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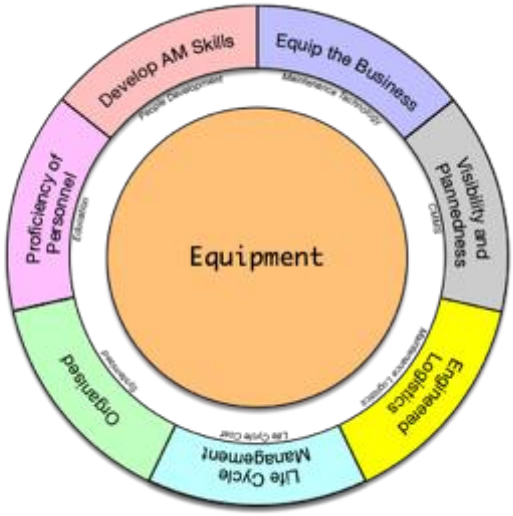
7 Assets Development Programme

There are 7 critical assets that need to be in place to have a successful Asset Management Business.

Jasper L. Coetzee

These seven areas are represented by the acronym **DEVELOP**, and shown in the circular diagram, which shows that the equipment of the organisation is served by these seven aspects:

DEVELOP



Develop AM Skills in personnel. In line with the complexity of achieving success in the process of maintaining facilities, a sizeable investment in the development of people is needed. Such development include understanding the various aspects of the business, the technical work involved, as well as being able to manage the work being performed, and achieving a success culture.

Equip the business with the correct level of maintenance technology. This includes all the handling facilities needed, specialised tools, measuring instrumentation, computerised analysis stations, and so on.

Visibility and Plannedness through the implementation of a maintenance operational system (CMMS) that is well designed and well implemented to facilitate the maintenance work being done, and provide the necessary information for the management of the function.

Engineered Logistics (well designed maintenance logistics). Maintenance is quite complex in the logistical area. There is a large volume of flow taking place in the maintenance organisation. This includes spares and materials flow, information flow, people flow, flow of instructions, and a great deal of communication. This is dependent on a well designed infrastructure of workshops and facilities.

Life-cycle management. It is so easy to fail in this crucial area. It is only when the equipment is maintained through scientifically designed maintenance procedures, that both the performance and the cost of such machines favours the business outcome.

Organised (**well systemised organisation)** - this includes all aspects of maintenance strategic management and maintenance tactical management. These need to be defined with such attention to detail that the whole organisation works like a Swiss timepiece.

Proficiency of personnel (**a "deep" level of maintenance expertise)** at all levels in the organisation (engineers, supervisors, planners, technicians, and artisans). This means that each level has the expertise needed at that level to further the goals of the organisation, and to support each other in this great endeavour.

Let us take a deeper look at these seven aspects:

1. Develop AM Skills of People

DEVELOP

Is development of maintenance personnel really necessary?

Meeting the basic educational requirements for a position, does not say that you can do the work. It only provides the basic foundation to be able to do the work at all. The employing business still needs to decide which further skills are vital. It then needs to develop a plan per employee of the specific skills that he/she should acquire.

A comparison of the skills profile required for the specific position with the person's current skill set results in a so-called skills matrix. This skills matrix documents the development needs of the person.

This involves the following developmental aspects:

1. The technical work that the person has to do, or supervise, or manage.
2. Specific work of the maintenance position.
3. General maintenance principles.
4. Maintenance techniques.

Related to this, and depending on the post involved, he/she also needs to be developed in areas such as:

- leadership,
- the use of generic management principles and techniques,
- personnel management,
- communication skills,
- critical thinking skills,
- problem-solving skills,
- decision-making skills, and
- teamwork skills.

