



# UNDERSTANDING

An Executive Overview

# Total Productive Maintenance

## JIPM APPROACH



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# Adopting the best continuous improvement tool is aiming for “INFINITY and BEYOND”

*Every company have a product or service to render but more importantly, it is your customer that spells all the difference why a company still remains in business. Therefore to let your customer stay, industry must satisfy 3 things . . .*

1. Those that can produce the cheapest
2. Those that can produce the highest quality
3. Those who can produce the fastest delivery of them all



*That's why in order to survive the competition, each company is seriously adopting the best continuous improvement practices and TPM tops them all . . .*



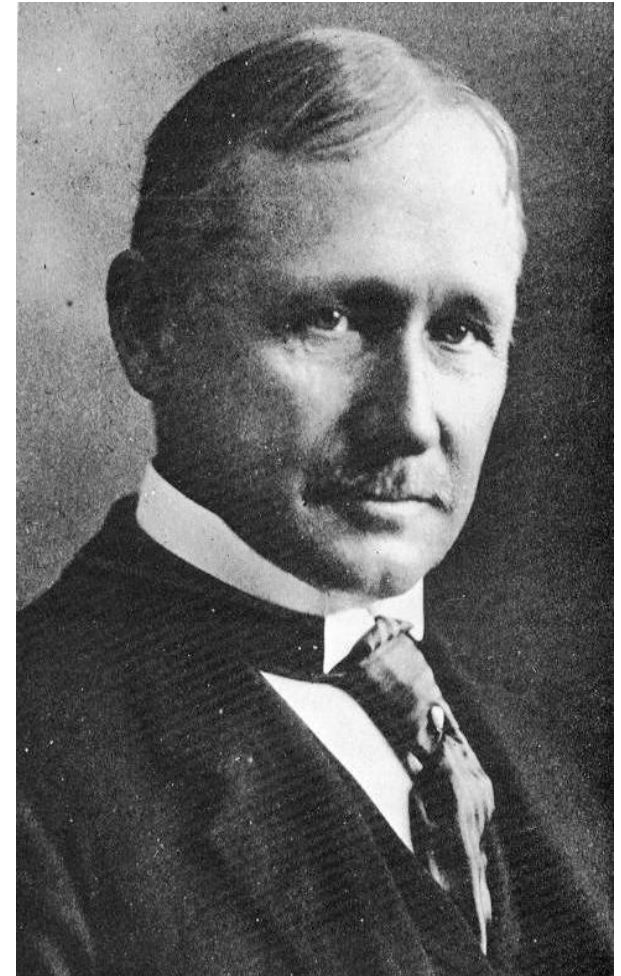
### HOW IT ALL STARTED IN INDUSTRIES . . . . .

According to Fredrick Taylor, the best way to manage an organization was to standardize the activity into simple repetitive tasks and then closely supervise them into doing it

In effect, management people do all the thinking as well as the decisions, while the supervisors act as the watchers making sure the decision is followed to the letter. Workers are focused on doing what they are told to do and just follow instructions until they get bored to death.

While the western countries focused more on producing big volumes, capacity and production, the Japanese people learned that the best way to run an organization is to focused more on the voices of their people by allowing them to make decisions in order to perform their work better

Western countries slowly realized that they are being beaten badly by their Japanese competitors but many are stubborn and remain trapped into the old Taylor's paradigm



Fredrick Winslow Taylor  
1856-1915



### HOW IT ALL STARTED IN INDUSTRIES . . . . .

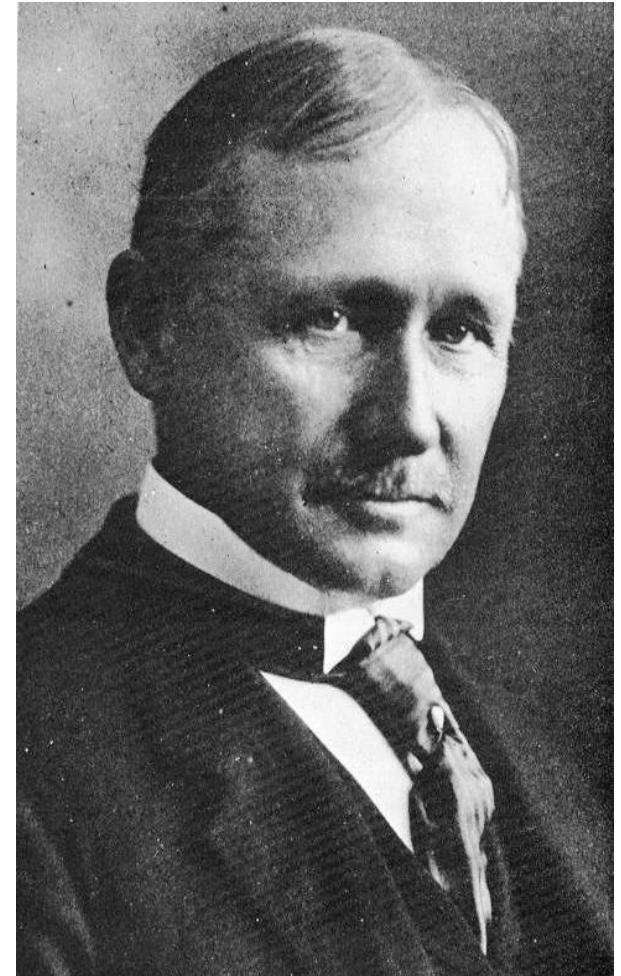
Because of this most American and western style factory management, clearly separated the roles of the production and maintenance departments

Managers were convinced that this style was the most effective way to utilize human resources. Operators concentrate on production with little or no knowledge on the structure and function of their equipment. Concurrently, maintenance received work orders and perform repairs on the equipment

As a result, both operations and maintenance went their own ways instead of following the path to mutual cooperation and shared responsibility. That is why today feud is pretty much alive on both sides

### TRIVIA QUESTION

If Frederick Taylor is still alive, what would be his favourite song as well as those who are managing operations ?



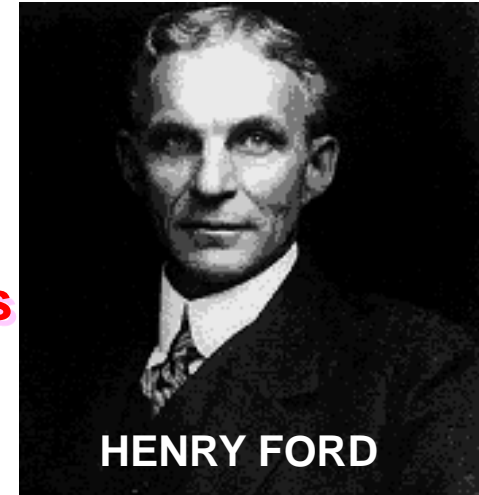
Fredrick Winsloy Taylor  
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## **LESSONS LEARNED FROM THE JAPANESE**

**US industries continue to focus on mass production paradigm in which the way to victory was to have smart people manage organizations that produce goods in large batches at lower costs leading to high profits**



**HENRY FORD**



**SOICHIRO HONDA**

**Japanese competitors had developed a new and powerful paradigm, winning organizations are those that listen to the voice of their workers, customer, design products and services that meet or exceed their expectations and continuously improve all the organizational process that led to customer satisfaction . . . .**



## TPM Defined :

Implementing TPM by Robinson and Ginder

- **TPM is a plant improvement methodology which enables continuous & rapid improvement of the manufacturing process through the use of employee involvement, employee empowerment and closed-loop measurement of results**
- **It is a production driven improvement methodology that is designed to optimize equipment reliability and ensure efficient management of Plant assets**





## TPM VISION :

*TPM will aim for infinity and beyond*

One Voice

**ZERO ACCIDENTS,  
DEFECTS and  
BREAKDOWNS**

TPM will try to bring an industry close to an ideal state

**Ideal State : End In Mind  
Clearly State where a  
company is heading 5 to  
10 years from now**

**What process it intends to  
use to achieve it's vision**

**VISION**

**MISSION**

Rules which determines plant priorities  
and how issues are addressed

**BASIC POLICY**

Must be supported by company's vision and mission

**COMPANY INDICES AND GOALS**

**TPM MASTER PLAN OF COMPLETION**

**Path → Destination**

**Rules**

**Measure of Success**

**Timeframe**





### What is Unique about TPM :

- TPM understands that the equipment is a shared responsibility for both operations & maintenance working towards a common goal
- It brings production and maintenance to work together to accomplish a common goal which is to establish basic equipment condition and to prevent accelerated deterioration
- TPM believes that big problems start from little once and understands the importance of establishing Basic Equipment Condition



