ABB were engaged to manage and deliver a comprehensive programme of alarm improvements, including alarm rationalisation. The client’s key drivers were to enhance process safety and compliance with their own and industry standards (e.g. IEC 62682 / EEMUA 191). This was to be done by reducing alarm rate and providing relevant alarm related information in the form of an Alarm Response Manual (ARM).

The client operates offshore facilities and had a number of alarm management issues. The aim of the exercise was to standardise on an alarm solution, that could be applied across all assets and ensure alarms are assessed with respect to the importance of their safety, environment and financial consequences. The review process also needed to be efficient because of the limited availability of the client’s resources.

Solution

ABB’s methodology involves the development of plans and process that best fit the client’s standards and resources available. Detailed project schedules were drawn up and reviewed to ensure the right resources were engaged at the right time to minimise disruption to the client staff.

A key element to retrospective alarm rationalisation is to get accurate and up-to-date information off the configuration of the alarm system. This was achieved by obtaining information directly from the Integrated Control and Safety System (ICSS) and importing the data automatically into the master alarm database.

Preparation for the alarm review process included; development of rules and their application to the database; pre-population of the database based on ABB’s knowledge of the client’s facility and other similar facilities; finally a formal ‘around the table’ review to confirm the accuracy of pre-populated alarms and to input alarms not pre-populated.

ABB managed the complete end to end process, providing leadership, direction and consistency across the various review teams and platforms. The remit of each rationalisation review session was to categorise each alarm event in terms of its potential consequence and the time available to respond to the alarm to prevent the event. We then captured the detail of the actions required in response to alarms.
ABB’s automated and integrated methodology allowed subsequent platform reviews to take advantage of the information from the first platform by pre-populating data into the master alarm database.

This not only ensured consistency and continuity across all platforms (bringing different approaches into line with agreed best practice), but resulted in a more efficient and cost effective process - up to 35% faster than previous reviews.

Testing
Testing of both the procedures and the ICSS changes were undertaken on a specifically developed test system. 100% testing of the changes was provided by re-importing the updated configuration back into the master alarm database and doing a verification check. Sample manual checks were made by forcing alarm conditions and ensuring the alarm was activated and the appropriate operator response (‘alarm help’) was accessible. The test system was also used to train the operations team prior to the implementation of the changes offshore.

Implementation
An ABB team, comprising an alarm management expert and a control system expert, managed the implementation offshore. Implementation was only carried out once all operators had been trained and a ‘window’ had been agreed when no other major activities were being undertaken on the platform. All platforms were updated without any interruption to the process production.

ICSS changes
The main changes to the ICSS were the re-structuring of alarm priorities and the removal of an automatic alarm suppression facility. This was replaced by an operator controlled alarm shelving facility. Other changes included the display of alarms on graphics display in their alarm priority colour.

Benefits
- Improved operator efficiency - reduction in outages due to alarm escalation
- Automation of alarm upload and implementation
  - Reduced risk through elimination of manual data manipulation
  - No shutdown required to implement tens of thousands of changes
- Improved alarm categorisation
- Consistent alarm design and operator response captured and applied across all assets
- Best practice documented and available to demonstrate compliance with regulations and requirements
- Personnel trained in design and application of alarms

Lessons learnt
- Procedures
  - Training / support
  - Get environment right
- What needs to be tested
  - Use of automation
  - Function testing
- Identify the changes
  - Consequence of changes
  - Implementation mitigation
- The right people
  - Presentation
  - Understanding
- Understanding alarm facilities
  - Configuration
- Accurate Information
- Improve operation, reliability
  - Meet best practice
  - Improve working environment

MOC
The review process generated over 50,000 changes that needed to be made to the ICSS alarm system, ABB supported the client MOC process by providing technical experts and new guide words appropriate to alarm management. Because the ICSS changes were to be undertaken during full production, an automated toolset was required. ABB’s master alarm database provided the facility to automatically generate command files that could load directly into the ICSS. Because there was a major change in the use of alarm priorities from ‘equipment types’ to ‘alarm by importance’ then the updates needed to be completed in the shortest time possible to minimise operator confusion.

Objectives
- Improve operation, reliability
- Meet best practice
- Improve working environment

Reviews
- The right people
- Presentation
- Understanding

System
- Understanding alarm facilities
- Configuration

Data
- Accurate Information

Testing
- What needs to be tested
  - Use of automation
  - Function testing

Implementation
- Procedures
  - Training / support
  - Get environment right

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