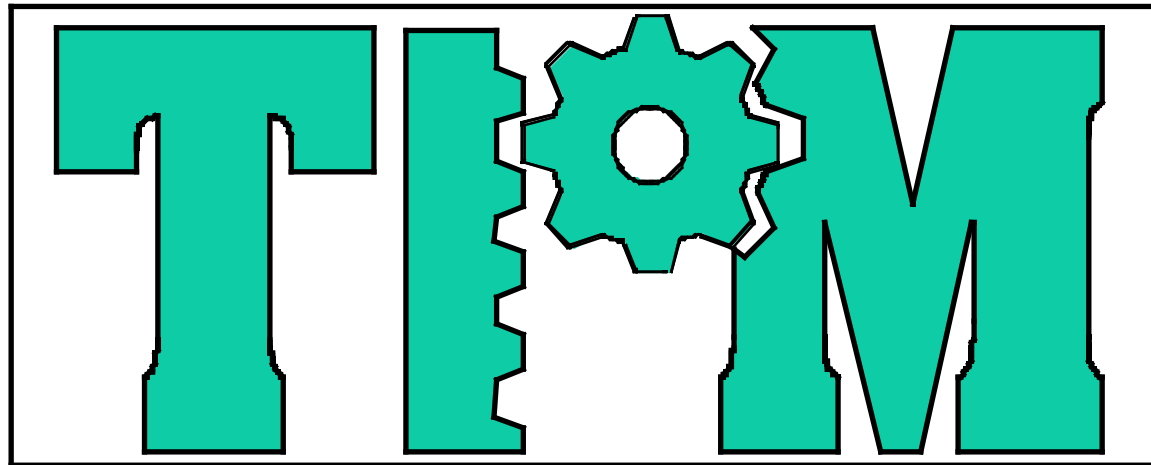


Courtesy, in part, of Motorola SPS.
Thank You!

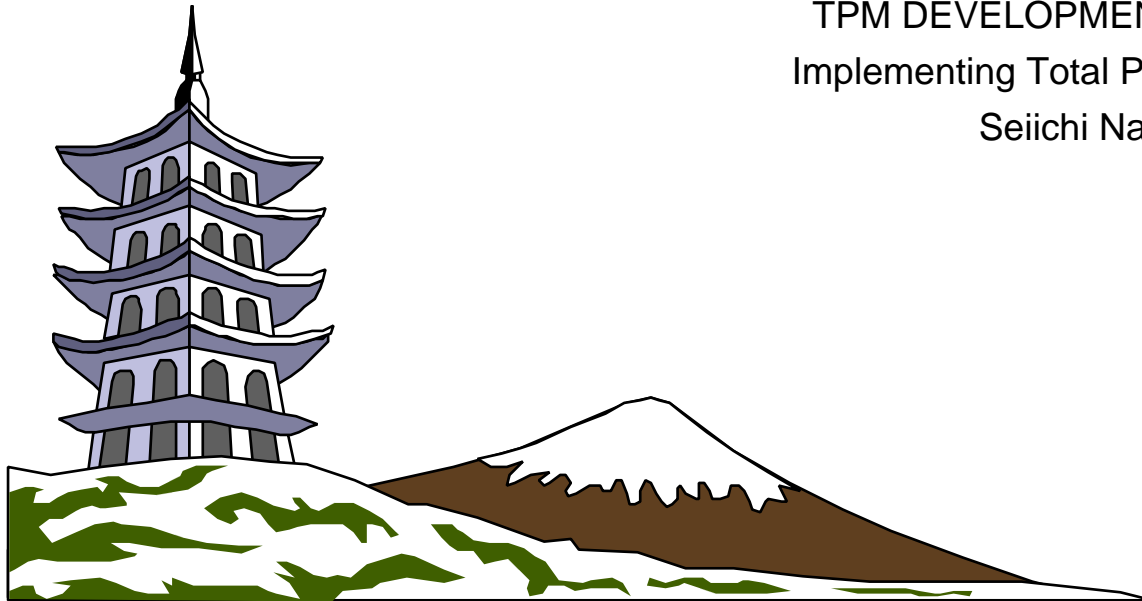
Welcome To



About T.P.M.

After World War II, Japanese industries determined that to compete successfully in the world market they had to improve the quality of their products. To do so, they imported management and manufacturing techniques from the United States and adapted them to their circumstances. Subsequently, their products became known throughout the world for their superior quality, focusing world attention on Japanese-style management techniques.

TPM DEVELOPMENT PROGRAM
Implementing Total Productive Maintenance
Seiichi Nakajima.



WHAT IS T.P.M. ??



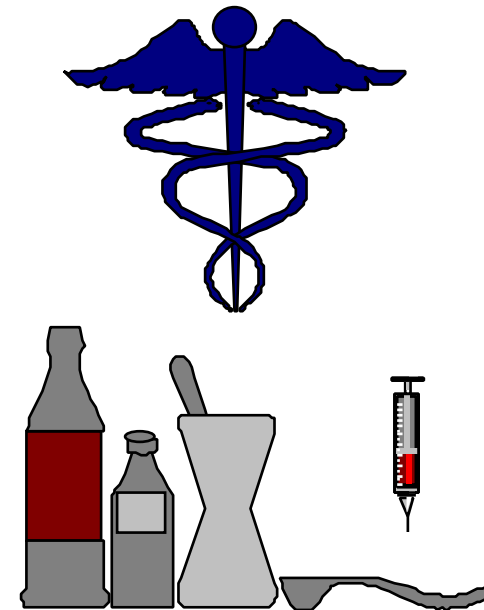
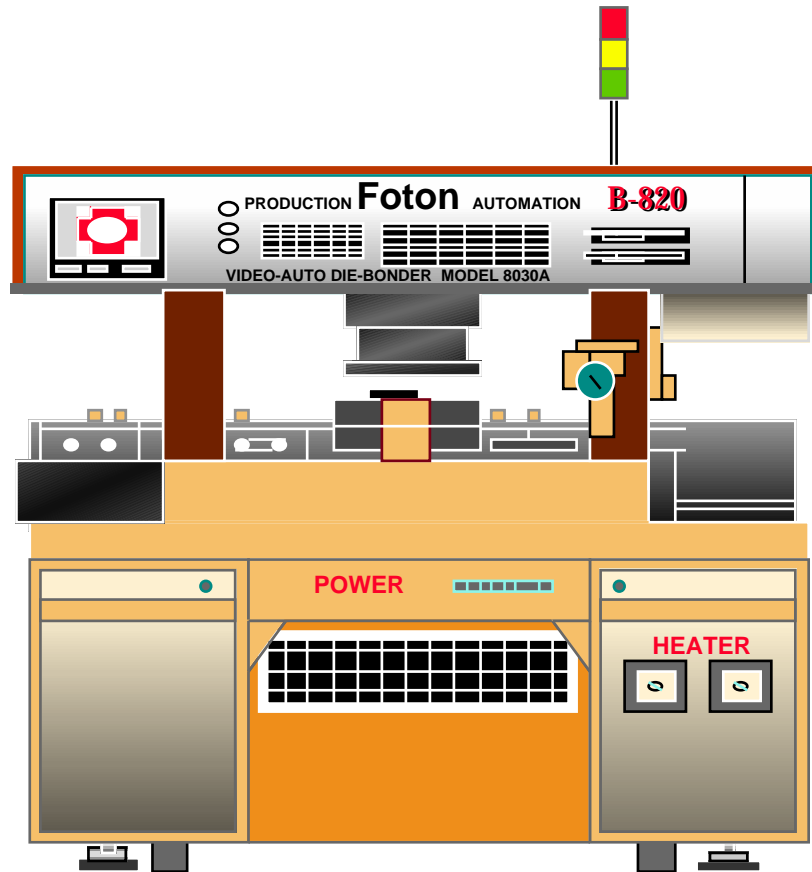
Definition of T.P.M. :

T.P.M. IS: A PRODUCTIVE MANUFACTURING SYSTEM with the TOTAL Participation of: Managers, Supervisors, Engineers, Technicians and Operators.

T.P.M. Includes the Following Benefits:

- Maximize Overall Equipment Effectiveness
- Establishment a Complete System of Maintenance for the Machine Entire Life
- Create a Better Work Environment, Promoting the Participation for All Employees

T.P.M. = Medical Science of Equipment

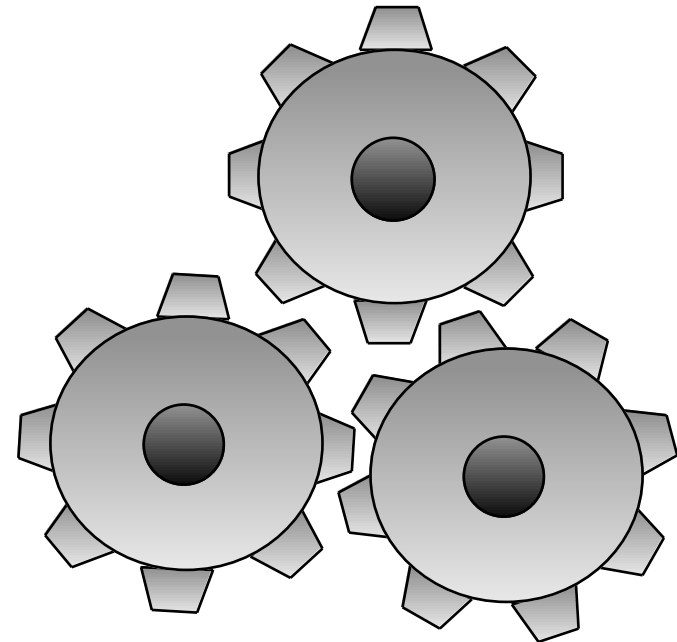


The Main objective of TPM is :
Zero Interruptions
Zero Defects
Zero Accidents

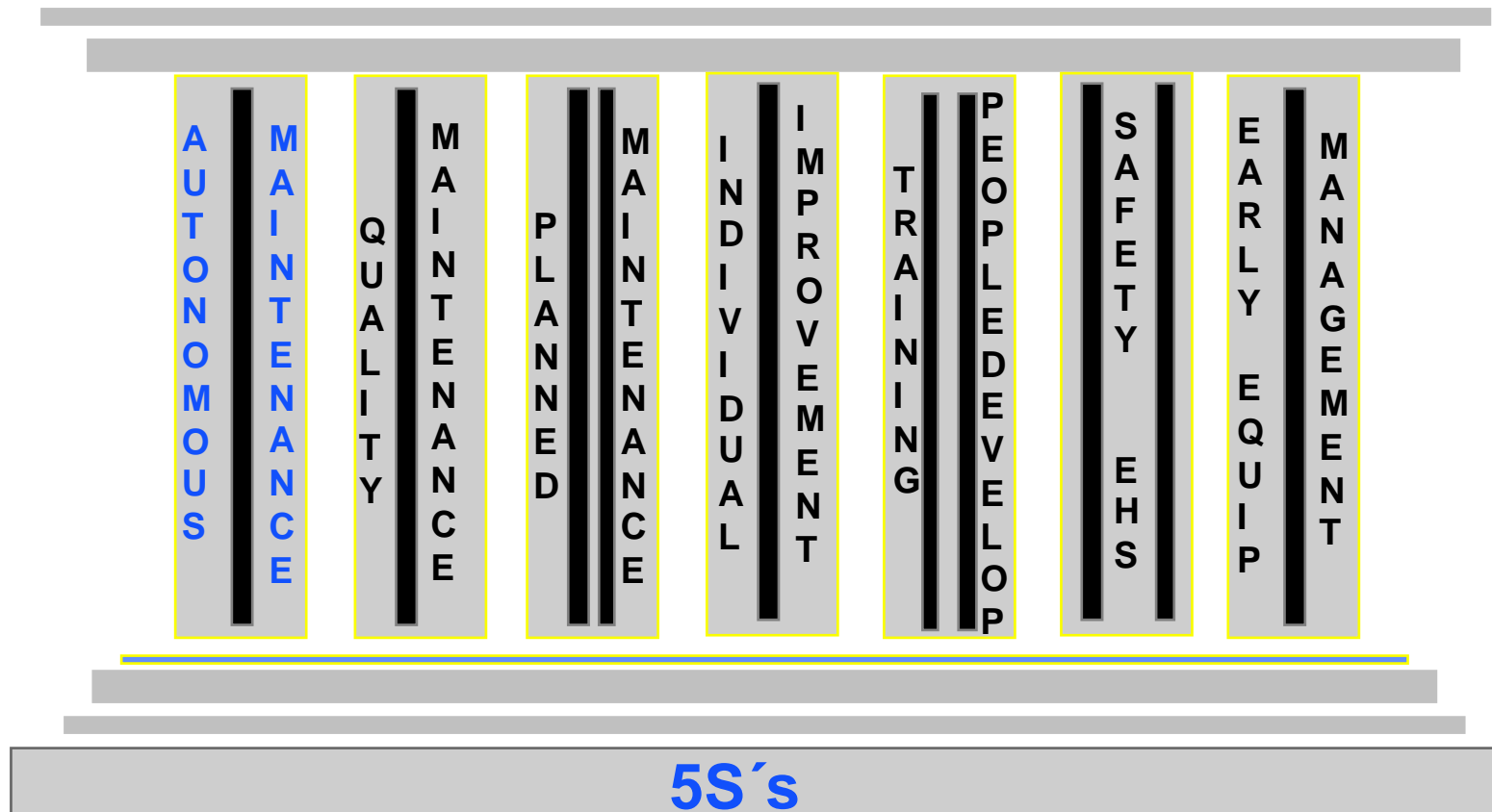
Throughout total employees participation from Top Management to Operators,
based in the following activities:

Autonomous Maintenance

- Planned Maintenance
- Individual Improvement
- Quality Maintenance
- Early Equipment Management
- Education/Training (People Development)
- Safety



PILLARS OF TPM



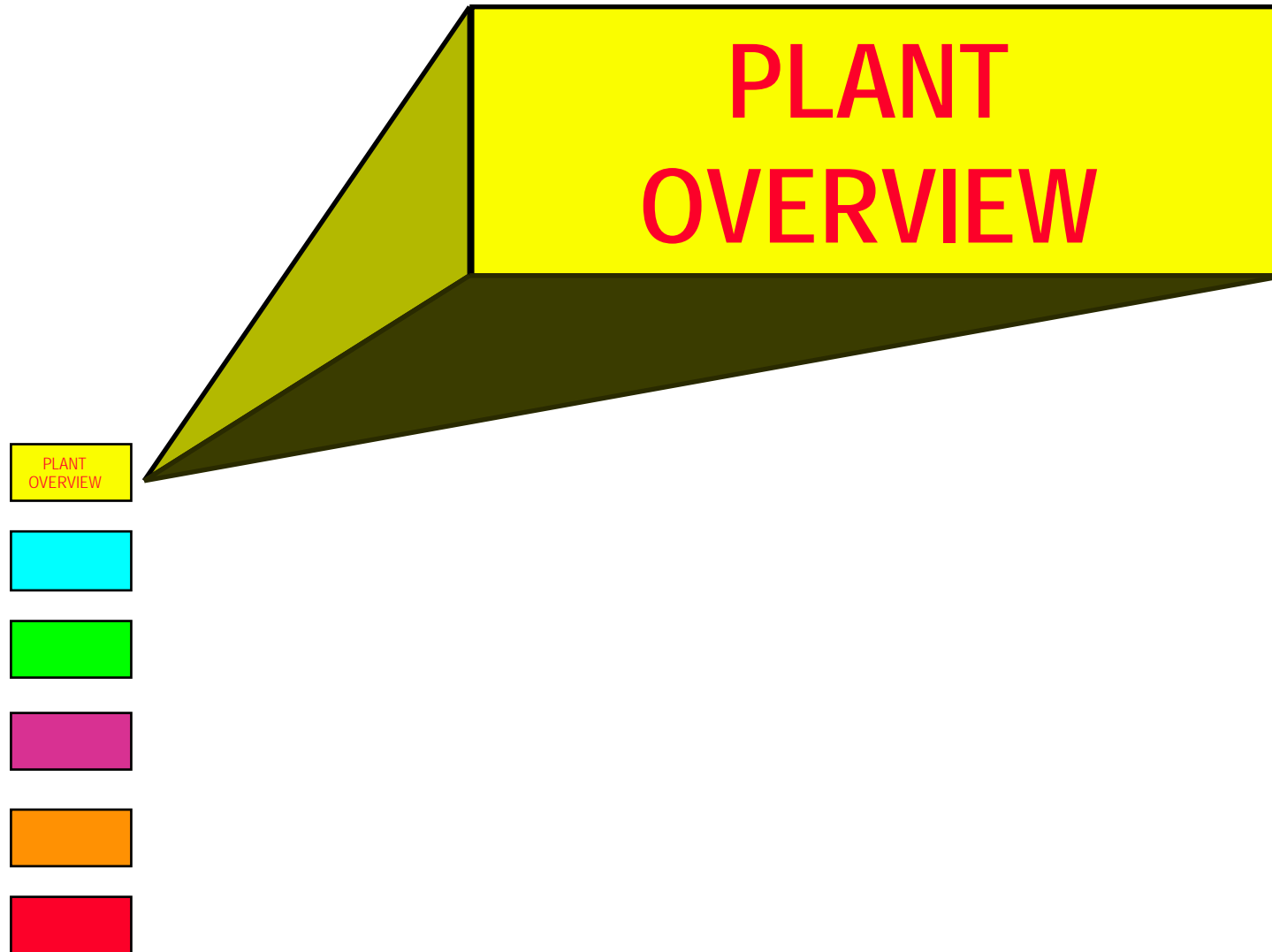
T.P.M.

