Section 1

Introductions and Background

Section 2

Begin with the End in Mind

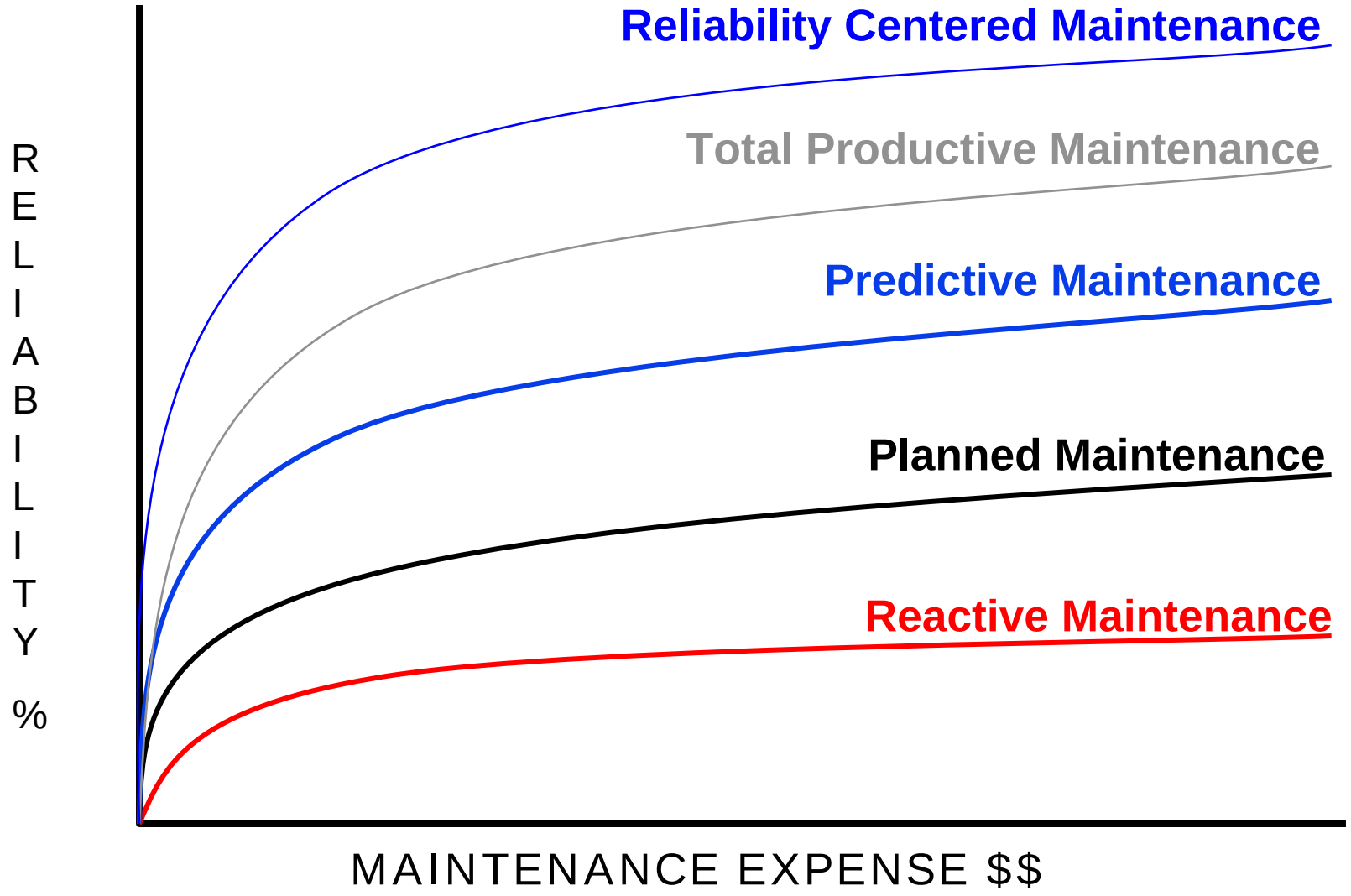
Create Your Personal Vision

Section 3

The Reliability Maturity Continuum

Strategic Asset Management Inc.

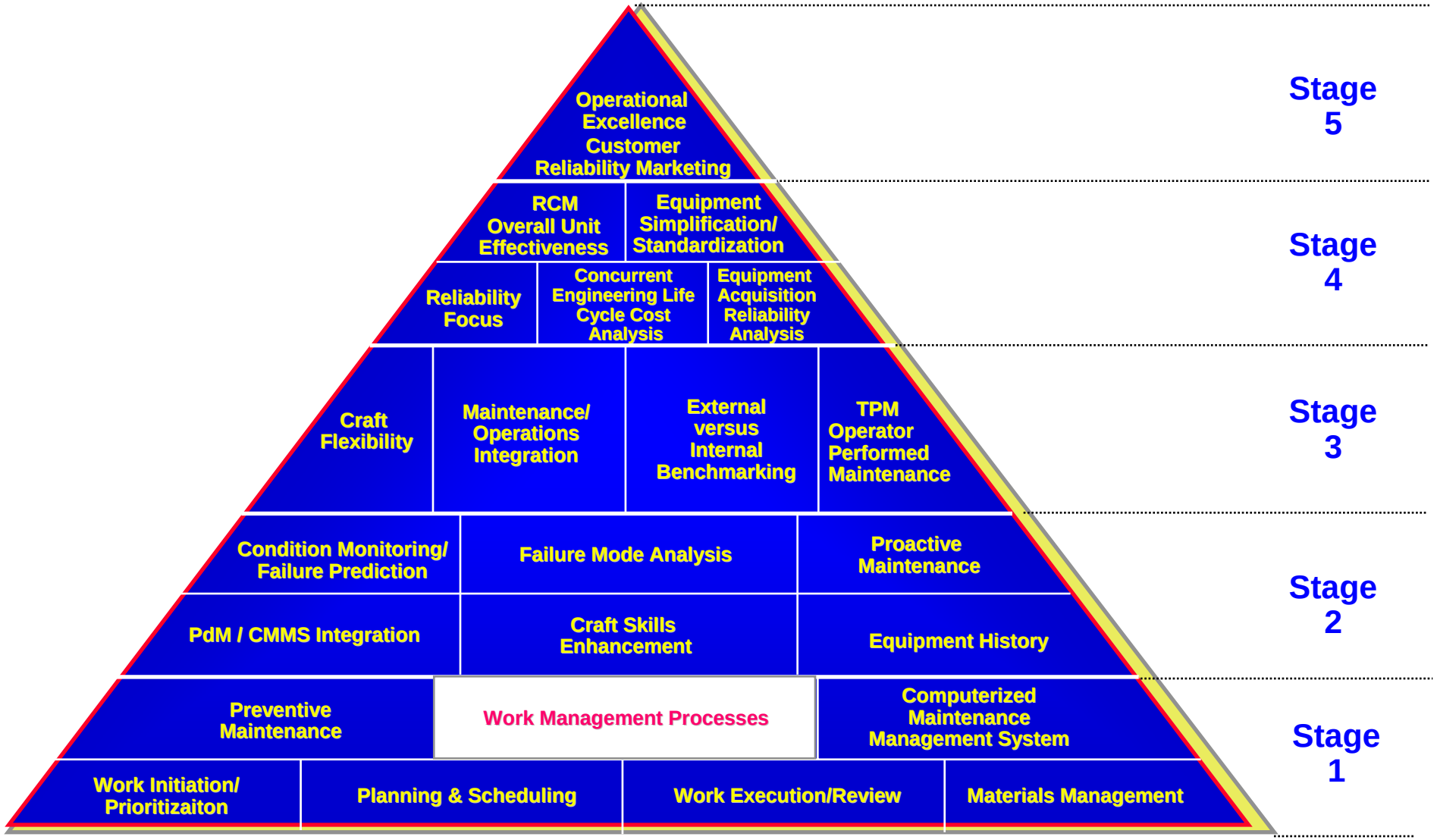
Reliability Stable Domains



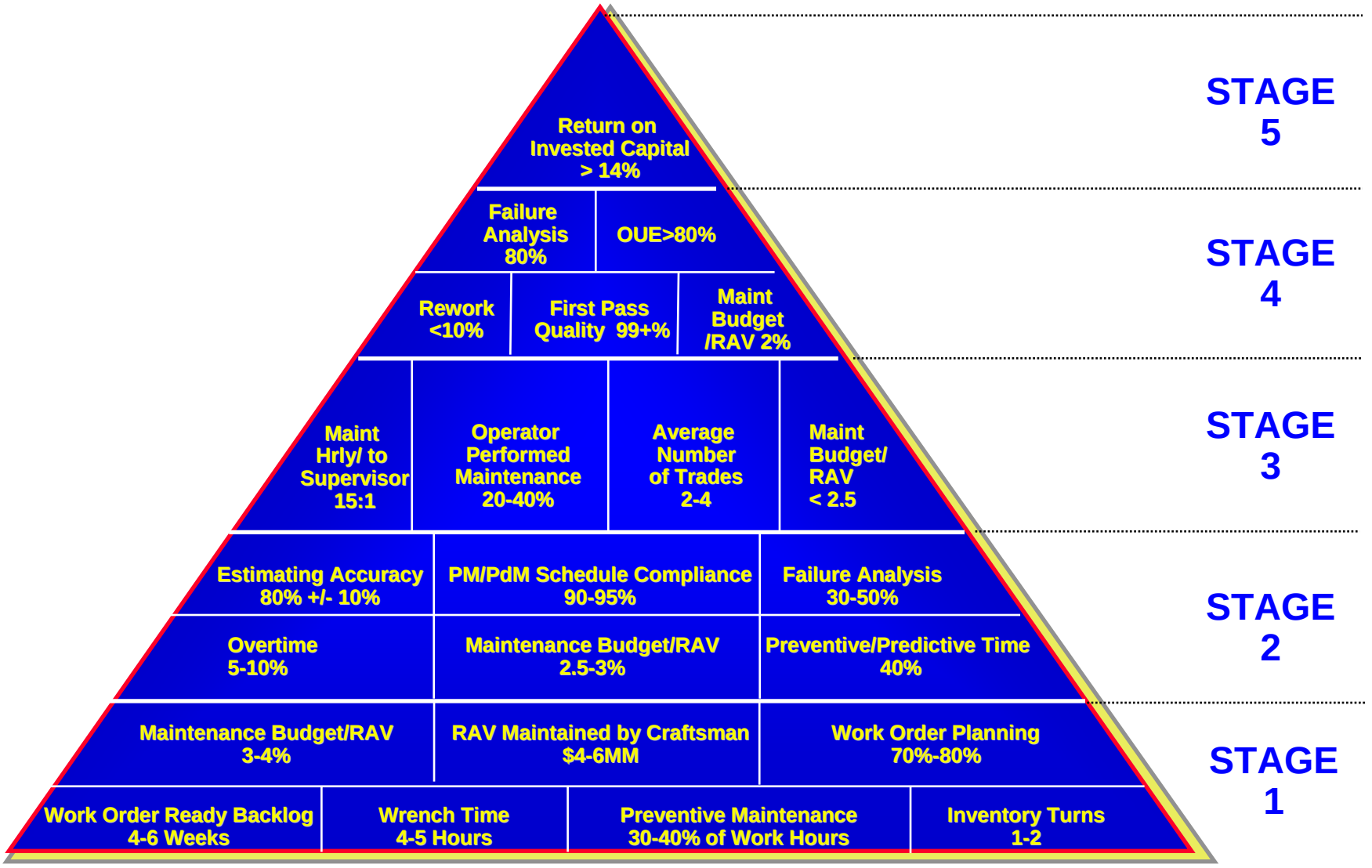
A Roadmap to Lasting Success . . .
the Operational Reliability Maturity Continuum

Stage \ Class	Low Performing	Competent	High Performing
Stage 1 Daily Maintenance	• "Fires" determine priorities • Breakdowns frequent • Maintenance equates to repair • No work orders, plans, controls • Stores service levels low • Poor operator/maintenance relationships • Poor customer service levels	• Most work planned, scheduled • Preventive maintenance implemented • Trades competent at most repairs • Computerized work order system • Stores service levels fair • Operators prep for repairs • Expedited orders infrequent	• All work prioritized • PM hours and W.O.s exceed repairs • Maint. Mgmt. System utilized, integrated with Purchasing, Stores • JIT Stores; 2x minimum turns • Operators inspect, create WOs • Turnarounds well planned, executed
Stage 2 Proactive Maintenance	• Condition-monitoring equipment purchased, installed • Little analysis performed on data • No preventive action taken • No analysis done to identify candidate equipment • Benefit tracking anecdotal	• Condition-monitoring equipment installed, readings taken regularly • Information analyzed, work orders created • Candidate equipment has high value to production • Rational cost/benefit analysis	• Condition-monitoring intervals based on risk analysis • Predictive techniques minimize repair, out-of-service cost and time • Proactive techniques employed (e.g., high quality filtration) • PDM data integrated with CMMS
Stage 3 Organizational Excellence	• Training emphasis disconnected from real work practices • Quality Program ineffective in changing work behaviors • "Team" implementation creates chaos • Anarchy replaces hierarchy	• Natural Work Teams perform most daily maintenance effectively • Operators perform TPM activities • Some program integration (e.g., Quality, PSM, EPA, ISO, RCare) • Crafts flexibility high priority • MX philosophy adopted (e.g., TPM)	• Work teams flexible, self-directed • Continuous improvement process embraced, understood, working • Programs rationalized, integrated • Reward/Recognition support best results • Skills predominate over functions • All staff systems competent
Stage 4 Engineered Reliability	• RCM implementation creates confusion, increased downtime • Functional divisions prevent successful pooling of talent • Pedantic rigor creates paralysis through analysis • Vendor reduction — lower service levels	• Failure analysis routine activity • High-value production processes assessed via RCM techniques • Maintenance routines changed to increase value impact • Reliability becomes focus — not maintenance	• Concurrent engineering employed to ensure lifecycle, maintainability • Reporting systems tie reliability to financial results through OUE • Complete equipment histories are used to trend and predict failures • Vendors participate in reliability
Stage 5 Operational Excellence	• Executive and plant management fail to align and implement goals • Market pressures make short-term decisions predominate • Union recalcitrance makes high performance organization impossible	• Clear organizational alignment • Operational reliability is cross-functional responsibility. Reliability built into purchasing, production, engineering • Activity-based management implemented • Market impact of reliability valued	• Monitoring, process control, and information systems integrated. Automated, self-correcting process/equipment • Life expectancy analysis, lifecycle extension reengineering done • Automated, demand-driven plant production balancing implemented

Planned Maintenance is the Foundation of Asset Management Excellence



Typical Measures and Values of Vary with Each Stage of Attainment of Reliability Maturity



Operational Reliability Maturity Continuum — Self Assessment

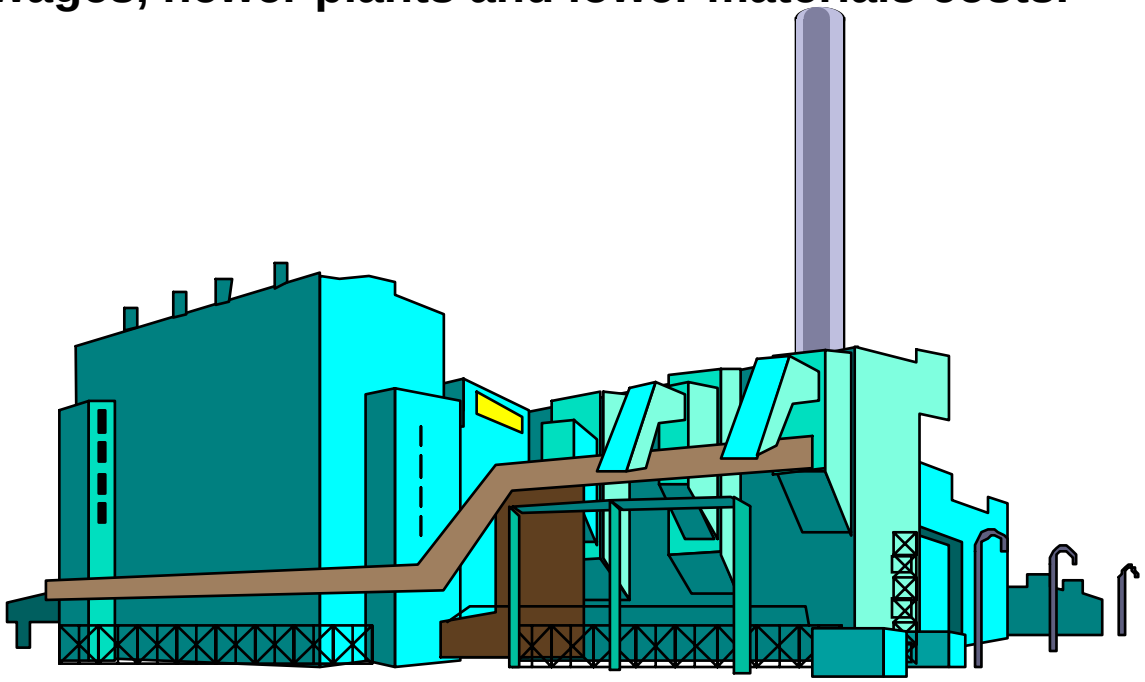
Stage \ Class	Low Performing	Competent	High Performing
Stage 1 Daily Maintenance			
Stage 2 Proactive Maintenance			
Stage 3 Organizational Excellence			
Stage 4 Engineered Reliability			
Stage 5 Operational Excellence			

Section 4

What is Asset Management?

