



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**THE IMPLEMENTATION OF RISK MANAGEMENT AT  
AEROSPACE MANUFACTURING COMPANY: CASE STUDY 1  
(SAFETY)**

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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FACULTY OF MANUFACTURING ENGINEERING

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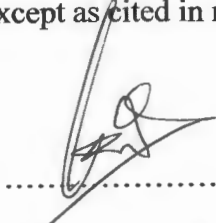
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## DECLARATION

I hereby, declared this report entitled “The Implementation of Risk Management at Aerospace Manufacturing Company (Safety)” is the results of my own research except as cited in references.

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## **ABSTRACT**

This report presents the study of risk management implementation in terms of safety at ABC Sdn Bhd, one of the aerospace manufacturing companies in Malaysia. The company has implemented risk management in order to sustain their mission and vision from affected by any potential risks. Although that, the production areas are exposed with potential hazards in terms of safety that can affect workers, areas and the company itself. The objectives are to study about risk management, to assess risk and to see the effectiveness of risk management implementation in terms of safety at selected company. Methods used in this study which is determined during doing the literature review are training, brainstorming, semi-structured interview, checklist, risk score matrix and ALARP principle. The risk management is learned through the literature review and training. Process of assessing risk in terms of safety is done by adopting the AS/NZS 4360:2004 Risk Management Standards as reference. The safety risk assessment assesses the Autoclave and Cleanroom section and the results are evaluated by using risk score matrix. The effectiveness of risk implementation in terms of safety is seeing from the decreasing of risk level after risk treatment is done and the increasing percentage of awareness on safety at the workplaces.

## **ABSTRAK**

Laporan ini merujuk kepada pelaksanaan pengurusan risiko dalam bidang keselamatan di ABC Sdn Bhd, antara sebuah syarikat pembuatan aeroangkasa di Malaysia. Syarikat ini telah melaksanakan pengurusan risiko bertujuan untuk menjaga visi dan misi syarikat daripada terganggu oleh risiko-risiko yang bakal berlaku dalam pengoperasian. Sungguhpun demikian, kawasan produksi terdedah kepada potensi risiko dalam isu keselamatan yang boleh memberi kesan terhadap pekerja, kawasan dan syarikat itu sendiri. Tujuan kajian adalah untuk memahami pengurusan risiko, mengkaji risiko serta mengukur tahap keberkesanan pelaksanaan pengurusan risiko dalam bidang keselamatan di syarikat terlibat. Kaedah yang digunakan dalam kajian dipilih ketika membuat kajian ilmiah adalah seperti sesi latihan, perbincangan, temubual tidak formal, senarai semakan, matriks skor risiko dan prinsip ALARP. Pengurusan risiko dipelajari melalui kajian ilmiah dan juga sesi latihan. Proses mengkaji risiko dalam bidang keselamatan dijalankan dengan menggunakan AS/NZS 4360-2004 sebagai rujukan. Kajian risiko keselamatan dijalankan di bahagian Autoclave dan Cleanroom dan hasil kajian di analisis menggunakan matriks skor risiko. Tahap keberkesanan pengurusan risiko dalam bidang keselamatan dilihat berdasarkan penurunan tahap risiko selepas rawatan risiko dibuat dan juga kenaikan peratusan keprihatinan terhadap soal keselamatan di tempat kerja.

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## LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

AS/NZS	-	Australian/New Zealand Standards
FTA	-	Fault Tree Analysis
FMEA	-	Failure Mode and Effect Analysis
KPI	-	Key Performance Indicator
ALARP	-	As Low as Reasonably Practicable
SME	-	Small Medium Sized Manufacturing Enterprise
US	-	United States
ISO	-	International Organization for Standardization
IEC	-	International Electrotechnical Commission
ESA	-	European Space Agency
JPL	-	Jet Propulsion Laboratory
MOP	-	Mission Operations Plan
VCL	-	Vegetation Canopy Lidar
AHP	-	Analytical Hierarchy Process
HAZOP	-	Hazard and Operability Study
ATSMS	-	Air Traffic Services Management System
ILO	-	International Labor Organization
DOSH	-	Department of Occupational Safety & Health
NPD	-	Non Permanent Disability
PD	-	Permanent Disability
LPG	-	Liquefied Petroleum Gas
LN2	-	Liquid Nitrogen
T/C	-	Thermocouple
CuFt	-	Cubic Foot
RiMS	-	Risk Management System
FOD	-	Foreign Object Damage
SOP	-	Standard Operating Procedure
MSDs	-	Musculoskeletal disorder

OPL	-	One Point Lesson
dB	-	Decibel
HVAC	-	Heating, Ventilating and Air Conditioning
PPE	-	Personal Protective Equipment
PSM	-	Projek Sarjana Muda



# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Introduction**

In the current business arena, manufacturing industries are under great pressure due to rapid technological development, continuous changes in customer demand, free market economy and safety and health environment issue. With the help of Risk Management, companies are now able to predict and control various risks that may have a critical impact on their business. Thus, a study about risk management is conducted at selected company of industry in order to see how they cope with risks that occur in their daily operation.

