



**IMPROVING THE EFFECTIVENESS OF PRODUCTION
QUALITY BY APPLYING PLANNED MAINTENANCE IN
MANUFACTURING INDUSTRY**



**BACHELOR OF MANUFACTURING ENGINEERING
TECHNOLOGY WITH HONOURS**

2023



**Faculty of Mechanical and Manufacturing Engineering
Technology**

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**IMPROVING THE EFFECTIVENESS OF PRODUCTION QUALITY
BY APPLYING PLANNED MAINTENANCE IN MANUFACTURING
INDUSTRY**

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA
Muhammad Asyraf Bin Ishak

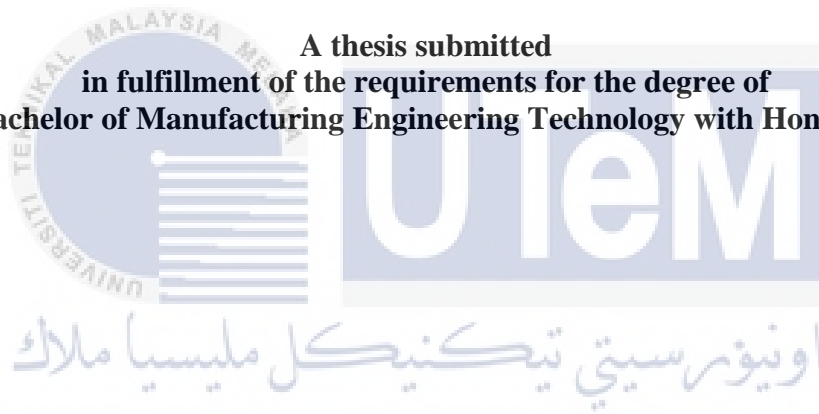
Bachelor of Manufacturing Engineering Technology with Honours

2023

**IMPROVING THE EFFECTIVENESS OF PRODUCTION QUALITY BY
APPLYING PLANNED MAINTENANCE IN MANUFACTURING INDUSTRY**

MUHAMMAD ASYRAF BIN ISHAK

**A thesis submitted
in fulfillment of the requirements for the degree of
Bachelor of Manufacturing Engineering Technology with Honours**



Faculty of Mechanical and Manufacturing Engineering Technology

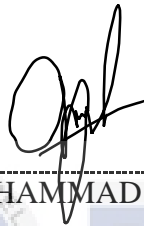
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DECLARATION

I declare that this Choose an item. entitled “ Improving The Effectiveness of Production Quality By Applying Planned Maintenance In Manufacturing Industry ” is the result of my own research except as cited in the references. The Choose an item. has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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Date :

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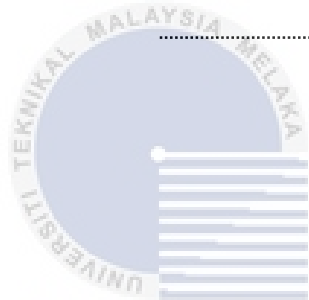
APPROVAL

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the Bachelor of Manufacturing Engineering Technology with Honours.

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DEDICATION

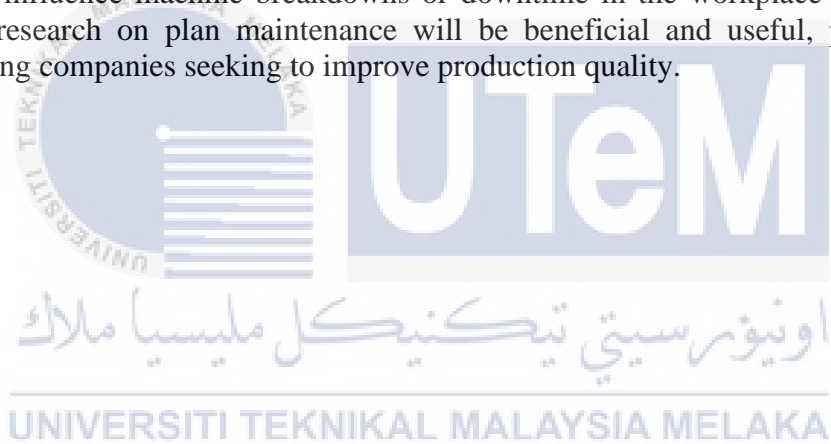
To my beloved family and friends who have been my source of strength and inspiration
and gave me support in terms of moral, spiritual, and emotional.