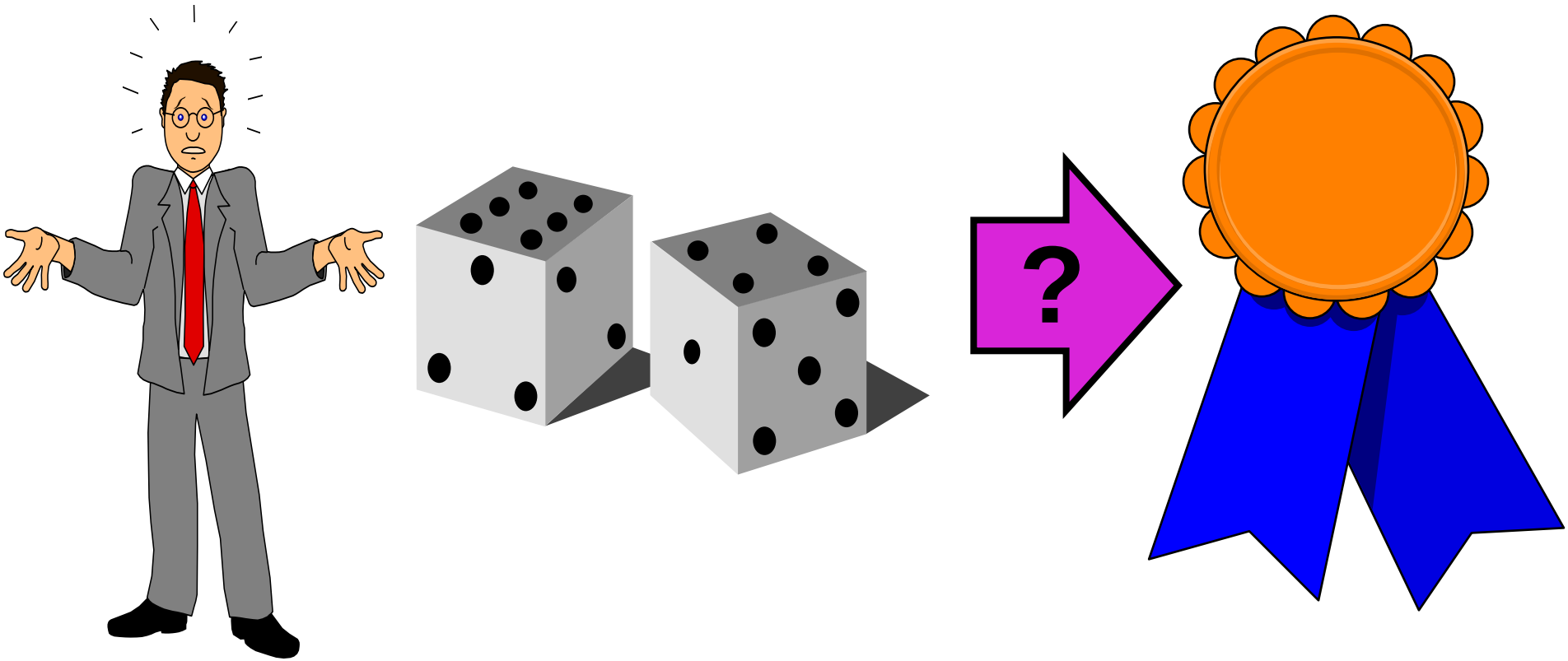
Background

Industry is faced with unprecedented challenges. Commodity markets have been unable to raise prices for years, and all producers continue to lower fixed costs through technology and reengineering. Offshore competitors often have lower cost of capital, lower wages, newer plants and lower materials costs.



An Asset Management Strategy to maximize the value from physical assets will help heavy industry compete in this new environment

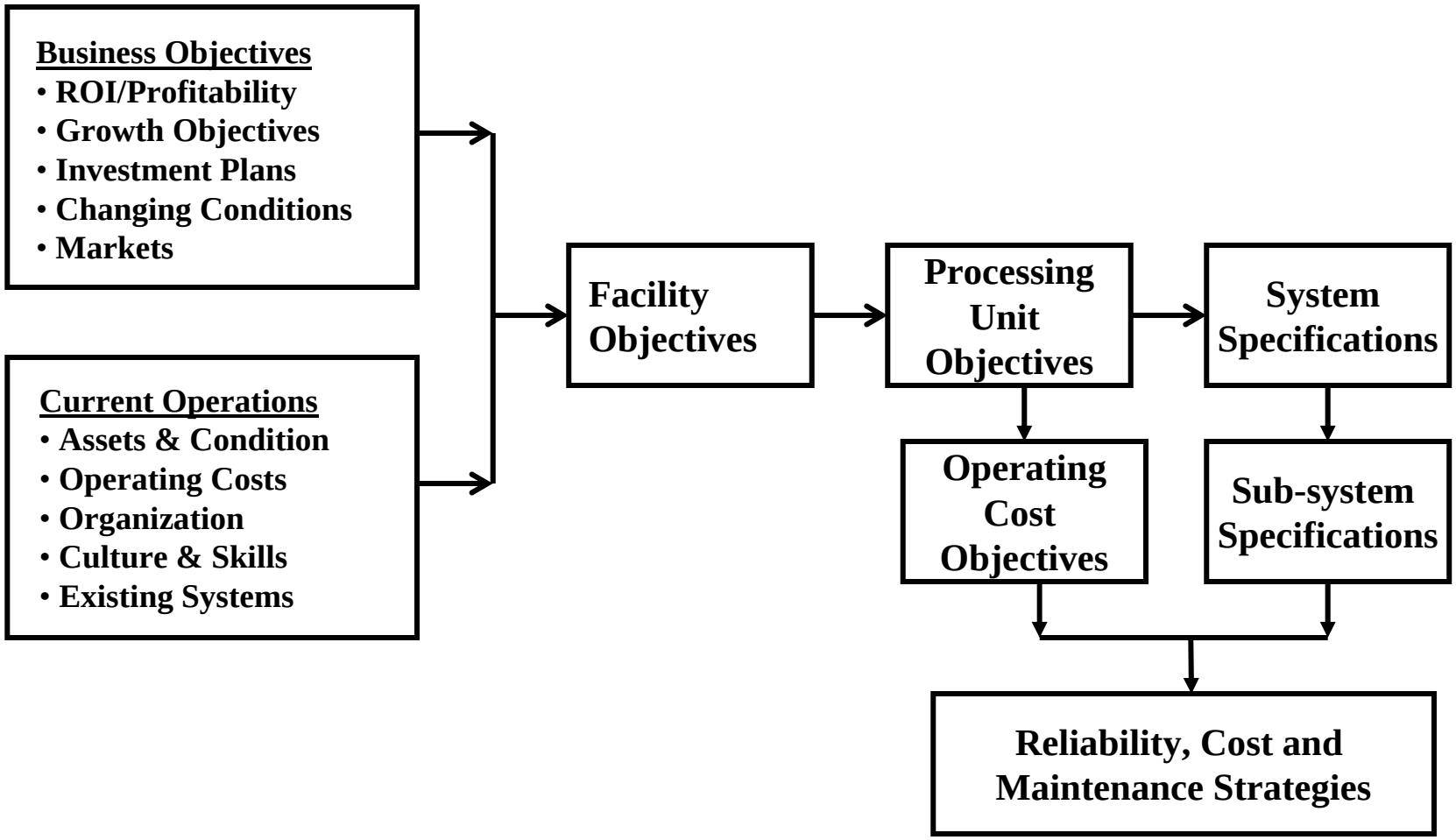
The Fundamental Question is This: Do Excellent Results Happen by Chance?



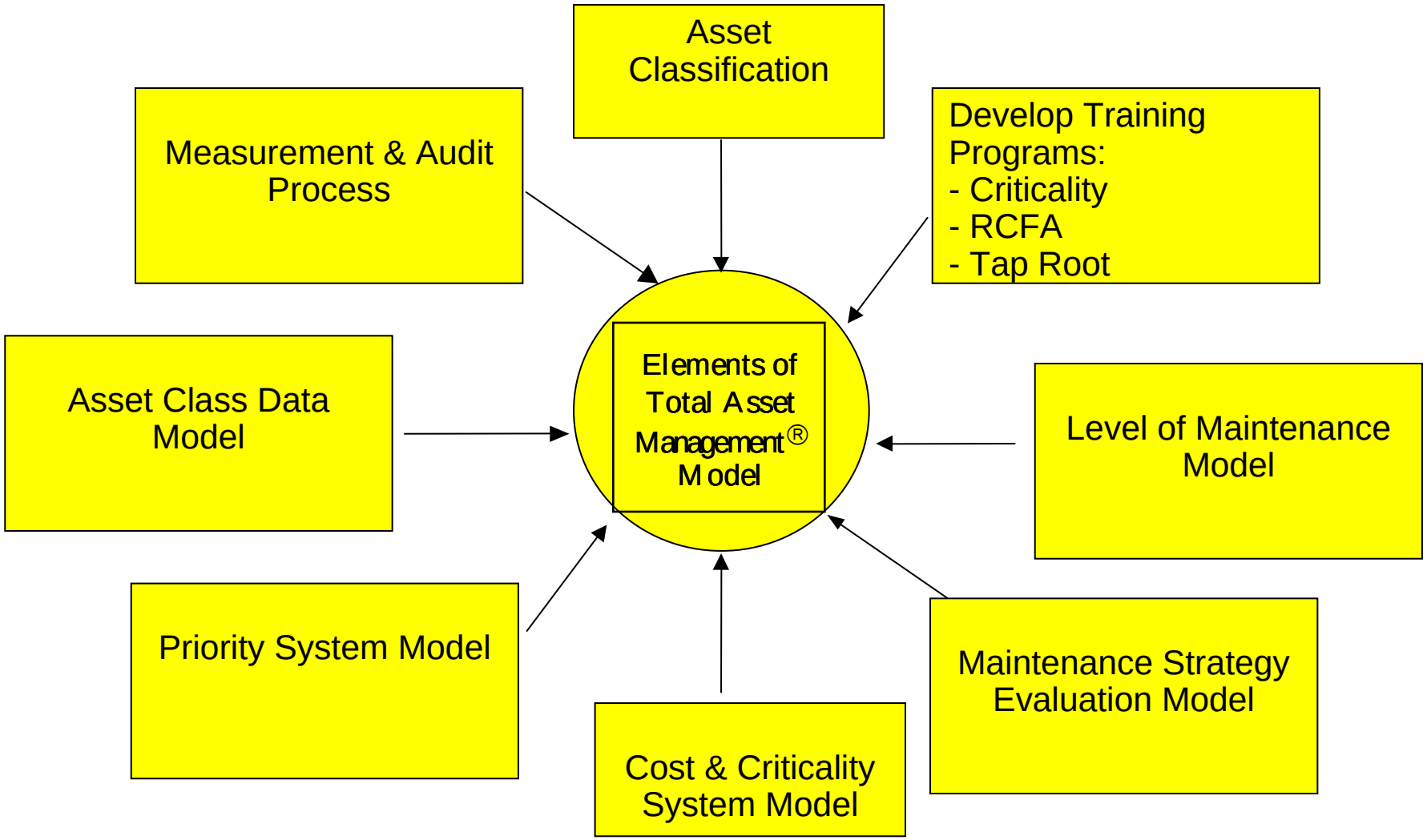
If consistently good results are not from chance, what are the key success factors?

Functional Excellence Model	Asset Management Excellence Model
• Operations owns production, maintenance owns equipment	• Operations owns equipment and is responsible for equipment health
• Maintenance excellence means efficient service (e.g. repairs) to production. A customer service model dominated by operations. Most work is inside planning time horizon	• Maintenance is a partnership with operations to identify and work ways to improve equipment health
• Repair efficiency is the best measure of maintenance performance. No time to do it right, but hope there is time to do it over	• Breakdowns represent an unacceptable management system failure, and require failure analysis of equipment and process
• Production runs at any cost. Don't turn equipment over to maintenance as scheduled.	• Production insists on and participates in assuring prevention and improvement activities
• Goals are set by functional managers, resulting in contradictory and self-defeating reward/recognition practices. Most measure are lagging indicators, demonstrating past results	• Goals are developed top-down in a cascaded fashion. Functions share lagging indicator goals (e.g. monthly production), and have unique leading indictor goals that support activities (e.g. % of PM's performed to schedule)
• Purchasing excellence means having the lowest cost of items available	• Purchasing and inventory management's highest goal is parts service level and MTBF is purchased parts
• Pressure is on individuals to do better. No gauges or tools of "better" exist	• Each piece of equipment has an operating performance specification, and gets the attention necessary for it

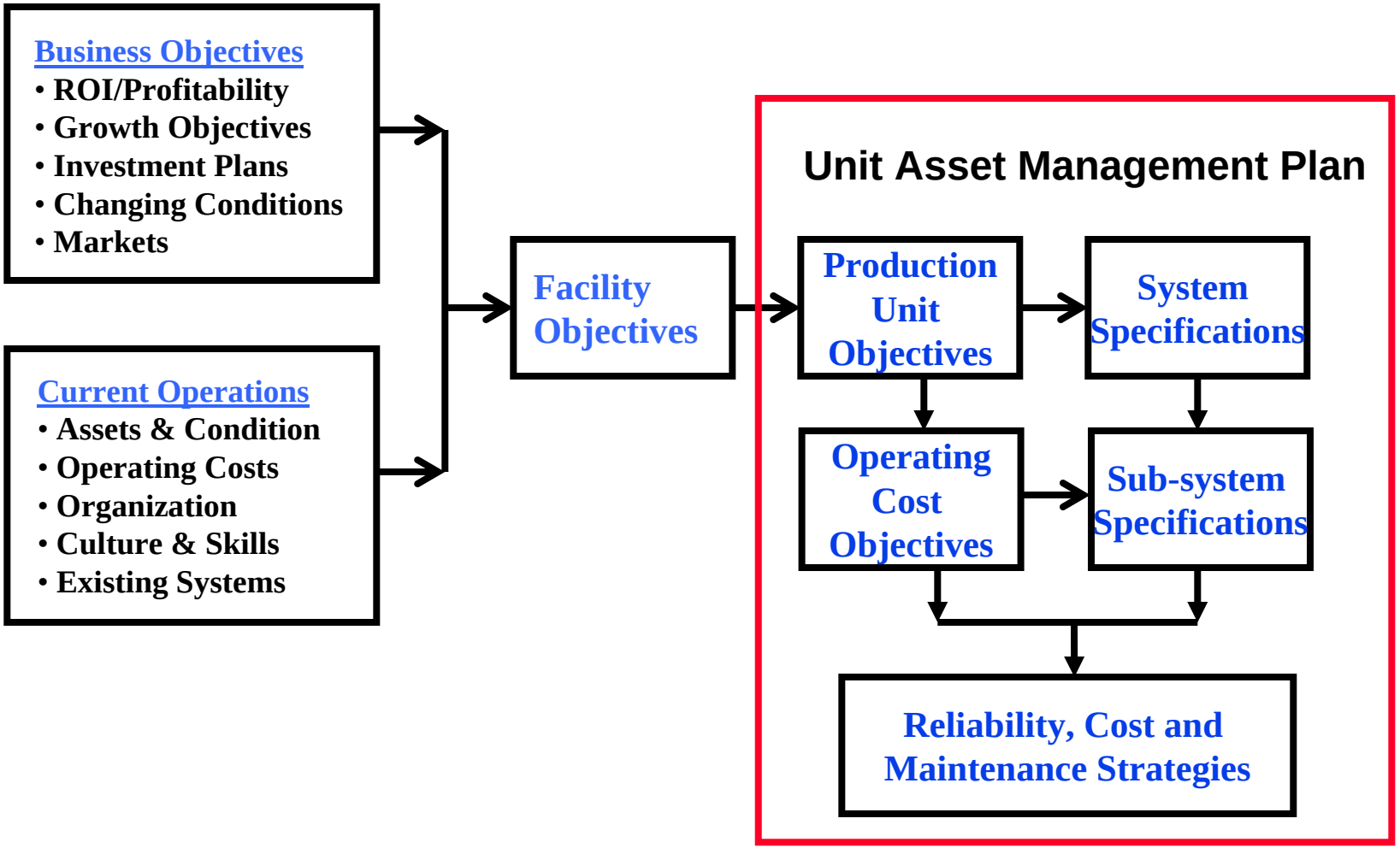
Asset Management Provides the Linkage Between An Organizations Objectives & the Activities to Achieve Them



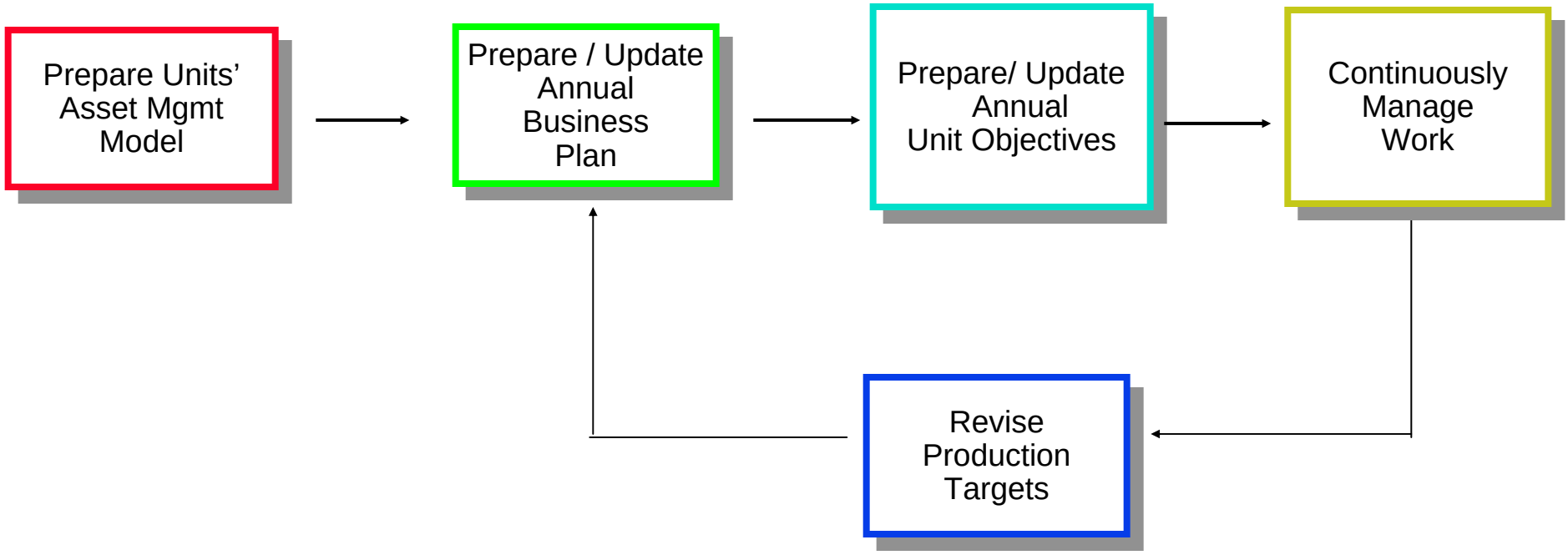
What Is the Elements of the Asset Management Plan?



