AMT Program
Professional Development

The Manufacturing Core Exercises

A Primer

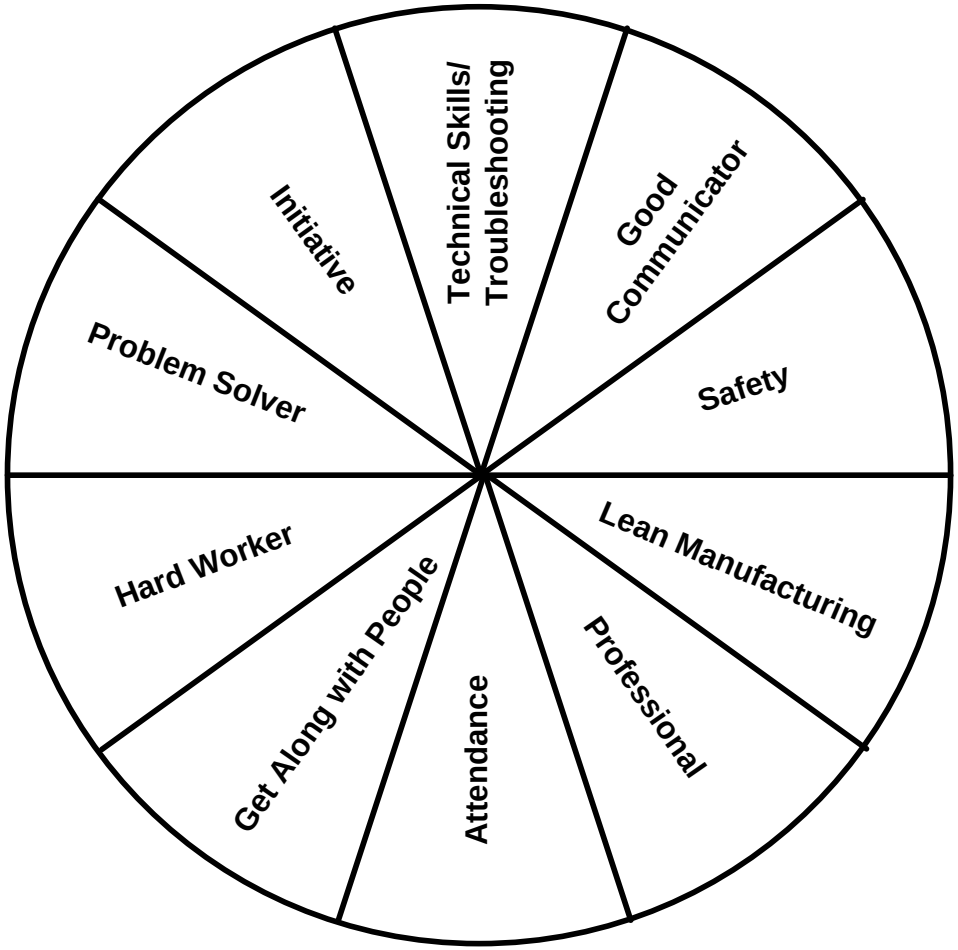
Introduction

- Here to Learn the How to Conduct the Manufacturing Core Exercises
- Distinguishing feature of the AMT Program
- Countermeasure a Long Standing North American Problem

Introduction

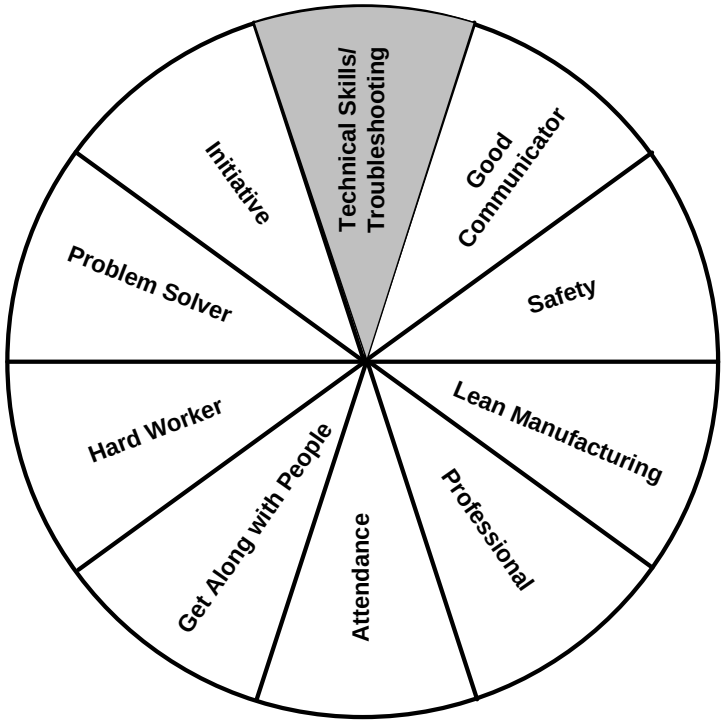
- Part of Response to Weak North American (U.S.) Technical Education
- Establish the Foundation for the Next Generation Skilled Maintenance Workforce
- Protects Competitive Manufacturing in North America

