

**I CERTIFY THAT ALL SEMESTER 5/PROBLEM SOLVING OUTCOMES
HAVE BEEN COMPLETED:**

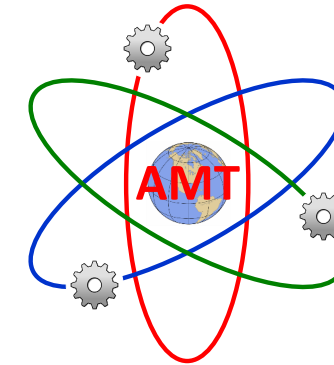
DATE

SIGNATURE

AMT Leader

TOYOTA

Advanced Manufacturing Technician



Manufacturing Core Exercises

MCE 4: Problem Solving
Critical Thinking
for Continuous Improvement

STAFF GUIDE

Problem Solving Process

PROCESS

1. Set a date and conduct Problem Solving 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 problem solving 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 a problem (per student) on the school floor. Problems should be able to be started and completed in about 3 weeks, so small scale. Complete school based exercise.
6. Floor management identifies a problem on the manufacturing floor. Problems should be able to be started and completed in about 9 weeks. Complete floor based 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 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

PROBLEM SOLVING Essay

You have completed your Problem Solving Exercise Outcomes. You have also participated in activities both at work and at school regarding Problem Solving. You should, yet again, be a different person than you were a few months ago.

Problem Solving is considered to be the most basic business practice at lean manufacturing companies. All team members—Production, Skilled Maintenance, Office & Professional, and Management—should practice Problem Solving. Team members should be as conversant in it as managers.

Your assignment is to write an essay discussing the importance of Problem Solving.

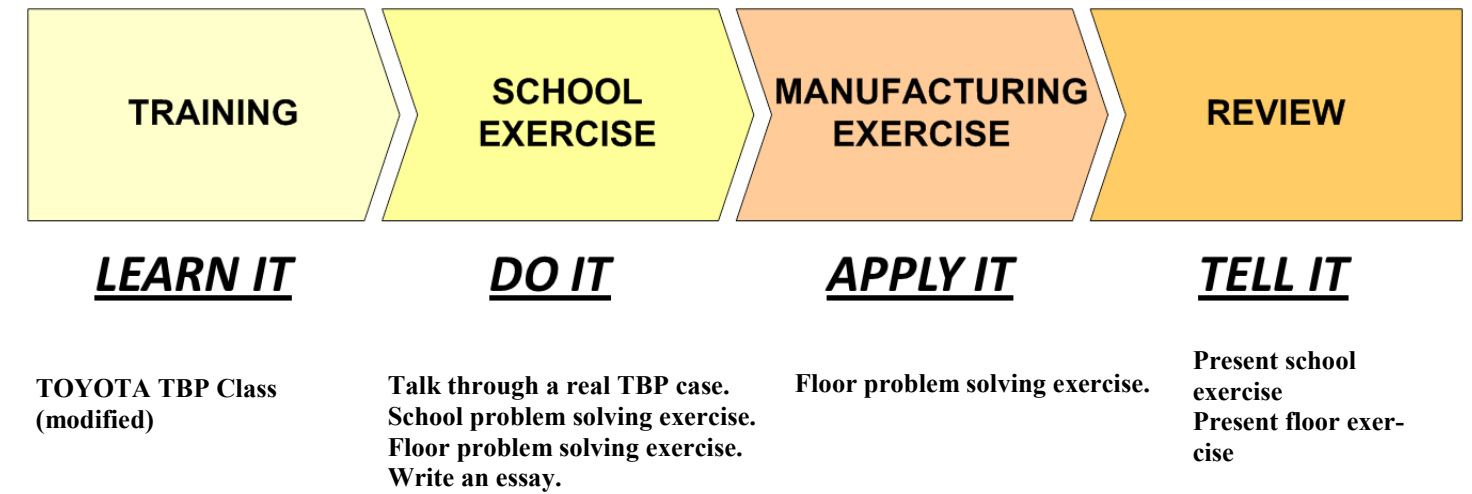
Another goal of the essay is to give you the opportunity to develop your good writing skills, both in using effective writing basics such as grammar, structure, and spelling, and in effectively communicating a message.