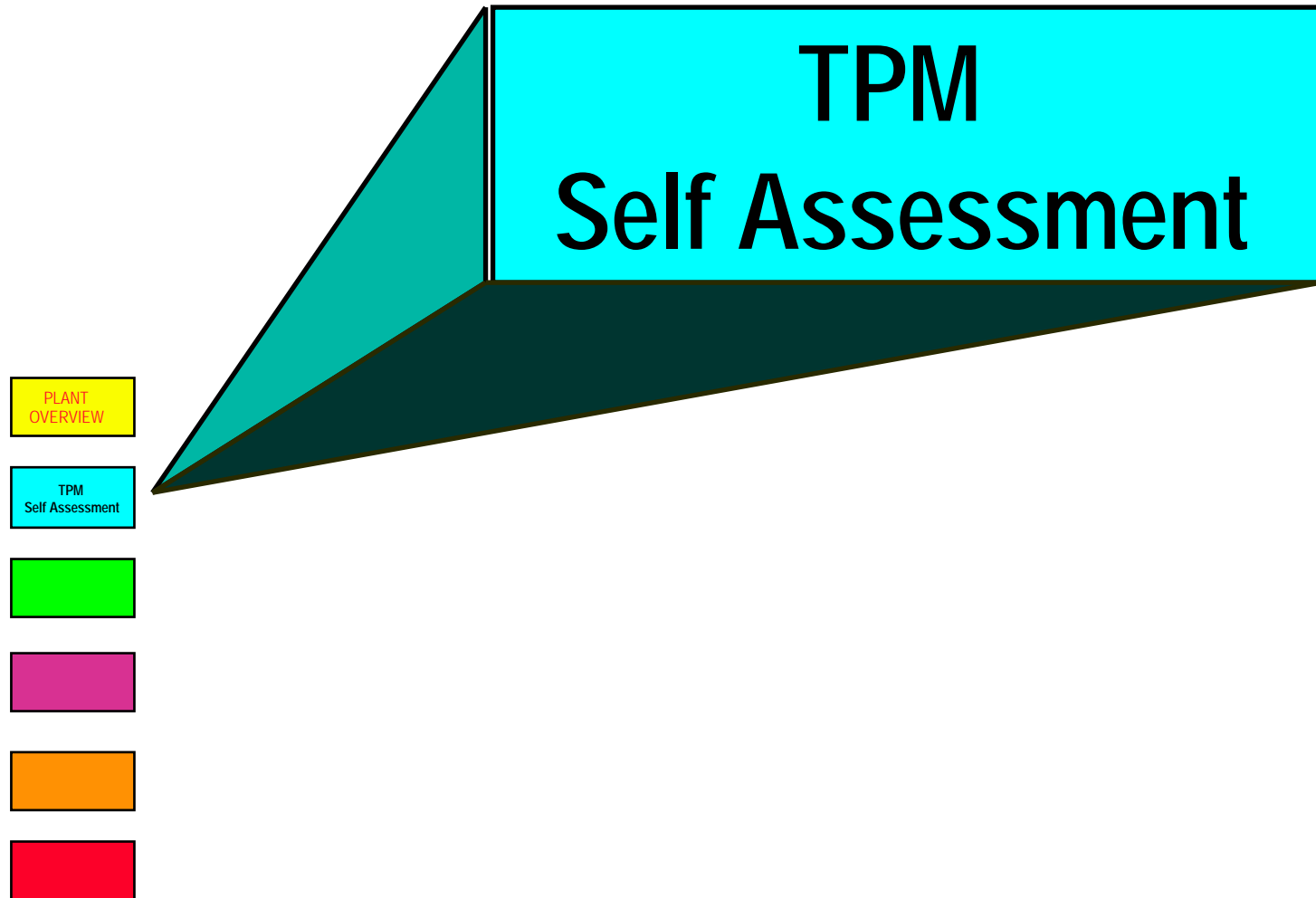
Total Productive Manufacturing

People , Equipment and Product
Improvement by Working Together.



Courtesy, in part, of Motorola SPS.
Thank You!





TPM Self Assessment

Background:

1991 First attempt to implement TPM.

TPM consultant provides training to selected Managers, Supervisors and Engineers.

One coordinator with experience in Process and Maintenance is assigned to lead TPM.

Literature and materials, prepared and distributed.

⇒ **Lack of support and involvement results on failing the implementation.**

TPM Self Assessment

1996

One Staff Mgr. is assigned to lead the TPM Implementation plant wide.

A core team is formed on **2Q/96** with key people from different departments to coordinate the implementation.

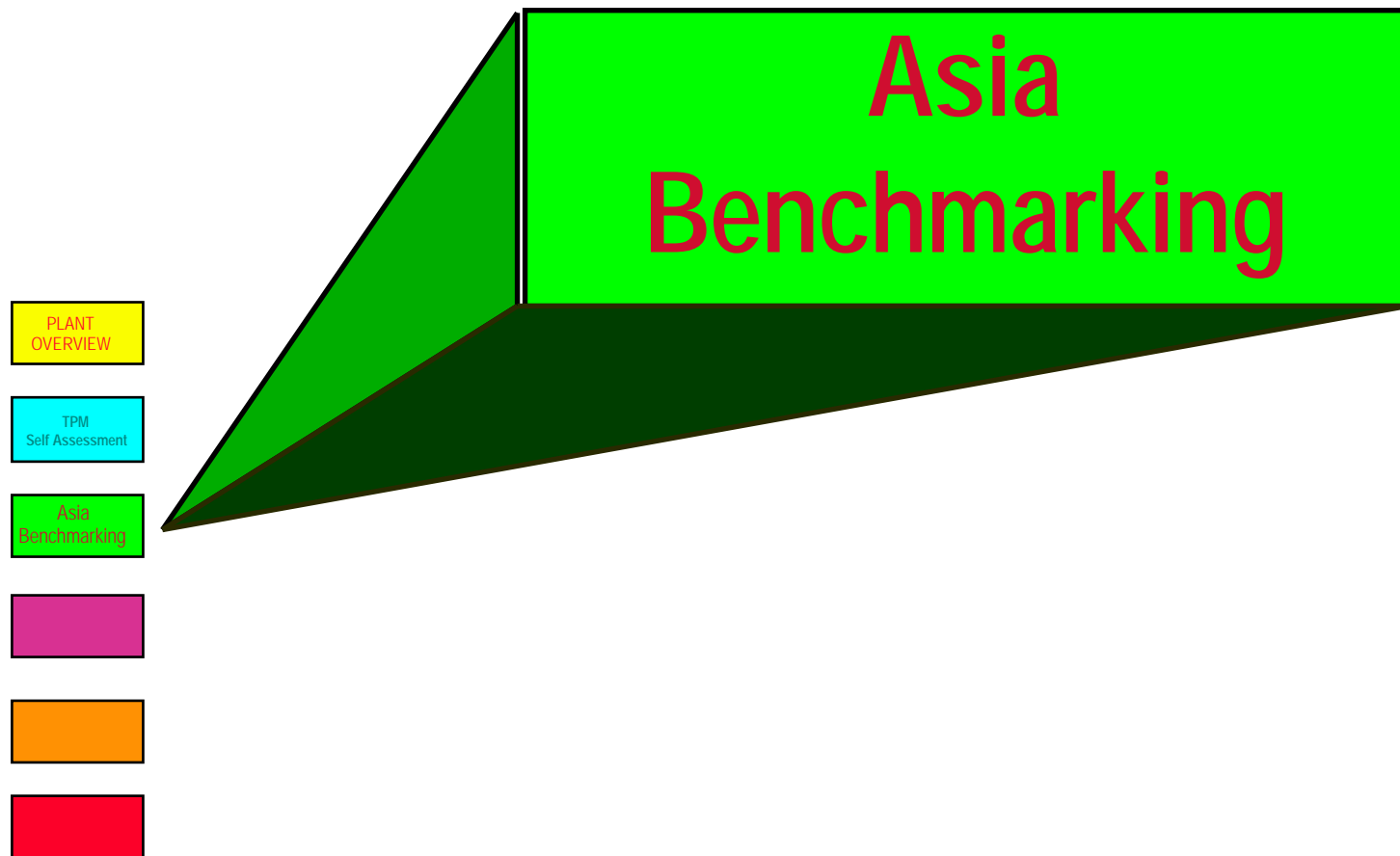
Model equipment is selected based on bottle neck operation.

Equipment conditions analysis performed.

Most of the teams cover the initial cleaning.

Activities are focused on six big losses detected and 5 S's implementation.

Courtesy, in part, of Motorola SPS.
Thank You!



TPM Benchmarking Asia Facilities

1996

Facility 1	April
Facility 2	May
Facility 3	June

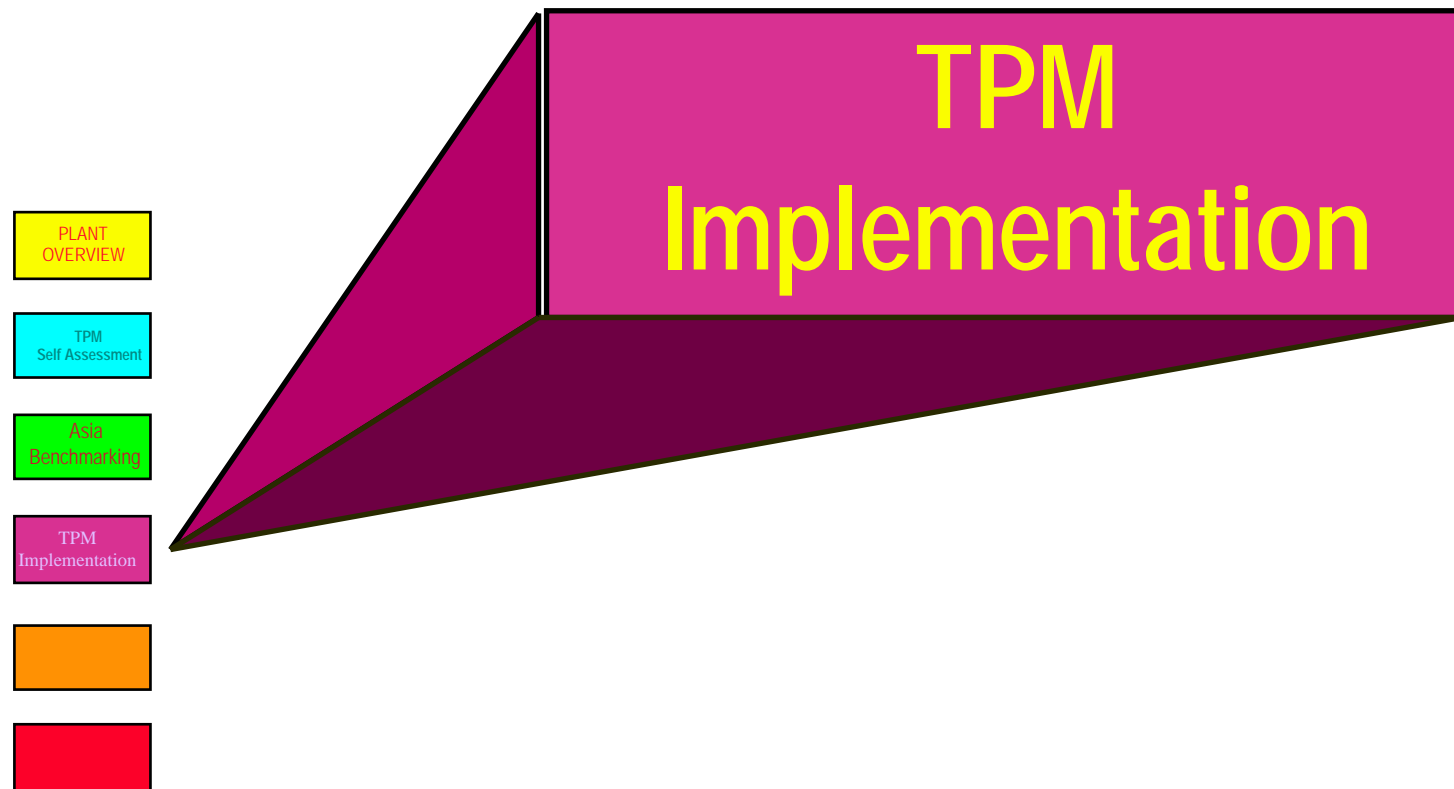
Committee: 4 Chosen Folks

Objective: Learn from Asia success experiences in TPM implementation and come up with directions for Plant implementation.

Benchmarking Conclusions

- Total management involvement.
- T.P.M. Manager (dedicated).
- A well defined implementation process.
- Provide people with time to work on it. (4- 6 Hr./wk).
- Each staff has their own T.P.M. Promoter full time.
- Focused in Consultant X model.
- Focused in just one product line per area.
- Budget assigned for consulting and external training.

Courtesy, in part, of Motorola SPS.
Thank You!

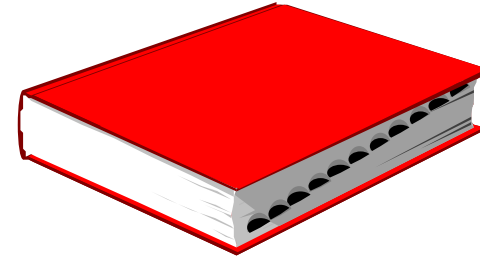


IMPLEMENTATION/CONSULTANT

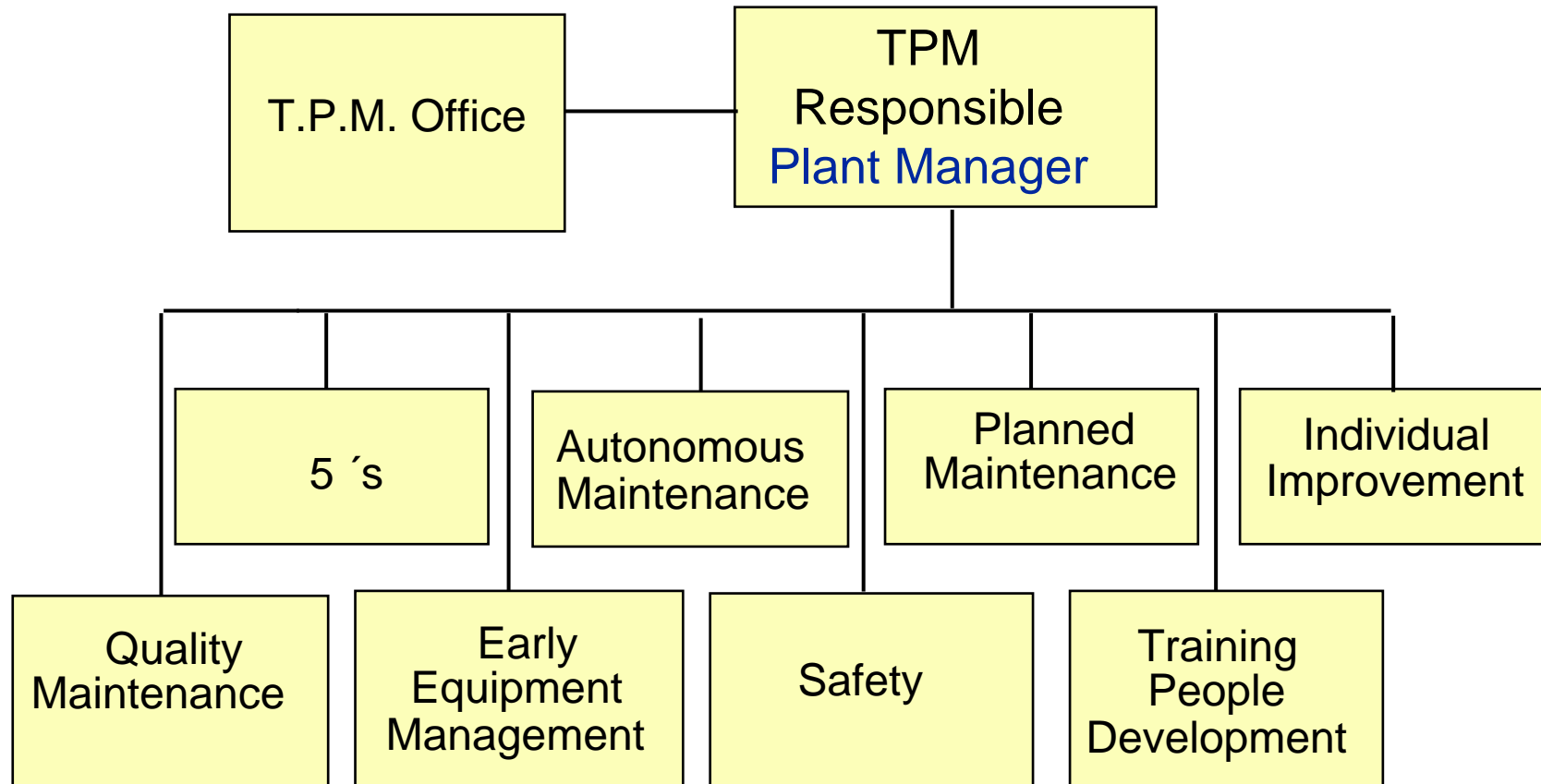
- * Q3 1996, **Consultant X** is selected to be Consultant.
- * Training of Managers, Team leaders and Team members
- * Master Plan Defined
- * TPM. implementation initiated according to Consultant X recommendations

