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CONTRACTORS AWARENESS ON HAZARD OF NOISE TO THE CONTRUCTION SITE WORKERS

MOHD AZWANFADZLI BIN DERIS

A project report submitted in partial fulfilment of the
requirements for the award of the degree of
Master of Science (Construction Management)

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DEDICATION

To my beloved family;

& to my love, Rodziana

ACKNOWLEDGEMENT

In preparing this research, I was in contact with many people, researchers, academicians, and practitioners. They have contributed towards my understanding and thoughts. In particular, I wish to express my sincere appreciation to my supervisor, Dr. Zaiton Haron, for encouragement, guidance, critics, motivation and friendship. Without her continued support and interest, this research would not have been the same as presented here.

My fellow postgraduate students should also be recognised for their support. My sincere appreciation also extends to all my colleagues and others who have provided assistance at various occasions. Their views and tips are useful indeed. Unfortunately, it is not possible to list all of them in this limited space. I am grateful to all my family members.

ABSTRACT

Noise from construction site could effect and hazard human. Noise not only affect physically i.e. human hearing due to exposure in a long period but also on the psychological part, interrupt daily activity such as communication and sleep that will lead to emotion pressure and uncomfortable feelings. However, the public is not the prime noise victim. Instead construction workers are the first individual expose directly with the noise because they work with the noise generators (construction tools and equipments) in construction. The main objective of this study is to identify the awareness of the contractors on the noise hazard to the construction workers. Two methods will be used in order to achieve the objective; first is the questionnaire survey to the contractors as well as their workers and second the noise level (TWA) determination where the workers carry out their task. The sufficient awareness from the contractor can be obtained by their compliance to noise hazard regulations. It is determined that the responsibility of contractors in reducing noise is providing hearing protection, giving training, performing maintenance of the plant, choosing less noise construction technique and enclose the noise sources. The workers are aware on the effect of the noise to their safety but they are not willing to comply with the regulation as they refuse to use hearing protection. The site survey measurement indicated that the TWA is 90.4dBA and this is exceeding 85dBA. This shows that in construction project, at substructure level is not complying with the noise regulation.

ABSTRAK

Kebisingan di tapak pembinaan boleh membahayakan manusia. Kebisingan bukan sahaja memberikan kesan kepada fizikal seperti pendengaran manusia yang boleh terganggu akibat daripada terdedah kepada bunyi dalam jangka masa yang lama, tetapi juga kepada psikologi kesan daripada gangguan terhadap akitiviti harian seperti komunikasi dan masa tidur yang boleh membawa kepada tekanan perasaan dan rasa tidak selesa. Namun begitu, orang awam bukanlah mangsa utama kebisingan. Malah pekerja tapak pembinaan merupakan individu pertama yang terdedah langsung kepada bunyi bising kerana mereka bekerja dengan punca kebisingan (alatan dan pekakasan) dalam pembinaan. Objektif utama kajian ini adalah untuk menentukan kesedaran kontraktor terhadap bahaya kebisingan kepada pekerja pembinaan. Dua kaedah digunakan untuk mencapai objektif iaitu pertama melalui soalan kaji selidik terhadap kontraktor dan juga pekerja pembinaan. Kedua melalui pengukuran atau cerapan tahap kebisingani (TWA) ketika pekerja menjalankan kerja. kesedaran kontraktor akan dicapai dicapai melalui pematuhan terhadap peraturan bunyi bising di tempat kerja. Didapati tanggungjawab kontraktor dalam mengurangkan kebisingan ialah dengan menyediakan alat pelindung pendengaran, memberikan latihan keselamatan, menjalankan selenggaraan mesin, memilih teknik pembinaan yang kurang bising dan menutup sumber kebisingan. Pekerja pembinaan didapati menyedari bahaya kebisingan terhadap kesihatan tetapi mereka tidak bersedia untuk mematuhi peraturan keselamatan kerana enggan menggunakan alat pelindung pendengaran. Pengurkuran kebisingan di mendapati tahap bunyi adalah 90.4dBA dan melebihi 85dBA. Ini menunjukkan projek pembinaan pada peringkat substruktur tidak mematuhi peraturan atau piawai kebisingan.