### **1.2 Overview of the Study**

Aerospace industry becomes one of the most high-profile industries in the world. This study comprehends the risk management in aerospace industry and concentrates at ABC Sdn. Bhd, one of the aerospace manufacturing companies in Malaysia. As a way of business, ABC Sdn. Bhd implemented Lean Manufacturing for a systematic elimination of waste and to promote a significant impact on the company's performance. In order to sustain the implementation of Lean Management and corporate goals, they take further step by implementing Risk Management so that any business risks and opportunities can be properly managed.

### **1.2.1 Risk Management**

In doing business or any operation, risk become the possibility that a future occurrence may cause harm or losses. It is the responsibility of the company to come out with a proper management to handle the risk in order to protect assets of company and to control events that may negatively impact the achievement of corporate goals. The proper management to handle risk is known as „Risk Management“.

The implementation of risk management process refers to uncovering the weaknesses through a structured approach so that timely mitigation actions are initiated to avoid risk, reduce risk likelihood or reduce risk impact (Risk Management Standard AS/NZS 4360, 1999). According to the standard too, the proposed risk management process is composed to seven sub-processes which are establishing the context of risk, identifying risks, analyzing risks, evaluating risks, treating risks, communicating and consulting, and monitoring and reviewing.

Risk can be categorized into three majors which are risk in business planning, production or product and safety. In business planning, risk is associated with marketing or timing of product releases and management issue while in production or product, risk is associated with quality and process to produce the product. Meanwhile, this study only focuses on safety which is associated more on hazards at workplace area.

Various approaches of tools and techniques can be used during the implementation of risk management. Examples are fault trees analysis (FTA), cause-and-effect diagram, checklist, failure mode and effect analysis (FMEA) and others depending on the suitability and risk management maturity of the company. The success of risk management implementation depends on how much the company can adapt and apply them in their business.

### **1.2.2 Safety Issue**

Safety issue becomes the priority of risk categories that been assessed in this study. Safety plays important roles and should not be neglected in the company especially at workplace in production area. This is because, a hazardous workplace contributes to unsafe environment towards workers and might cause injuries for them. A high control and proper management of safety at workplace is compulsory in order to make sure workers are able to work in safe and healthy condition. When working environment is safe and healthy, the production activities will also give a positive impact towards company.

### **1.3 Problem Statement**

Risk management is still newly implemented at ABC Sdn. Bhd. The company implemented risk management in order to ensure that all risks in their operation are properly managed. Thus, company mission and vision will not be affected and all company KPIs (Quality, Cost, Delivery, Accountability and Continuous Improvement) are achieved.

Nobody knows that workplace area can be the most hazardous place for workers while doing works. In daily operation at ABC Sdn. Bhd, workers at production area handle machines, equipments and tools. During works, some workers engaged with chemicals while others are exposed with physical environment such as extreme heat. Condition of working area that is not ergonomic also becomes a problem in safety issue. Lack of safety awareness and improper safety management will cause these workers to be exposed to injuries either directly or indirectly. Therefore, an assessment of risk is conducted at selected areas in order to treat and control risks in terms of safety.

## **1.4 Objectives of the Study**

The objectives of this study are:

1.4.1 To study about risk management.

1.4.2 To assess risk in terms of safety at selected company.

1.4.3 To see the effectiveness of risk management implementation in terms of safety at selected company.

## **1.5 Scope of the Study**

The study focuses about risk assessment in terms of safety in ABC Sdn Bhd. The assessment is conducted at production areas which are Autoclave and Cleanroom section. Semi structured interview is used to identify risk while risk scoring matrix is used as a technique for the risk assessment. Results obtained from the risk assessment are used to see the effectiveness of risk management implementation. A checklist method also is used to record important data during the risk assessment.

## **1.6 Significance of the Study**

The outcome of the study shows the importance and advantages of risk management in terms of safety issue at the company. It is based on risk assessment by using technique of risk scoring matrix. The study also shows how risk management was implemented in field of aerospace industry. Moreover, the study can be used as a reference for future work of risk management implementation in terms of safety.

## **1.7 Research Methodology**

The risk management process is composed of seven sub-processes; identifying, analyzing, evaluating, treating, monitoring, communicating and reviewing the risks. Each of the sub-processes has its specialized methods to be performed which are training, brainstorming, survey (semi-structured interview and checklist), risk scoring matrix and as low as reasonably practicable (ALARP) principle. Detail explanations of the research methodology can be reviewed in Chapter 3.