T.P.M. POLICY

- # ESTABLISH AN INTEGRATED STRUCTURE TO PROMOTE T.P.M. AS A COMPANY CULTURE.
- # MAXIMIZE OVERALL EQUIPMENT EFFECTIVENESS
- # TOTAL EMPLOYEE INVOLVEMENT.
- # CULTIVATE EQUIPMENT & PROCESS RELATED EXPERTISE THROUGHOUT SHOP FLOOR. (Autonomous Maintenance, Planned Maintenance etc..)
- # ESTABLISH A RELIABILITY AND MAINTAINABILITY SYSTEM TO MAXIMIZE EQUIPMENT LIFE TIME. (Planned Maintenance Autonomous Maintenance, Individual Improvement, Early Equipment Management.)
- # ALL EMPLOYEES MUST PARTICIPATE IN T.P.M TRAINING PROGRAM.
- # ALL AREAS MUST FOLLOW T.P.M. ESTABLISHED GUIDE LINES.
- # DEPARTMENT HEAD IS RESPONSIBLE TO ACCOMPLISH AND SUPPORT T.P.M. GOALS.

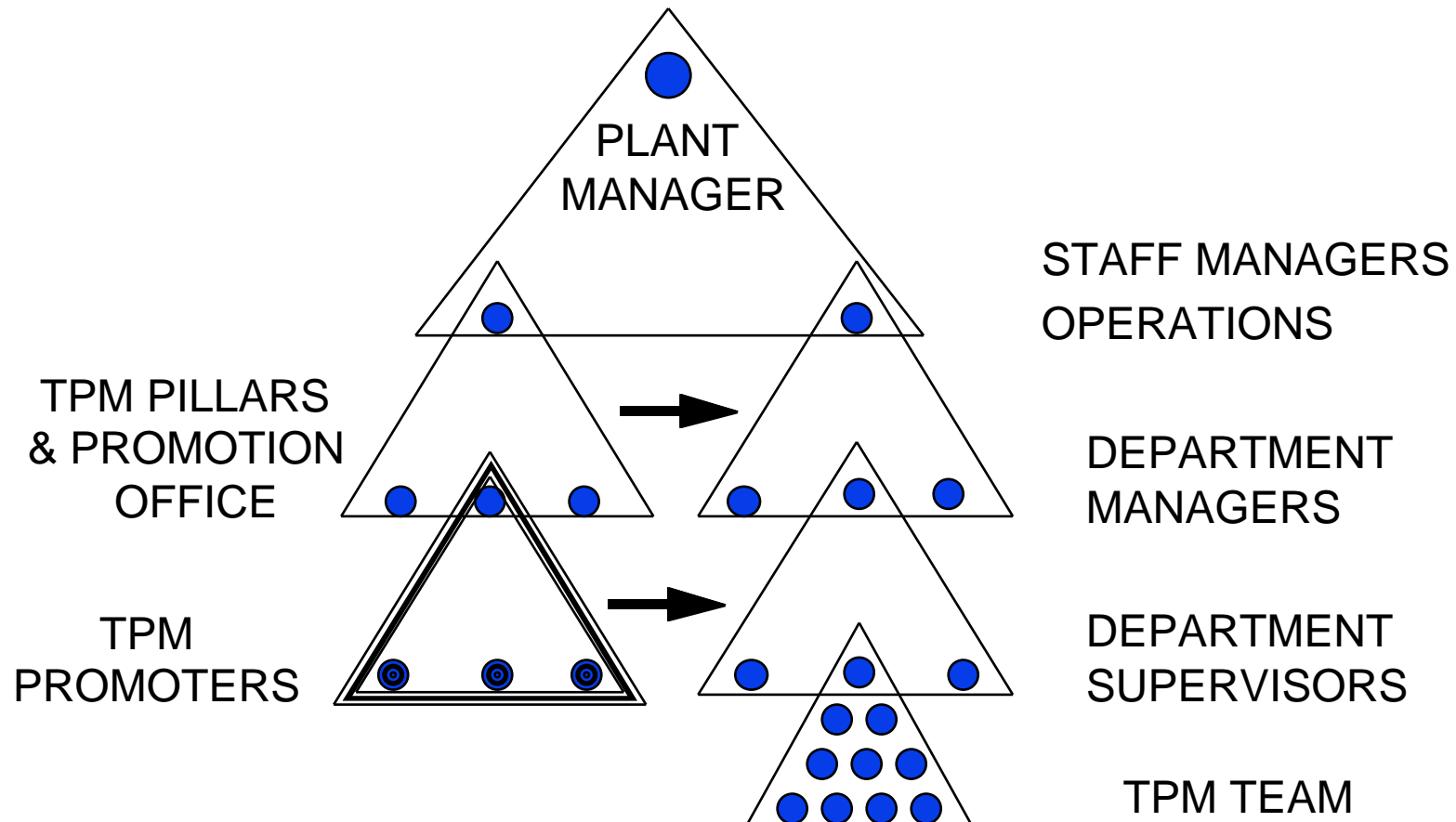


T.P.M. PLANT WIDE STRUCTURE

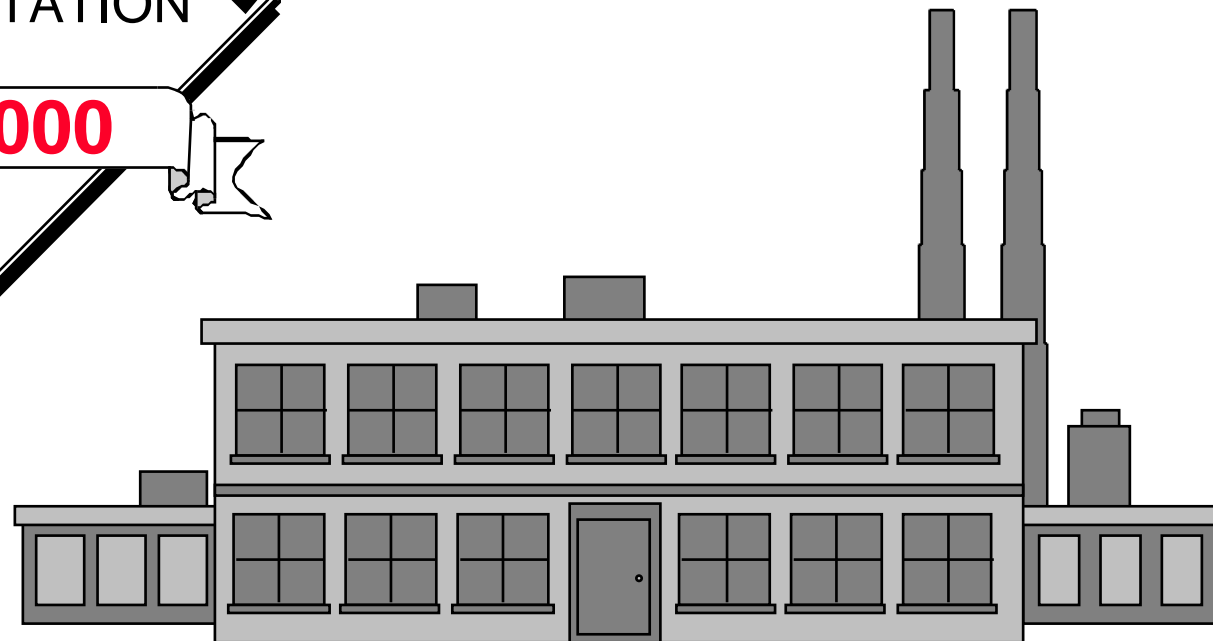
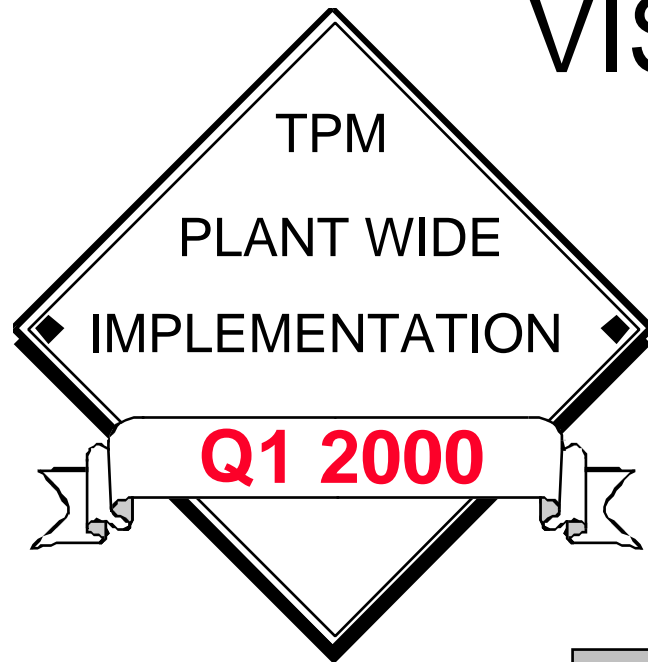


PROMOTION STRUCTURE

(OVERLAPPING SMALL GROUPS)



VISION STATEMENT:



