

Implementing & Monitoring Shutdown Performance Improvement

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1. INTRODUCTION

SCA Hygiene Australasia's Box Hill tissue manufacturing site embarked on a Maintenance Improvement Program in late 2003. This commenced with the conduct of a Maintenance Operations Review (Audit) followed by a more detailed review of shutdowns. Priority projects were selected for action to improve maintenance and shutdown performance.

The improvement program was successfully implemented and managed with the assistance of external consulting expertise. Challenges faced during this program included a change of ownership, restructuring and implementing a range of improvements to maintenance processes concurrently with a major change to the CMMS. In addition the maintenance improvement program had to be integrated with broader corporate improvement programs. A review of progress in the first half of 2005 has resulting in moves to increase the improvement program intensity, build on successes and ensure that meaningful performance measures are put in place for maintenance overall, planning and scheduling and shutdown management and execution.

2. BACKGROUND

A key aspect of the improvement program was to bring about a change of culture. In the beginning there was a wide range of attitudes approaches including:

- A low understanding of a shutdown schedule Critical Path. Many stakeholders did not see the need to understand it resulting in discontinuities in the critical path activities.
- Many stakeholder also thought they were doing quite well so far as job planning was concerned. The lack of planning, however, was demonstrated by producing a plot of stores transactions showing very high demand at the critical time during a shut
- Few spares bookings were made against job work orders and there was a low understanding of the need to do so
- Project, production and maintenance were running with separate schedules and agenda's
- Key stakeholders were not focussed on the detailed shut schedule preferring the "see how it goes" and "we will fit it in when we can" approach.

To a large extent the culture had been reinforced historically by the low level of maturity of the maintenance processes such as:

- The plant had operated for a long period of time without formal processes
- Business units operated autonomously in each major plant section
- Most supervisors worked with a list of jobs that were allocated on the shut day.
- Very few spare parts were pre-arranged
- Good MS Project schedules were developed by the Planners but there was a low ownership / involvement and hence low compliance
- There was a low labour cross utilisation between the main plant sections
- Low level of documentation of what to do and what was done

- SAP CMMS was poorly implemented and partially used as a corrective maintenance record capture tool
- Stakeholders were taught how to use SAP but not the philosophy behind what is done or what should be done.
- No previous good paper system that could be transferred to SAP
- SAP CMMS had poor reputation.
- Almost no attempt to measure maintenance performance
- Initial attempts for better methods were hindered by an upgrade and change of owners' systems. SAP development was under control of IT dept with changes dictated without the needs being understood

3. MAINTENANCE OPERATIONS REVIEW

The program commenced with the conduct of an independent external Maintenance Operations Reviews. A comprehensive report was issued detailing the current level of maintenance performance, improvement potential and priorities identified. The 18 Elements of the Review are rated and depicted on a vertical scale where 1=Minimal, 2=Emerging, 3=Developing, 4=Competent and 5=Excellence. Figure 1 shows the rating for each of the 18 Elements plotted against the high, low and average results for a large number of similar reviews. This benchmark chart indicates that the Box Hill site was comparable to many others and that there is improvement required in many aspects of the maintenance operations particularly Planning & Scheduling and Shutdown Management.

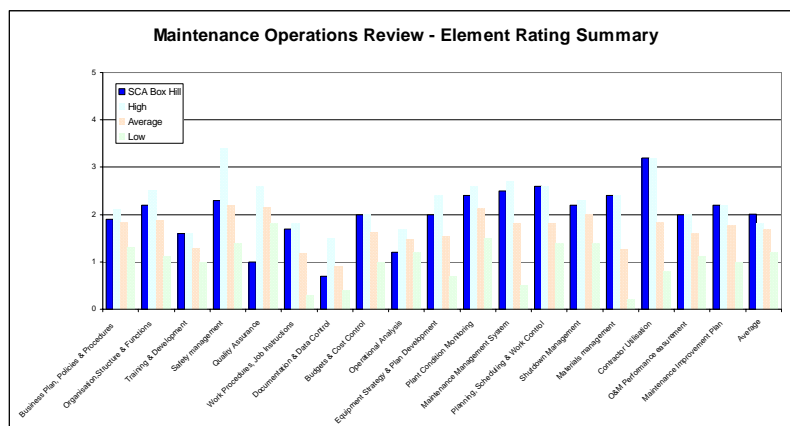


Figure 1

General Observations and Comments from the review:

