

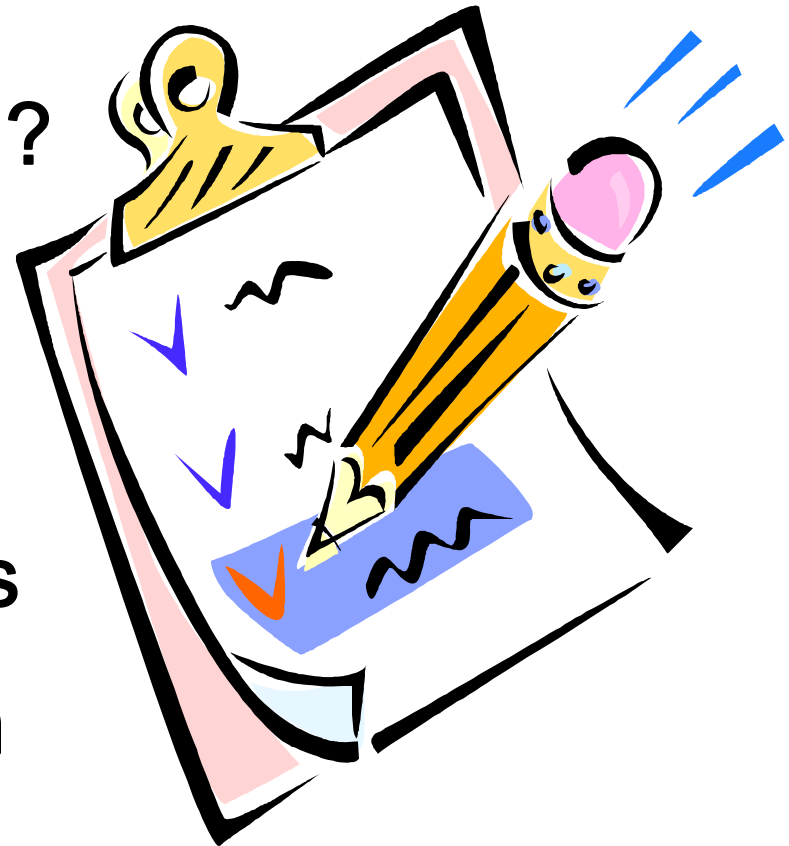
# Navigating the Road to Reliability-Centered Maintenance



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# Agenda

- Introduction
- Why Transition to RCM?
- Potential Benefits
- What Does It Take?
- Maintenance Strategies
- Focus the Organization
- Example of Results
- Questions



# Why Transition to Reliability-Centered Maintenance (RCM)?

*Global competition!*

*Survival!*



# Why Transition to Reliability-Centered Maintenance (RCM)?

- Highly competitive, capital-intensive industry
- Global marketplace
- Rising inflationary pressures
- Limited capital budgets
- The need to do more with less

# Potential Benefits of RCM

- Overall financial productivity improvement through:
  - Improved equipment efficiency
  - Improved resource utilization
  - Reduced unscheduled break-in work
  - Reduced equipment failures
  - Reduced high-cost outside services

# Potential Benefits of RCM

- Superior financial returns
- Long-term viability
- Survival in a highly competitive, capital-intensive industry

# What Does It Take?

- Vision
- Leadership
- Commitment
- Engagement
- Financial resources

# What Does It Take?



A willingness to behave differently

# What Does It Take?

Alignment



# What Does It Take?

**Additionally:**

- You must know where you “live” on the maintenance strategies continuum
- Your organization must be ready

# Maintenance Strategy Stages

## Breakdown maintenance:

- Time allocated (approximate)
  - 55% Breakdowns
  - 15% Preventive
  - 15% Time based
  - 15% Design-out failures, using RCFA
- Systems and attributes
  - Lack of training
  - Lack of work systems
  - High costs

# Maintenance Strategy Stages

## Preventive:

- Time allocated (approximate)
  - 45% Preventive
  - 25% Breakdowns
  - 15% Time based
  - 15% Design-out failures, using RCFA
- Systems and attributes
  - Basic lubrication and inspection
  - Basic craft skills training
  - High degree of breakdown and time-based repairs

# Maintenance Strategy Stages

## Predictive and condition-based:

- Time allocated (approximate)
  - 50% Predictive
  - 20% Preventive
  - 20% Design-out failures, using RCFA
  - 10% Run to failure
- Systems and attributes
  - Detection before failure
  - Development of procedures
  - Multi-skilled workforce
  - Well-organized reliability organization

