Nutshell Learning

Courses Synopsis

- Failure Mode Effects Criticality Analysis (FMECA)
- Fault Analysis and Troubleshooting
- Life Cycle Cost
- Obsolescence & Counterfeit Resources
- Spares Management
- Process Modelling and Mapping
- Understanding Maintenance 501

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Nutshell Learning Courses Synopsis

Benefits of our Courses

1. Focus on waste, loss and adverse impact reduction through a proactive understanding of property, plant and equipment assets technical and economic performance in terms of their readiness, reliability and resources.
2. Competitive pricing and value; flexible training options available to suit customer needs.
3. Presenter's strong reputation in terms of range and depth of knowledge, enthusiasm, ability to motivate, and to initiate change as a result of the training.
4. Provide a platform for complementing forward looking change management strategies, enhance technical communication within an organization and further promote the focus on quality.
5. Focus on preparing for the future and not re-hashing the past.

Lead Courses

1. Failure Mode Effects Criticality Analysis (FMECA)
    a. General Course
    b. Extended Course
2. Fault Analysis and Troubleshooting
3. Life Cycle Cost
4. Obsolescence & Counterfeit Resources Management
5. Spares Management
6. Process Modelling and Mapping
7. Understanding Maintenance 501

LPL

Successful Maintenance $\propto \int$(Proactive processes)

These courses take an **integrated and proactive** approach to core processes necessary for maintenance and maintenance support. **We need to avoid being proactively reactive.**

On a regular basis we offer the following leading edge courses that are fundamental to productive technology asset management.

The focus is on "how to think and do", rather than "what to think and do".

There are many and diverse constraints, methods and issues to be considered to make the "best value" decisions to enable plant and equipments to be productive throughout their expected useful life.

But, when all is considered, there are three fundamental questions to be resolved to achieve productivity goals.

- ✓ How is the product or equipment most likely to fail and incur wastes, losses or adverse impacts?
- ✓ Given all of the costs associated with buying, owning or operating this product or equipment, what are the main cost drivers and how much is the total life cost estimated to be for all realistic options?
- ✓ Given the plant or equipment does fail, how many of what spares are needed to minimise losses?

To be able to answer these three questions is core to successful maintenance. It is possible to identify potentially hundreds of issues to consider in such an analysis; but, it is necessary to be able to answer the three questions above.

Where relevant, the course work will meet the requirements of training packages such as TLI10 Transport and Logistics Training Package and relevant industry standards.

We offer workplace focused training, mentoring or tutoring on these questions using relevant industry standards and practices as well as our own research and logistics experience.

LPL

Failure Mode Effects Criticality Analysis (FMECA)

Failure Mode Effects and Criticality Analysis in its simplest description is a proactive and systematic process to catalogue the way plant and equipment is anticipated to fail and the resulting consequences, such as losses and risk.

A FMECA should be started at the design stage, and then later in life it is updated as part of a continuous improvement quality program.

Generally, unless the FMECA analysis proactively identifies that there is a failure, then there is no need for spares, training, tools, documentation, facilities, and so on. It is this deeper understanding of failures in the beginning which drives the need for maintenance and maintenance support.

That is, FMECA is the proactive core to Reliability Centred Maintenance (RCM), Root Cause Analysis (RCA), Failure Reporting and Corrective Action Systems (FRACAS), Integrated Logistics Support (ILS), and Logistics Support Analysis (LSA) processes.

Unless you know how all of these maintenance and support resources are linked back to the failure mode, you will lose control of the business of maintenance and its support and thus incur losses. If you want to reduce losses, then you must do a proactive FMECA.

The course also includes a systematic analysis of damages as distinct to failures through a Damage Mode Effects Analysis (DMEA).

Two FMECA Courses are offered, but they can be tailored to suit the needs of the customer. A **general course** which focuses on how FMECA works, why it is important, how it is the source of integration of maintenance activities, how it is used to make decisions, and describes the processes involved. An **extended course** is also offered as a follow on to the general course. This course focuses on the hands-on technical details of the range and depth of failure and damage modes and how to catalogue them using FMECA and DMEA studies. Several industry based and recognised standards will be used to document and compare this detailed analysis.

This is an intensive course and provides training in the necessary logic, processes and methods to ensure that failure modes are understood, identified, catalogued and assessed for their criticality and other performance measures including losses, life cycle cost and spares

LPL

Fault Assessment and Troubleshooting

This Fault Assessment and Troubleshooting course is based on FMECA practices that are linked to other fault assessment practices such as Root Cause Analysis (RCA), Fault Tree Analysis (FTA), Event Tree Analysis (ETA), and Failure Reporting and Corrective Action Systems (FRACAS).