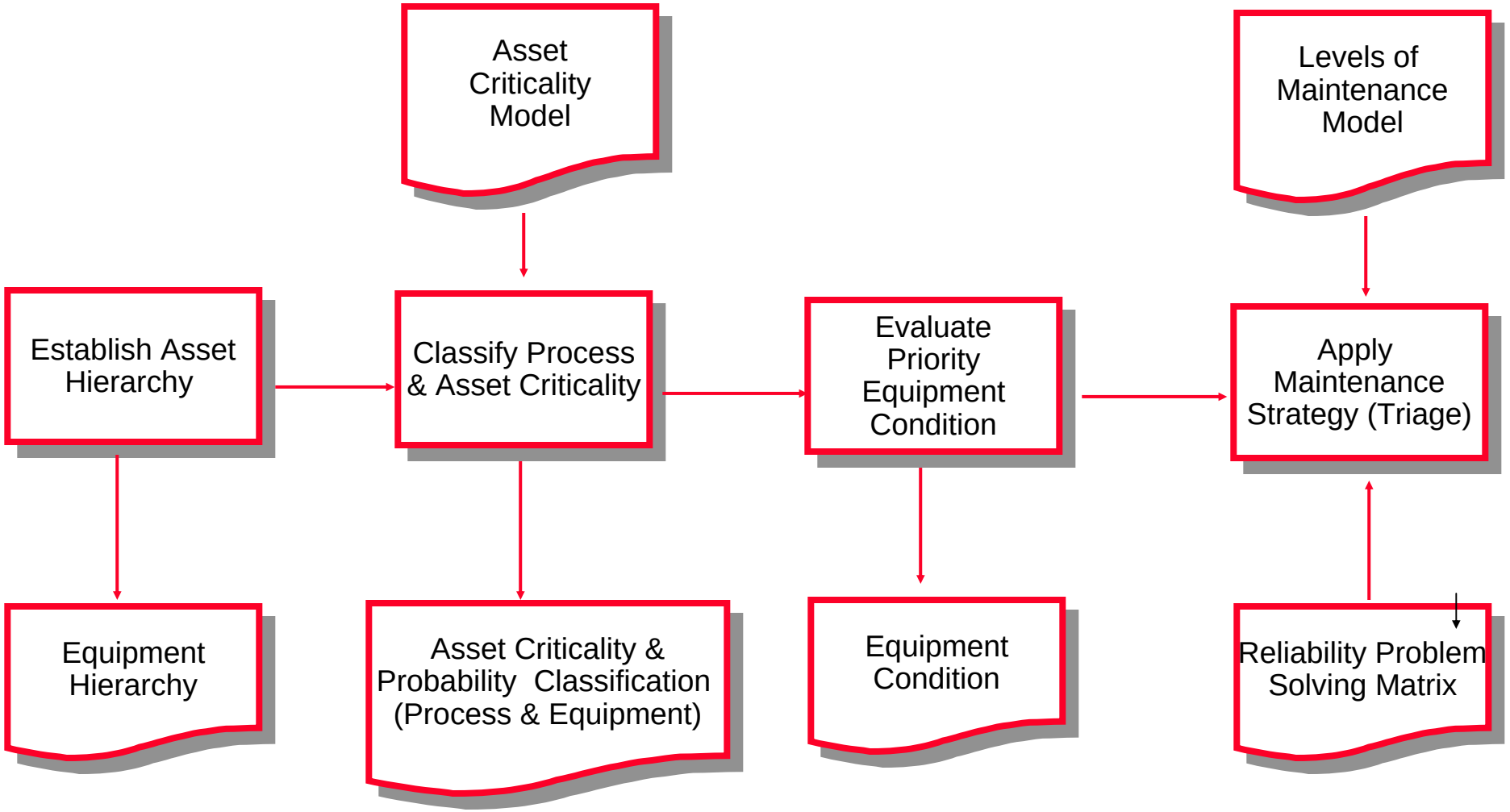
The Essential Part of Asset Management is Implementation at the Unit or Production Level



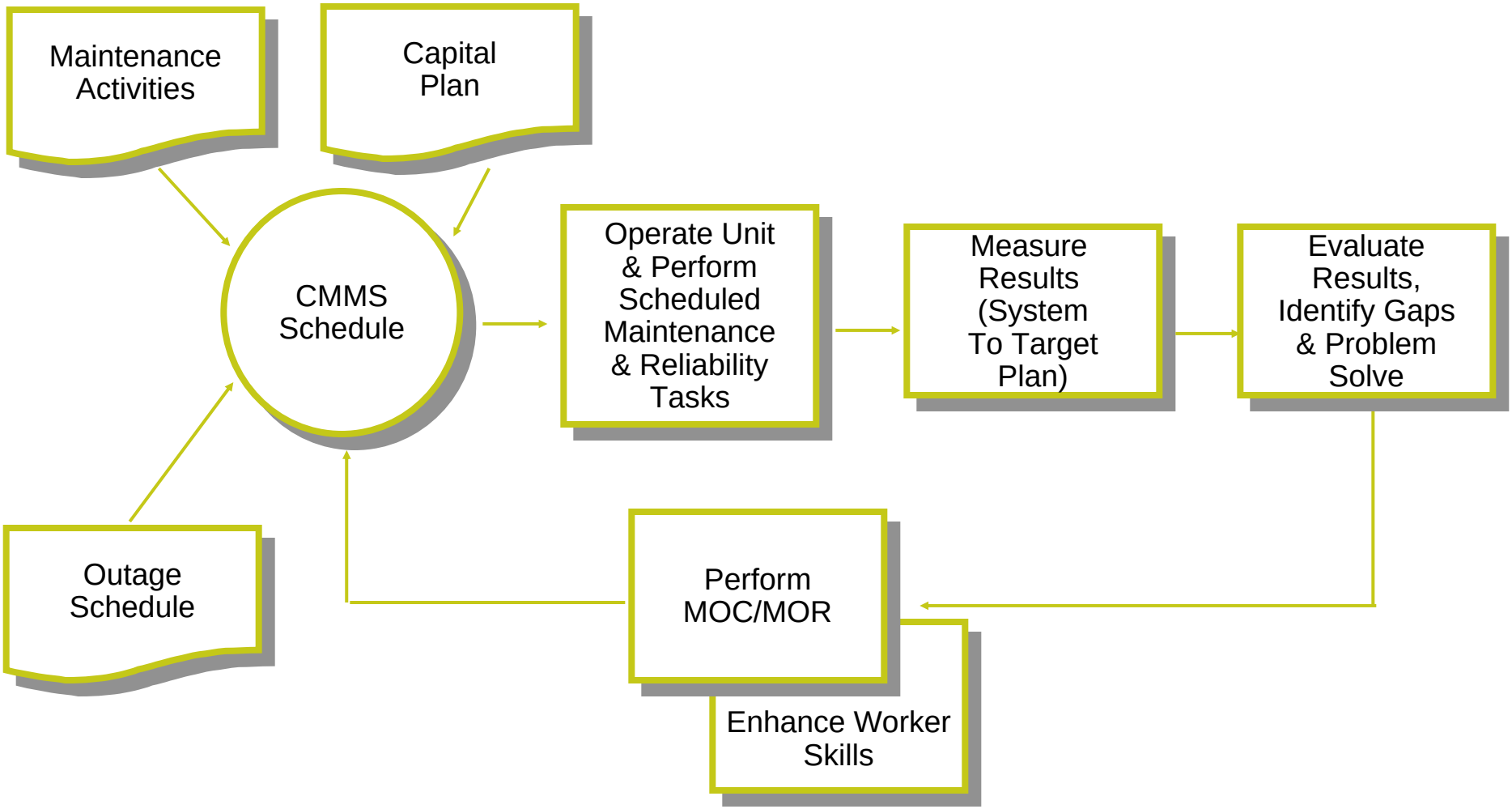
Total Asset Management® Process Flow



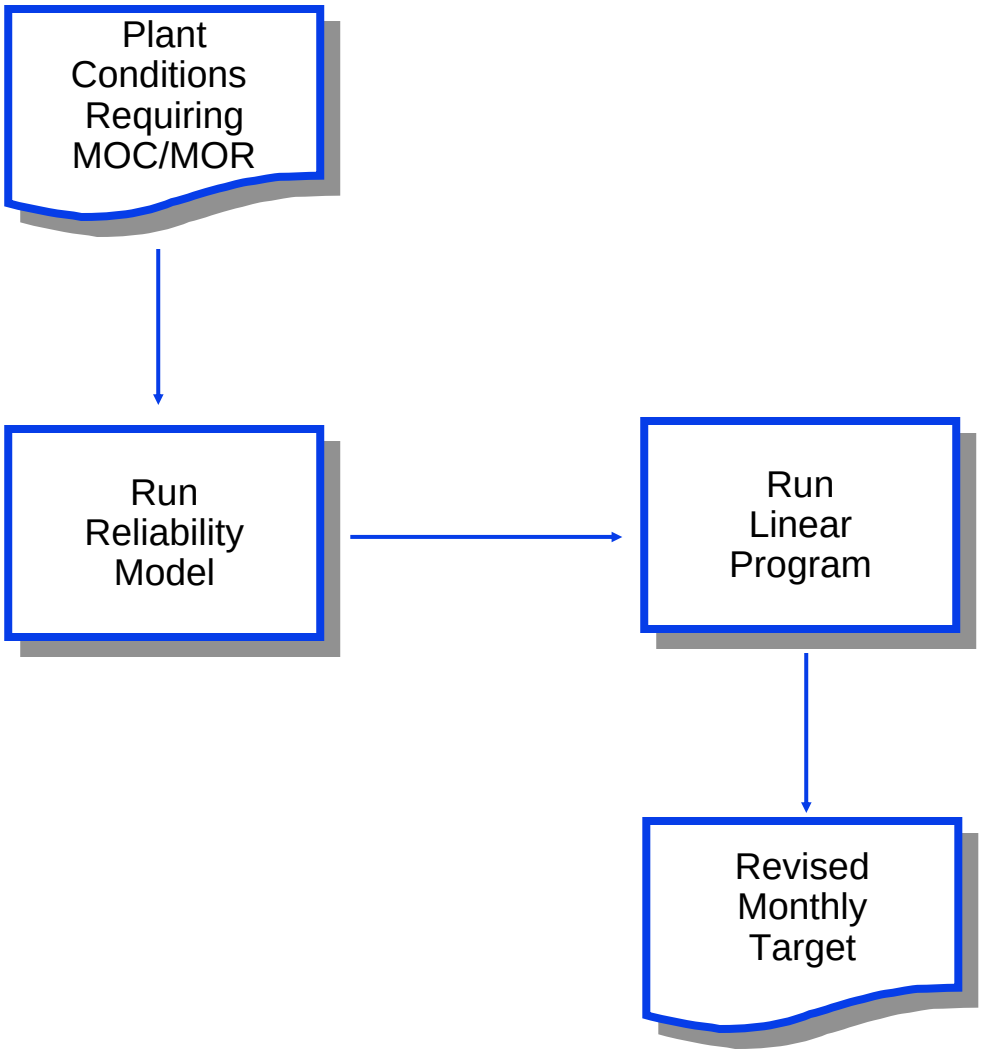
Prepare Units' Asset Management Model



Continuously Manage Work



Revise Production Targets



Functional Excellence Model

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Section 5

Developing the Strategic Plan

Asset Management Strategy is Documented in a Plan, with These Characteristics

- Documents a shared vision of future state. Creates shared ownership.
- Identifies current situation.
- Identifies desired outcomes — quantitative/qualitative.
- Outlines business case.

- Outlines series of initiatives/projects over several years with approximate costs.
- Identifies structure, accountability, and responsibility.
- Contains specific targets in lead and lag indicators.

The only lasting value of a Strategic Plan for Asset Management is if it guides the change process successfully--leading to new behaviors by all.

What Are the Critical Success Factors in Plan Development?

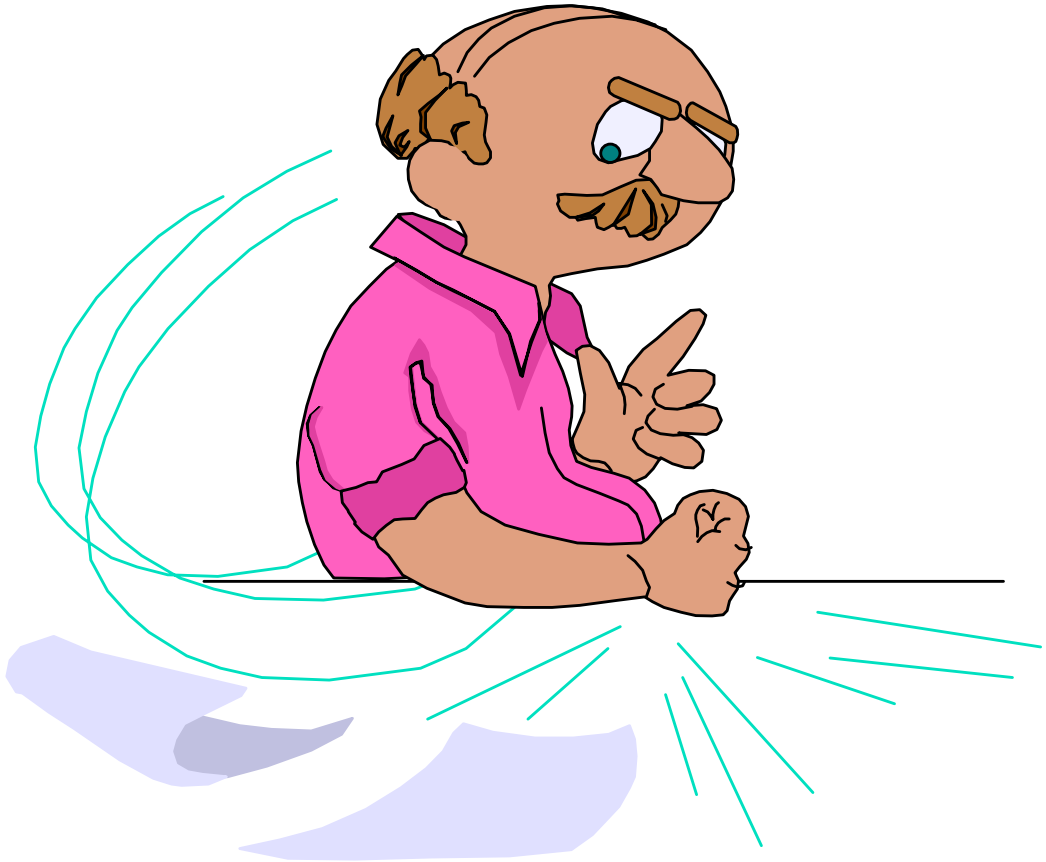
Critical success factors include:

People	Measures	Process
• Wide participation in development	• Cascaded and aligned annual goals	• Sponsorship and visibility at highest level
• Ownership by all functions and management	• Lead and lag indicators	• Structure
• Understanding by each function of roles and contributions	• Practical, useful, simple	• Accountability
• Crafts and operators understand and are measured on contribution	• Change over time	• Integration with annual plan
	• Clear benefits, with tracking and accountability	

An additional success factor is to follow a proven model for growth--

The Operational Reliability Maturity Continuum

Some Approaches Tend to Work--and Others Tend Toward Failure!

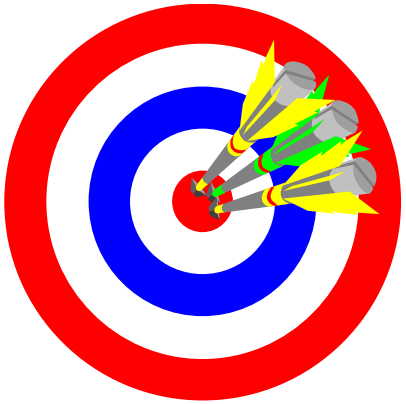


Management must lead the planning effort..that way it will be understood, owned, and have the best chances of implementation.

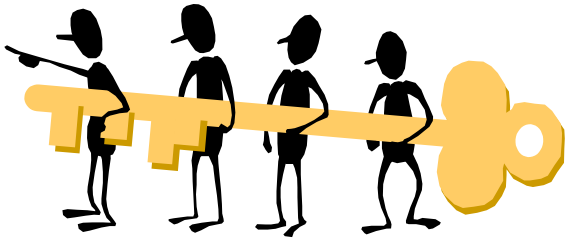
A Management Steering Committee Participates in Plan Development in These Ways...

Learn what the leaders are doing...

Create the Plan...

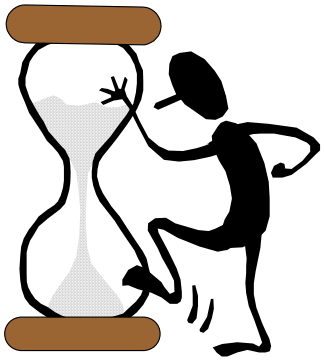


Pick the best strategies...



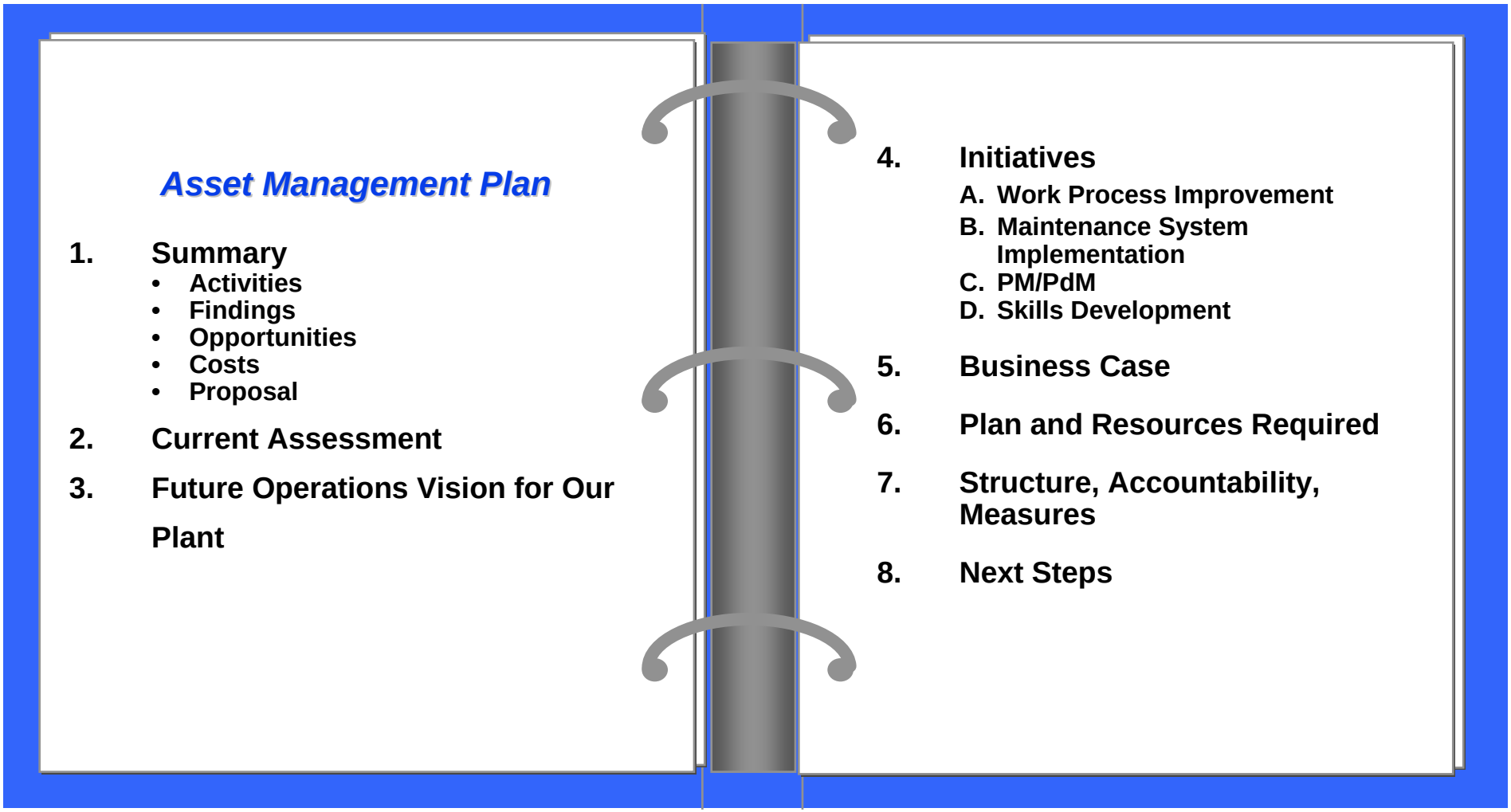
Lead the Change...