Skill Wheel

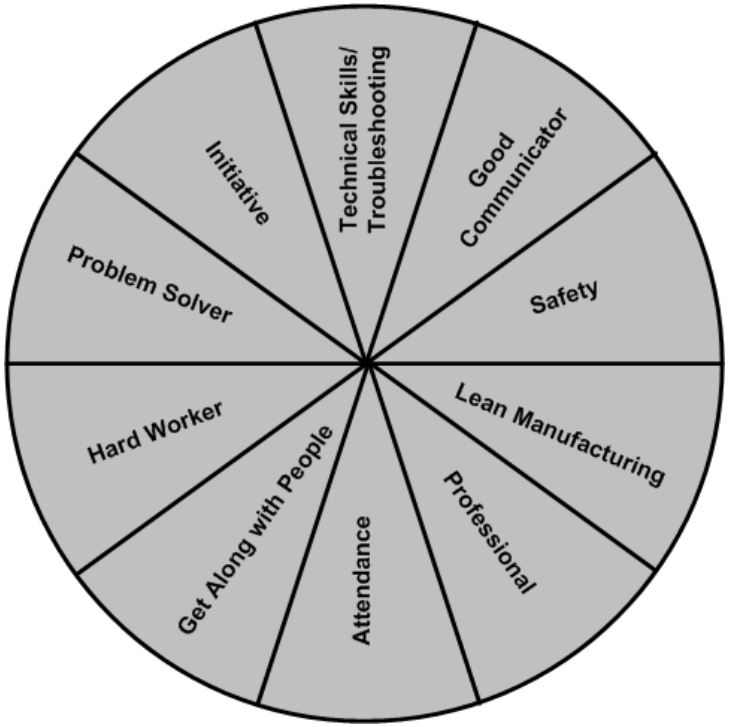

Technical Skills/ Troubleshooting
Good Communicator
Safety
Lean Manufacturing
Professional
Attendance
Get Along with People
Hard Worker
Problem Solver
Initiative

American Technical Education

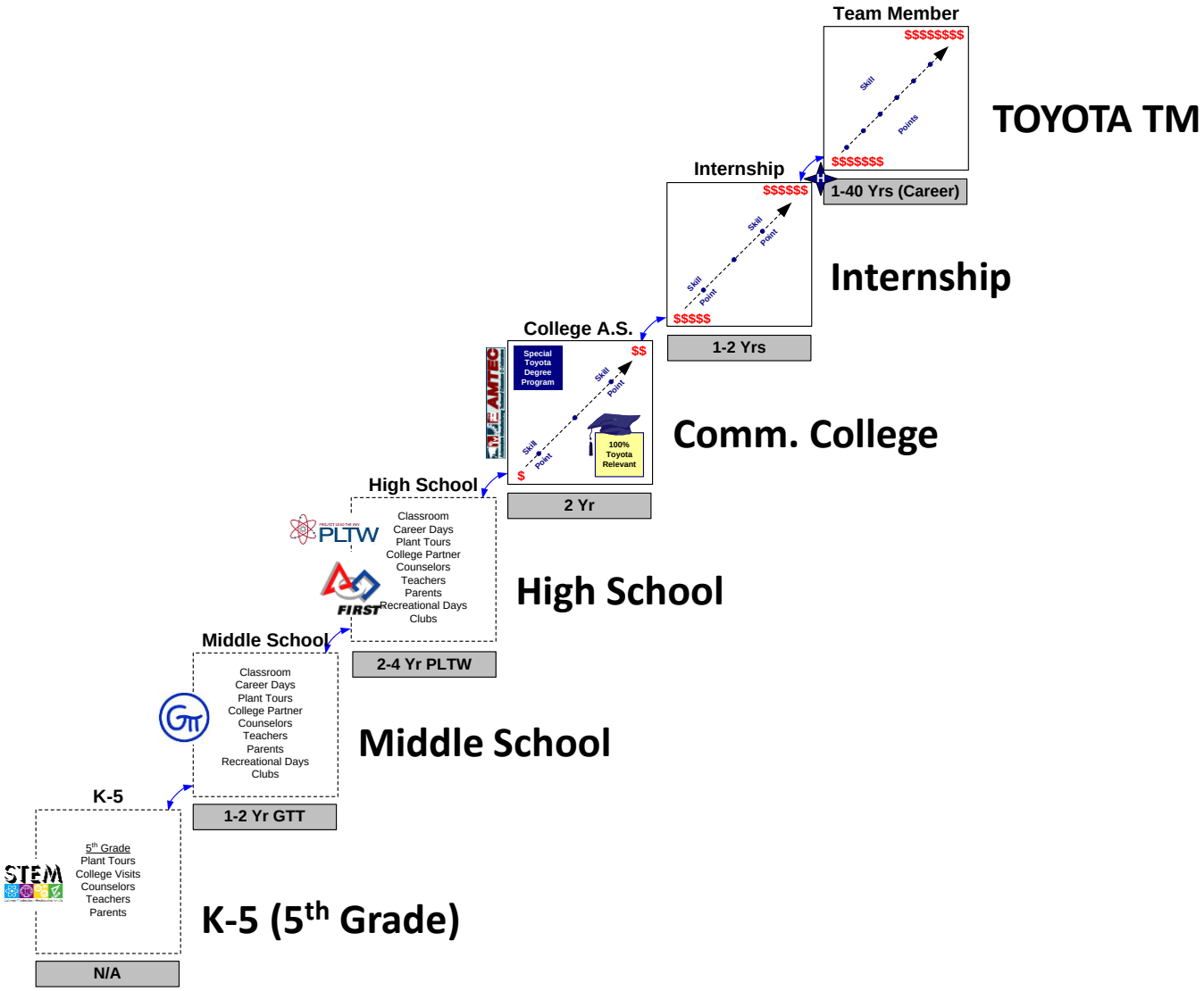
What is developed with intention, structure, and consistency



What is NEEDED



THE AMT CAREER PATHWAY



Best Education Career Pathway in the U.S.

