UNIVERSITI TEKNIKAL MALAYSIA MELAKA

THE IMPLEMENTATION OF RISK MANAGEMENT IN METAL INDUSTRY: CASE STUDY 2 (FMEA)

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Manufacturing Engineering (Manufacturing Management) with Honours.

By

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JUDUL: THE IMPLEMENTATION OF RISK MANAGEMENT IN METAL INDUSTRY: CASE STUDY 2 (FMEA)

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I hereby, declared this Bachelor's Project entitled "The Implementation of Risk Management in Metal industry: Case Study 2 (FMEA)" is the result of my own study except as cited in references.

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APPROVAL

This Bachelor's Project submitted to the senate of UTeM and has been accepted as fulfillment of the requirement for the Degree of Bachelor of Manufacturing Engineering (Manufacturing Management) with Honours. The member of the supervisory committee is as follow:

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ABSTRACT

The final year project (FYP) is one of the criteria in order to be considered as successfully completing the bachelor programmed. The final year project (FYP) also refers to the research orientation project. It practices the student to solve the current problem in industry based on the right research methodology. Basically, this project report divided by two parts which is FYP 1 and FYP 2. For the first semester, the report covered up the abstract, introduction, objective, research scope, literature review and the research methodology. But, for the second semester, the reports continue for the result, discussion and the conclusion. This project was carried out at Jati Beringin Sdn. Bhd, especially at the production area that focusing on the process of Thimble product that facing quality problems. The objectives of this project are to study, implement risk management and measure the effectiveness of the implementation. This study adopting the (AS/NZ 4360,2004): Risk Management Standard as a reference to managing operational risk of the company. Basically, FMEA (Failure Mode and Effect Analysis) is used as a tool to perform the implementation. As a result, an analysis of the risk will identify the failure that affect to the process that influence quality of the product. The effectiveness of the implementation is measured by determining which process is improved and significantly changed due to the implementation.

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ABSTRAK

Projek Sarjana Muda (PSM) adalah salah satu kriteria di mana ia merujuk kepada pencapaian yang cemerlang dalam menyiapkan program sarjana. Projek Sarjana Muda (PSM) juga merujuk kepada projek yang berorientasikan penyelidikan. Projek ini membantu pelajar dalam menyelesaikan isu dan masalah semasa dalam industri berdasarkan kaedah penyelidikan. Secara terperinci, projek ini dibahagikan kepada dua bahagian iaitu PSM 1 dan PSM 2. Semester pertama, laporan mengandungi abstrak, pengenalan, objektif, skop penyelidikan, dan kaedah penyelidikan.Manakala, untuk semester kedua, laporan akan diteruskan dengan hasil kajian dan analisis data, kesimpulan dan cadangan untuk masa hadapan bagi projek tersebut. Projek ini dikendalikan di bahagian pengeluaran Jati Beringin Sdn. Bhd dan fokus kepada proses salah satu dari product mereka yang menghadapi msalah kualiti iaitu Thimble. Objektif projek ini adalah untuk memahami konsep pengurusan risiko, melaksanakan pengurusan risiko dalam menyelesaikan masalah syarikat. Selain itu, keberkesanan perlaksanannya juga diukur. Kajian ini menggunakn AS/NZ 4360,2004): Risk Management Standard sebagai rujukan sepanjang proses perlaksanaan dan FMEA (Failure Mode and Effect Analysis) digunakan sebagai kaedah dalam perlaksanaan. Daripada analisis risiko tersebut, kegagalan dalam proses yang mengakibatkan produk bermasalah dalam kualiti dapat di kesan. Tahap keberkesanan perlaksanan ini dinilai dengan megukur sebanyak mana perubahan memberangsangkan hasil dari perlaksanaan tersebut.

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LIST OF ABBREVIATIONS

PSM	-	Projek Sarjana Muda
FMEA	-	Failure Mode and Effect Analysis
RPN	-	Risk Priority Number
JBSB	-	Jati Beringin Sdn Bhd
FMECA	-	Failure Mode Criticality Analysis
FTA	-	Fault Tree Analysis
HACCP	-	Hazard Analysis and Critical Control Points
PHA	-	Preliminary Hazard Analysis
AS/NZ	-	Australian/New Zealand Standard

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Now days, industries are deals with strong competition among each other. Each industry has to be better in every aspect such as productivity, quality and management compare to its competitor. Many study of risk management are conducted to manage the risk in proper ways. The risk literature tends to have a very piecemeal and myopic approach, looking at each risk one by one in the figure as below, there are several type of risks exist and it related to each other. A strong operational focus on risk management can be an important strategic capability. Before examining specific strategic responses to such risks, the entire spectrum of risks from "inside" risks largely under the control of management to "outside" risks that are out of their control should review and consider potential responses to each.

