Solving Downtime Dilemmas:
Efficient Hiring in Maintenance Operations

Thursday, January 18, 2:00-3:15 PM

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WARNING!

The following content is text and information heavy!

We will be presenting the TLDR version

We plan to share this presentation digitally, upon request, and want you to have the information vs sevel graphics that require context.

Time for Questions - 15 minutes at the end

Discover how to implement a preventative maintenance approach by understanding the benefits and strategies of integrating skilled maintenance personnel directly into your cidery’s operations.

This session will not only emphasize the compelling financial case for this strategic investment but will help provide practical insight to help you improve equipment uptime, enhance working conditions, and boost team morale; along with HR considerations associated with integrating in-house maintenance personnel into these facility roles.

Types of Maintenance Strategies

Reactive (Corrective, Run-to-Failure) Maintenance:

- Reactive maintenance activities performed in response to failures or breakdowns.
- Repairs, replacements, and troubleshooting are common corrective maintenance actions.

Advantages and Disadvantages:

Advantages:

The primary advantage of reactive maintenance is its simplicity and low short-term costs. It requires no planning or scheduling of maintenance tasks, which can reduce the upfront time and resources required.

Disadvantages:

Despite its simplicity, reactive maintenance can be more costly in the long run. It often leads to increased downtime, as equipment is only repaired after it fails. This can disrupt production and lead to lost revenue. Furthermore, run-to-failure maintenance can shorten the lifespan of equipment and may result in higher repair or replacement costs over time. It can also pose safety risks if critical equipment fails unexpectedly.

Preventative Maintenance:

- Preventative maintenance involves proactively performing tasks to prevent equipment or systems from failing; corrective maintenance involves responding to failures or breakdowns after they have occurred.
- Proactive maintenance activities performed to prevent equipment or systems from failing.
- Regular inspections, cleaning, lubrication, adjustments, and replacement of parts are examples of preventative maintenance tasks.

Advantages and Disadvantages:

Advantages:

Preventative maintenance can lead to increased equipment reliability and lifespan, reduced downtime, and overall cost savings. By preventing breakdowns, it also enhances safety and can lead to more predictable maintenance scheduling.

Disadvantages:

It requires upfront investment in time and resources for planning and executing maintenance tasks. There's also the risk of over-maintaining equipment, which can increase costs without corresponding benefits.

Predictive maintenance: is an advanced maintenance strategy that uses data, sensors, and analytics to *predict* when equipment is likely to fail so that maintenance can be performed just in time to prevent the failure. This approach aims to maximize the lifespan of equipment, minimize downtime, and optimize maintenance costs.

Advantages and Disadvantages:

Advantages:

Predictive maintenance can significantly extend the lifespan of equipment, minimize downtime by preventing unexpected failures, and optimize maintenance costs by avoiding unnecessary maintenance actions.

Disadvantages:

Implementing a predictive maintenance program can be costly and complex. It requires investment in advanced sensors, data analytics tools, and possibly new software and training. Additionally, it depends heavily on the quality and quantity of the data collected.

Maintenance Strategies

	Reactive Maintenance	Preventative Maintenance	Predictive Maintenance	RCM (Reliability Centered - Fixx $50-$80 month)
Fix It	When it breaks	Scheduled	Condition-based monitoring - work orders	Investigate Failures - Determine Strategy
Implementation Cost	Low	Average	High	Highest
Pros	**Best for low-priority Equipment**	Best strategy without expertise	Informed monitoring - Insight into causes of breakdowns	Most efficient maintenance schedule
Cons	Downtime and runaway repair costs	“PM Creep” can occur	Expensive implementation	Time, skill and cost

Source:https://fiixsoftware.com/blog/evaluating-maintenance-strategies-select-model-asset-management/

Why You Should Consider Creating a Preventative Maintenance Strategy

I think that many people have a fundamental misunderstanding about how mechanical equipment is designed, and intended to function.

The Business Case:

Implementing a preventative maintenance program can benefit businesses of all sizes in the cider industry. Regardless of the size of the operation, preventative maintenance is crucial for several reasons:

1. **Equipment Reliability:**
   - Preventative maintenance helps ensure the reliability of production equipment. Regular inspections, cleaning, and servicing can identify and address potential issues before they lead to breakdowns or failures.