T.P.M. IMPLEMENTATION ACTIVITIES

MANAGER TEAMS



PREPARATION / PLANNING STAGE

DEFINE PILOT LINES

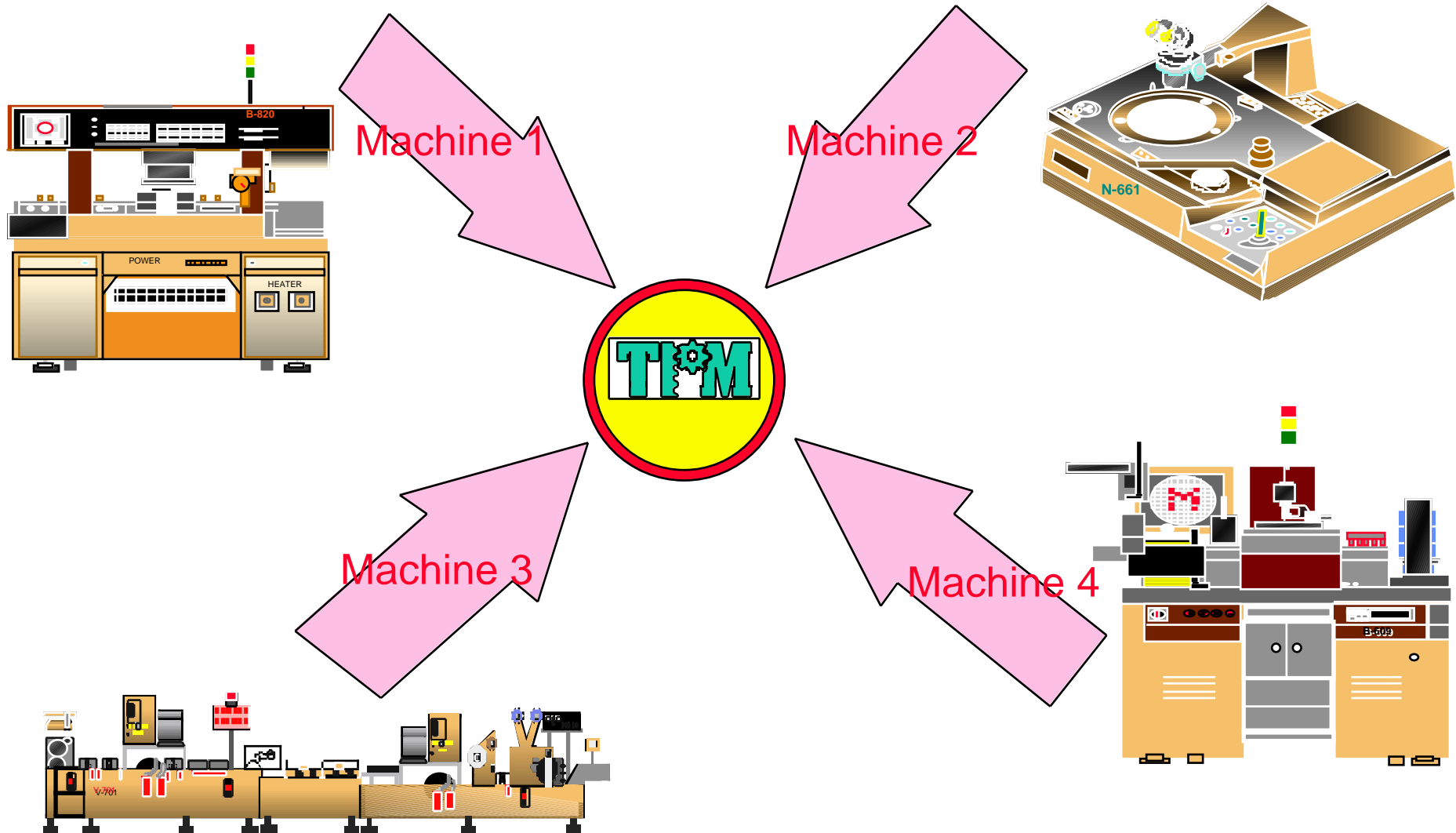
AMOUNT OF MACHINES INCLUDED PER LINE

DEFINE CORE TEAM MEMBERS OF EACH LINE

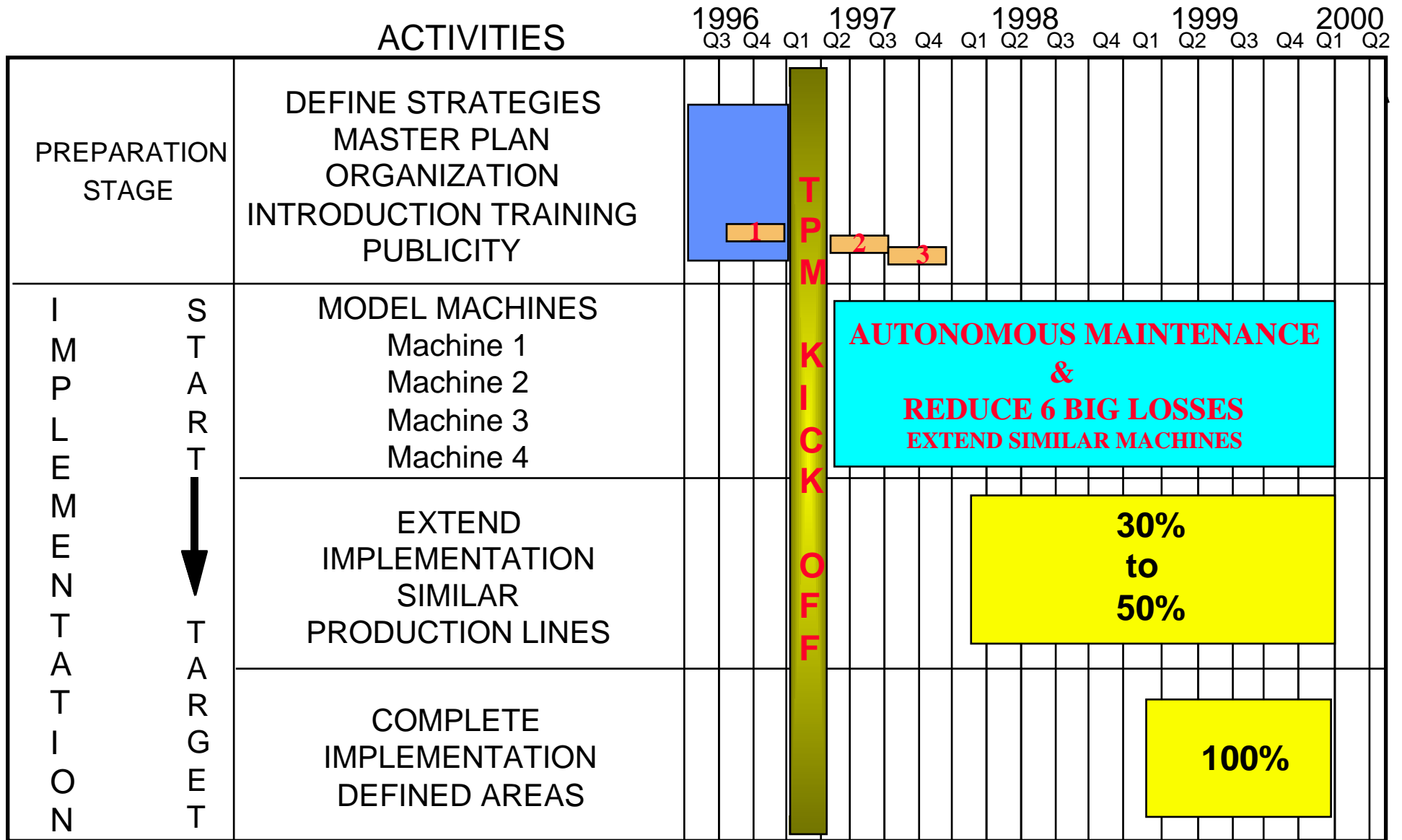
SELECT TEAM MEMBERS PER MACHINE

START ACTIVITIES IN PILOT MACHINES (bottle neck.)

Line and Machine Selection



TPM Implementation Plan



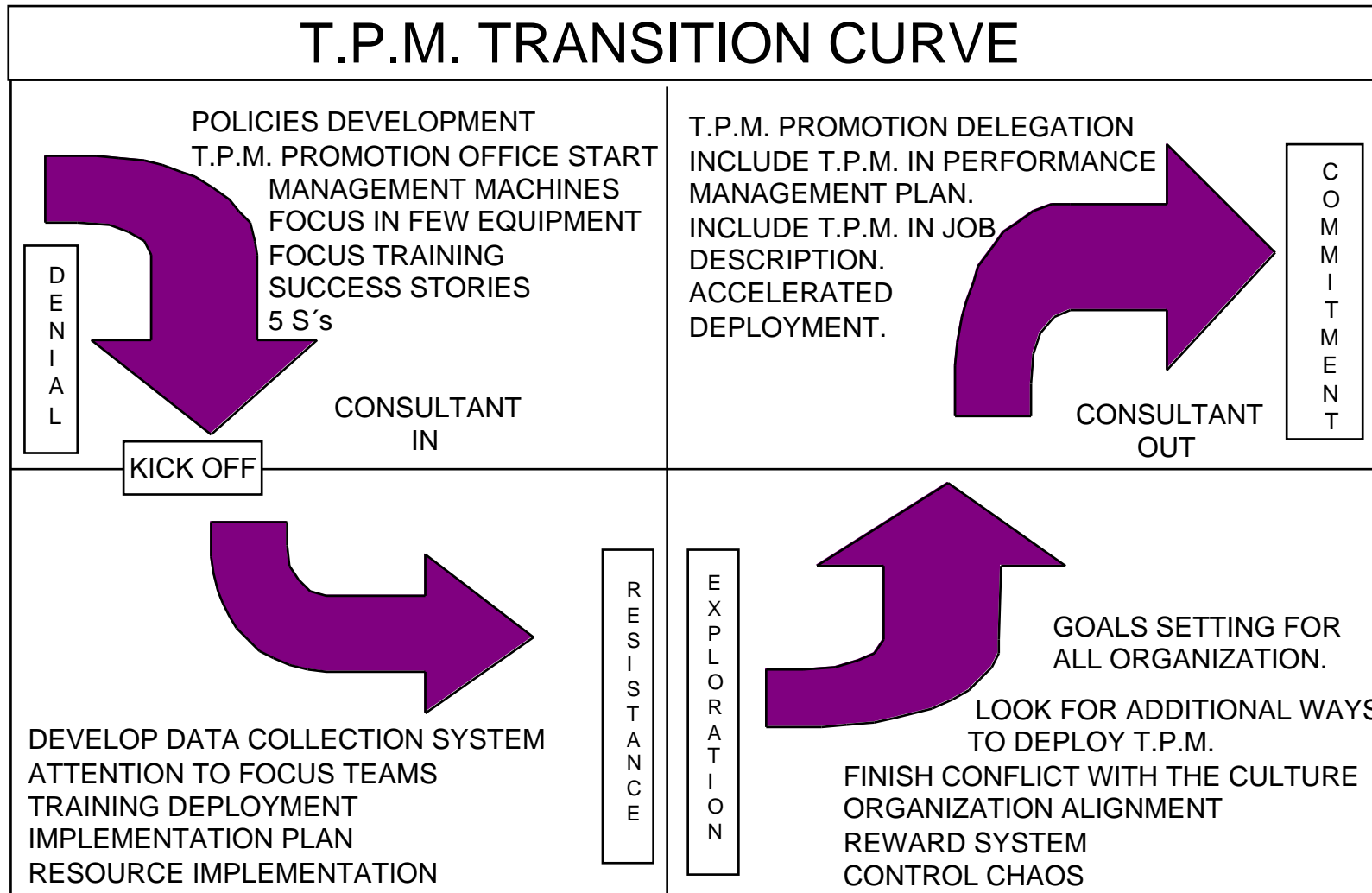
TPM KICK OFF



TPM 90 Days Explosion Plan

TPM Teams Deployment

		October				November				December							
		ww40	ww41	ww42	ww43	ww44	ww45	ww46	ww47	ww48	ww49	ww50	ww51	ww52			
TPM Teams Deployment	Machine 1																
	PILOT TEAM					Start											
	Planned maintenance									Start							
	6 big losses					Start											
	Individual Improvement									Start							
	10 Extension teams	step 1-2								4 mc		3 mc		3 mc			
	19 Extension teams	Start step 1								7 mc		6 mc		6 mc			
	Machine 2																
	PILOT TEAM					Start											
	Planned maintenance									Start							
	6 big losses					Step 1				Step 2							
	Individual Improvement									Step 1							
	11 Extension teams	step 1-2								B-613		3 mc		2 mc	2 mc	B-601	L-604
	Machine 3																
PILOT TEAM									Start								
Planned maintenance									Start								
6 big losses					Start												
Individual Improvement									Start								
6 Extension teams	step 1-2								2 mc		4 mc						
2 Extension teams	Start step 1				Start												
Machine 4																	
PILOT TEAM					Start												
Planned maintenance					Start												
6 big losses					Start												
Individual Improvement									Start								
4 extension teams	Start step 1				a-820				a-821	J-701	J-601						
PILLARS	IMPLEMENTATION MODEL																
	GANTT																
Support Activities	TPM Activity Board	Extension Teams															
	Server	Data collection															
	GM Audit					M1				M2				M3		M4	
	Team presentations	■		■		■		■		■		■		■			
	TPM Office Audit	■		■		■		■		■		■		■			
	Consultant visit									■							
	TPM Meeting																
	Local BOOT CAMP					■											
	TPM MCOE MEETING, JAPAN					■											
	Pillars meeting					■											



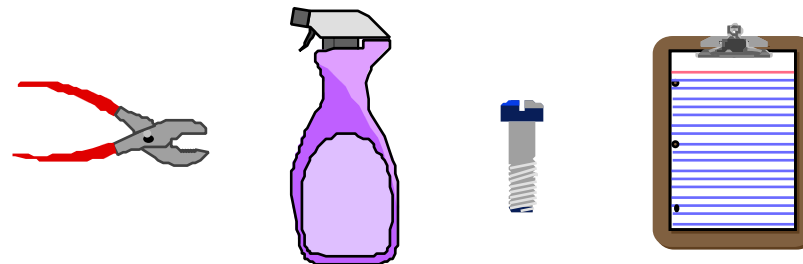
KEY GOALS

1.- TOTAL EQUIPMENT EFFECTIVENESS	%	85
A) Equipment Breakdown	HOURS/MONTH	1/10
B) M.T.B.A.	MINUTES	1x10x
C) M.T.B.F.	HOURS	1x2x
2.- REJECT CAUSED BY LINE EQUIPMENT	PPM	1/5
3.- LINE REJECT RATE	%	1/5
4.- CYCLE TIME	DAYS	0.8X
5.- FATAL ERROR AT CUSTOMER	# OF	0
6.- ON TIME DELIVERED	%	98
7.- MANUFACTURING COST	USD	20% LESS
8.- LABOR PRODUCTIVITY	K.UNITS /# OF D/L	2X

AUTONOMOUS MAINTENANCE.



MANUFACTURING SPECIALIST



AUTONOMOUS MAINTENANCE IS:

Maintenance performed by equipment operators.

THE FIRST 3 STEPS OF AUTONOMOUS MAINTENANCE.

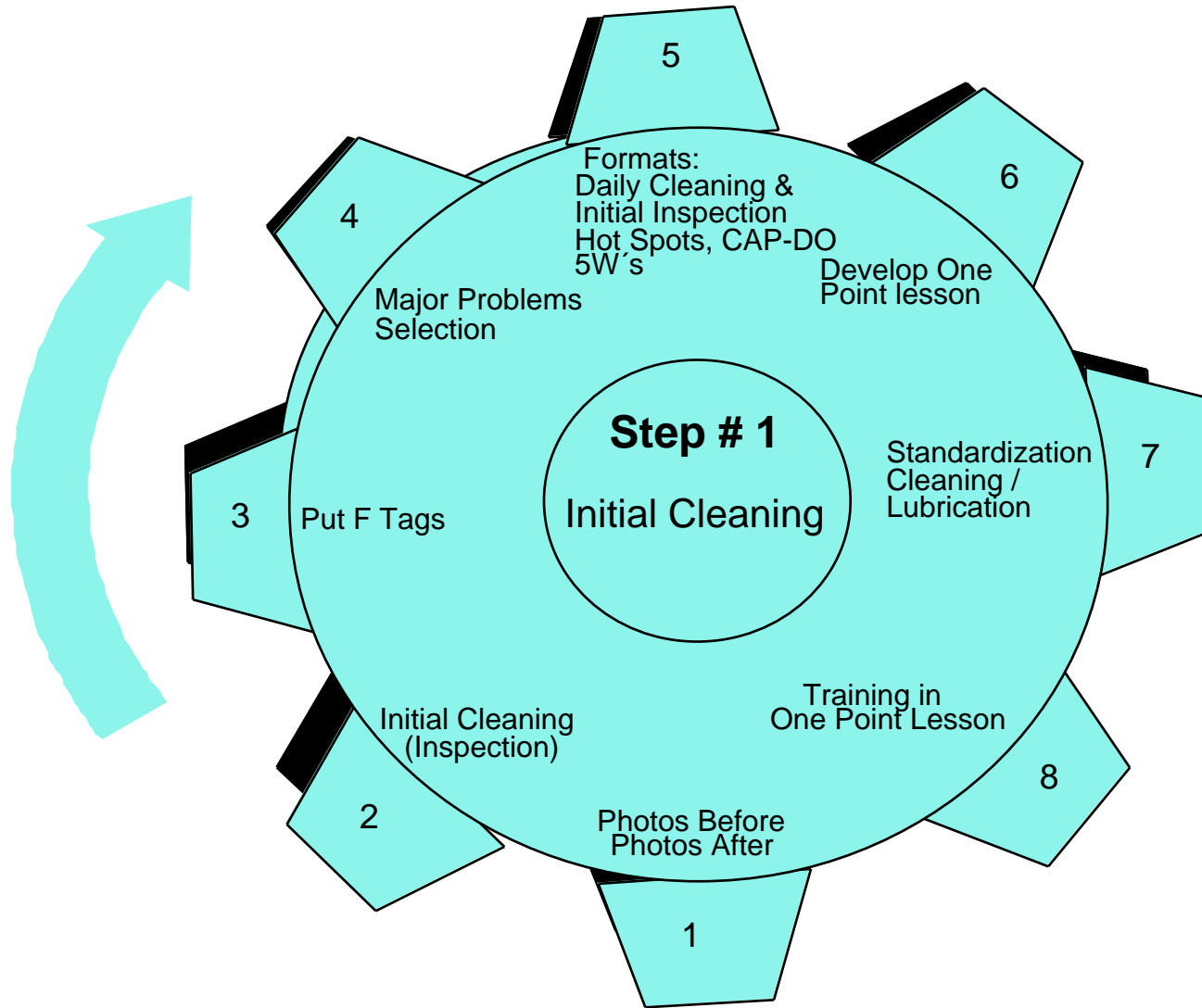
STEP # 1 INITIAL CLEANING.

STEP # 2 COUNTERMEASURES FOR THE CAUSES
OF FORCED DETERIORATION AND IMPROVING
HARD-TO-ACCESS AREAS.

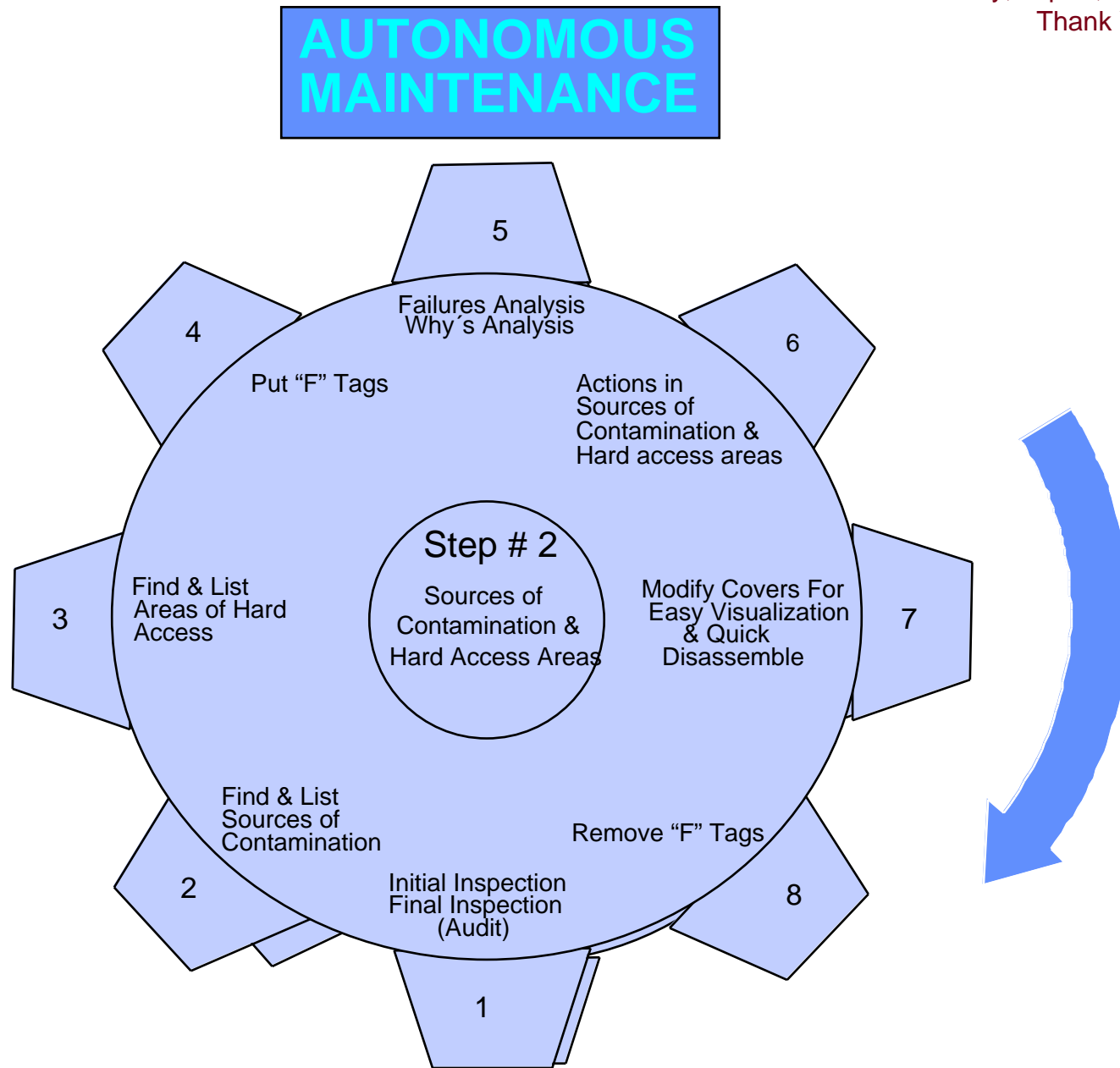
STEP # 3 MAKING A TENTATIVE CLEANING/
LUBRICATION STANDARD.