Sponsored by kuder

Career Pathways Partnership

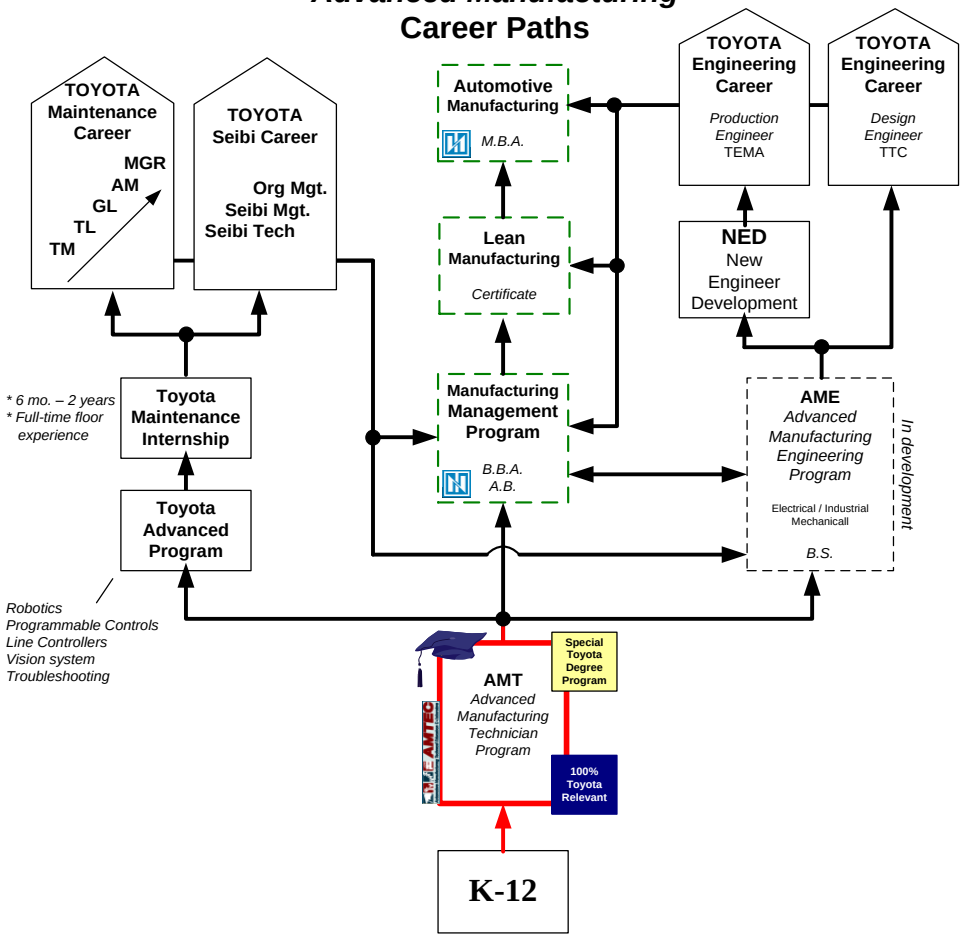
2013 Excellence Award winner!

1st place: Toyota AMT Program (NAPSC)

2nd place: Woodrow Wilson Rehab Center (VA)

3rd place: Ranken Technical College (MO)

TOYOTA
Advanced Manufacturing
Career Paths



Project Lead the Way

NEXT GENERATION Technical Degree

Advanced Manufacturing Technician Program

Associate Degree in Applied Science

TOYOTA MAINTENANCE FUNDAMENTAL SKILLS

Weekly Schedule

M	T	W	Th	F
WORK	SCHOOL	WORK	SCHOOL	WORK

MCE Activity Homework

Selection Process

Target Criteria:
High School Graduates
> 1/3 Math Ranking
> ½ Class Standing
PLTW Participant

Internship

CHARACT-ERISTICS WHEN HIRED

	1st Semester	2nd Semester	3rd Semester	4th Semester	5th Semester	
General Education	*Math*	*Writing*	*Science*	*Social Science*	*Public Speaking*	*Communication and critical thinking skills*
Technical Core Areas	*Intro to Electricity Fluid Power*	*Motors Mechanics*	*Controls PLC*	*Welding & Machining Drawings*	*System Troubleshooting Robots*	*Multiskilled Technical Foundation*
Manufacturing Experience Program	*Production Experience*	*Maintenance Introduction*	*Maintenance Technician Building*			*Floor experience and hands-on skill*
Manufacturing Core Exercises	***Safety Culture***					**Continue Practicing Activity** → *Good safety practice on hire* (Coach)
		5S *Workplace Organization*				**Continue Practicing Activity** → *5S understanding and practice on hire* (Coach)
			TPS-M *Toyota Production System for Maintenance* *"Lean Manufacturing"*			**Continue Practicing Activity** → *Lean mfg thinking and practice on hire* (Coach)
				Problem Solving		**Continue Practice** → *Problem solving thinking and use on hire* (Coach)
					RCM *Reliability Centered Maintenance*	*Understanding of maintenance practice on hire*
Work Behavior	Attendance – Communication – Diligence – Teamwork – Interpersonal Relations - Initiative					*Excellent worker behavior on hire*

