

UNIVERSITI TEKNOLOGI MARA

**EXPOSURE OF HEAT, VIBRATION & NOISE AND
ITS PHYSIOLOGICAL EFFECTS ON STEEL MILL
INDUSTRY WORKERS IN SELANGOR**

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TABLE OF CONTENTS

TITLE PAGE	i
DECLARATION BY STUDENT	ii
INTELLECTUAL PROPERTIES	iii
APPROVAL BY SUPERVISOR	v
ACKNOWLEDGEMENT	vi
TABLE OF CONTENT	vii
LIST OF TABLE	xi
LIST OF FIGURES	xii
LIST OF ABBREVIATION	xiii
ABSTRACT	xiv
ABSTRAK	xv

CHAPTER 1: INTRODUCTION.....	1
1.1 Backgrounds of the study.....	1
Effect of heat stress on human health.....	1
Effect of noise on human health.....	2
Effect of vibration on human health.....	3
1.2 Problem Statement.....	4
1.3 Significance of the study.....	5
1.4 Objectives.....	6
General Objectives.....	6
Specific Objectives.....	6
1.5 Conceptual Framework.....	7

CHAPTER 2: LITERATURE REVIEW.....	8
2.1 Steel mill industry in general.....	8
2.2 Hazard and Accident in Steel Mill Industries.....	8
2.3 Employees in Steel Mill Industries.....	10

ABSTRACT

Heat, vibration and noise are the common physical hazards present in many industrial sectors. Manufacturing of steel is one of the industrial activities that involve in many work activities that exposed to heat, vibration and noise. These hazards will increase health complication risk to the workers in the steel industry. Hence, this study is conducted to assess the heat exposure, vibration and noise exposure level and the physiological changes related to each hazards. To assess heat exposure, the ambient temperature of the workstations were measured by using Wet Globe Bulb Temperature (WBGT). One of the workstations had exceeded the Action Limit (AL) and Threshold Limit Value (TLV) of the ambient temperature set by the American Conference of Governmental Industrial Hygienist (ACGIH) with a slight increase in the body temperature of the participants working in that area before and after 8 hours of work. Meanwhile for noise, the exposure level assessed using the dosimeter for 8 hours recorded several work station in the steel mill with mean noise exposures exceeding the PEL of 85-90 dB(A) from the guidelines provided by ACGIH. Physiological changes data for heat hazard were monitored by measuring blood pressure and body temperature while for noise exposure, only blood pressure of the participants were measured before and after 8 working hours and the data collected were analyzed using Paired sample t-test of the IBM SPSS version 23.0. The findings of the study for noise and heat hazard shows significant difference between the blood pressure level before and after 8 hours of working. However, the correlation between the exposures of noise heat hazards towards the blood pressure level has been considered as no statistically significant correlation and showing weak relationships. For vibration, the exposure were assessed using Nordic questionnaires form to determine the physiological changes experienced by the participants at a few selected body parts which are neck, shoulder, elbows, wrist/hands, upper back, lower back, hips/thigh, knees, and ankle/feet. The problems include ache, pain, discomfort, or numbness experienced by the participants. The relationship between the duration of the participants worked as forklift driver and the body parts experiencing problems (eg: discomfort, pain & numbness) for the past 12 months shows participants that have worked as a forklift driver for the longest time in the steel mill have acquired problems such as stiffness and pain at their lower back, neck and shoulder. Several prevention action should be taken to reduce health and safety risk and ensure the workers are in a safe working condition for effective task performance. Further studies should also be conducted with larger sample size to obtain precise results on the physiological effects due to exposure towards these hazards.

Keywords : *heat, vibration, noise, physiological changes, steel mill*

CHAPTER 1

INTRODUCTION

1.1 Backgrounds of the study

Most of the workers exposed to various types of hazard in their workplaces. There are many types of hazards exist at workplaces such as physical hazards, chemical hazards, biological hazards, ergonomic hazards and psychological hazards based on the activities at the workplaces. Based on the OSHA act 1994, there is employers' responsibilities to provide a safe workplace to employees. This means the employers must make sure that workers and others are safe from anything that can cause harm and must implement the suggestion method to control any risks to injury or health effectively to avoid the accident from occur. Examples of physical hazards is noise, extreme temperature either hot or cold, vibration and radiation. The legislation involved in this study are OSHA act 1994 and Factory and Machinery Act 1967.

Physical hazards are an agent, factor or circumstance that can cause harm with or without contact. Physical hazards are a common source of injuries in many industries and unavoidable in certain industries such as construction and mining, but some people have developed safety guidelines and procedures to manage the risks of physical hazards in the workplaces. Engineering control are often used to mitigate physical hazards besides provides PPE to employees to reduce the severity of accident.

Effect of heat stress on human health

Heat stress is one of the physical hazards that can affect the human health in tropical and subtropical countries. Industrial places such as chemical, mining, ceramics, steel and environments are the place affected by source of heat that produced by industrial process