

**I CERTIFY THAT ALL SEMESTER 5/MAINTENANCE RELIABILITY
OUTCOMES HAVE BEEN COMPLETED:**

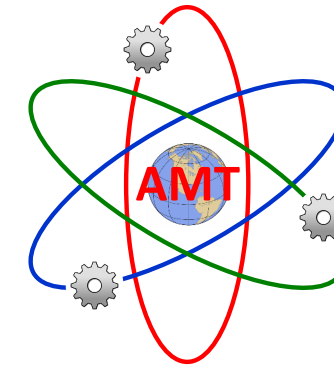
DATE

SIGNATURE

AMT Leader

TOYOTA

Advanced Manufacturing Technician



Manufacturing Core Exercises

MCE 5: Maintenance Reliability

Driving for Zero Downtime

Reaching for Maximum Heijunka

STAFF GUIDE

Maintenance Reliability Process

IMAGES FROM RCM TRAINING

PROCESS

1. Set a date with NAPSC/TEMA PE and conduct Maintenance Reliability training.
2. Meet with the school faculty and plan the semester action plan for accomplishing the MCE. Organize resources and responsibilities.
3. Brief management in each shop (with an AMT) to support their student(s) with their floor RCMNet exercise.
4. Meet with the AMTs, distribute materials, and give direction on what is to be done and how to go about accomplishing the MCE.
5. Work with faculty and AMTs to identify an equipment (per 3 students) on the school floor. Complete school based exercise.
6. Floor management identifies an equipment on the manufacturing floor. Complete floor based exercise. (Ideal = 2 students/exercise, i.e. the student individually performs a full RCMNet. Acceptable = 3 students/exercise)
7. Throughout both school and floor phases advise AMTs on each problem solving step. Have high expectations and coach and mentor them.
8. Track MCE (recommended, through MQS) to ensure that class maintains progress and is complete on time.
9. Include MCE status in monthly AMT meetings with faculty.
10. Arrange and conduct appropriate presentations as projects are completed. These are important presentations, Involve shop and executive management if possible.
11. Coordinate with NAPSC and arrange for end-of-semester AMT presentations as part of regional review.


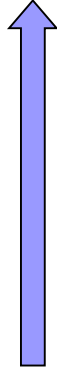
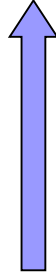
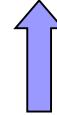
MATERIALS NEEDED

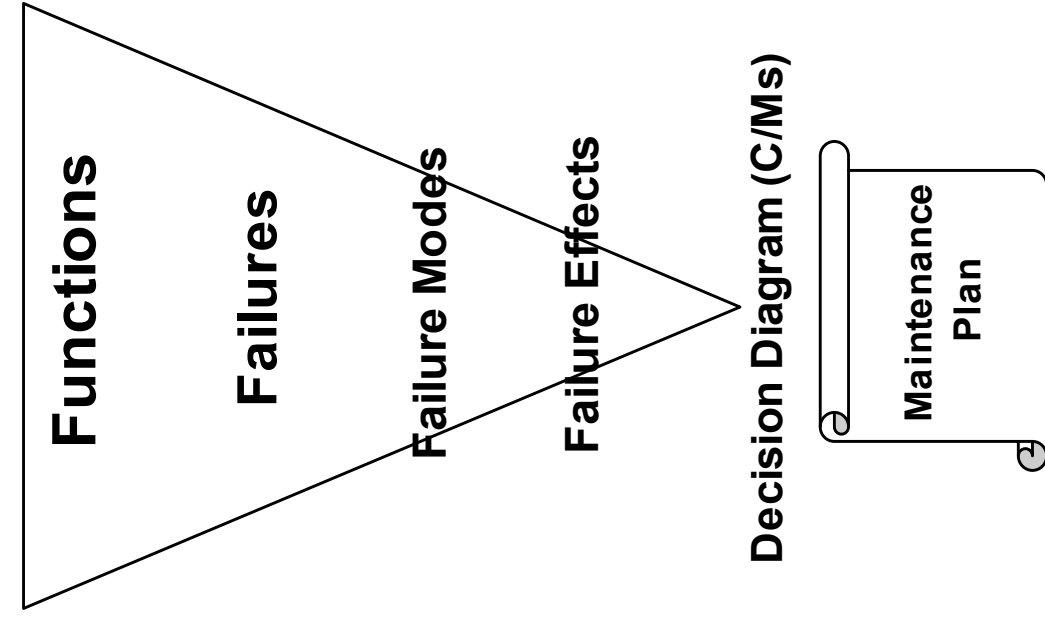
- ◇ As needed for each machine (cleaning, repair, etc.)