Figure1.1: Layer of risk (D Lessard and R Lucea, 2009)

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Operational risks have to do with what the company do and how it does it. Competitive risks are linked to the activities of direct competitors and other actors operating in one‟s industry. Institutional risks are unexpected changes to the legal, normative, or social rules of how a firm is allowed to operate. Country risks have to do with more pervasive macroeconomic sources of uncertainty that are at work in a particular country. Global Market risks involve unexpected changes in global prices and worldwide availability of capital and basic commodities.

Practically, risk management is not only about finance. Risk management means shaping the risk profile of the company and not only responding to the different sources of risk. Thus, risk management should take on a wide perspective. Nonetheless, more often than not, in today‟s businesses, there is a stark separation of those in the organization who deal with risk and those who worry about growing the business. Risk management needs to be deeply embedded in the culture of the firm and be reflected in its routines and coordinating processes and in the configuration of its value chain.

1.2 Background of the study

This study is mainly about the implementation of risk management in metal industry, Jati Beringin Sdn Bhd. The aim for this study is to focus on the improvement at production area which has the high risk. Risk management is one approach to manage the risk happens during the process of product. It is used to eliminate the waste in order to improve productivity.

Risk management is a process or approach that seeks to eliminate or at least minimize the level of risk associated with a business operation. In fact, this approach can recognize and manage the internal and external threats that affect the likelihood of project success. Managing risk has become fundamental to successful project management (Carbone and Tippett, 2004).

Risk can be expressed in many ways, as long as it combines a hazard with likelihood. The concept of risk exists in finance, product development, safety and many other areas. One can use the methods of science, engineering, and math in order to define

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risks. Once the business model is understood, it is possible to identify specific risks that are present throughout the production process, including the delivery of goods and services to buyers.

On other hand, risk management as it relates to the production process may include action items such as reworking the maintenance schedule for machinery to ensure there is less opportunity for a breakdown or malfunction. Employees may be required to wear safety goggles, gloves, or earplugs in order to ensure safety and thus minimize the chances of injury through company negligence.

Risk management not only seeks to minimize the potential for injury to employees, but also reduce the opportunity for money and other forms of finance to be abused or utilized ineffectively. By making sure that all resources are utilized in a manner that is safe, logical, and efficient, the profit margin for the company will increase and everyone associated with the company is motivated to continue production.

Some of the primary tools and techniques that commonly used in quality risk management by industry are Failure Mode Effects Analysis (FMEA), Failure Mode, Effects, and Criticality Analysis (FMECA), Fault Tree Analysis (FTA), Hazard Analysis and Critical Control Points (HACCP) and Risk Ranking and Filtering. But, for this project, FMEA is selected as assessment of risk management. The FMEA conducted is relies on the process only, not design of product. Finance and safety issues are not covered in this study.

1.3 Problem Statement

Thimble is one of the products that produced by Jati Beringin with high demand. The product must to pursue the specifications which mean can be functionally in order to meet customer satisfactions. However, that product always faced quality problems because of failure during the process. They want to improve quality of the process in order to reduce scraps of finish product and reduce non value added activities. Therefore, risk management is implemented to manage the risk occur during the process. The purpose is to ensure that all the risk present is managed effectively. A

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Lean tools and techniques that related is use to identify the problems of defection for make a productivity improvement and profit probably.

1.4 Objective of the Study

The purposes of this study are:

I. To study about risk management
II. To implement risk management at selected company.
III. To measure the effectiveness of implementation of risk management at selected company.

1.5 Scope of the Study

This study is focusing on how risk management is related to the productivity improvement in term of quality and process of product. This study is conducted at Jati Beringin Sdn Bhd production area. This study will use Failure Mode and Effect Analysis (FMEA) as a main technique to identify, analyze and prioritize that risks present during the process. From that, the risk will be found out and action for improvement can be taking. The effectiveness of this study will be measured. Other field of risk management like business, financial and safety are not covered in this study.

1.6 Importance of the Study

The benefits of this study are:

1. Identify the related issue that resulting the implementation of risk management.
2. Identify the effectiveness of risk management and FMEA tool for manufacturing industry.
3. Give guidelines in implementing risk management.
4. Help industry improve their productivity in production by reduce failure of process.