Ts. Dr. Amir Hamzah Bin Abdul Rasib, my supervisor, for mentoring, instructing, and
assisting me in finishing my thesis from start till end.



ABSTRACT

The manufacturing industry is advancing at a rapid pace and is well-positioned for the future. Having high productivity is a crucial part of achieving this. Productivity has the same worth as money since it affects profitability and allows a company to compete in the same industry as its competitor. This data is utilised in studies to improve certain food and beverage industries. In most cases, plan maintenance is the most cost-effective method. This is due to the fact that in terms of maintenance to detect problems at workstations or in industries, the plan maintenance technique is still inadequate. The identified causes then aid in the identification of acceptable solutions for resolving any machine problem in the workplace. As a result, this technique will give ideas for activities to increase product quality and machine performance. The framework for this study was devised and organised based on a review of the literature on plan maintenance. The outcomes of this approach were then analysed using Ishikawa diagrams to discover the frequency of loss factors and causes, as well as suggestions for improvement using the Why-Why Analysis. The research can then be used in the Food and Beverage Industry. As a result, it will have an impact on the quality of the product, which will be considered defective. The study's objective is to determine the factors that influence machine breakdowns or downtime in the workplace and the thesis containing research on plan maintenance will be beneficial and useful, particularly to manufacturing companies seeking to improve production quality.



ABSTRAK

Industri pembuatan sedang berkembang pesat dan berada pada kedudukan yang baik untuk masa hadapan. Mempunyai produktiviti yang tinggi adalah bahagian penting untuk mencapai matlamat ini. Produktiviti mempunyai nilai yang sama seperti wang kerana ia menjejaskan keuntungan dan membolehkan syarikat bersaing dalam industri yang sama dengan pesaingnya. Data ini digunakan dalam kajian untuk menambah baik industri makanan dan minuman tertentu. Dalam kebanyakan kes, penyelenggaraan pelan adalah kaedah yang paling kos efektif. Ini berikutan dari segi penyelenggaraan untuk mengesan masalah di stesen kerja atau dalam industri, teknik penyelenggaraan pelan masih tidak mencukupi. Punca yang dikenal pasti kemudian membantu dalam mengenal pasti penyelesaian yang boleh diterima untuk menyelesaikan sebarang masalah mesin di tempat kerja. Hasilnya, teknik ini akan memberi idea untuk aktiviti meningkatkan kualiti produk dan prestasi mesin. Rangka kerja untuk kajian ini telah dirangka dan disusun berdasarkan kajian literatur mengenai penyelenggaraan pelan. Hasil daripada pendekatan ini kemudiannya dianalisis menggunakan gambar rajah Ishikawa untuk mengetahui kekerapan faktor dan punca kerugian, serta cadangan penambahbaikan menggunakan Analisis “Why-Why Analysis” itu kemudiannya boleh digunakan dalam Industri Makanan dan Minuman. Akibatnya, ia akan memberi kesan kepada kualiti produk, yang akan dianggap rosak. Objektif kajian adalah untuk menentukan faktor-faktor yang mempengaruhi kerosakan mesin atau masa henti di tempat kerja dan tesis yang mengandungi penyelidikan mengenai penyelenggaraan pelan akan memberi manfaat dan berguna, terutamanya kepada syarikat pembuatan yang ingin meningkatkan kualiti pengeluaran.



