



Transforming Conservative Maintenance Practice to Reliability Culture

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BACKGROUND

An engineering product's life cycle will start from a solution conceived to solve a particular need, design, development, construction/production, useful operational life and then the imminent obsolescence either through the normal life expectancy or sometimes prematurely. A good product/asset ensures the maximum utilisation for the period of useful life especially when the product reaches the decline stage. By doing this, the user will reap the maximum benefit from the asset.

In a well-engineered design, factors in product life cycle will be balanced between the fit for purpose and the financial requirement. Unfortunately, striking the optimum balance is not an absolute science but is based subjectively on objectives of the producer and/or the needs of the user. Normally any engineering product will pass through many parties before its actual demise. Hence without proper understanding of the product design, operations and maintenance requirement, most likely the user will face early loss of the product functionality. In some cases, the financial loss of not being able to fully utilise the asset can be enormous.

It is not uncommon for management to be excited over new development of assets or construction of new facilities but give less attention on the maintenance of the asset. There is a higher focus towards the design and construction of a building compared to how effective it is to operate or maintain the equipment. In a way, society places maintenance as less significant in priority. This is evident as we see the maintenance team is usually located in a far corner in a factory lot or in the basement of a building.

Should engineers then be blamed when there were numerous reports in the news about poor maintenance existing in society from public toilets to hospital operating theatres to mammoth infrastructure projects? Some ridicule us in that we are a

society of grand builders but are not able to effectively maintain the assets.

MAINTENANCE MINDSET

So, how would we want to change society's conservative perspective on the function of maintenance? Engineers would first have to understand that all aspects in an asset lifecycle are important to ensure maximum benefits are derived from the purpose of the asset. If possible, we should be able to extend the usefulness and evolve the asset as the requirement changes.

More importantly the stake holders, especially the management of the asset, must understand the benefits of having the asset fully utilised and the consequence of action or inaction to upkeep the asset to its intended purpose. The understanding of the overall asset life cycle will bring to the concept of reliability in which we not only measure the fit for purpose but how assured are we that particular asset is available when needed and satisfy the user's requirement.

The management needs to be convinced that the cost of acquiring the asset is about the whole asset life cycle and not the initial investment only. In order to maximise profit, the asset must be able to be fully utilised effectively and efficiently.

The organisation must have a competent reliability team to manage the asset life cycle. The team not only repairs but also properly maintains the equipment to ensure predictable performance and reliability of the product. The team must clearly understand the objectives of asset reliability. They must be able to translate them to clear action points that can be followed by the whole organisation. It is a cultural shift from the conservative repair and maintenance concept where maintenance/reliability is the responsibility of the maintenance department only. Now reliability is a concern for the whole organisation.

Reliability should be taken to the forefront of the organisation's mission. It has to be part of the business strategy. Reliability has to be propelled together with the quality system or the supply chain system. To succeed in the long term, the organisation must have some reliability key performance index (KPI) indicators, which must align with the organisation's business objectives.

Currently there are many concepts that an organisation can adopt to manage asset lifecycles. Activities such as Total Productive Maintenance (TPM), Six Sigma, Lean Maintenance, Predictive/proactive maintenance concept, etc., are amongst the concepts of asset management. To measure the effectiveness, KPI such as overall equipment effectiveness (OEE), mean time between failures (MTBF) or mean time to repair (MTTR) can be used. There are numerous other KPIs that the organisation can use, such as breakdown hours, number of "on call" or unexpected repairs or manpower utilisation. However it is important to align the key performance index (KPI) with the overall organisation's objective and to choose only few KPIs that give the most impact to the reliability of the asset.