Identify the Value of Change...



And Remember..Time Waits for No Man...

The Strategic Plan Might Look Like This



Results of the Strategic Plan--We Identify Where We Are on the Reliability Maturity Continuum

	Low	Comp	High
1		X	
2			
3			
4			
5			

A Stage I Competent Plant

We Set Out a Long-Range Plan of Action

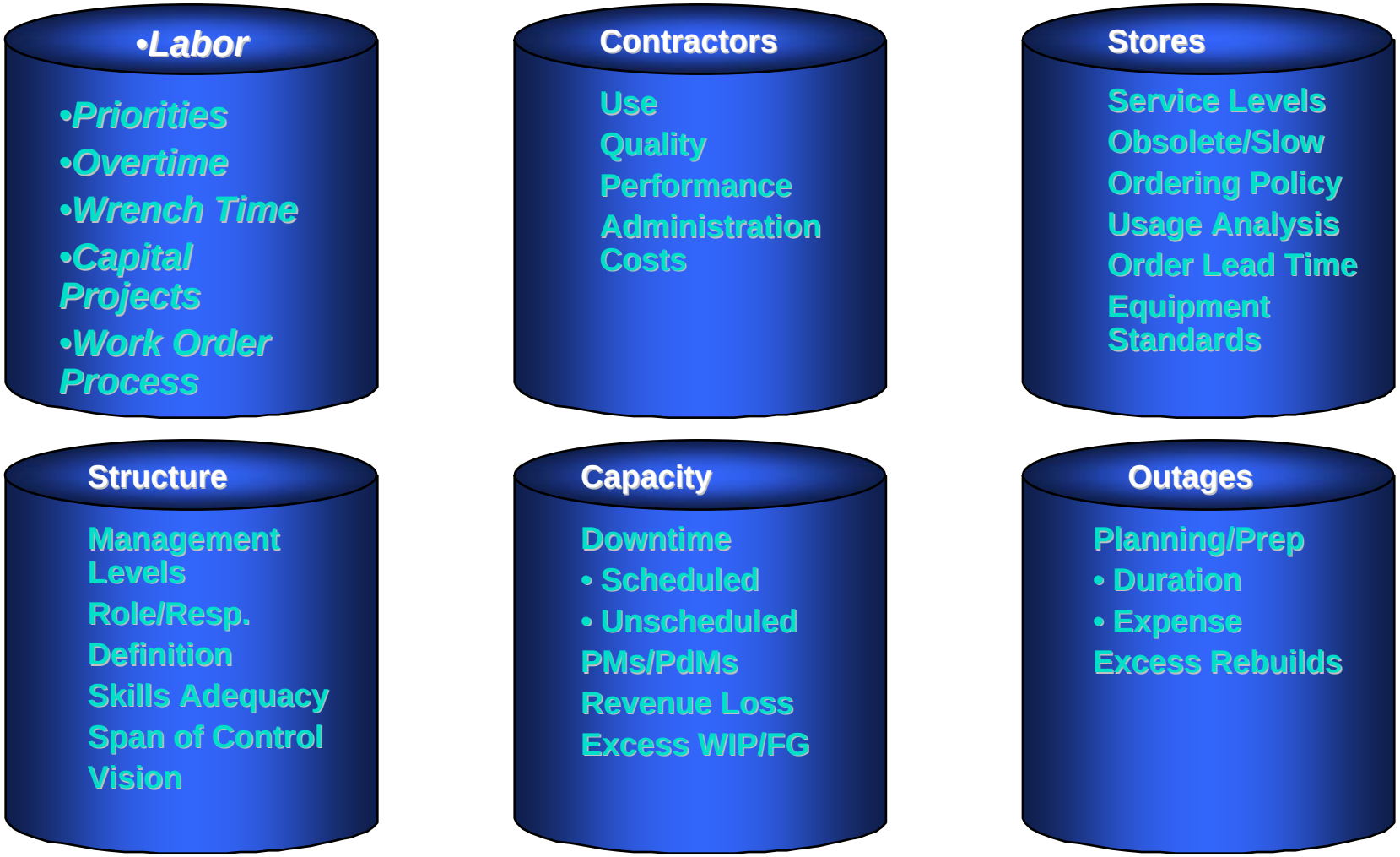
	1998	1999	2000	2001	2002
1. Daily Maintenance	X X X X				
2. Proactive Maintenance		X X X			
3. Organizational Excellence			X X X		
4. Reliability Engineering				X X X X	
5. Operational Excellence					X X X X X X

With a Five-Year Asset Management Plan

Section 6

Developing the Business Case

One of the Critical Steps in the Plan is the Business Case-- Identifying Costs and Benefits Available Through Improvement



The Plan Identifies the Opportunities We Intend to Capture

Opportunities (in $ millions)	
1. Labor	$ 2.00
2. Contractors	2.00
3. Parts & Supplies	0.75
4. Product Unit 1	9.00
5. Product Unit 2	16.50
	$ 30.25M

$30 million in benefits over 36 months

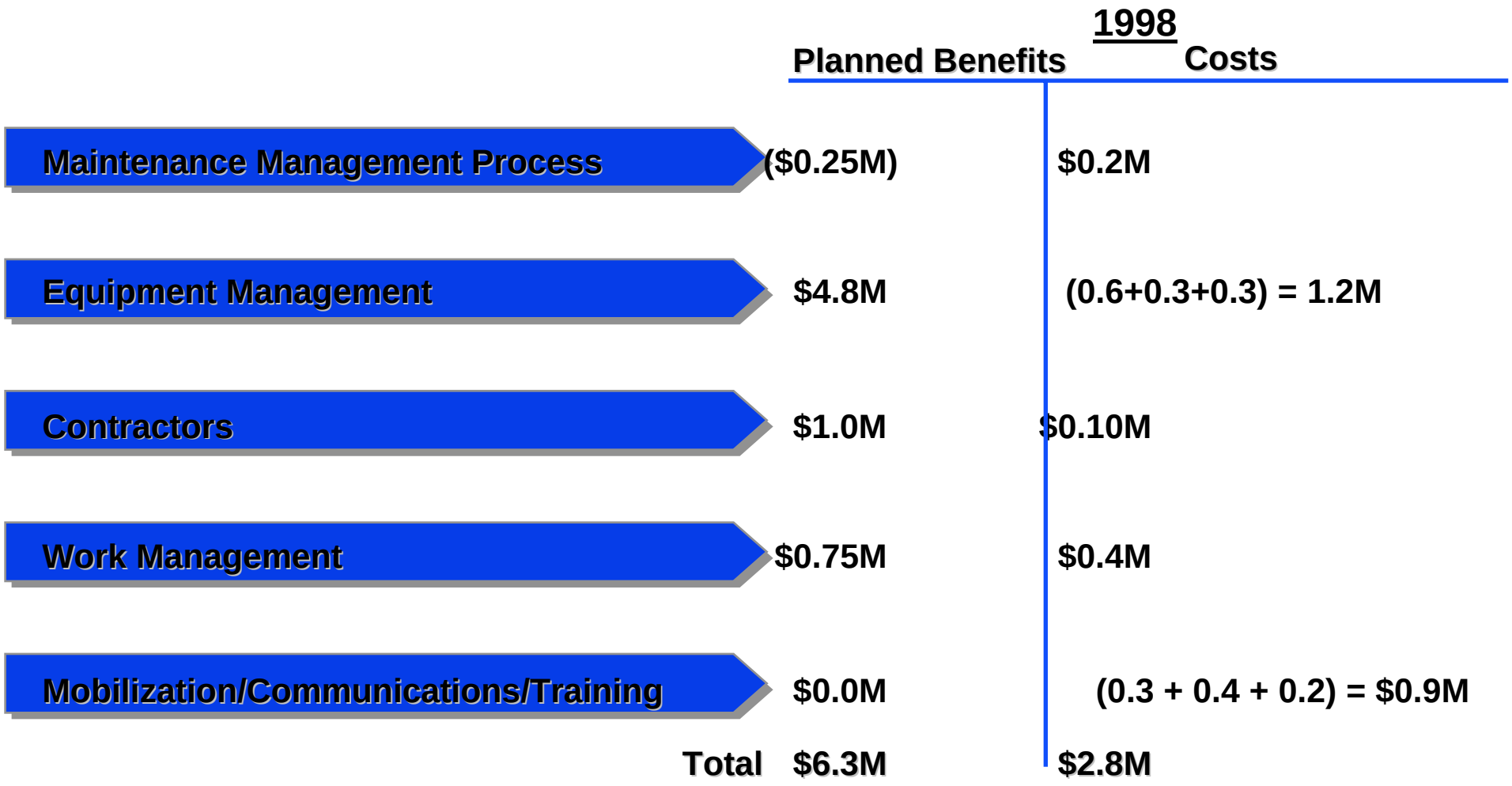
...As Well as the Costs and Bottom-Line Results

	1998	1999	2000	Total
•Total Benefits	$ 6.3M	$ 9.85M	$ 14.1M	$ 30.25M
•Costs ($M)				
• 1. Equipment Upgrades	.6	2.5	.8	3.9
• 2. Consulting Services	1.2	.3	.3	1.8
• 3. Training	.3	.3	.3	.9
• 4. Restructuring	.4	--	--	.4
• 5. CMMS/PdM	.3	.6	.3	1.2
•Total Costs	$ 2.8M	$ 3.7M	$ 1.7M	$ 8.2M
• Total Net Benefits	$ 3.5M	$ 6.15M	$ 12.4M	$ 21.95M
•Annual Return	2.2:1	2.7:1	8.3:1	3.7:1

We Spread the Financial Gains into Achievable Goals for Each Year

	1998	1999	2000	Total
• Cost Reduction ($M)				
• Labor	$ 0.75	$ 1.00	$ 0.25	$ 2.00
• Contractors	$ 1.00	$ 0.50	$ 0.50	$ 2.00
• MRO	($ 0.25)	$ 0.75	$ 0.25	$ 0.75
• Cost Reduction	*$ 1.50M*	*$ 2.25M*	*$ 1.00M*	*$ 4.75M*
• Additional Product				
• Unit 1				
– KLBS	9,000	14,000	22,000	45,000
– Profits ($ 0.20)	$ 1.8M	$ 2.8M	$ 4.4M	$ 9.0M
• Unit 2				
– KLBS Cap	5,000	8,000	14,500	27,500
– Profits ($ 0.60)	$ 3.0M	$ 4.8M	$ 8.7M	$ 16.5M
Total Benefits	$ 6.3M	$ 9.85M	$ 14.1M	$ 30.25M

And Outline Annual Plans and Projects to Achieve our Financial Goals



For Greatest Credibility, You Employ a Structured and Auditable Approach to Identify Benefits

Benefits Category	Benefits Subcategory	Benefits Source	Benefits Benchmark	Typical Analysis Probe	Improvement Methods
• LABOR	• Efficiency	•Hands-on-tools time •Operator Performed Maint.	• 5-6 Hours/Day • 20% of Routine Maint.	• DILO, Permits, Parts • WO Proc. Brownpaper	• Reeng. W.O. Process • OPM Program
	• Effectiveness	•Rework/Scrap Reduction	• Rework <10%, Scrap<3%	• DILO--W.O. Review	• Job Planning, Skills
	• Workload Red'n	•PM/PdM Effects •Reduction in Crew Size	•"E" Reduction by 50-75% • Decrease .25 FTE/W.O.	• W.O. Review -- %PPM • DILO--W.O. Review	• Impl. PM/PdM Proc. • Safety Stds, Planning
	• Mgt Structure	•Supervisor Ratio	• 12-15:1	• Org. Chart Review	• R/R Def'n, Training
• MATERIALS/ ENERGY	• Rationalization	•Decrease MRO Inv. Value	• Two Turns / Year	• MRO Utilization Rvw	• Analysis, Restocking
	• Prevention	•Decreased Usage	• 10-30% Reduction	• W.O. Review -- %PPM • Preventable Mx Review	•Impl. PM/PdM
	• Vendor Stocking	•Reduced Carrying Cost	• 10-30% Reduction	• Utilization Review	• Impl. Vendor Stocking
• CONTRACTOR USAGE	• Routine Maint	•Improved Mgt/Utilization	• 5-15% Reduction	• Billing/Activity Review • Admin. Process Rvw	• Value-Added Analysis • New Admin. Process
	• Projects	•Better Planning&Execution	• 10-40% Reduction	• Planning/Mgt Rvw	• Planning/Mgt Process
• CAPACITY	• Imp. Throughput	• Incr.. Avail, Rate, Quality	• 70%-90%, Ind. Specific	• 70%-90%, Ind.. Specific	• PM/PdM • Bad Actor Analysis
	• Reduced Waste	• Decr Raw Materials	• 1-5%, Ind. Specific • Process Dependent	• Ops Report Review • Fishbone Analysis	• Dec. Unpl. Stoppages • Process, Mgt Practices
	• Reduced Time Outage & T/A	• Increased Availability	• 10-50% over 3-5 years	• Planning/Mgt Review • Ind.. Benchmark Rvw	• Improve Planning • Predictive Maintenance • Reliability Engineering

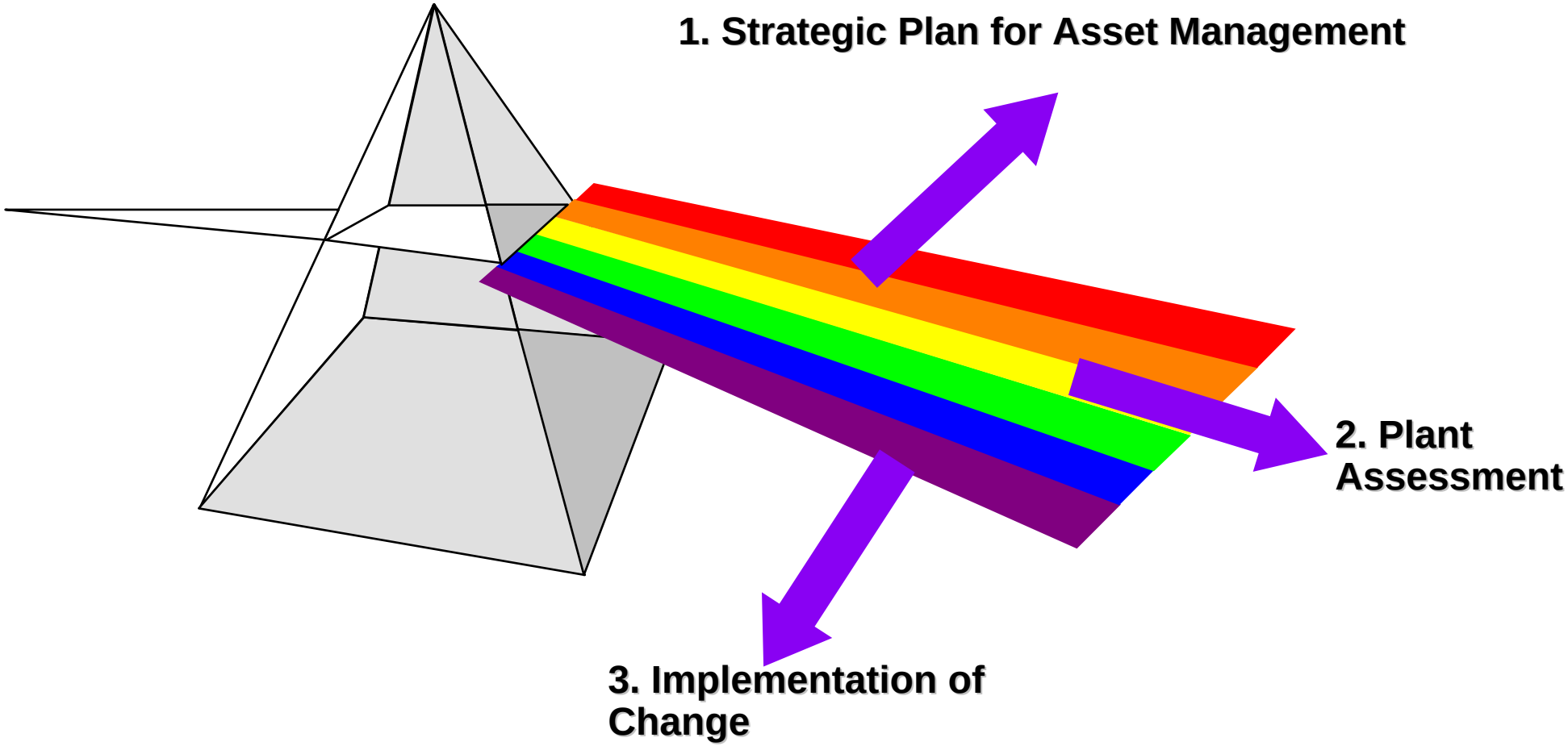
Exercise: Calculate the Benefits Available for Your Plant

Benefits Category	Benefits Subcategory	Benefits Source	Est. Current Value	Improved Value	Calculation	Benefit Value $
• LABOR	• Efficiency	•Hands-on-tools time •Operator Performed Mx			• Add'l Hrs* #Crafts*$/Hr • % Work*Maint Labor Cost	
	• Effectiveness	•Rework/Scrap Reduction			• Ann Repair $ * % RW * %Red'n	
	• Workload Red'n	•PM/PdM Effects			• Ann Repair Costs * %	
	• Mgt Structure	•Supervisor Ratio				
• MATERIALS/ ENERGY	• Rationalization	•Decrease MRO Inv. Value				
	• Prevention	•Decreased Usage			•Ann Parts Cost * % Red'n	
	• Vendor Stocking	•Reduced Carrying Cost				
• CONTRACTOR USAGE	• Routine Maint	•Improved Mgt/Utilization				
	• Projects	•Better Planning&Execution			•Ann. Contr Labor $ * % Red'n	
• CAPACITY	• Imp. Throughput	• Incr. Avail, Rate, Quality			•# Add'l Units * Unit Margin	
	• Reduced Waste	• Decr. Raw Materials			•# Scrap * Unit Value * %	
	• Reduced Time Outage & T/A	• Increased Availability			•# Days Red'n * Unit Prod. Value / Day	