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TABLE OF CONTENTS

| | PAGE |
|---|-------------|
| DECLARATION | |
| APPROVAL | |
| DEDICATION | |
| ABSTRACT | i |
| ABSTRAK | ii |
| ACKNOWLEDGEMENTS | iii |
| TABLE OF CONTENTS | iv |
| LIST OF TABLES | vii |
| LIST OF FIGURES | viii |
| LIST OF SYMBOLS AND ABBREVIATIONS | ix |
| LIST OF APPENDICES | 10 |
| CHAPTER 1 | 11 |
| INTRODUCTION | 11 |
| 1.1 Research Background | 11 |
| 1.2 Problem Statement | 13 |
| 1.3 Research Question | 14 |
| 1.4 Research Objective | 14 |
| 1.5 Research Scope | 15 |
| 1.6 Expected Result | 16 |
| 1.7 Thesis Frame | 16 |
| 1.8 Summary | 18 |
| CHAPTER 2 | 19 |
| LITERATURE REVIEW | 19 |
| 2.1 Preliminaries | 19 |
| 2.2 Lean Manufacturing | 20 |
| 2.2.1 FIVE principles of the lean manufacturing | 20 |
| 2.2.2 Eight wastes of lean manufacturing | 22 |
| 2.2.3 Advantages of lean manufacturing | 27 |
| 2.3 Total Productive Maintenance (TPM) | 27 |
| 2.3.1 Objective of Total Productive Maintenance (TPM) | 28 |
| 2.3.2 Principle of TPM\ | 29 |
| 2.3.3 Pillars of Total Productive Maintenance (TPM) | 29 |
| 2.3.4 Eight Pillars of Total Productive Maintenance (TPM) | 30 |
| 2.4 Plan Maintenance | 35 |
| 2.4.1 Benefits of Plan maintenance | 37 |
| 2.5 MTTR & MTBF | 38 |

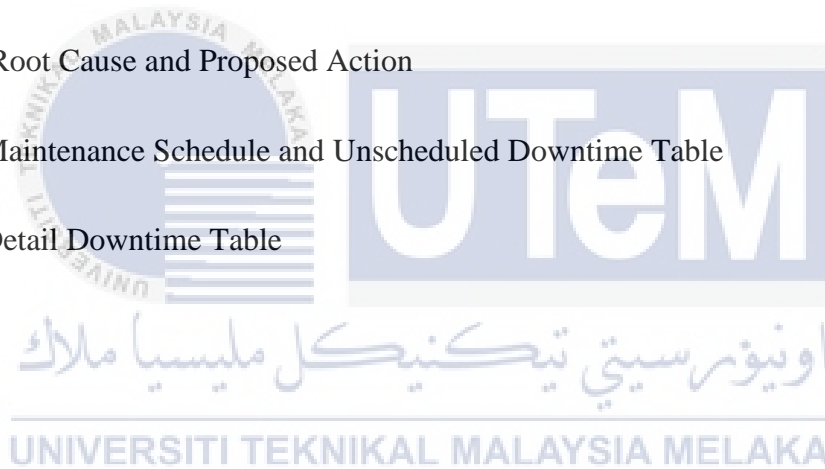
| | | |
|------------------------------|--|-----------|
| 2.5.1 | Mean Time to Repair (MTTR) | 38 |
| 2.5.2 | Mean Time Between Failures (MTBF) | 39 |
| 2.5.3 | The difference of MTBF and MTTR to MTTF | 39 |
| 2.5.4 | MTTR & MTBF formula | 40 |
| 2.5.5 | Benefits in the use of these performance indicators. | 41 |
| 2.6 | Summary | 42 |
| CHAPTER 3 | | 43 |
| METHODOLOGY | | 43 |
| 3.1 | Preliminaries | 43 |
| 3.2 | Design of Studies | 44 |
| 3.2.1 | Research approach | 44 |
| 3.2.2 | Process | 44 |
| 3.2.3 | Method | 44 |
| 3.2.4 | Source | 45 |
| 3.2.5 | Size | 45 |
| 3.2.6 | Research Objective | 45 |
| 3.3 | Flow Chart | 46 |
| 3.3.1 | Identify Research Problems and Questions | 47 |
| 3.3.2 | Establish Research Scope and Objectives | 48 |
| 3.3.3 | Literature Review | 49 |
| 3.4 | Data Collection | 50 |
| 3.4.1 | Spreadsheet (Microsoft Excel) | 51 |
| 3.4.2 | Capture Photo | 52 |
| 3.4.3 | Data Analysis | 53 |
| 3.5 | Propose improvement | 54 |
| 3.5.1 | Why-Why Analysis | 55 |
| 3.6 | Summary | 55 |
| CHAPTER 4 | | 57 |
| RESULT AND DISCUSSION | | 57 |
| 4.1 | Preliminaries | 57 |
| 4.2 | Definition of Machine Maintenance Planning | 58 |
| 4.3 | Data Collection | 59 |
| 4.3.1 | Primary Data | 60 |
| 4.3.2 | Secondary Data | 68 |
| 4.4 | Data Analysis | 75 |
| 4.4.1 | Cause and Effect Diagram (Fishbone) | 75 |
| 4.4.2 | Why-Why Analysis | 77 |
| 4.5 | Propose Improvement | 81 |
| 4.5.1 | Proposal for Machine's Root Cause | 82 |
| 4.5.2 | Proposal for Men's Root Cause | 85 |
| 4.6 | Control and Continues Improvement | 85 |
| 4.6.1 | Maintenance Report Form | 86 |
| 4.6.2 | Hiring a Professional Technician | 89 |
| 4.7 | Summary | 90 |

