WORK IMPROVEMENT AT AN ENGINE ASSEMBLY LINE AT CAR MANUFACTURING PLANT

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Specially dedicated to my beloved parents, siblings, and friends
who have always been supportive

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ABSTRACT

The project was carried out at ETM engine assembly line at a car assembly plant. The objectives of this project are to reduce cycle time in ETM assembly at EA21 workstation and suggest improvement technique to overcome the problem. The company produces many types of engines and the process of producing one engine has been chosen for this project. The study only focus on the internal part of engine assembly line. By assuming all work is normally distributed, time study is done using continuous stop watch method in order to determine the standard time of all the processes involved. Data collection was done through observations, interviews, and study of company records and discussion with supervisors and engineer. Pareto Chart is constructed to determine problem which lead to the high waste operation time. Poor Line balancing is the main problem with 330 hours or 67.1% time lost. Simulation using WITNESS software and line balancing analysis has been chosen to overcome the problem. Through these techniques, 4 alternative models have been developed. Alternative 3 proposed using color coding for parts storage rack has been selected as the best alternative. The scoring was done by taking three performance measurements into account which is cycle time, line balancing loss, and cost.

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ABSTRAK

Projek ini telah dijalankan di pemasangan enjin di kilang pemasangan kereta. Objektif projek ini adalah untuk mengurangkan kitaran masa dan mencadangkan teknik penambahbaikan untuk mengatasi masalah yang terdapat pada pengeluaran kilang ini. Kilang ini mengeluarkan pelbagai jenis enjin dan proses pengeluaran sebuah enjin telah dipilih untuk kajian ini. Kajian juga hanya menumpukan kepada pemasangan bahagian dalaman enjin sahaja. Dengan menganggap bahawa taburan kerja adalah secara normal, pengukuran masa dengan kaedah *stop watch* digunakan dalam menentukan masa piawai bagi semua proses yang terlibat. Pengumpulan data telah dinilai melalui pemerhatian, temuduga, merujuk kepada rekod syarikat, dan juga perbincangan dengan pengendali dan jurutera. Carta Pareto telah dibangunkan bagi mengenalpasti masalah utama yang menyebabkan masa operasi pengeluaran yang tinggi. Masalah pengimbangan lini didapati merupakan masalah utama dengan menyebabkan kehilangan masa operasi sebanyak 330 jam ataupun 67.1%. Bagi menyelesaikan masalah ini, simulasi dengan menggunakan perisian WITNESS dan aturcara pengimbangan lini telah dipilih. Dengan menggunakan teknik ini, sebanyak empat alternatif bagi mengatasi masalah ini telah direkabentuk dah didapati bahawa alternative ke 3 iaitu menggunakan kod warna untuk rak simpanan merupakan alternatif yang terbaik. Pemarkahan bagi menilai setiap alternatif telah dijalankan dengan melihat kepada tiga pengukur prestasi iaitu masa yang digunakan untuk menamatkan keseluruhan operasi, *Line Balancing Loss,* dan kos.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter discusses the background, objective, scope, and methodology of the project and organization of the report.

1.2 Background of the Project

This project seeks to improve productivity of an engine assembly line by applying method study, line balancing and time study. Markets pressure requires every manufacturing company to be able to respond quickly to variations in quantity and mix of produced goods.

Car manufacturing industries are growing rapidly in this country. Automotive manufacturers need to improve as well as quality, cost and delivery. Quality directly affects warranty costs and customer satisfaction. Productivity improvement requires knowledge of manufacturing processes.

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1.3 Objectives of Project

This project is about work improvement in an automotive engine assembly line. The objectives of project are to:

a) Identify problems of ETM assembly at EA21 workstation
b) Suggest improvement to overcome the problem

1.4 Scope of Project

The scopes of the project are:

a) Only focused at EA21 engine assembly line
b) Cover work improvement only
c) All suggestion are not necessarily implemented

1.5 Methodology

This project is carried out using methodology. An engine assembly line at a car manufacturing plant is selected as case study. Observation of the manufacturing process is done to identify the main problem. Relevant data were collected through interviews with engineer and supervisor as well as using time study to determine cycle time for each operation.

Once the problems are determined, further data collections are carried out. A simulation model of the operation under study is then developed using gathered data.

By comparing the time from simulation process and actual process time, any variation can be observed. Alternative solutions can be generated followed by evaluation of each proposed solution. The alternative which provide the lowest throughput time will be chosen.

Conclusion and suggestion of future work will be included at the end of the project report. Gantt chart for this project is shown in Appendix A.

1.6 Summary

This chapter explains the background of the project, objectives and scope. The methodology to be applied in the project and problem solving method is also described.

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