synaptic Business Automation underlies a process of co-innovation and collaboration with customers that leverages Yokogawa's domain knowledge and digital automation technologies to create sustainable value.

Synaptic takes its name from the synapse, a structure in the nervous system that plays a role in the transfer of signals to other parts of the body. *With Synaptic*, we help customers create new value by connecting and integrating everything such as data, organizations, business processes and supply chains with domain knowledge and digital automation technologies, like neural networks.

With Business Automation, we co-create value with customers by improving their business performance through optimization of supply chains and operations, and maximization of asset performance through co-innovation and digitalization.

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Co-innovating tomorrow™

Introduction

Alarm Systems are an essential element of any SCADA Control and Management System. Although often seen as obvious they provide the vital support to operators for any particular application by attracting the attention to those situations that need corrective measures or procedures.

With the introduction of more intelligence into process installations and integration of information from other systems into the SCADA environment (i.e. asset management, business and planning) there is an increasing variety and quantity of alarms.

Without proper implementation of a good alarm philosophy operators will be flooded by alarms that exceed the recommended number of 10 per 10 minutes that can be managed within an acceptable time period.

Yokogawa offers a very powerful Alarm Management System fully integrated into our FAST/TOOLS comprehensive Process Management System software. This system can accept sophisticated alarm philosophies to meet the requirements of any particular application taking into account the guidelines of the EEMUA 191 directives.

To measure the quality and effectiveness of the FAST/TOOLS Alarm Management System Yokogawa recommends ASPA (Alarm System Performance Analysis) which can be tailored to any specific application.

ASPA supports the alarm system performance improvement processes to avoid operator overload and reduce the risk of critical alarms being overlooked, causing wrong or to late decisions putting safety as well as the continuity and quality of production at stake.

Supervisory Systems
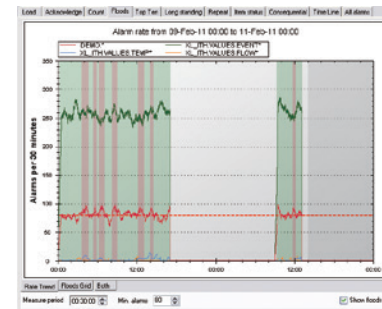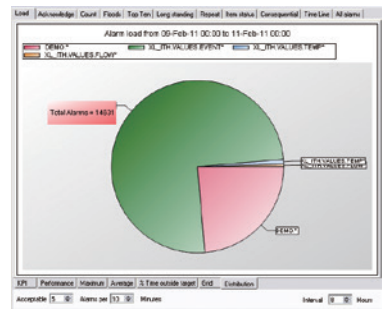**FAST/TOOLS™**
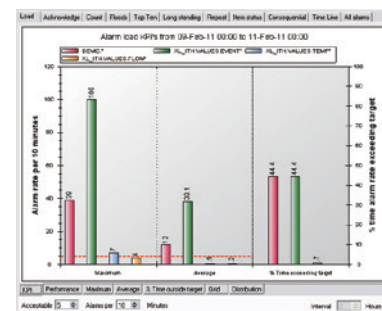
Improvement Objectives

Functionality

FAST/TOOLS ASPA delivers critical statistical methods, views and tools providing performance analysis in relation to the guidelines of EEMUA 191, ISA18.2 to ensure alarm system quality and effectiveness.

Based on key performance measurements embedded in FAST/TOOLS ASPA, the behavior of the alarm system will be presented from different angles. This will deliver holistic and informative views providing guidance for improvement.

Deployment

FAST/TOOLS ASPA can be utilized for a number of objectives that contribute to improved effectiveness and performance of new and installed alarm systems.

Examples of FAST/TOOLS ASPA deployment objectives:

- To set and measure performance targets to enhance the quality of a (new) Alarm Management System
- To analyze the functioning of an existing alarm system
- As a management tool to follow the results from an ongoing improvement program such as Human Centric Operations
- To identify specific nuisance alarms and number of standing, delayed and suppressed alarms
- To demonstrate the performance of an alarm system to an independent auditor and regulatory bodies

Performance Measurements

There are two main groups of performance measurements embedded in FAST/TOOLS ASPA on which most of the provided metrics are based on or related to; design benchmarks and usability metrics. These form the foundation to guard the effectiveness and quality of the alarm system.

Design Benchmarks

Design benchmarks include the number of alarms per element/ unit (i.e. control valve, analogue or digital measurement) and the distribution of alarm priorities. These provide the average figures that point to potential risks.

Usability Metrics

Usability metrics include the average alarm rate of the system during steady operation, the number of alarms in 10 minutes after a plant upset and the average number of standing alarms.

Alarm Analysis

Supported Alarm Analysis Metrics

FAST/TOOLS ASPA offers an extensive set of predefined metrics:
- Number of alarms over a defined period
- Most frequent alarms over a defined period
- Counts of standing alarms at defined times
- Counts of shelved alarms at defined times
- Identification of longest standing alarms over a defined period
- Proportion of alarms at each priority during a defined period
- Measurements of operator acceptance times
- Auto- and cross correlation of alarm records