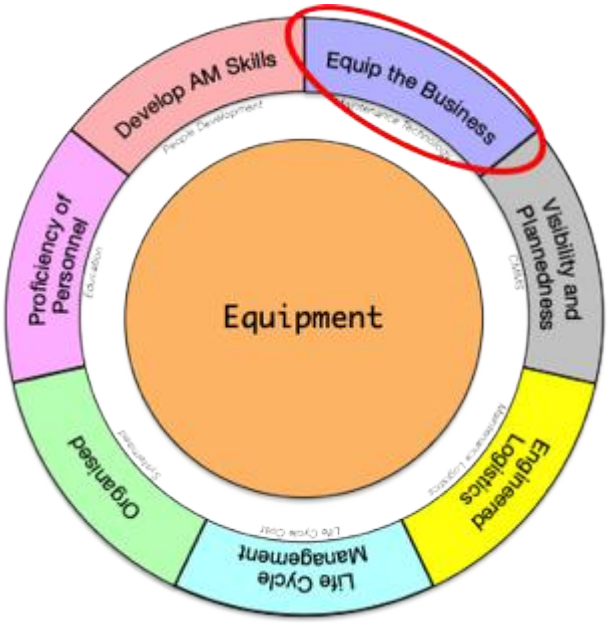
But most businesses certainly develop their people?

Some maintenance businesses do have skill-plans in place. Nevertheless, the training programme often gets delayed because of work pressure and/or budget constraints. This is understandable, but leads to lots of inefficiencies, lack of needed improvement and quality problems.

The point is that you need all seven assets. If you have the other six assets, but not this 7th asset, development of personnel, you will still not achieve the critical goals of the business. This then leads to a sub-optimised business that can at best perform poorly.

2. Equip the Business with Maintenance Technology

DEVELOP



There are a vast array of technology involved in the performance of maintenance. A complete listing is not possible, but it includes the following classes of equipment:

- Cleaning equipment, including ultrasonic cleaning booths and baths, high pressure washers, and specialised cleaning bays.
- General instrumentation such as pressure gauges, flow meters, meggers, and multimeters.
- General engineering machines, such as hydraulic presses, lathes, and so on.
- Specialised machines, such as hydraulic pipe crimping machines, injector test benches, and dynamometers.
- Specialised tooling, such as hydraulic bolt tensioners, and similar.
- Fault finding instrumentation such as cable fault locators.
- Handling equipment, including cranes, forklifts, and movable trolleys.Condition monitoring instrumentation, such as vibration measuring instruments and computerised analysis, infra red cameras, oil analysis instrumentation including atomic absorption spectrometers, and a whole variety of non-contact methods.

Because maintenance technology is physical and technical, as opposed to the somewhat conceptual notions involved in the first three asset areas, one typically find that this asset is usually fairly well developed. Nevertheless, it pays to discuss the matter with the workforce to determine where there might be shortcomings, causing inefficiencies and non-compliance due to a lack of available technologies.

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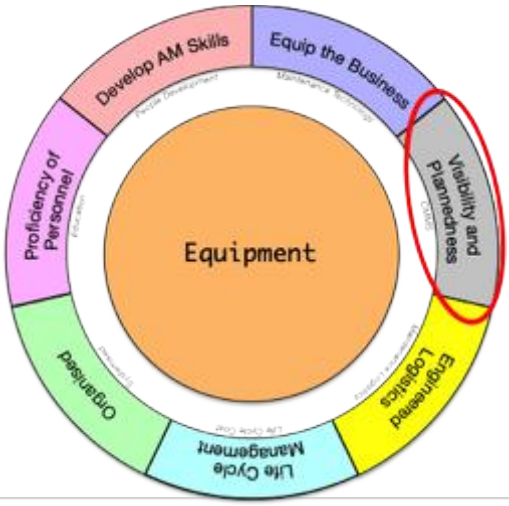
3. Visibility and Plannedness via the CMMS