2. **Consistent Product Quality:**
   - Consistent product quality is vital in the beverage industry. Preventative maintenance helps maintain the integrity of equipment, ensuring that it functions at its best and contributes to the production of high-quality cider.

3. **Cost Savings:**
   - Proactively maintaining equipment will result in cost savings in the long run. Addressing issues before they escalate can prevent major breakdowns, reduce downtime, and minimize the need for expensive *emergency repairs*.

4. **Extended Equipment Lifespan:**
   - Regular maintenance contributes to the extended lifespan of production equipment. Well-maintained machinery is less likely to experience premature wear and tear, leading to longer operational life.

The Human Element:

1. **Reduction in Stress:** Proactive maintenance reduces the likelihood of unexpected equipment breakdowns. For employees, this means less stress related to dealing with crises or emergency situations. When equipment runs smoothly, employees can focus on their regular tasks without the disruption and pressure of unexpected failures.

2. **Sense of Pride and Professionalism:** Working with well-maintained, up-to-date equipment can instill a sense of pride and professionalism among employees. It demonstrates the company's commitment to quality and efficiency, both in its assets and its workforce.

3. **Improved Working Conditions:** Regular maintenance can improve the overall working conditions. This includes not just the functioning of machinery, but also the cleanliness and organization of the work environment. A clean and well-organized workspace can boost morale and increase productivity.

The Human Element:

5. **Empowerment through Involvement:** Involving employees in the preventative maintenance process can empower them. It gives them a sense of ownership and control over their work environment. Employees who are trained to identify potential issues and contribute to maintenance planning feel more valued and engaged.

6. **Career Development Opportunities:** Implementing a proactive maintenance strategy often involves training and skill development for the employees. This not only enhances their current performance but also provides them with valuable skills for their career growth.

While the specific tasks and frequency of preventative maintenance may vary based on the size of the business and the complexity of its operations, the fundamental principles remain applicable across the board. Small businesses can benefit just as much as larger ones from the proactive approach that preventative maintenance brings to equipment management and production processes.

Implementing a Preventative Strategy

(A look at the difference between small and large operations)

When it comes to scalability in preventative maintenance programs for cider production, there are several differences between small boutique operations and large-scale production facilities. The key distinctions often lie in the scale of operations, the complexity of equipment, and the resources available. Here are some factors to consider:

1. **Equipment Complexity:**
   - **Small Operation:** A smaller operation may have a limited number of production equipment, and the machinery might be simpler in design. Preventative maintenance tasks may involve basic inspections, cleaning, and lubrication.
   - **Large-Scale Production Facility:** In a larger facility, there may be a more extensive range of complex machinery, including bottling lines, fermentation tanks, filtration systems, and more. Preventative maintenance tasks may be more sophisticated, involving in-depth inspections, calibration, and specialized maintenance for complex equipment.

2. **Frequency of Maintenance:**
   - **Small Operation:** Preventative maintenance tasks may be performed less frequently, given the smaller scale of operations. Regular but less frequent maintenance may be sufficient to keep equipment in good working condition.
   - **Large-Scale Production Facility:** Due to the higher production volumes and the complexity of machinery, preventative maintenance tasks may be more frequent and follow a more structured schedule to ensure optimal performance.

3. **Staffing and Expertise:**
   - **Small Operation:** Smaller operations may have limited staffing, and individuals may wear multiple hats. Preventative maintenance tasks might be performed by existing staff with general knowledge of equipment.
   - **Large-Scale Production Facility:** Larger facilities may have dedicated maintenance teams or personnel with specialized expertise. The preventative maintenance program may involve collaboration between production and maintenance teams, with specialists for different types of equipment.

4. **Automation and Technology:**
   - **Small Operation:** Automation may be less prevalent, and preventative maintenance tasks might rely more on manual processes. Technology adoption may be more limited.
   - **Large-Scale Production Facility:** Larger facilities may leverage automation and advanced technologies for condition monitoring, predictive maintenance, and data analytics. Preventative maintenance may be more technology-driven and integrated with the overall production system.

