

SIRF Roundtables Pty Ltd
Industrial Maintenance Roundtable in South Australia
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Designing an Effective Maintenance Department

Richard Twisk, General Manager, Networks, ETSA Utilities spoke on development of the department vision, goal alignment and engagement with the corporate goals.

ETSA Utilities has undergone a transformation from a public utility to a regulated but private corporation that has different goals and expectations distributing electricity from transmission substations to end users. Although its assets have long life expectancy, the rapid growth in power demand and the new corporate goals have changed the expectations on its operations. Richard discussed the planning cycle, the realignment of operations to satisfy the changing needs of its operating environment and the goals of the new owners.

A vision for the network sets the theme. An annual SWOT analysis identifies critical success indicators for the Business Plan.

ETSA Utilities operates a “Balanced Scorecard” Business Plan where the critical success factors focus on finance, business growth, productivity and employee commitment which is essential for the success of the business.

Employee commitment is monitored using an annual employee satisfaction survey. This covers the full range of issues including productivity, regulatory compliance, growth, customer service and finance.

The employee survey results are presented to the 100 leaders workshop and each group in the structure is ranked by employee satisfaction. Management is required to manage the changing expectations of staff to the vision.

The Vision is designed for ETSA Utilities – not anyone else. It may pose a statement such as reduce cost through materials synergy. That rolls down to an action plan for staff.

The corporation’s aim is to reduce costs by using the synergies that exist between it and similar groups. As an example they may bundle together insurance packages and adopt common supply packages.

Operations management must respond to the incentives provided by the regulator for improved reliability and service.

ETSA is an asset manager. The company operates an integrated finance and asset strategy on a single platform. This provides lifecycle plans for every item in the asset register and defines roles and Service Level Agreements which drive improvement.

Reliability is the key performance indicator. Whole of life asset management plans are in place. Faults are investigated to learn from problems to ensure that the appropriate improvements are made. Operational purchases need to be approved by the maintenance department. This approval is based on whole of life costing. Procedures throughout the maintenance department have been standardised.

For long life assets in a capital intensive business, planning is required by employees at all levels.

Every business can learn by looking outside and in other industries. New technology drives up skilling for a workforce with an average age of 45 years. ETSA focuses on our core business not new businesses such as powerline telecommunications. Our business is to help our staff use their skills.

Hermann Reiner, Converting Maintenance Engineer, Kimberly-Clark Australia spoke on structure, task allocation and skill mix at Kimberley-Clark.

Within the Converting Department there have been a number of reviews to determine the optimum structure for the maintenance department. Its current structure was introduced to achieve cultural change and to ensure 24 hour availability of maintainers. It is based on a mix of KCA maintainers who are supplemented by people from a national contract maintenance group. This approach has achieved substantial reductions in maintenance costs with early indications of improvements in on line equipment efficiencies. This efficiency is monitored by the company's SAP.

A breakdown crew covers all of the site and is on call 24 hours per day. If a breakdown will take more than two hours to repair by the converting mill maintainers this crew is called in to effect the required repairs.

A separate project department conducts capital work.

An annual asset plan is prepared for each plant item. A mechanical engineer, planner, and team leader develop a weekly asset plan from the annual asset plan. The team leader implements the weekly plan. There is a planned weekly shut down for each converting line.

KCA employs an area technician who reports to the asset manager and is the technical expert in the department with control of equipment knowledge. The role of the area technician is to improve process reliability on line, to conduct root cause analysis on failures, to assist operators and the breakdown crews on tool selection and tasks, to set up the line for new products and to reduce waste.

Operator-maintainers conduct minor static and dynamic checks and the planned maintenance work during the weekly shutdown. Sometimes it is trying to get reports from them.

All report to mechanical engineer.

Most maintenance people are contractors including the Document writer, Reliability staff, the Planner, the Team Leader and the Maintenance crew. The area technician provides technical support to operators. Maintenance strategy is developed by contractors who conduct routine tasks and minor modifications with support from the area technician.

Bill Holmes, Principal SIRF Roundtables

Bill Holmes spoke on benchmarking and performance measurement for reliability describing the outcomes that can be achieved in the Australian environment. He outlined current experience bench marking thermal power stations around Australia.