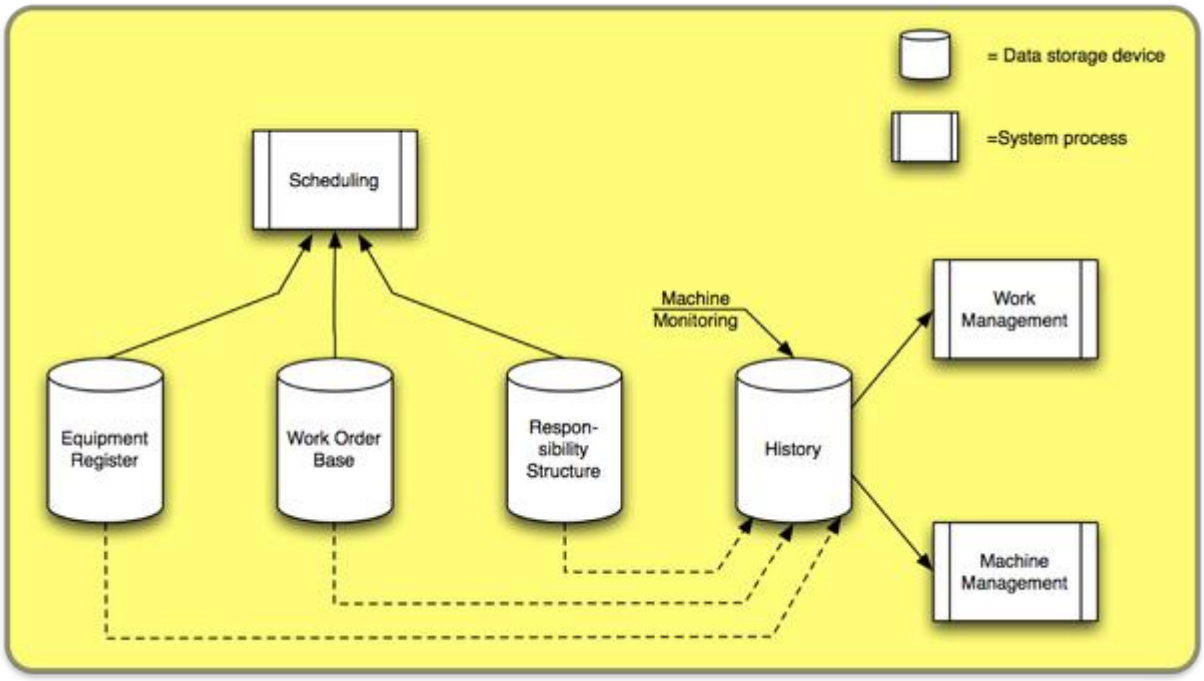
DEVELOP

The CMMS central to the business success



Now we address the third of the seven success factors (or assets), the Computerised Maintenance Management System (CMMS). The CMMS plays a central role in the business to administer and link the activities taking place in the business. It is not a cure-all, as it is often made out to be. Many a maintenance business has a CMMS in place, which does not contribute much to the success of the business. The CMMS will only be an important contributor to success if two requirements are met. These are, firstly, that all the other six components of success are sufficiently in place to make the CMMS effective. Secondly, the CMMS itself must be deployed well, which is again only possible in a well systemised and organised business.

What is the CMMS really?



