PROMAT 2015

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Maintaining Systems for Maximum Reliability

Sponsored by:

CCS Intelligent Automation

DEMATIC

Presented by:

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powered by MHI

Agenda

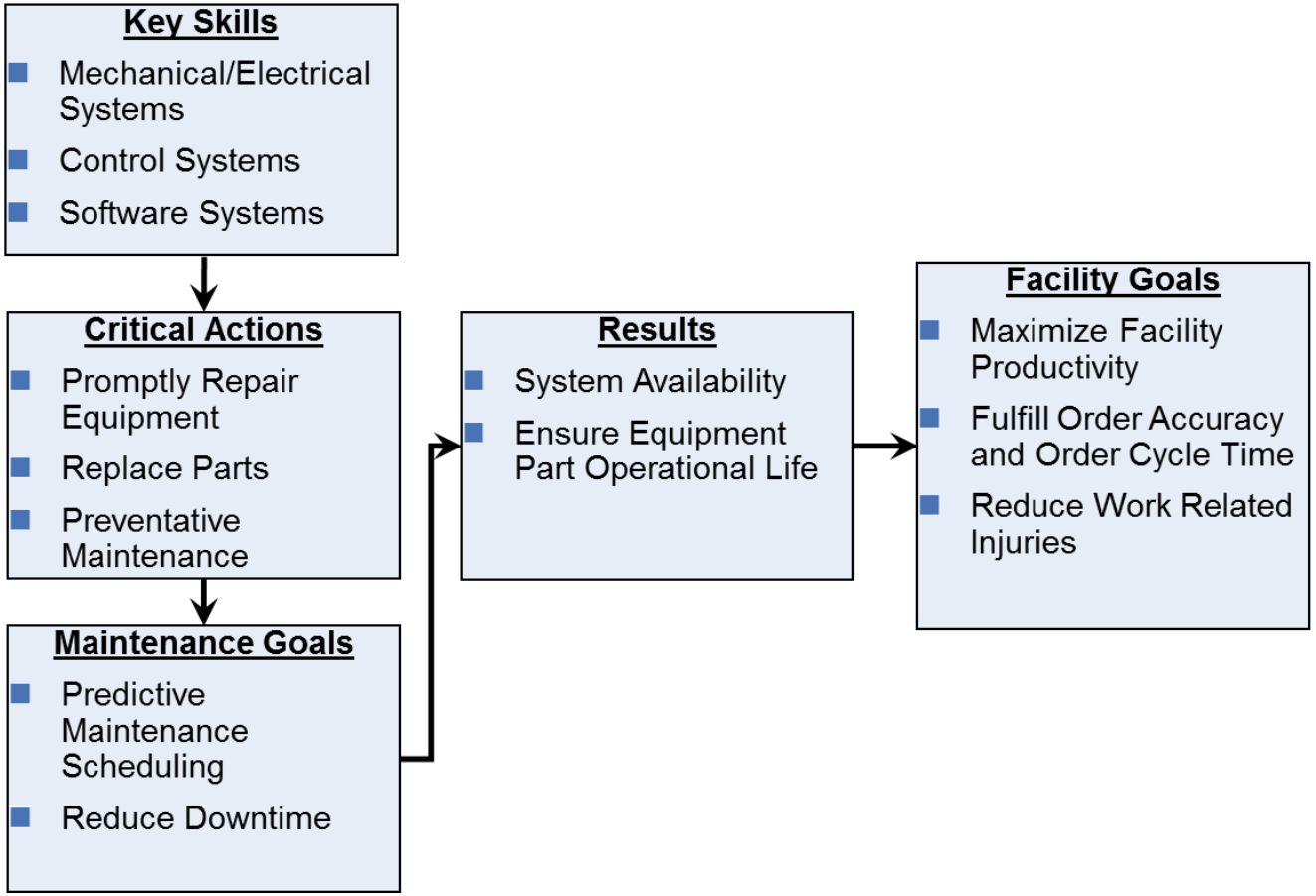
- How to properly design the correct maintenance staff
- How to develop proper maintenance practices
- How to determine maintenance KPI's

How to properly design maintenance staff

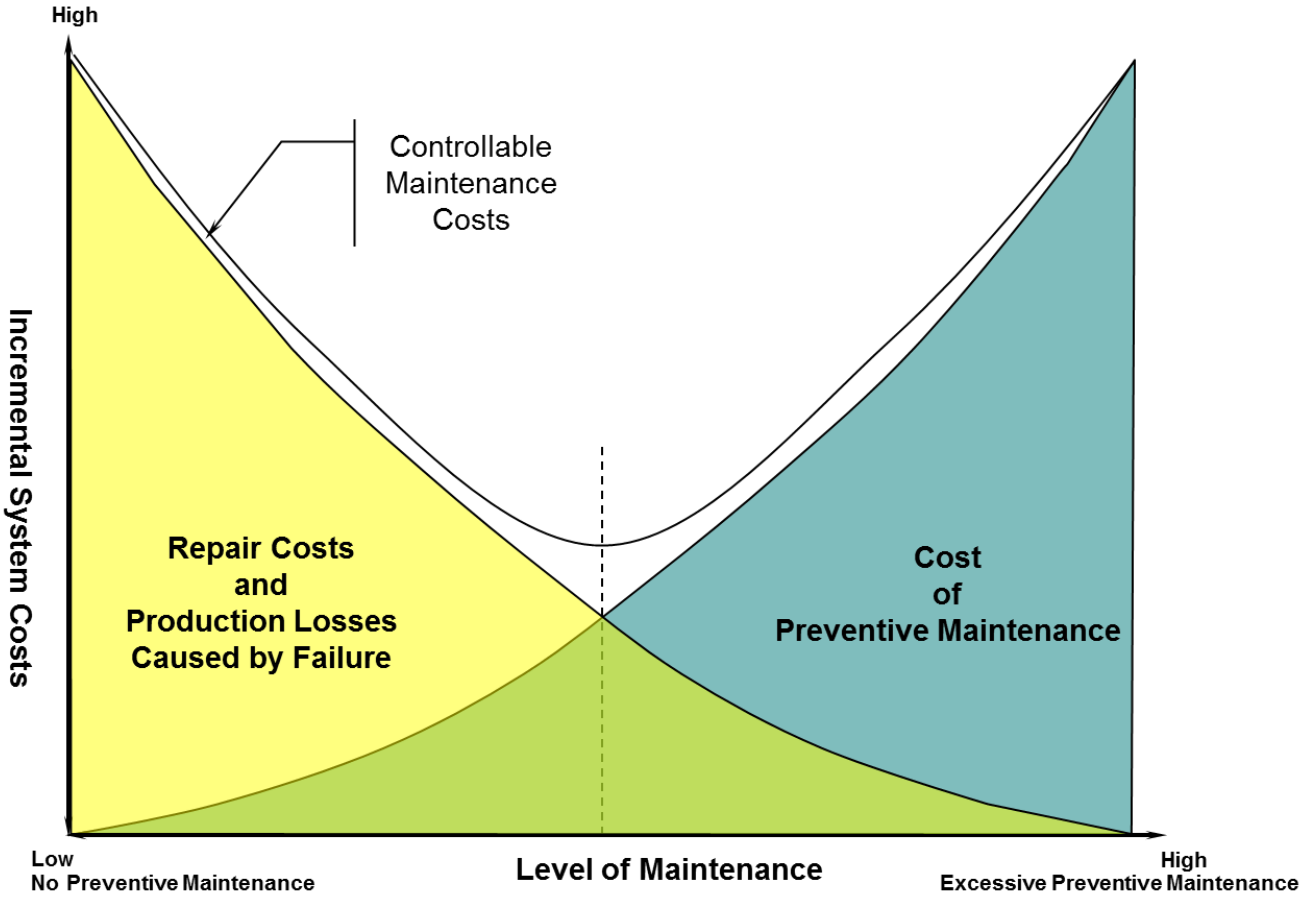
There is a labor shortage in maintenance