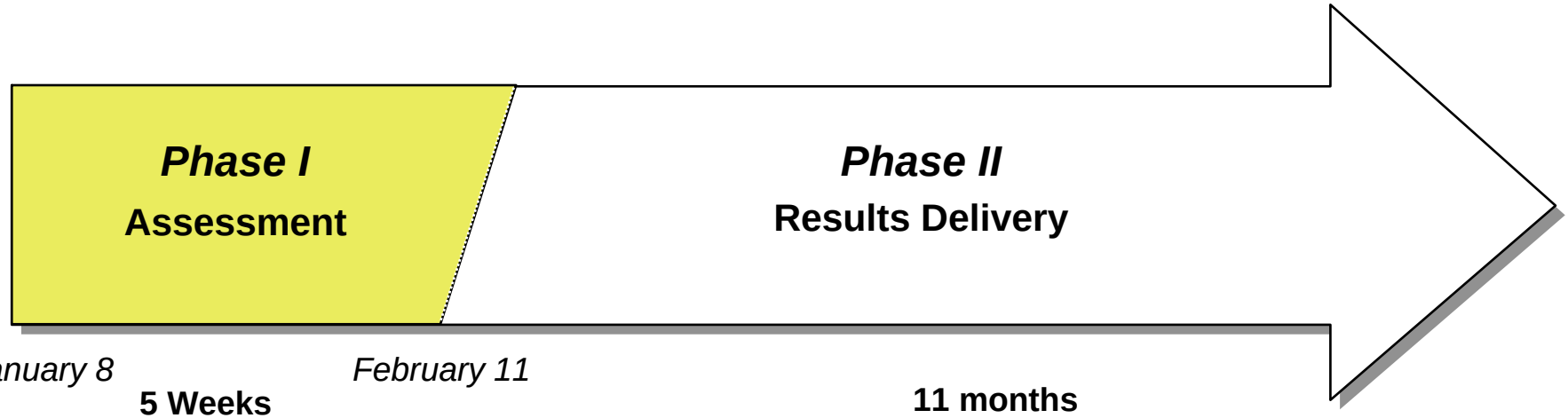
Section 7

Performing the Plant Assessment

The Strategic Plan is Only the First Step in the Journey, However



The Assessment is The First Phase of a Two Phased Program to Improve Operational Reliability



Objectives

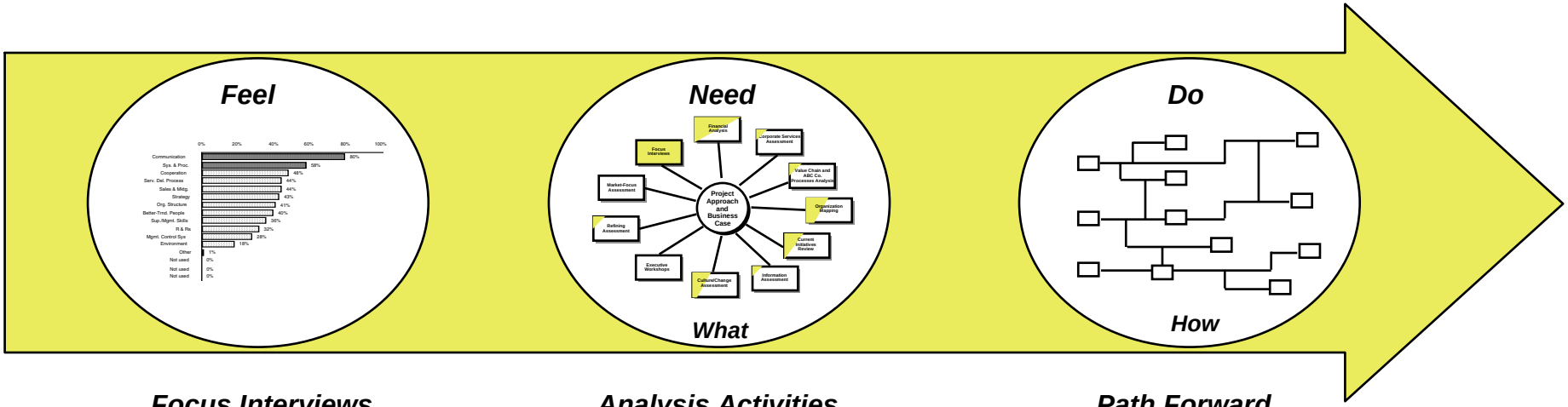
- Build an “As Is” model of relevant processes and procedures
- Determine performance improvement opportunities
- Develop a Business Case to support implementation of improvements
- Design an integrated implementation approach/plan
- Build organizational commitment to address opportunities

Objectives

- Jointly implement plan
- Jointly deliver results
- Transfer change acceleration skills

The Assessment Covers These Areas, With the Goal of Touching as Many People as Possible

Interviews and Surveys Help Surface People's *Perceptions* of Issues



Focus Interviews
Maintenance Survey

Analysis Activities

Path Forward
Business Case

- **What is the existing level of consensus in the organization around the future; will a significant consensus building effort need to be launched?**
- **What is the sense of urgency in the organization; what degree of mobilization is necessary?**
- **Does the organization understand the scope, scale and difficulty of change; will a massive management effort be required?**
- **What are the major barriers to success for the path forward; what must be done to overcome these barriers?**
- **Does the organization feel confident in the future; does accountability still need to be built?**

Interviews Give an Opportunity for Many People to Express Their Opinion about the Plant

- **"Feeling better about the company compared to what I did 6 months ago. Made some real improvements like SIP, flex spending on insurance, improvement of colleagues and management attitudes. Still need to work on team effort."**

- **"The last two years maintenance has been hard to come by…can't put in emergency work orders….2 years ago, anyone could put in an emergency order…now that is not the case."**

- **"We have not had good direction even though we have attempted changes, but never with commitment. Built expectation at lower level, but have not met them ."**

What Are the Most Critical Issues Facing the Plant Today?

- **"Work order planning and scheduling not working well. Too many changes that don't accomplish anything "**
- **"Problem with balance of craft assignment to 12 hour shifts. Trouble keeping adequate coverage with department techs"**
- **"Communication at all levels"**
- **"Training - Need more formal training; politics gets in the way of training. We try to do in-house training but do not get cooperation"**
- **"Maintain a union free environment"**

What Three Things Could the Plant Do to Most Significantly Improve Maintenance Effectiveness?

- **“Improve communication”**
- **“Institute accountability for the equipment and job performance (maintenance and operations)”**
- **“Consolidate control over all maintenance technicians”**

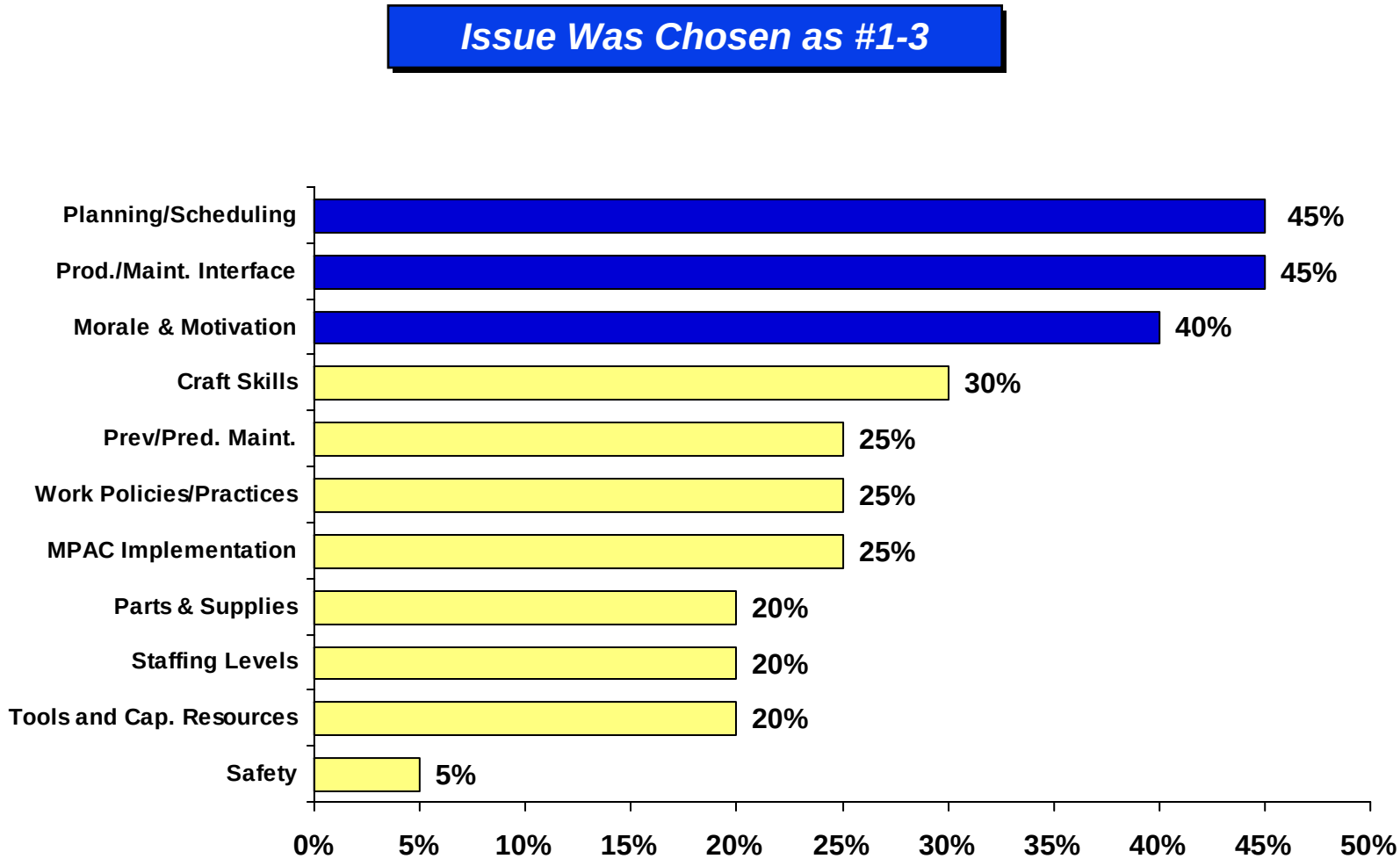
What Three Things Could Your Department Differently To Contribute to Improved Maintenance?

- **“Do more root cause analysis to solve recurring problems”**
- **“Make the planning system more efficient”**
- **“Operators try to take care of equipment”**

Where Do You Consider the Greatest Opportunities for Cost Improvement in Maintaining Production Equipment?

- **“Make people accountable”**
- **“Operator ownership of the equipment”**
- **“Good PM minimizes major breakdowns and lost productivity… increase uptime”**
- **“Cleanliness of the equipment”**

We Highlight Issues Selected by the Organization as Significant Barriers to Improving Operational Reliability

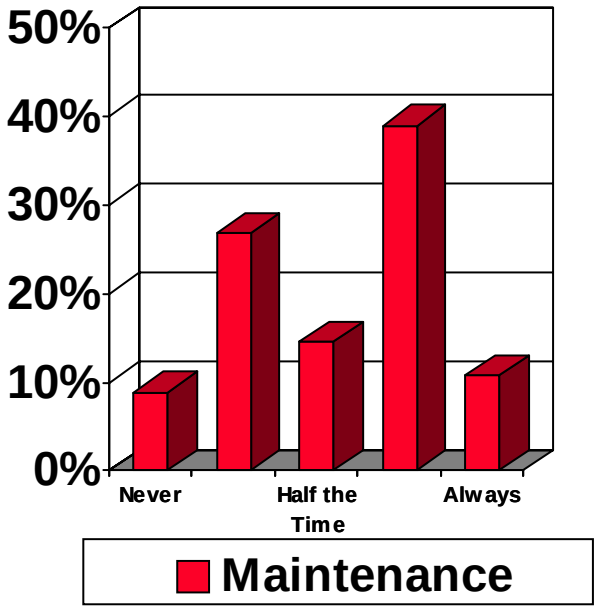


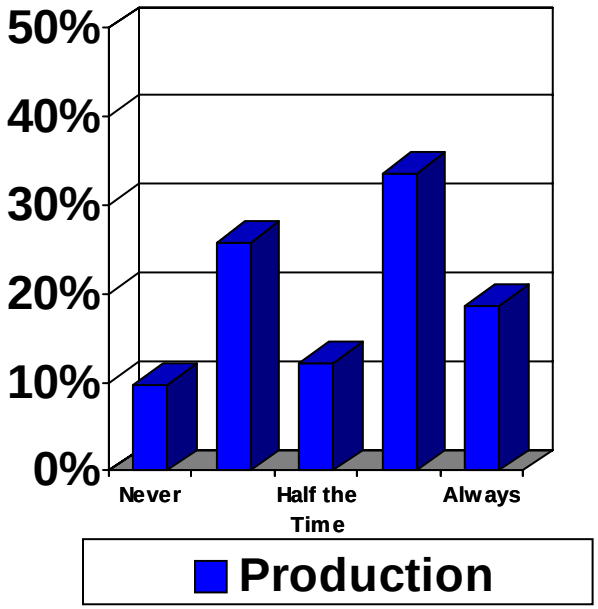
n = 20

Source: Focus Interviews

In the Maintenance Survey We Determine Perceptions: Is The Initiation/Authorization Process Used Correctly?

Maintenance Avg.=3.2 **Combined Avg.=3.2** **Production Avg.=3.3**

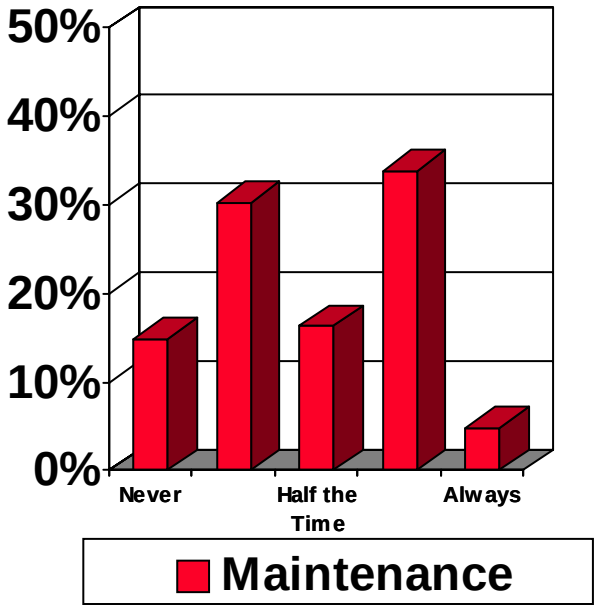


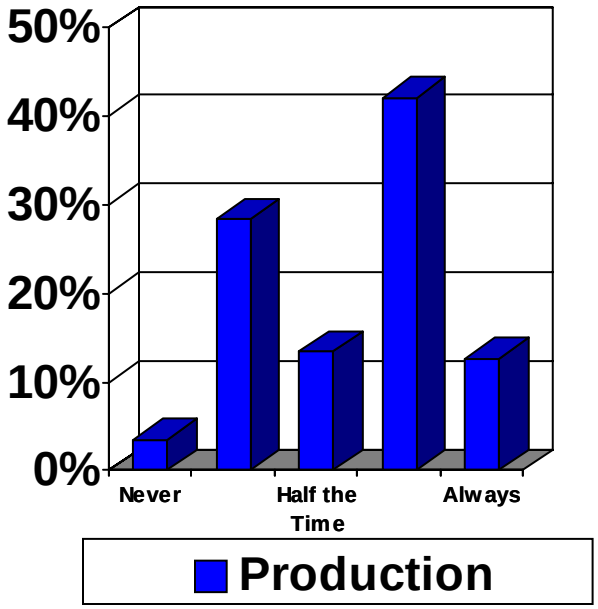


- "We create formal work orders for all work" Operations= 2.3
- "All work is entered into CMMS" Average= 4.2
- "Our CMMS helps to identify the equipment & problem" Maintenance= .9 higher than production
- "CMMS terminals are easily accessible for all staff" Average= 4.0
- "W/R's are reviewed/authorized within 24 hours" Operations= 2.2

Do We Pay Attention to Reliability and Downtime ?