#### CURRENT MINDSET

“ I **Operate**, You **Fix** “  
“ I **Fix**, You **Design** “  
“ I **Design**, You **Manage** “

#### CORRECT MINDSET

“ **We** are **All** responsible  
for **Our** Equipment “  
“ **We** take good care of  
**Our** Equipment “





## TPM Composed of 8 Pillars





## Goals of Each TPM Pillar

### Planned Maintenance

- Attain Predictive Mtce Stage
- Increase MTBF Reduce Breakdown
- Improve reliability & lower costs



### Quality Maintenance

- Elimination of defects
- Elimination of chronic problems

### Autonomous Maintenance

- Establish Basic Equipment Condition
- Perform basic repairs and set-up
- Reduce Idling and Minor Stoppages
- Empowered Operators



### Admin/Office TPM

- Reduce of Product inventory and Work-In-Process
- Speed of Information transmission

### Focused Improvement

- Attain 85% OEE on critical machines
- Elimination of 6 Equipment Losses
- Improve indices on PQCDSM



### Initial Flow Control Activities (IFCA)

- Well develop system of MP Design
- Improvement in Vertical Start-up time of equipment being purchase

### Environmental, Health and Safety (EHS)

- Zero accidents and plant disasters
- Compliance to environmental stds.

**Zero Breakdowns**  
**Zero Rejects/Defects**  
**Zero Accidents**

### Training and Education

- Effective training skills assessment
- Systematic training programs
- Support each pillar training needs



### KEY GOALS AND KPI's FOR PLANNED MAINTENANCE

INDICATOR	GOAL WE WANT TO ACHIEVE
• Reduce Breakdown	Rank A Equipment = Zero Rank B Equipment = 100% of Rank B
• Improve MTBF	Improve MTBF by 60 - 70 %
• Reduce MTTR	Reduce Time To Repair to less than 0.15 hrs
• Reduce Maintenance Cost	Reduce Maintenance Cost to 50 %
• Increase Utilization	Increase Utilization to 98 %
• Improve Set-Up Time	Set-up Time to be less than 15 minutes
• Improve Maintenance Skill	48 hours of Technical Training per year for every maintenance
• Reduce Spare Parts	Reduce cost of inventory to 40 %

*Measuring Maintenance activities are geared towards challenging these goals and as these goals start to improve, skills also improve . . . .*






## TPM Involves Total Employee Participation

Company's Departments →	Operations Department	Maintenance Department	Environment, Health, Safety	HRD-Training Department	Finance Department	Facilities Department	Accounting Department	Purchasing Department	Quality Control	Warehouse Department	Research & Development	Offices, Legal, MISD
TPM Pillars ↓												
1. Autonomous Maintenance	▲	▲										
2. Planned Maintenance		▲	▲			▲						
3. Focused-Improvement	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
4. Quality Maintenance		▲						▲				
5. Initial Flow Control Activities	▲	▲						▲		▲	▲	
6. Admin/Office TPM	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
7. Environmental, Health and Safety	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
8. Training and Skill Development	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲





## TPM pillars aim to eliminate 16 Big Losses

8 Equipment Losses	5 Manpower Losses	3 Other Losses
<ul style="list-style-type: none"><li>• Breakdown Loss</li><li>• Set-Up and Adjustment Loss</li><li>• Cutting Blade Loss</li><li>• Start-Up Loss</li><li>• Idling and Minor Stoppage Loss</li><li>• Speed Loss</li><li>• Defect and Rework Loss</li><li>• Shutdown Loss</li></ul> 	<ul style="list-style-type: none"><li>• Management Loss</li><li>• Operating motion Loss</li><li>• Line Organization Loss</li><li>• Logistic Loss</li><li>• Measurement and Adjustment Loss</li></ul> 	<ul style="list-style-type: none"><li>• Energy Loss</li><li>• Yield Loss</li><li>• Die Tool and Jig Loss</li></ul> 





**Operation : Destruct and Destroy Equipment's 16 Big Losses**

**Cross-functional Focused-Improvement Team - Kobetsu-Kaizen**



## TPM 12 Developmental Step by Step Approach

Stage	Step
<b>Preparatory (6 months)</b> 	<ol style="list-style-type: none"><li>1. Declaration of Top Management to introduce TPM</li><li>2. Conduct TPM Educational Campaign</li><li>3. Create a TPM promotional organization</li><li>4. Establish TPM Basic Policy and Goals</li><li>5. Create a Master Plan of Implementing TPM</li></ol>
<b>Introduction</b>	<ol style="list-style-type: none"><li>6. Kick-off TPM</li></ol>
<b>Implementation (3 yrs)</b> 	<ol style="list-style-type: none"><li>7. Establish system to improve Production Efficiency<ol style="list-style-type: none"><li>7.1 Implement Kobetsu-Kaizen Pillar</li><li>7.2 Implement Autonomous Maintenance Pillar</li><li>7.3 Implement Planned Maintenance Pillar</li><li>7.4 Training &amp; education for operation and mtce</li></ol></li><li>8. Build an Initial Flow Control Activities</li><li>9. Build a Quality Maintenance System</li><li>10. Implement Admin./Office TPM for support system</li><li>11. Establish a system for effective EHS</li></ol>
<b>Stabilization</b>	<ol style="list-style-type: none"><li>12. Total TPM implementation and raise level</li></ol>

**The most difficult part will always be the start-up process**

[illegible]



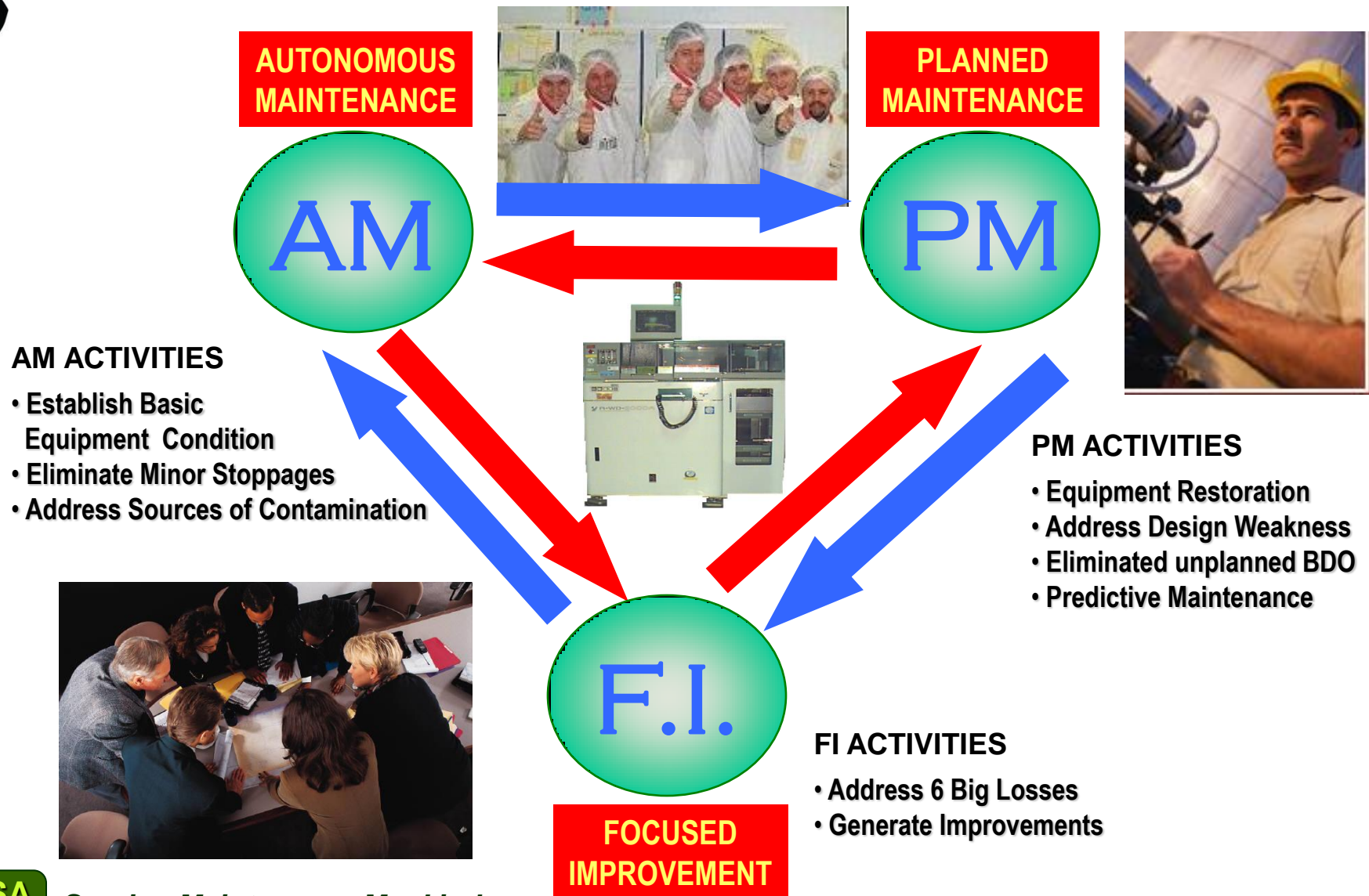
## Master Plan of Implementation per Pillar