RCM OVERVIEW

■ 7 Questions (Core of RCM)

1. What are the functions of the equipment? 
2. How does it fail? 
3. What causes it to fail? 
4. What happens when it fails? 
5. Does it matter if it fails?
6. What can be done to predict or prevent each failure?
7. What if the failure cannot be prevented?



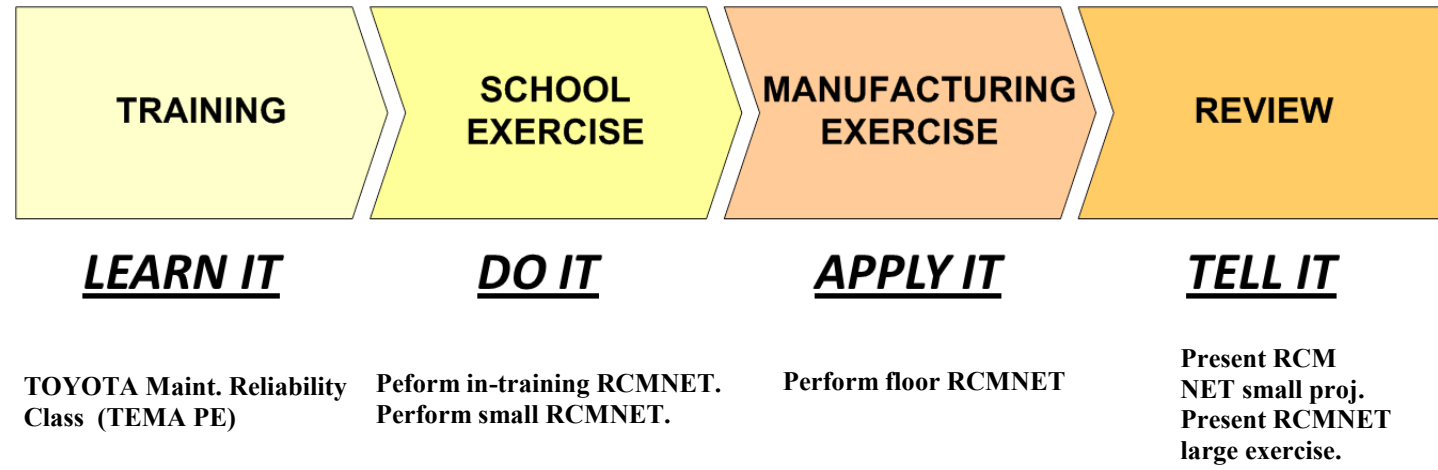
Conducting the MCE Maintenance Reliability Class

PROCESS

1. Per Step 1 of the Maintenance Reliability Process, establish a class date with NAPSC.
2. Coordinate with all necessary organizations and schedule all senior class AMT students for the class. Ensure thorough communications so that everyone is at the right place, on time.
3. Coordinate with the College Partner and schedule all AMT-designated instructors who have not yet attended the full class.
4. Identify the machine that will be used for the Maintenance Reliability training.
5. If necessary, prior to the class conduct an analysis of the machine, and generate a machine history, for use during the class.
6. Print and prepare hands-outs (ensure that the latest PPT is used).
7. Conduct the class.
8. Video and take still photos of the final class project presentations.
9. Instruct students on completing the RCM activity.
10. Send videos and photos to NAPSC/AMT Program.