Maintenance Avg.=2.8 **Combined Avg.=3.0** **Production Avg.=3.3**

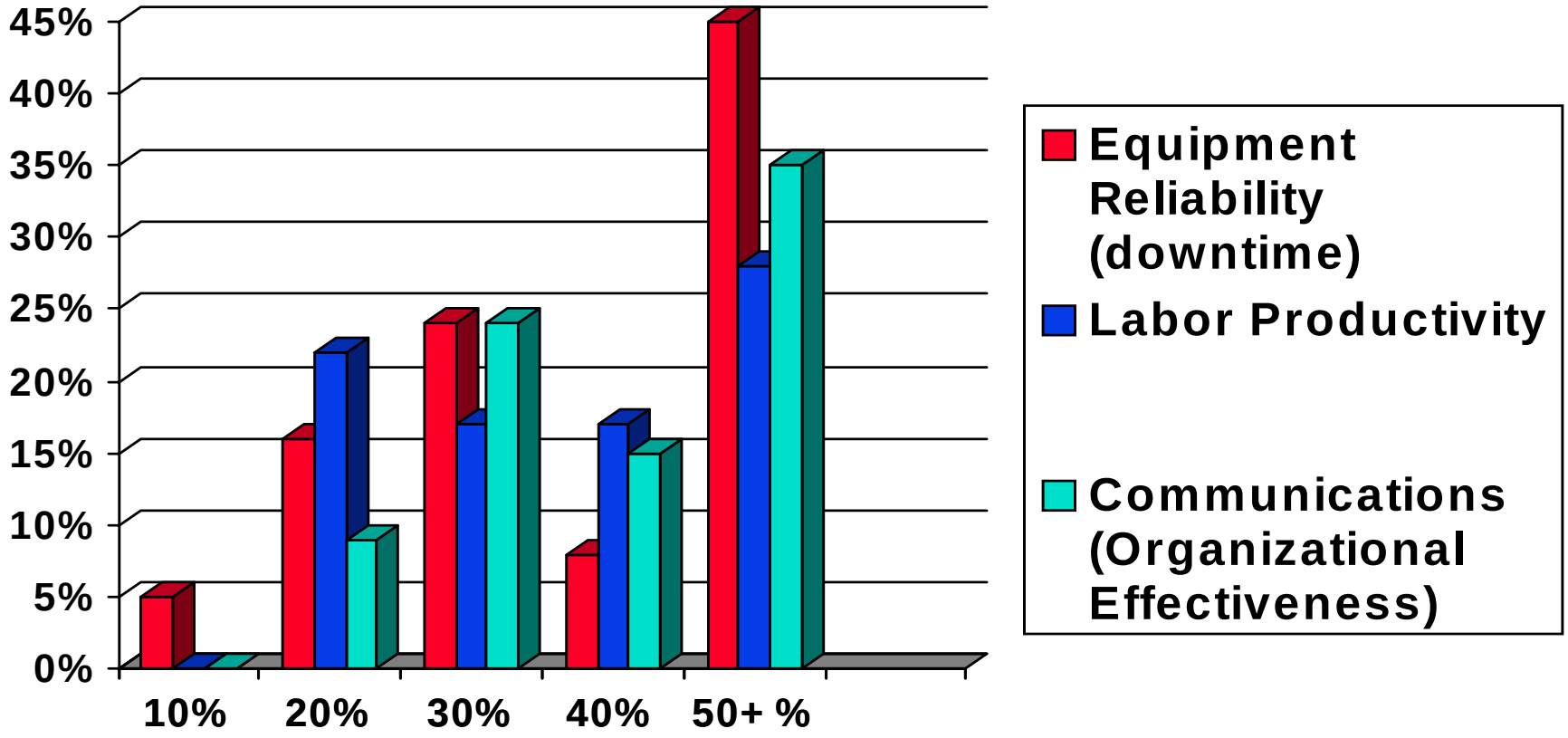




- "Sources & causes of downtime are classified & reported" Production= 3.7
- "We have formal failure analysis process" Production= .9 over Maintenance
- MTBF records are kept & reported for major equipment" Maintenance= 2.3
- All staff understand the capacity of each unit" Maintenance= 2.4

We Ask About Improvement Opportunities, to Gauge Enthusiasm for Change

"% Possible Improvement"



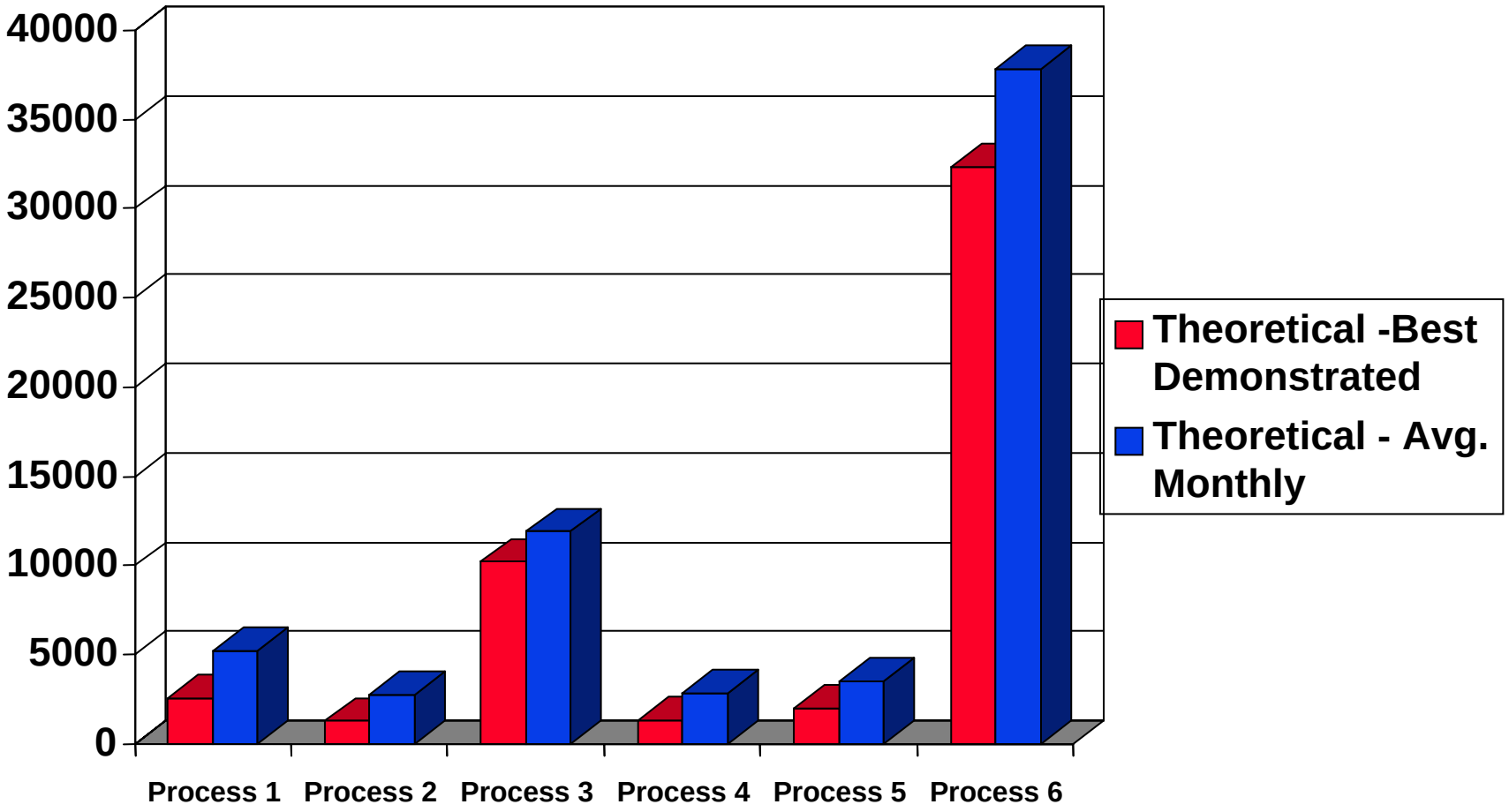
Capacity Analysis (Preliminary) Identifies Potential Bottlenecks and Shortfalls From Potential Production (lbs/hr)

Permit Max		12,905		13,218	12,450	
Theor. Capacity	17,540	13,572	21,842	13,924	13,763	58,422
Best Month	14,986	12,316	11,648	12,585	11,791	26,065
95-96 Avg. Rate	12,338	10,822	9,948	11,063	10,285	20,612
Adj. Best Mo	14,986*	13,855	21,842*	14,158	13,265	26,065*
Gain/Loss Factor		-10.0%	+10.5%	-6.2%	-4.5%	
Equiv. Adj. Cap.	14,986	13,855	24,026	12,671	14,087	27,238

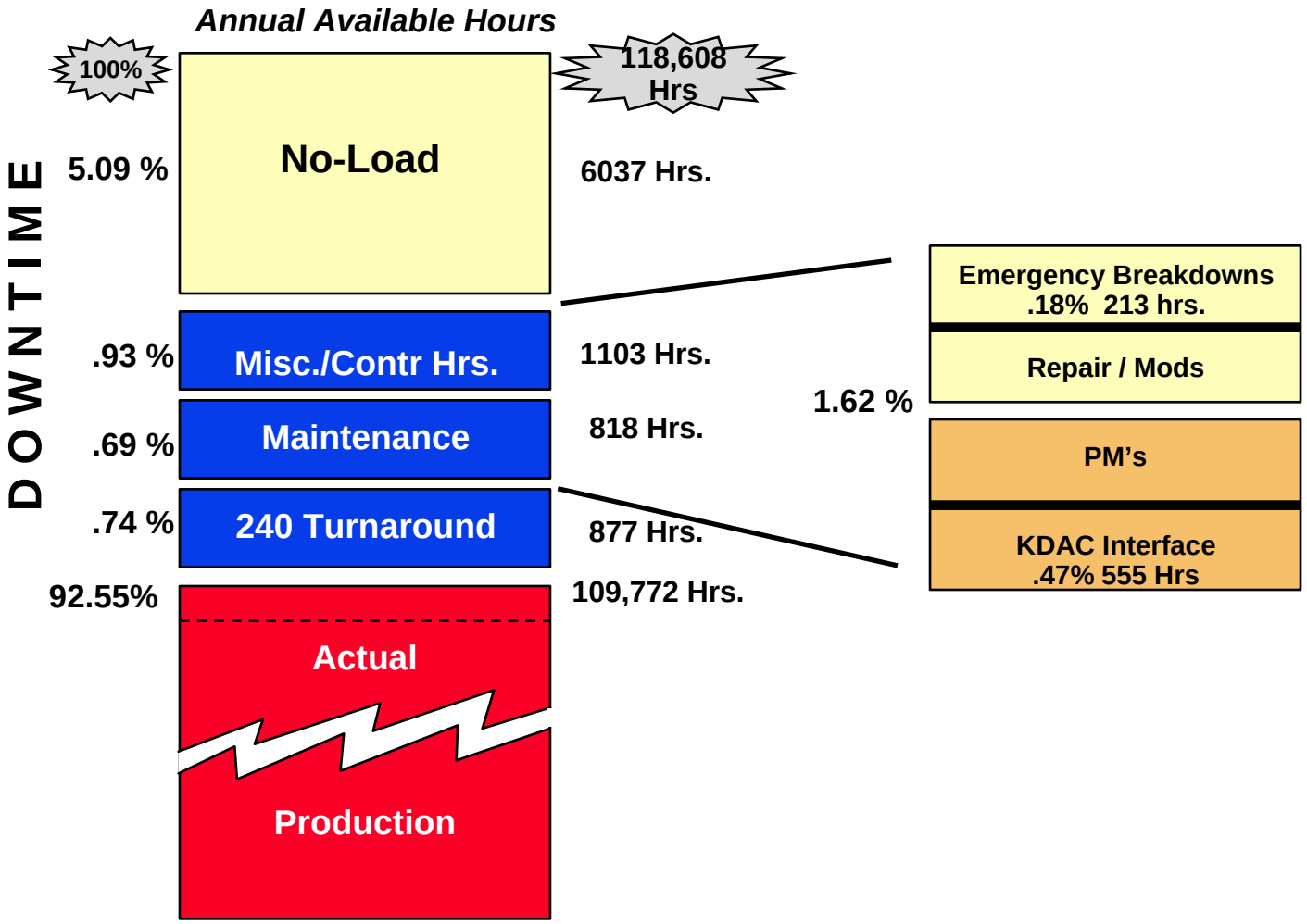
Performance	Process 1	Process 2	Process 3	Process 4	Process 5	Process 6
Theor-Best Mo.	2,554	1,256	10,194	1,339	1,972	32,357
Theor.-Avg.	5,202	2,750	11,894	2,861	3,478	37,810
Best Mo-Avg.	2,648	1,494	1,700	1,522	1,506	5,453
Adj Best Mo-Avg.	2,648	3,033	11,894	3,095	2,980	5,453

While this analysis need discussion and refinement, it can serve to identify the plants opportunity for additional production.

Excess Capacity Demonstrates the Bottleneck Areas Targeted for Additional Analysis



1997 Equipment Downtime
Process 4



Establishing an Effective Measurement System Is Fundamental to Improving the Maintenance Management Process

Leading Indicators
• Work request quality • Work approval effectiveness • Priority system effectiveness • Planned work ratio • Job estimating accuracy • Inventory accuracy • Maintenance work conducted by operators ratio • Craft to supervisor ratio • Total backlog • Preventive and predictive ratio • Failure analysis

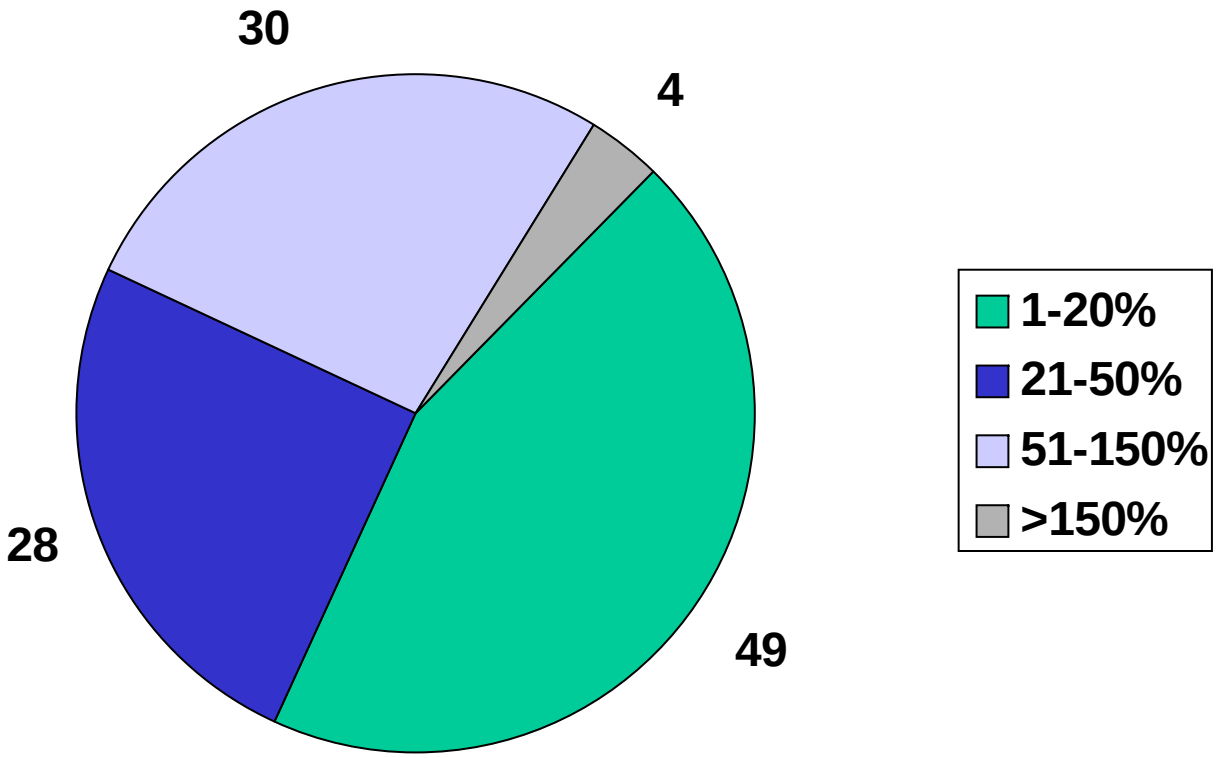
Lagging Indicators
• Maintenance cost / replacement asset value ratio • Wrench time • Emergency work ratio • Equipment availability • Re-work • Equipment history quality • Material / equipment stock-outs • Inventory turn-over

Maintenance Management Leading Indicators

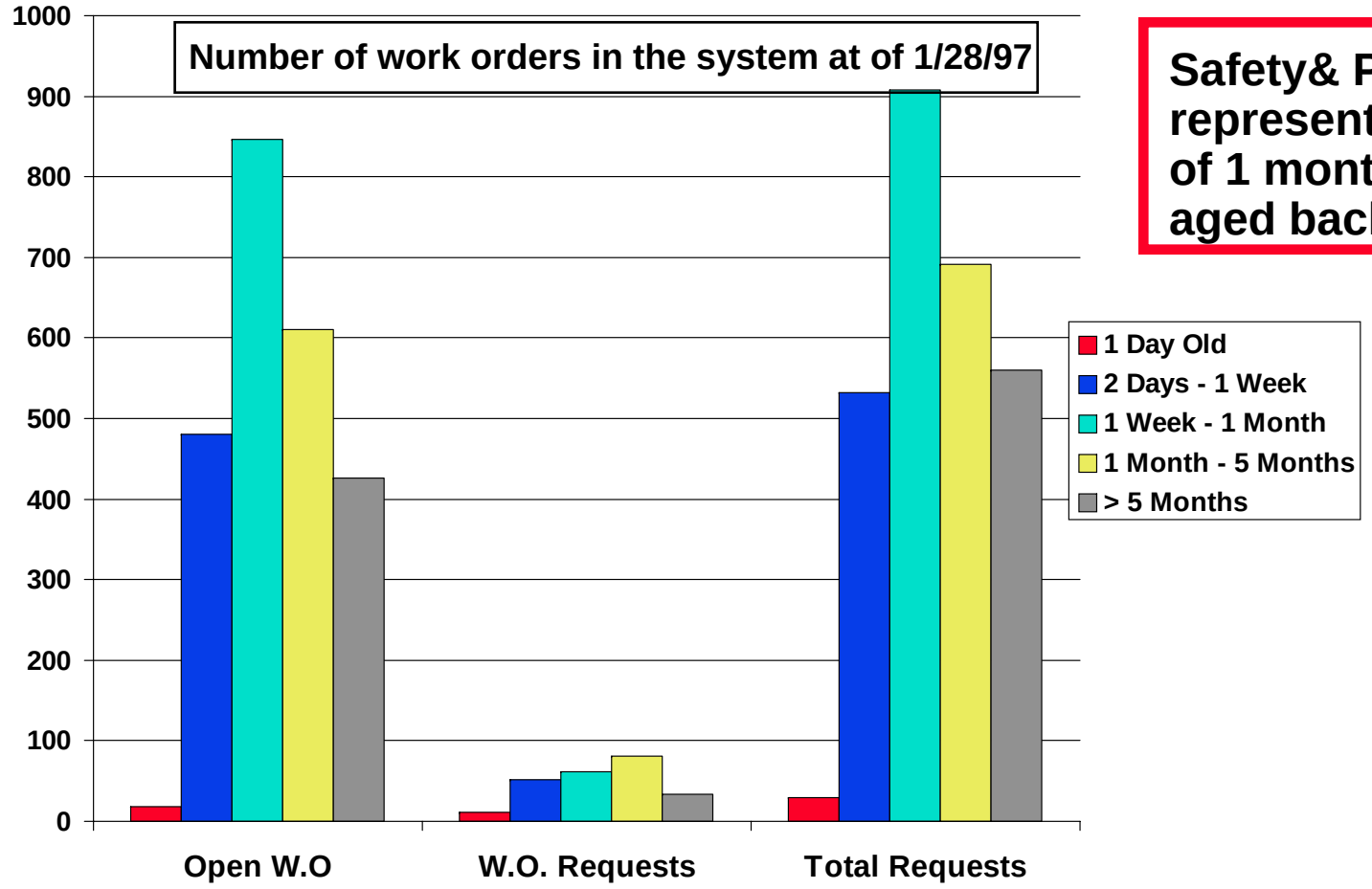
Performance Indicators	Measurement	Best in Class[1]	SAMI Experience[2]	Your Plant
Inventory Accuracy	Percent of Items Actually Found During Physical Inventory	99%	90 - 95%	98.83%
Maintenance Work Conducted by Operators Ratio	W/O Count of Maintenance Work Done by Operators / Total Maintenance W/O	>25%	15%	7.04%
Craft to Supervisor Ratio	# Maintenance Hourly / # of Maintenance Supervisors	15 : 1	10 - 15 : 1	11.1 : 1
Total Backlog	Number of Calendar Weeks to Complete All Planned Maintenance Work Using Straight Time	5 Weeks	5 Weeks	10.5 Weeks
Preventive and Predictive Maintenance Ratio	Maintenance Hours Worked on PM/PDM Work / Total Completed Work Order Hours	40%	30-35%	42.7%
Failure Analysis	Percent Work Orders Reviewed for Root Cause	60 - 70%	40 - 50%	Not Performed on A routine Basis