NO.		MASTER PLAN ACTIVITY		INTRO		IMPLEMENTATION								FULL DEVELOPMENT				STABILIZE			
				2000		2001				2002				2003				2004			
				Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	ZERO BREAKDOWN ACTIVITIES	PM 7 STEP JOURNEY																			
		Step's 0 : Preparatory Stage	PLAN					Machine are categorized as Rank A, B													
		- Machine Ranking	ACTUAL																		
		Step's 1-3	PLAN			Attain ZERO Breakdown for all Rank A and Rank B Machines															
		- Initial Cleaning, Restore, Standards	ACTUAL																		
		Step 4 - Corrective Maintenance	PLAN					Apply P-M Analysis on Recurring Breakdowns and Feedback to IFCA													
		- Countermeasure for Design Weakness	ACTUAL																		
		Step 5 - Preventive Maintenance	PLAN					Final Inspection Standards - Time Based Maintenance													
		- Periodic - Preventive Maintenance	ACTUAL																		
		Step 6 - Predictive Maintenance	PLAN					Utilize Condition Based Maintenance Instruments & Techniques													
		- Overall Audit and Diagnosis	ACTUAL																		
		Step 7	PLAN																		
		- Machine Ultimate Utilization	ACTUAL																		
2	MTCE CONTROL SYSTEM	SPARE PARTS CONTROL	PLAN					Review and Improve Spare Parts Control and Utilization													
			ACTUAL																		
3	MTCE CONTROL SYSTEM	MAINTENANCE COST AND BUDGET CONTROL	PLAN					Review Maintenance Cost Control and Utilization													
			ACTUAL																		
3	MTCE CONTROL SYSTEM	MAINTENANCE INFORMATION MANAGEMENT & CONTROL SYSTEM	PLAN																		
			ACTUAL																		
4	MTCE CONTROL SYSTEM	MAINTENANCE WORK PLANNING AND MANAGEMENT	PLAN					Review PM System													
			ACTUAL																		
5	SUPPORT ACT	GUIDANCE AND SUPPORT FOR JISHU HOZEN	PLAN					PM Guidance and Support for Jishu Hozen Activities													
			ACTUAL																		
6	SUPPORT ACT	MAINTENANCE SKILLS ENHANCEMENT	PLAN																		
			ACTUAL																		
7	SUPPORT ACT	EVALUATION OF THE PLANNED MAINTENANCE ACTIVITIES	PLAN																		
			ACTUAL																		





**TPM GOAL IS TO ACHIEVE 85 % OEE**





## DEPLOY TPM PILLAR TEAMS

Recommended to work on the same model equipment

### Planned Maintenance



#### Planned Maintenance Team

#### 4 Phases / Steps

- Phase 0 : Preparatory Stage
- Phase 1: Stabilize MTBF
- Phase 2 : Lengthen Equipment Life and address Design Weakness
- Phase 3 : Periodically Restore Deterioration
- Phase 4 : Predict Equipment Life

### Autonomous Maintenance



#### AM Manager's Model Machine

#### 7 Steps of AM

- Step 0 : Training and Education
- Step 1: Perform Initial Cleaning
- Step 2: Address Sources of Contamination and hard to access areas
- Step 3: Establish Cleaning, Inspection and Lubrication Standards
- Step 4: Develop General Inspection Procedures and Training
- Step 5: Conduct General Inspection Autonomously
- Step 6 : Systematic AM and manage the workplace
- Step 7 : Empowered AM Workforce

### Focused Improvement



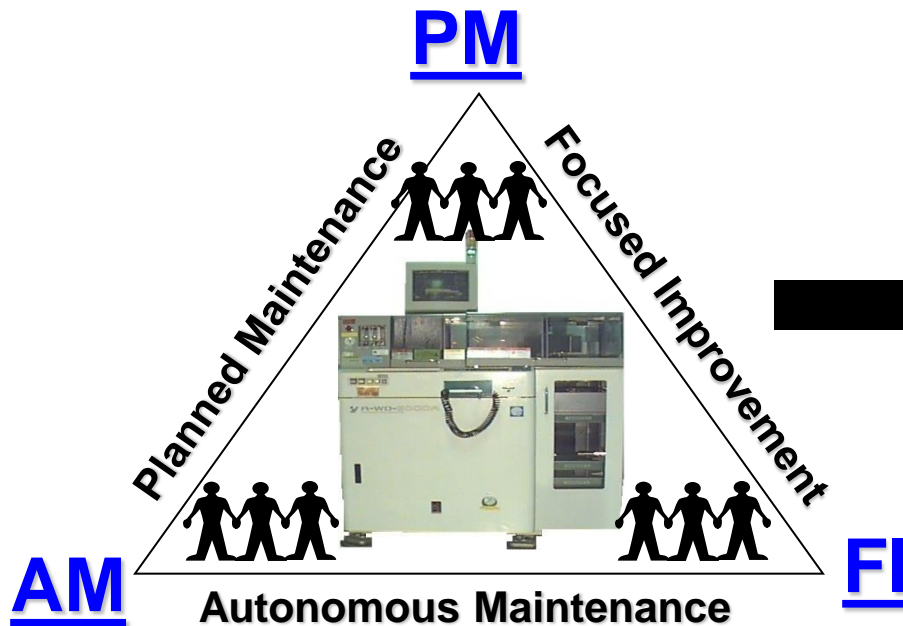
#### FI Improvement Team

#### FI Steps

- Step 0 : Select Improvement Topic
- Step 1: Understand Current Situation
- Step 2: Expose and Eliminate Abnormalities / Fugua
- Step 3: Analyze Causes
- Step 4: Plan the Improvement
- Step 5: Implement Improvement
- Step 6: Check the results
- Step 7: Consolidate the gains



