

**A MODEL TO FACILITATE
RCM CONCEPTS.**



RELIABILITY FOCUSED MAINTENANCE™

**RELIABILITY FOCUSED MAINTENANCE
IS ESTABLISHED AS THE MOST
EFFECTIVE MIX OF PREVENTIVE,
PREDICTIVE AND REACTIVE
MAINTENANCE CONSIDERING
CRITICALITY, AVAILABILITY AND
OPERATING ENVIRONMENT.**



MAXIMIZE EQUIPMENT LIFE, MINIMIZE SCHEDULED AND

ASSET RELIABILITY PROCESS

CONCEPTS.

Asset Reliability provides optimum levels of maintenance to all process functional systems according to criticality or degree of impact. The result is maximum asset life cycle at sustained levels of safety, quality and output.

PREVENTIVE MAINTENANCE.

PM programs in themselves do not provide the necessary tools to evaluate their own effectiveness. A limiting factor is that the PM inspections are based on 'RUN TIMES' or 'CALENDAR FREQUENCIES'.

Preventive and repetitive programs need to focus on basics first! Then use predictive technologies for condition monitoring to determine needs for corrective action.

PREDICTIVE MAINTENANCE.

PdM is applying appropriate technologies to measure equipment operating characteristics and analyzing this data against established characteristics and trends of 'like equipment'. Some examples are:

- *Misalignment*
- *Mechanical looseness*
- *Worn or spalled bearings, etc.*

Specific 'triggers' are used to identify the need for action. The engineers and others in the 'reliability group' are highly trained in root cause failure analysis, failure modes and effects analysis, statistical process control and process improvement techniques. These tools are then applied to problem areas.

DEVELOPMENT.

The process for reliability focused maintenance is designed for efficient and immediate improvements that are measurable.

1. TARGET SPECIFIC EQUIPMENT AND PROCESSES (80/20 APPROACH)

Use historical data to identify prior year and year to date work orders by actual hours, total cost. Sort according to criticality and identify the top 20% for analysis.

"... in excess of 30% of overhauled machines fail at start up, often causing collateral damage."



UNSCHEDULED DOWNTIME

2. SELECT CURRENT DATA FROM EQUIPMENT DOCUMENTATION AND HISTORY.

- Equipment identification
- Number and location of units
- Equipment description
- Age of equipment
- Original specification
- Operating environment
- Work performed by type (PM, PdM, Corrective, Breakdown, Service, Routine)
- Parts used (mfg. specs)
- Maintenance related downtime
- Non-maintenance related downtime
- Identify all levels of current maintenance (Operators, Maintenance, Safety/Environmental, Engineering, Calibration, Service)

3. FORMAT CODE TABLES.

- Failure codes
- Part causing failure code
- Work order class codes
- Maintenance type codes
- Criticality codes
- Completion codes

4. ESTABLISH RELIABILITY GROUP.

It is beneficial to dedicate a small group of engineers rather than assigning reliability as 'other related responsibilities' to a large group.

5. TRAIN RCM AND PROCESS TOOLS.

- (MTBR) Mean time between repair
- Pareto chart
- Weibul analysis
- (RCFA) Root cause failure analysis
- (FMEA) Failure modes and effects analysis
- Statistical process control

6. DOCUMENTATION.

Supporting procedures for RCM program.

7. CORRECTIVE ACTIONS.

- Work management system to correct and track deficiencies
- Budget requirements

8. TRACKING MECHANICAL RELIABILITY.

- Failure rate run charts
- Failure rate vs. maintenance costs
- Reliability study of PM program

9. COMMUNICATE RESULTS.

- Develop Key Performance Indicators (KPI's) and standard reports to monitor performance
- Develop cost and benefit analysis
- Provide report information as necessary for all business decision makers

RESOURCES.

Our approach to training and practical application is designed to teach and implement Reliability Centered Maintenance (RCM) concepts, utilizing existing staffing and technical resources where possible.

GROUP PARTICIPANTS INCLUDE:

- Engineers dedicated to asset reliability
- Individuals from operations, maintenance or other job specific assignments like PPM programs will be brought in for additional studies as needed.

SCHEDULE.

The actual schedule will be based upon the progress of the assigned engineers. PCA will typically space out the weeks to allow individual and group assignments to be accomplished.

All of the RCM programs and training are conducted at your site and tailored to your specific work environment and business needs.

"Reliability improvements do not have to take years to get results!"

VALUE ADDED



**PCA'S RELIABILITY FOCUSED MAINTENANCE™
PROCESS IS DIFFERENT THAN OTHER
TRADITIONAL RCM APPROACHES. WE CAN
ADD VALUE QUICKLY AND HELP TO IMPROVE
YOUR COMPETITIVE ADVANTAGE BECAUSE
OUR APPROACH:**

- **Takes Less Time and Costs Less to Implement**
- **Utilizes Fewer Resources**
- **Identifies Cost Savings Quickly**
- **Measures Quantifiable Performance**
- **Focuses on Greater Process Reliability -- Uptime**
- **Evaluates Process and Maintenance Data As One**

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