Courtesy, in part, of Motorola SPS.
Thank You!

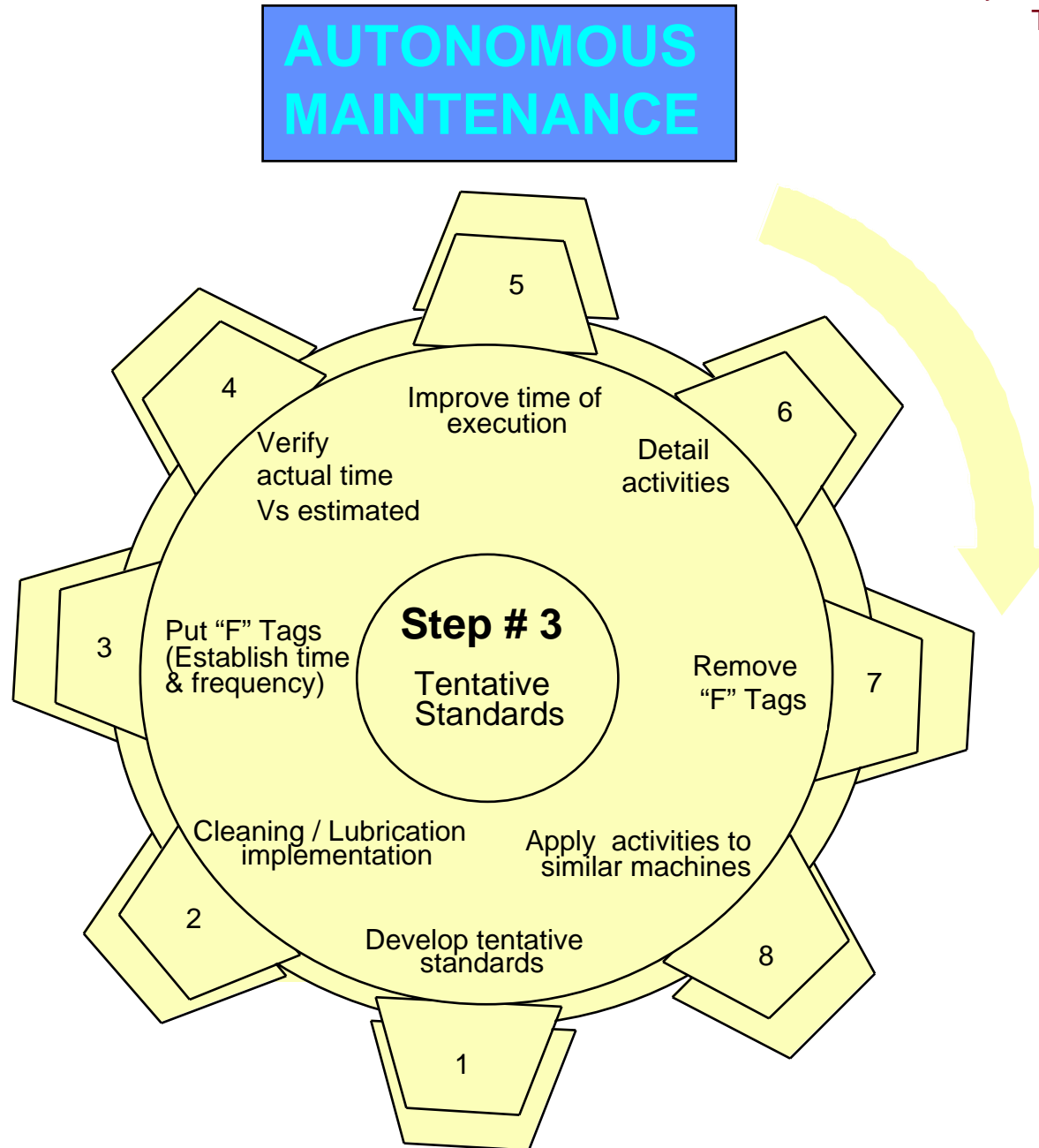
AUTONOMOUS MAINTENANCE



Courtesy, in part, of Motorola SPS.
Thank You!



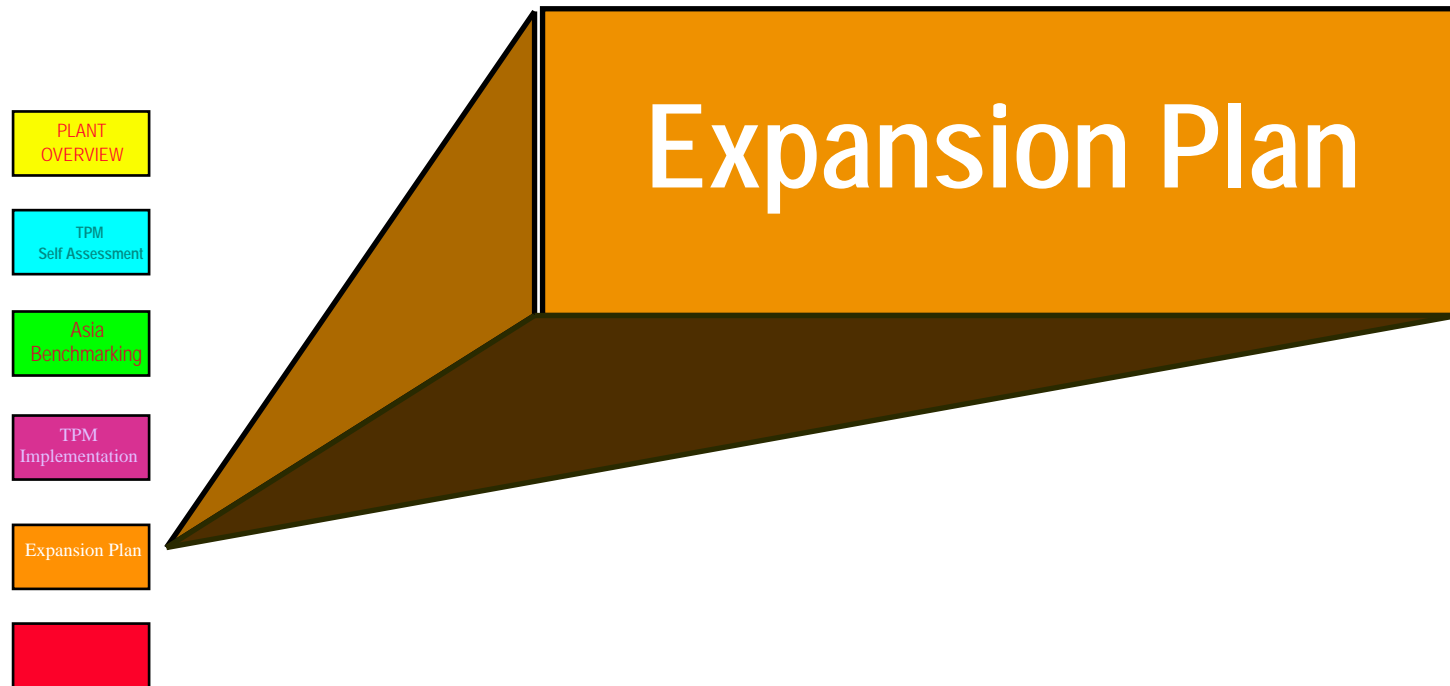
Courtesy, in part, of Motorola SPS.
Thank You!



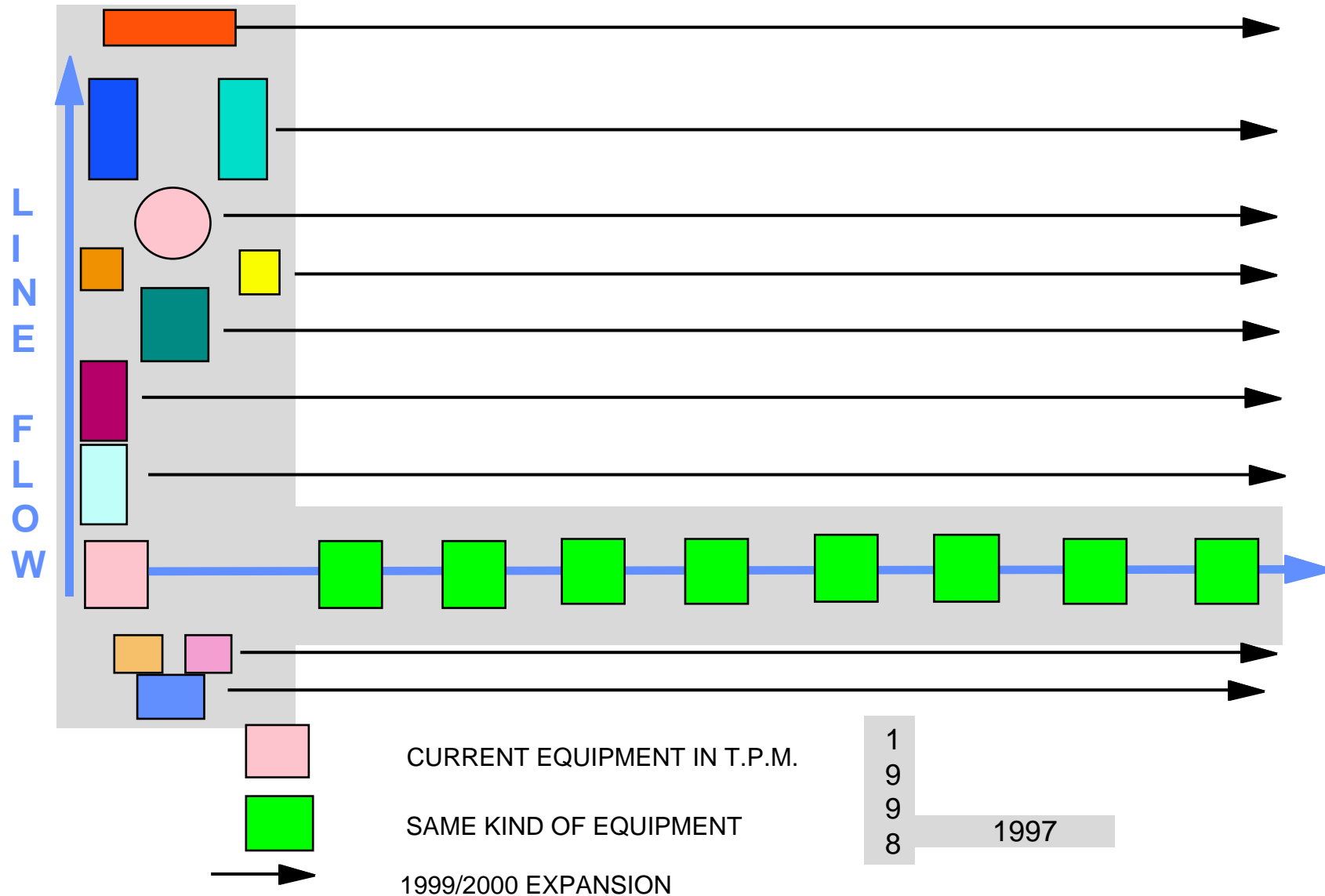
TPM Teams Status

October 1997

•Number of Hot Spots detected:	284
•Number of Hot Spots solved:	126
•One Point Lesson developed:	44
•One Point Lesson Taught:	34
•Number of teams on TPM:	27
•Teams on step 3:	1
•Teams on step 2:	2
•Teams on step 1:	24