◇

Maintenance Reliability Overview



Maintenance Reliability Notes

- AMTs should plan on staying at least 2 hours after class on every school day and on work days as needed. This is a maximum effort MCE.
- Always coordinate with the College Partner to ensure that someone is leading the AMTs.
- School should actively lead the school level exercise, but will need significant support by plant.
- Work with floor management to have an active and effective leader for the floor exercise.
- The AMT Leader and TEMA PE should participate and advise as much as possible in both venues.
- This is a very hands-on activity. Be sure to teach and reinforce principles through the activities.
- The floor exercise should involve at least 2 TMs per equipment, including the primary support TMi in the team/group.
- Analyses should be sustained after countermeasures are implemented, on both the school and manufacturing floors.
- Be sure to capture every project activity in a sharable form.

The RCM Analysis Team

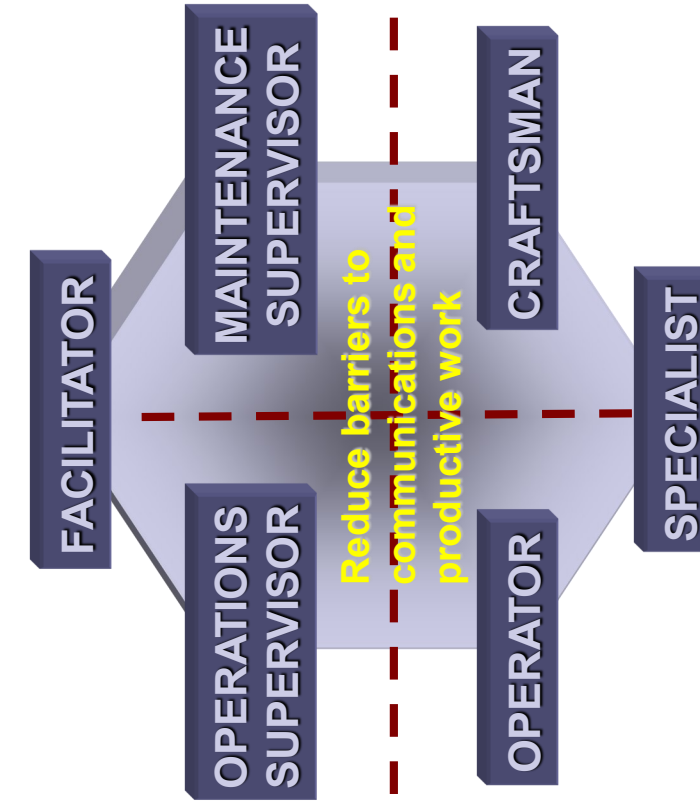
Why the mixed review group of people who know the equipment the best?

Peer knowledge transfer and team building

Reduce communication barriers

A “technically feasible” and “worth doing” PM list doesn’t make reliability happen on its own.

People must change the way they do business in the workplace



Employee Empowerment, Ownership & Knowledge helps to insure that positive change occurs in the workplace

RCM OVERVIEW

■ Reliability-Centered Maintenance (RCM):

a process used to determine what must be done to ensure that any physical asset continues to do what its users want it to do in its present operating context.

■ 7 Questions (Core of RCM)

1. What are the functions of the equipment?
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Outcomes

AMT Semester 5 Manufacturing Core Exercise Activity Outcomes

MAINTENANCE RELIABILITY

- Complete initial Proactive Maintenance training.
- State the difference between Corrective Maintenance and Preventive Maintenance.
- Define Proactive Maintenance and associated tools/processes.
- Properly breakdown a system and define its functions.
- Properly define failure modes and root causes of a system.
- Properly evaluate a system's failure mode risks and countermeasure accordingly.
- Perform an in-training 'RCMNET' activity on a troubleshooting machine.
- Perform a second small scale 'RCMNET' on a system/machine of your choosing.
- Perform a large scale floor 'RCMNET' on system/machine that is assigned to you.
- Report results and findings in the 'RCMNET' to teachers and management.

Maintenance Reliability Basics

COMPLETE MAINTENANCE RELIABILITY TRAINING, INCLUDING FULL COMPLETION OF THE FAILURE-MODE ANALYSIS EXERCISE.

DATE _____

Include a summary of your RCMNET project here.

Currently Andy Inman of TEMA PE leads this activity. He coordinates with NAPSC to support plants.