EEMUA 191 Metrics

- Operator Load KPI
- Operator Load Performance
- Alarm Rates and Floods
- Alarm Top 10 bad actors
- Long Standing Alarms
- Consequential – Alarm correlations
- Average Annunciated Alarm Rate per operator
- Annunciated Alarm Priority Distribution
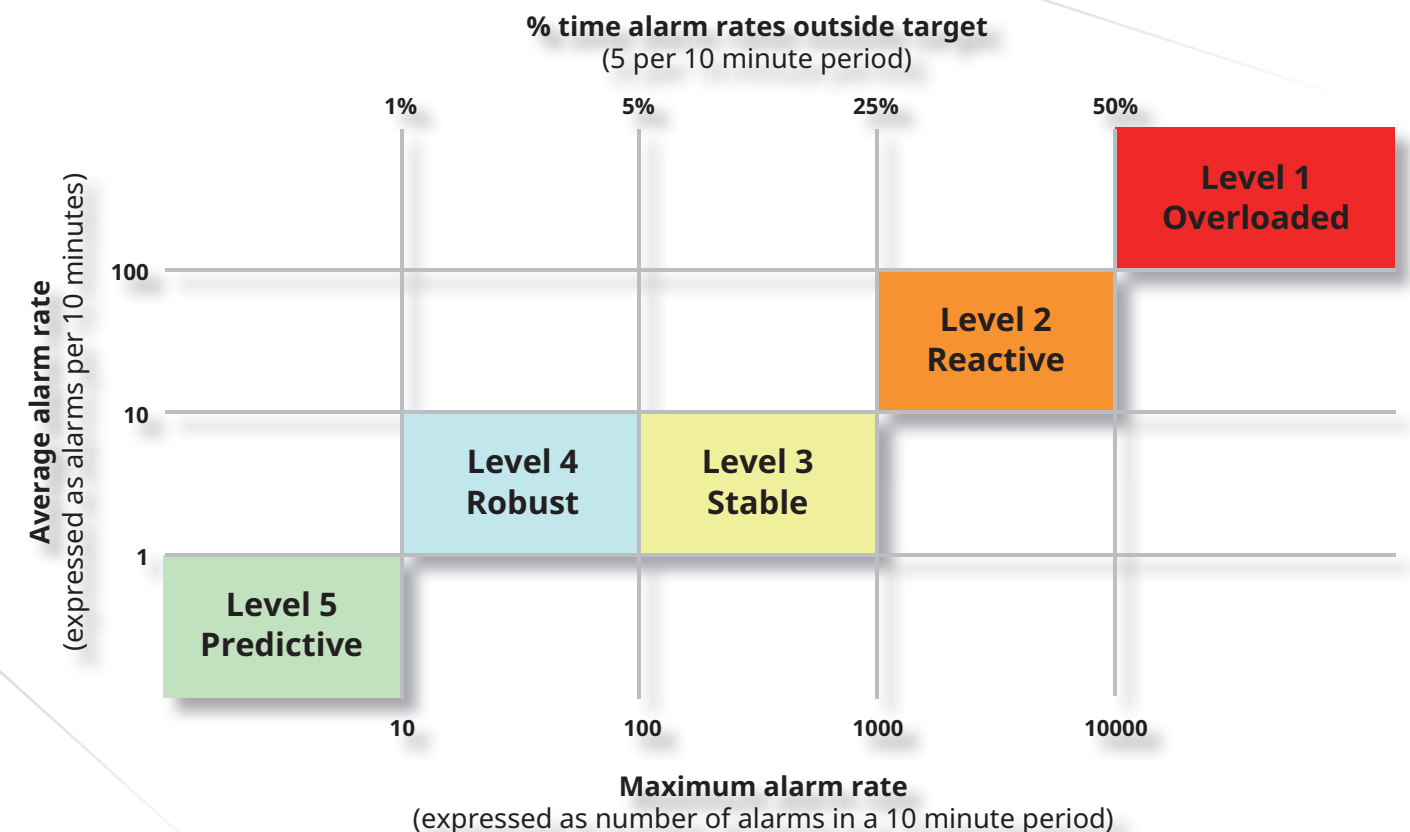- Peak Annunciated Alarm Rates per operator

These metrics are the basis in the assessment of whether operators will find the alarm system easy to work with and does not exceed the ergonomically acceptable workload and quality. This is made visible by categorizing the state of the alarm system performance into five levels as defined by EEMUA 191.

FAST/TOOLS ASPA identifies the worst case load during any ten minute time slice and categorizes this to alarm system performance levels in accordance with EEMUA 191 (see table at the right side).
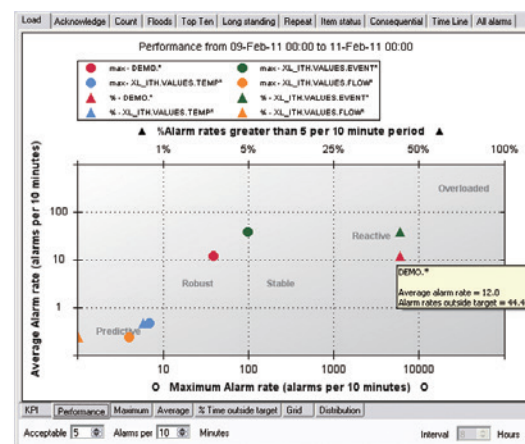
Key Benefits of using FAST/TOOLS ASPA

- Better insight into operator workload respecting ergonomic limitations
- Timely information about alarm system weaknesses
- Online monitoring of the improvement process
- Facilitating the benchmark categorization in accordance with EEMUA 191
- Monitoring operator responsiveness
- Provides all necessary views to identify potential (future) problems

% time alarm rates outside target
(5 per 10 minute period)

Average alarm rate (expressed as alarms per 10 minutes)

Level 1 Overloaded
Level 2 Reactive
Level 3 Stable
Level 4 Robust
Level 5 Predictive

Maximum alarm rate
(expressed as number of alarms in a 10 minute period)

Represented by:

https://www.yokogawa.com/solutions/products-platforms/
control-system/supervisory-control-and-data-acquisition-scada/

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