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Reducing Downtime with an Effective PM Plan

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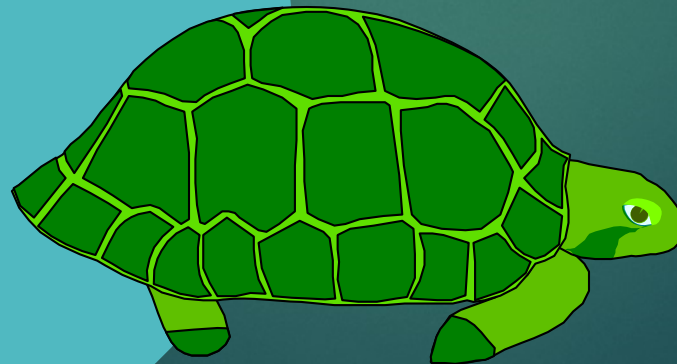
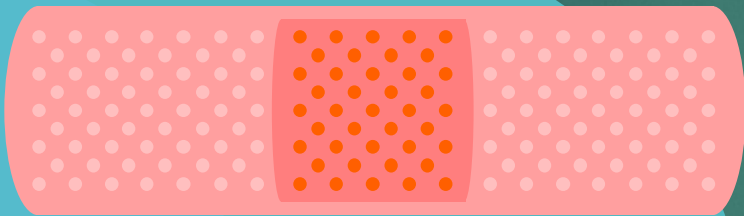
Learning Objectives

- ▶ Understand the concept of scheduled downtime and unscheduled downtime
- ▶ Explain essential elements of a preventive maintenance program
- ▶ Understand role of operators in preventive maintenance
- ▶ Learn practical tips to apply in your operation

Downtime and PM

- ▶ Quiz: What do you get when you type "PM" in google?
- ▶ Difference between preventive and predictive maintenance?
- ▶ Difference between scheduled downtime and downtime?
- ▶ Industry averages

What type of Maintenance program do you have?



What are we trying to prevent?

- ▶ Prevent breakdowns
- ▶ Prevent product contamination
- ▶ Prevent quality problems (temperature, relative humidity, machine settings)
- ▶ Prevent employee injuries
- ▶ Prevent excessive repair costs

How can P.M. pay off?

- ▶ Increased efficiency of equipment- longer life and better yields per shift
- ▶ Increased level of safety and sanitation
- ▶ Reduced energy cost
- ▶ Reduced cost of repairs
- ▶ Improved quality of product
- ▶ Less waste
- ▶ Better spare parts control

Essential elements of PM program

- ▶ Routine external inspections of equipment
- ▶ Periodic internal inspections
- ▶ Systematic lubrication
- ▶ Prompt adjustment, repair, or replacement of defective parts
- ▶ Accurate record-keeping
- ▶ Spare parts inventory/control

More essential elements

- ▶ Scheduled major overhauls
- ▶ Cost/ benefit analysis
- ▶ Systematic work procedure
- ▶ Planning and scheduling
- ▶ On-going training

Responsibilities of Plant Engineer

- ▶ Teamwork
- ▶ Supervise P.M.
- ▶ Maintain parts inventory
- ▶ Hiring, training, and scheduling
- ▶ Supervise equipment installations
- ▶ Organization
- ▶ Other management responsibilities

Role of Operators in P.M.

- ▶ Specific to plant
- ▶ Total Productive Maintenance (TPM) part of lean manufacturing tools
- ▶ T _____
- ▶ L _____
- ▶ C _____

Total Productive Maintenance

- ▶ Production
- ▶ Sanitation
- ▶ Maintenance
- ▶ Suppliers
- ▶ Consultants
- ▶ Who is NOT involved??

How to organize TPM?

- ▶ Safety first!
- ▶ What can be done while the line is running?
- ▶ What must be done when the line is stopped?
- ▶ Can any of this be done during changeovers?
- ▶ Use of "pit crew."

Six areas of productivity loss

- ▶ Breakdown losses
- ▶ Changover/adjustment losses
- ▶ Minor stoppages loss
- ▶ Speed losses
- ▶ Quality/defect/rework losses
- ▶ Yield losses

Operator's role

- ▶ TLC
- ▶ Timely adjustments
- ▶ Documentation
- ▶ Communication
- ▶ Assist in repairs?
- ▶ Support temporary repairs?

Mechanic's role

- ▶ Attentive to operator
- ▶ Compare equipment condition to designed specs
- ▶ Complete short repairs and overhauls as needed
- ▶ Assure needed parts available
- ▶ Study ways in which equipment reliability can be increased

Why planning is important

- ▶ Unplanned maintenance cost 4 times as much as planned maintenance
- ▶ Industry goal= 80% proactive and 20% reactive

Practical tips

- ▶ Generation of task lists
- ▶ Don't forget maintenance for sanitation
- ▶ 30 minute limit on short repairs before using temporary repair
- ▶ Proximity of tools and parts- PM carts and cart inventory
- ▶ Use of CMMS

Important questions

- ▶ How much scheduled down time is allowed?
- ▶ How much and what kinds of inventory will suppliers carry?
- ▶ What is the cost of one hour of unscheduled downtime?
- ▶ Do the people in the bakery have the skills to do timely repairs?

Costs of downtime

- ▶ Specific to plant
- ▶ Consider:
 - ▣ Materials wasted
 - ▣ Labor, other direct costs wasted
 - ▣ Overtime vs. straight time
 - ▣ Repair parts costs
 - ▣ Costs of re-doing
 - ▣ Other costs (utilities, outside purchase)

Unscheduled downtime- breakdowns

- ▶ Track on daily basis
- ▶ Industry standard= 5% or less per line
- ▶ If calculate costs of downtime per hour or per minute, easy to track costs of breakdowns
- ▶ Also consider reduction of equipment life with frequent breakdowns (depreciation)

Scheduled downtime

- ▶ 168 hours in a week
- ▶ Ideally, the plant is only scheduled for between 120 to 140 hours per week, which would allow 28-48 hours per week of scheduled downtime
- ▶ Recommend minimum of 16-24 hours per week for efficient operations

Dollars spent in Maintenance Departments

- ▶ View in 3 major areas: payroll cost, repair parts, repair services
- ▶ Look at use of overtime
- ▶ Look at flexibility to do projects
- ▶ Look at hours needed to do proper PM
- ▶ Track use of parts
- ▶ Provide training to reduce service costs

Team efforts are needed

- ▶ Involve equipment operators
- ▶ Plan PM activities
- ▶ Maintenance skills training
- ▶ Certification and recertification
- ▶ Partner with vendors to improve reliability
- ▶ Recognition and rewards



Predictive Maintenance

- ▶ Vibration analysis- bearing wear
- ▶ Infrared thermography- ID hot spots
- ▶ Oil analysis for gear boxes- contamination?
- ▶ Ultrasonic sound- metal stress