Past		Present	
	Teens play with engines, electronics, rocket kits	Teens play with Xbox 360, PS3 and iPhones	
	High Schools offer Electronics and Shop classes	Electronics and shop classes dropped from high school curriculum	
	Two year electronics' degree enrollment high	Two year electronics' degree enrollment continues to decrease	
	MHE Systems mechanically based	MHE Systems software and controls based	
	Low wages for MHE mechanics	High demand (wages) for MHE technicians	

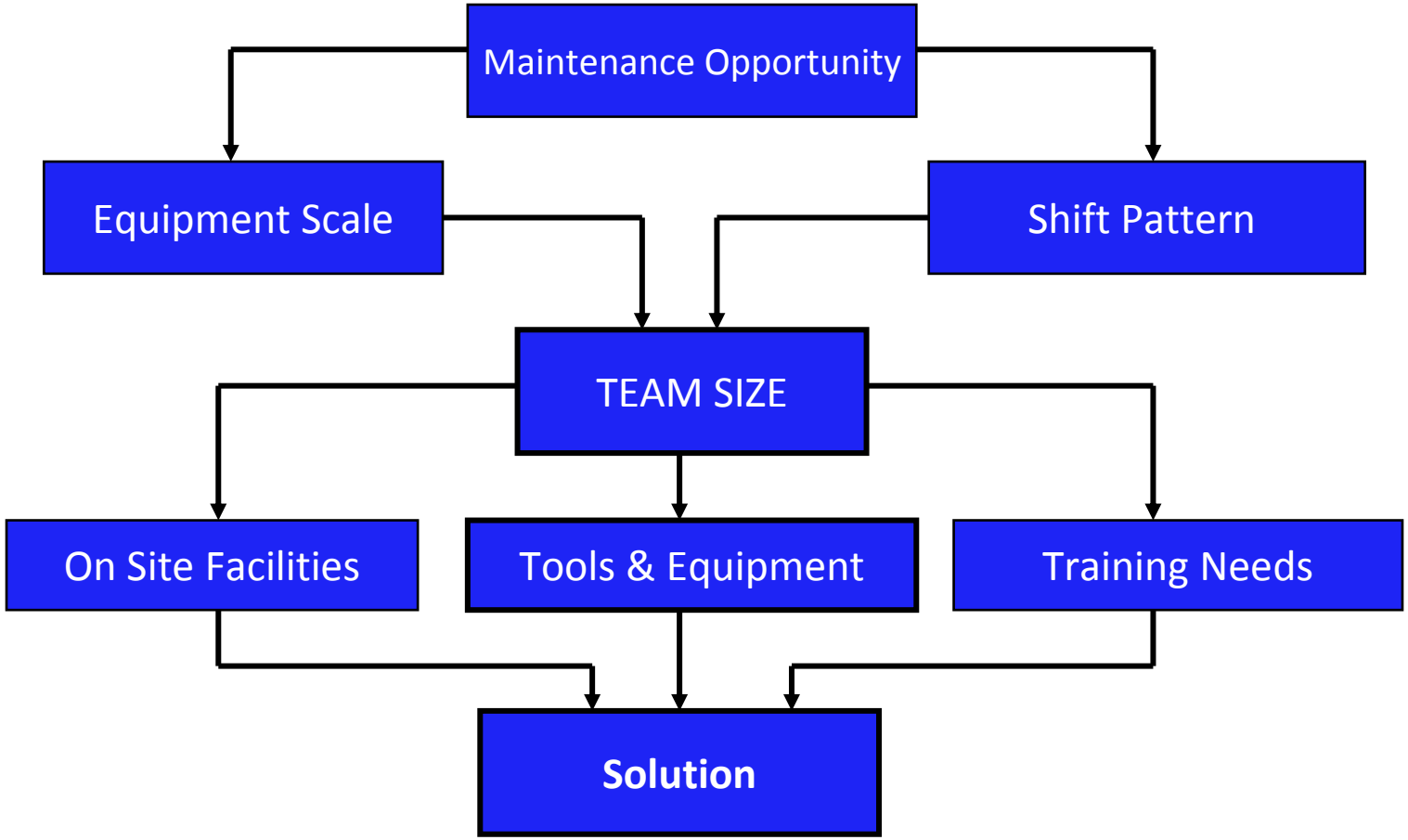
How to develop a maintenance team



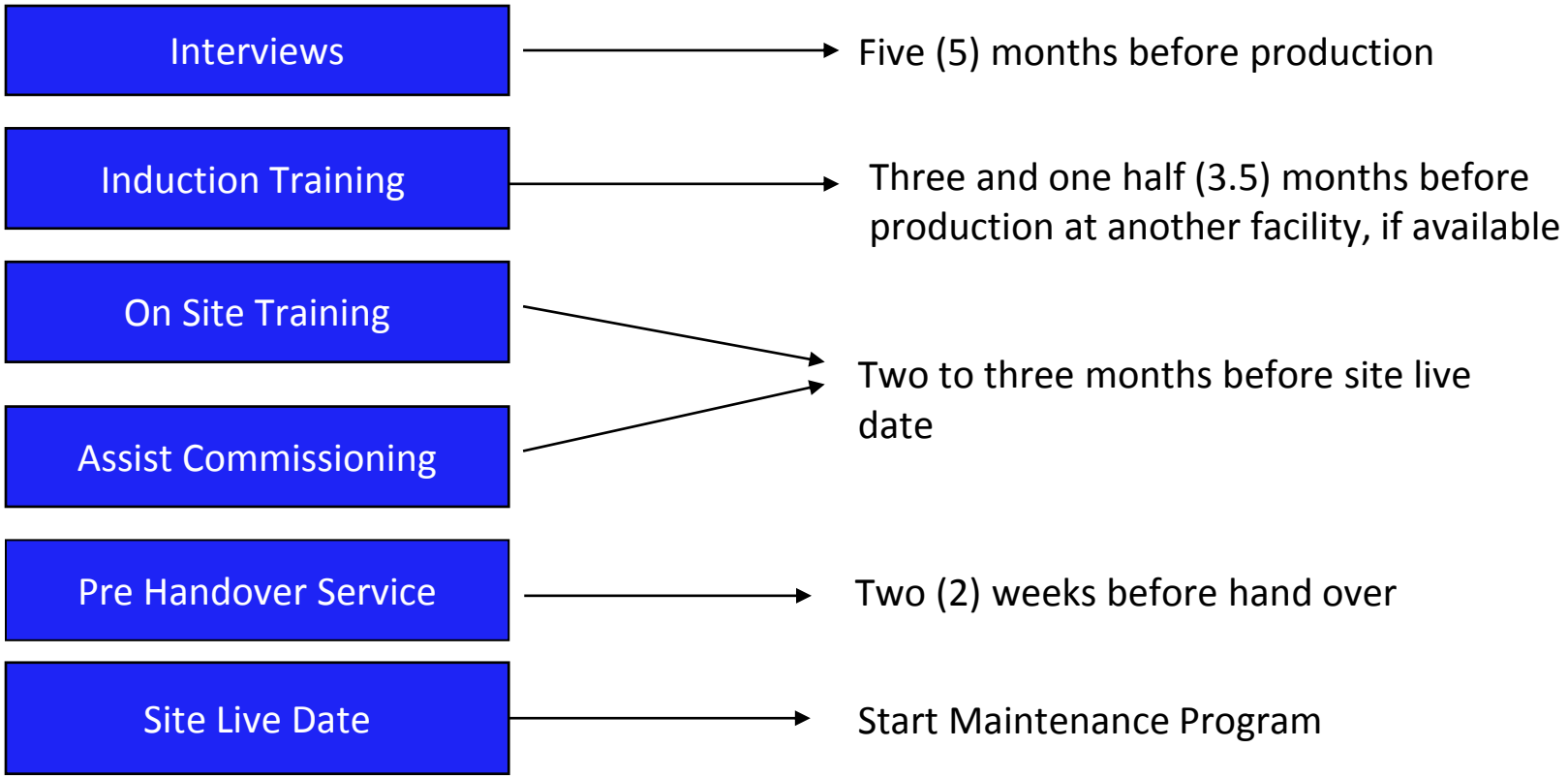
Target the Right Amount of Maintenance



Factors to determine team



Prepare for Go-Live



Ensure a strong start up

Prepare Basic Maintenance Plan	Ensure all equipment service requirements are met (manpower & frequency of service)
Set Up Shift Pattern	Shift Pattern to Cover Site Running hours & Maintenance requirement
Set Up Workshop & Tooling	Ensure correct level of tools and workshop equipment is available for the servicing task
RSPL and CMMS	Take over Recommended Spares and train on CMMS
Address Site Heath & Safety Issues	Carry out site risk assessments

Develop a training plan

Description	Dematic Orientation	Dematic Safety	System Overview - Flow	Sprocket DMMS	Off-site Training - Other Resident Sites	Conveyor Control System Overview	Conveyor Controls - Basic	Conveyor Controls - Advanced (PLCs, Drives, Networking)	Dual Motor Controller (DMC) Embedded Conveyor Controller (ECC) Mechanical-Electrical	Sorter Mechanical - Basic	Sorter Controls - Basic	A-114 Model 2424 S-L300 Sorter Operations	A-115 Model 2424 S-L300 High Rate Slat Sorter Mechanical-Electrical	A-116 Model 2459 Gen III Sorter Operations	A-117 Model 2459 Gen III Sorter Mechanical-Electrical	A-118 Model 2465 Steerable Wheel Divert Operations	A-119 Model 2465 Steerable Wheel Divert Mechanical-Electrical	A-113 Model 2350 FlexGap High Speed Gapper Mechanical-Electrical	A-112 Model 2350 FlexGap High Speed Gapper Operations	A-106 Model 4081 Interroll Crossbelt Sorter Operations	A-107 Model 4081 Interroll Crossbelt Sorter Mechanical-Electrical	A-101 SLAM Operations	A-102 SLAM Mechanical-Electrical
Initial	X	X			X																		
On-site	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
