CHAPTER I

INTRODUCTION

Generality

Fatigue occurs to everyone in daily life. It is caused by various factors such as duration of work, intensity of task, environment, and diseases. Fatigue can seriously affect not merely the quality of work but also that of life. Recently, advanced technology has been introduced to industry. With its increasing influence upon industry, workers tend to suffer from more fatigue, which can be seen in accidents, absenteeism, illness, and decreases in product output. Consequently, it would be useful to focus on mental fatigue as the topic of studies and researches.

There are several causes of mental fatigue; for instance, mental fatigue:

1. induced by monotonous work
2. caused by vigilance
3. induced by information and decision making overload
4. caused by emotional tensions
5. as a result of intensive stimulation and so on

Monotonous work which is extensively found in many industries is mostly classified as repetitive work; for example, press work and inspection. Such work does not demand a great deal of energy; however, workers perform the same task repeatedly all day long. Thus, the repetitive work may lead to feelings of tiredness and boredom which will reduce the quality of physical and mental activities, resulting

in a decrease in product output. Moreover, workers may be attacked by such illnesses as headaches, dizziness and loss of appetite.

Several studies suggest that exposure to repetitive work can result in a variety of unwanted effects. One example of the case is seen in two comparative groups of sawmill workers engaged in repetitive work. Those who work in very short cycle times (less than one minute) were found to suffer much more from depression, gastrointestinal disorders, and insomnia than those who work in longer cycle times. These relatively long-term effects were also associated with disturbance in mood and in a psychophysiological state. (Mackay et al., 1978)

In Thailand, there has been no previous research on mental fatigue measurement using fuzzy sets. The theory of fuzzy sets when applied to the concepts of thresholds (CFF) can constitute the grade of threshold as an indicator of mental fatigue. Thus, this study presents the measurement of mental fatigue on repetitive work by the fuzzy approach.

Objectives

The objectives of this study were the following to:

1. compare work strain, i.e., mental fatigue accumulated throughout a day shift, of two kinds of repetitive works.
2. study the relationship between fuzzy critical flicker fusion frequency (FCFF) and the assessment using the self-scaling questionnaire.
3. attempt to employ results of the study as an indicator of mental fatigue.

Scope

This study attempts to measure the degree of mental fatigue caused by the continuous undertaking of two selected forms of repetitive work, namely pipe cutting and pipe machining in an industrial setting, as opposed to laboratory settings. Both objective and subjective methods of measurement were used on workers three times a day. For objective methods, they were as follows: 1) critical flicker fusion frequency based on fuzzy set theory (FCFF), 2) reaction time, and 3) hand grip strength. A self-scaling questionnaire, as a subjective method, was employed to assess feeling. The values obtained from the use of the above-mentioned methods were analyzed by statistical inference.

Methods and Procedures

Eight male workers participated in this study. The following methods were used to assess mental fatigue during the day shift:

1. Measuring subjective frequency of flicker fusion of eyes
2. Psychomotor test
3. Strength testing
4. Recording subjective impressions of fatigue

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Expected Benefits

The benefits expected from the study are as follows:

1. The result on the increase in the degree of mental fatigue will enable us to propose ameliorative working conditions, i.e. to pay appropriate wages for workers.

2. This study will promote the application of fuzzy methodologies in this field of research.

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย