

## **Mission Critical Shift Handover Knowledge Transfer**

In today's modern Process Industry, plant operations professionals have to function within the manufacturing environment and be conversant with an increased level of complex and sophisticated technology related to running a production plant. The Process Industry must continually focus on issues of plant safety, and the health safety & welfare of its employees, as well as the perceived impact on the local environment. The Process Industry must also demonstrate that plant operational processes and procedures adhere to regulatory compliance. Whilst stakeholders demonstrate their commitment to environmental matters by publishing the company Responsible Care policies via share holder reports, as well as in the local community media.

Most organisations outsource some part of their plant maintenance to engineering specialists. Therefore the coordination of activities between internal plant operational staff and the outsourced organisation requires a tremendous amount of discipline and a high degree of communications. No matter what internal plant operation processes and procedures are employed, communications between operational shifts is of paramount importance. Many organisations are reliant upon paper based systems, and it would seem that their paper recording is a testimony to the diligence and operational knowledge of the individual member of staff concerned. However, paper based plant operation recording systems have their limitations, no matter how rigorously they are deployed.

Imagine recording critical plant operations information on paper. This paper document is circulated amongst the operational professionals who need to be aware of the document content. Apart from the fact that traditionally only direct operational staff regularly see this plant operations record and that distribution throughout the organisation is normally limited. It is difficult to envisage how such a paper document can be effectively and efficiently stored, and successfully retrieved if the need arises, without the use of modern computer storage systems. Traditionally paper based plant operations records have been stored in the control room, until available space is exceeded. Boxes of paper log records are then moved to a bulk storage area somewhere on the plant. UK organisations are well versed with the need to adhere to regulatory compliance. More importantly, have the plant operations records close at hand should regulators such as the Health and Safety Executive (HSE) wish to examine the plant operational logs that lead up to a site incident. Paper based plant operations records are notoriously difficult to locate when they are stored in filing cabinets. Even more difficult to locate and retrieve when under pressure from an external source, particularly when records with a specific date or date ranges are required! Many Process Industry organisations are still reliant upon paper log records to communicate what has occurred on the plant during the current shift. The outgoing shift team leader and team will affect the shift handover process with the incoming shift team leader and team. The shift team has a wealth of operational knowledge that must be effectively communicated to the incoming shift. Every relevant detail must be passed onto the incoming shift team, as this information may contribute to performance from a safety, environmental, health, quality, cost or reliability perspective

Those of us who work in the Process Industry would probably not be surprised to learn that the more significant process disruptions occur shortly after a shift handover than at any other time of the day. A decision is made or more importantly 'not' made simply because the incoming shift operators and supervisors are not made aware of the current operational status of the plant. These avoidable incidents can range from an oversight to a life-threatening situation! What could possibly go wrong at this critical shift handover time? The answer to this rhetorical question is just about anything!

An outgoing operator is tired and forgets to tell the incoming operator about a crucial piece of operational information, or a piece of equipment that seems to have a mind of its own, or a maintenance task that should have been finished but isn't, or an abnormal process condition... etc. Maybe the operator doesn't sufficiently describe an operational condition concisely, they write the information down on a piece of paper but it doesn't describe the problem clearly, or the imperative nature is not made abundantly clear to the incoming operator. Of course, some sites have recognised this crucial transition point in time and have implemented systems that will ensure a rigorous handover. Often these systems rely on whiteboards, spreadsheets or other stand-alone applications. This means that islands of

information are created that are not visible to the wider organisation and are not traceable so that their success is dependant upon the professionalism of the operational member of staff. There is potential impact on the following areas:

- **Customers** - Loss of a valuable customer due to poor performance
- **Suppliers** - Emergency call-out costs due to poor planning
- **Production** - Optimum manufacturing capacity not reached due to plant breakdown
- **Maintenance** - Planned maintenance did not commence due miscommunication between shifts
- **Health and Safety** - Relaxed operational safety standards due to pressure of work
- **Environment** - Local environment threatened by reduced plant performance levels
- **Cost** - Incurring higher costs by operating for longer periods before carrying out instructions.

The quest for more information will not guarantee better decisions or prevent the repetition of mistakes; only by capturing and applying the collective knowledge of our colleagues and employees will we improve in these areas. Surveys show that 80% of manufacturing organisations are average to poor at capturing knowledge and yet 45% of the knowledge required to run an organisation effectively resides in the heads of employees. Despite sophisticated IT infrastructure the organisation's knowledge diminishes every time an employee leaves. Statutory legislation, such as COMAH (Control of Major Accident Hazards) are all about mitigating risk, and this can only be achieved through the application of knowledge.

Your organisation's most valuable asset is your employees who retain a wealth of knowledge and experience concerning plant operations! As Process Industry professionals, we all have a responsibility to ensure that the plant operations processes and procedures employed support the individual's ability to record and transfer the operational knowledge to colleagues who takeover at the next shift change.