1. International Benchmarking Clearinghouse and SAMI experience in continuous process industry
2. SAMI experience after re-engineering when a ‘steady’ state achieved
3. Most measures not tracked. ABC Co. estimates based on first three weeks of A&D diagnostics and interviews

We Review Job Estimating Accuracy to Determine What Portion of Workorders are Inaccurately Estimated



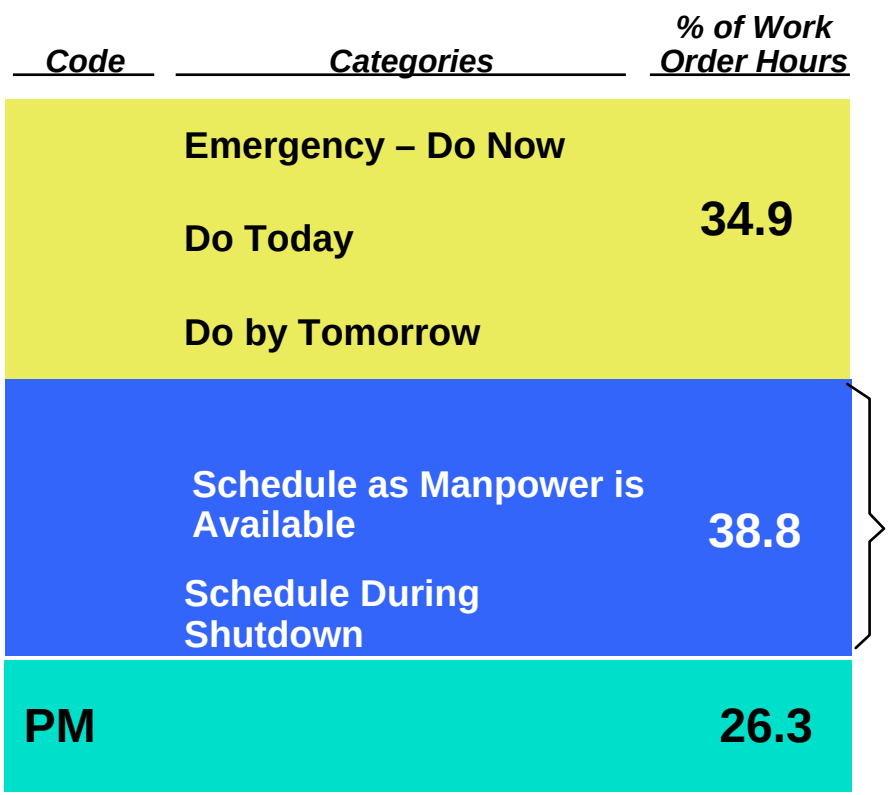
Analysis of Open Work Orders and Request Identifies Age Distribution



Safety& PM work represent over 83% of 1 month or greater aged backlog

Ability to service work in a timely manner is critical to reliability and faith in the maintenance process by operations

In Many Cases Work Orders Are Ineligible for Real Planning[1]



Best-in-Class Maintenance

Less than 10%

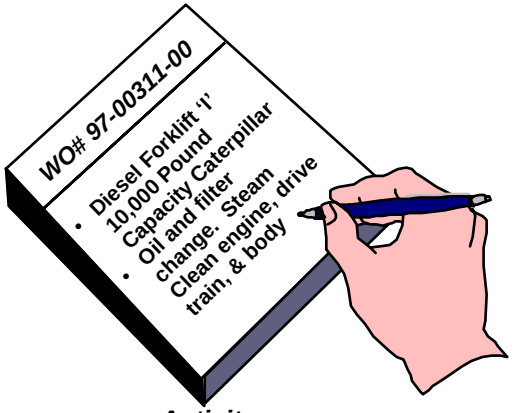
Shifting the balance from emergency and high priority work orders to preventive/predictive maintenance will yield big gains in operational reliability

1. Planned = Determine job content, develop work plan, estimate job, plan and order parts and materials, plan special equipment and tools, identify workers with unique skills, assign cost accounts, establish backlog

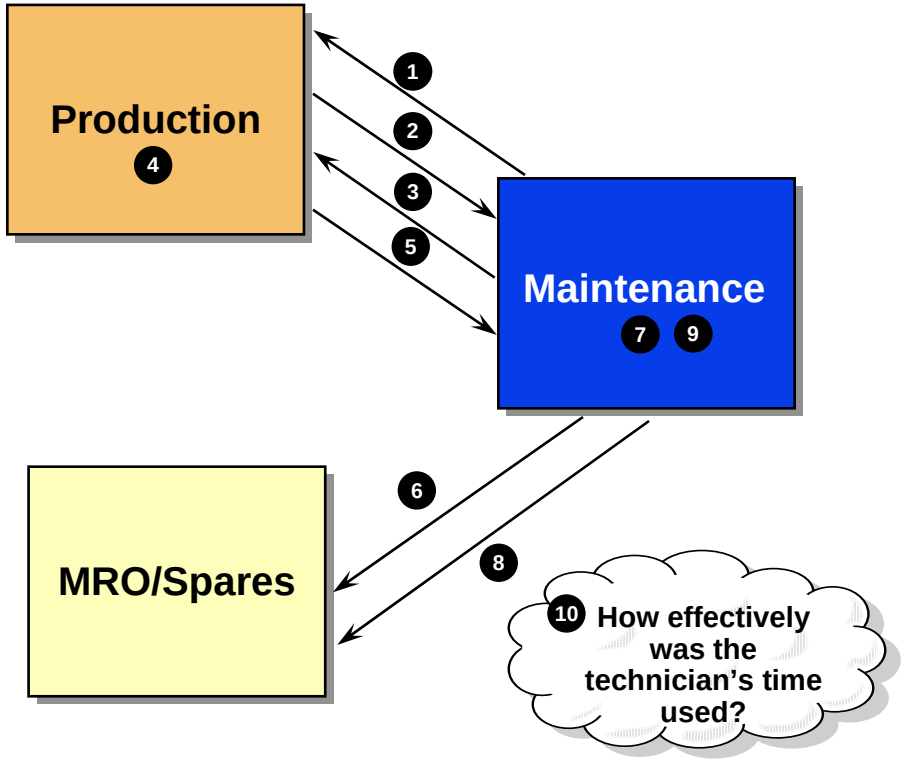
Source: Analysis of work orders completed during 1996

"Maintenance Technician Seeks a Machine That Production Will Allow Him to Service"

Daytime 984-6294/ Evening 872-8349"



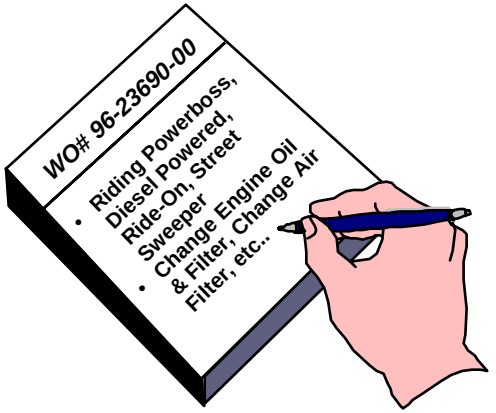
DILO of a Mobile Technician



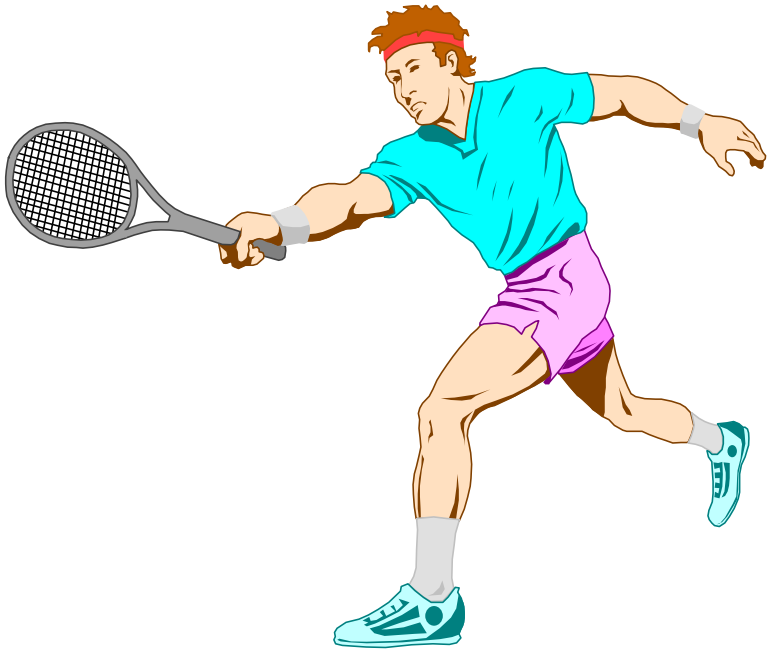
Step	Time	Activity
1	7:04 am	Mobile technician picks PM work order
2	7:10 am	Is told that equipment is unavailable for PM
3	7:14 am	Technician chooses another w/o
4	7:20 am	This piece of equipment is also occupied
5	7:28 am	Technician finds an unoccupied forklift, forklift is brought to shop
6	7:31 am	Technician gets parts necessary for w/o from warehouse, using MPAC
7	7:33 am	Technician begins engine tune
8	7:39 am	Technician is asked to open tool crib for other workers
9	7:41 am	Returns to PM
10	8:17 am	W/O is completed

Over 1 Hour's worth of activity resulted in a half hour of wrench time and six idle trips to spares or production

Poor Planning Continues to Hamper Our Maintenance Technician



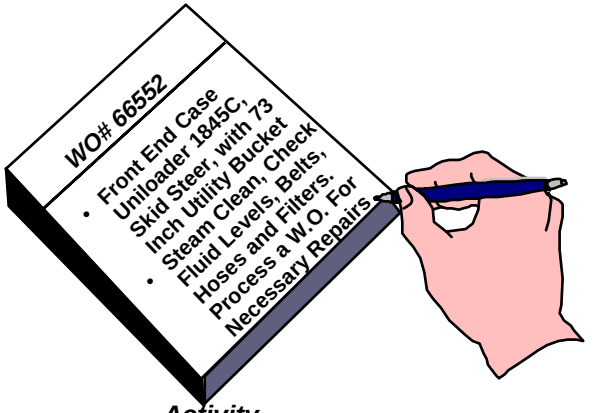
DILO of a Mobile Technician



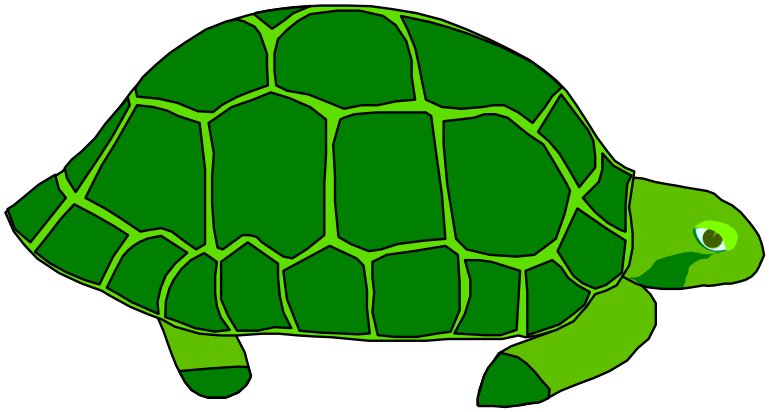
Step	*Time*	*Activity*
1	8:31 am	Mobile technician picks PM work order
2	8:34 am	Locates sweeper, drives it to shop
3	8:41 am	Washes sweeper. At this time, technician's partner alerts him that the same PM was attempted last week by the partner, but parts had not been available
4	8:51 am	MPAC reveals that parts are still unavailable, while technician is at terminal, he is asked to open tool crib
5	8:57 am	Break
6	9:20 am	Technician returns to sweeper, closes engine, and returns it to 220
7	9:32 am	Technician locates another machine to be serviced

Responsibility for the w/o is being volleyed like a tennis ball!

Our Maintenance Technician Changes His Schedule to Fix Growing Problems



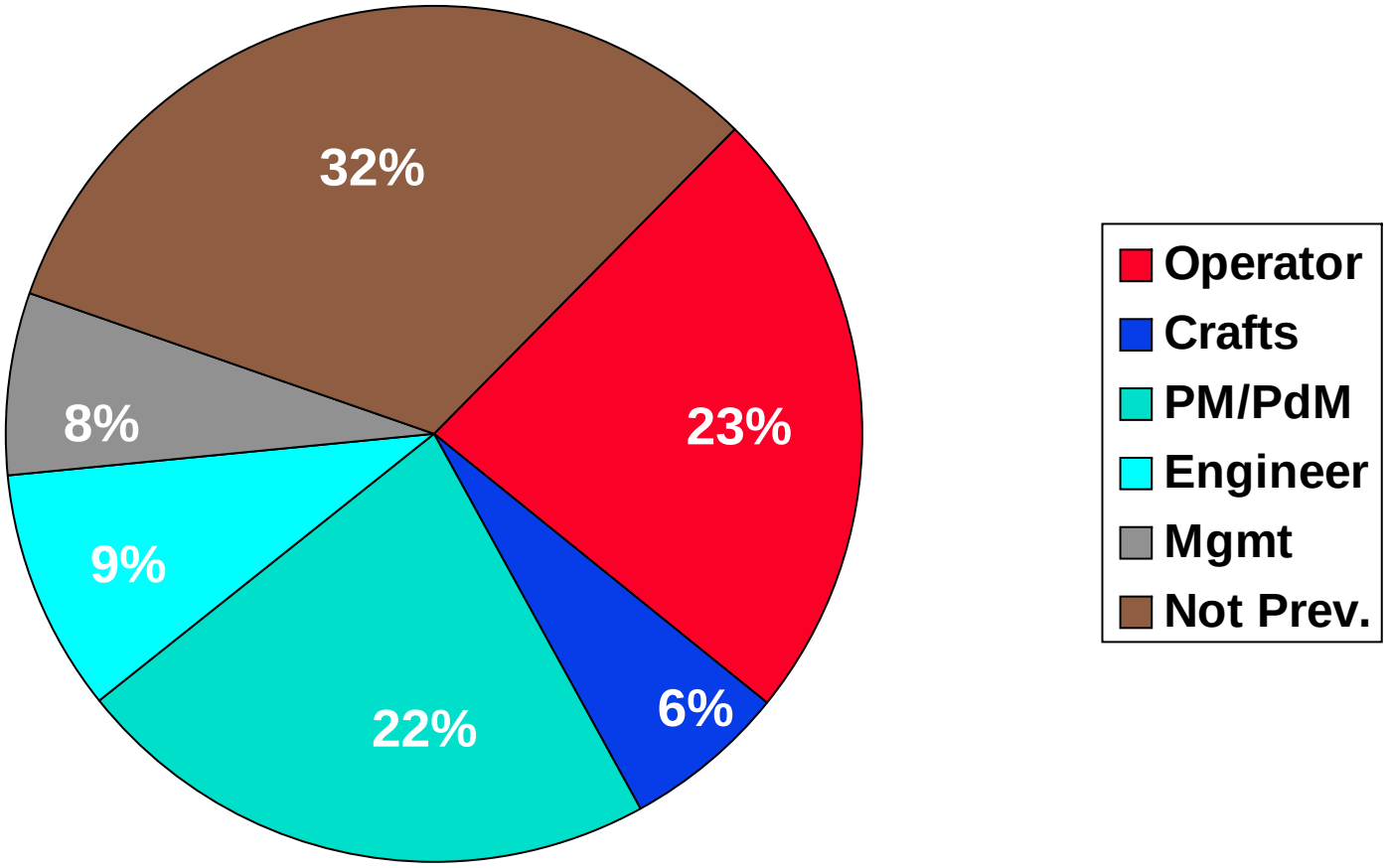
DILO of a Mobile Technician



Progress is really slow, like a turtle!

Step	*Time*	*Activity*
1	9:50 am	Mobile technician picks PM work order
2	9:56 am	After searching, technician locates Bobcat at 110
3	9:59 am	Operator is finished with vehicle, technician drives it to shop, and begins Tune-Up
4	10:21 am	Technician has discovered that lift bucket has a tear, and is therefore unusable. He enters office get W.O. that his partner had entered as a work request a week ago
5	10:24 am	Technician cannot find planner, but secures wo, returns to execute maintenance
6	10:25 am	Technician realizes that a brake light has been broken off, also. Rather than wait another week+ for an order, he gets brake light from spares, and replaces broken one
7	10:44 am	Technician's partner shows him on MPAC that the same PM he had carried out earlier today had been closed 9 days ago.
8	10:45 am	Technician begins welding bucket. His partner comments that the rip in the bucket has considerably worsened since last week, meaning at least an extra hour of work
9	10:57 am	His efforts are interrupted by a request that he open the tool crib
10	11:01 am	He returns to welding