| | |
|-------------------------------------|-----------|
| CHAPTER 5 | 91 |
| CONCLUSION | 91 |
| 5.1 Conclusion | 91 |
| 5.2 Contribution | 92 |
| 5.3 Improvement for Future Research | 93 |
| REFERENCES | 94 |
| APPENDICES | 97 |



LIST OF TABLES

| TABLE | TITLE | PAGE |
|-----------|---|-------|
| Table 3.1 | Example of Why-Why Analysis Template | 55 |
| Table 4.1 | Tamarind Drinks | 60 |
| Table 4.2 | Explanation of Machine at Tamarind Production | 66-68 |
| Table 4.3 | Identifying the factors effecting production | 69 |
| Table 4.4 | MTTR Calculation Data Table | 72 |
| Table 4.5 | Why-Why Analysis | 79 |
| Table 4.6 | Root Cause and Proposed Action | 81 |
| Table 4.7 | Maintenance Schedule and Unscheduled Downtime Table | 83 |
| Table 4.8 | Detail Downtime Table | 88 |



LIST OF FIGURES

| FIGURE | TITLE | PAGE |
|-------------------|---|------|
| Figure 2.1 | Eight Wastes of Lean Manufacturing Diagram (TechSolve, 2022) | 23 |
| Figure 2.2 | TPM 8 Pillars Diagrams by Lean Production (2021) | 30 |
| Figure 2.3 | Easy Steps For Implement Autonomous Maintenance Pillars of TPM by nikunjboraniya (2020) | 30 |
| Figure 2.4 | 7 Steps of Focus Improvement by nikunjboraniya (2020) | 31 |
| Figure 2.5 | Plan Maintenance Workflow Flowchart by UpKeep (2020) | 36 |
| Figure 2.6 | MTTR Formula by OPServices (2019) | 40 |
| Figure 2.7 | MTBF Formula by OPServices (2019) | 40 |
| Figure 2.8 | Uptime Calculation Formula by OPServices (2019) | 40 |
| Figure 3.1 | Design of Studies | 45 |
| Figure 3.2 | Detailed Process Flow of Research Methodology | 47 |
| Figure 3.3 | Process Flow for Objective 1 | 49 |
| Figure 3.4 | Example of Spreadsheet of MS Excel | 51 |
| Figure 3.5 | Example Photo of Production Stock | 52 |
| Figure 3.6 | Example of Cause-And-Effect Diagram | 54 |
| Figure 4.1 | Process of Tamarind Beverage | 62 |
| Figure 4.2 | Tamarind Production Floor Plan Layout | 63 |
| Figure 4.3 | Each Machine at Tamarind Production | 65 |
| Figure 4.4 | Graph Factors Affect Production Process | 70 |
| Figure 4.5 | MTTR Process Layout | 71 |
| Figure 4.6 | MTBF Process Layout | 73 |
| Figure 4.7 | Cause and Effect Diagram | 76 |
| Figure 4.8 | Current Machine Maintenance Report | 79 |