## HOW EQUIPMENT IS IMPROVED



**OEE = 85% >**

Utilization = 95% >

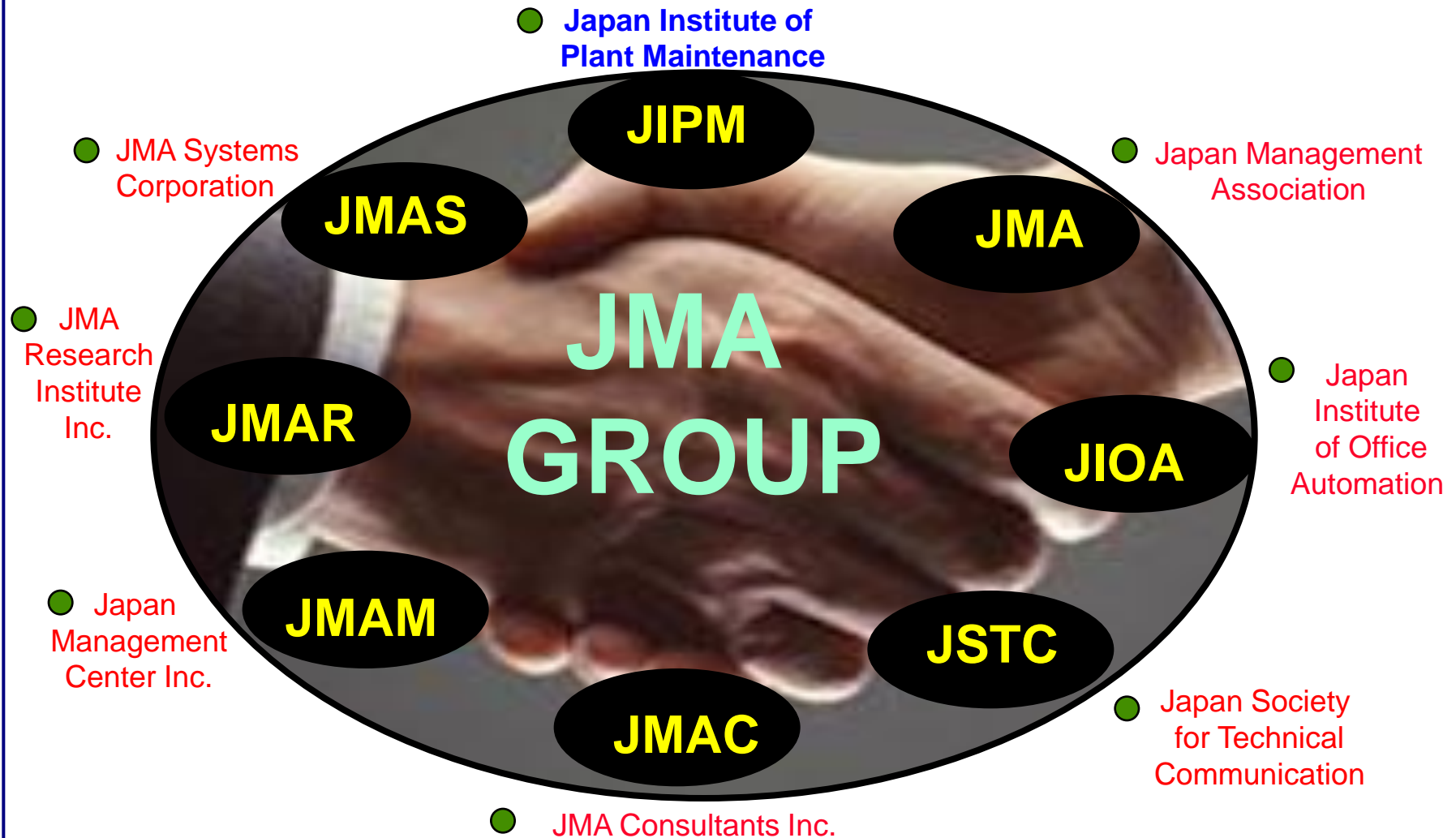
Performance Rate = 90% >

Quality Rate = 99% >

- Breakdown the OEE of the equipment into different components
- Understand which OEE component is providing the problem
- Understand what losses the equipment is suffering
- Deploy a cross-selection group whenever necessary or the TPM pillar involved will take care of the problem



# JAPAN MANAGEMENT ASSOCIATION GROUP







## JIPM Awards

### 1. TPM Excellence Award - 2nd Category

- Any Plant with less than 500 employees will be eligible

### 2. TPM Excellence Award - 1st Category

- Any Plant with more than 500 employees will be eligible

### 3. Excellence In Consistent TPM Commitment Award

- Any Plant which was given an Award in TPM Excellence for more than 2 years in the past and continues to improve TPM activities will be eligible

### 4. Special Award for TPM Achievement

- Any Plant which was given an Award in TPM Excellence for more than 3 years in the past which demonstrated remarkable improvement in TPM activities and made distinctive achievements in TPM will be eligible

### 5. Advance Special Award for TPM Achievement

- Any Plant which was given a Special Award for TPM Achievement for 2 or more years and continuous to improve to the level of achieving for Awards for World-Class TPM Achievement will be eligible

### 6. Award for World-Class TPM Achievement

- Any Plant with a record of winning a Special Award for TPM Achievement for more than 3 years in the past and achieving results by means of unique, innovative implementation of TPM activities will be eligible





**2002 TPM AWARD WINNERS**



**Partial Lists of  
companies that  
attain JIPM - TPM  
Awards**

- Alexandra Carbon Black Co.(Egypt)
- Dai Den Co. LDT (Japan)
- Epson Industrial Corporation (taiwan)
- FIAT - GM Powertrain, Verrone (Italy)
- GKN Gelenkwellenwerk (Germany)
- Isuzu Castic Corporation (Japan)
- Konica Minolta Supplies Mfg., (Japan)
- **Nippon Mining (Taiwan)**
- Milliken & Company, Gayley (USA)
- Struik Foods Europe (Belgium)
- Tanfac Industries Limited (India)
- Unilever/Lever Faberge (Germany)
- Unipro N.V. Sourcing Unit (Belgium)
- Milliken & Company, Abbeville (USA)
- Miitsubishi Heavy Industries, (Japan)
- Motorola Inc. Sdn. Bhn (Malaysia)
- Centras Eletricas do Nortos (Brazil)
- Kwang Yang Motor Co. Ltd (Taiwan)
- Ugine & ALZ, Plant (France)
- Yamaha Motor Brazil (Brazil)
- Yulon Motor Co. Ltd (Taiwan)
- Unipath Limited, Bedford (UK)
- Unilever de Argentina (Argentina)
- Chao Long Motor Parts Co (Taiwan)
- Asahi Sangyo. Co. Ltd (Japan)
- Kyowa Industrial Co. Ltd (Japan)
- Metalart Corporation (Japan)
- Noritake Itron Corporation (Japan)
- **YTM Component Inc. (Philippines)**
- Unileverl /GB Glace AB, (Sweden)
- Tsu Tah Elastomerics Co ( Taiwan)
- Sanwa C., Ltd (Japan)
- Okitsurasen Co., Ltd (Japan)
- Tetra Pak Materials Denton (USA)
- Toppan Containers, Saitama (Japan)
- Shininippon Koukyu Co., Ltd (Japan)
- Hamada Heavy Industries (Japan)
- Toppan Printing Co, Kansai (Japan)
- Tata Metaliks Ltd. Kharagpur (India)
- Thai Sulphites & Chemicals (Thailand)
- Ugine & ALZ, Gueugnon Plant (France)
- TDK Corporation (Japan)
- TDK Shonai Manufacturing (Japan)
- Suntori Limited, Azusanomori (Japan)
- Thai Rayon Public Co., Ltd (Thailand)
- Yutaka Co., Ltd. (Japan)
- Fairchild Semicon (Malaysia)
- Hitachi Zosen Diesel & Eng. (Japan)
- Eurogal - Arcelor Group (Japan)
- Daiwa Seiko Co.,Ltd (Japan)
- Hokkaido Sumniden Precision (Japan)
- Kochi Casio Co.,Ltd (Japan)
- Mazda Motor Corporation (Japan)
- Mitsubishi Materials Corp (Japan)
- Nihon Yamamura Glass Co. (Japan)



## 6.4.9 MAINTENANCE COST AND BUDGET CONTROL

Our Maintenance Costs comprises of the following

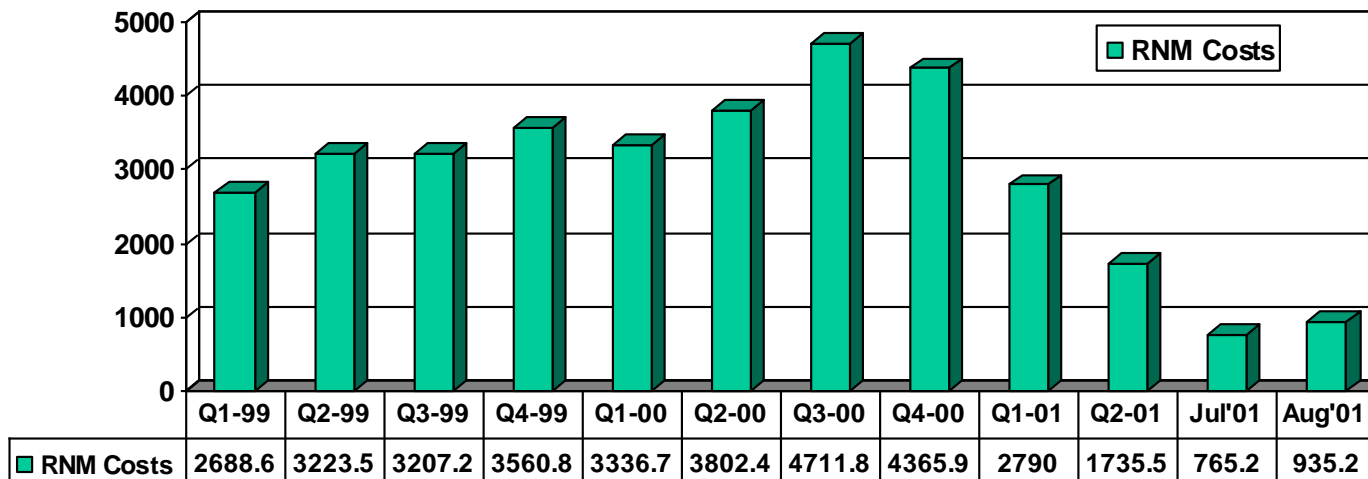
**RNM (Repair and Maintenance Costs) which includes**