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1.7 Research Methodology

This study requires several methods to complete the each process of risk management in proper way. The methods used are brainstorming, informal interview, FMEA and Pareto Diagram. Further explanation of methodology can be referred in Chapter 3.

1.8 Organization of the Report

This report is divided into two phases which is Projek Sarjana Muda (PSM) 1 and 2. Overall, this report contains 6 chapters. There are introduction, literature review, methodology, result and discussion, and conclusion and recommendation.

Chapter 1 is an introduction of the study. It explains the background of the study, followed with the problem statement, objective, scope, importance of this study and research methodology.

Chapter 2 reviews relevant literature which set the stage for the need of this study. This chapter describes the concept of risk. It also gives an overview of risk management process.

Chapter 3 explains method used to achieve the objectives of the study.

Chapter 4 focuses on the result and data been collected from the study. Discussion from the result obtained is detailed explained in this chapter.

Chapter 5 provides conclusion and future work.

1.9 Gantt Chart

Gantt chart is provided as the standard format for displaying a planning and schedule graphically. It pictured the whole tasks planned in one year duration from start until finish the study. All the activities are listed in Gant Chart. The chart can be reviewed in Appendix A.

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CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

Some researches were made to gain knowledge about risk management in detailed. The researches cover the theory of implementation and some useful information that relates with the study. Generally, risk management is a process that should be required for all projects, no matter how big or how small the project. It is very beneficial approach for those experienced in project management to deal with risk presents. It will make the project more successful due to the effective risk management‟s strategy.

It is commonly understood that risk is defined as the combination of the probability of occurrence of harm and the severity of that harm. The risk to its quality is just one component of the overall risk. It is important to understand that product quality should be maintained throughout the product lifecycle such that the attributes that are important to the quality of the product remain constant. An effective quality risk management approach can further ensure the high quality of the product to the customers.

This study is written for those who want to know about project risk and how to take advantage of the opportunities risk presents or about how to reduce or eliminate the impact it has on project. This study also explores risks and risk management from a practical, and hands on. It specifically provides guidance on the principles and some of the tools of quality risk management that can enable the risk are manageable in effective way.

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2.2 Definition of Risk Management

According to (Emblemsvag and Kjostad , 2002) the word “risk” is derived from the Italian word risicare, which originally meant “to dare”. Risk is an uncertain event or condition that has a positive and negative effect on project objective if it is occurs. A risk has a cause and consequence. It will impact the cost, schedule, and quality of the project. Otherwise, risk can have positive consequences such as unexpected price reduction in materials.

Risk management has many definitions. The Australian/New Zealand Standard on Risk Management (AS/NZ 4360,2004) described risk as the chance of something happening that will have an impact upon objectives. It is measured in terms of likelihood and consequences. In other words, the risk event or incident or accident that might happen will prevent from successfully completing what are setting to do.

Based from (Marquette University , 2000), risk management involves a great perspective of an organization in order to control events and arrange financing to reducing the negative impact. Aims are to achieve the efficiency of corporate goals, such as continuity, stability, market share, dividend return, and growth. All the aims will be achieved from a good management of financing.

Meanwhile, Project Management Institute‟s (2004) claimed that risk management exists in the field of project management that involves identifying future probable events, analyzing the events to determine their probability of occurrence and potential impact on the project, and elaborating strategies for managing the risks. Good management of projects requires an effectiveness of risk management.

There are many techniques for risk management implementation. For (Kaplan et al., 2001; Carbone and Tippett, 2004) FMEA is used in identifying technical risks in the development of new products. These are generally based on concepts of qualitative risks analysis generated by the utilizations of failure mode and effects analysis. Managing risk has become fundamental to successful product development.

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2.3 Factors contribute to risk

(Keil et al, 1998) have noted the most common risk factors are remarkably consistent across projects:

- lack of top management commitment to the project
- failure to gain user commitment
- misunderstanding the requirements
- lack of adequate user involvement
- failure to manage end user expectations

To those risks, Jones (1994) adds that projects involving information technology are also particularly subject to the following additional risk factors:

- creeping user requirements
- excessive schedule pressure; that is doing too much in too little time
- low quality work as a result of undue pressure
- cost overruns
- inadequate configuration control

2.4 People involved in risk management

People who firstly involved in risk management are project manager. Project manager will drives the risk management process at the start of the project. They also responsible in deciding to accept or reject the level of risk happen for the project. Other people who involved directly in risk management are project team.