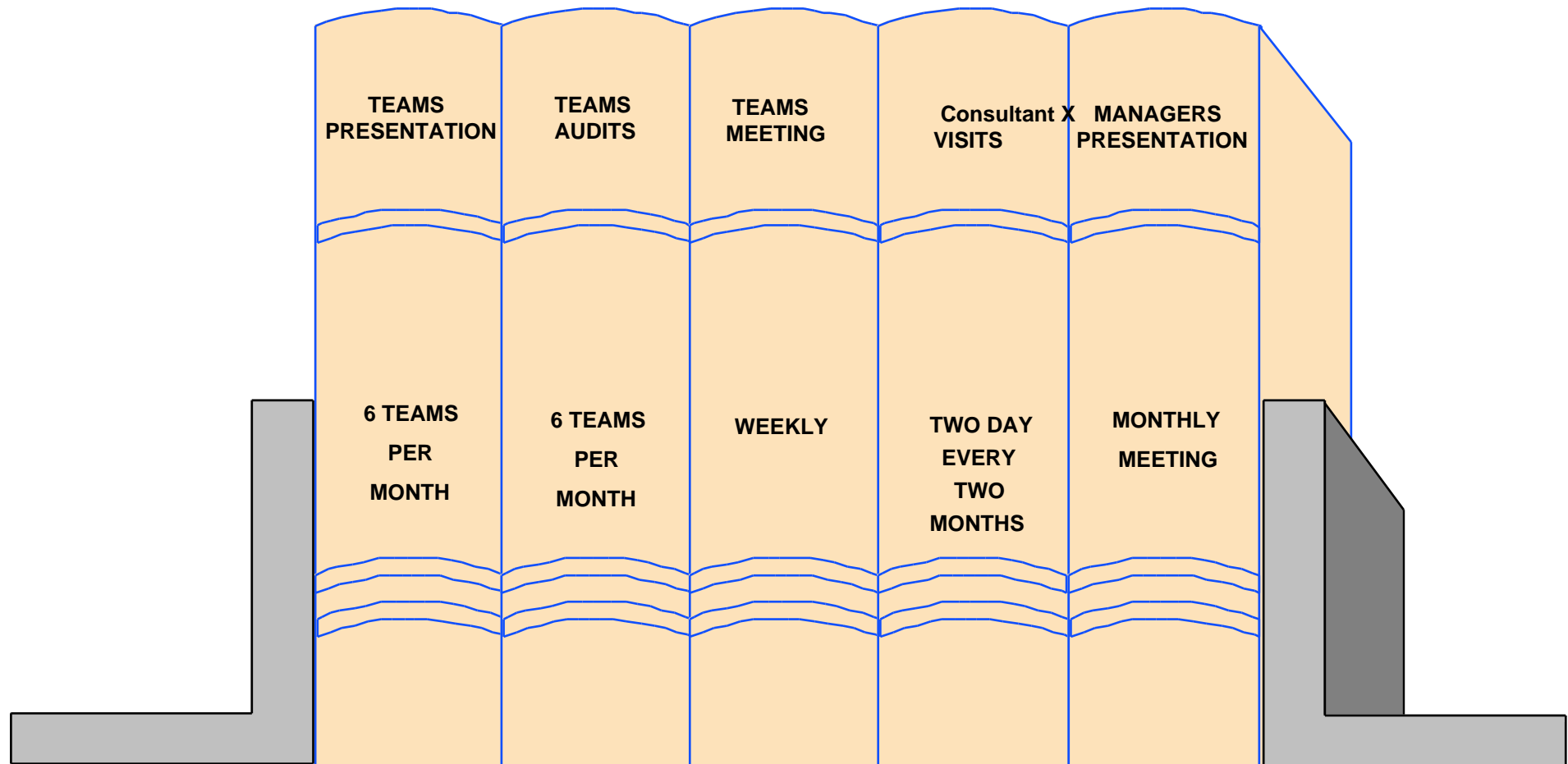


T.P.M. DEPLOYMENT

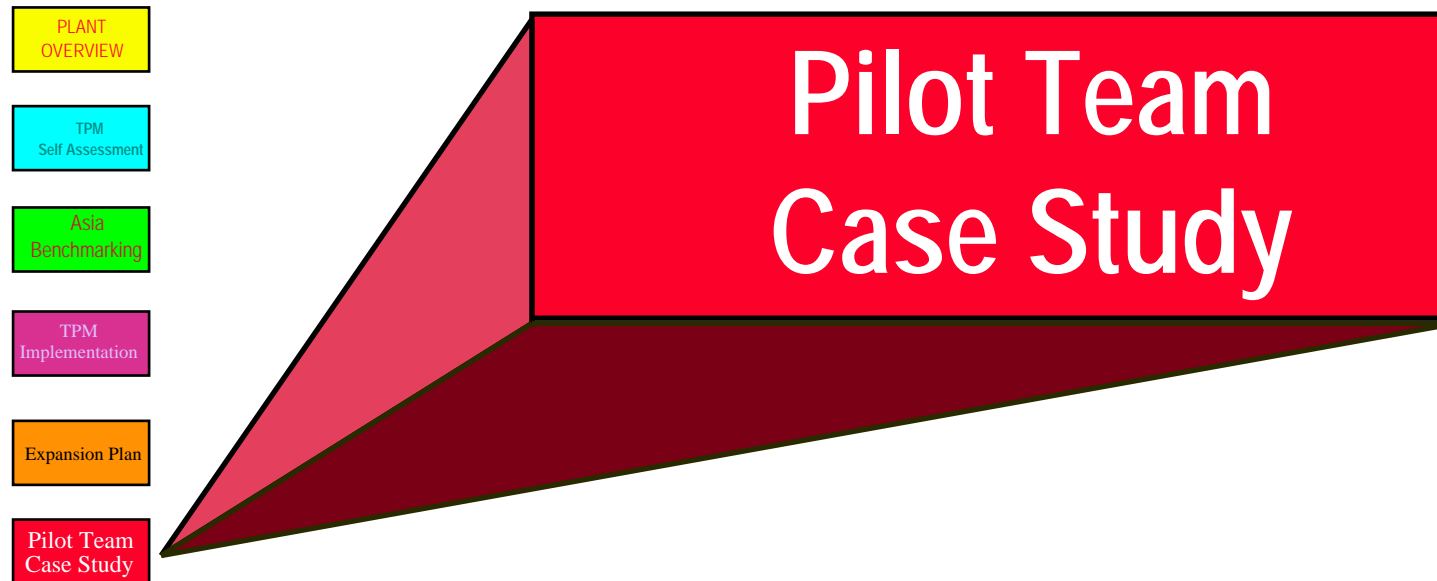


PROJECTED PROGRESS IN TEAMS Q-1' 98			
Line	A.M. STEP # 1	A.M. STEP # 2	A.M. STEP # 3
Line 1	11	16	03
Line 2	03	11	01
Line 3	03	08	01
Line 4	04	01	01

T.P.M. FOLLOW-UP

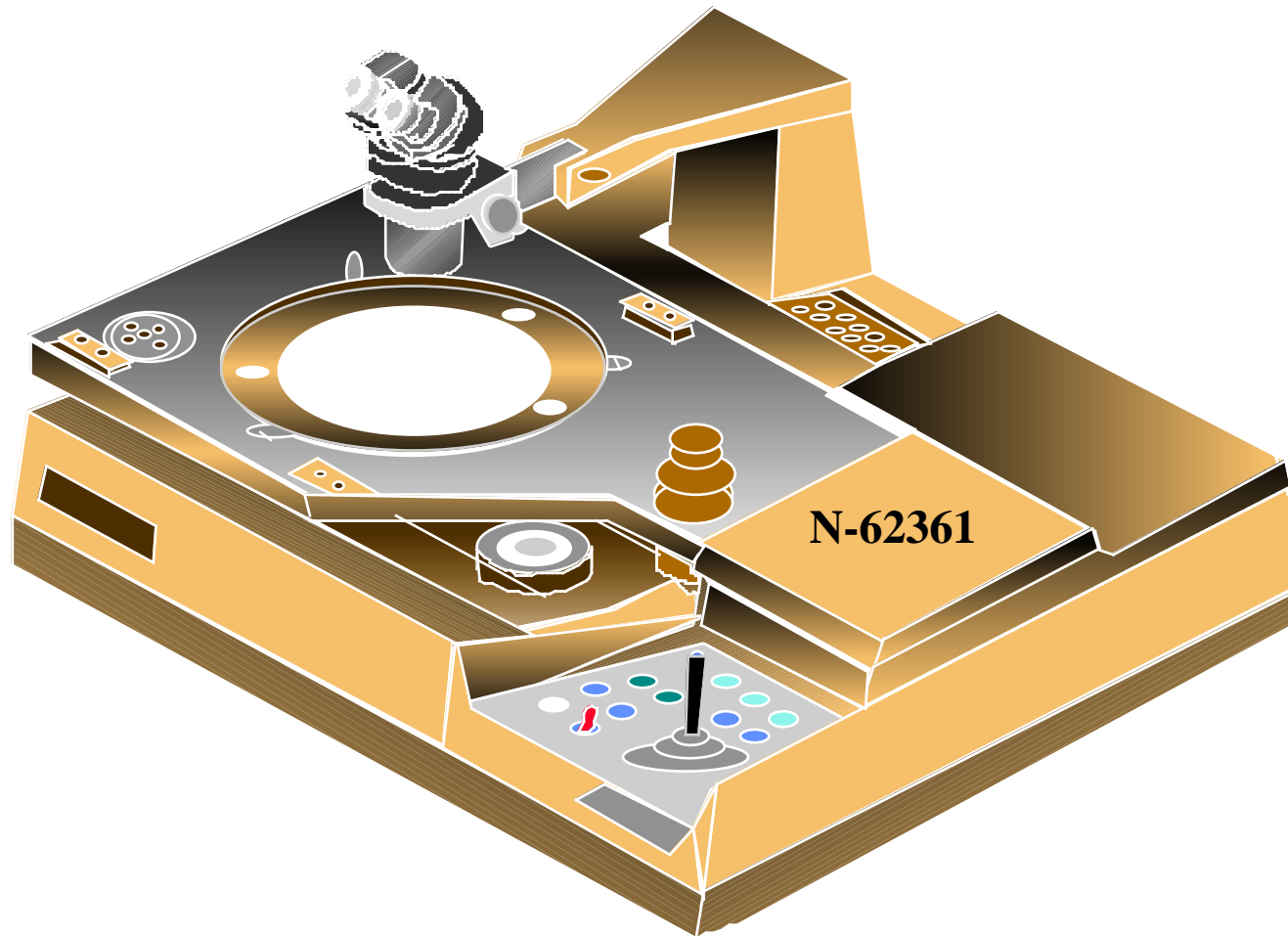


Courtesy, in part, of Motorola SPS.
Thank You!

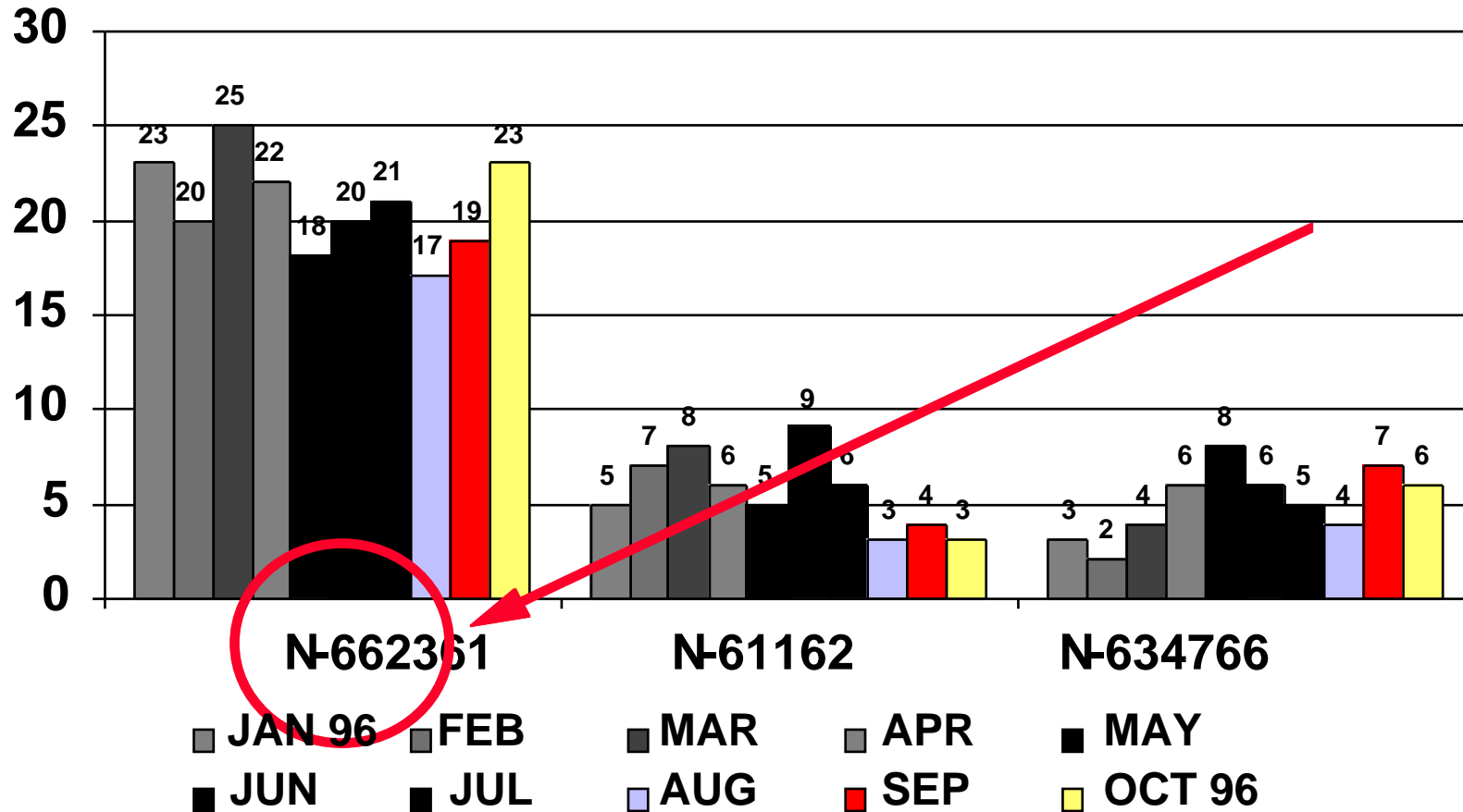


Courtesy, in part, of Motorola SPS.
Thank You!

PILOT MACHINE

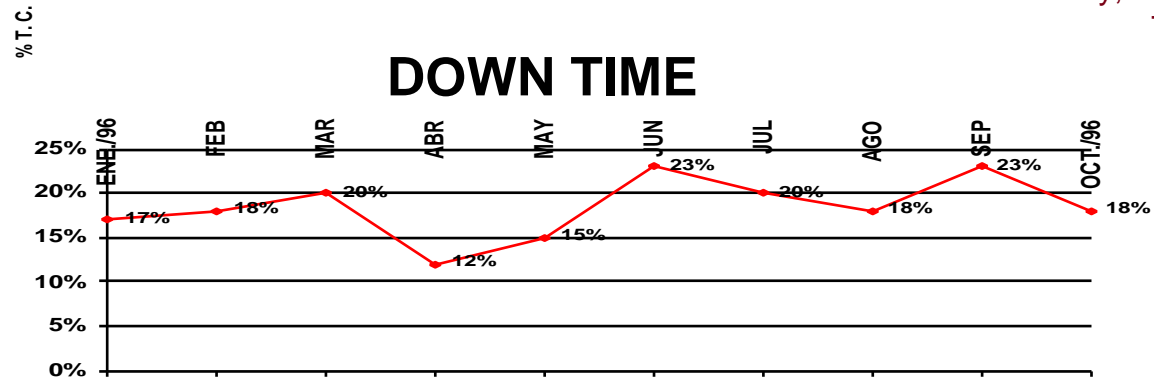


Defectives

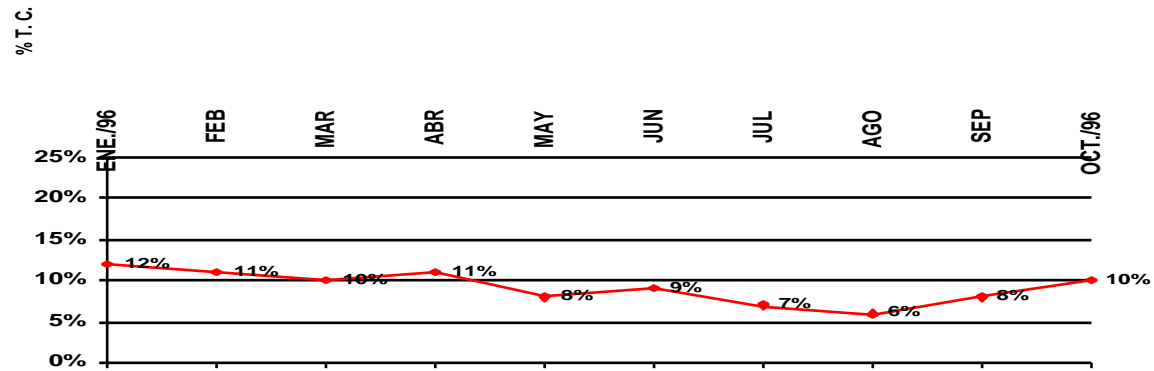


Courtesy, in part, of Motorola SPS.
Thank You!