Fault assessment and trouble shooting are maintenance work practices that are "joined at the hip" to keep assets in a readiness state to achieve their operational and reliability goals.

This **practical short course** is suitable from **fitters to managers**, and focuses on understanding the theory and practices of faults and **how to manage and troubleshoot them**. That is, how to:

- ✓ Assess an assets possibility and probability of faults and failures.
- ✓ Assess asset faults and failure data.
- ✓ Build troubleshooting schema that improves performance and reduces losses and waste.

No part of a maintenance program is standalone, and the course shows how a fault assessment and troubleshooting practices program should be established within the maintenance and maintenance support framework for property, plant and equipment assets.

Assets are complex, irrespective of their age and assumed inherent simplicity; and they need to achieve increasing levels of performance such productivity, capability, dependability, reliability, and durability. To be able to increase and sustain **economic and technical performance** you need to understand asset fault profiles, recovery and minimisation options.

Processes and equipments of all types suffer a range of fault states that are costly in terms of lost production as well as for re-prioritized resources that need to be diverted to respond to such faults. This course will provide options to address these situations.

The significant issue for maintenance and maintenance support is to identify and address the possibility and probability of fault before it occurs or can be detected, and know how to troubleshoot it. For example, the practices that need to be in place to prevent the ingress of a small amount of foreign material during a bearing lubrication process may cause a fault that cannot be detected until long after the adverse event took place.

Troubleshooting faults is a technical skill that needs to be understood and developed in the context of faults and failures as it will result in measurable benefits to the organization.

The benefit of this practical course is to be able to know how to address asset fault assessment and how to develop and apply troubleshooting practices, and thus improve performance and reduce losses and waste.

LPL

Life Cycle Cost (LCC)

Life Cycle Cost is a rational estimate of the total cost of buying, owning and disposing (acquisition and sustainment) of productive plant and equipment.

The cost is estimated over the life cycle phases of the product (idea to recycle). The type of phases is usually described by the product type and the industry. Also, the cost elements will change in priority over time as well.

An important aspect of a life cycle cost assessment is to assess the impact of a decision. The action to reduce costs in one situation, may adversely impact cost in other aspects. What seemed like a good idea at the time is found later to be a terrible idea.

A thorough and objective life cycle assessment will generally expose these weaknesses.

The main issue to consider in life cycle cost is to ensure that it is approached objectively and rigorously. It can help show that the planned course of action leads to a good solution; as well as show that it is not the best value option to achieve productivity goals.
If you are currently dealing with problems such as unplanned high maintenance costs, obsolescence, shortage of support resources, and ageing equipment; that could be because a number of years ago an analyst was unable to foresee these events. Or, what is also known to happen is the foreseeable events of the analyst were ignored.

The course provides training in the necessary ability to assess or review future issues as well as short term issues for "no surprises" cost estimates of through life productivity decisions.

LPL

Spares Management

Spare parts are the critical driver of productivity. If the plant or equipment fails and there are no spares, or the means to use them, productivity cannot be achieved and losses incurred.

Spares management is a key productivity process. In addition to determining the range and depth of spares, it is necessary to be able to manage the spares for their total life. In some cases spares may be bought for insurance purposes where it is necessary to keep the spare in a useable condition for many years. This makes spares analysis such as Packaging, Handling, Storage and Transportability (PHST) a critical and essential part of spares management work.

As part of the selection of a part as a logical spare, other logistics practices such as configuration management, training, documentation, tools, warehouse facilities, and accounting need to be put in place to ensure the through life usefulness and availability of the spare.

Generally, a spare should not exist in the inventory unless there is a failure mode that generates the need for the spare, and a life cycle cost assessment selects it as a good productivity solution. A spares warehouse should not be a museum of parts.

An important aspect of spares management is to ensure that resources are in place to be able to effectively use the part as a spare.

This course considers the practical aspects of spares inventory management as well as analytical tools to undertake a more proactive and detailed spares management program.

This course provides training on the many qualitative and quantitative issues to consider in spares management and how these issues are linked to productivity goals through providing useful spares that reduce downtime losses.

LPL

Obsolescence & Counterfeit Resources Management

Obsolescence management is an important activity to achieve optimum through life operational and cost effectiveness for an asset. Obsolescence affects all products and at all stages of their life cycle. Because obsolescence will happen, obsolescence cannot be ignored and must be planned for from the earliest possible stages in a project.

The course will also address the growing problems that are due to counterfeit resources appearing, often undetected, in the supply chain. The problem s that you might not know that you have a problem.

Obsolescence applies to hardware, software and in the case of products with a long life it could impact upon training and skills retention. Obsolescence management applies to the following categories of equipment.