- Good internal Staff relations, good Industrial relations, good relations between Maintenance and Business Units and good relations with contractors and between contractors.
- There was a high commitment to improving the maintenance performance and the business generally with a range of broader plant wide improvement programs underway
- There was a good acceptance of the new Planning & Scheduling direction, however the newly formed planning team and processes required further development
- The site was under pressure to produce product at reduced costs (Maintenance)
- Modifications work appeared to account for a large proportion of the maintenance effort and consumed maintenance resources.

- There was an awareness of the value of asset history, hierarchical structure and configuration management.
- There was a heavy reliance on experienced persons with information not centrally captured
- Maintenance practices were difficult to benchmark, as fundamental performance measures were not in place.

The positive culture at the site and support for existing improvement initiatives provided a sound base to develop improvements that were the subject of the Review report.

The Review Key Recommendations included:

- A Maintenance Business Plan / Strategy / Direction document be developed so that all personnel concerned with the function have clear directives on the requirement, the relationships and how all of the systems integrate. The document should address short term as well as long-term matters.
- Training in maintenance processes including Planning & Scheduling, Maintenance Strategy and shutdown management should be provided to build on the current reliance on technical OEM equipment training.
- Develop a fully effective document, drawing and data management system to provide secure central control.
- Develop a procedure and checklists for an effective handover of documents and data from capital projects.
- Develop procedures that ensure increased and targeted maintenance input into capital projects from design to commissioning and handover.
- Develop strategic maintenance plans by using one or more structured approaches to enhance the good practices already initiated.
- Review current inspections, corrective history and undocumented practices to improve maintenance strategies
- Enhance the Planning & Scheduling effort by introducing a priority system that accounts for the effect of maintenance work on the business. A work categorisation process is also require
- A planning and scheduling system needs to be developed, together within process flows and accompanying procedures to ensure that the process works effectively. This is an essential step in making SAP MPA a central, consistent and effective maintenance management tool.
- Commence “closing the loop” with maintenance on critical items by entering history and using this as a basis for improving maintenance strategies.
- Undertake a strategic review of spares using a structured approach that examines the risks to operating plant of holding / not holding spares.
- Document and minimise satellite / emotional stores.
- Establish a centralised process to coordinate site contract labour requirements to maximise effective use of contract personnel.
- Appropriate Maintenance performance measures must be established, widely displayed and understood.
- Establish a Maintenance Improvement Plan, process and forum to manage the recommendations of this report and embrace other improvement initiatives.
- Establish a priority system for maintenance work

4. SHUTDOWN REVIEW

A Shutdown Review was conducted in August 2004 as it was felt that significant gains could be made in this area. The review process was similar to the main review but more detailed for a number of aspects. Key Observations & Recommendations included:

- Establish a structured program of training, coaching and mentoring for all stakeholders (engineering, production, project, management & trades) in shutdown planning, management and execution as well as general planning & scheduling processes.
- Establish a structured development program for the newly appointed Planning & Services staff involving other plant sections (production and project) to ensure involvement and buy-in for improved methods of operation and to commence the cultural changes necessary.
- A site shutdown scenarios and priority matrix should be drawn up to guide management, supervisors and planners in the effective management and sharing of available resources.
- Develop an annual / long-term roll change schedule agreed between production and maintenance. Under what conditions does it change? – the criteria for roll changes both maintenance and production quality.
- Develop plant wide shut determinants (with area specific variances) to provide ongoing effective plant wide resources allocation and outlining the consequences to site performance on variations to shut content, timing and duration.
- Develop process flows and procedures for key planning & scheduling activities.
- Provide awareness training in the need for a paradigm shift in planning, scheduling and work control. Critical Path methods and the need for accurate job costing (all stakeholders)
- Develop a policy on the appointment of shut managers for all shuts
- Have a standard process for developing a Crane schedule to be integrated into the common shut schedule
- Include work for all disciplines in shut schedule
- Supervisors / trades leaders must have a feedback process to progressively update the displayed schedule