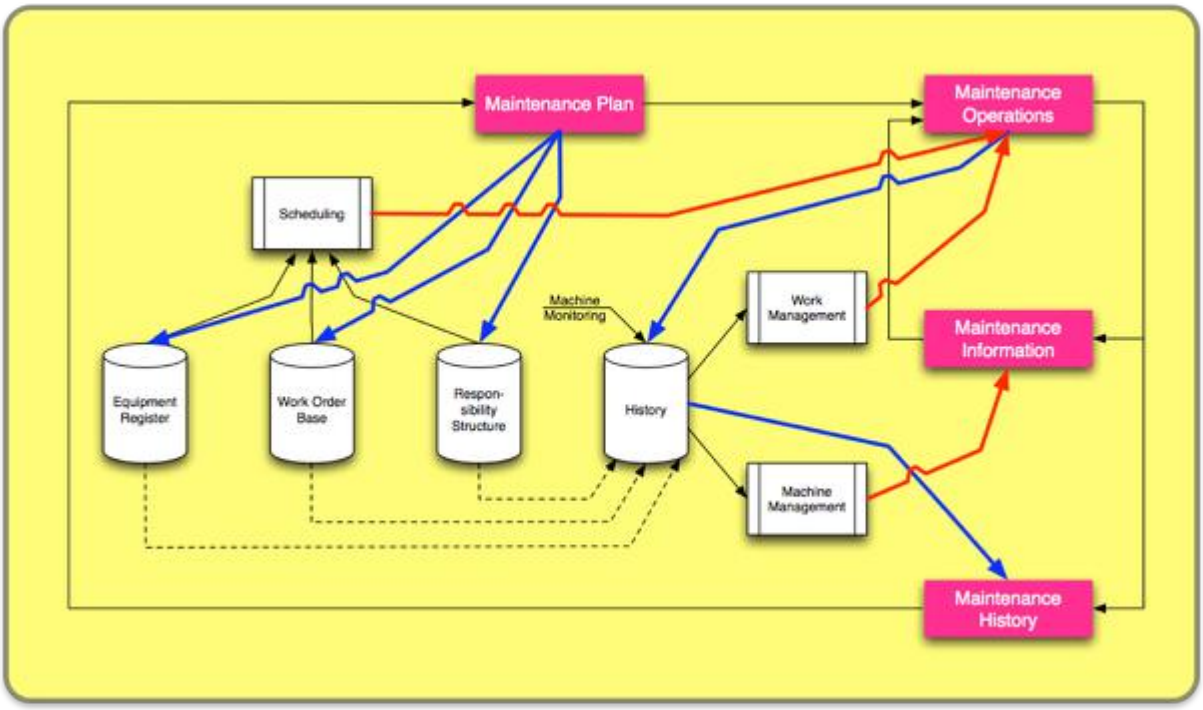
The CMMS provides four data-related "handles" to the business. It firstly furnishes data-structures for defining the business' equipment configuration (equipment register) such that it facilitates the equipment-related functions found in a maintenance business. Secondly, it gives a way to build task structures (work order base) that includes both tasks and their frequencies of occurrence. Furthermore it provides data-structures for defining the maintenance organisation structures and equipment-coupled responsibilities (responsibility structure). And then, lastly, it keeps the history of work done to equipment, such that it facilitates the various equipment, people, and work management functions (see following).

Additionally, the CMMS provides three user-related functions. These are the Scheduling function, the Work Management function, and the Machine (equipment) Management function. These provide the ability for the maintenance personnel to manage and improve. And it provides the ability to perform business processes such as the scheduling, planning, and management of maintenance work. Further to this, it also furnishes the ability for task feedback and data entry to build the database and maintenance history.

Implementation (or re-implementation) of the CMMS

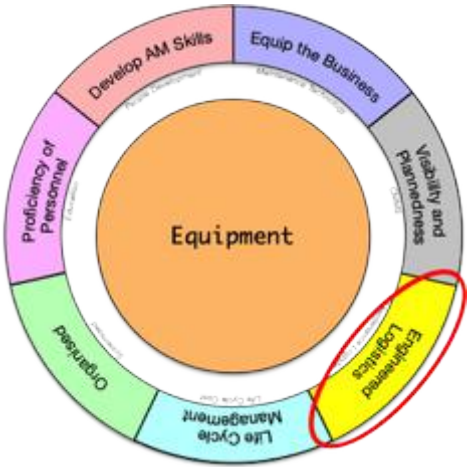
The implementation of the CMMS is a complicated affair, which is mostly handled in a too simplistic manner. The reason for this is that there is not enough of an awareness of the pre-positioning required in terms of the requirement of the synchronised development of the seven assets, of which the CMMS is one. Mostly, because the CMMS is regarded as a silver bullet, it is installed in a simplistic manner, with the hope that its use will over time improve. Nevertheless, such an approach simply leads to bad systems behaviours that will later prove quite difficult to correct. This fact leads to us talking of re-implementation.

Many businesses that want to improve have to accept that re-implementation is a requirement as part of the improvement process.



The CMMS shown in context of the Maintenance Tactical Work Cycle

4. Engineering Logistics



Each minute lost is forever gone!

This is the second but last of the seven assets that will lead to maintenance success. See the diagram on the right for the seven assets. These constitute the success factors for successful equipment maintenance.

The heading above uses an analogy from Formula One racing. It says that the organisation needs to be faultless. First all, the facilities needed to support the driver must be ready. Further to this, the crew should be efficient and effective. Otherwise, the chances of success are poor.