5. **Documentation and Compliance:**
   - **Small Operation:** Documentation and compliance may be less formalized, with a focus on basic record-keeping. Regulatory requirements may still be important but on a smaller scale.
   - **Large-Scale Production Facility:** Compliance with industry regulations and standards, as well as detailed documentation of maintenance activities, may be critical. Large facilities may have more rigorous documentation requirements to meet regulatory standards.

6. **Budget and Resources:**
   - **Small Operation:** Budget constraints may impact the extent of preventative maintenance activities. Resources may be allocated based on immediate needs.
   - **Large-Scale Production Facility:** Larger facilities may have dedicated budgets for preventative maintenance programs, allowing for the allocation of resources to address both short-term and long-term maintenance needs.

While the overarching goal of preventing equipment failures and ensuring consistent product quality remains consistent, the approach to preventative maintenance can be tailored to the specific needs and capabilities of each type of operation. Small operations may focus on simplicity and cost-effectiveness, while large facilities may prioritize advanced technologies and comprehensive maintenance strategies.

Facing Challenges in Implementation
(Hurdles to Overcome)

Implementing a preventative maintenance program, whether for a large or small company, can face various challenges. Overcoming these hurdles is essential to ensure the success and effectiveness of the maintenance strategy. Here are some common challenges:

1. **Resource Constraints:**
   - **Small Companies:** Limited financial resources and staffing may pose challenges in acquiring the necessary tools, software, and personnel for an effective preventative maintenance program.
   - **Large Companies:** Despite having more resources, large companies may face challenges in allocating budgets and coordinating efforts across various departments.

2. **Lack of Data and Documentation:**
   - Many companies, especially smaller ones, may lack comprehensive historical data on equipment performance and maintenance history. Without this data, it's challenging to establish baseline conditions and develop effective maintenance plans.

3. **Resistance to Change:**
   - Employees at all levels may resist changes to existing maintenance practices. This resistance can stem from a lack of awareness, fear of job role changes, or skepticism about the benefits of preventative maintenance.

4. **Insufficient Training:**
   - Employees may lack the necessary training to implement and manage a preventative maintenance program effectively. Training is crucial for ensuring that staff can use new tools and methodologies correctly.

5. **Prioritization and Planning:**
   - Companies may struggle to prioritize assets for preventative maintenance. Deciding which equipment is most critical and establishing appropriate maintenance schedules can be challenging.

6. **Integration with Operations:**
   - Integrating preventative maintenance activities seamlessly into ongoing operations can be a logistical challenge. Maintenance activities must be scheduled to minimize disruptions to production schedules.

7. **Technology Adoption:**
   - Small companies may lack the technological infrastructure needed for modern preventative maintenance systems. Larger companies may face challenges integrating new technologies into existing systems.

8. **Sustainability and Consistency:**
   - Maintaining a consistent and sustainable preventative maintenance program requires ongoing commitment and discipline. Companies may struggle to sustain the program over the long term.

9. **Measuring Effectiveness:**
   - Establishing Key Performance Indicators (KPIs) and metrics to measure the effectiveness of the preventative maintenance program can be challenging. Without clear metrics, it's difficult to assess the impact on equipment reliability and overall business performance.

Overcoming these challenges requires a strategic and systematic approach. Companies should invest in employee training, develop clear communication plans, leverage available technologies, and continuously refine their preventative maintenance strategies based on feedback and results. Engaging employees in the process and fostering a culture of continuous improvement can also contribute to the success of a preventative maintenance program.

Key Performance Indicators | KPIs

(Metrics by which we measure success, and failure)