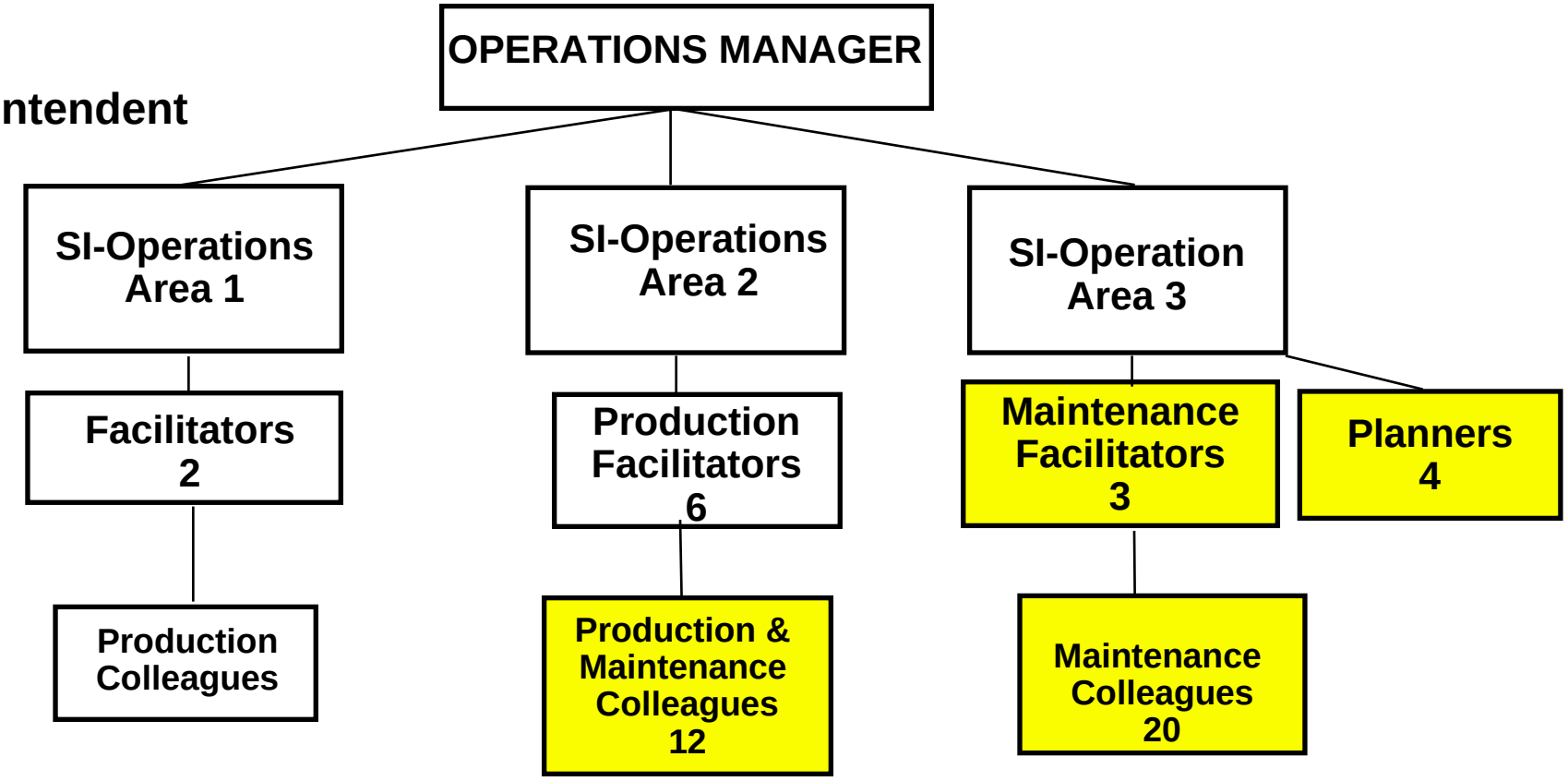
We Review Emergency Work Orders to Identify Those Which are Preventable/Avoidable



* Percent of 112 work orders surveyed

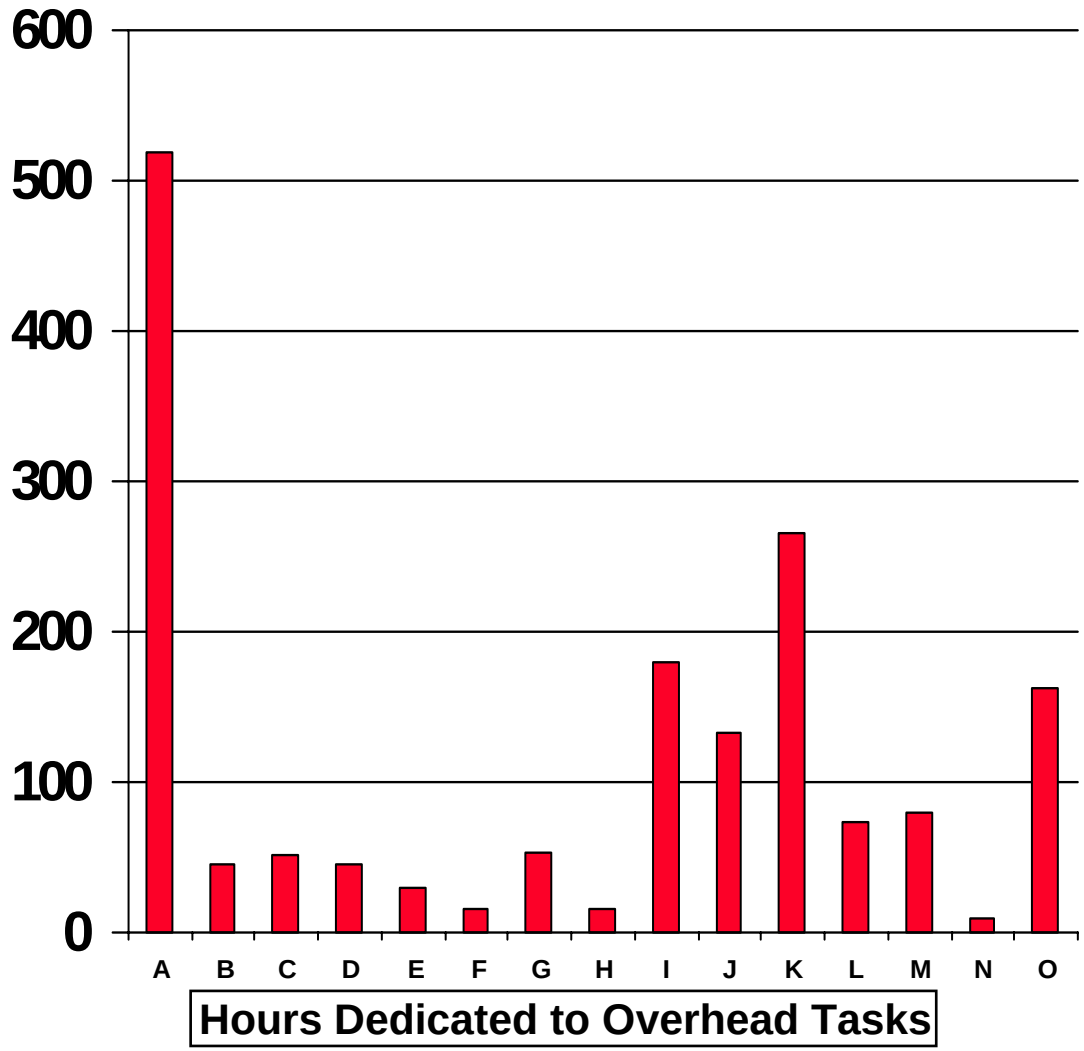
We Review the Organization to Determine Its Fit with Overall Plant Goals

SI: Superintendent



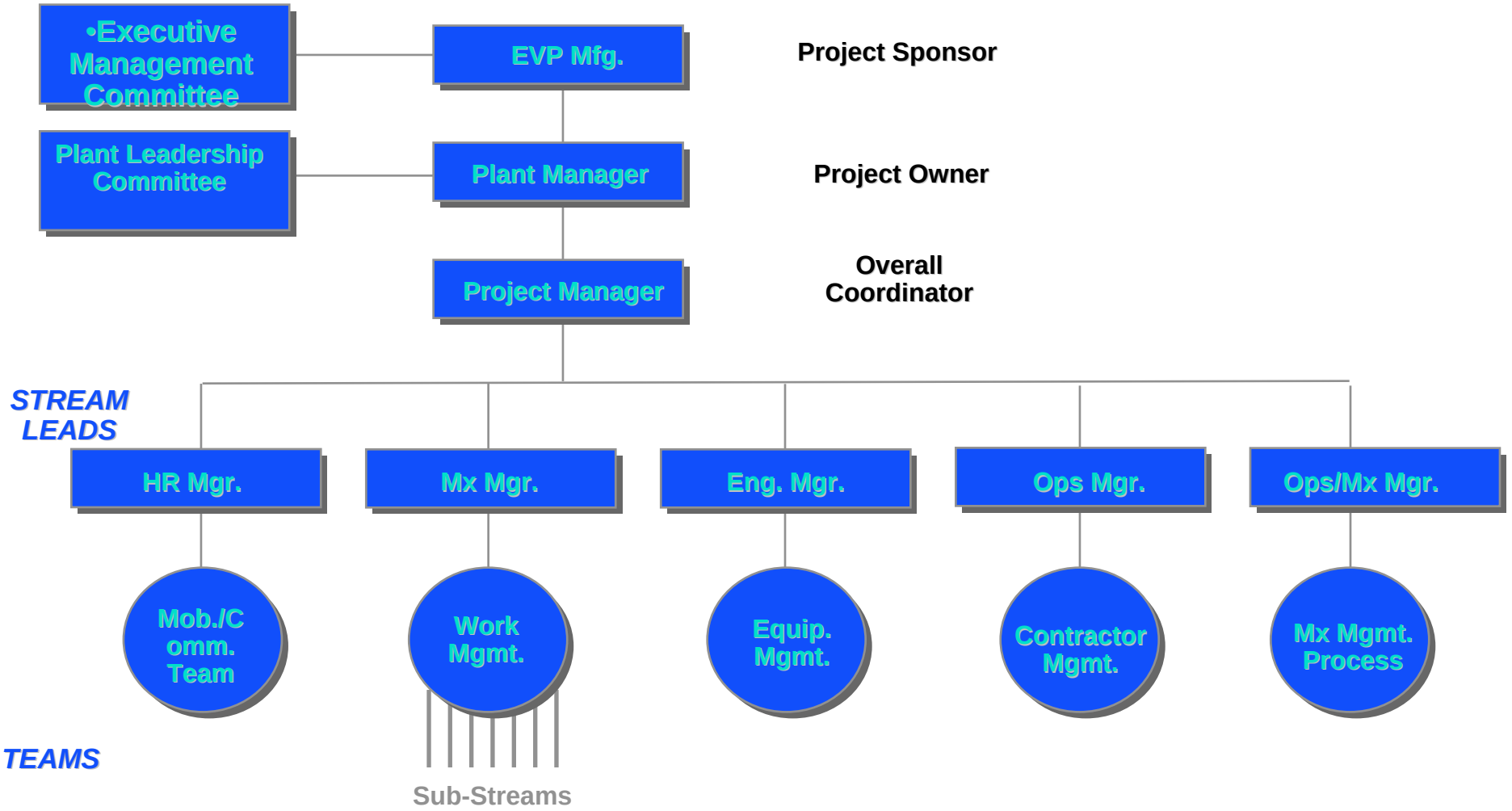
During Results Delivery we will study whether organizational realignment is necessary to make it more effective

We Examine How Time is Spent, and How Much is Available for Value-Added Work

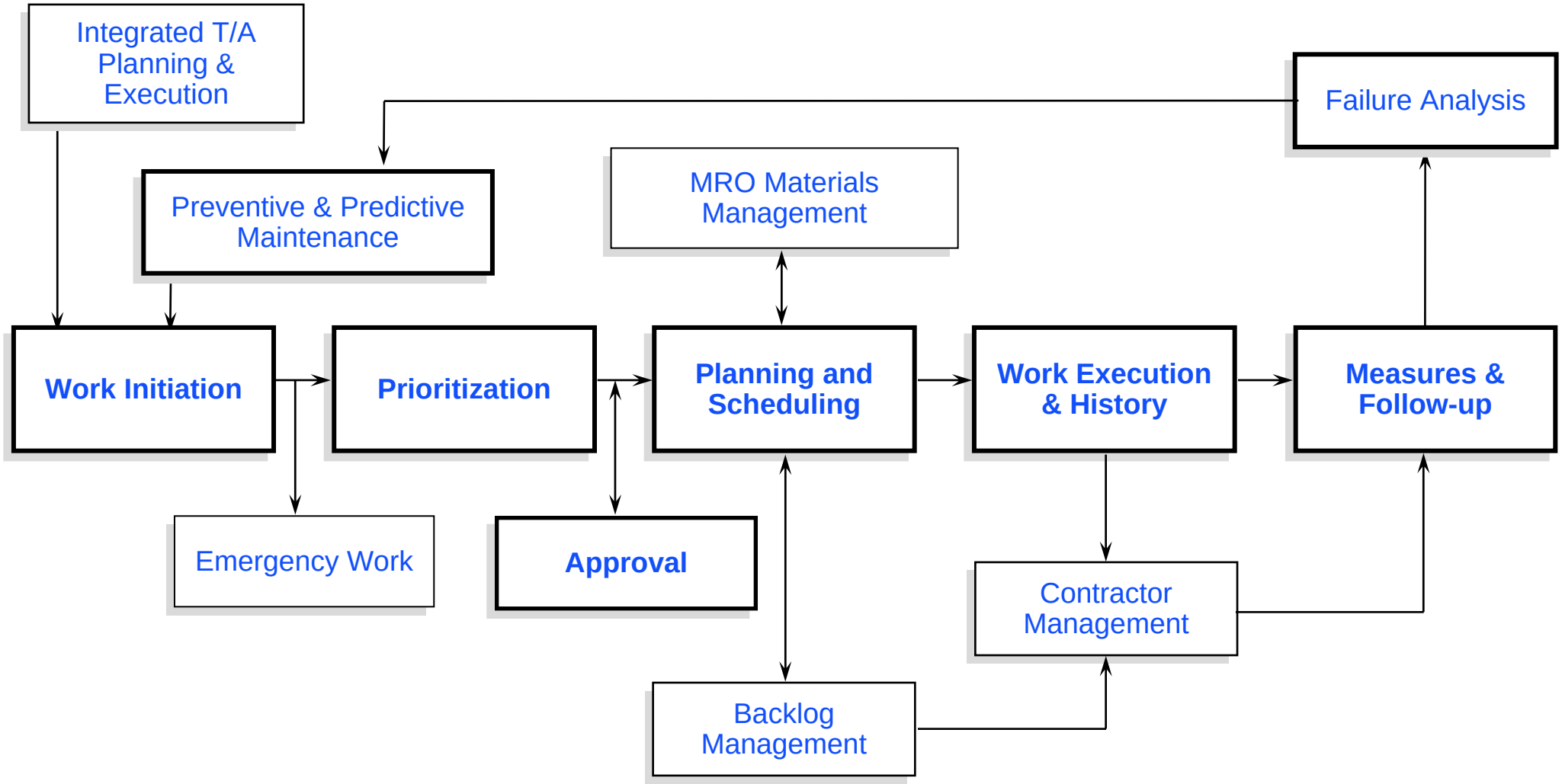


A- TBW
B- Meetings
C- Clean Up
D- Sickness
E- Tardy
F- Travel
G- Vacation
H- Tool Crib
I- Training
J- Coordinator
K- PdM Collection
L- PdM Analysis
M- Administration
N- Production Assistance
O- Other

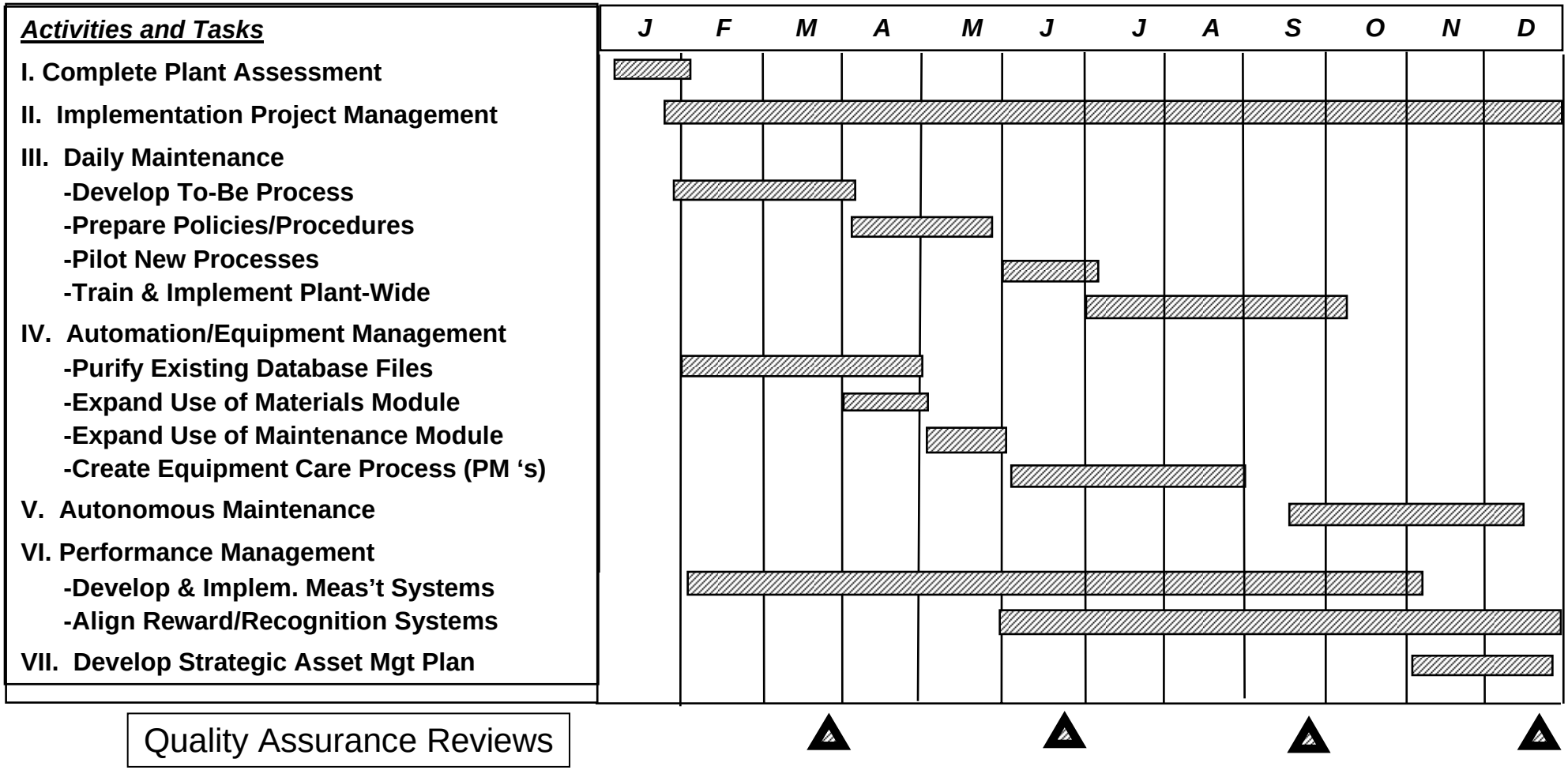
We Also Create a Project Structure That Emphasizes Involvement and Ownership



In Most Cases We Find the First Project is to Bolster Planned Maintenance, our Stage I Goal



In the Assessment We Develop a Detailed Annual Plan to Guide our Work and to Monitor our Progress



Exercise: Estimate Your Own KPI's

Performance Indicators	Measurement	Best in Class[1]	SAMI Experience[2]	Your Plant
Inventory Accuracy	Percent of Items Actually Found During Physical Inventory	99%	90 - 95%	
Maintenance Work Conducted by Operators Ratio	W/O Count of Maintenance Work Done by Operators / Total Maintenance W/O	>25%	15%	
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2. SAMI experience after re-engineering when a 'steady' state achieved
3. Most measures not tracked. ABC Co. estimates based on first three weeks of A&D diagnostics and interviews

Section 8

Implementing Your Plan

Section 9

Characteristics of Excellence

Section 10

Overcoming Our Barriers

Should You Consider Outside Help?

- Guide you through the discovery process
- Help structure your thinking and your work, avoiding blind alleys
- Bring a wealth of experience in improving culture and practices
- Provide benchmarking data
- Teach new skills
- Identify models of excellence
- Help you stay focused
- Enable you to achieve your goals