Guidelines:

- Length: 1-3 pages.
- Content: Do you have a deeper understanding of Problem Solving. Do the principles of Problem Solving extend beyond the workplace into other aspects of life? What is the connection of Problem Solving to Standardized Work? Has learning Problem Solving improved your ability in other aspects of critical and analytical thinking? These are just thought starters. 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

Problem Solving Overview



Problem Solving 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 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.
- Problems should be real and should be sustained after countermeasures are implemented, on both the school and manufacturing floors.
- Be sure to capture every problem solving activity in a sharable form.

Outcomes

WORK-BASED PROBLEM SOLVING PRESENTATION:

DATE

AMT SemeSter 4 Manufacturing Core Exercise Activity Outcomes

PROBLEM SOLVING

- State the definition of a problem, including each aspect of the problem illustration
- Draw and label the Toyota Problem diagram
- Definitively state the 8-step Problem Solving Process
- Thoroughly explain each step of the Problem Solving Process
- State each one of the Drive & Dedication Principles
- Thoroughly explain each of the Drive & Dedication Principles
- Do a "talk through" of a completed problem example.
- Perform a school-based Problem Solving exercise.
- Present problem to work/school panel
- Perform a work-based Problem Solving exercise.
- Present problem to work/school panel
- Submit Problem Solving Essay

REVIEWERS AT THE PRESENTATION

NAME

TITLE

Building the Basics

- State the definition of a problem, including each aspect of the problem
- Draw and label the Toyota Problem diagram
- Definitively state the 8-step Problem Solving Process
- Thoroughly explain each step of the Problem Solving Process
- State each one of the Drive & Dedication Principles
- Thoroughly explain each of the Drive & Dedication Principles

In keeping with the AMT principle that the Manufacturing Core Exercises are not “familiarity training,” but are instead committed to deep understanding it is expected that each AMT Student will actually know what we call TBP from memory, including both the steps and an effective understanding of them. They must also be able to do the same with the Drive & Dedication principles.

As preparation for yourself as AMT Leaders (school and company), if you do not already know this process “by heart,” then you should immediately begin sufficient study to do so. It will be difficult to lead the AMTs to this strength if you are not also already there.

The first six general Outcomes of Problem Solving, listed above, are directed toward developing an internalized knowledge level. The exercises should begin by explaining to the AMTs what is expected and encouraging them to keep their hand-outs with them at all times, both at school and away, and devoting their time to achieving these outcomes as quickly as possible.

To confirm the outcomes, and sign the workbooks, you may use any method which is convenient for your situation, of course. Here are some suggestions for you to consider:

- This phase of the activity should be a joint effort between the school and the company staff. Faculty should drive the activity at school while the AMT Leader and shop floor mentors drive the activity at work.
- While at school the faculty should take opportunities to quiz the students on their level of knowledge. Ask the students to recite the 8-step process. If they fail to get to the end, or have errors, help them with it at the moment, but then ask them to come back to you later and try it again. Company representatives should do the same at work. The AMT Leader should do the same at work and should work with shop mentors to continue the activity during their time on the floor.
- Even after a student has mastered a certain level, e.g. reciting the 8 steps correctly and without error, continue to occasionally check this level for the remainder of the exercise.
- After a student has mastered a certain level, immediately move on to the next. For example, after a student has recited the 8 steps, acknowledge their achievement. Then move on to asking them to more thoroughly explain an individual step. Coach them to deepen their understanding of each step.
- Let most formal, structured study be on their own time as they see fit to organize into their own individualized schedules. Be sure to frequently—daily—ask them about elements of these six steps. Faculty should lead the effort on school days, and company reps on work days. If the students have some quizzing and interactivity every day, they will quickly begin to remember and understand the knowledge basics.
- The knowledge basics will be done simultaneously with the first real application exercise, a small problem solving experience on the school floor. The actual hands-on application coupled with the continual quizzing and coaching activity above should also help the students to quickly and soundly grasp problem solving basics.
- As certain students begin to master the 8 steps, understand them, and master the Drive & Dedication principles begin to take opportunities to have them demonstrate their knowledge to others. Call on them at meetings, public presentations, school visit, etc. to recite and demonstrate their knowledge of the material.

