

## **Mapping and Planning Your Maintenance Management and Reliability Improvement Journey**

When done well your maintenance strategies and practices deliver the six purposes of maintenance – equipment reliability, failure avoidance, defect elimination, least operating costs, risk reduction and maximum production. Fail to achieve one of them and your maintenance efforts will not get the big pay-offs that they should.

There are modern understandings, systems and tools you need to know and use to move toward world-class maintenance results. The table below provides guidance for developing your plans and strategies in adopting the leading-edge and the best classic strategies that make equipment run stoppage-free for longer; deliver assets that produce at maximum sustainable capacity with first-pass quality throughput, and make industrial operations highly profitable.

Understanding how you intentionally make your business processes and production equipment more and more reliable turns average organisations into world-class organisations. Use the table as a means to gauge where your operation is currently at and what more it can do to move towards world class maintenance performance.

Some companies are now developing competencies for the operators for “Fitness to Operate” and for their maintainers “Fitness to Maintain”. These will require, for example, that maintainers have a knowledge of the processes that the equipment they care for is working in. Similarly, Operators will have to have a knowledge of the maintenance requirements and strategies of the equipment they use in their processes.

No longer is the philosophy ‘trained once, trained for life’ acceptable, as it used to be, for example for someone having completed an apprenticeship. The application of higher skills and the thrust for excellence is acknowledged as critical in the elimination of operational equipment failures and in the move toward equipment reliability with extended MTBF, resulting in higher plant availability or uptime.

All managers and employees need to adopt a wider perspective that looks at the greater picture of a business and its operation, especially the interaction of the equipments’ component parts across their life cycle so the operation can gain a greater benefits from use of best practice operational asset management.

It means teaching your people how to integrate their business systems so there is a freedom of movement of information. It means teaching them that with this wider perspective a new and more powerful strategic vision becomes a possibility. Once there is a strategic vision that everyone understands there will be no holding them back from turning your business into a world class operation.

Use the **Journey to Reliability and Maintenance Mastery** table over the page to decide just how far you want to take your company and its people.

My best regards to you,

Mike Sondalini  
[www.lifetime-reliability.com](http://www.lifetime-reliability.com)

# The Journey to Reliability and Maintenance Mastery

	Leadership and Capability					Systems and Processes				
	Maintenance Vision & Strategy	Performance Measures	Organization Structure	Human Resources	Knowledge Base	Maintenance Strategy	Stores and Materials Management	Planning & Scheduling	Contractor Management	Reliability Improvement
Mastery	Quality System managed Accuracy Controlled Enterprise where everyone in every department works to 3T error prevention procedures; Lean philosophies improve processes	Business strategy focus; Maximising Life Cycle Profit; Defect And Failure True (DAFT) Cost database	Integrated cross-functional teams incorporating financial, engineering, operations and maintenance	Empowered, flexible, cross-functional teams of experts working to scientific discipline	Continually learning, pushing-out the boundaries of human knowledge and understanding, Six Sigma discipline is normal	Precision Domain drives all engineering, installation, operations and maintenance work; Risk analysis and management normal	Materials problems designed-out, OEM monitors real-time information on critical parts' condition and carries necessary spares	Maintenance reducing as continual improvements extend time between outages; continually reducing time to repair with Lean philosophies	Small teams of experts servicing entire local industry delivering precision maintenance and design-out maintenance with profit sharing	Reliability growth pervades thinking. 'Design and Operations Cost Total Optimized Risk' (DOCTOR) is used to minimise all operating risks throughout the facility's life.
Excellence	Personnel action plans; appraisals are clearly tied to the maintenance strategy	On-going benchmarking of metrics and processes; Full cost database	Total Productive Maintenance where operators drive reliability, fault-find and maintain equipment; root cause failure analysis by operators and maintainers	Empowered, flexible, world-class workers; self-managed teams	Expert systems used; fully integrated CMMS common database	Preventive & Predictive plans continuously optimized; the 'right' maintenance tactic is applied based on analysis	Stores system integrated to CMMS and accounting system; bar coding or radio frequency tags of all stores items; World-class Stores Management	>90% all maintenance is planned and >95% first-times schedule compliance; rolling schedule fixed for the week ahead	Small numbers of contractors on long term sharing partnership agreements with high innovativeness	Risk and unplanned failure reduced to best in industry by reliability analysis and modeling. Reliability Growth Cause Analysis (RGCA) applied during project design
Competence	Reliability focused Maintenance improvement action plan is linked to the maintenance Management Strategy	Statistical process control applied to maintenance process measures; Equipment specific maintenance costs available	Established teams for achieving key objectives in the Maintenance Management Strategy	Multi-skilled trades with process capability analysis and basic operating skills	Easy access to knowledge bases available to all employees at all times	Preventive & Predictive plans exist for all maintainable items; emphasis on PdM. All tactics understood	Single source supplier partnerships established and effective; Area stores with visual controls; Reliability of spares maintained; Suppliers provide technical expertise	Long term asset planning established; Critical path analysis used for all rebuilds and shutdowns	Contractors are established based on principle of 'risk sharing'; Contractors provide technical expertise	Effective Root Cause Analysis (RCA) applied to equipment problems to extend life
Understanding	A clear Maintenance vision and strategy is documented and communicated to all employees	Input – Output process measures reviewed and displayed; Downtime by cause; Segregated maintenance costs reviewed	Decentralized with central support; Clearly written, mandates/roles for each maintenance function and group	Trades have problem identification and solving; team dynamics and training skills	Document control system established; CMMS installed and used to manage knowledge bases	Preventive & Predictive plans exist for key equipment; Compliance to scheduled plan is more than 95%	Spares classified with separate strategies; Spares linked to BOMs/Equipment Drawings; Standardization policies exist; ABC spares management with 'A' spares protected	All but unexpected failures planned; All planned jobs specify safety, labour, materials, tools, technical details	All contractors repairing rotables are capable of Original Equipment Manufacturer's testing	Basic equipment conditions established; Good failure databases; All major failures investigated; PMs modified based on site experience
Awareness	No clearly documented role of maintenance; No Maintenance vision or strategy	Some downtime records; Maintenance costs regularly available, but not segregated into area/line	Centralized maintenance group with alignment to production; Team approach to technical problems	Trades have OH&S and maintenance support (inspection, reporting) skills	Plant register established and useful data collected; central technical library; All drawings and equipment information identified	System to identify all maintainable items exists; Emphasis on time-based overhauls and inspections	Stores catalogue established; Inventory accuracy >95%; Goods receiving practices in-place	Work Request/Work Order system established; Major rebuilds, shutdowns fully planned and programmed	Contractors used for peak loads and non-core maintenance work	Collect the failure data; Equipment histories occasionally reviewed for failure analysis
Innocence	The main role is to fix it when it breaks/fails	Incomplete or no maintenance downtime records; Maintenance costs not readily available	Centralized maintenance group with no alignment to production; Command and Control' approach	Trades have their basic trade skills, however little or no technical knowledge or support and training given	Ad-hoc records kept for purchasing; No plant register or control of drawings	"If it ain't broke don't fix it"; Annual shutdown and inspections only	Ad-hoc stores; No costing or control of spares	No planning function; planning done on-the-run; Short term focus	All maintenance carried out by in-house team, which may include individual contractors	No failure records