eLearning				X																			
Mobile Training Unit								X	X														
Classroom		X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hands-on		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Off-site	XX				X																		
On-going		X																					
Site Manager	XX	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Planner / Scheduler	XX	X	X	X																			
Parts Coordinator	XX	X	X	X		X				X	X												
Shift Area Manager	XX	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Shift Area Manager	XX	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Shift Area Manager	XX	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Shift Area Manager	XX	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Team Lead / Supervisor	XX	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Team Lead / Supervisor	XX	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Team Lead / Supervisor	XX	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Team Lead / Supervisor	XX	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Level 4 Controls Technician	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Level 4 Controls Technician	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
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Level 4 Controls Technician	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Level 3 SLAM Technician	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
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Level 3 Technician	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Level 2 Technician / Planner	X	X	X			X	X		X	X	X			X	X	X	X		X	X		X	
Level 2 Technician / Parts	X	X	X			X	X		X	X	X			X	X	X	X		X	X		X	
Level 2 Technician	X	X	X			X	X		X	X	X			X	X	X	X		X	X		X	
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Level 2 Technician	X	X	X			X	X		X	X	X			X	X	X	X		X	X		X	
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Level 2 Technician	X	X	X			X	X		X	X	X			X	X	X	X		X	X		X	
Level 2 Technician	X	X	X			X	X		X	X	X			X	X	X	X		X	X		X	
Level 1 Facilities Technician	X	X	X																				
Level 1 Facilities Technician	X	X	X																				
Level 1 Facilities Technician	X	X	X																				
Level 1 Facilities Technician	X	X	X																				
Level 1 Technician	X	X	X																				

