

# Machinery Maintenance Survey

An Anonymous Response Survey

## SURVEY INTRODUCTION

The National Institute of Standards and Technology (NIST) promotes innovation and industrial competitiveness in domestic manufacturing. To achieve this goal in an effective and efficient manner, NIST aims to identify the most efficient means for reducing costs, environmental impacts, and increasing resilience. This survey focuses on gathering data relevant to manufacturing machinery maintenance (i.e., machinery used in the manufacturing process). Your participation is appreciated, and the data provided is anonymous.

## WHO SHOULD COMPLETE THIS SURVEY

This survey should be completed by management staff or senior staff members that are familiar with the maintenance practices, costs, and strategies at this establishment. If certain information cannot be divulged or determined, please leave it blank.

## REPORTING UNIT

This survey seeks information at the establishment level. An establishment is, for the purposes of this survey, a single physical location where operations are performed (e.g., a factory).

## ADDITIONAL INFORMATION

This collection of information contains Paperwork Reduction Act (PRA) requirements approved by the Office of Management and Budget (OMB). Notwithstanding any other provisions of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the PRA unless that collection of information displays a currently valid OMB control number. Public reporting burden for this collection is estimated to be 25 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any aspect of this collection of information, including suggestions for reducing this burden, to the National Institute of Standards and Technology, [douglas.thomas@nist.gov](mailto:douglas.thomas@nist.gov).

OMB Control #0602-0042 Expiration Date: 12/31/18 NIST Generic Clearance for Usability

- a. 1 to 4 Employees
- b. 5 to 9 Employees
- c. 10 to 19 Employees
- d. 20 to 49 Employees
- e. 50 to 99 Employees
- f. 100 to 249 Employees
- g. 250 to 499 Employees
- h. 500 to 999 Employees
- i. 1000 or more Employees

2. What is the estimated total annual payroll for this establishment?

Your answer \_\_\_\_\_

3. What type of products are produced at this establishment?

Your answer \_\_\_\_\_

4. What is the estimated total annual value of products shipped for this establishment?

5. What is the primary NAICS code for this establishment?

Your answer \_\_\_\_\_

6. What is the estimated annual expenditures on manufacturing machinery maintenance and repair at this establishment (e.g., maintenance department budget)?

Your answer \_\_\_\_\_

7. For the following questions, What percent of machinery maintenance and repair costs do you estimate is predictive (i.e., condition-based maintenance using data such as temperature, noise, and/or vibration), preventive (i.e., scheduled, timed, or based on a cycle), and reactive maintenance (i.e., run to failure)?

Responses to Questions 7a through 7d should total 100%

Your answer \_\_\_\_\_

**7a. Predictive Maintenance**

(answer in %)

Your answer \_\_\_\_\_

**7b. Preventive Maintenance**

(answer in %)

Your answer \_\_\_\_\_

Your answer

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**7d. Other Maintenance Costs (e.g., training)**

(answer in %)

Your answer

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8. In addition to the costs discussed above, what do you estimate were additional expenditures per year, if any, used for replacing machinery that was damaged due to irreparable faults or failures?

Your answer

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9. What percent of the planned production time do you estimate is downtime?

Your answer

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Is this information tracked formally?

Yes

No

If so, are you familiar with the estimates?

9a. What percent of the downtime (i.e., planned production time that is downtime) is due to reactive maintenance (i.e., unplanned maintenance and repair)?

Your answer \_\_\_\_\_

9b. What percent, if any, of sales do you estimate were lost due to delays from downtime caused by maintenance issues?

Your answer \_\_\_\_\_

Is this information tracked formally?

Yes

No

If so, are you familiar with the estimates?

Yes

No

10. What do you estimate is the rate of product defects for this establishment?

Your answer \_\_\_\_\_

10a. What percent of defects do you estimate are a result of reactive maintenance?

Is this information tracked formally?

Yes

No

If so, are you familiar with the estimates?

Yes

No

10b. What percent of sales, if any, do you estimate were lost due to defects caused by maintenance issues?

Your answer \_\_\_\_\_

11. Do you believe that your establishment would benefit from converting some portion of reactive and preventive maintenance to predictive maintenance?

Yes

No

12. If yes, what benefits and costs do you believe could come about by converting some portion of reactive and preventive maintenance to predictive maintenance?

**% change in maintenance and repair costs, if any**

Your answer \_\_\_\_\_

**% change in downtime, if any**

Your answer \_\_\_\_\_

**% change in sales, if any**

Your answer \_\_\_\_\_

**% change in injuries, if any**

Your answer \_\_\_\_\_

**Other benefits, costs, or comments**

Your answer \_\_\_\_\_

**13. What percent of injuries, if any, are associated with reactive maintenance at this establishment?**

Your answer \_\_\_\_\_

**14. What is the lead time for a product at this establishment (i.e., the time it takes a new set of inputs to move all the way through the operation)?**

15. Please select the most accurate statement for this establishment:

- a. Very few investments are made to reduce future maintenance related costs and losses.
- b. Minor investments, such as in planning software, are made to reduce future maintenance related costs and losses.
- c. Moderate investments, such as in monitoring equipment for some machinery, are made to reduce future maintenance related costs and losses.
- d. Significant or major investments, such as analysis software and monitoring equipment for most machines, are made to reduce future maintenance related costs and losses.

16. How many hours per week is this establishment operating on average this year?

Your answer \_\_\_\_\_

17. What percent increase in finished goods inventory, if any, do you estimate is maintained to deal with delays from unplanned



18. What is the primary competitive focus of this establishment and its products (select one)?

- a. Cost competitiveness: we compete primarily based on having a low cost for the customer
- b. Differentiation: we compete primarily based on differentiating ourselves from others through quality, reputation, service, brand name, or other similar characteristics

19. Does this establishment primarily use a push (i.e., make to stock) or pull (i.e., make to order) strategy (select one)?

- a. Push or make to stock strategy
- b. Pull or make to order strategy

20. What best describes the management style used at this establishment (select one):

- a. Autocratic: Decision are made at the top with limited input from staff
- b. Consultative: Decisions are made at the top with input from staff
- c. Democratic: Employees take part in the decision-making process
- d. Delegative: Employees make a great deal of the decisions with limited guidance from management

21. Did you receive this survey in the mail?

20. What best describes the management style used at this establishment (select one):

- a. Autocratic: Decision are made at the top with limited input from staff
- b. Consultative: Decisions are made at the top with input from staff
- c. Democratic: Employees take part in the decision-making process
- d. Delegative: Employees make a great deal of the decisions with limited guidance from management

21. Did you receive this survey in the mail?

- Yes
- No

22. Other comments

Your answer

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**SUBMIT**

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