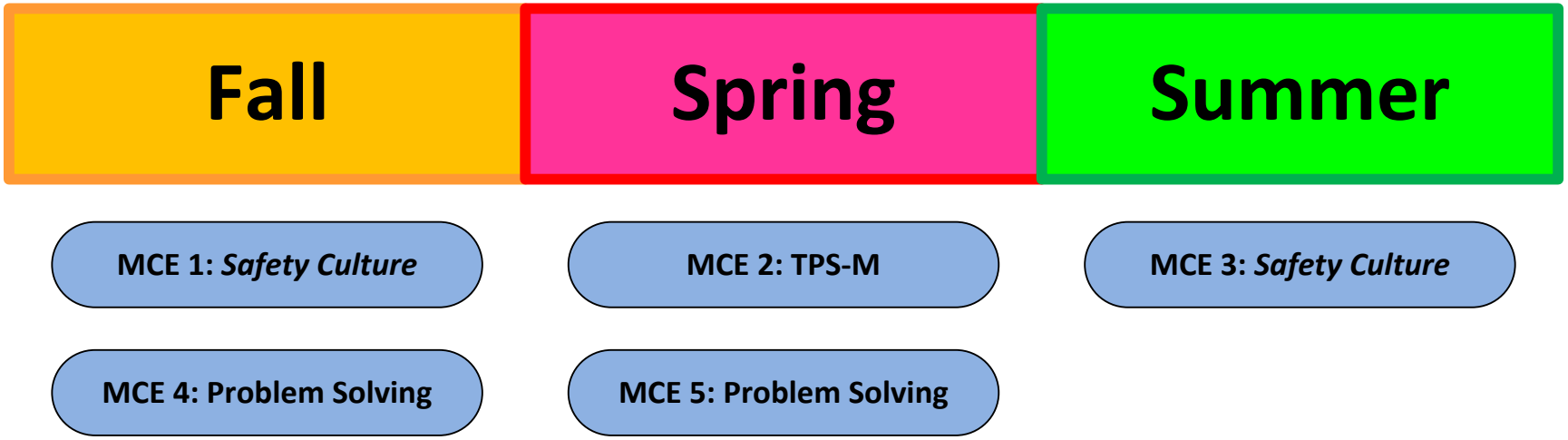
Components of the AMT Program

MCE Fundamentals

The Five

- **MCE 1: Safety Culture** - *Value for Safety*
- **MCE 2: 5S** - *Work Place Organization*
- **MCE 3: TPS-M** - *Lean Manufacturing*
- **MCE 4: Problem Solving** - *Quality/Continuous Improvement*
- **MCE 5: Maintenance Reliability** - *Productivity*

MCE Cycle

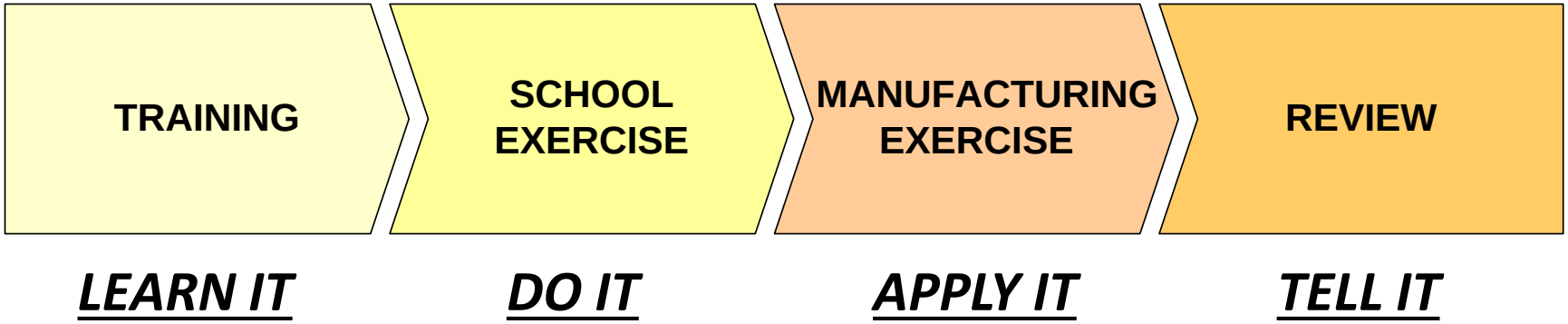

Fall
Spring
Summer
MCE 1: *Safety Culture*
MCE 2: TPS-M
MCE 3: *Safety Culture*
MCE 4: Problem Solving
MCE 5: Problem Solving

MCE Fundamentals

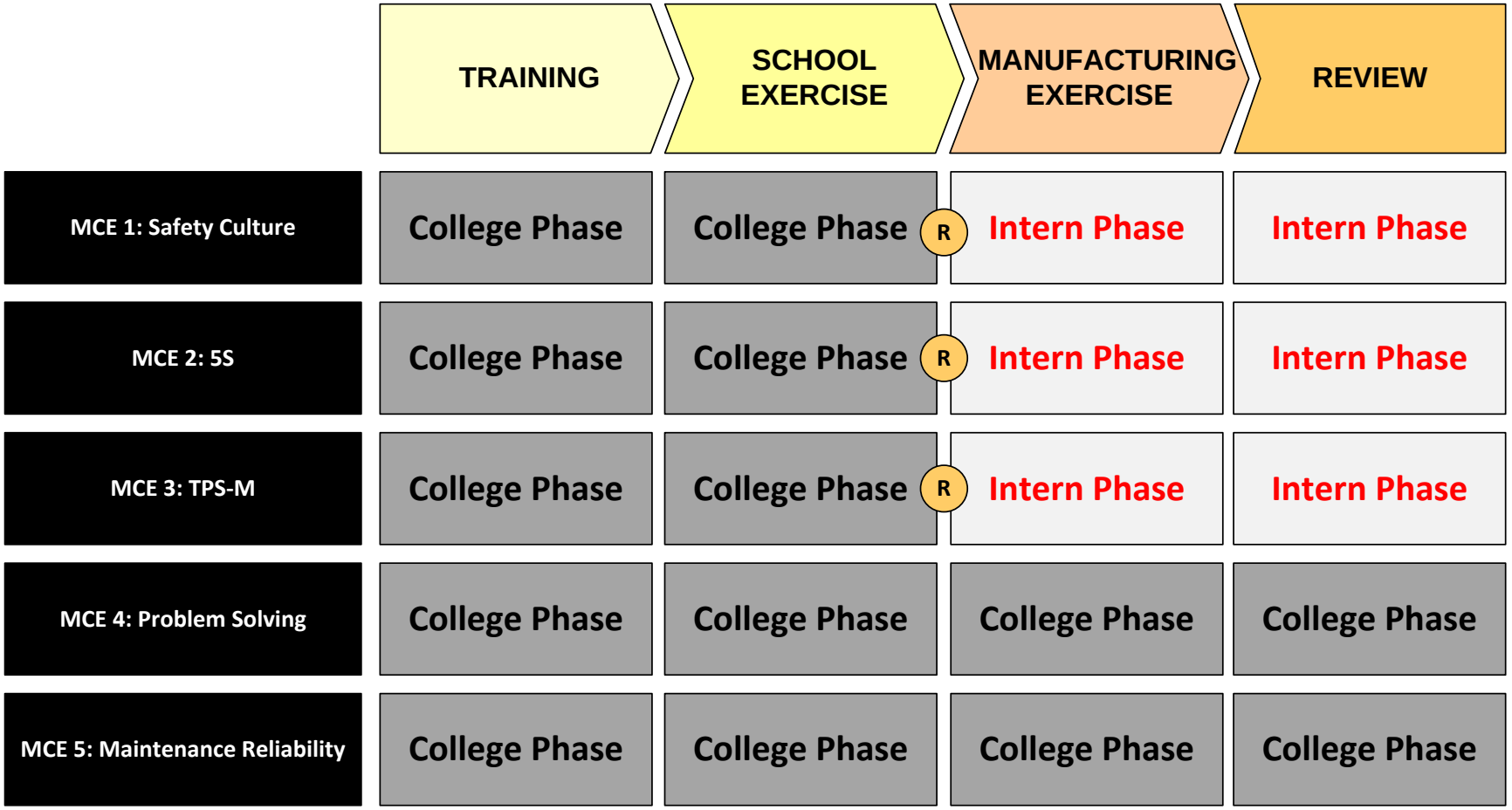
- Principles of the MCEs
  - Not “familiarity” training.
    AMT has deep understanding.
  - Core method = *Learning* **+** *Doing*
  - ‘Doing’ involves real projects
  - All activities require verbal and written reviews by AMT students

