Practical Guide for a Sustainable Maintenance Reliability Program Implementation

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University of Tennessee
ABOUT ME

Americas Division Maintenance and Reliability Program Manager at Trivium Packaging.

+ 20 years of experience in manufacturing, maintenance, and engineering roles in the consumer goods, food, and packaging industries.

Leading and implementing high-performance and world-class manufacturing teams, deploying Lean and TPM methodologies to promote operational excellence.

Certifications: Black Belt, Reliability Centered Maintenance (RCM), TPM instructor (by JMC - Japan).

Brazilian American, graduated in Electrical Engineering and a Master’s in Business Administration from Mackenzie University of Brazil.
A Global leader in metal packaging, supplying infinitely recyclable metal packaging for the world’s leading brands.

We shape the future of packaging to ensure a better planet for everyone – today and for generations to come.
SUSTAINABLE, CUSTOMIZABLE, RELIABLE PACKAGING

Leading positions in food, seafood, nutrition, specialty beverage, aerosol and paints & coatings.

**Threaded bottles**
Versatile and eco-friendly solutions for liquids.

**Three piece cans**
Perfect for food cans, nutrition cans, paint cans and tinplate aerosols.

**Two piece cans**
Flexible, efficient and ideal for canned foods.

**Beverage bottles**
Perfect for any drink, our aluminium bottles allow you to customise the size, shape and capacity of your packaging to best suit your brand – and your buyers.

**Aerosols**
Lightweight steel and aluminium aerosols for sprayable products.

**DWI cans**
Ideal for standard, high-volume food production. Always leak-free.

**DRD cans**
Perfect for lower volumes, with multiple shaping options available.

**Slugs, ends and components**
100% infinitely recyclable openings and ends for all of our metal packaging.
IS YOUR MAINTENANCE RELIABILITY PROGRAM SUSTAINABLE?

More than 70% of Reliability Maintenance programs fail to generate their projected cost savings and/or asset productivity results!

Source: ReliabilityWeb report
WHY MAINTENANCE RELIABILITY PROGRAM FAIL?

• Wrong asset selected to perform the Reliability program
• Lack or poor data analysis of losses and opportunities
• Lack of planning or understanding of the Reliability program
• Not enrolling the right people on the Reliability program
• Lack of communication, willingness and leadership support
• Lack of sufficient resources to implement the Reliability program
• Unrealistic expectation from Reliability program (Cost vs Value-added)
• Lack of an adequate performance goals in the Reliability program implementation
WHY MAINTENANCE RELIABILITY PROGRAM FAIL?

In fact, the 3 main reasons are:

- Not embedded or not part of a World Class or Operational Excellence strategy
- Maintenance reliability plan not using a holistic approach
- Shop floor players not fully integrated to the Reliability program
WHAT SUCCESSFUL COMPANIES IMPLEMENTING RELIABILITY PROGRAM HAVE IN COMMON?

Toyota Production System

Integrated Lean 6-Sigma System

100% Employee Engagement
WHY MAINTENANCE RELIABILITY PROGRAM FAIL?

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HOW TO INCREASE MAINTENANCE RELIABILITY PROGRAM SUCCESS RATE?

• World Class and Operational Excellence go beyond focus on the bottom line.

• It requires to create a culture that values grow, develop, and continuously find new ways to improve productivity and efficiency levels.
VISION
To be *the* global leader in metal packaging.

MISSION
*To reliably deliver* high quality, innovative and sustainable packaging that exceeds expectations in protecting and promoting our partners’ brands.
Passion
Every day we strive to positively impact Trivium and society. We aim high and we are committed, enthusiastic and accountable.

Teamwork
With safety as our first priority, we harness the power of collaboration. We do this with humility, trust, integrity and openness.

