

Determination of Leading Indicator for Proactive Safe Performance in Chemical Process Industries (CPI)

Nur Amira Zulkarnain^{2, a)}, Nur Izzati Pakhor Anuar^{1, b)}, Hanida Abdul Aziz^{1, c)} and Wan Norlinda Roshana Mohd Nawi^{1, d)}

¹ Faculty of Industrial Sciences and Technology, College of Computing and Applied Sciences, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Pahang, Malaysia.

² Tasek Corporation Berhad (4698-W) (A member of Hong Leong Asia Ltd.) Persiaran Tasek, Tasek Industrial Estate, 31400 Ipoh, Perak, Malaysia.

a) amira@tasek.com.my

b) nurizzatipa@gmail.com

c) Corresponding author: hanidaaziz@ump.edu.my

d) roshana@ump.edu.my

Abstract. The rapid growth of Chemical Process Industries (CPI) cause plant operation and process dependent more on technology advanced and innovation. More complex processes and operation condition such as high pressure and temperature may create new hazard that may lead to process safety accident. One of the established regulations that address process safety accidents is Process Safety Management (PSM) by Occupational Safety & Health Administration (OSHA), United State. Most elements in PSM can be thought of as leading indicators in PSM since the item in PSM somehow helps organizations to proactively evaluate the performance of the safety program by providing early warning signals to any process defects. However, PSM performance based on leading indicator conducted in Malaysia process industries are still lacking. Therefore, this research highlights the leading indicators that evaluate the effectiveness of the PSM programs. The current study used an exploratory research design. The literature review on journal and article with keywords “process safety management” and “major accident,” was conducted and a questionnaire was developed by adapting Institute for Work & Health Organizational Performance Metric (IWH-OPM) questionnaire. The effectiveness and validity of the generated statements regarding the identified leading indicator in the CPI was confirmed through a sharing session with a safety expert.

INTRODUCTION

Major Accident in Process Industries

The revolution of industry 4.0 caused the process industries to be dependent on technology advanced and innovation. Nevertheless, because of these advancements, more complex processes, and comparatively tough operating conditions, such as high pressure, temperature, and reactive chemicals with exotic chemistry, are becoming more common. Accidents in process plants are becoming more difficult to control as the scale and complexity of the process grows [1]. More sophisticated machinery and equipment in the developing industrial sector have created a new hazard when dealing with improper safety management. Unexpected releases of toxic, reactive, or flammable