Description	Conveyor Mechanical Overview	A-120 Model 2466 Right Angle Transfer Operations	A-121 Model 2466 Right Angle Transfer Mechanical-Electrical	A-122 Model 2490 High Speed Live Roller Operations	A-123 Model 2490 High Speed Live Roller Mechanical-Electrical	A-124 Model 6130 O-Ring Skew Drive Roller Operations	A-125 Model 6130 O-Ring Skew Drive Roller Mechanical-Electrical	A-126 Model 6300 Segmented BOR Operations	A-127 Model 6300 Segmented BOR Mechanical-Electrical	A-128 Model 6320 Segmented BOR Operations	A-129 Model 6320 Segmented BOR Mechanical-Electrical	A-130 Model 9190 Live Roller Curve-Junctions Operations	A-131 Model 9190 Live Roller Curve-Junctions Mechanical-Electrical	A-132 Model 9265 Narrow Belt Live Roller APC Operations	A-133 Model 9265 Narrow Belt Live Roller APC Mechanical-Electrical	A-100 Introduction to Material Handling Equipment	A-103 Gravity Conveyor 105/200/206/306	A-108 Model 2310 Induct Belt Operations	A-109 Model 2310 Induct Belt Mechanical-Electrical	A-110 Model 2330 Meter Belt Operations	A-111 Model 2330 Meter Belt Mechanical-Electrical
Initial																					
On-site	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
eLearning																					
Mobile Training Unit																					
Classroom	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hands-on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Off-site																					
On-going																					
Site Manager	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Planner / Scheduler																					
Parts Coordinator																					
Shift Area Manager	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Shift Area Manager	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Shift Area Manager	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Shift Area Manager	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Team Lead / Supervisor	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Team Lead / Supervisor	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
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Team Lead / Supervisor	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Level 4 Controls Technician	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
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Level 3 SLAM Technician	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
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Level 3 Technician	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Level 2 Technician / Planner	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Level 2 Technician / Parts	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
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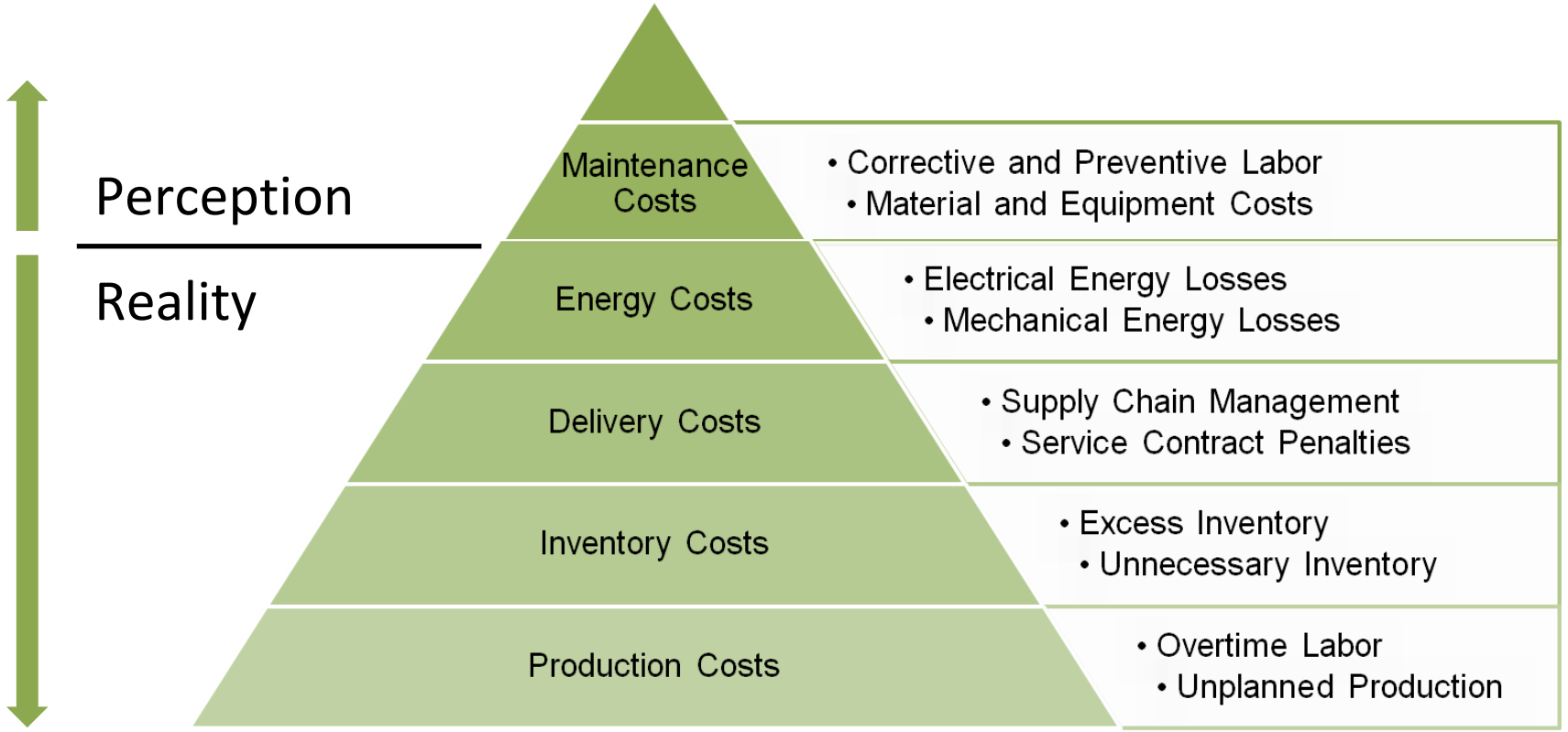
Level 2 Technician	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Level 1 Facilities Technician		X		X		X		X		X		X		X		X	X				
Level 1 Facilities Technician		X		X		X		X		X		X		X		X	X				
Level 1 Facilities Technician		X		X		X		X		X		X		X		X	X				
Level 1 Facilities Technician		X		X		X		X		X		X		X		X	X				
Level 1 Technician		X		X		X		X		X		X		X		X	X				