MCE Fundamentals

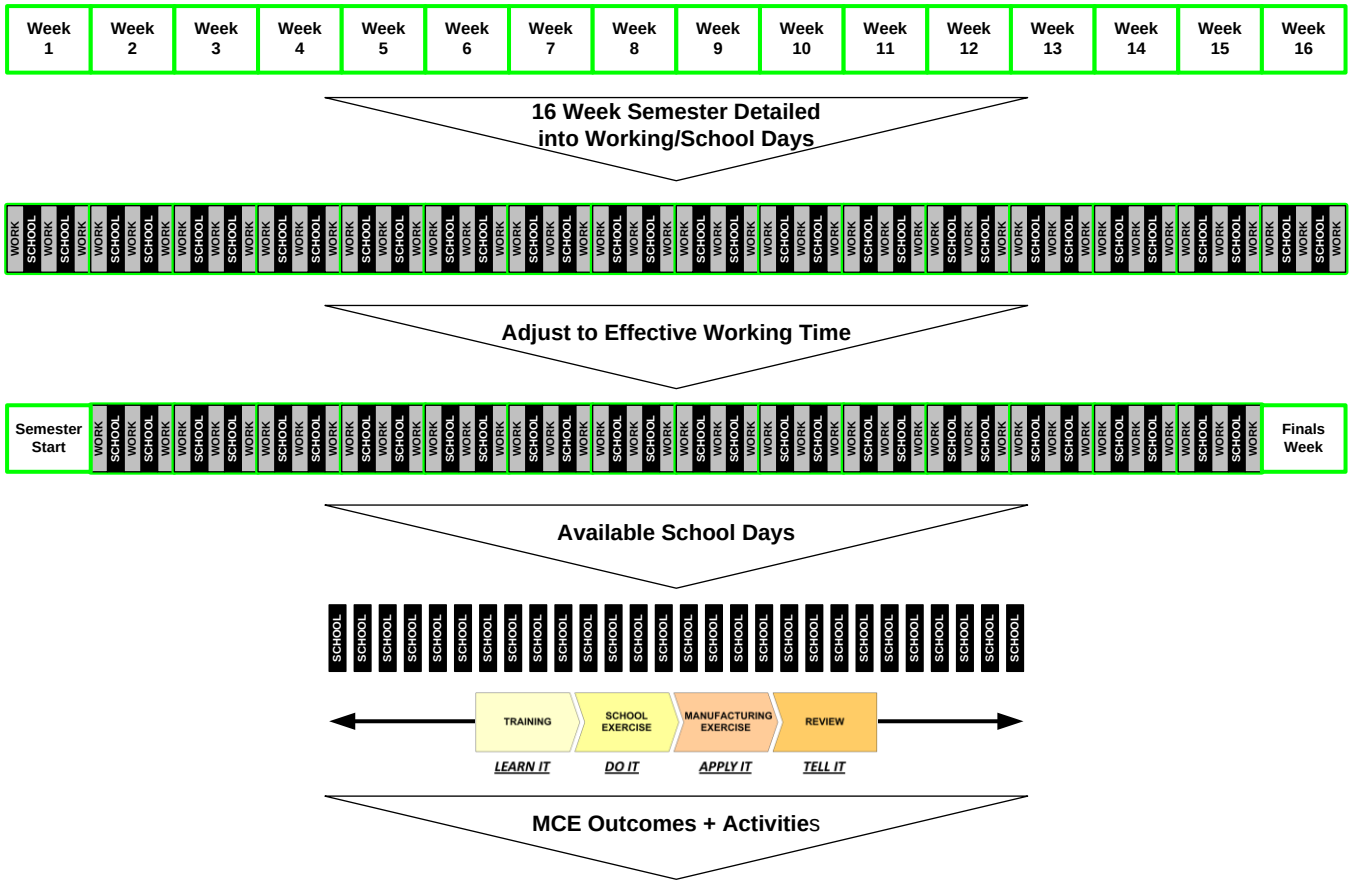
Basic MCE Structure



MCE Structure



Planning the MCE



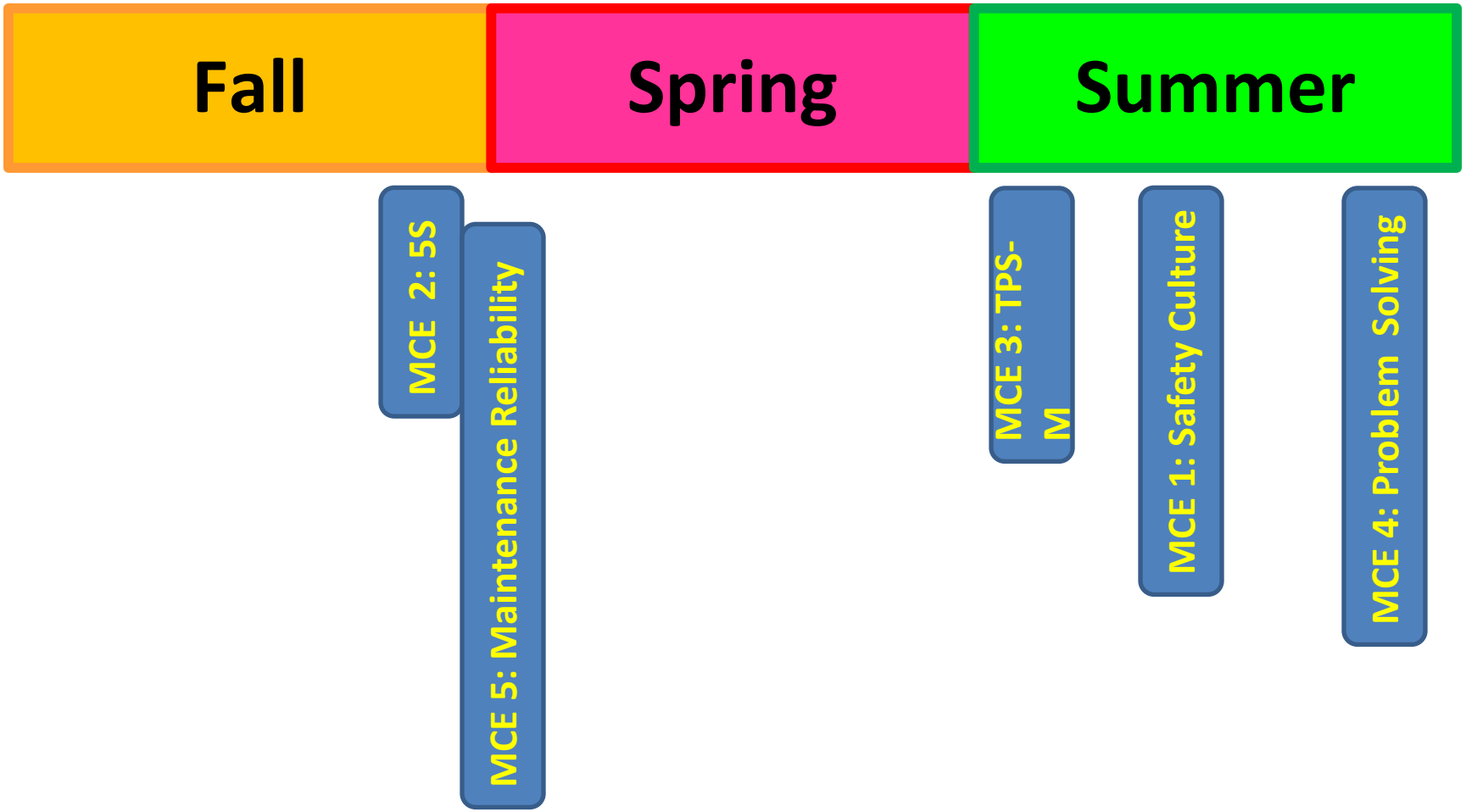
PLAN TO COMPLETE THE SEMESTER MCE

Training

- Conducted by a *Certified* trainer to ensure quality and regional consistency
- Provides initial subject knowledge
- Introduces the semester exercises and activities.
- Identifies the MCE Outcomes

KEY POINT: The student initially LEARNS the topic

Training Cycle

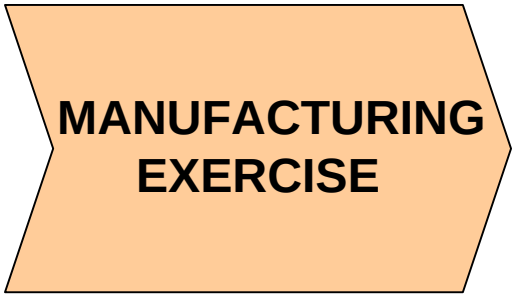


School Exercise

- Student puts the knowledge *into action* for the first time.
- Done in the Advanced Mfg. Center
- Led by the AMT School Faculty
  (Assisted as needed by Toyota/FAME)
- Real project – sustains at the school

KEY POINT: Student applies *hands-on* for the first time

Manufacturing Exercise



- Second hands-on activity
- Done on the manufacturing floor
- Led by Shop team/mentors
  (Assisted as needed by the Plant AMT Leader)
- Real project – sustained over time
  Tangible benefit for the shop!