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LIST OF ABBREVIATIONS

BS	British Standard
CIDB	Construction Industry Development Board
ISO	International Organization for Standardization
GDP	Growth development percent
SOCSO	Social Security Organisation
OSHA	Occupational Safety and Healt Act
TWA	Time weighted average
PEL	Pemissable exposure limit
NIHL	Noise induced hearing loss
NIPTS	Noise induced permanent threshold shift
PPE	Personal protective equipment
HPD	Hearing protection device

LIST OF SYMBOLS

a	Value of scale
C	Total time exposure to a specific noise
D	Noise dose
dB	Decibel
L	Level of noise recorded
log	Logarithm
n	Respondent frequency
T	Duration of exposure

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Introduction

Construction industry plays a significant role in the economics growth. This industry have been consistently contributing between 3% to 5% of the national GDP for the last 20 years. The contributions are more than just economics but the product of the industry whether infrastructure or buildings has contributed extensively towards the creation of wealth and quality of life of the population (CIDB Workshop on Technology Foresight, 2000). Besides, the construction industry also is well known as an important industry to the developing country than the developed country. This is due to the fact that construction establishes the basic infrastructure that urgently requires by the developing country in order to sustain socio-economic growth and development (Khairuddin, 2002).

However, this industry also contributed a negative impact to human life and the surrounding environment (Glass and Simmonds, 2007). Construction industry is well known as a pollution generator to the environment. Moreover, there are many types of

hazard come from this industry such as noise, solid and liquid wastes, dust and harmful gases (Li, Wong and Love, 2002). At the same time, the industry exposing the workers with various hazards and this prove with the increase no of accident reported every year by SOCSO from 1988 to 1993 (Soehod and Laxma, 2002). All this facts is the usual payment to achieve what been called as the development.

The operation in construction involve with heavy machines such as heavy duty bulldozer, tower crane and vibrating road roller that could creating an excessive noise. It is also been identify that construction activity itself is the source of noise. Besides construct the building and other infrastructures, this industry also involve with maintenance and alteration work such as pavement breaking and bridge deck removal that certainly will create noise (Suter, 2002). Therefore, construction industry is inseparable with noise.

Noise is one of the hazards in construction (Li, Wong and Love, 2002). It is well known that noise could affect human hearing whether in short time or a long period (Singal, 2005). Hearing impairment is a common hazard to construction workers in U.S. It is estimated about half a million to 750, 000 construction workers are potentially expose with the hazardous noise level (Suter, 2002). This problem becomes more severe when employers are not taken responsibility to ensure the safety of workplace (Anonymous, 2003).

Therefore, the construction noise needs to control and all parties in construction should have a responsibility on this safety issue. The awareness of noise hazard needs to stress in order to prevent and control the noise problem. There are several regulations that focus on noise such as OSHA that stated the level of acceptable noise and exposures for safe working condition (Cheremisinoff, 1993). However, the regulation

will not help to control the noise problem if there is no awareness from the party in construction.

1.2 Problem statement

The principles of the construction objective do not consider the environment sector. There are only time, cost and quality (Figure 1.1). However, the client and contractor do not fully ignore the environment but they only focus on business benefit point of view such as protection of resources from the effect of environment. The effect of the construction to the overall environment due to construction does not take into accounnt. This practices are keep continue and the pollution are keep arise especially noise pollution due to construction activity (Barnes, 1988).

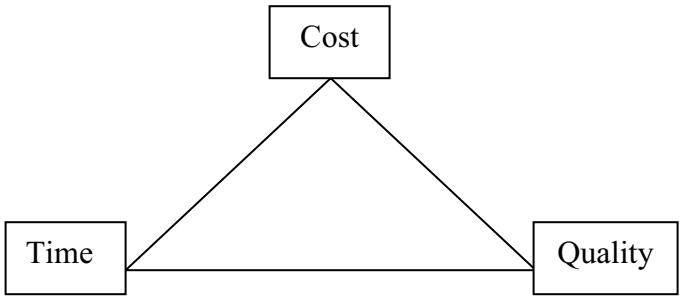

Figure 1.1: Construction management with three dimensions (construction project management (Woodward), 1993)

Construction site generate high noise and the exposure of noise to workers is common. It was reported by the research that have been carried out in America that the range of noise in construction site is from 74 dBA to104 dBA and at the mean TWA of 90.25 dBA. This proves that the noise from construction site had exceeded the OSHA

permissible exposure limit (PEL)-TWA of 90 dBA. Besides, several Canadian studies also concluded that construction workers are regularly overexposed to noise related to tools and heavy equipments (Kerr, Brosseau & Johnson, 2002). From these researches, it can be concluded that there is a lack of awareness on the noise hazard to construction workers.