5. MAINTENANCE IMPROVEMENT PROCESS

Soon after the Maintenance Operations Review the Maintenance group commenced a structured and managed Maintenance Improvement Program. Improvement projects were prioritised and scheduled out on a 12-month schedule and were subsequently reviewed on a regular basis. The main emphasis throughout was to have a high focus on Planning & Scheduling and shutdown management. This program ensured that emphasis was placed in the right areas and resulted in an enthusiastic improvement culture being developed in the Planning Group. Even though there was a considerable time gap from the Review impetus was maintained through the period of company and organisational change. This was due to the identified need, the enthusiasm and leadership of key personnel.

The program was further enhanced by carefully looking at the implementation and cultural issues. This resulted in the adoption of an Implementation Management Program that ensured a people development process implemented in parallel to match the technical improvement projects required in Planning & Scheduling and Shutdown management (Figure 2).

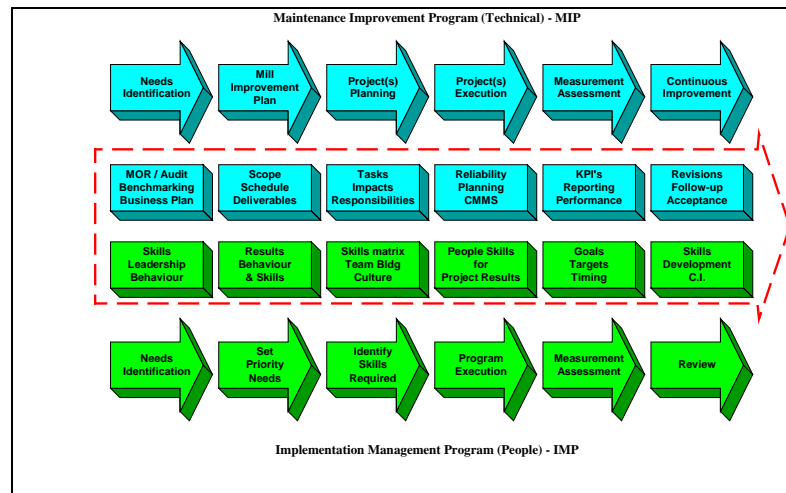


Figure 2

Skills training was conducted with the Planners along with awareness training for contract trade groups, production, project, Engineering and General Management. The skills training was supplemented with an external coaching and mentoring program as well as external training on Critical Path and Maintenance. These were partially interwoven with facilitated work sessions for the definition of Planning & Scheduling processes and the development of operational process flows and procedures.

6. IMPROVEMENT IMPLEMENTATION

Culture changes were brought about by working in the 3 areas of Culture, Technology and Process concurrently:

- Shut report goes to high level management
- Involving planners and others in designing the improved P&S processes
- Defined P&S and Shut processes and developed accompanying Procedures. This was done over time by use of consultant and work sessions with Planners and key staff – good buy-in.
- A special effort was made to educate production and other sections in maintenance processes and goals and emphasised their involvement.
- Since reporting shut outcomes (e.g. jobs completed) negativity to maintenance has decreased.
- New methods have driven Production and Project groups to improve their involvement
- Changed from a maintenance shut to a machine outage
- Shut schedules have been modified for ease of broader understanding

7. IMPROVEMENTS - ACHIEVED

The improvement program has tackled this vast array of challenges resulting in:

- Large effort in defining equipment hierarchy and numbering and correcting records in SAP
- BOM's are being developed progressively by trades and supervision
- Equipment numbering has been introduced that is consistent across the site
- Equipment numbering and descriptions have been developed so that it is user friendly for shop floor