- Costs of Repairs, Rebuild, costs of Spare Parts, Fabrication Costs, Tooling Costs, Overhead costs, Inspection costs, labor costs, Contractor's Costs etc

Hence, we develop in-house Maintenance Costs Reduction Programs in order to reduce our Maintenance costs through which we implement as of Q1` of 2001

- Reduction on Maintenance Costs through PM Improvements as well as the use of Condition-Based Maintenance
- Reduction on Maintenance Costs through Planned Maintenance Improve Design Weaknesses by Improving Lifespan
- Reduction on Maintenance Costs through our Regular RNM Cost Reduction Program
- Others includes Cost reduction on Energy and Facilities

### 1999 - 2001 RNM COSTS SUMMARY



Actual data from Finance shows a Dramatic reduction In maintenance costs As a direct result of Our Planned Maintenance activities

Computation of Budget is being based on last month's RNM total costs in which each division try to reduce their RNM Costs through different Costs Improvement programs we have, above data for RNM is based from Overall RNM Finance Report

*Serving Maintenance Mankind . . .*





# Total Productive Maintenance - JIPM Approach

## C) Cost Improvement Savings Through Step's 4 Address Design Weaknesses

### A) Improvement : Resizing of AHU Filter from 24 x 24 x 6 to 24 x 24 x 12

Division : Facilities  
 PM Step : Step 4  
 Leader : Arman Jusay  
 PM Committee : Arman Jusay  
 Model Machine : AHU-401  
 Total Fan-Out : 6 AHU  
 Impact : Lengthen life of filter from 1800 to 3600 hrs

Details :	Before	After
Filter Size	24 x 24 x 6	24 x 24 x 12
Cost per Unit	\$47.00	\$60.00
Cost per AHU	\$752.00	\$960.00
Replication 7 AHU	\$5,264.00	\$6,720.00
Average Life in hrs	1800 hrs	3600 hrs
Average Life in year	0.2055 year	0.41096 years
Cost for 7 AHU/year	\$25,615.57	\$16,351.96
<b>Yearly Savings</b>	<b>\$9,263.61 per year</b>	
<b>Yearly Savings</b>	<b>P 370,544.40 per year</b>	

### B) Improvement : Modification & Localization of Gripper Plate Holder

Division : Central Lead Finish  
 PM Step : Step 4  
 Leader : Jojo Santos  
 PM Committee : Cesar dela Torre  
 Model Machine : Meco 2  
 Total Fan-Out : 3 Meco and 1 pilot

Impact : Lengthen life of filter from 5 weeks to 24 weeks

Details :	Before	After
Cost per clip	\$0.33	\$0.33
Usage per equipm	6000 pcs	6000 pcs
Cost per Equipmen	\$1,980.00	\$1,980.00
Total Cost per year	\$24,090.00	\$6,570.00
Cost for 4 Meco /y	\$96,360.00	\$26,280.00
Average Life in day	30	110
Average Life in year	0.082191781	0.301369863
<b>Yearly Savings</b>	<b>\$70,080.00 per year</b>	
<b>Yearly Savings</b>	<b>P 2,803,200.00 per year</b>	

### D) Improvement : Modification of belt fly-wheel for Meco 2

Division : Central Lead Finish  
 PM Step : Step 4  
 Leader : Jojo Santos  
 PM Committee : Cesar dela Torre  
 Model Machine : Meco 2  
 Total Fan-Out : 3 Meco  
 Impact : Lengthen life of filter from 30 days to 110 days

Details :	Before	After
Replacement Frequency	4 to 5 weeks	24 weeks
Cost per 1 set	\$600.00	P2,200.00
Cost per AHU	\$752.00	\$960.00
Cost per machine	\$1,200.00	P4,400.00
Total Fan-Out :	\$4,800.00	P17,800.00
Material	Tool Steel	Stainless Steel
Average Life in weeks	4 to 5 weeks	24 weeks
Average Life in years	0.0961538 yrs	0.4161538
Cost for 4 Meco /year	\$49,920.02	\$445.00
<b>Yearly Savings \$</b>	<b>\$49,475.02 per year</b>	
<b>Yearly Savings Peso</b>	<b>P 1,979,000.80 per year</b>	

### E) Improvement : Modification of sprocket pin and stopper

Division : Central Lead Finish  
 PM Step : Step 4  
 Leader : Jojo Santos  
 PM Committee : Cesar dela Torre  
 Model Machine : Meco 2  
 Total Fan-Out : All Meco and Technic

Impact : Lengthen life of filter from 5 weeks to 24 weeks

Details :	Before	After
Cost of Pin (Technic & Meco)	P 20.00	P 20.00
Monthly Consumption	3396 pcs	1698 pcs
Monthly Cost of Pins	P 67,920.00	P 33,960.00
Yearly Costs of Pins	P 815,040.00	P 407,520.00
<b>Yearly Savings \$</b>	<b>\$10,188.00 per year</b>	
<b>Yearly Savings Peso</b>	<b>P 407,520.00 per year</b>	

Above are sample evidences on how we benefited on cost savings as we complete our CORRECTIVE MAINTENANCE through our PM Step 4 on Lengthening Lifespan by Addressing Design Weaknesses Part

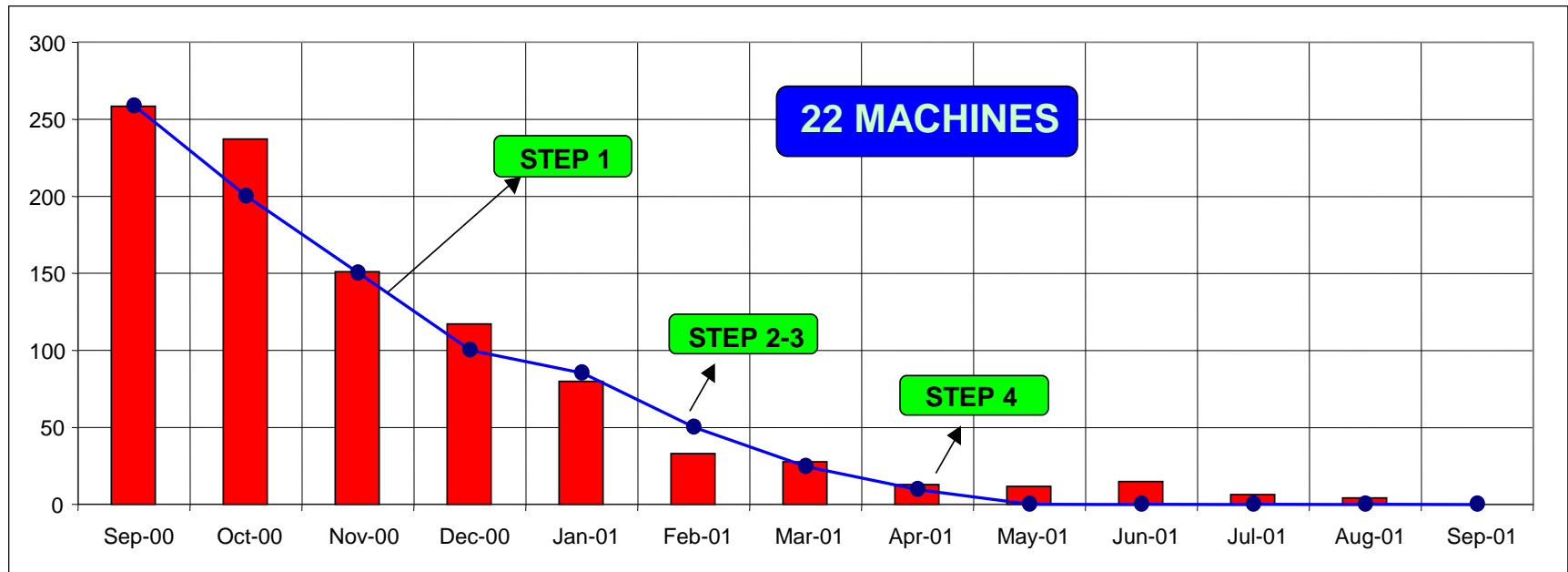


## REMEMBERING ATP PLANNED MAINTENANCE 1998 - 2001

Sa Planned Maintenance, Isang Misyon, Isang Direksyon pa rin . . . . .

