DIGITIZED OPERATIONS LOGBOOKS:
HELPING PLANTS RUN EFFECTIVELY WITH FEWER ERRORS

HONEYWELL FORGE

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Shift handover is a common source of revenue loss and safety incidents in process plants. Catastrophic accidents around the world have been attributed to discontinuity of tasks and personnel following operator shift changes. Both economic and regulatory pressures demand substantial improvement in the shift handover process.

In the operation of an industrial site, a large number of events must be documented, together with the operator actions performed. This kind of documentation is obligatory in many plants, and is typically referred to as an operator shift logbook. Still, today, it is often a paper document or page in a book filled out manually by the operator during or near the end of his or her shift.

Even with ad hoc or standalone logging techniques such as spreadsheets, retrieval of information about past shift events is very time-consuming—and detailed analysis of data for optimizing operations, workflows and safety measures is nearly impossible.

A new breed of digitized operations shift logbook is now bringing reduced risk, greater effectiveness and substantial savings to the process industries. This tool helps personnel across the plant to work together and achieve greater operational reliability. The digitized log consolidates information from different sources to provide a consistent and up-to-date view of key process data, problems, operating plans and the shift log.

BACKGROUND

The industrial world has long recognized that discontinuities of shift handover are among the most common and potentially serious sources of problems. These can range from minor impacts on operational efficiency to the most serious safety incidents; all incur corresponding levels of economic cost.

Shift handover occurs when one team of operators goes off duty and an incoming team takes ownership of the plant for the following shift. During this period, the incoming shift must be made fully aware of the plant's status, including any incidents. A comprehensive view of the process will include many different kinds of information, such as safety logs, operational records, lab information, etc. The necessary transfer of information can be performed both by a review of the shift handover log, or, preferably, a face-to-face meeting between outgoing and incoming shift workers.

Based on reports from high-profile incident investigations, coupled with Abnormal Situation Management (ASM®) Consortium research on effective shift handover, failures of communication or misunderstanding at shift handover are to blame for many industrial accidents. Incidents often take place during maintenance work or in the implementation of changes. In many cases, they occur within the first hours after the next shift has started.

The ASM Consortium has identified the need for a more comprehensive approach to shift handover in plants with complex operations and processes. Information in manually prepared shift logs often is limited in usefulness, and as a result, whiteboards, post-it notes and change sheets are common ways of enhancing communication and coordination across shifts. However, these communication mechanisms suffer from a lack of structure and permanence.

EXAMPLES OF
INDUSTRIAL ACCIDENTS

Several industrial incidents emphasize the importance of effective logging and shift handover. On July 6, 1988, a large fire and explosion on the Piper Alpha offshore platform killed 165 and destroyed the facility. A relief valve on the platform was removed for service and a blank had been loosely installed in its place.

This information was not recorded in the control room or maintenance logs. During shift handover, the status of the pump work was discussed, but no mention was made of the relief valve work. Upon restart, the pump leaked, producing a flammable hydrocarbon cloud.

A more recent incident occurred at a refinery in Texas City, Texas, on March 23, 2005. Fifteen people were killed and over 170 injured as the result of a fire and explosion in the plant's isomerization unit. The explosion occurred when a flammable vapor cloud formed following liquid overflow from the blowdown stack during operation of the raffinate splitter. Among the root causes of the accident were a failure to log pertinent information, as well as an informal and unstructured shift handover process (See Fig. 1).

Figure 1: *A fire and explosion at a refinery in Texas City, Texas, was due, in part, to an unstructured shift handover process.*

Collectively, these and other incidents suggest there is a need for a more efficient way to guarantee the next shift gets the information needed for shared situational awareness. Crucial data and insights may be obtained from laboratory results, managers, engineers, supervisors, field operators, maintenance personnel, business planners and schedulers.

In addition to safety considerations, the details of work-in-progress are not always accurate conveyed during shift handover, and thus tasks are often repeated from the beginning. This results in wasted time and material. As such, effective tools for shift handover are also needed to help with executing operational tasks.

TODAY'S
OPERATING CHALLENGES

3

Ideally, the pre-defined sheet of an operations logbook ensures consistent data collected at defined, scheduled times. Too often, however, the logbook is a collection of disparate data and notations maintained by a supervisor or manager, with little or no ability to share information up and down the chain of command within the organization (See Fig. 2).