Excellence
We aspire to continuously shape our industry through world class performance and exceptional value creation for all our stakeholders.
Trivium Production System

Vision, Mission

Problem Identification
“We see problems”

Problem Solving
“We eliminate problems”

Communication
“We communicate and actively listen”

Standardized Processes
“We build effective & efficient processes”

People Development
“We realize people’s potential”

Continuous Improvement
“We improve daily”

People: Passion, Teamwork, Excellence
Trivium Progressive Maintenance System
Mission

“Develop capabilities in our operators and technicians to establish the basic condition and improve equipment maintenance standards required to achieve manufacturing world class performance at optimal cost in order to deliver business needs.”

We provide the methodology, training, coaching and the tools to empower our people, giving the authority to take decisions, operate, problem solve, manage performance, and continuously improve the life expectancy of equipment and its critical components.
Trivium Progressive Maintenance System

Vision

“Achieve operational excellence through a world class manufacturing performance”

We aspire to shape our industry through world class performance and exceptional value creation for all our stakeholders, looking for “Zero Breakdowns” and an outstanding “unplanned downtime” reduction.
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HOW TO INCREASE MAINTENANCE RELIABILITY PROGRAM SUCCESS RATE?

• Effective asset management holistic approach creates value, from the asset design through the life cycle and to disposal phase, flowing from the CEO to the shop floor

• Smartly integrate TPM, Lean and WCM methodology elements to drive the high performance and world class culture to the organization

• Prioritize and define the boundaries of the analysis, selecting the most critical asset at critical production line
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HOW TO INCREASE MAINTENANCE RELIABILITY PROGRAM SUCCESS RATE?

A well implemented and value-added Reliability program requires:

• Leaders, operators and maintenance technicians' engagement and collaboration

• Operation and Maintenance defining and establishing basic condition standards
HOW TO INCREASE MAINTENANCE RELIABILITY PROGRAM SUCCESS RATE?

Asset Maintenance & Operational Reliability process:

• Connecting Operators, Maintenance technicians, technical support and manufacturing leaders to work together

• From “ownership” to “authorship” the key concept to sustainable Reliability program
AMOR PROCESS

Operators and Technicians
collaborating on defining the desired basic conditions, sharing knowledge and setting the activities
to leverage the standards we operate and maintain the equipment
TPMS SPECIFIC STANDARD PROCESSES

Replicate standards with similar equipment (share plant to plant)
Complete activity on similar assets Perform AAR

Optimize operational activities and tasks (TPM sheet, PM’s, Tune-ups, process parameters settings), update troubleshooting guide and maintenance standard procedures

Optimize maintenance PM plan (type, activities, frequency), review spare parts needed. Functional Skill Matrix and training plan updated

Define business-related critical Lines to improve based on key customers needs

Define Equipment criticality at critical Lines (ABC Classification)

Perform Deep Cleaning (build safety map), identify and fix defects, list adjustable points, lubrication points, SOC’s and HTR points at selected priority equipment

Operators & technicians describe how equipment works, explain key functions and transformations, identify adjustable points

Define cleaning, inspection and maintenance procedures based on failure modes, to keep critical components at basic conditions

Replication Plan

Business Critical Lines

Equipment Criticality

Deep Cleaning

Maintenance Planning

Standard Procedures

Basic Condition Matrix

Principle Of Operation

Asset Maintenance & Operational Reliability AMOR
Principle Of Operation

Equipment: Rotary Pouch Packing Machine for Sealing PP Bags

Working Principles:

1. The product is fed into the machine through the hopper.
2. The product is then conveyed through the machine.
3. The product is sealed using heat.
4. The sealed pouches are then discharged into the hopper.

List all sequence or transformations of the product while in the machine:

- Add drawing / picture of equipment in analysis
- List the key parameters and setups
- Add drawing / picture of detailed parts of equipment in analysis
# Basic Condition Matrix