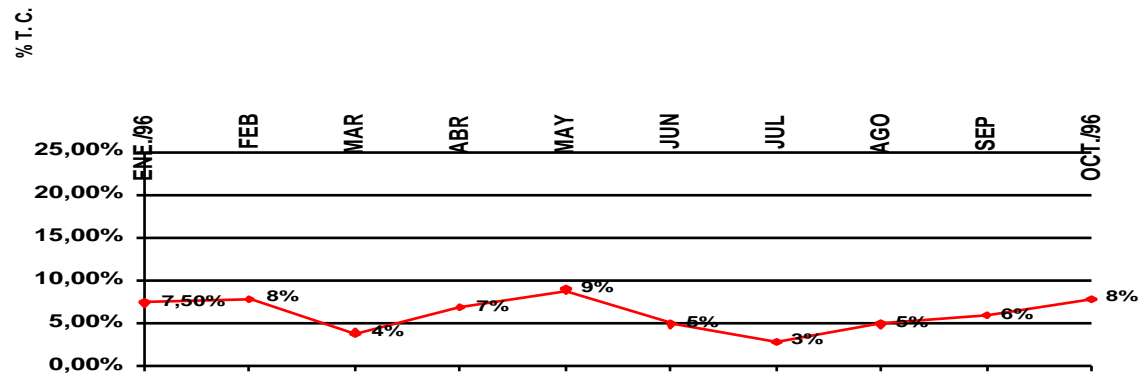
N-662361



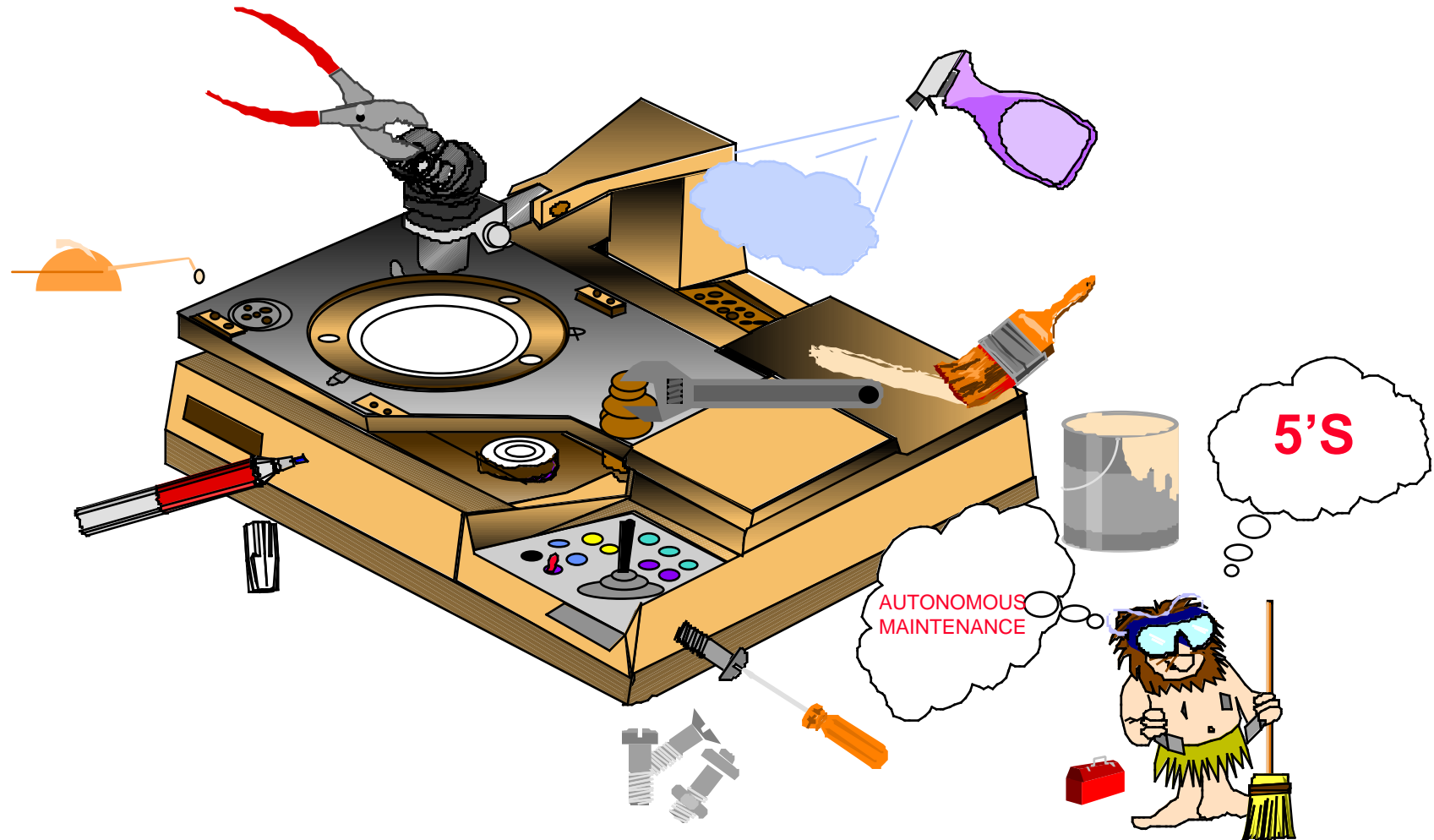
N-663242



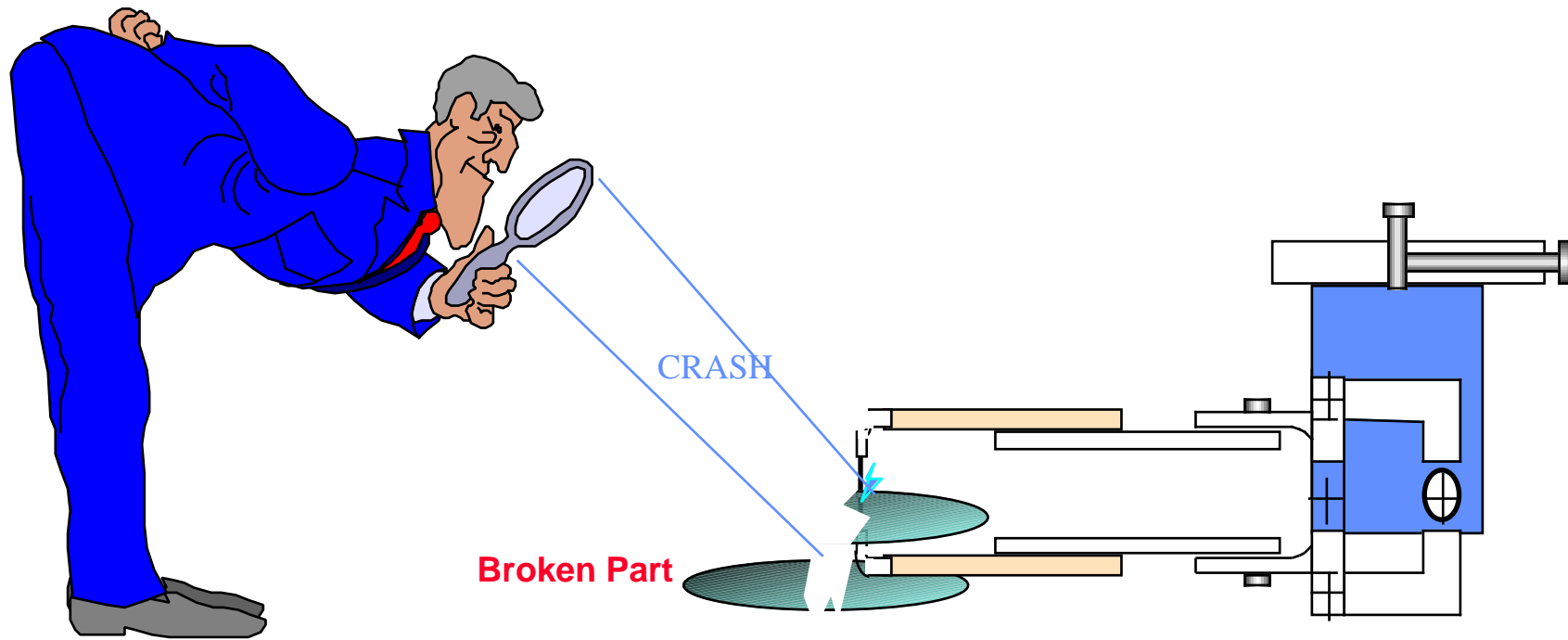
N-649666

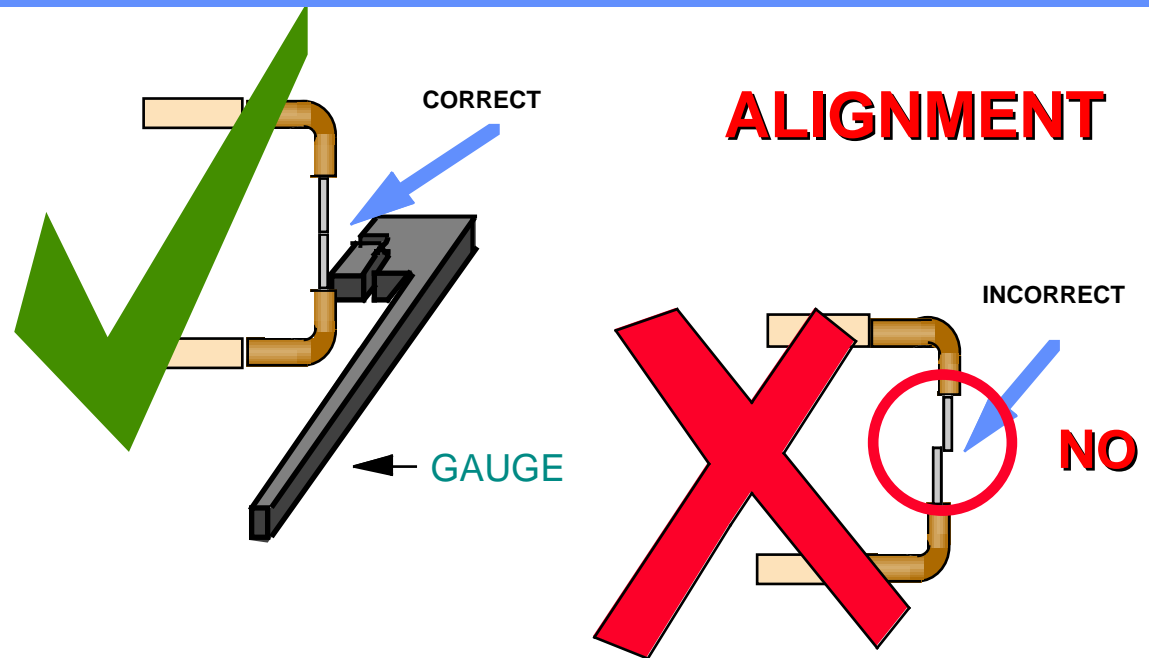
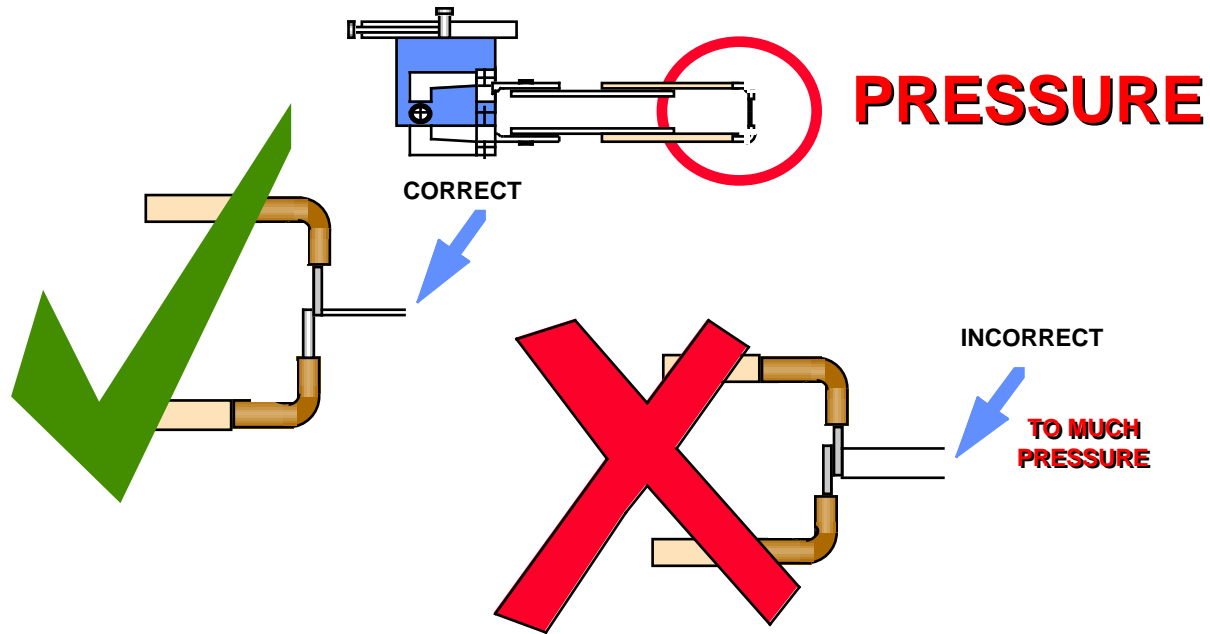


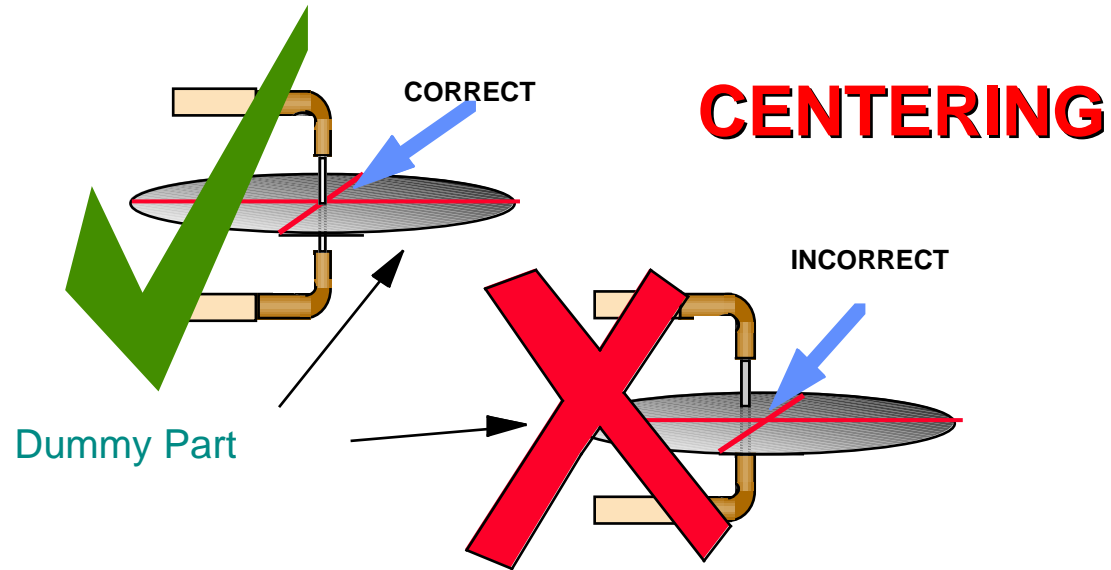
CLEANING IS INSPECTION...



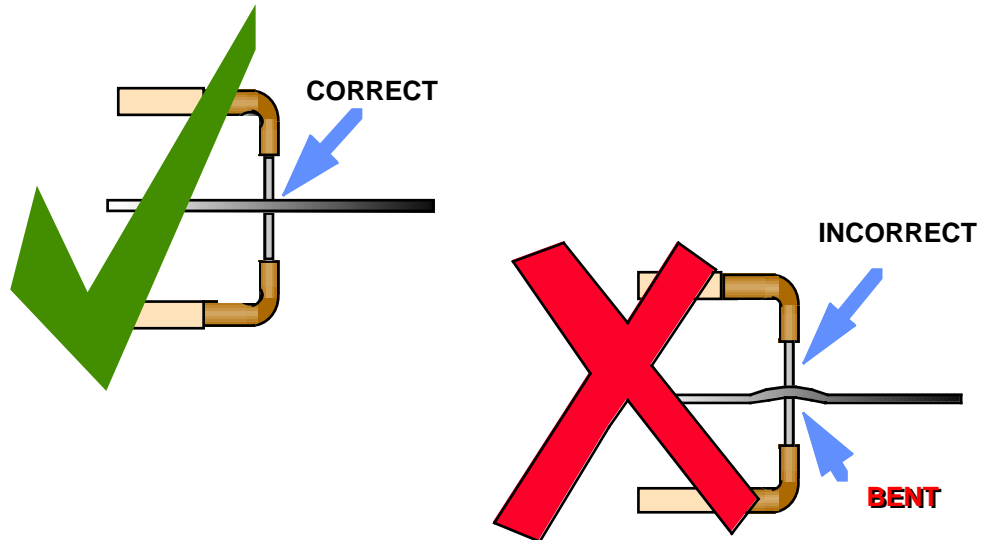
INSPECTION IS DETECTION.