Now, industrial maintenance needs to be well organised in likewise fashion. All facilities need to be correctly equipped and at the ready. The workers must be well trained and experienced. Additionally, purposeful motivation leads to clockwork-like task execution. Careful planning of work, and facilities and spares procured beforehand are prerequisites.

Additionally, the flow of people, work, and information must follow on careful contemplation. This should further precision task performance, and short turnaround times.

The components of maintenance logistics

The above simplistic description does not reflect the total complexity of maintenance logistics. Only when one starts investigating the matter the intricacies become evident.

One of the building blocks involves a deep understanding of the maintained equipment. It is only then that the requirements for the success of the maintenance actions unfolds. To an extent, this happens during design and development. This includes a decision about the maintenance approach taken, and the actions performed. Also, the facilities, parts and personal support required.

The organisation of the maintenance business

Maintenance by and large consists of people, workshops, workshop machinery, tools, and transport. But inherent to this, a lot of thinking, analysis, and design takes place to achieve such situation. The design needs to address supportability, the inventory needs, and satisfactory inventory systems.

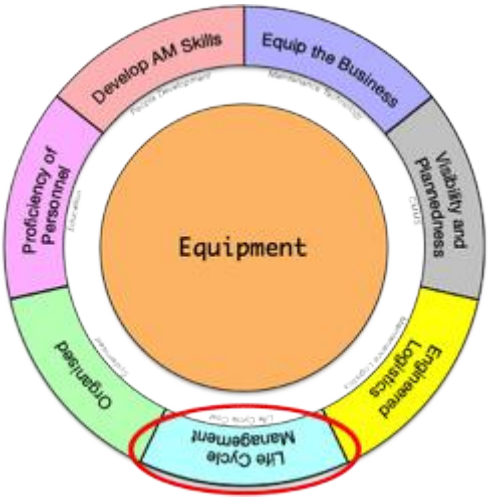
Good logistical design also involves the adequate layout and organisation of maintenance facilities. This to ensure results of a high calibre. Also, a continuous review of the prescribed tasks should take place. This is to achieve the best possible business outcomes. The application of method study and work measurement achieve industry comparable outcomes.

The last component regards the planning and scheduling of maintenance work. This ensures that all important work takes place per the Maintenance Plan. It also achieves adequate resourcing for work completion.

5. Life Cycle Management

DEVELOP

What does Life Cycle Management entail?



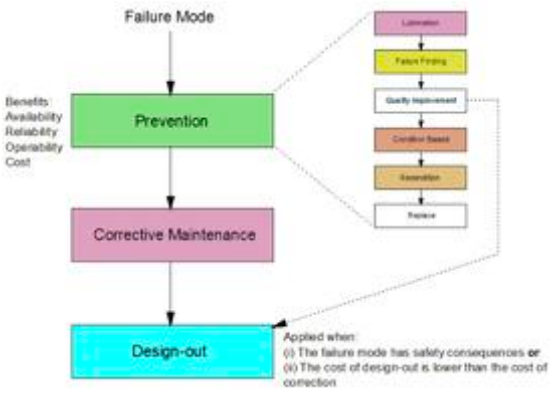
There are two things that need to be in place for proper Life Cycle Management of equipment. Firstly, the maintenance of the equipment must be based on the best information available regarding the equipment and it's failures. This involves firstly assembling the maintenance requirements set by the manufacturer, plus the business' failure experience (history and in-company know-how) plus the experience of other users of the equipment if available. This is then used to develop a scientifically designed Maintenance Plan for the equipment, using the Reliability Centred Maintenance methodology (see figure below).

Secondly, the information regarding the operational cost and failure history needs to be combined to optimise the Life Cycle Cost of the equipment by taking correct decisions regarding the replacement of components, stocking of parts, and replacing the equipment such that it serves the need of the business best.

What must be done?

This is a key requirement towards having a successful maintenance function. Whereas it is vital towards the success of the organisation to be functioning well through being organisationally optimised (or systemised - see article 1 of this series), it is just as important that the work that the department performs contributes maximally to the equipment life cycle performance and cost.