<table>
<thead>
<tr>
<th>N°</th>
<th>Critical Components</th>
<th># Part Number</th>
<th>Condition that indicates deterioration</th>
<th>What needs to be done to prevent deterioration (Type of inspection: Visual, Physical, Infra Red, Vibration, Noise, Olfactory (smell))</th>
<th>Responsible</th>
<th>How to do (Standard #: CIL, PM01, ZMG02, IDD, Rounds, Checklist)</th>
<th>When Do (Frequency)</th>
<th>Need OPL?</th>
<th>Skill Matrix Item?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Station Cups</td>
<td>800009</td>
<td>Wear</td>
<td>Visual/Physical Inspection</td>
<td>X</td>
<td>CIL #1, PM03</td>
<td>Once / 60 Days</td>
<td>X</td>
<td></td>
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<tr>
<td>2</td>
<td>Crosshead Pick &amp; Place Air Cylinder (In &amp; Out)</td>
<td>807915</td>
<td>Air Leaks</td>
<td>Visual Inspection</td>
<td>X</td>
<td>CIL #1, PM03</td>
<td>Once / 60 Days</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Crosshead Pick &amp; Place Air Cylinder (Extend &amp; Retract)</td>
<td>876530</td>
<td>Air Leaks</td>
<td>Physical Inspection</td>
<td>X</td>
<td>CIL #1, PM03</td>
<td>Daily / 60 Days</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Parts &amp; Lifting Arm</td>
<td>8077915</td>
<td>Wear &amp; Corrosion</td>
<td>Visual Inspection</td>
<td>X</td>
<td>PM03</td>
<td>Once / 60 Days</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>VACUUM PUMP</td>
<td>806922</td>
<td>Valve Leaks</td>
<td>Visual Inspection</td>
<td>X</td>
<td>PM03</td>
<td>Once / 60 Days</td>
<td>X</td>
<td></td>
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<tr>
<td>6</td>
<td>Photo Eye Part</td>
<td>806922</td>
<td>Lens Leaks</td>
<td>Visual Inspection</td>
<td>X</td>
<td>CIL #4, PM03</td>
<td>Daily / 60 Days</td>
<td>X</td>
<td></td>
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<tr>
<td>7</td>
<td>Proximity Sensor</td>
<td>91939PFT900</td>
<td>Adjustments</td>
<td>Visual Inspection</td>
<td>X</td>
<td>CIL #5, PM03</td>
<td>Daily / 60 Days</td>
<td>X</td>
<td></td>
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<tr>
<td>8</td>
<td>Reflexors</td>
<td>812509</td>
<td>Leaks &amp; Malfunction</td>
<td>Visual Inspection</td>
<td>X</td>
<td>CIL #6, PM03</td>
<td>Daily / 60 Days</td>
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<td>9</td>
<td>Air Regulator</td>
<td>802952</td>
<td>Leaks &amp; Malfunction</td>
<td>Visual Inspection</td>
<td>X</td>
<td>PM03</td>
<td>Once / 60 Days</td>
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<tr>
<td>10</td>
<td>Lift Table Hydraulic Unit</td>
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<td>Leaks &amp; Malfunction</td>
<td>Visual Inspection</td>
<td>X</td>
<td>PM03</td>
<td>Once / 60 Days</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

**Identify Critical Components**
Define activities to keep basic condition

**Identify Failure Modes**
Define who is responsible to keep basic condition

**Define the standards and frequency**

**Basic Condition Matrix**

Palletizer Slipsheet Dispenser

Date: 6/2/2020
Approved By: John Wayne

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Who should participate?

It is defined as **multidisciplinary team**:

The implementation **Leaders**:
- Maintenance Manager
- Operations Department Manager
- Continuous Improvement Coordinator
- Maintenance Planner

The **execution Team**:
- Operations Shift Leader, Supervisor,
- Maintenance Shift leader, Supervisor
- Technical Managers, Electricians, Mechanics
- Machine Operators

Additional support can be **required the participation of**:
- MRO Leader
- Tooling Leader
- Plant Engineering Leader
- Safety Leader
- Quality Leader

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The Reliability Core Team
The Results

Tangible and intangible results:

- Sustainable performance improvement
- Higher collaboration among departments and functions
- Operators' knowledge and ownership
- Operational and Maintenance tasks completion and compliance at target level
- Problem solving and troubleshooting capability
- MTBF increase
- MTTR reduction
- Spare Parts optimization
- Continuous ideas generation for improvement