Plant information relevant to the shift handover process can include:

– Permit to work status

– Alarm defeat logs

– Emergency shutdown device (ESD) defeat logs

– Controller mode status

– Sample logs such as lab results

– Defective equipment log

– Night order book

– Unit and factory standing instructions/orders

– Work order log

– Shutdown job folders

– Operating instructions

– Material handling guides

– Production, operations, and safety incident logs

Besides content for shift handover logs, there is also context—what data should be included in daily reporting? Ideally, clear boundary lines should be drawn between different units within a plant containing several product lines.

Figure 2: *Operations logbooks are often a collection of disparate data and notations maintained by a supervisor or manager.*

PROBLEMS WITH EXISTING APPROACHES

4

> **Most process plants already have a shift handover logging application of some sort, but they frequently make use of ad hoc or standalone data logging tools such as spreadsheets, e-mail or custom databases.**

Ad hoc tools may provide only limited access to daily operating information for the rest of the organization, or be inconsistently applied. In addition, "homegrown" solutions can be difficult to keep up-to-date when the process changes. And such tools may not be suited to following through on problems once identified.

Because personal spreadsheets are generally not subject to the same rigid control standards as other IT applications, errors and omissions can occur, impacting the accuracy of information used to implement shift handover procedures. Without a central data repository, different individuals may apply different data as the basis for reporting and decisions.

In a typical scenario, a plant relies on a manual system to manage its shifts, using hand-written reports logged in hardcover books. This process is not only time-consuming, but it can be unreliable, with readings for critical processes such as tank levels and ratios often not recorded accurately. Issues like defeated alarms and details on plant status and situations can also be missed. Plus, the logbook may not always be accessible between shifts, and being manual, it has no backup in the event of loss or damage, so the risk of data loss is high.

Some shift handover logs are no more than simple notebooks that operators complete during their shift. These have obvious and serious limitations, such as illegible handwriting, the difficulty of searching through a mass of entries across numerous books to find a particular entry, and the inability to identify or correlate common or recurring issues (See Fig. 3).

More advanced shift handover systems use some type of electronic logbook, which overcomes the illegibility problem and can provide limited search capabilities. However, these are generally stand-alone applications, which do not enable information to be shared across networks or used as a corporate resource. Search provisions are often simple text-matching functions that cannot access the latent intelligence in the accumulated information, inhibiting the ability to identify related problems or recurring issues.

The requirements for an effective operations logging solution include: open connectivity with plant information systems, real-time process data reconciliation and validation, an efficient and friendly user environment, low maintenance requirements and full automation capability.

Figure 3: *Some shift handover logs are no more than simple notebooks, which have obvious and serious limitations.*

FINDING A
BETTER SOLUTION

> Improving operational reliability requires a team effort by operators, engineers and various specialists in a process plant. These people will benefit from software tools that help ensure the facility is always operated within the right limits and each new team of operators fully understands what is happening, and what activities remain to be done.

Leading automation suppliers like Honeywell have developed a new breed of tools to enable an effective shift handover process at modern industrial sites. These solutions, designed to capture and aggregate key data from across the plant and make it available through a web-based user interface, enable efficient and reliable shift handover work processes to reduce errors, avoid incidents and improve operational effectiveness.