The requirement for an optimal Maintenance Plan involves *firstly* deciding what part of the equipment eco-system are the most important for the business outcome, both in terms of it supporting the production result, and not wrecking the business due to high cost. Such important part of the equipment eco-system should then be subjected to rigorous analysis to find the best possible approach to its upkeep.



Then, the available information for that part of the equipment eco-system needs to be assembled as described above, and the Maintenance Plan developed to optimise it's availability and reliability, such that the business can achieve maximal profit.

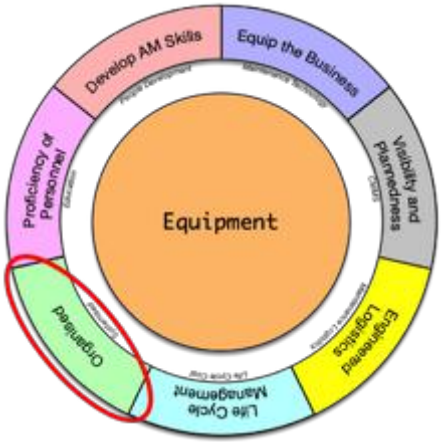
Further to this, the business needs to put in place an asset management optimisation program that constantly monitors the equipment outcomes with a view to optimising the contribution of the equipment. In many present organisations this is called a Reliability Engineering function. The purpose of such function is to achieve the best possible Life Cycle outcomes. In some businesses this function also performs the work involved in designing the Maintenance Plan as recounted above.

Implementing the approach

The implementation of a sound approach to this all, involves finding personnel with the correct skill-set, typically Reliability Engineers with the needed academic proficiency, and then leading them to success through additional training and coaching as needed. Alternatively, one can have your existing personnel trained to be able to perform this function, but with much slower progress.

6. Organised (Systemised Organisation)

What is involved in maintenance systemisation?



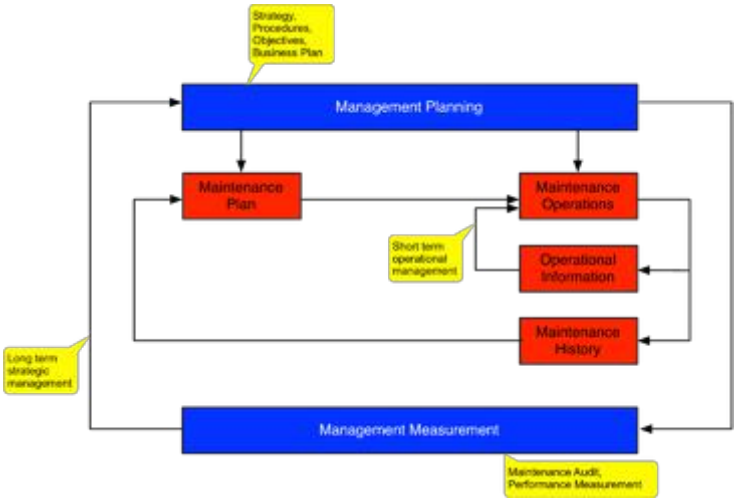
Asset Management / Maintenance needs to be systemised on two levels, namely the strategic level and the tactical level. The first (strategic level) concerns what the organisation needs to achieve for success, and how it will go about in achieving those successes. It can also be thought of as the broad approach taken to put into place all the needed processes to ensure success. Such processes span both the strategic and the tactical realms.

The second (tactical level) concerns the actual operations that are required for successful performance of the required maintenance actions. These include the planning, execution, and supervision over maintenance tasks. Such tasks are broadly divided into preventive and corrective tasks. Preventive tasks are documented in the Maintenance Plan, following an analysis of failure history through the Reliability Centred Maintenance methodology.

Feedback is critical to success

A critically important part of the systemisation of any business function, including Maintenance, involves the measurement of success achieved through dedicated reporting. On the strategic level, this includes regular reporting of Maintenance Performance Monitoring results, flowing from just on 20 calculated maintenance indices, as well as regular (typically annual) maintenance system audits. The tactical level is served by a variety of reports indicating tactical success. These are too many to list here, but include reports for task completion, backlog, worker utilisation/efficiency, equipment availability, equipment reliability, and Overall Equipment Effectiveness (OEE).