Proactive Maintenance Tools

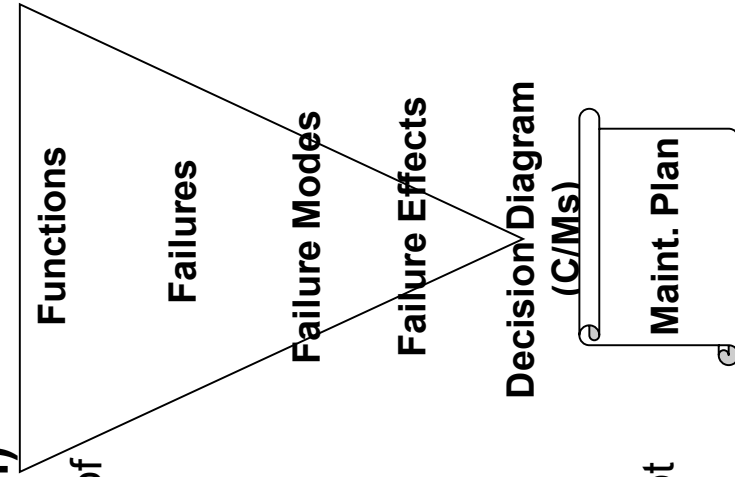
MNET Activity Steps

- Audit the Machine "Set Target"
- Improve Machine's Backup
- Complete Open W/O's
- Divide the Machine
- Clean Machine
- Evaluate each PLC input / Improve Panelview
- Clarify Normal Conditions
- Evaluate spare parts recorded in Step 5
- Kaizen A Rank Parts
- Reduce MTTR of A Rank Parts
- Maintain the Improvements

RCM Fundamentals

7 Questions (Core of RCM)

1. What are the functions of the equipment?
How does it fail?
3. What causes it to fail?
4. What happens when it fails?
Does it matter if it fails?
What can be done to predict or prevent each failure?
What if the failure cannot be prevented?



COMPLETE AN RCMNET OF A MACHINE ON THE SCHOOL FLOOR.

DATE

RCMNET PRESENTATION:

DATE

RESOURCES

REVIEWERS AT THE PRESENTATION

NAME

TITLE

The same machine can be used in multiple projects, i.e. a machine that was used last year can be done again this year. In both cases, the RCMNET analyses is real.

COMPLETE AN RCMNET ON A LARGER FLOOR MACHINE.

DATE

RCMNET PRESENTATION:

DATE

REVIEWERS AT THE PRESENTATION

NAME

TITLE

The same machine can be used in multiple projects, i.e. a machine that was used last year can be done again this year. In both cases, the RCMNET analyses is real.

MAINTENANCE RELIABILITY Essay

You have completed your Maintenance Reliability Exercise Outcomes. You have also participated in activities both at work and at school regarding MR. As your understanding of MR has increased you should have begun seeing your workplace in the company in a different light. This exercise, perhaps more than any other, really brings your knowledge and growing capability into real workplace application on the modern, advanced manufacturing floor. This essay will reflect on your emerging talent in managing the manufacturing floor for reliable, continuous operation.

Your assignment is to write an essay about Maintenance Reliability.

Another goal of the essay is to give you the opportunity to develop your good writing skills, both in using effective writing basics such as grammar, structure, and spelling, and in effectively communicating a message.

Guidelines:

- Length: 1-3 pages.
- Content: How can what has been learned with this exercise improve manufacturing operations. What will be the business impact of this improvement? What elements of TPS do the results of a good Maintenance Reliability practice impact? There is much more that can be included.
- This essay does not need to be foot-noted unless your writing needs it. Use any accepted writing standard or structure that you wish, but be sure to use correct practices and techniques.
- Write in any medium that you wish (paper, computer, etc.) The final product should be in electronic form so that it can be both e-mailed and saved as a file. It should be in a form that can easily be converted to Microsoft Word.
- Double check spelling!
- Print a copy of your final product.
- E-mail your file to the following parties:
 - ◊ AMT Leader: _____ (e-mail address)
 - ◊ School AMT Coordinator: _____ (e-mail address)
 - ◊ North American Toyota AMT Regional Assistant: jim.mattingly@tema.toyota.com
 - ◊ Additional parties as directed: _____ (e-mail address)

DUE DATE