PROBLEM SOLVING Basics

COMPLETE A WORK BASED PROBLEM SOLVING ACTIVITY.

DATE

STATE FROM MEMORY THE DEFINITION OF A PROBLEM, INCLUDING EACH ELEMENT OF THE PROBLEM ILLUSTRATION.

DATE

Post photos and examples on this page and the next.

DRAW FROM MEMORY THE BASIC PROBLEM DIAGRAM.

DATE

STATE FROM MEMORY EACH STEP OF THE 8-STEP PROBLEM SOLVING PROCESS.

DATE

THOROUGHLY EXPLAIN STEP 1 OF PROBLEM SOLVING.

DATE

SCHOOL-BASED PROBLEM SOLVING PRESENTATION:

DATE

REVIEWERS AT THE PRESENTATION

NAME

TITLE

THOROUGHLY EXPLAIN STEP 2 OF PROBLEM SOLVING.

DATE

THOROUGHLY EXPLAIN STEP 3 OF PROBLEM SOLVING.

DATE

THOROUGHLY EXPLAIN STEP 4 OF PROBLEM SOLVING.

DATE

THOROUGHLY EXPLAIN STEP 5 OF PROBLEM SOLVING.

DATE

THOROUGHLY EXPLAIN STEP 6 OF PROBLEM SOLVING.

DATE

THOROUGHLY EXPLAIN STEP 7 OF PROBLEM SOLVING.

DATE

THOROUGHLY EXPLAIN STEP 8 OF PROBLEM SOLVING.

DATE

**STATE FROM MEMORY EACH OF THE 10 DRIVE & DEDICATION
ELMEENTS.**

DATE

COMPLETE A SCHOOL BASED PROBLEM SOLVING ACTIVITY.

DATE

Post photos and examples on this page and the next.

COMPLETE A TALK-THROUGH OF A REAL PROBLEM SOLVING ACTIVITY.

DATE

PROBLEM SOLVING EXERCISES

- Perform a school-based Problem Solving exercise.
- Present problem to work/school panel
- Perform a work-based Problem Solving exercise.
- Present problem to work/school panel

OVERALL PROCESS

1. Meet with faculty and plan the school-based problem solving exercise.
2. Meet with AMT students and explain the overall and school-specific activity and goal to them. Give them a completion target. Disseminate appropriate materials.
3. Students identify a problem on their school floor. It should:
 - a. A real problem
 - b. Enough of a problem to take some work, but able to be accomplished in a relatively short time (2-3 weeks).
4. Students work their problem. Progress should be maintained on a visual control board (several students can use the same board). Faculty and company should advise closely and ensure steady progress.
5. At completion each student presents the problem to a school/company group.
6. Meet with AMT students and explain the floor-specific activity to them.
7. Students work with their shops to identify a problem. It should be of a scope which can be completed by semester end.
8. Students work the problem. Progress should be maintained on a visual control board in their shop. It is suggested that a white board be devoted to illustrating and working the whole problem.
9. At completion students present their problem to a company and (highly suggested) school based group. Shop management should be included, and it is highly suggested that at least some executive management be included.

At the conclusion send all completed Problem Solving documents to NAPSC.

THOROUGHLY EXPLAIN THE DRIVE & DEDICATION PRINCIPLE OF XXX.

DATE

THOROUGHLY EXPLAIN THE DRIVE & DEDICATION PRINCIPLE OF XXX.

DATE

THOROUGHLY EXPLAIN THE DRIVE & DEDICATION PRINCIPLE OF XXX.

DATE

THOROUGHLY EXPLAIN THE DRIVE & DEDICATION PRINCIPLE OF XXX.

DATE

THOROUGHLY EXPLAIN THE DRIVE & DEDICATION PRINCIPLE OF XXX.

DATE