# Tailor Your Maintenance Training Program to Teach the Best Practices Your People Need to Know

You need to be proactive at getting positive action and real change happening in the workplace that truly helps your business improve and innovate. Do training so that improvements are driven from the top and the respective levels in the business each contribute with appropriate skills and knowledge. Create a maintenance training strategy that fits your operational reliability improvement vision by building a training matrix with the necessary content in each module to give people at all levels in the company the detailed knowledge and practical experience they must have. An example of a training strategy focused intentionally at developing the right knowledge, skills and understanding where it is required in a company is shown in the matrix below.

	<b>Trades</b>	<b>Supervision Levels</b>	<b>Planners</b>	<b>Managers</b>
<b>OUTCOME</b>	<b>Know and use the specific skills that maximise equipment uptime and workplace efficiencies</b>	<b>Know and use the specific principles and practices used in the workplace to maximise benefits from the workforce and equipment</b>	<b>Know and use the specific planning methods and practices that maximise equipment uptime and maximise tool-time of trades</b>	<b>Know and use the specific business process and systems that deliver value to the operation</b>
<b>WORKING KNOWLEDGE</b>	<ul style="list-style-type: none"> <li>• Lubrication</li> <li>• Roller and plain bearings</li> <li>• Root cause failure removal</li> </ul>	<ul style="list-style-type: none"> <li>• Lubrication management</li> <li>• Machine vibration</li> <li>• Reliability fundamentals</li> <li>• Quality management</li> </ul>	<ul style="list-style-type: none"> <li>• Preventive Maintenance</li> <li>• Predictive Maintenance</li> <li>• Balancing</li> <li>• Maintenance Stores management</li> <li>• Maintenance Planning systems and methods</li> <li>• Maintenance Scheduling</li> </ul>	<ul style="list-style-type: none"> <li>• Maintenance for profit</li> <li>• High equipment reliability methods and practices</li> <li>• Life cycle profit asset management</li> <li>• Precision maintenance</li> <li>• Quality management</li> </ul>
<b>APPLIED SKILLS</b>	<ul style="list-style-type: none"> <li>• Precision alignment</li> <li>• Creative disassembly</li> <li>• Equipment condition inspection</li> <li>• Roller bearing replacement</li> <li>• Fastener tensioning</li> </ul>	<ul style="list-style-type: none"> <li>• RCM/FMEA</li> <li>• RCA / 5 Why</li> <li>• Meeting management</li> </ul>	<ul style="list-style-type: none"> <li>• RCM/FMEA</li> <li>• MS Project</li> <li>• SOP writing for high equipment reliability</li> <li>• Meeting management</li> </ul>	<ul style="list-style-type: none"> <li>• Meeting management</li> </ul>
<b>INGRAINED PRINCIPLES</b>	<ul style="list-style-type: none"> <li>• Precision maintenance</li> <li>• Production/Maintenance Partnership</li> <li>• Lubrication management</li> </ul>	<ul style="list-style-type: none"> <li>• Production/Maintenance Partnership</li> <li>• Reliability Engineering</li> </ul>	<ul style="list-style-type: none"> <li>• Production/Maintenance Partnership</li> <li>• Reliability Engineering</li> </ul>	<ul style="list-style-type: none"> <li>• Production/Maintenance Partnership</li> <li>• Reliability Engineering</li> <li>• Lean process improvement</li> </ul>

Use the ‘Journey to Maintenance Management Mastery’ table to identify the additional knowledge and capabilities needed in your business and then populate your maintenance training matrix so the right training is delivered to the right people. If you need people to deliver that training we at Lifetime Reliability Solutions ([www.lifetime-reliability.com](http://www.lifetime-reliability.com)) can provide them and also tailor the training received by you people to fit the needs of your business and its plant and equipment.