LIST OF SYMBOLS AND ABBREVIATIONS

| | | |
|----------------|---|---------------------------------|
| TPM | - | Total Productive Maintenance |
| MTTR | - | Mean Time to Repair |
| MTBF | - | Mean Time Before Failure |
| RQ | - | Research Question |
| F&B | - | Food & Beverages |
| MRP | - | Manufacturing Resource Planning |
| OEE | - | Overall Equipment Effectiveness |
| % | - | Percent |
| Min | - | minute |



LIST OF APPENDICES

| APPENDIX | TITLE | PAGE |
|------------|-------------------|------|
| APPENDIX A | Gantt Chart PSM 1 | 97 |
| APPENDIX B | Gantt Chart PSM 2 | 98 |
| APPENDIX C | K-Chart | 99 |
| APPENDIX D | Plagiarism Report | 100 |



CHAPTER 1

INTRODUCTION

1.1 Research Background

Today's markets and trends are making sectors more competitive. Overall productivity within an industry must always be raised to achieve the highest level of competitiveness. In today's competitive manufacturing environment, being on the cutting edge of providing good products at the lowest feasible cost is a problem. Without a comprehensive strategy, as may be found in statistical quality control or Industrial Statistics, this is improbable.

In production quality aspect, there have a way to control the product quality output. By applying the Total Productive Maintenance (TPM). The entire TPM edifice is constructed on eight pillars, which result in a significant boost in labor productivity through managed maintenance, lower maintenance costs, and fewer production stoppages and downtimes. the eight TPM pillars for achieving manufacturing performance improvements by Singh (2018).

In this study, planned maintenance is the way that can be proposed to the industry because planned maintenance is a proactive maintenance method that focuses on reducing downtime and expenses associated with failures. The procedure begins with identifying a maintenance problem to solve, such as reducing downtime or extending the life of your assets and equipment. It may then predict, arrange, and document the many tasks that help the firm achieve its objectives goal by Nathan Jeans (2020). There some advantages of

performing the maintenance that has been planned. Aside from decreasing unforeseen downtime, planned maintenance has a number of advantages for businesses. Planned maintenance is an excellent way to save money on maintenance costs. The life cycle of assets that are serviced often is longer. Equipment that is maintained and kept in good functioning order has a longer operational life and requires less replacement. It is also can increase the safety at the workplace. Not only does planned maintenance cut down on downtime for equipment, but it also cuts down on downtime for employees. If preventative maintenance duties are planned ahead of time and the stress of unplanned equipment breakdowns is reduced, the employees will be more active, collaborate, and be more happy to do their work.

There is also have maintenance calculation technique that provide in this study. Mean Time to Repair (MTTR) and Mean Time Between Failures (MTBF) is the technique that can help in the maintenance to control the product quality. The availability of the controlled environment can be used to calculate the average time between failures and the average time for repair. All outages are reported on the platform, and reports can be generated to track Mean Time to Repair (MTTR) and Mean Time Between Failures (MTBF) by Pedro Caesar (2020).

1.2 Problem Statement

Production quality is too significant and important to the industry nowadays and it must get some improvement. This study is used to determining to prove that planned maintenance can be used in industry to get the best result in production quality. The research examines of performing planned maintenance in the industry. The advantage of performing the planned maintenance can monitor the machine lifetime.

The methodology of Mean Time to Repair (MTTR) and Mean Time Between Failures (MTBF) is the time it takes to conduct a repair after the failure occurs. That is, it is the amount of time spent during each process' intervention. The average time elapsed between a failure and the next time it happens is a metric. As a result of this technology, machine maintenance can be made easier.

From that technique, it also applies the planned maintenance in manufacturing industry. So, planned maintenance advantages can keep the machine performance in a best condition. It also can add the machine lifetime because it is service the machine before it broke. If the industry machine has some problem, it can affect to the product. The product can be defect cannot be used or had to re-do the process to get the best result. Planned maintenance is the important in term of control the machine performance. If the machine in the good performance, it can produce the good quality product.

The use of planned maintenance indices in production to meet product requirements is a way to increase production quality. A planned maintenance is used to evaluate a method that ability to meet requirements. As a result, this method would aid in maintaining that production quality can be improves in the industries

1.3 Research Question

Regarding to the problem statement, there are research question which are identified.