XX = Off-site Orientation

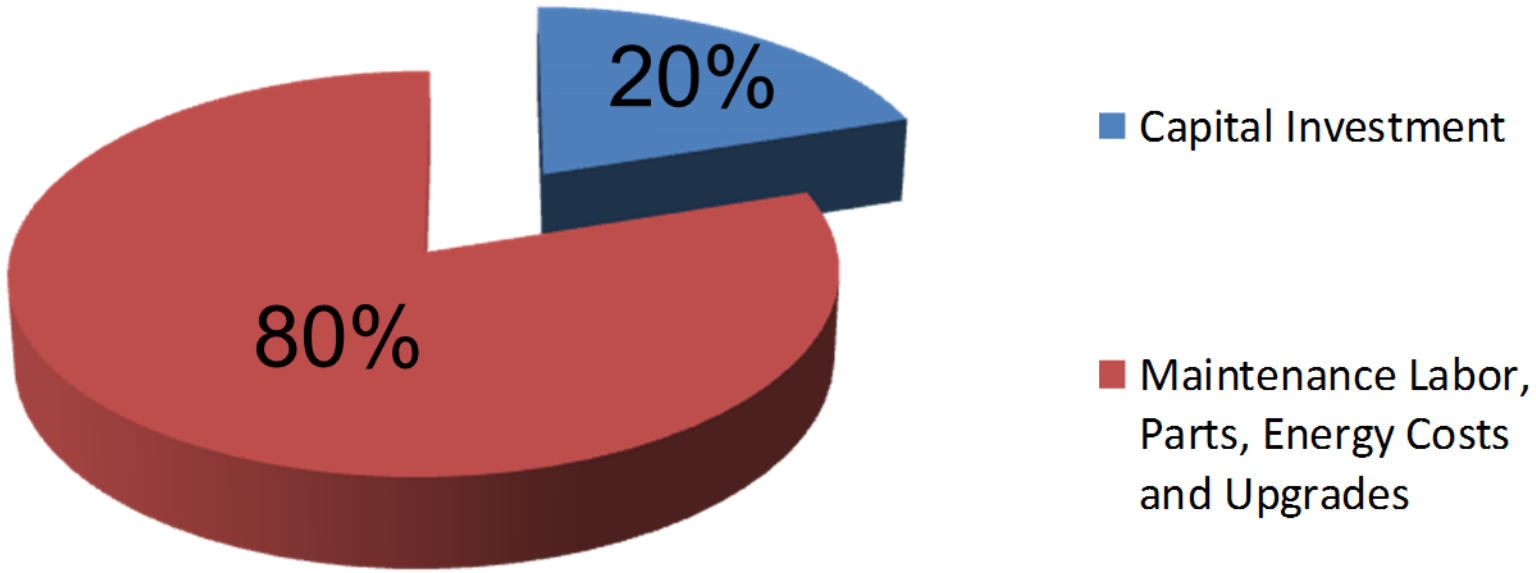
- Management & Administration
- Team A (Day) Mon-Wed + Sun
- Team B (Day) Thu-Sat + Sun
- Team C (Night) Mon-Wed + Sun
- Team D (Night) Thu-Sat + Sun
- Preventive Maintenance Team

How to develop best maintenance practices

True cost of maintenance



Total Lifecycle Costs



Reliable Equipment → **Asset Management**

- Consistent operation during scheduled production
- Effective operation for maximum equipment life

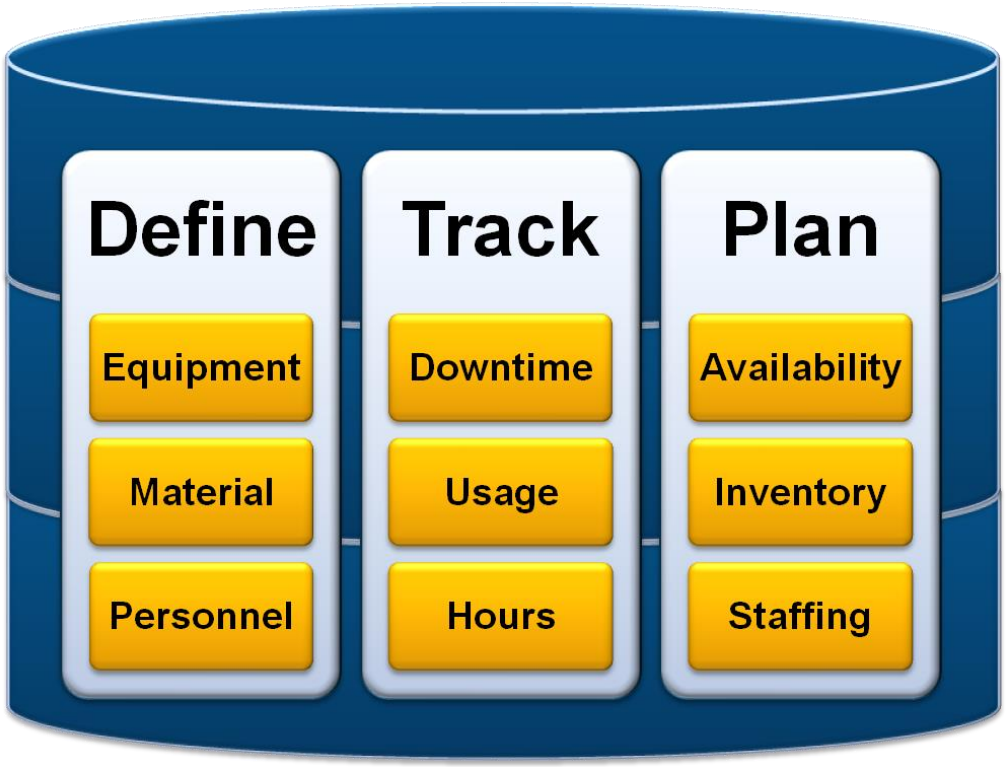
Accurate Inventory → **Material Management**