Operations Logbook, part of the Honeywell Forge Operations Management offering is powerful and versatile software that puts advanced operations logging capabilities within the reach of all types of end users—for both large and small implementations. It is part of a comprehensive operations management suite developed by Honeywell.
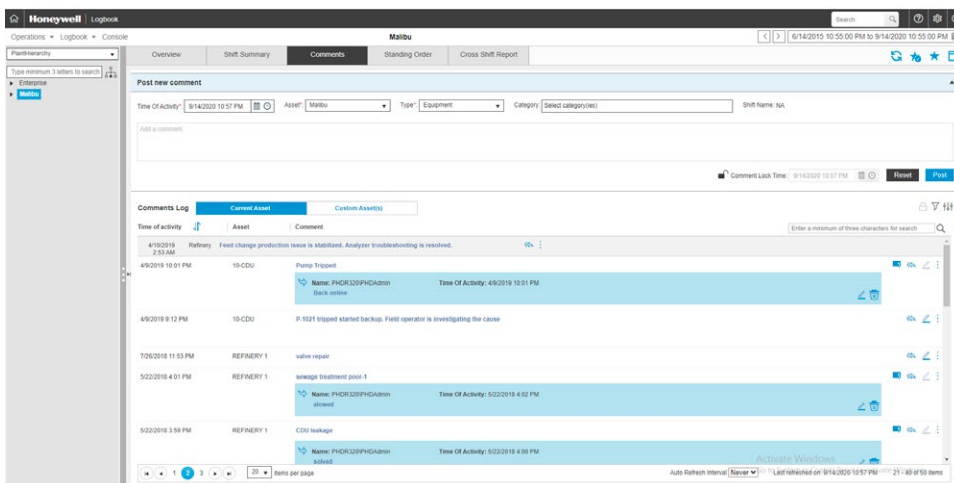

Figure 4: *Forge Operations Logbook provides a common, web-based window to access and enter information related to various plant operations.*

Provided on a new, streamlined platform, this control system-independent application builds on Honeywell's experience in the operations management arena and can be tightly integrated with additional tools for plant operations monitoring, setting daily operating instructions and analyzing alarm performance.

Operations Logbook helps industrial facilities transition from labor-intensive legacy spreadsheets, word documents or paper logbooks to an automated and standardized system for facility-wide data collection, analysis and reporting. Employing versatile Microsoft SQL Server technology, the software can be used to keep a detailed record of events during an operator shift. It delivers user- configurable shift summary reports to enable effective shift handover and an intuitive, blog-style interface to capture operator comments and notes about daily operations, replacing ad hoc paperwork and spreadsheets.

Operations Logbook provides operations staff with a common, browser-based window to access and enter information related to various plant operations. Information from a wide range of data sources, including plant databases, process historians, maintenance management systems and MES/ERP systems, is automatically brought together to give operators, supervisors and engineers a consistent, up-to-date view of key operating data, problems, operating plans, the shift log and more. The software can also be integrated with an alarm management system to provide an overview of alarm activity during a shift (See Fig. 5).

The operations logging tool is designed to address questions such as:

– What comments and observations were recorded today or during the last shift?
– What comments and observations have been recorded about a topic such as environmental issues for a particular unit?
– What happened during a shift and what does the incoming team need to know in order to operate safely and effectively during the next shift?
– What are the safety, process, design and environmental limits, and are these limits being honored when operating plans are drawn up?
– What did the operators observe while executing the plan?

Honeywell's software lets operators enter comments and prepare shift summary reports, often used to facilitate an effective, structured shift handover. It allows comments or notes to be entered from a variety of places. The system automatically records the name of the user who entered or last edited a comment and the time of the change.

A common objective in the process industries is to improve reliability, and reduce the number and severity of incidents. In addition, plants are seeking to extend asset life and increase margins through better fidelity to the operating plan. Solutions such as Honeywell's Operations Logbook can assist control room and field personnel by providing quick access to a host of valuable information from all corners of the operation.

For example, using the digitized log, an operator reviews the highlights of a shift just ending with another operator. The outgoing operator brings up the shift report that they recently filed via the logbook application. They point to a comment about a pump repair, and another notation about a feedstock change planned for the next shift. They then look to the instruction, where flow and temperature target changes are highlighted, and see that the planner wrote that a lineup change is needed.