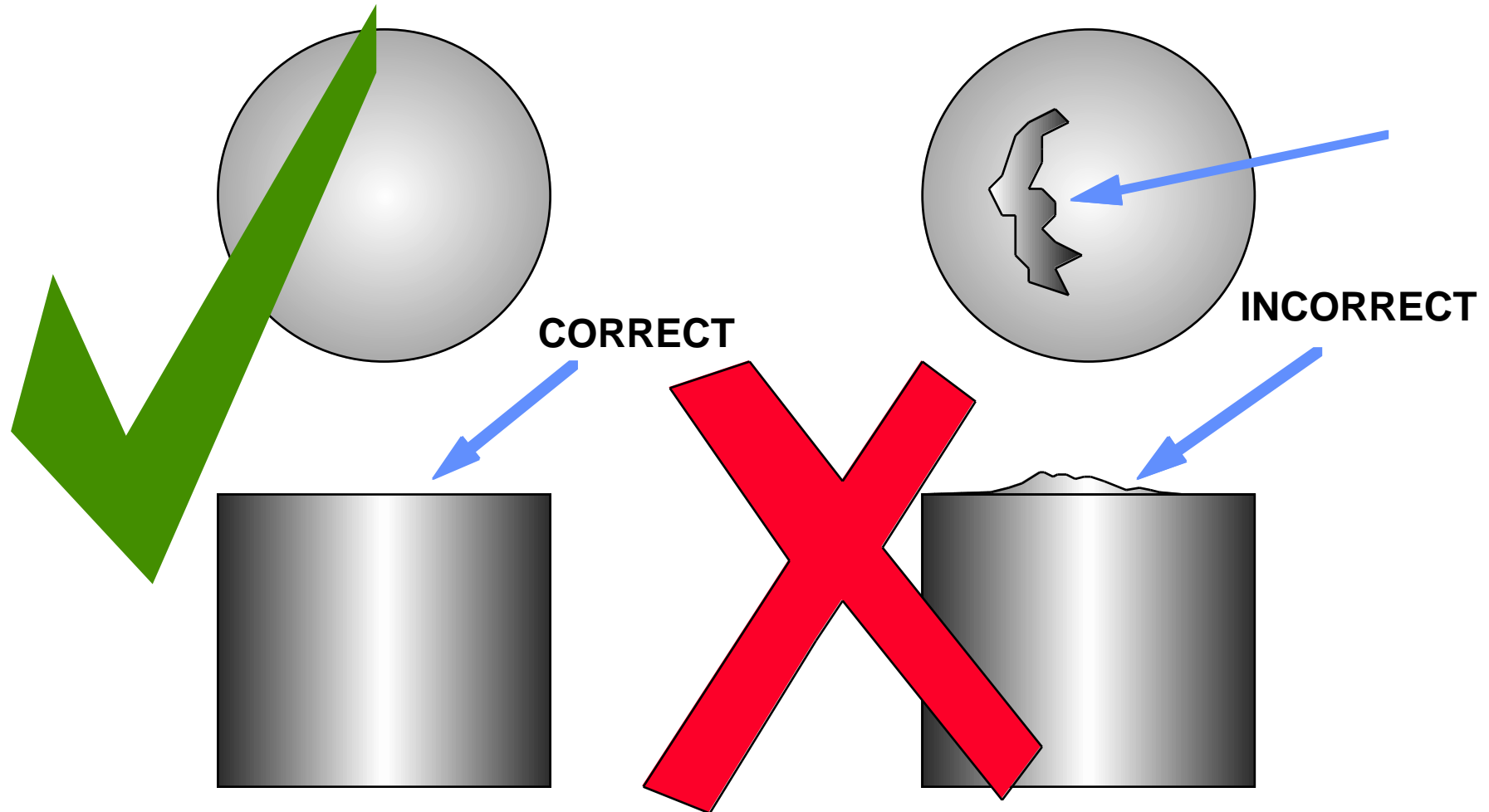




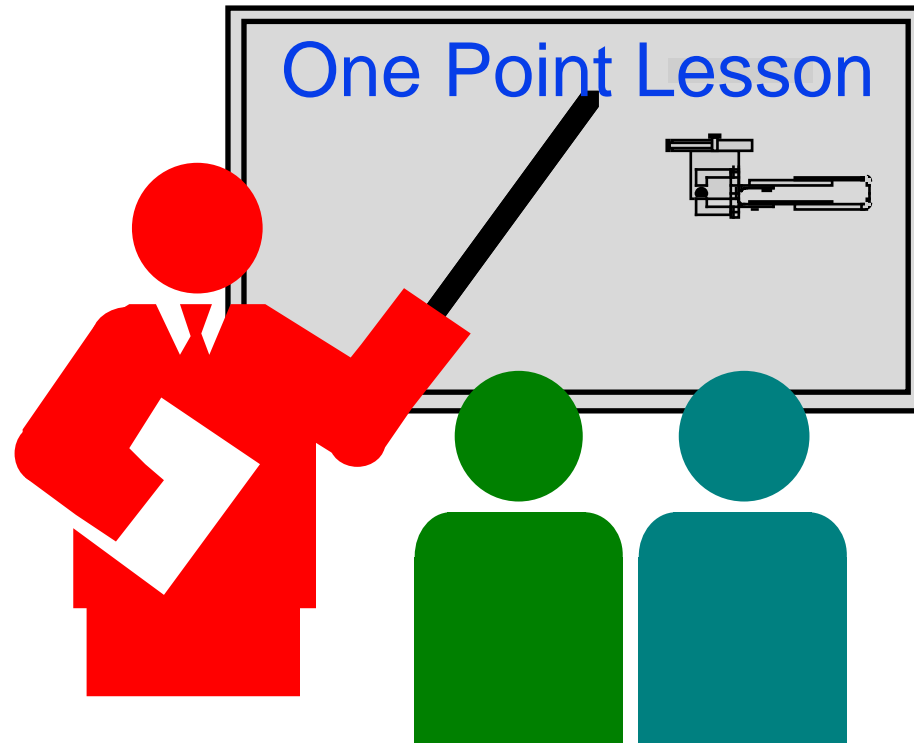
SYMMETRY



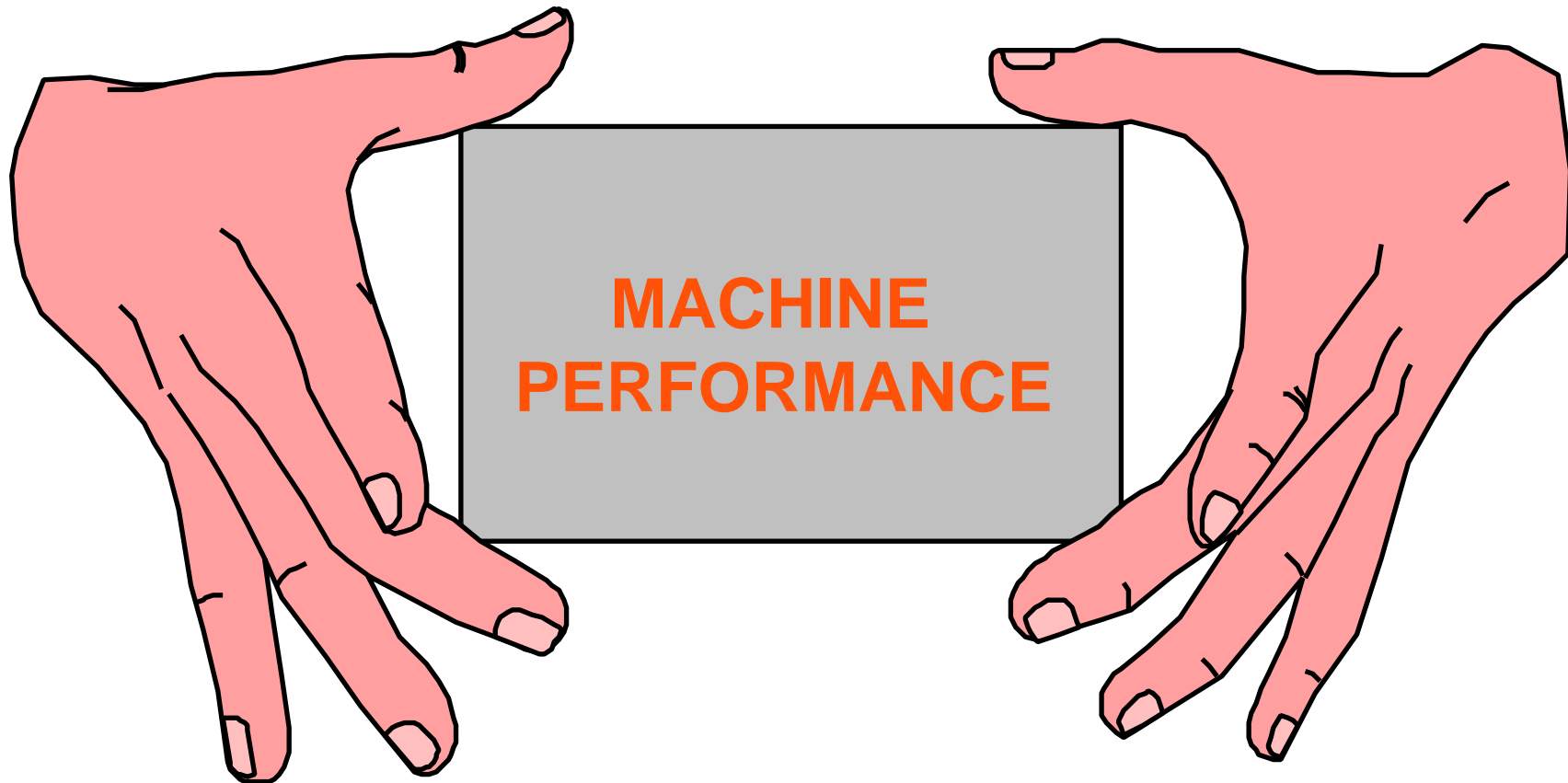
CONTACT



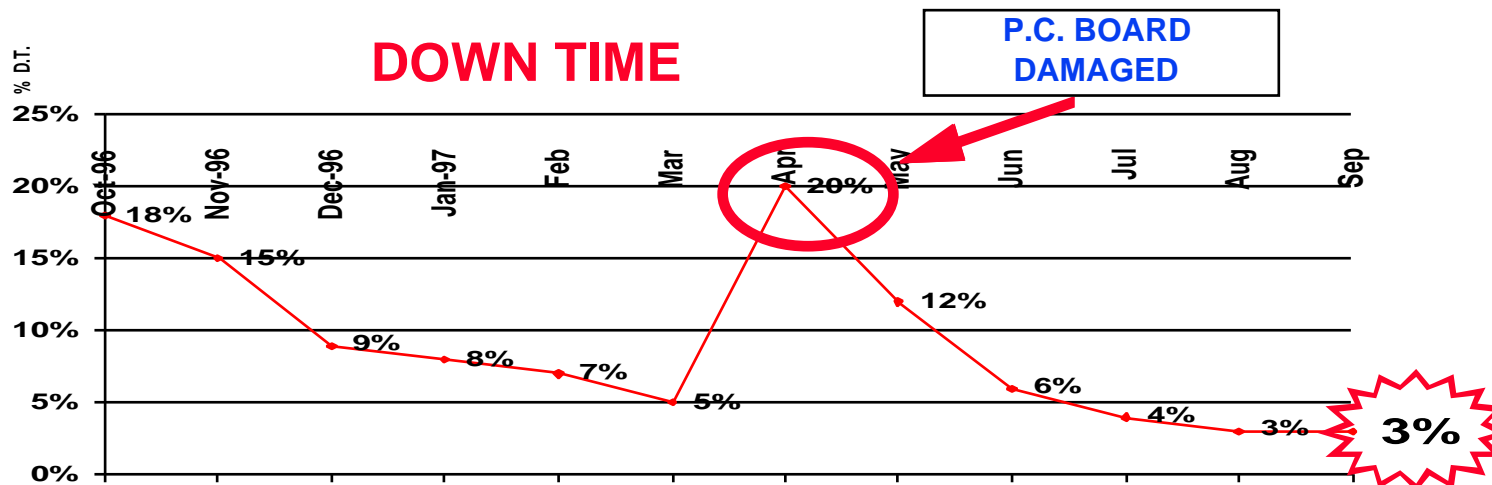
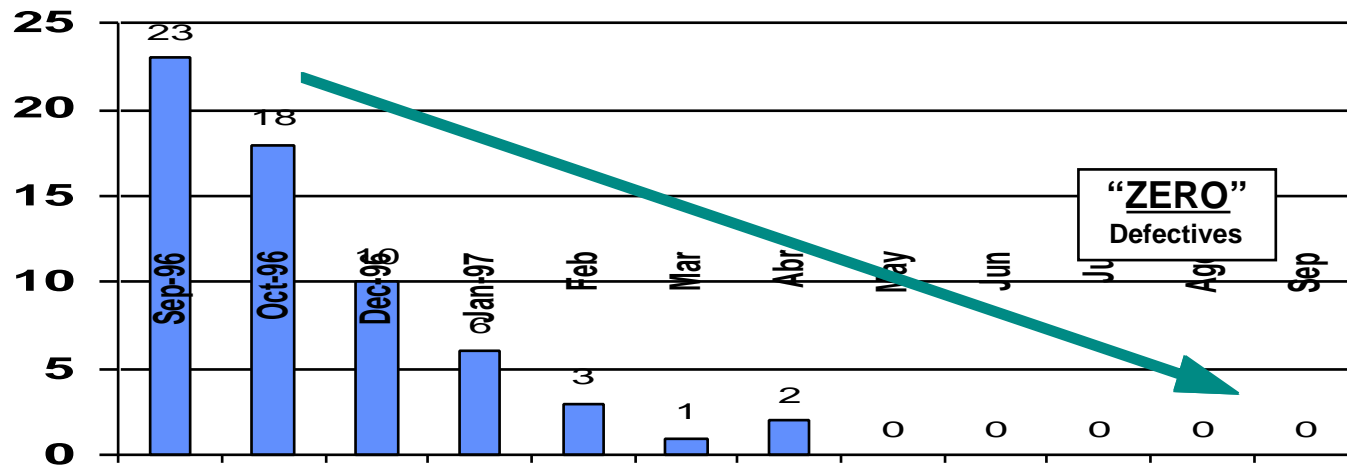
TO STANDARDIZE AND PREVENT RECURRENCE



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Thank You!

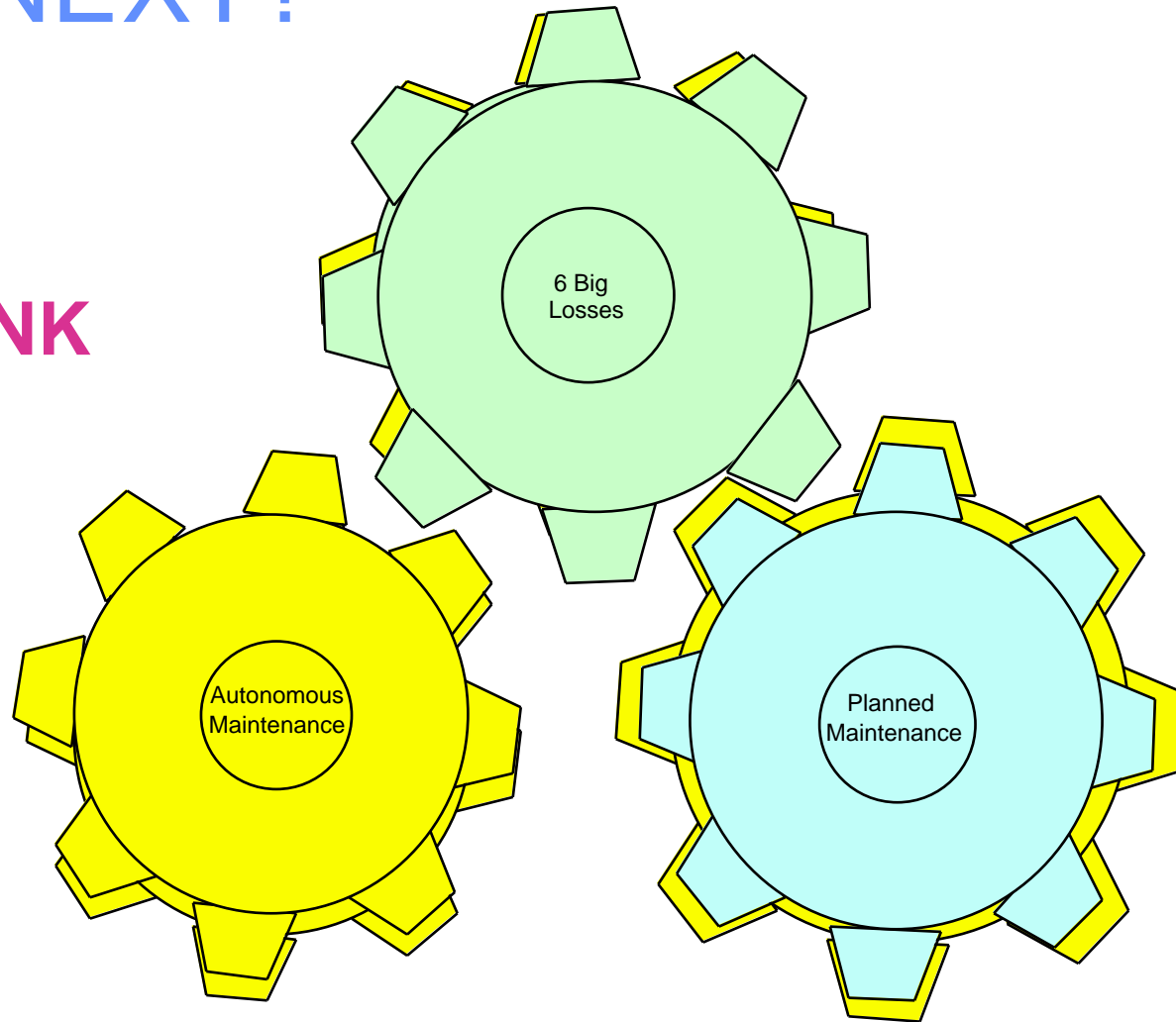


Defectives



WHAT IS NEXT?

LINK



Courtesy, in part, of Motorola SPS.
Thank You!