- 2024 -
CIDERCON


Can Loss
Loss Percentage
Target loss
2.0%
1.5%
1.0%
0.5%
0.0%
0.62%
Year To Date
0.25%
0.64%
0.96%
1.27%
1.01%
0.95%
0.94%
0.29%
0.16%
January
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March
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May
June
July
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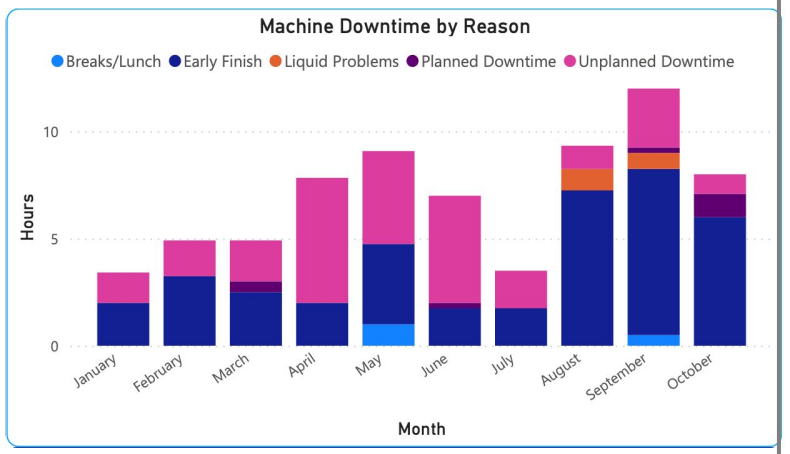
September
October


Machine Downtime by Reason
Breaks/Lunch
Early Finish
Liquid Problems
Planned Downtime
Unplanned Downtime
Hours
10
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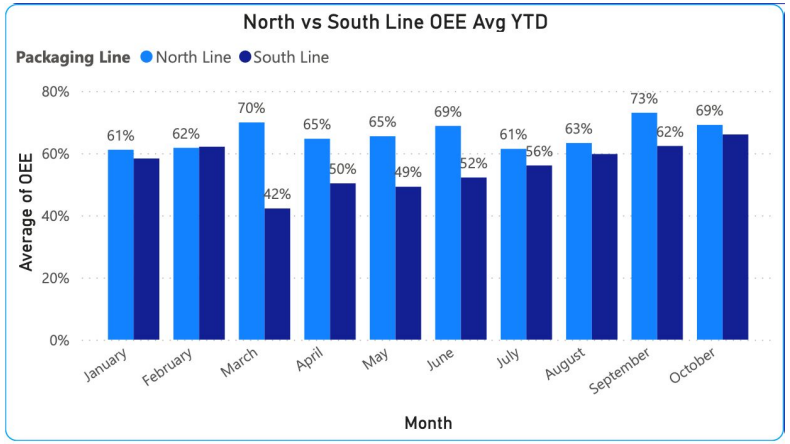
February
March
April
May
June
July
August
September
October
Month


North vs South Line OEE Avg YTD
Packaging Line
North Line
South Line
Average of OEE
80%
60%
40%
20%
0%
61%
62%
70%
42%
65%
50%
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49%
69%
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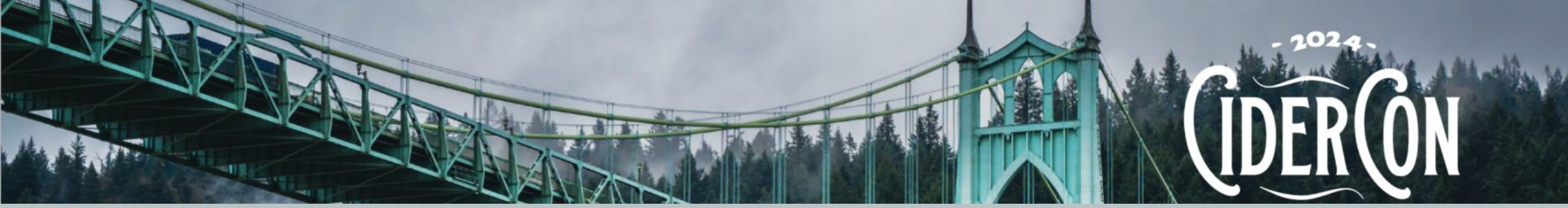
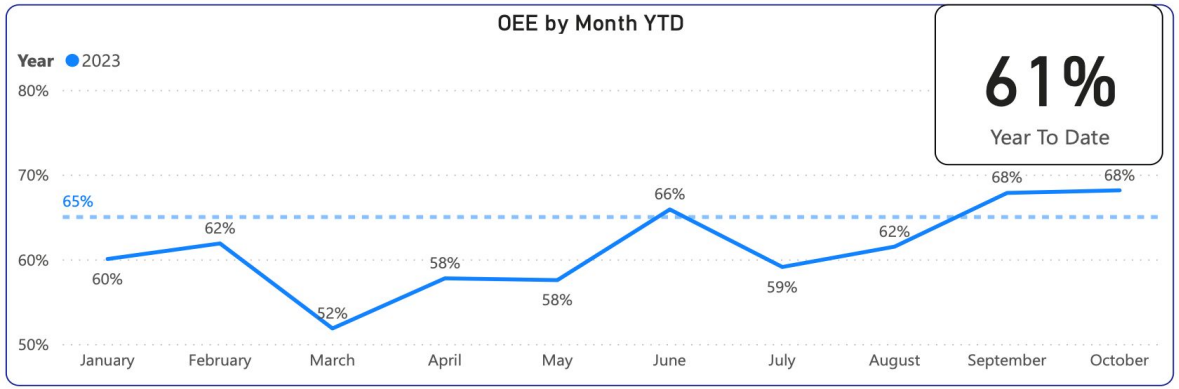