- User friendly intra-net screens developed for shop floor use and access to maintenance information
- Some key performance measures have been introduced and the need to develop more for shuts and P&S is understood
- A shut report card was developed and subsequently enhanced
- Planners have attended CP training and key stakeholders provided with awareness training
- The improvement projects have been introduced in a scheduled manner and efforts now underway to spread the pockets of excellence

8. PERFORMANCE MEASUREMENT & MONITORING

The first performance measure adopted for Shutdowns was a simple scorecard showing the overall picture of how the shut was executed compared to plan. This was issued to all stakeholders from management to trade teams. The scorecard was a basic display of scheduled work and comments as to whether the schedule was achieved or not and comments on the overall performance. This in effect showed how each workgroup performed. Initially some work groups found this confrontational and an affront to their ability and input. Through ongoing communication based mainly around the fact that usually there were legitimate reasons for not achieving the required outcomes, i.e. an miss or a hit). The report is now well accepted as a real picture of how the shut went and a guide to further improvements.

Two graphical reports are now prepared in addition to the scorecards. The first (Figure 3) shows the relative proportions of work that is Planned, Scheduled and Planned & Scheduled. These are excellent measures to give management an indication of the quality of input in to maintenance tasks. The second (Figure 4) chart depicts the ongoing adherence of the total actual shut time compared to the planned shut duration.

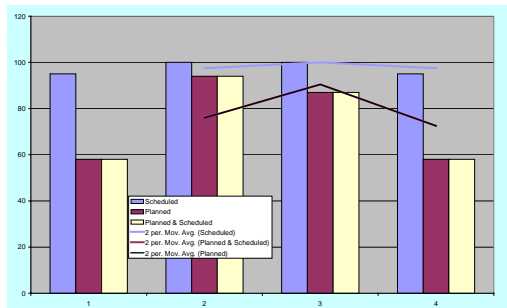


Figure 3

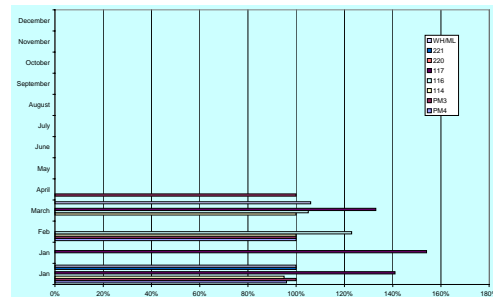


Figure 4

9. SUCCESSES & OPPORTUNITIES

The improvement program resulted in many changes for the Planning group and particularly resulted in a number of successes for shutdowns including:

- All disciplines are on the same schedule
- Shuts being completed on time
- Less confusion on shut days
- Less stress on shut days
- The correct work is being completed on shut days

There are also many improvement opportunities recognised as being necessary in the relative short term to build on the successes to date. These include:

- Understanding of detailed planning
- Understanding of Critical Path
- More detailed scheduling

10. WHERE TO FROM HERE?

The improvement program has been driven by management with the assistance of external expertise. Through the heavy involvement of key stakeholders, (particularly the Planning group), the program quickly developed from a poor background to a level where new initiatives and a desire for a new way are coming from all work groups. The main thrust in the near future is:

- Continued effort to consolidate gains. A successful improvement program is underway with different work groups throughout the plant achieving differing levels or results. The program has however developed it's own omentum and new initiatives arise continually and being followed up
- Further job planning training, coaching and mentoring. It is recognise that the changes are cultural in nature and this requires time and persistence
- Spread pockets of excellence throughout the plant. Individua; work groups have adapted to new initiatives in different ways and to different levels. The successes now need to become more widespread.
- Strategic approach to determining Performance Measures. The development so far has been basic and further work is recognised to ensure appropriate measures are put in place to keep track of development and ongoing performance.

It is clear that a large effort is required with the trade groups to understand the demanding requirements for "planned" jobs and the supporting documentation that is required. This will no doubt have an effect on the apparent good results shown on the reports for planned and scheduled work.

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This paper was presented jointly by Ross Francis and Rodney Meagher at the IQPC Shutdowns & Turnarounds Conference held in Melbourne in August 2005.