The following is an extract is from:

**OFFSHORE TECHNOLOGY REPORT - OTO 96 003 Date of Issue : June 1996 Health and Safety Executive**

***The review of communication theory indicates that to ensure effective shift handover communication organisations should:***

- *give effective shift handover communication a high priority*
- *pay particular attention to handovers which occur when staff have returned following a lengthy absence from work; during plant maintenance; during deviations from normal working; and when handovers take place between experienced and inexperienced staff*
- *specify key information needed by the incoming operator to update their mental model of plant status*
- *use operator supports (logs, displays etc.) designed on the basis of the operator's information needs*
- *include communication skills in their selection criteria for shift-workers*
- *develop the communication skills of existing staff.*

***Individual handovers should:***

- *be conducted face-to-face*
- *be two-way, with both participants taking joint responsibility for ensuring accurate communication*
- *use verbal and written means of communication*
- *be given as much time as necessary to ensure accurate communication.*

The following is an extract from:

***Buncefield Joint Task group calls for immediate action***

*The actions, provide a significant challenge to industry, and are in response to findings contained in the Buncefield Major Incident Investigation Board's (MIIB) initial report published in July. These recommendations, based on the latest information available, are believed to be precautionary and prudent to offer worthwhile additional public and environmental protection. The actions relate to:*

- *Pipeline transfers;*
- *Tank overfill prevention – operating safety margins and level alarms;*
- *Fire safe shut-off valves and remotely operated shut off valves;*
- *Containment – bunds and other measures; and*
- ***Shift handover.***

Many of the concepts that operational professionals embrace today are quoted in the 1996 HSE report 'bullet points' as shown in the extract above. And more recently, the Major Incident Investigation Board's (MIIB) initial report, which was published in July of this year, clearly cites '**Shift Handover**' as a topic that requires some attention at Buncefield!

Petroleum, Chemical, Oil and Gas sectors of the Process Industry must maintain their competitive edge! It is necessary to maintain production throughput as this obviates the immense cost of shutting down the plant, and repairing defective or reduced capacity process plant. Manufacturing organisations are always calculating the cost of a plant shutdown, compared to running the plant equipment at a reduced capacity. The Process Industry at large has realised that a manufacturing plant can be run safely at a reduced production rates, rather than facing the cost of a shutdown and defaulting on client orders. Therefore it is even more important that these interim measures which keep a plant running, are communicated to incoming shift team! An example of this might be a valve wheel that has broken off with the valve in the fully open position. A risk assessment may conclude it is acceptable and safe for the production operators to close the valve using an adjustable spanner on the valve stem; mechanically this defect may not prevent the plant from running. Then the valve can be repaired in a controlled manner and if necessary, the plant will be shutdown, drained, isolated and the broken valve replaced. This type of interim measure needs to be communicated to the incoming shift team, and again at each shift changeover point until the valve is repaired or replaced.

BASF plc (The Chemical Company) based in Seal Sands, has opted to replace their paper based shift recording and shift handover system with a computerised solution. Camtique Ltd and BASF IT Services Ltd jointly developed and implemented the STAR (Shift – Tracking – Action – Recording) software solution at the Seal Sands plant. After seven months of continuous 24 hour usage of the STAR software solution, the whole site has benefited from an increased level of communications with regard to plant operations on a day and night shift basis. In fact every employee at Seal Sands has access to the STAR system, albeit read only access. As a result of this increased level of communications, Shift Managers have changed their modus operandi. Shift Managers would previously commence their shift with a walk around the plant and pick up a copy of the paper logs. Now the Shift Managers start their shift by interrogating STAR, understand all relevant activities logged by each production plant, and then plan their route around the plant and supervise and support operations as usual.

*'The Seal Sands site is always thinking of new ways to use the STAR solution. To this end, operations intend to expand the usage of STAR so that it encompasses site emergency services. BASF Seal Sands is a top tier COMAH (Control Of Major Accident Hazards) site and has its own emergency services. Industrial fire fighters, trained in medical first aid response and emergency management, provide 24 hour shift cover. From the 20th November*

2006 this function will be outsourced to Semb Corp. The team, based at the BASF site fire station, will provide a service to the BASF and neighbouring Sabic (formerly Huntsman North Tees) sites. Like any shift team, in order to be fully effective, it is important that good communications between shifts are maintained, especially so when there are abnormal conditions on the site. A significant part of the work load is routine checking of equipment and systems, recording that work has been done and ensuring that additional tasks are logged and followed up on. STAR will provide an excellent tool to ensure that nothing is missed and that a high standard of service is provided.' **Phil Stevens – Engineering Service Manager BASF plc.**

The STAR solution has become the focal point for the Shift Handover process at Seal Sands. STAR facilitates the physical shift handover between outgoing shift team and the incoming shift team. Shift teams position themselves around the STAR display screen and discuss the log entries for the current shift. To reinforce the Shift Handover process, STAR produces an on screen report which encompasses: log entries for the shift, completed instructions, outstanding instructions, plus a thirty day forward view of information that is likely to impact plant operations e.g. road closures and a crane lifting a vessel on site. The onscreen Shift Handover report can be printed to a hard copy so that that the shift team members have a detailed report close to hand whilst walking around the plant. Computer system databases provide the user with a multitude of benefits, one of which is the historical audit trail. To this end STAR can produce a Shift Handover for any historical date.

As a prerequisite for implementing a Shift Logging and Shift Handover software solution, BASF plc required STAR to be an open system which would act as a site-wide communications medium related to plant operations recording. BASF were specifically seeking the following benefits by moving away from a paper based system:-

- Improved communications
- Increased Productivity
- Site wide visibility
- Improved log entry details
- Audit traceability
- Enhanced Plant Safety
- Historical data retention and accessibility
- Improved Shift handover processes & procedures (Knowledge Transfer)

STAR is the common communications medium for plant operations across the Seal Sands site. BASF Shift Managers are now using STAR to monitor plant operations rather than telephoning each control room seeking information. Shift Managers are also using the operational knowledge contained in STAR before conducting physical plant inspections.

Camtique Ltd and BASF IT Service Ltd, in conjunction with BASF plc have published a Case Study document with regard to '*what we did and how we did it at BASF Seal Sands.*' If any JOIFF reader would like a copy of the Case Study document, please contact The Catalyst editor.

Acknowledgement:

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15/11/2006