Project team will perform the risk management process for the project that will be conducted. During the risk process, risk identification team will help to provides input to the process for identifying risks. Then, risks mitigation team will perform the actions to reduce the exposure from this risk, focused on either or both of probability and consequence of the risks.

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That teams may come from the members of the project team, other affected groups, user, customer, management, and others, depending on the risk item. Process improvement team is the last who is responsible to conduct risk management. The team will maintain the organization's risk management process assets and incorporating lessons learned from the project.

2.5 Why operation needs risk management

Risk is broadly defined as any event or condition that can have an impact on the outcome of an activity. Risk is the probability, not the certainty, of suffering a loss and the likelihood that the threat will occur. The loss could be anything from diminished quality of a service to increased cost, missed deadlines, or complete service failure.

Risks arise from uncertainty surrounding operational decisions and outcomes. Most individuals associate the concept of risk with the potential for loss in value, control, functionality, quality, or timeliness of completion of an activity. However, outcomes may also result in failure to maximize gain in an opportunity, the uncertainties in decision making that lead up to this outcome can also be said to involve elements of risk.

2.6 Process of Risk Management

Risk is the chance of something happening that will have an impact on the achievement of organizational objectives. Therefore, risk management is needed to identify those risks for business improvement. Risk management requires several processes to implement. The risk management process is shown as below.

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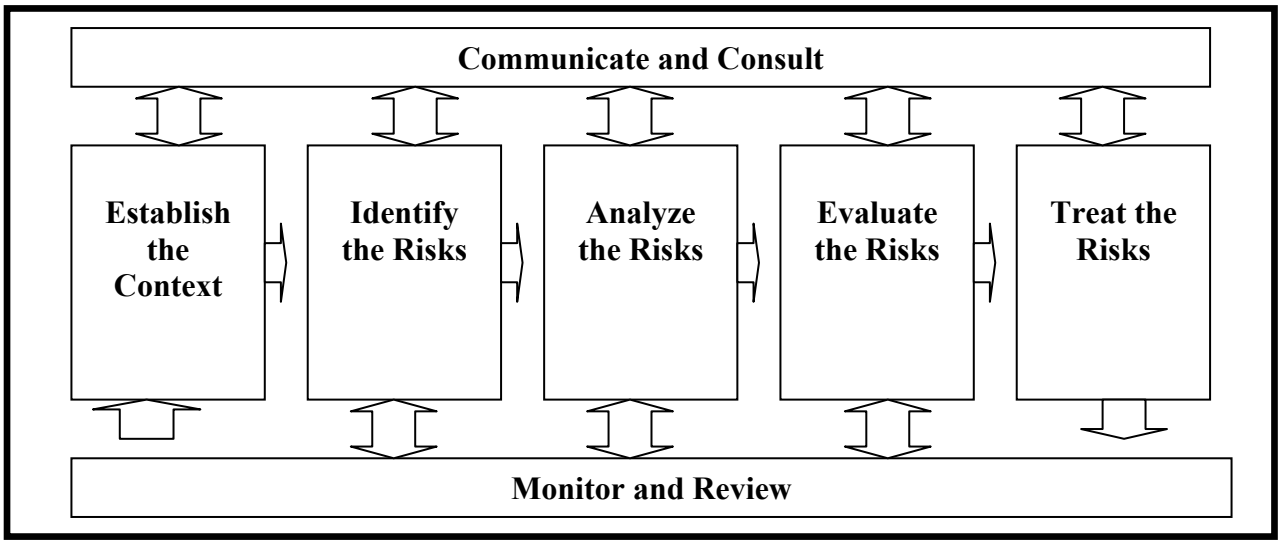

Figure 2. 1: Risk Management Process (AS/NZ 4360,2004)

The diagram above shows the stages in process of risk management. Risk identification is often seen as the heart of risk management. To be able to recognize a risk it is necessary to know what is at risk.

2.6.1 Establish the Context

The first step in the standard process is to define the context of risk assessment, which is falls into two parts, one descriptive and the other creative.

2.6.1.1 Descriptive

To ensure that all significant risks are captured, it is necessary to know the objectives of the management within with risks are to be managed. Objective is a main key in the context definition. They are linked into the risk management process via criteria for measuring success. Success criteria are the basis for measuring the achievement of objectives, and so are used to measure the impact of anything that might be failing those objectives. It generally associated with the clear preference for the direction in which they are to be driven.

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