IDENTIFICATION ON SAFETY CLIMATE AND HAZARD FOR IMPROVISE SAFETY PERFORMANCE AT WATER TREATMENT PLANT OPERATION

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DEDICATION

To my beloved wife ; Asmalida Bt. Ahmad @ Wahab,

my children; Muhamad Syabil Akmal, Nur Syafiah Aleeya,

Nur Syafiah Afreena, Nur Syafiah Arressa, Nur Syafiah Az-zahra

& Muhamad Syabil Ar-Rayyan.

Thank you for your patience and endless support.

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ABSTRACT

Water is an important element of life. To ensure the quality and demand of water supply, it is important for water treatment plant (WTP) to fully operate to ensure its sustainability of nation. With this role and through this phase the WTP workers are exposed to certain risks due to the crucial no of supply environment which situation at work 24 hours, daily. The aim of this study is to improvise the safety performance at WTP operation based on existing practice and enhance its safety features to suits the purposed of its needs. With this, three (3) objectives has been discussed which covers: (1) To identify the level of safety climate at WTP operation (2) To determine the critical hazard at the WTP (3) To propose the best strategy to improvise safety performance at the WTP. Quantitative and qualitative analyzes technique were used to collect the data. 100 survey questionnaires have been distributed among the WTP practices, while 72 respondents have been taken into consideration for further analysis. The data was analyzed using the factor analysis approach with SPSS and risk matrix analysis. The results show that management commitment and safety management system with an average mean value of 3.85 and 3.83 respectively is the most importance factor that needs to be improvised. From the analysis of the major hazard factor shows that exposed to various water disinfection chemical and exposed to the sudden release toxic i.e chlorine with a high risk level of 16.67 and 15.23 separately compare to 20 potential hazard. From the expert opinion show that for safety climate factor indicates enhancing a proper platform in discussing safety matter between management and workers, providing safety campaign and providing incentives to workers that comply with safety regulation is the best practices to be improvised. Besides that to improve the hazard control implementing transferring chlorine drum and improvise local exhaust ventilation system and also monitor the workers health surveillance. As conclusion Improvements to safety performance indirectly contribute to improving the health of the global community and contributing to the nation's gross domestic product (GDP).

ABSTRAK

Air adalah elemen penting dalam hidup. Untuk memastikan kualiti dan permintaan bekalan air dipenuhi, penting bagi Loji Rawatan Air (WTP) untuk beroperasi sepenuhnya untuk memastikan kemampanan negara. Bagi memenuhi peranan ini pekerja WTP terdedah kepada risiko kerana permintaan yang tinggi serta persekitaran kerja yang sangat penting dengan keadaan operasi bekerja 24 jam sehari. Kajian ini bertujuan bagi menambahbaik prestasi keselamatan di operasi WTP berasaskan amalan sedia dapat juga mempertingkatkan ciri keselamatan yang bersesuaian dengan keperluan. Oleh ini, tiga (3) objektif telah dibincangkan yang meliputi: (1) Untuk mengenal pasti tahap iklim keselamatan di operasi WTP (2) Untuk menentukan bahaya kritikal di WTP (3) Untuk mencadangkan strategi terbaik untuk penambahbaikkan prestasi keselamatan di WTP. Teknik analisis kuantitatif dan kualitatif digunakan untuk mengumpul data. 100 soal selidik telah diedarkan di kalangan pekerja WTP, manakala 72 responden telah diambil kira untuk analisis lanjut. Data dianalisis menggunakan pendekatan analisis faktor menggunakan SPSS dan analisis matriks risiko. Keputusan menunjukkan bahawa komitmen pengurusan dan sistem pengurusan keselamatan dengan purata nilai purata 3.85 dan 3.83 masing-masing adalah faktor yang paling penting yang perlu ditambahbaikkan. Dari analisis faktor bahaya utama menunjukkan bahawa terdedah kepada pelbagai kimia pembasmian air dan terdedah kepada pelepasan secara tiba-tiba toksik klorin adalah berisiko dengan tahap risiko tinggi 16.67 dan 15.23 secara berasingan berbanding 20 bahaya yang berpotensi. Pendapat pakar menunjukkan bahawa antara amalan yang boleh diperbaiki adalah dengan menyediakan platform yang betul dalam membincangkan perkara keselamatan antara pengurusan dan pekerja, menyediakan kempen keselamatan dan menyediakan insentif kepada pekerja yang mematuhi peraturan keselamatan. Selain itu bagi meningkatkan kawalan bahaya adalah dicadangkan melaksanakan pemindahan drum klorin dan menambah baik sistem pengudaraan ekzos tempatan serta memantau pengawasan kesihatan pekerja. Sebagai kesimpulan peningkatan kepada prestasi keselamatan secara tidak langsung menyumbang kepada peningkatan kesihatan masyarakat global secara menyumbang kepada Keluaran Dalam Negara Kasar (KDNK) negara.