# Maintenance Strategy Stages

## Reliability-centered maintenance:

- Time allocated (approximate)
  - 55% Predictive
  - 30% Design-out failures, using RCFA
  - 10% Preventive
  - 5% Run to failure
- Systems and attributes
  - Root cause failure analysis
  - Reliability-centered maintenance
  - Failure modes and effects analysis
  - Common goals and objectives

# Focus Organization on Reliability

## Allocate the resources:

- 20-30% of salaried resources focused on reliability activities
- 35-50% of hourly maintenance resources engaged in reliability tasks
- Hourly operations resources have defined condition-monitoring routes

# Focus Organization on Reliability

Provide comprehensive tools and methodology:

- Root Cause Failure Analysis (RCFA)
- Failure Modes and Effects Analysis (FMEA)
- Risk-based decision-making methodology
- Document management system integrated with maintenance management systems
  - Condition-monitoring results
  - Critical incidents and corrective actions

# Focus Organization on Reliability

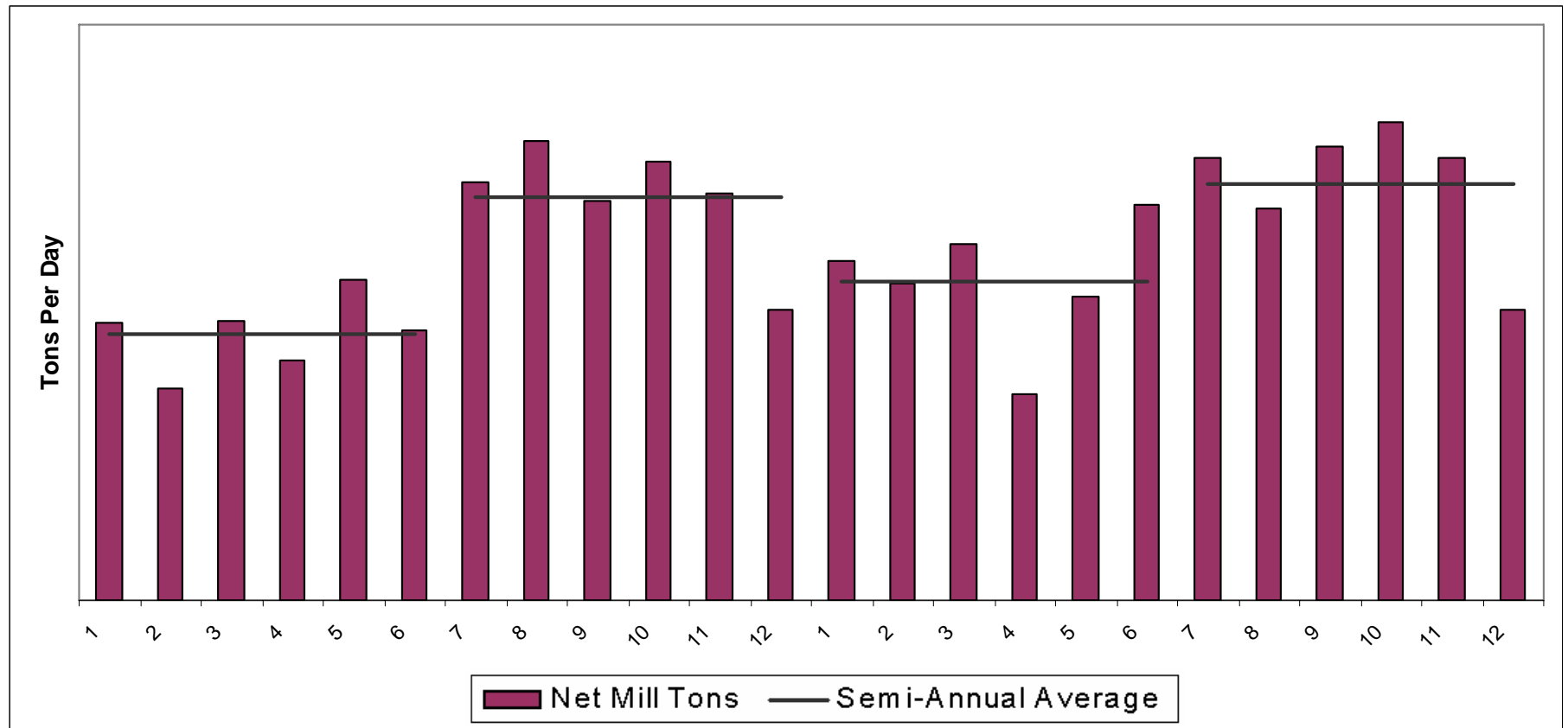
Develop common goals and systems:

- Give operations and maintenance salaried resources the same objectives and accountabilities
- Benchmark and develop Key Performance Indicators (KPIs)
- Utilize Best Practices for work management
- Develop communication and feedback tools

# Example of Results

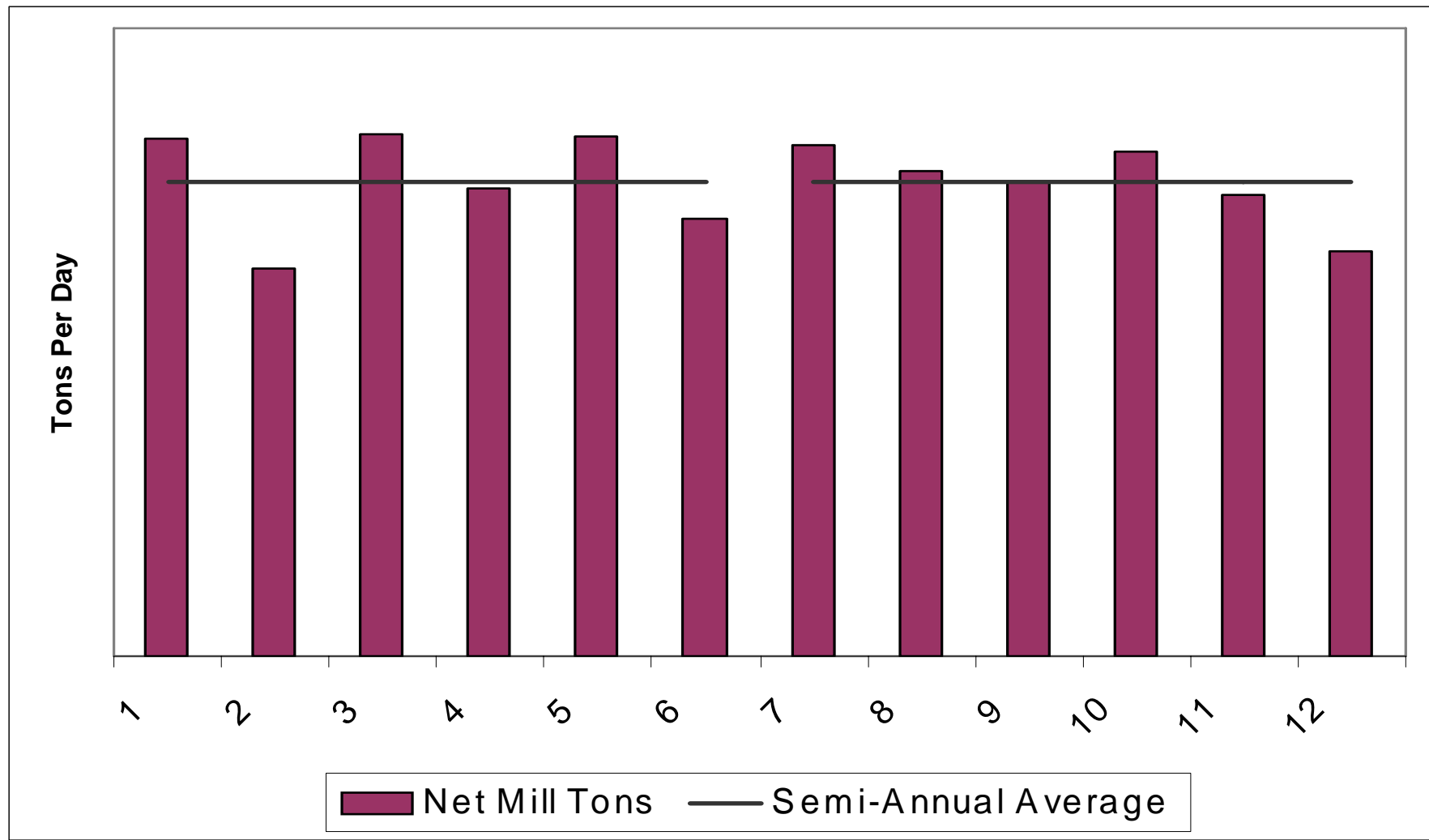
# Example of Results

Before RCM:



# Example of Results

After beginning RCM methods:



**Thank you**

**Questions?**