- 2024 -
CIDERCON


OEE by Month YTD
Year 2023
61%
Year To Date
80%
70%
60%
50%
65%
60%
62%
52%
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59%
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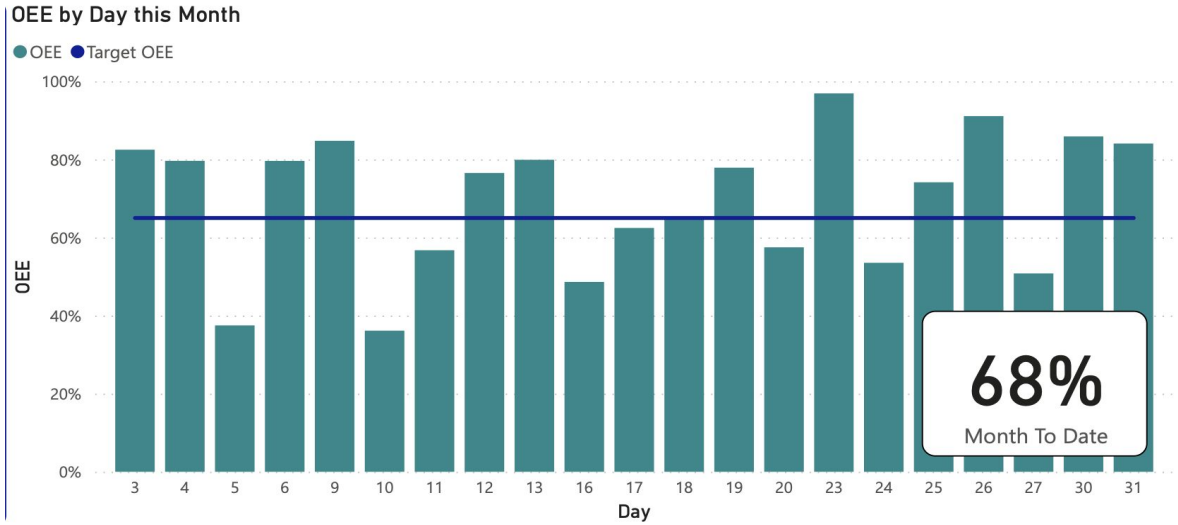
OEE by Day this Month
OEE
Target OEE
100%
80%
60%
40%
20%
0%
OEE
68%
Month To Date
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4
5
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27
30
31
Day

What is Best for My Organization?

Know the number of assets you have
- Inventory All Equipment
- Use a software program or internal spreadsheets

Determine your priority assets
- Which assets are critical to operations
- **strategy can be different for each asset**

Identify your bottlenecks
- Map out your process
- Understand where and why bottlenecks are occuring

Conduct Cost Analysis
- If downtime due to equipment failure occurs, what is the cost of lost production, replacement parts, reduced productivity for staff

Choose your maintenance strategy
- **Reactive**
- **Preventative**
- **Predictive**
- **RCM -** Reliability Centered

Hire Maintenance personnel
- Technician - General oversight of equipment **Objective:** produce and package product, rebuilds
- Manager General oversight of equipment & ee's **Objective:** improve equip availability
- Skilled Tradesman Electrical Installs, new builds

Workforce Planning

Workforce Planning: A Collaborative Effort

Strategic Planning → Current Workforce Analysis → Future Workforce Requirements → Gap Analysis → Action Planning → Execution and Evaluation