The systems framework



The Maintenance Cycle model (see the figure) provides a framework for the total systemisation process. The outer (blue) cycle represents the strategic processes in the business, while the inner (red) cycle shows the tactical processes. The important strategic elements include the strategy (what needs to be achieved), management procedures (how are the strategies to be achieved), detailed timed objectives, business planning (annual and long term execution plans and resource plans), as well as Maintenance Performance Management, and Systems Auditing.

The inner (red) cycle includes the Maintenance Plan, the tactical business processes, short term operational management, operational optimisation, and equipment performance monitoring and management.

Implementation of such systematic environment

To implement a successful maintenance systems environment, is an endeavour that most maintenance engineers and managers were not prepared for. Nevertheless, it is certainly not outside their ability. They simply need to receive pointed training and coaching to assist them on the way of becoming the supermen and -women of the Physical Asset Management (or Maintenance) world. The alternative, of some consultant assisting with putting these elements in place, are an option, but does not lead to sustainable success, due to two factors. First, the simple principle of “not invented here”, causes resistance against the system, with people hankering back to the past. Secondly, because the system was conceived by others, even if so-called “buy-in” was achieved, the systems are not fully understood such that the maintenance managers/engineers can successfully follow through with its long term implementation and advancement.

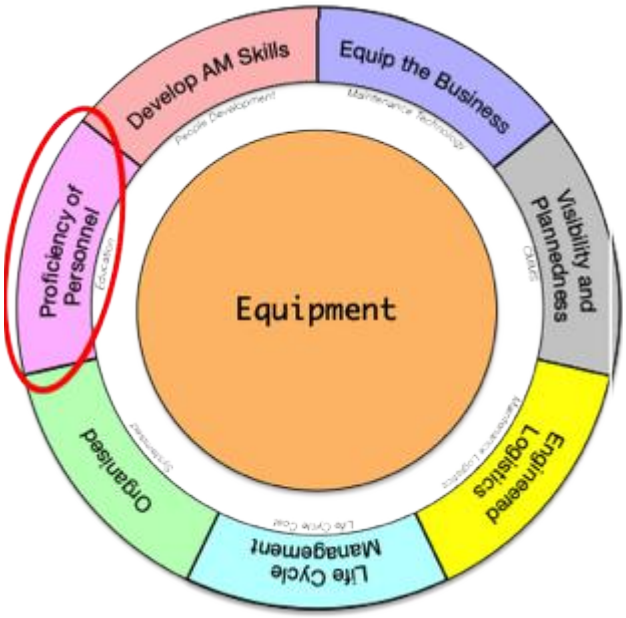
7. Proficiency of Personnel

DEVELOP

A deep level of expertise

The business needs to achieve a 'deep' level of maintenance expertise (at all levels of maintenance operations and management). Let us see how this works...

It is fairly logical that one needs certain skills and knowledge to perform any business. The same is true for the personnel of a maintenance organisation. First, there are many functions involved in the maintenance business, each needing certain education and training requirements. There is for instance a need for maintenance engineers, typically with an academic education in mechanical or electrical engineering. And then there is a



requirement for artisans/technicians that has undergone an apprenticeship that is suitable for the specific trade.

Importance of organisational design

It is not the intention to list all the possible skillsets needed in this article, but rather to point out that it is very important for the business to determine which posts will be needed, as well as the requirements for each position, and then only appointing persons that conform to those prerequisites.

Further to this, it is important to realise that one does not just need a person with the specific qualification, but one that also has the necessary experience and aptitude. A person that is simply appointed for the purpose of filling an empty position can often prove to be more of a burden on the organisation than an asset.

Practical experience and job enrichment

Much of the technical expertise needed in the maintenance organisation is developed during the execution of the maintenance task itself. This includes attending technical training at suppliers, manufacturers, and generic training providers.

And then the organisation can hold internal workshops during which knowledge can be transferred between employees, and can send personnel to conferences to acquire inter-company and supplier insights.