## **1.8 Organization of the Report**

This report is organized in six chapters. Chapter 1, the introduction of this report which contains overview of the study, problem statement, objectives of the study, scope of the study, significance of the study as well as the research methodology of the study. Chapter 2 consists of literature review of the study. This chapter contains some facts and information related to the study. Chapter 3 describes the research methodology used to obtain the expected result in the study. Chapter 4 contains a brief overview of assessed areas. Chapter 5 interprets the findings and discussions from the conducted study. Chapter 6, the final chapter of this report concludes the findings of the study. This chapter also presents the suggestions and recommendations for future works.

## **1.9 Gantt Chart**

The Gantt chart depicts the progress of the project planning and scheduling. In Appendix A, the chart presented the plan and actual activities in one year duration of the study.

## **CHAPTER 2**

### **LITERATURE REVIEW**

Risk is present in every aspect of our lives and happens with different degree. From our understanding, risk is defined as negative consequence in any events. In the meantime, not all risks give negative impact to events because some of it also creates opportunities. An appropriate management to manage risk is compulsory in order to make sure that risks are managed in proper way and this is where Risk Management takes place.

#### **2.1 What is Risk Management?**

The Australian/New Zealand Standard on Risk Management (AS/NZ 4360:2004) describes risk management as an iterative process consisting of well-defined steps which taken in sequence, support better decision making by contributing a greater insight into risks and their impacts.

According to the European Foundation for Quality Management (2005), they have defined that risk management as a systematic use of organization-wide processes to identify, assess, manage, and monitor risks. This definition also supported by Liu *et al.* (2003) where managing risk involves creating awareness of uncertainty, qualifying the risks, managing the controllable risks by risk allocation apportionment.

Through project management point of view, risk management attempts to recognize and manage potential and unforeseen trouble spots that may occur when the project is implemented. In law enforcement agencies field, risk management is an ongoing

process for managing the identifiable risks of an organization and determining appropriate managerial strategies in order to preserve and insure the assets of the organization (Ashley and Pearson, 2001).

In Small and Medium-Sized Manufacturing Enterprises (SMEs), risk management is refer to the process of reducing the risks to a level deemed tolerable by society and to assure control, monitoring and public communication. Islam, M. *et al*, (2006) added that risk management is also the process by which management decisions are made about controlling and minimizing hazards and accepting residual risks. It also is a continuous process that depends directly on changes to the internal and external environment of the organization.

Furthermore, risk management also was viewed as a decision making process that entailed considerations of political, social, economic and engineering information with risk-related information in order to develop, analyze, compare and select the appropriate regulatory response where the selection necessarily requires the use of value judgments on such issues as the acceptability of risk and the reasonableness of the costs of control (US National Research Council, 1983).

Put simply, risk management aims to provide decision makers with a systematic approach to coping with risk and uncertainty.

## **2.2 What Benefit of Risk Management?**

Risk covers all aspects of organizational activities and it is included in all management levels. Since then, risk management has become a main part of the organization's activities and its main aim is to help all other management activities to reach the organization's aims directly and efficiently. Risk management is a continuous process that depends directly on the chances of the internal and external environment of the organization (Tchankova, L. *et al*. 2002).

Before we get know more about the benefit of risk management, we must know the purpose of risk management first. Actually, the purpose of risk management is to

identify the possible risks, reduce or allocate risks, provide a rational basis for better decision making in regards to all risks and plan a treatment towards the risk (Stanleigh, 2009). In other words, risk management is to keep the risks at an acceptable level by maintaining the tolerable risks and following a program to move unacceptable risks to an acceptable level (Islam, M. *et al.* 2006). By applying risk management, we can gain as much as benefits depend on type of condition and field of risk.

For example, some benefits that we can expect from risk management are such it able to promote continuous improvement in the organization, quick grasp of new opportunities, enhancing communication, supporting effective use of resources and supporting strategic and business planning.

According to Edmund.H (2000), risk management is very beneficial since it concerned with the outcome of future events and deal with the uncertainties. In project management point of view, risk management becomes an important skill that can be applied to a wide variety of projects. In an era of downsizing, shrinking budgets, increasing technological sophistication, and shorter development times, risk management can provide valuable insight to help key project personnel plan for risks, alert for potential risk issues, analyze the issues, and develop, implement, and monitor plans to address the issues long before the issues surface as problems and adversely affect project cost, performance, and schedule.

In security management system, risk management help the organizations identify potential security incidents. The organizations can then adopt appropriate countermeasures to the incidents based on their expected loss. Moreover, building risk management processes is one of the necessary requirements for an organization that wishes to follow ISO/IEC 27001 to establish its information security management systems (Cha *et al.* 2008).

Meanwhile, risk management still has its limitation. This is because, if risks are improperly assessed and prioritized, time can be wasted in dealing with risk of losses that are not likely to occur. Spending too much time assessing and managing unlikely risks can redirect the resources that could be used more profitably. Besides,