Strategic Workforce Planning

- 3-5 year forecast period
- Aligned with long term business plan and growth projections
- Involves Top Leadership
- Identify stakeholders for Operational Workforce Planning

Operational Workforce Planning

- 12-18 month forecast period
- Aligned with annual business planning cycle
- Identify current workforce skill sets
- Identify gaps (do I hire or train)
- Move to Planning, Execution and Evaluation

Planning, Execution, Evaluation

- Develop position, job description
- Begin recruitment
- Implement plans
- Evaluate results

Other HR-Related Considerations

Other Considerations

Type of Position

- **Smaller orgs** - maintenance likely performed by production team member
- **Mid-sized orgs** - hybrid positions: OEM/Facilities Technician
- **Large orgs** - Maintenance teams

Federal and State Employment Law

- Department of Labor (DOL), Wage and Hour Division, Fair Labor Standards Act: sets requirements for overtime pay for “blue collar” workers
- **Maintenance workers do not qualify for an overtime exemption - must be paid OT**
- Federal - Must be paid an hourly rate with OT for all hours > 40 in a week…. **BUT,**
- AK, CA, NV, PR, VI have **daily** OT laws for > 8 hrs in a day
- CO has **daily** OT for > 12 hrs in a day
- Oregon - Manufacturing OT rules
  - Daily and Weekly calculations
  - >10/hrs in a day, or 40 hrs in a week
- ON CALL - In Oregon - Engaged to wait, waiting to be engaged, On-call

Other Considerations

Limited Maintenance Electrician (LME)

- LME can repair and maintain **existing** electrical installations for existing operable buildings.
- 2-year program
- An LME is NOT authorized to make new electrical installations. Must be an licensed electrician.

Pay for Skills Program

Opportunities for Growth/Time

- Maintenance Lubrication Technician Level I and II
- Infrared Thermography Level I and II
- Ultrasound Technician Level I and II
- Precision Maintenance Training
- Vibration Analyst Level I
- Electrical safety and troubleshooting training
- Limited Maintenance Electrician License (LME Apprenticeship - Voluntary)

Calculating Cost of Down Time

Steps to Calculate Total Cost of Downtime

Identify the Duration of Downtime: Record the time from when the equipment failed until it is back up and running. This includes repair time, testing after repair, and ramp-up time to full production.

Calculate Lost Production: Determine the amount of production lost during the downtime. This is typically measured in units that could have been produced during the period of equipment failure.

Assess Financial Impact:

- Direct Costs: Calculate the cost of lost production. This is usually the selling price of the product minus the variable costs (like materials) that were not expended due to the downtime.
- Indirect Costs: Consider costs such as employee wages paid during downtime, expedited shipping costs for delayed orders, or additional labor costs for catching up on production.

Factors Involved in Cost Calculation

1. **Loss of Production Output:** The primary cost is the loss of goods or services that the failed equipment would have produced. This is often the biggest component of downtime cost.

2. **Labor Costs:** Wages paid to employees during the downtime, even though they might not be productive. This includes both direct labor (those operating the equipment) and indirect labor (supporting staff).

3. **Overhead Costs:** Fixed costs that continue to accrue during downtime, such as utilities, rent, and administrative expenses.

4. **Repair and Replacement Costs:** Includes the cost of parts, tools, and labor required to get the equipment back into operation.

5. **Ramp-up Time Costs:** After the equipment is repaired, there may be additional costs and lost production associated with slowly ramping back up to full production capacity.

Factors Involved in Cost Calculation

6. **Quality Costs:** When production restarts, there may be a period of lower quality output as the equipment stabilizes, leading to potential waste or rework.

7. **Impact on Customer Satisfaction:** This can be harder to quantify but includes the cost of lost sales, damage to brand reputation, and potential penalties for late delivery.

8. **Opportunity Cost:** The lost opportunity to produce other goods or services during the downtime period.

9. **Expedited Shipping or Overtime Costs:** Additional costs to expedite shipping to customers or pay overtime to workers to catch up on production schedules.

10. **Regulatory or Compliance Costs:** Any fines or compliance issues that arise due to delayed production or failure to meet contractual obligations.