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DOSH		Department Of Occupational Safety And Health
LAP		Lembaga Air Perak
MWA	-	Malaysian Water Associated
MLD	-	Million Liter Per Day
OSHA	-	Occupational Safety And Health Act
WTP	-	Water Treatment Plant

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CHAPTER 1

INTRODUCTION

1.1 Background of study

The Occupational Safety and Health Act OSHA (1994) is the key law for establishing occupational safety and safety regulations in Malaysia. It was adopted in February 1994 and provides a legal framework for increasing safety and health standards at work, raising awareness of safety for employees and creating efficient safety organizations by means of self-regulation, such as safety policy, safety training and documentation.

To have a proper safety in the workplace is a must. It is going to motivate workers to work harder while saving the company million. Unfortunately, because of changes in working patterns and the rapid growth of new technologies, procedures and goods, new risks and dangerous conditions of employment are becoming increasingly prevalent in the workplace. The assessment must be made as a result of this fundamental changes to the working environment. Risk assessment is a legal requirement of health and safety legislation in many countries and it is an important way to identify risks associated with business operations.

Continued monitoring of the workplace can require short-term expenditure on change, but the possibility of fines, or of suing an employee or public official, is greatly reduced. Safety is hard to measure, but not to ignored. Nevertheless, the most recent work in occupational health and safety has shown that high injury rates are largely due to poor or non-existent policies and procedures on occupational health and safety and inadequate hazard identification, risk assessment and risk control. Health and safety can also be defined as a field with high improvising capacity. A health and safety improvement should therefore be done to reduce the risk of

accidents, with an emphasis on change. Maintaining a safe and healthy working environment is rather than just an essential important human resources issue, but it is the law.

1.2 Problem Background

There are more than 500 water treatment plants (WTP) in Malaysia in 2018. The production of water has shown an increase of 100% of demand from 8,000 million liters per day in 1998 to 16,000 million liters per day in 2016 (MWA report 2017). It is also known that workers in WTP were exposed to occupational safety and health hazards from operations processes which is beginning from raw water intake until the distribution of treated water to the consumer.

Most of the water treatment plants frequently reported their plant has positive safety performance. But does it truly indicates that the water treatment plant will not have any accidents at all or all potential hazards are being controlled to acceptable conditions?. Even with positive safety performance as reported, the accident still does occur. For example, in most recent cases on 14th Jun 2019, employees of Syarikat Air Negeri Sembilan (SAINS) (Berita Harian) found dead after fall into a water treatment plant while doing maintenance works. Does this equate the safety performance indicator as reported is not reliable?.

The current performance of safety is only aimed at achieving zero accidents in water treatment plants without further action to maintain performance over time. The safety management systems always emphasized technical aspects of the safety standards and regulations and only measures are taken when accidents happen (Herrero et al. 2002). In addition, the safety management program is always isolated and not integrated into other organizational functions. This strategy focuses only on the implementation of safety management systems, not on the importance of safety within or integrated as a safety culture for the worker.

Safety climate is employees' current perceptions or opinions regarding policies, procedures, activities and general importance and priority of safety at work (Griffin and Neal 2000; Zohar 1980). Safety Climate protection factors can contribute to increased enthusiasm for health, thus increasing workplace safety awareness. Good knowledge about safety among employees will make employees more optimistic about safety and will thus lead to positive safety behavior.

In the meantime, risk detection is undertaken to eliminate a threat. Hazard is a condition that may cause damage or damage to the environment or property or any combination thereof as a result of human injury or ill health (DOSH 2008). The system of Hazard Identification, Risk Assessment, and Risk Control (HIRARC) suggested by the Malaysian Department of Occupational Safety and Health (DOSH) could be used to classify hazard in the process. Once the hazards are identified, prioritization of the threats could be rendered by assessing the risks associated with each hazard. Three methods of evaluation are used to determine risks, such as qualitative, quantitative and semi-quantitative. The risk control approach was chosen for each threat based on the measured of risk level.

Through his study, (Glennon, 1982) compares safety climate score with safety performance. He found that the safety climate to be continues to be connected to conventional measures of safety performance, and therefore the principal challenge today is how to achieve and implement a good safety climate and integrate it into the organization. A Zhou et al study (2011) showed that a supportive safety climate would improve the safety of workers and minimize unsafe employees ' behaviour. In facilitating measurement and comparison of safety climates over time it is important to have consistent key factors in the safety climate, which then help identify effective approaches to improve safety performance. Nevertheless, there have been very limited safety studies in the water industry, especially in the operation of water-treatment plant operation. Therefore, a study on how safety climate with integrated with HIRARC as a method of preventing accident could enhance and improvise safety performance mainly for the long term.

1.3 Aims and Objectives

This research aims to improvise safety performance at water treatment plant. To achieve this, several objectives are summarized as follows:

a) To identify the level of safety climate at water treatment plant operation.
b) To determine the critical hazard at the water treatment plant.
c) To propose the best strategy to improvise safety performance at the water treatment plant.

1.4 Scope of the study

This study was conducted to seek outlined objectives based focus on the respondent who is directly involved in the water treatment plant operation which is located in the state of Perak.

Table 1.1 Selection WTP location and capacity

No	Water Treatment Plant (WTP)	Plant Capacity (MLD)
1	Sungai Kampar	36.37
2	Sungai Palai	18.18
3	Teluk Kepayang	136.00
4	Kampung Senin	34.13
5	Jalan Baru	50.00
6	Air Terjun / Trong	65.38
7	Hilir Perak	109.00
8	Bukit Temoh	136.00
9	Kota Lama Kiri	22.73
10	Sungai Siput	36.37

Table 1.1 show the selected 10 water treatment plant out of 46 that involve in this study. The selected treated water plant are chosen base on a difference location, varies of design capacity and year of operation in excess of 15 years. This is to ensure that the results obtained from the study are comprehensive. The study was conducted to seek outlined objectives based focus on the respondent who is directly involved in the water treatment plant operation.

1.5 Significant of the Study

This study is significant because it is related to the theoretical history and work carried out in the field of safety management and safety climate. Safety climate has been recognized as a critical aspect of safety management that can be adapted and applied to create a positive safety culture that would improve the performance of safety.

However, very few studies have attempted to examine the factors that influence the safety climate and its effect on the operation of the water treatment plant operation. Knowing the factors influencing the safety climate from the Malaysian perspective would aid in the preparation of acceptable and successful safety practices, contributing to improved safety performance.

1.6 Summary

In conclusion to maximise a safety performance it is better to be evaluated and streamlined to ensure a more structured and appropriate method of implementation . Opinion and current knowledge related to workers and identifying safety at workplace is an initial step to implement improvements to the existing safety process.

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