- New products
- Upgrades
- Legacy equipment

This course addresses the many plant durability issues (e.g. **spares, training, budgets, skills, etc**) involved in obsolescence management considerations and how they impact on the acquisition and sustainment methods for assets. Without a proper understanding of these issues it will not be possible to plan for and sustain a maximum remaining useful life. Issues covered include diminishing manufacturing resources, counterfeit parts and decision making under these conditions. The course is aimed at a wider discipline than engineers and fitters. The obsolescence issues need to be understood by senior management, commercial and operational staffs; and this course is structured that way.

The objective of an obsolescence and counterfeit resources management course is to be aware of the issues involved. The key objectives are as follows.

- Derive the most rational balance between life cycle cost, performance, dependability, reliability, availability, and maintainability.
- Understand the diminishing resources problem.
- Understand the obsolete, obsolescence and obsolescent resources problem.
- Understand the counterfeit resources problem.

Obsolescence and counterfeit resources are increasing threats to integrity and productivity and they need careful planning all of the time.

A fundamental outcome of this course is an understanding and awareness of obsolescence and counterfeit resource avoidance planning to minimize the impact of these “hidden and potentially high risk situations” on property, plant & equipment (assets) throughout their useful life.

LPL

Process Modelling & Mapping

Understanding your actual business processes is the key to good business practices and success. If you want to save money, you first have to have processes that enable saving, otherwise it will never happen. You don't only need a sharp pencil – *you need a sharp innovative process*.

Have you ever wondered why a process you expected to work did not? Do you keep changing the process because "it didn't work"? The chances are high that the dominating reason why these outcomes occurred is due to not really understanding the process events required and their consequences. The objective design of required process is essential to good business practices.

Although we believe we understand a process, it is not until we really dig deep into the process that we find where things have gone wrong, or could easily go wrong. Such an analysis of process requires a level of thinking that is often simply taken for granted. Sometimes, the difference in the thinking process can be the determining factor in being successful or not.

Often, process mapping is thought to be a special event. In this course we will show how it becomes part of the everyday skill set at all levels in the organisation. For any organization involved in finding efficient and eff4ective ways of achieving goals, actually understanding how the process works, compared to how it is believed to work is often the most important finding. This course is fundamental for understanding and implementing contemporary processes such as value added, lean, six sigma, 7 muda, 5S and so on. None of these can work without good processes in place that are documented, understood and managed.

This is a hands-on course and is aimed at solving the type of problems encountered in the workplace. Different forms of process modelling and mapping will be demonstrated and consolidated with practice sessions.

There is an old saying "Learn from the mistakes of others as you cannot live long enough to do it yourself."

This course will challenge you to think about the activities you do in an everyday sense and work at continuously improving or innovating those activities to get the best business practices.

LPL

Understanding Maintenance 501

The objective of this course is to give you the range and depth of practical and theoretical skills to *understand maintenance* in the workplace context.

"Maintenance: *combination of any actions carried out to retain an item in, or restore it to, conditions in which it is able to meet the requirements of the relevant specification and perform its required functions.*" IEV 426-14-01

This is a "501" level course. As such it will introduce you to the need to better understand maintenance in your workplace by clear, careful and rational thought about what maintenance actions you actually need to do to improve productivity in your workplace. That is, the course is about the critical thinking behind working out what actions you need for maintenance work and then assembling them in the most practical combination to improve productivity.

This course is not a "cook-book course" about selecting a tool and then asking "how do I apply this tool". The course is to show you how to think carefully about your needs and then select the most appropriate tools to solve the maintenance problem. It is possible that the best solution is counter-intuitive at first.

This course includes the economics of maintenance and maintenance support work covered in dependability and durability management. The normal approach to maintenance and its support is from an engineering or other technical perspective. This course also looks at maintenance from the perspective of economics (not just accounting) and describes how they are related.

Economists often do not see maintenance with this degree of granularity. Fitters and engineers often do not see the economic impact of their work. They are acutely aware of the financial accounting aspects; but, the management accounting and economic links are not always so obvious.

After completing this workshop you will be able to:

- Extend your understanding of maintenance in the context of your workplace.
- Understand the integrated and interlaced aspects of maintenance, logistics and economic process.
- Understand the range and depth of the actions in maintenance work to achieve productivity goals, as well as avoiding scarcity problems.
- Know the various methods of recording and extracting the results for maintenance decision making.

"We can't solve problems by using the same kind of thinking we used when we created them." Albert Einstein. The course introduces you to new thinking.

An outcome of the course is the preparation of an Understanding Maintenance Profile which can form the basis of a maintenance productivity improvement program as part of your quality program.

To improve plant productivity, first you must understand maintenance.