More than half million construction workers are exposed to potentially hazardous level of noise (Suter, 2002). Noise is known as one of the hazards in workplace (Asfahl, 2004) because it negative affects on human psychical especially the ears (Singal, 2005). A study also proves the construction workers are the greatest amount of hearing loss compared to manufacturing and mining workers. Besides, the white collar construction workers also had more hearing loss than their counterparts in other industries (Suter, 2002). All of those facts showed that noise hazard is a major problem in construction industry. Construction workers, particularly the white collar workers are well known as the group that overexposed this hazard. Therefore, it is important to give awareness to workers and all parties in construction regarding the noise hazard effects.

On the other part, noise also can affect the mind. Noise could stimulate people to a nervous peak. This problem will due the people to making more mistakes in their activity. Moreover, this situation also could lead to workplace accidents (Cheremisinoff, 1993). In the contact of construction workers, this problem could reduce the efficiency and the productivity of work. This show that noise is generally hazards the human health, physically and psychologically.

The builders and contractors are burdening with liability to ensure the safety of their workers. This liability is stated in OSHA 1994, section 15 (1):

It shall be the duty of every employer and every self-employed person to ensure, so far as is practicable, the safety, health and welfare at work of all his employees.

Realizing the hazard of noise faced by construction workers, the contractors should be responsible to protect their workers and not just protecting themselves from legal penalization (Hamson, 1994). Therefore, the awareness of contractor of workers safety is very important and they should understand the negative effects and the benefits that can be a gain by complying with the safety regulation.

The tort law is also considering about noise. Party who has and interest in his or her land and been interfering by noise due to the action of other party can claim the damage or loss arose from that action. This law concept is known as private nuisance (Aminah, 2008). In one case involving construction which is *Andreae v Selfridge & Co. Ltd,* the defendant engage to develop a site that including demolition work, excavation work and the erection of the new building near the plaintiff's hotel. The works that continue until night and the noise had interfere the plaintiff and the customers. The judge, Sir Wilfred Greene had decided that nuisance had arisen from that construction (Kerse, 1975). This showed that contractor need to alert and aware on the noise generated from construction site because this is one of their liability.

Consideration on workers health and safety is very important. Fail to take proper care on this mater will cause a negative effect such as workplace accidents, increase of cost in medical expenses and arrears of work (Goetsch, 2005). Generally, every party in construction project is responsible on the safety and health issue, but the contractor will always be blame (Professional safety, issued November 2003) on this problem because the hazard at workplace, especially noise is arise at the construction stage where the contractors play their role. In that case, the awareness of construction noise is important as a knowledge that can be used to prevent and control the noise hazard in construction site.

1.3 Objective of Study

The objectives of this study are as follow:

1. To determine the responsibility of contractor in order to reduce noise to the construction workers.

2. To obtain the awareness from the construction workers regarding the noise hazard in construction site.

3. To determine the 8 hour time weighted average (TWA) experience by the workers

4. To determine whether TWA comply with the safety regulation on noise hazard.

1.4 Scope of Study

The scopes of the study are:

1. The research will only focus on the building construction project.

2. The construction workers are referring to the workers who work in the construction site. The workers are including the site supervisor, skilled workmen and the general worker.

1.5 Significant of Study

The significant of the study are:

1. This study can be a reference to the contractor about the source of noise at the construction site and the law and regulation towards noise hazard that enforce by the government of Malaysia.

3. This study also can be a reference to the public and private organisation towards the awareness of contractor/builder on the construction noise hazard.

1.6 Limitation of Study

This study has several limitations. The limitations are as stated below:

1. Although this study has stated about the noise pollution due to construction, but the focus only on the hazard of the construction noise to the construction workers.

2. This study is not focus on the public perspective considering the noise problem.

3. This study only focuses on the awareness of the contactor as a builder of the project. The other parties in construction such as owner, design team and consultants will not include.