- Graph below shows actual results on the number of breakdowns after thorough implementation of Planned Maintenance 4 Phases To Zero Breakdown

### 1st PILOT BDO TRENDING FOR PM PILOT MACHINES



		Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01	Sep-01
BDO	PLAN	259	200	150	100	85	50	25	10	0	0	0	0	0
	ACTUAL	259	237	151	117	80	33	28	13	12	15	6	4	0

LEGEND : BDO - Number of Breakdown Occurrences



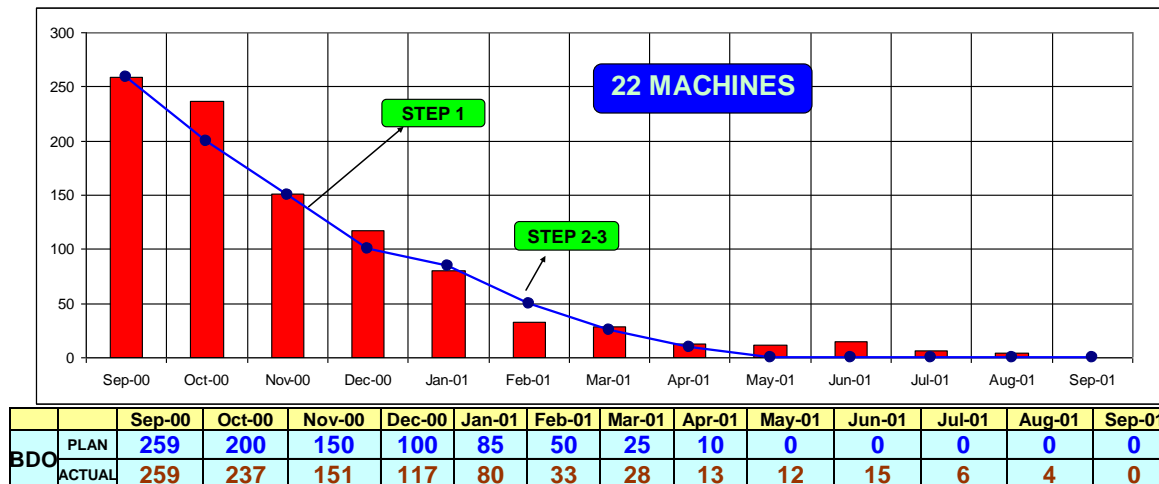


## 6.5 PM ACTIVITY RESULTS

### 6.5.1 PM BREAKDOWN REDUCTION

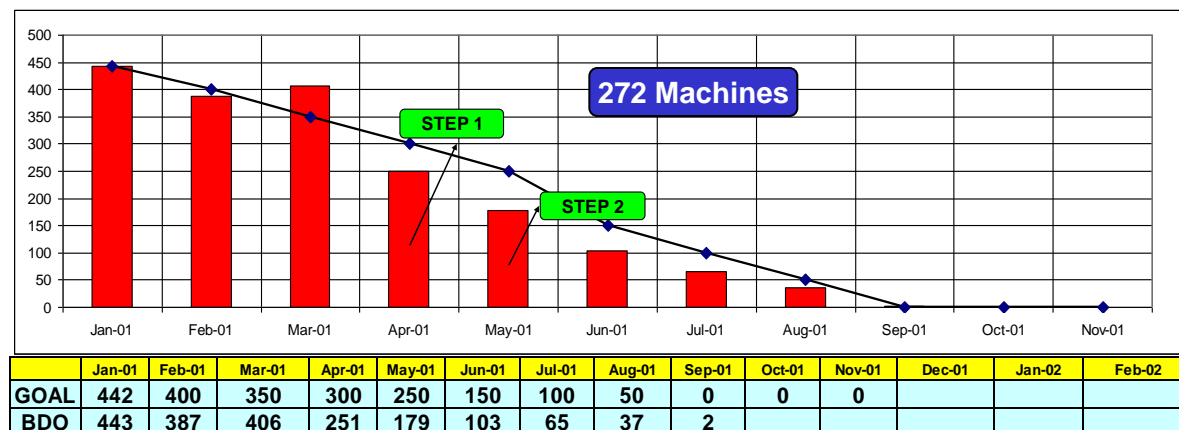
#### 1st PILOT BDO TRENDING FOR PM PILOT MACHINES

*Sa Planned Maintenance, Isang Misyon, Isang Direksyon pa rin . . . .*



#### PM 1ST FAN-OUT MACHINE BDO TRACKING

*Sa Planned Maintenance, Isang Misyon, Isang Direksyon pa rin . . . .*



The Planned Maintenance Team Piloted 22 Rank A machines composing of different types across divisions and successfully reduced the BDO Recurrence

Our goal is to totally Reduce to ZERO the breakdown for the 22 PM Pilot Machines as we complete Step's 1 - 3

Next, the PM Team formed the Fan-Out team which then composed of 172 machines from Operations and 100 from Facilities totaling 272 machines then Horizontally Replicated the activities of the pilot team's Step's 1 -3 and checked other recurrence of Breakdown



## Total Productive Maintenance - JIPM Approach

### OUR PM GOAL :

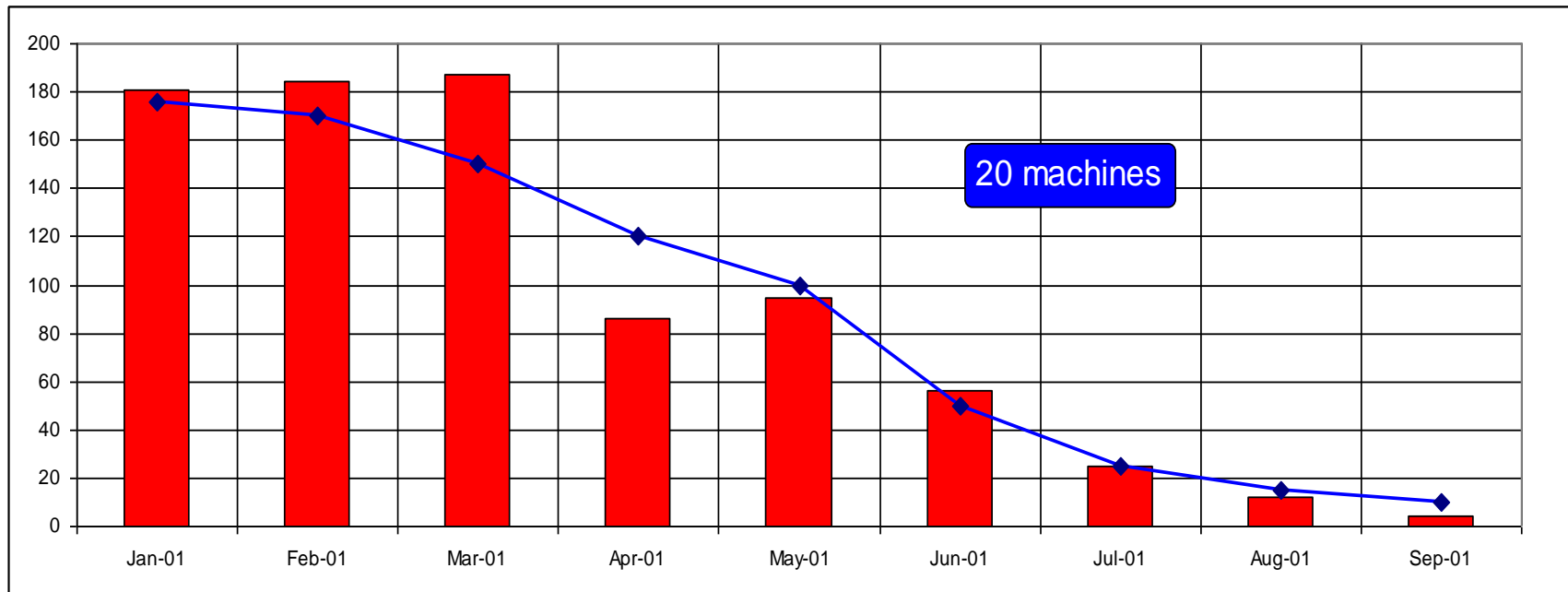
All Rank A Machines - Attain 90 to 100% Zero BDO

All Rank B Machines - Attain 70 to 80% Zero BDO

The Planned Maintenance never stopped believing that they can change not only themselves but the reliability of their assets

## OVERALL BDO TRENDING FOR PM 2nd PILOT MACHINES

*Sa Planned Maintenance, Isang Misyon, Isang Direksyon pa rin . . .*



		Jan-01	Feb-01	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01	Sep-01	Oct-01	Nov-01
BDO	PLAN	176	170	150	120	100	50	25	15	10	5	0
	ACTUAL	181	184	187	86	95	56	25	12	4		

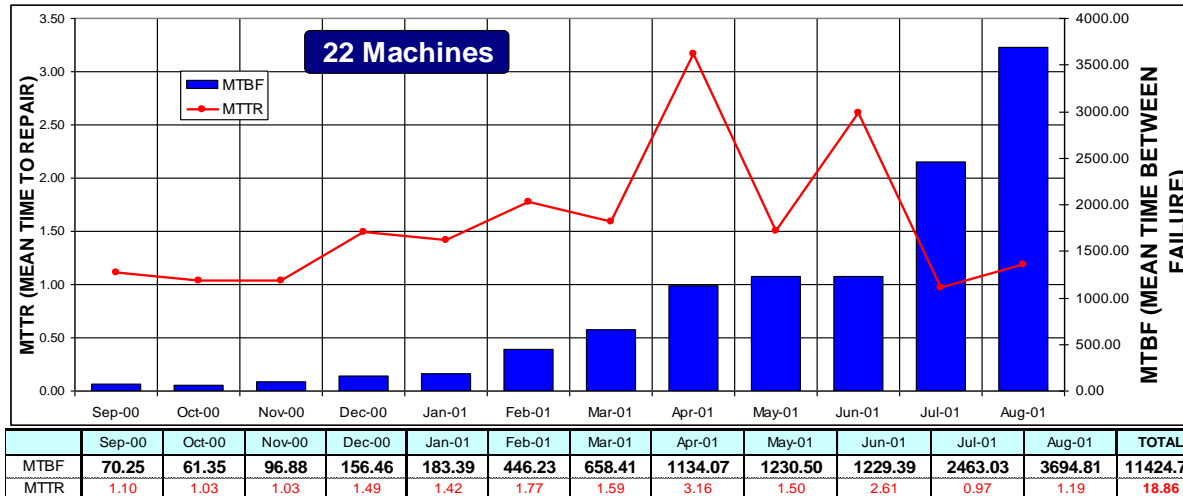
Likewise, we started working on our 2nd Pilot Machine composing of 22 machines across divisions and we expect to have the same results obtained from the 1st PM Pilot Machine



## 6.5.2 PM MTBF / MTTR TRANSITION

### MTBF / MTTR GRAPH FOR 1st PILOT MACHINE

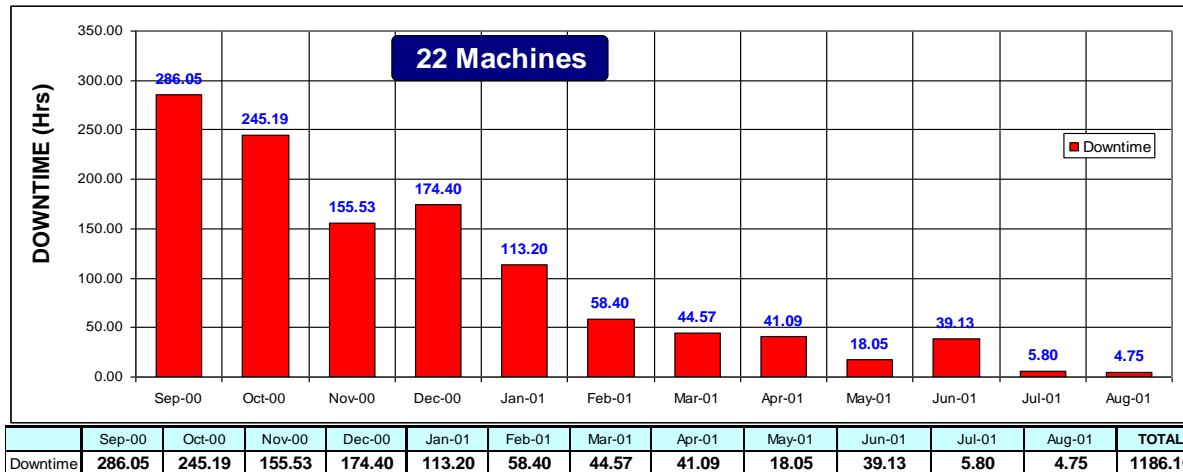
*Sa Planned Maintenance, Isang Misyon, Isang Direksiyon pa rin . . . .*



As we achieve near to ZERO breakdown on our 22 PM Pilot Machines, we also improve in our MTBF or Mean to Between Failures, hence, we have a good trend on our MTBF Indices

### DOWNTIME TREND FOR 1st PILOT MACHINE

*Sa Planned Maintenance, Isang Misyon, Isang Direksiyon pa rin . . . .*



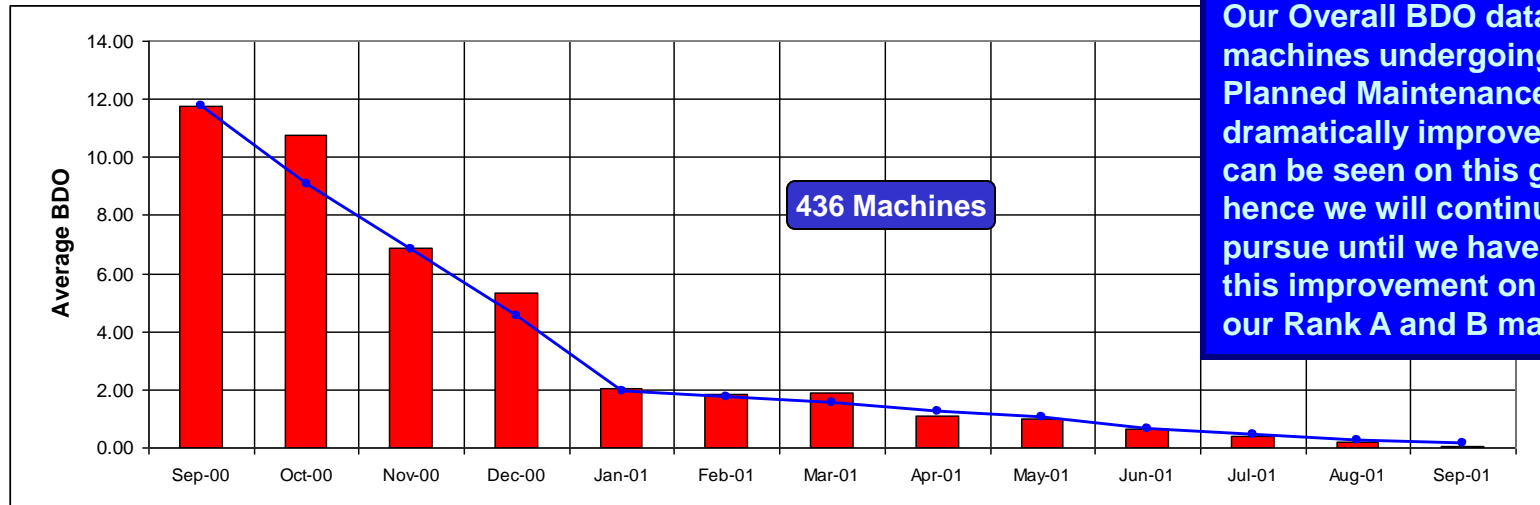
Likewise we compute for MTTR or Mean Time to Repair and we are improving in our repair time. For recurring failures we adopted a breakthrough approach through Root Cause Failure Analysis



## 6.5.3 OVERALL BDO REDUCTION

### OVERALL PM BDO SUMMARY P1 and P2

*Sa Planned Maintenance, Isang Misyon, Isang Direksyon pa rin . . . . .*



Our Overall BDO data for machines undergoing Planned Maintenance had dramatically improved as can be seen on this graph, hence we will continue to pursue until we have done this improvement on all our Rank A and B machines