THE STRATEGY

So how would we transform the maintenance culture to be in a class that is comparable with world standard? Below is a suggestion of strategies that could be adopted:

a. Management commitment

Any endeavour can only be successful if the top management is in full support of cultural change initiatives. As the main stakeholder, the management must fully understand that a good reliability system will allow production to operate efficiently or the asset functioning as expected. This can directly be translated to a positive financial bottom line. However, the management must understand that the result of reliability

initiatives cannot materialise overnight as it requires structural and behavioral changes to the organisation. Therefore getting the management's commitment is prerequisite for a reliability program to become successful.

b. Proper system and knowledge

The maintenance and reliability team must develop a proper strategy to improve their maintenance approach. Since the reliability culture has to be embraced by the whole organisation, everybody must buy in to change their perspective and understanding of the importance of asset/reliability management. The organisation must conduct a gap analysis to measure the difference between their current practice and the industry standard. With clear KPIs, the organisation will be able to chart a road map for the initiative. The plan will ensure that the organisation is on the right track and this also allows regular tracking of achievements.

One hurdle to tackle is the resistance to change especially from the shop floor. The organisation has to develop an approach to handle conflicts that may arise as a result of the initiative. A good communication channel will allow all parties to share their concerns and excitement. It is best that the champion of the initiatives is well trained to lead the team.

c. Systematic development of training

Having relevant skill sets for the maintenance and reliability teams are vital to ensure that the team can operate effectively. The reliability team must have the technical expertise for proper asset maintenance and the philosophy to be adopted for maintenance practice. More importantly they should develop the passion to do the reliability work effectively. Thus the organisation could never be successful if they do not adopt a learning culture or expect only minimal competencies from the team. The organisation must continuously train the employees on new knowledge to ensure that they keep on improving their skills. This is important as rapid technological advancement in certain equipment or

asset design/construction demand for new knowledge to be learned for efficient and safe operation of the asset.

d. Retention of skill sets and useful information

The organisation needs to develop a system to retain experienced reliability personnel in order to ensure continuity of the initiatives. Though attrition of employees is normal in any industry either through voluntary separation or retirement, the organisation must establish a mechanism to retain the vast knowledge and the skills. One method of retention is by developing standard operating procedures and recording the best practices. A good standard will avoid unnecessary failures to be repeated by another person. It will ensure conformity to good engineering practice.

To deal with enormous amounts of data and information, there are many computerised maintenance management systems (CMMS) or enterprise asset management (EAM) system to assist in planning and managing the workflow processes. The data will become a good historical record that allow easy understanding and ensure proper perspective on any particular asset especially in troubleshooting during breakdowns. The systems can provide easy and quick reference for measuring the effectiveness and efficiency of the reliability activities.

Lastly, a good succession planning or proper transition period is vital to keep the activities in the right mode. There are many reliability initiatives that have failed simply by not having an effective transition between the project champions.

e. Getting the right skills team

It is important for the organisation to have people with the right skills and attitude for the job. The wrong people are a liability to the organisation. It does not mean that the organisation must attain all the skills needed for effective maintenance. What the organisation

needs is to be able to manage the skills needed by either developing their own internal skills or acquiring the resources from third parties. The right skills and advice will ensure success in the initiatives.

f. Benchmarking against the best in the class.

Lastly, we can never improve the reliability system if we do not benchmark our practices against the best in the industry. Benchmarking will reveal the strengths and weaknesses and provides sense of direction to the plan. An objective assessment either by trained professionals or an honest opinion from the organisation itself will ensure that the organisation continues on the right track for reliability improvement.

CONCLUSION

Changing the maintenance practice to a reliability framework is not impossible to achieve. It requires understanding of the principles, commitment from the management, support from the whole organisation, right maintenance or reliability teams in terms of skills and attitudes, proper planning, execution and evaluation of the initiatives. In many organisations, the initiatives will involve cultural changes or even sometimes some structural modifications. These are necessary evils and the process may be painful. But the reward is plentiful both personally and to the organisation. With reliability concept, we can improve on the asset life cycle and not be bolted down to conservative maintenance concepts. If we do not embrace the idea, we will lose our competitiveness against the best in the world. ■

REFERENCES

- [1] Torbjorn Idhammer, Maintenance Management Legends, Maintenance Journal, May 2005.