All this is to achieve the needed deep level of expertise

The purpose of all this is to achieve a depth of knowledge and know-how regarding the maintenance of the equipment and systems maintained by the business. The idea is *firstly* that the artisans/technicians need to have the requisite know-how and skills to maintain the machines for which they are responsible.

Further to this, the supervisors overseeing their work again needs to be so accomplished in the maintenance and care of all the equipment under their care that they can assist their artisans/technicians when they are at a loss about how to handle certain problem situations.

Additionally, engineers need to have wide insight regarding the interrelationships between the various systems employed by the business, so that they can provide leadership during major upheavals, and can prioritise when their supervisor(s) needs direction in difficult task situations.

In Conclusion

These seven assets need to be in place to a sufficient level to ensure that success can be achieved. Necessarily, there are also other things that need to be addressed while implementing the seven assets. That is a given. But these seven aspects give an important and sufficient framework for developing Asset Management Leaders so that they can perform miracles in the organisation.

Thing is, I really have a heart for those in asset / maintenance management. They are often given a raw deal. They are expected to keep vast industrial systems in tiptop shape, while they have not even been formally trained to perform this function.

Why do I say this? Maintenance Engineers and Managers typically come from the ranks of Mechanical and Electrical Engineers, taught at universities in the design of technical systems. They receive no teaching on the upkeep of such systems at university.

What are engineers taught during their studies?

Engineers are typically taught a combination of subjects such as design, specific deep technical studies, mathematics, and the like. Very little of management, very little of human behaviour, and mostly nothing of the failure behaviour of systems. And then they are expected to control and oversee the upkeep of complex and very advanced technical systems.

The pure engineering disciplines are taught well for the work they encounter in practice

The conventional thinking would be that every discipline knows how to perform their function. If we limit ourselves to pure engineering, one can say that:

- A mechanical engineer is educated in the design of mechanical systems and related knowledge. They typically can use their knowledge to design and consult in mechanical systems, such as heat pump systems, boiler systems, and so on.
- An electrical engineer is educated in the design of electrical systems. They can use this knowledge to design and build electrical machines, distribution networks, etc.
- A civil engineer is educated in the design of civil structures and the oversight of the building of such structures.

- A metallurgical engineer is taught how to design alloys, how to heat treat steel and other material, and how to manage metallurgical businesses.

- And so on.

What about the maintenance world?

There exists no degree in Maintenance Engineering. So, the typical maintenance engineer is taken from the ranks of mechanical and electrical engineers and typically knows very little about maintenance engineering when they are put in the position of maintenance engineer.

Now, after some brief practical training, mostly involving artisan type of work and a little supervision, they need to manage crews consisting of seasoned maintenance supervisors and artisans. These employees know that this engineer really knows nothing about the realities of the maintenance world, and give him/her the “we know better” treatment.

This can at best produce mediocre results

Being engineers they are very proud of their achievement in achieving a higher qualification in engineering, which is after all one of the most taxing of professional studies. Consequently, they do not succumb to the pressures of the people that they need to manage. They rather start developing their own philosophies regarding what is maintenance and what needs to be done to succeed. And they themselves, and the businesses in which they are regarded as the experts in their field (which is not their field at all) are the losers in this process.

A summary view of the maintenance function

To be successful in this field you need to achieve a balanced outcome in the seven critically important areas shortly discussed above. This is only possible if you receive suitable tuition in all of these areas, and in the process of achieving the correct balance between them.

The answer lies in dedicated education and coaching

My mission (and that of my organisation) is to serve the maintenance fraternity with dedicated training and support services.

Specifically, in the case of maintenance engineers, this includes tailor made tuition to equip them with the knowledge that was missing in their engineering studies. We “convert" pure discipline engineers to maintenance engineers. And, we support them with direly needed coaching to achieve career success.

The 7-Assets Development Programme

The 7-Assets Development Programme was created specifically to assist Asset Management / Maintenance leaders in achieving success in their businesses. They will become totally proficient in this field, to such an extent that they can even assist other businesses in becoming successful.

The first step then? Fill in this enquiry form, and we will contact you.