In a plant, maintenance costs oscillate over a three to five year period because once maintenance costs are cut it takes that time for the deleterious impact of cost reductions on plant efficiency to become obvious.

Expressing maintenance costs as a percentage of the capital replacement value of the plant is a key performance indicator to indicate the effectiveness of maintenance strategies. This figure should be between three to five percent although it varies from industry to industry.

There are three key maintenance strategies that may be compared to the three legs on a stool. They are:

- Emphasis on introducing and maintaining a reliability culture;
- Focusing on improving uptime and aligning maintenance and organisational goals; and
- Adopting an engineering approach to maintenance of systems.

The emphasis of maintenance should be on rapid removal of defects. This is best done by eliminating the main sources of defects which are:

- Equipment failure;
- Poor workmanship;
- Bad design;
- Lack of or inappropriate spare parts; and
- Operator error.

Du Pont found that the latter two areas were responsible for the bulk of equipment failures.

Benchmarking requires confidence in what you are doing and where you are going. Maintenance departments should have a business plan but generally refuse to commit to

one because they feel that they are putting their heads onto a chopping block. A business plan should be based on good data and should discuss the key areas of focus and performance measures and the impact that improved maintenance has on profitability. An improvement in online equipment efficiency has a significant impact on profitability. Alternatively, we should also consider the cost of the alternative, poor reliability and customer satisfaction.

In an organisation that has poor systems, one hour of planning should be allocated for every seven to ten hours of work by a maintainer. Where good planning systems are in place, one hour of planning can support up to ten to 15 hours of maintenance work. If the reliability engineer does some analysis, take account of this in allocating planning.

You need to be aware of the cost of holding spares which is about 25% per annum of the purchase cost of the spare.

Successful implementation of appropriate maintenance regimes requires strong leadership and active involvement of the HR department because we must overcome the existing thought paradigms. Sending people to a course achieves nothing. We need a sustained push to break this paradigm if we are to achieve ongoing change.

Breakout Discussion:

In discussion members first considered the issues of establishing and structuring a maintenance function. What should we do? How can it go wrong? What should we monitor? How can we ensure success or prevent and overcome failure?

We should share information and follow a one team approach with the support of senior management.

This requires aligned goals.

Maintenance must relate to business goals. This requires common measures, such as downtime, and a simple vision. Making sure maintenance goals and vision fit the business allows us to lock in agreed activities and define optional opportunities.

The vision should outline the purpose of the business and must be understandable and relevant, portraying the desired future.

Input to creating the vision must take account of the size of the enterprise, the client, the core business and world's best practice.

Communicate the vision in clear and tangible language: what, when, who and how.

Manage misaligned goals by returning to the vision and goals of the business. Removing defects or running to failure should be determined by the value each creates for the customer and the business.

Reasons for failure to align goals include:

- Did not sell the vision properly (ie. Bad delivery)
- Poor or no measures identified (milestones)
- Too complicated, unachievable or unrealistic
- No plan to deliver the vision
- Review processes that are not in place
- Lack of support from middle management
- Not understanding needs of the client

The internal customer model is helpful where it encourages a mutual contribution to the vision.

Where goals are misaligned, monitor

- your milestones
- employee behavior
- customer response
- Changing needs of customer
- Changing expectations of customer
- Employee morale

Success factors in retaining aligned goals include

- Continuous improvement
- Continuous monitoring and change
- Well trained and motivated workers

How to sustain it.

- Be flexible in your plan
- Regular review and feedback by all stakeholders
- Reward structure to support ownership

Structure and task allocation should be fit for purpose. That is it should be adapted to the conditions and demography of the region including remoteness, limited labor supply, limited capabilities, and it should support the vision and values of the business.

A structure should integrate and streamline tasks as much as possible. Tradespersons should be dedicated to specific activities such as break down crew, area technician or maintenance. There should be less demarcation between trades and operators and operators should acquire a variety of skills, to allow operators to disconnect and reconnect machines.