Example Calculation

Downtime Duration: 8 hours
Lost Production: 100 units
Selling Price per Unit: $50
Variable Cost per Unit: $20
Direct Labor Cost: $500
Overhead Costs per Hour: $100

Total Cost of Downtime = (Lost Production × (Selling Price - Variable Cost)) + (Labor Costs) + (Overhead Costs × Downtime Duration)

= (100 × ($50 - $20)) + $500 + ($100 × 8)

= $3000 + $500 + $800

= $4300

*Does not include the cost to repair

Example - Fully Burdened Labor Cost

		Production	Technician	Manager	LME	Electrician
Hourly Rate		$ 18.00	$ 23.00	$ 40.00	$ 35.00	$ 45.00
Annual Salary		$ 37,440.00	$ 47,840.00	$ 83,200.00	$ 72,800.00	$ 93,600.00
Mandatory						
Payroll Taxes						
Social Security	6.20%	$ 1.12	$ 1.43	$ 2.48	$ 2.17	$ 2.79
Medicare	2.35%	$ 0.42	$ 0.54	$ 0.94	$ 0.82	$ 1.06
FUTA	6.00%	$ 1.08	$ 1.38	$ 2.40	$ 2.10	$ 2.70
SUTA	2.00%	$ 0.36	$ 0.46	$ 0.80	$ 0.70	$ 0.90
Work Comp	1.50%	$ 0.27	$ 0.35	$ 0.60	$ 0.53	$ 0.68
Local Taxes	0.00%	$ -	$ -	$ -	$ -	$ -
Paid Fam Leave	1.00%	$ 0.18	$ 0.23	$ 0.40	$ 0.35	$ 0.45
Voluntary - company paid benefits						
Health Insurance (600/mo)	$ 7,200.00	$ 3.46	$ 3.46	$ 3.46	$ 3.46	$ 3.46
PTO	48 Hours	$ 0.42	$ 0.53	$ 0.92	$ 0.81	$ 1.04
Sick Leave	40 Hours	$ 0.35	$ 0.44	$ 0.77	$ 0.67	$ 0.87
Retirement	3.00%	$ 0.54	$ 0.69	$ 1.20	$ 1.05	$ 1.35
Workboots	$ 400.00	$ 0.19	$ 0.19	$ 0.19	$ 0.19	$ 0.19
Product Alottments	$ 1,200.00	$ 0.58	$ 0.58	$ 0.58	$ 0.58	$ 0.58
Product Swag	$ 600.00	$ 0.29	$ 0.29	$ 0.29	$ 0.29	$ 0.29
Total OPE per Hour		**$ 9.25**	**$ 10.56**	**$ 15.03**	**$ 13.72**	**$ 16.35**
Total Annual Labor Cost		**$ 56,679.52**	**$ 69,812.72**	**$ 114,465.60**	**$ 101,332.40**	**$ 127,598.80**
With Medical		51.39%	45.93%	37.58%	39.19%	36.32%
Without Medical		32.16%	30.88%	28.93%	29.30%	28.63%

Hourly rates, annual salary and voluntary benefits are national averages and used for examples only

Conduct Cost Analysis

When Considering Equipment Downtime - analyze:

- Cost of lost production
- Cost of equipment repair
- Cost of lost labor
- Cost of repair time

How does that compare to the fully burdened cost of an in-house maintenance professional OR traveling technician $$$$

Now that you know who you need - how do you find them?

Develop Job Description

- Perform Job Analysis - KSA's, Environment, Credentials
- Ensure essential functions represent full scope of work
- HR and Managers work closely together

Benchmark Rate

- Company Compensation Strategy
- Pay Equity for similarly situated ee's
- Salary Surveys Free vs Paid

Identify Stakeholders

- Who has a vested interest in this position? Who can evaluate the candidates KSA's?
- HR, Cellar, Packaging…etc

Recruit

- HRIS may have automatic listings
- Pay Transparency laws

Interview

Hire!

Know your labor market - Maintenance is a universal trade - competition is tight and cross-industry comparisons are necessary

Summary

Evaluate Your Assets → Determine your maintenance strategy → Evaluate your workforce

Identify skills gaps → Determine the type of Maintenance personnel you need → Hire Maintenance personnel → Execute Maintenance Strategy

Evaluate and tweak!

Questions?