No.	Batch	Total Machines		Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01	Sep-01	TOTAL	REMARKS
1	1st Pilot	22	Plan	259	200	150	100	85	50	25	10	0	0	0	0	0	879	
			1st Pilot	259	237	151	117	80	33	28	13	12	15	6	4	0	955	
2	1st Fan-Out	272	Plan	---	---	---	---	442	400	350	300	250	150	100	50	25	2067	
			Fan-Out	---	---	---	---	443	387	406	251	179	103	65	37	2	1873	
3	2nd Pilot	21	Plan	---	---	---	---	176	170	150	120	100	50	25	15	10	816	
			2nd Pilot	---	---	---	---	181	184	187	86	95	56	25	12	4	830	
4	2nd Fan-Out	121	Plan	---	---	---	---	153	150	140	120	100	80	60	50	40	893	
			2nd FO	---	---	---	---	184	199	206	133	143	104	85	43	8	1105	
	TOTAL	436		Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01	Sep-01	TOTAL	
			Plan	259	200	150	100	856	770	665	550	450	280	185	115	75	4655	
			Actual	259	237	151	117	888	803	827	483	429	278	181	96	14	4763	
				Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01	Sep-01	TOTAL	
			AVE. Plan	11.77	9.09	6.82	4.55	1.96	1.77	1.53	1.26	1.03	0.64	0.42	0.26	0.17	41.28	
			AVE BDO	11.77	10.77	6.86	5.32	2.04	1.84	1.90	1.11	0.98	0.64	0.42	0.22	0.03	43.90	



## REMEMBERING ATP PLANNED MAINTENANCE 2001



**Previous Planned Maintenance team responsible for the dramatic reduction of breakdowns during my employment days**





## 2 SIDES OF FAILURE

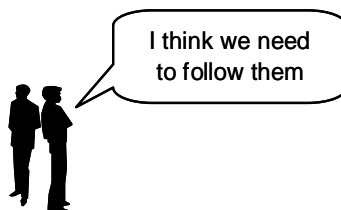
### REACTIVE SIDE:

Most maintenance people work occurs right after a breakdown. Planning and scheduling are in place but when the machine fails without any warning, these initiatives are set in place. Mostly this this always the accepted norm of their culture and maintenance are praised and being promoted by following this course of path, so this is what the incumbent maintenance taught to new ones

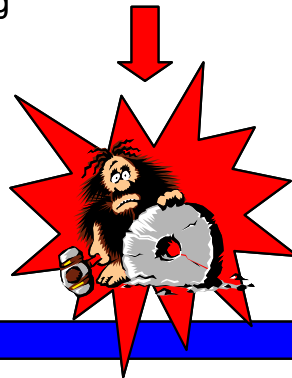
### RIGHT SIDE OR REACTIVE SIDE OF FAILURE

#### LEFT SIDE Proactive Side

A few are starting a reliability initiative but they cannot seem to get the people along



**Breakdown  
Occurs here !**



#### RIGHT SIDE Reactive Side

Most maintenance people are on this side



Period



## 2 SIDES OF FAILURE

### PROACTIVE SIDE:

When equipment reliability improve, there will be less people working on a reactive mode. It does not mean that these people will be retired nor terminated. Top management must understand that maintenance is a diversified and noble profession, these people should understand that there are a lot of positions on the Maintenance that can be filled in. When maintenance and reliability improve, then New doors on the maintenance function can be finally open

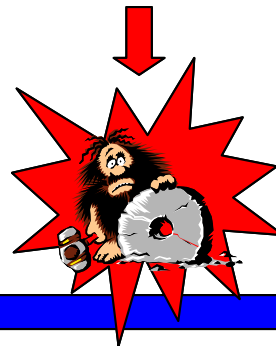
### LEFT SIDE OR PROACTIVE SIDE OF FAILURE

#### LEFT SIDE Proactive Side

Spare Parts, CMMS, Planning and Scheduling,  
Tribology, PdM Group, TPM/RCM Group,  
Training Group, Support for Operators

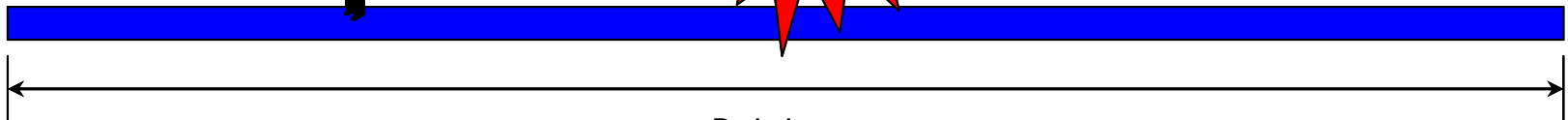


**Breakdown  
Occurs here !**



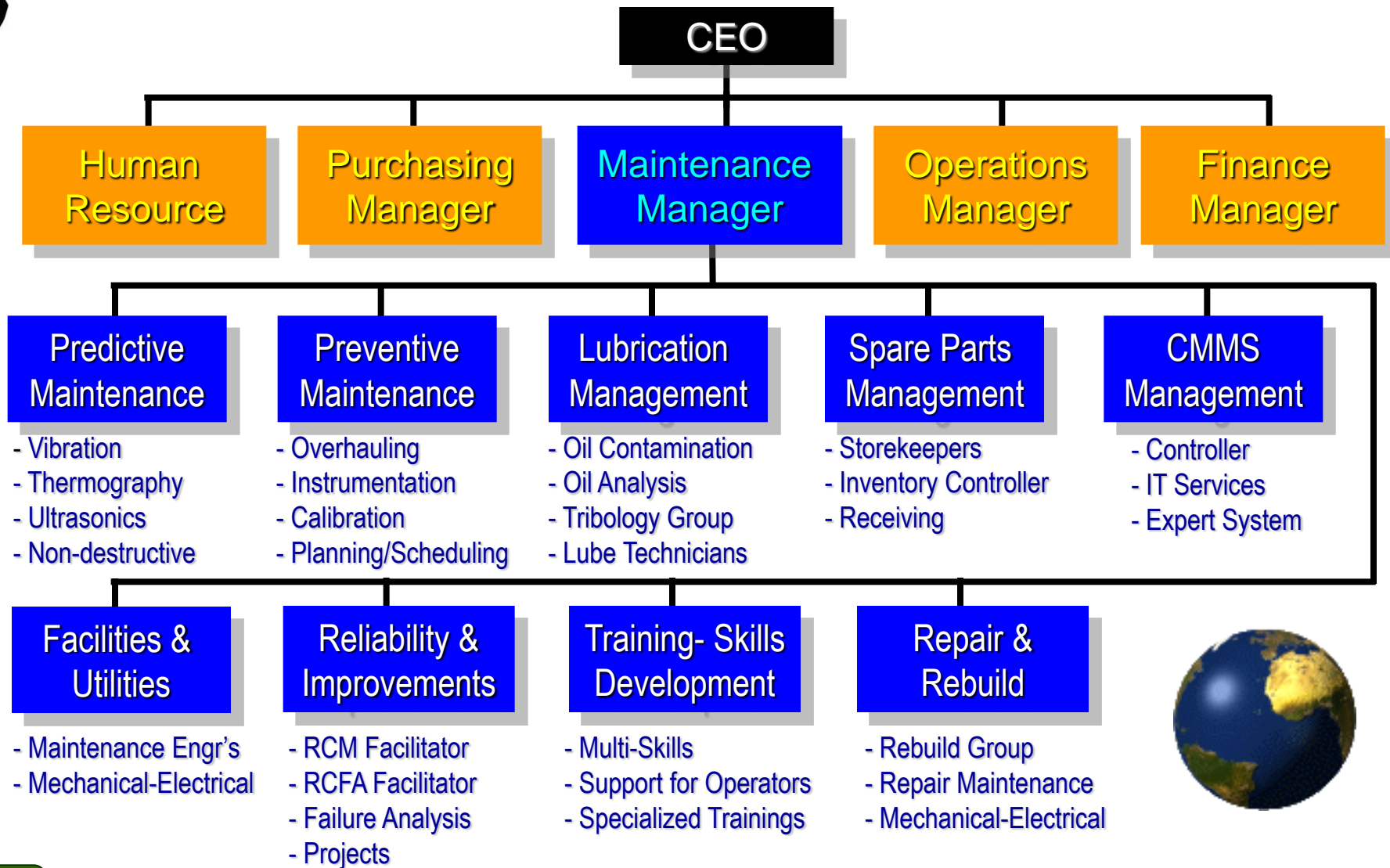
#### RIGHT SIDE Reactive Side

Repair Group / RCFA Group





## CENTRALIZED WORLD CLASS MAINTENANCE STRUCTURE





## FINAL QUOTE

- **Doing TPM for the first time in your plant is like playing the guitar the first time around. It takes time, passion, dedication, discipline, a change in thinking, and a change in the way we do things around and it cannot be done quickly and overnight. It takes time to become like them**
- **It is my hope that the learning's shared to the people of Botash provide some fruits that can benefit not only the equipment but most of all its people and that whatever we do in our life, the learning just never stops.**
- **Thank You and Keep On Rocking . . . Rolly Angeles**