The operator returns to the shift report and points out the key operating parameters for the unit, and how they have been stable for the day. They then show the result of the last alarm enforcement report, which indicates the outgoing operator changed some alarm limits for the pump that was repaired with a note the limits should be changed back when the repair is complete (See Fig. 5).
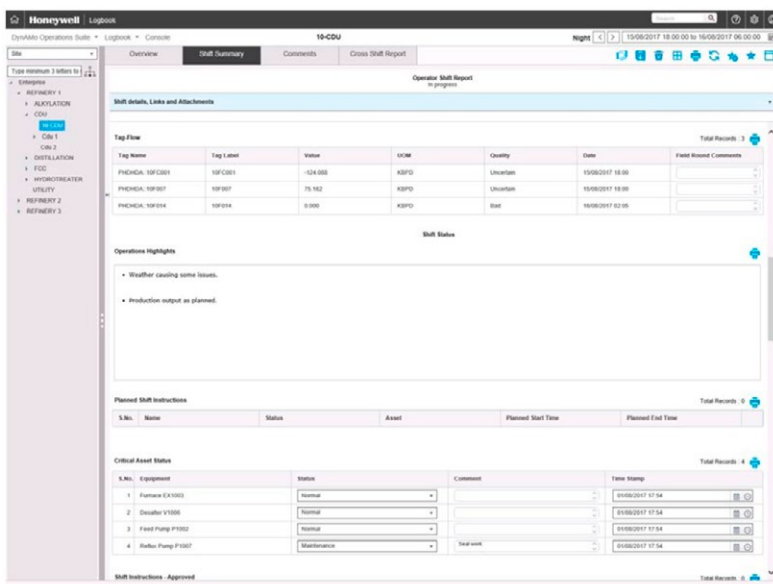

Figure 5: *Using the digitized log, an operator can review the highlights of a shift just ending with another operator.*

BENEFITS FOR
PROCESS FACILITIES

<div style="text-align: right">7</div>

The new generation of digitized operations logbooks can substantially eliminate the deficiencies of current shift handover management systems, and deliver significant economic benefits in operational efficiency and risk reduction. The advantages available to process plants come from a variety of sources, including:

– Reduced number and severity of incidents

– Lower operating and maintenance costs through increased asset reliability

– Better safety and environmental compliance

– Increased production through learning from and avoiding incidents

– Automatic documentation of the state of the plant for shift handover

– Reduced time for analyzing disturbances

– Easier evaluation of messages for diagnosis and optimization purposes

– Simple collection and maintenance of plant know-how

– Better identification of weak points and opportunities for optimization

Even experienced operators can make mistakes if the information they have is incomplete or difficult to understand. A well-designed digitized logbook helps solve this problem by enabling a structured shift logging and handover program. Operators record what they do, and everyone can see what really happened in the plant (See Fig. 6).

IT professionals will also appreciate how tools such as Operations Logbook work as part of an integrated plant information system. helping to satisfy a number of crucial IT requirements:

– Minimizes administration costs with a web user interface

– Reduces costs by taking advantage of built-in integration with other operations-related applications

– Accesses process data from plant historians

– Implements a robust, role-based security model

Figure 6: *With a well-designed digitized logbook, operators record what they do, and everyone can see what really happened in the plant.*

SUMMARY

Today's advanced operational logbook tools are designed to capture and make data accessible across an industrial organization to a wide variety of users. They can replace the myriad of paper logs, spreadsheets and disparate databases to integrate information from many different sources in one location. Providing a sound structure for operator logging based on key categories of situational information is the answer to optimizing the effectiveness of shift handovers.

Many key benefits result from a structured shift handover solution. These include:

1. The ability to quickly find relevant information (e.g., comments logged by an operator dealing with the same situation in the past);

2. Saved time in terms of capturing data and pulling information together for the shift summary report;

3. Improved reliability/reduced downtime; enhanced communications across all organizations at the site, not just operations;

4. improved regulatory compliance (where applicable) given automated recording and archiving of reports in a format that is not editable;

5. Consistent situational awareness for all users; and improved data for process improvement activities and incident forensics.

REFERENCES

1. Plocher, T., Shanqing Y., Laberge, J., Thompson, B., Telner, J., "Effective Shift Handover," Engineering Psychology and Cognitive Ergonomics. Web. 2011.

2. Nimmo, I., "Effective Shift Handover Is No Accident," Chemical Processing. Web. 28 June 2006.

For More Information
Learn more about how Honeywell Forge Operations Management can help in effective shift handovers, visit our website www.hwll.co\operationsmanagement or contact your Honeywell account manager.

Honeywell Connected Enterprise
715 Peachtree Street NE
Atlanta, Georgia 30308
InspectionRounds@Honeywell.com
EUR +44 (0) 162 562 62 50
USA +1 208 921 9867

WP-20-17-ENG | 01/21
© 2021 Honeywell International Inc.

THE
FUTURE
IS
WHAT
WE
MAKE IT
—

Honeywell