- Right parts available when system failures occur
- Quantity of spares based on historical usage levels

Effective Labor → **Work Management**

- Proper staffing levels to support all maintenance tasks
- Efficient staff through proper planning and coordination

What is a CMMS?



FIND WHAT'S NEXT.

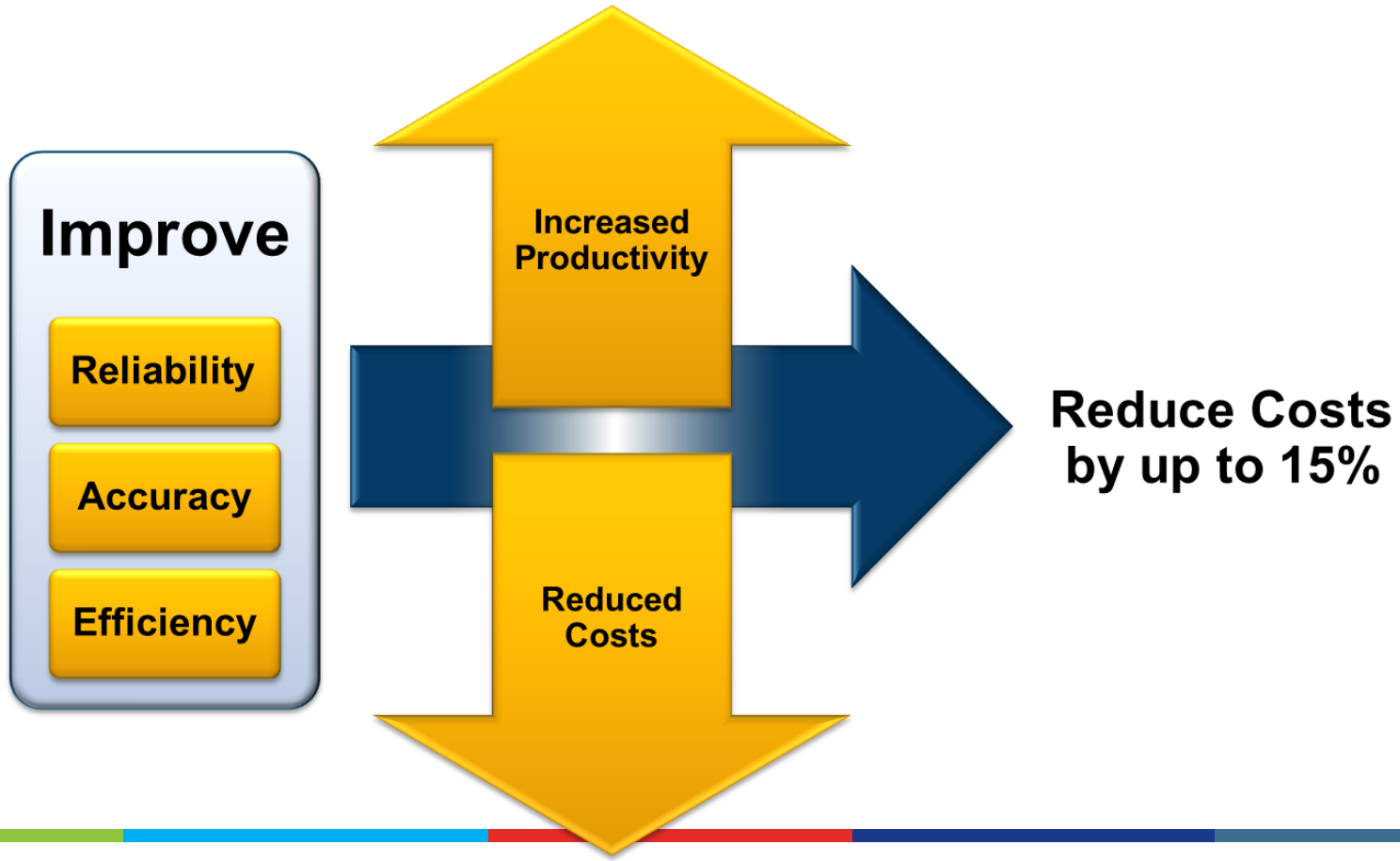
Define	Track	Plan
• Assets (Facility and MHE) • PM Tasks and Schedules • Contractor and Warranty Information	• Downtime by Equip Type • Corrective and Preventive Maintenance Equipment **Equipment**	• Equipment Availability • Maintenance Downtime
• Spare Parts • Min and Max Levels • Storage Location • Preferred Vendor	• Parts Usage (Stock and Non-Stock) • Parts Order Status **Material**	• Annual Parts Budget • Annual Parts Usage • Parts to be Stocked
• Users by Roles (From Parts Clerk to Maint Mgr) • Work Order and Parts Requisition Approval Rules	• Actual vs. Estimated Hours • Corrective vs. Preventative Maintenance Labor • Overall Labor Utilization **Personnel**	• PM Labor Loading • Dept Staffing Levels • Annual Labor Budget