KEY POINT: Transfers ability to <u>Do</u> to the Mfg. Floor

Review

- Sets a tangible completion target
- Recognition for accomplishment
- Strengthens verbal, written, and presentation skills
- Promotes exercise quality
- Connects management to program
- Promotes regional consistency

KEY POINT: Provides Importance & Recognition

MCE 1: Safety Culture

TRAINING

- TEMA “Safety Culture Training”
- 1 day / 8+ hours
  Time impacted by group size
- Conducted in June as Day 2 of AMT Class Start Activity
  Orientation / SC Training / Lockout
- Currently 2 Certified Trainers

MCE 1: Safety Culture

TRAINING

- Key Activities Include:
  - ✓ Safety Culture Training
  - ✓ KYT Training
  - ✓ CHIPS Card & Instruction
  - ✓ DRIVE & CHOICE Card & Game Instruction
  - ✓ Safety Commitment Instruction
  - ✓ Safety Board Instruction
  - ✓ Semester Safety Activities Overview
  - ✓ Safety Culture Essay Assignment

MCE 1: Safety Culture

SCHOOL EXERCISE

- Conducted during the 1st Semester
- Led by AMT School Faculty
  - Faculty may need support by AMT leader, especially during 1st experience
- School-based in the AMC
  Can be assigned elsewhere on a case-by-case basis
- Primarily done in 2-4 hour period following class end. Faculty can blend into school day as desired.
- Used as opportunity for active instruction

Drive & Choice Game

1. Establish a flip chart in the AMC to “keep score” during the D&C game.
2. Issue a D&C card to AMTs during SC training.
3. There are 3 “big picture” goals:
    1. Students consistently have the D&C on them.
    2. Students can state every element of the D&C card.
    3. Students can thoroughly explain every D&C element.
4. Play the game by attempting to catch students without their cards. Ask them at various times if they have their card on them.

Drive & Choice Game

5. Invite the students to catch you, also. Ensure that this can occasionally happen.
6. Anyone can ask anyone for their card. When a student catches someone without their card they use the flip chart to keep track of their score.
7. Be sure to encourage students to challenge one another, and challenge the instructors. Everyone plays!

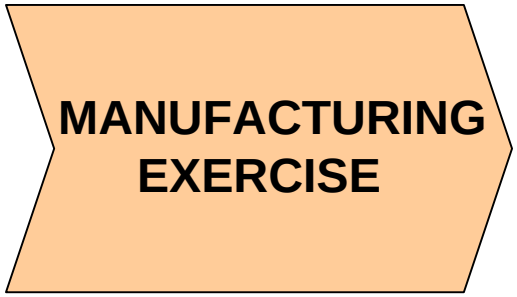
Drive & Choice Game

8. When students consistently have their card with them, transition to asking them to state all of the elements of the card. Score as many as they cannot name.
9. When students consistently can state all elements on the card, transition to having them explain each element.
10. When a student can explain all elements of the card, and has an integrated understanding in context of the manufacturing operation, take their “game” card and issue them a badge card.

Drive & Choice Game

11. Play the same game with the CHIPS card, and add points to the same game/flip chart as the D&C cards. It's one game, big game.
12. As students master each step check off their Outcomes on the MCE outcome matrix.

MCE 1: Safety Culture



- None required.
- Programs strongly consider having students do the listed exercises at the work site.

MCE 1: Safety Culture

- End of Semester
- Attended by NAPSC
- School & Plant

MCE 2: 5S

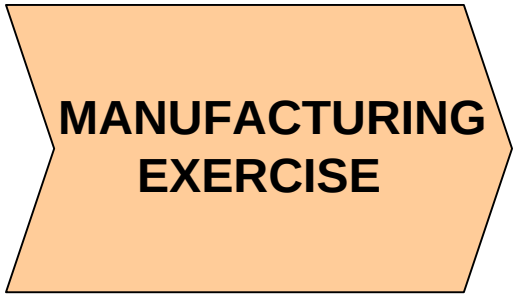
- 5S Training: Maintenance Version
- 1 day / 8 hours
  Time impacted by group size
- Conducted in December or Janaury
- Target: Local Certified Trainer

MCE 2: 5S

SCHOOL EXERCISE

- Conducted in the AMC
- Led by School Faculty (Company support)
- Real 5S Exercise
- New Programs: Put AMC into 5S condition
- Existing Programs: Improve 5S condition

MCE 2: 5S



- None required
- Programs strongly consider having students do the listed exercises at the work site.

MCE 2: 5S

REVIEW

- End of Spring Semester/Beginning of Summer.
- Attended by NAPSC
- Include School & Company

MCE 3: TPS-M

TRAINING

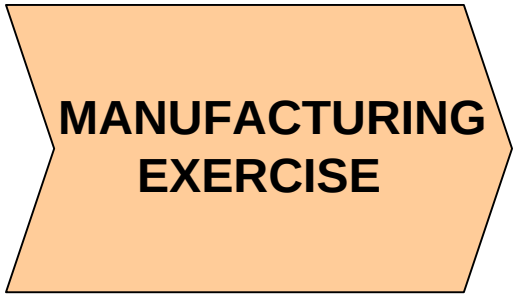
- TPS-M for Maintenance Course
- 2 days/16 Hrs.
- Schedule with NAPSC
- Target: Local Certified Trainer

MCE 3: TPS-M

SCHOOL EXERCISE

- **Standard Work Exercise**
- **Problem Solving Exercise**
- **Kaizen Exercise**
- **Pokayoke Exercise**
- **Takt Time Exercise**
- **Heijunka Exercise**
- **Mura/Muri/Muda Exerise**
- **Write an Essay**

MCE 3: TPS-M



- None required.
- Programs strongly consider having students do the listed exercises at the work site.