CHAPTER 2

CONSTRUCTION NOISE AND ITS HAZARD EFFECT ON CONSTRUCTION WORKERS

2.1 Introduction

The development in construction industry had brought some negative impact on society. Noise pollution problem appears together with the development of economic and facilities to public. Normally, the noise problem will occur when the construction work begin. It can arise independently or combination with other hazards of the industrial environment such as dust, chemical fume and heat stress, having combined effects on health and well being (Leong, 2003). Noise is well known as one of the hazards in industry and can influence human hearing and psychology. In order to achieve a development, noise becomes an inevitable problem.

This chapter focuses on the source of noise in construction, its effect on construction workers, noise hazard regulations and methods that can be used to control the workers from excessive noise generated from construction site. In order to give understanding on construction noise and elaboration regarding definition of noise and

the level of sound that can be accepted. But, the construction process and its nature will be the main concentration on this chapter to identify the source of noise in construction site.

2.2 Definition of Noise

Noise is a result from vibration that occurs when there are forces applied onto structure and machines. In simple terms, vibration is an oscillating motion as a result of some forcing (Leong, 2003). Many people consider a loud sound as noise, but defined strictly noise does not just constitute only loud sound. The sound called noise, can be additionally intermittent, multi-frequency and impulsive in nature (Singal, 2005).

In psychological scope, noise is any sound undesired by the recipient and can adversely affect the health and well being of individuals or populations. It is a wrong sound, in the wrong place and at the wrong time. Even the finest music also can be a noise in the middle of the night. So noise is the unwanted sound (McMullan, 1991). This mean, sound is a subjective view depends on the time, place and mood of the listener while considering sound to constitute noise (Waldron, 1989).

Therefore, noise is an unpleasant, unwanted and disturbing sound which generated from the vibration of structure or machine and brings bad effects to physical and psychology especially to construction workers.

2.3 Basic of Sound

2.3.1 Human Hearing Range

Hearing range or range of level is referring to the range of frequency that can be heard by an animal of human. The audio range frequency for human being is between 20Hz to 20, 000 Hz. However, not all human can one hundred percent heard between this level. The sensitivity of human hearing can also be influence by the age factor and this mater still consider as normal. Every species in this world have a different hearing range (www.wikipedia.com, 2008) as shown in Figure 2.1.

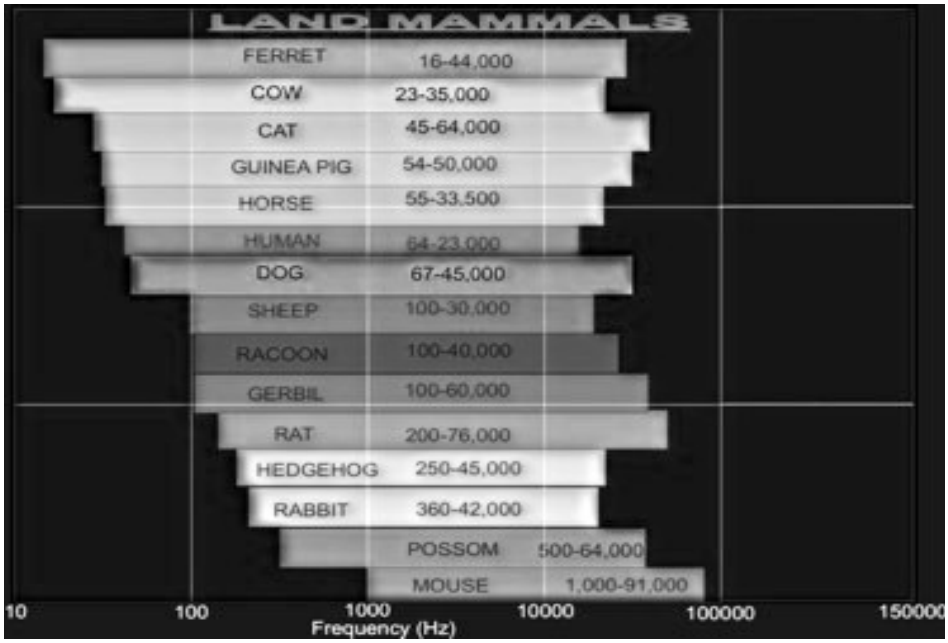

Figure 2.1: Appropriate hearing range in frequency (Hz) in different mammals (www.wikipeida.com, 2008)