The Right Tool Set

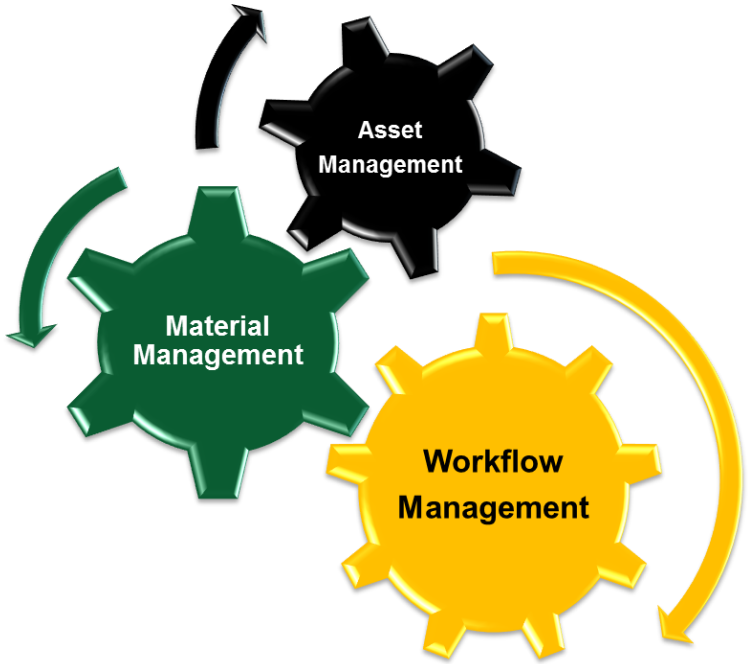
"Trying to obtain value from technology alone is like trying to stand on a three-legged stool that is missing two legs."

"A properly configured and utilized CMMS provides the necessary foundation for a successful maintenance program."

The Value of a CMMS



- **Asset Management**
  - Configure Dematic Standard PM Tasks
  - Simple, Optimized PM Planning
  - Optional, Interactive Inspections
  - Track Labor and Material Costs
- **Material Management**
  - Maintain Real-Time Inventory
  - Track Stock and Non-Stock Items
  - Direct Integration to Dematic Customer Portal
  - Automated Purchase Request Generation
- **Workflow Management**
  - Configured Work Flow and Approval Process
  - Automatic or Manual Dispatch of Work Orders
  - Automated Email and Text Message Updates
- **Reporting and KPIs**
  - Customizable based on User Role
  - Display Information as Dashboards or Reports
  - Automatically Distribute Reports to Email Recipients



A.R.M. Yourself with Knowledge

- **A**ccountability
- **R**educe Risk
- **M**oney Saved

Develop and determine proper KPI's

Agenda

- How to properly design the correct maintenance staff
- How to develop proper maintenance practices
- **How to determine maintenance KPI's**

Key Performance Indicators (KPI's)

What are KPI's?

Business tools used to **measure and improve** the **effectiveness and efficiency** of our maintenance programs

Your Maintenance KPI's should:

- Help you to **highlight** what **maintenance** is doing
- What maintenance is **achieving** for the **business**
- How maintenance can **improve operational performance**

The Measurement of performance is important:

- **Identifies gaps** between current and desired performance
- Provides indication of progress towards **closing the gaps**
- Provides data to **visually show** the **benefits** that maintenance brings to the business
- Carefully selected KPI's **identify** precisely **where to take action** to improve performance

Rules for Determining what to Measure

1) Make sure the **outcomes** can be **controlled by** the **employees** responsible for meeting them.

- DON'T try to achieve results that employees have little influence over. It creates unnecessary frustration and running around in circles.
- DO create measurements that are relevant to what maintenance does each day and has some control over.

Rules for Determining what to Measure

2) Useful and relevant maintenance **KPI's DRIVE** the **actions and behaviors** needed to meet the goals you set.

3) **DON'T only measure historic data.** Too much time passes between the failure occurrence and the response. Historic data is good for showing improvement over time, but won't help determine the root cause of your failures.

Maintenance KPI's that Support Business Strategy

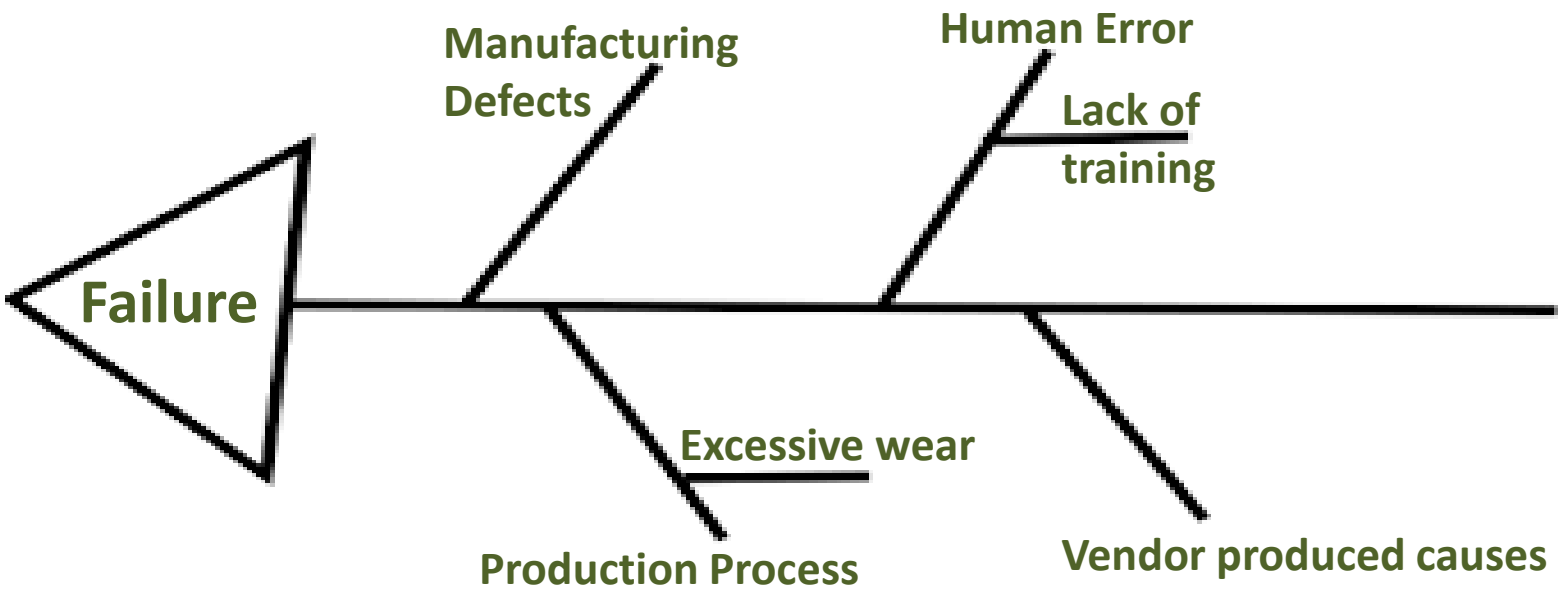
- Identify what is causing your equipment failures
- Direct focus of Maintenance time & resources
- Identify if Maintenance is removing the causes of failure
- Drive the business benefits delivered by Maintenance

Identify what is causing your equipment failures

- To find out the root cause of your repairs and remove/reduce the causes of those repairs requires tracking of the type of failure and the cause.