RQ1: What is the significant factor that can contribute to the planned maintenance?

RQ2: What is the technique that applied to solve the planned maintenance issue?

RQ3: How to improve the production quality in the industry based on planned maintenance?

1.4 Research Objective

The general objective of this study is aimed to improve the effectiveness of production quality by applying planned maintenance in manufacturing industry by using (MTTR&MTBF). Regarding to primary objective there are several specific objectives that need to be accomplished in this study.

- i. To identify the factors of the planned maintenance that can affect the production productivity in manufacturing maintenance industry.
- ii. To conduct and analyze plan maintenance method to improve production quality through study at food and beverages industry.
- iii. To propose the plan maintenance technique in production quality in industry.

1.5 Research Scope

This research will concentrate on production quality improvement, often known as the maintenance schedule in industry, to maintain their machine performance. The major strategy is to enhance the production quality of the industry's process. Planned maintenance has become one of the key goals for ensuring that products' requirements are fulfilled. As a result, utilising planned maintenance through (MTTR and MTBF) makes the study scope quite appropriate, effective, methodical, and dependable. Figure 1.1 show that K- chart flow.



1.6 Expected Result

The study's planned outcome is to evaluate a planned maintenance to meet production quality standards in production by measuring with Mean Time to Repair (MTTR) and Mean Time Between Failures (MTBF). A planned maintenance analysis in the manufacturing business was undertaken based on the findings to improve, develop, and approach production quality. This study aids in the application of knowledge and research in a practical setting. This is a fantastic way to obtain experience outside of the classroom.

This study aids in determining the industry's manufacturing process, diagnosing problems, and implementing adjustments based on the findings. In addition, the study's planned outcome is to measure plan maintenance in order to evaluate production quality in order to achieve product quality standards in production. A plan maintenance research in the manufacturing industry was undertaken based on the findings in order to strengthen and expand the industry. Finally, the expected consequence is to recommend an improvement action.

1.7 Thesis Frame

The introduction to this topic takes up the first chapter. This chapter explains the research process that led to the creation of this report essay. Furthermore, the research of problem statements is explored in this chapter. Following that, the research challenge is described using the problem statement as a guide. Although the research question is clearly stated in this paper, it also includes research objectives and a description of the research scope. The expected

outcome of this study, as well as the thesis frameworks, will be mentioned, and the study's summary will be included.

The second chapter is all about preparing literature review research. All significant information regarding this study, such as dependability, product, production, and process capability study, is located and reviewed in this chapter to prepare for the authoring of this chapter. The method used to write this thesis essay was discovering historical journals and articles, as well as gaining knowledge from these recent journals and articles. Then, for each participant, write down what they learnt in this chapter. As a result, this chapter will be divided into various sub-topics, each of which is relevant to the research.

In the third chapter, the methods given in this analysis is use. This chapter included the research methodologies and tools, as well as the directions for doing the study. The techniques and approaches will be clearly explored in this examination. Individually, learn about significant issue strategies to implement in this chapter. In chapter four, the findings and recommendations of this study will be given.

The methodologies and strategies presented in chapter 3 will be used in this analysis. More information on how to use skills and approaches may be found here. The outcomes of applying these strategies and procedures would be examined in this chapter. The debate will be center on the findings, which will aid in meeting the thesis requirement's research goals.

The report's thesis will eventually be applied in chapter 5. This chapter will summaries the findings of the overall study. The progress of this report will be visible. The future of introducing a modernized F&B industry process and production management system is examined. To reinforce the framework, the proposal's procedure results were shown as supporting documents. In this post, the improvement will be proved, and the precise understanding, as indicated in the thesis, will be given.

1.8 Summary

In a nutshell, manufacturing industry development is accelerating as a result of client needs and rivalry from other industries. Similarly, efforts should be made to increase the manufacturing process' quality and efficiency. Furthermore, to preserve the industry's efficiency and productivity in the processing of a product during the manufacturing stage. The goal of maintenance is to optimise and precisely provide a product that meets the consumer's needs. This strategy is based on quality management, which is particularly useful in manufacturing settings.