MCE 3: TPS-M

REVIEW

- End of Summer/Beginning of Fall.
- Attended by NAPSC
- Attended by School/Plant

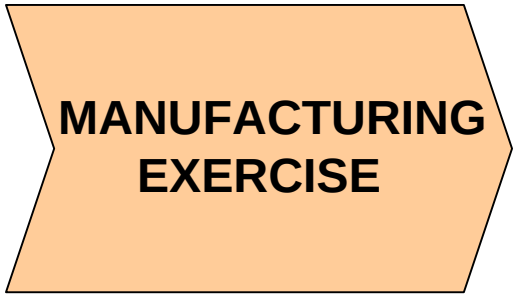
MCE 4: Problem Solving

- Modified TBP Training
- 1 day/8 hours
- End of Fall/Beginning of Spring
- Target: Local Trainer

MCE 4: Problem Solving

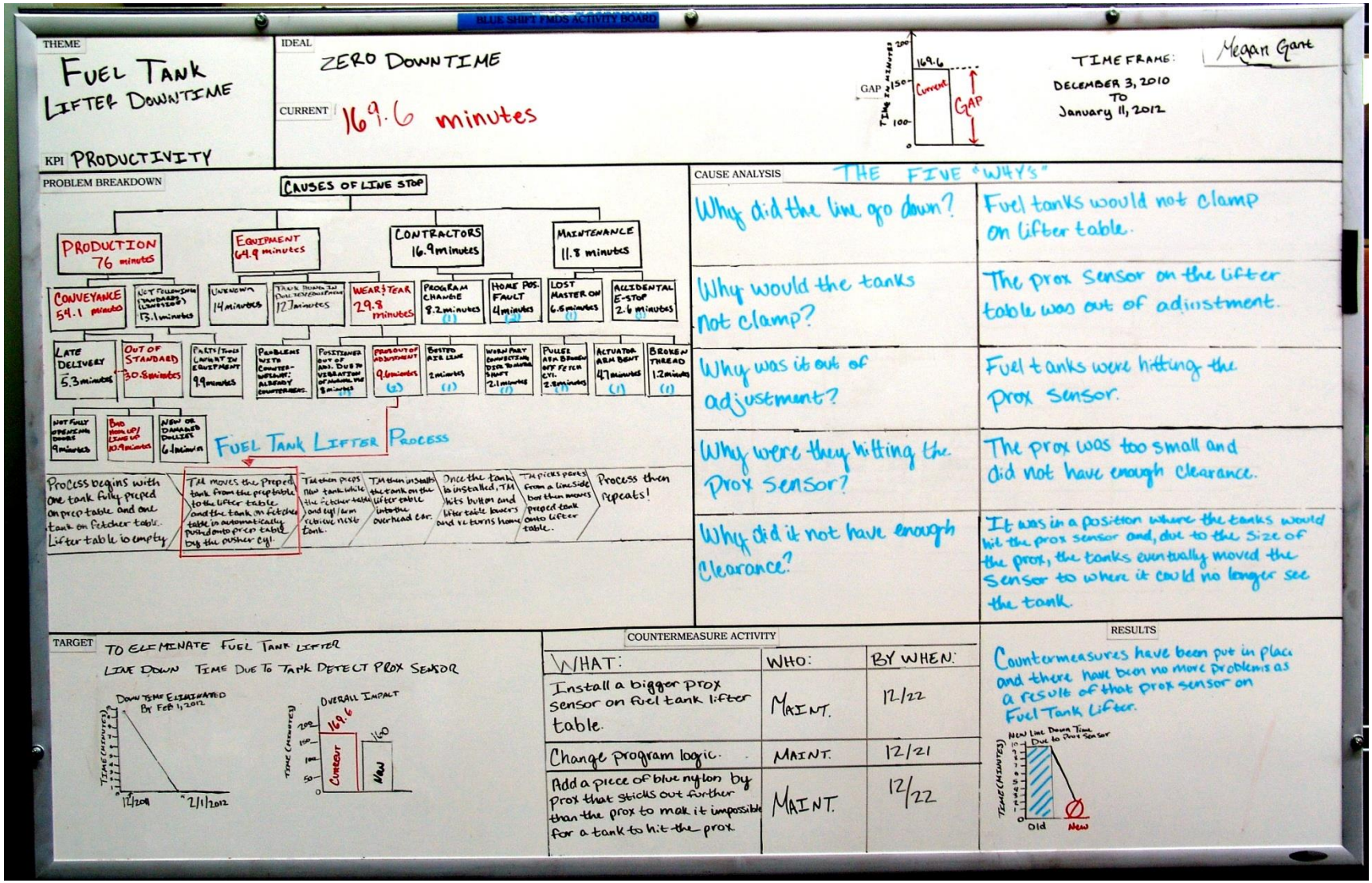
- **Talk through a real TBP case.**
- **School problem solving exercise.**
- **Write an essay.**

MCE 4: Problem Solving



- Floor Problem Solving Exercise

MCE 4: Problem Solving



MCE 4: Problem Solving

- End of Fall/Beginning of Spring
- Attended by NAPSC
- Attend by School/Company
- A major presentation. Invite significant attendees from both school & company.

MCE 5: Maintenance Reliability

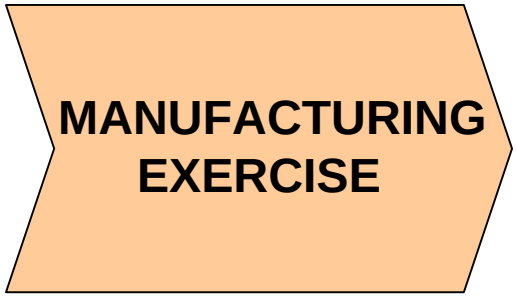
TRAINING

- Maintenance Reliability: Failure Mode Analysis
- TEMA PE
  Andy Inman current instructor
- 2 days/16 hours
- Includes a full RCMNET

MCE 5: Maintenance Reliability

- **Peform in-training RCMNET.**
- **Perform small RCMNET.**
- **Teams of at least 3 TMs (AMTs)**

MCE 5: Maintenance Reliability



- Perform manufacturing floor RCMNET
- Teams of at least 3 TMs
- May need STM TMs
- Excellent training for TMs.

MCE 5: Maintenance Reliability

- Beginning of Summer
- Review Floor Exercise
- Attended by company/school
- Major Review. Invite company/school VIPs

Open Discussion