Defining the categories for types of failure

One simple way to help identify the categories for failure causes you might list on a work order form is with a fishbone diagram.



Tracking equipment failures

- Accumulation of this data can be presented monthly or quarterly in a simple format like a pie chart, which can help justify efforts ($) to eliminate root causes of failures.

What is the focus of your Maintenance time & resources?

For most companies, maintenance is an afterthought. Maintenance spends a large percentage of time repairing broken equipment and works very hard just to keep the operation running.

But EFFECTIVE maintenance is not about fixing things – it's about **NOT** having to fix things.

FOCUS a significant amount of time & resources on:

- Work orders spent on **IMPROVING** equipment & safety
- **REMOVING** breakdown causes
- **IMPROVING** maintenance procedures
- **IMPROVING** maintainer skills/knowledge
- **REDUCING** operating problems
- **REMOVING** wasted effort & cost from maintenance processes
- **IMPROVING** stores management processes & stored parts reliability

KPI's to measure effectiveness & efficiency

Percent of completed work that is reactive

- This KPI measures whether your organization is in a culture of reactive maintenance or is moving toward world-class or high-performance maintenance.
- This transition is important because **reactive work costs four-six times more** than planned and scheduled work.
- Managers should aim for **no more than 20-30% of completed work being reactive**.

KPI's to measure effectiveness & efficiency

Preventive Maintenance (PM) program compliance

- This KPI indicates whether the department is **improving proactive maintenance**.
- To succeed in the asset management and reliability categories of maintenance, you must have a **disciplined PM program that produces results**.
- A successful PM program includes all critical equipment, and technicians should **complete 99 percent** of PM inspections and procedures on time.

Maintenance has to remove the causes of failure

Mechanical Failures

- Lubricant contamination
- Out-of-balance
- Misalignment
- Working component distortion
- Incorrect fastening
- Induced vibration

Electrical Failures

- Contamination
- Induced vibration
- Over temperature
- Moisture
- Distortion
- Power supply stability

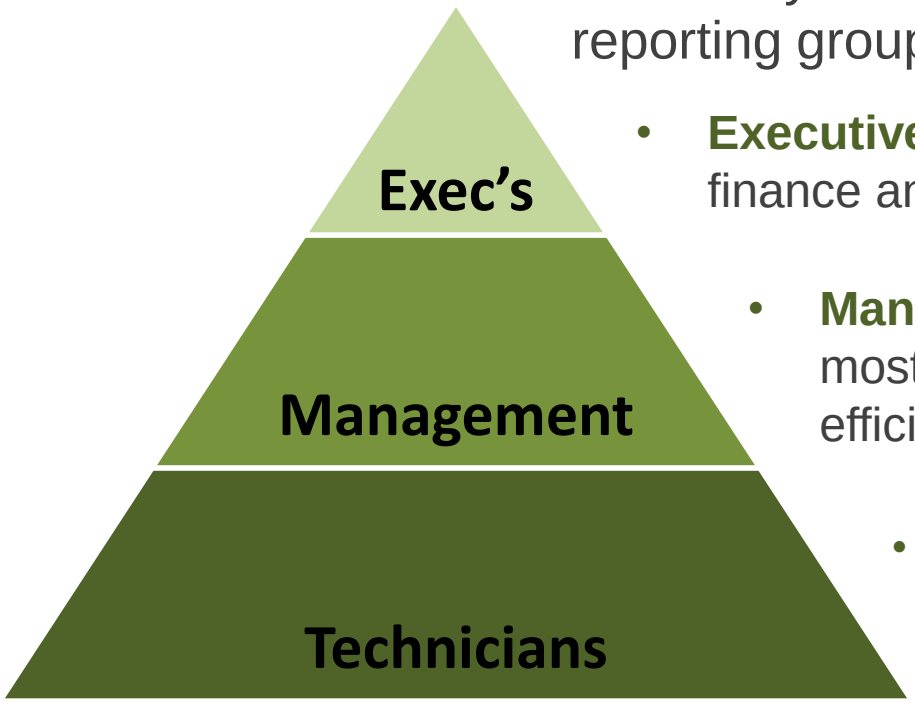
Preventive or Proactive Maintenance prevents failures

- Employ the scientific method to determine what you think are the **causes of higher reliability** and **measure their effects** with monthly KPI's.
- Maintenance **efforts become proactive** and each **monthly report confirms** the success (or not) of your reliability improvement efforts.

Creating a proactive environment in management and on the shop floor will have people seeking successful maintenance outcomes.

Drive the business benefits delivered by Maintenance

To focus your reporting efforts, determine your reporting groups and what is important to them:



- **Executives** – this group looks most closely at finance and high-level performance trends.
- **Management staff** - this group typically cares most that work is completed effectively and efficiently.
- **Technicians** - this group cares about the daily activities: PMs, emergency calls, systems monitoring, and complaints.

Drive the business benefits delivered by Maintenance

- **Connect KPI's to each of these groups and the mission of the business.** Don't waste time chasing data that serves no purpose.
- **After developing the right KPIs, consider the most effective way to package the information.**
- Use data to tell the maintenance story. This is the **best opportunity to showcase the value of departments' work and gain support for programs.**

Key Takeaways

Two main categories of KPI's for maintenance:

- Those that improve maintenance's effect on business performance
- Those that drive good reliability-building behaviors

For More Information:

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