The balance of contractors and permanent staff depends on culture, retention of skills and people, and the balance of salary against overtime. A balance will provide the benefits of retaining specialization, and specialist contractors for services like hydraulics.

An ageing workforce creates an opportunity to bring in new skills and attitudes, but new people can be influenced by experienced, long serving people. Difficulties recruiting skills result from trades careers not being encouraged for some years

Common causes of structural failure include:

- Imbalance in the structure
- Fragmented organization
- Changing the goals
- Poorly conceived structure
- Poor or lack of consultation

Some approaches to addressing structural failure include:

- Employee opinion survey
- Benchmarking with similar enterprises
- Monitoring and reporting market trend
- Internal or external demand

A key means of sustaining an effective structure is to share the rewards of success

- Recognition
- Progress reporting
- Build in a sense of community wellbeing

Summary: Vision, Goals, Strategies and Tasks

Vision

- Decide on the purpose of the business
- Do not change too often
- Key Performance (indicators, Performance Management, Plan Do. Check. Act
- Ensure goals align and commit to execution

Goals

- Must support the vision
- If individuals do not believe in the vision
- Measure to ensure the outcomes meet goals
- Reward and recognition are important. The use of incentives is not generally agreed

Strategies

- Must support goals and be realistic
- Maximise asset availability

- Stay on target
- Stick to the business plan and communicate clearly any changes or substitutions
- Continuous monitoring of performance and compliance

Tasks

- Continually re-prioritise tasks in pursuit of strategies and goals
- Too many tasks: balance tasks with resources
- Monitor the position and progress

Three Take Away Messages

Lessons Learned

- Quantify the benefit to justify the input
- Importance of business plan
- Belief, drive and commitment (It can be done)

Asset Management Strategies at Adelaide Brighton Cement

Site Visit: Adelaide Brighton Limited, Birkenhead

John Mckenna, Reliability Manager

Adelaide Brighton Limited manufactures 4 million tonnes of cement per annum in Australia, directly in South Australia and Northern territory or in joint ventures in Queensland and Western Australia. One million tonnes per annum are produced at Birkenhead. Australian sales are \$400 million which is small in global terms. China produces 300 million tonnes of cement per year.

While each plant operates autonomously there is a National Operations Manager and national team meetings of Reliability Engineers. Some key performance indicators are shared but there is room for more. A weekly email links the plants.

The Reliability Manager has direct responsibility for maintenance, shutdowns, trades across the State. Reliability Engineers reduce recurring problems and assist with capital development.

At Birkenhead there are 200 staff and 100 contractors. Contractors do cleaning, contact and fabrication services. Reliability Engineers have a role managing projects of less than \$1 million.

Adelaide Brighton Limited has worked hard to establish process control standards at every point in the process. A lot of effort has gone into determining the best way to run the plant because very tightly controlled process standards prevent operators from driving the plant.

Standards set tolerances for each process. This eliminates most of the beginning of shift fiddling which bedevils much of manufacturing.

Each (and any) process is controlled by:

- inputs, which determine cost;
- process settings, which determine time, and
- performance standards which determine value.

There is a clearly defined plant modification loop involving process engineers and reliability engineers.

Reliability can be managed as a process. Inputs are planning, condition based monitoring and stores. Leadership determines the process. Outputs are execution, reliability engineering and project engineering.

Reliability standards drive support and control standards, which drive process control standards.

The life of refractory lining in the kiln determines the frequency of shut downs. This year Birkenhead will achieve 12 months between shut downs, up from 9 months previously. This will lift throughput by one third. Shut downs are managed by formal review of the shutdown plan, cost controls, coordination of efforts and performance measures on controllers.

The business focus is on reducing repeated failures between shutdowns by using condition monitoring and by removing defects, rather than focusing on what needs fixing now.

Budget is controlled using number of jobs and target costs for contractors, who we engaged in alliance contracts with Adelaide Brighton.

The company provides the resources to do cost-benefit analyses on every project within a shut down. This demonstrates the gains flowing from each project and optimises the program. The company selects projects to be carried out during the shutdown by assessing the likelihood of failure and the expected cost of failure (lost production compared with the cost of fix) before committing to work.