

Process Equipment Information Web-based System for Process Industries

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Abstract. The Process Safety Management (PSM) standard consist of 14 elements to prevent and mitigate major accident including fire, explosion, and toxics release that may endanger a worker and the surrounding environment. The recent review of the PSM program by OSHA, Process Safety Information (PSI), and Mechanical Integrity (MI) elements were the most cited elements in organization audit. Process Equipment Information including material and energy balance, certificate, permits and approval, relief system design basis, ventilation of PSI is related to MI element; hence a complete compilation of process equipment information is vital for a robust PSI program that supports other PSM critical element including MI. However, lacking a systematic system to implement SI has hindered the effort to complete PSI compilation in a timely manner. This paper focuses on the development of a PSI web-based system focusing on process equipment coverage and compliance with PSM standards. The system was developed by an ionic framework for front-end technology and adapting Plan Do Check and Act (PDCA) concept as a backbone. The process equipment module could assist organizations to capture process equipment information including design code, equipment description, materials of construction, design basis, and electrical classification. The system has been tested via a case study using real plant data. From the case study the system can provide real-time process equipment data for employees to refer, review, update, download, and communicate. In addition, the system features able the top management to do a self-check audit of equipment information completeness. A good agreement was also found from the focus group discussion.

INTRODUCTION

Process Safety Information (PSI)

Every element of PSM has an interrelationship with other PSM elements. Aziz and co-worker (2017) found that Process Safety Information (PSI) have interrelationship with other 13 PSM elements. Changing in PSI can affect on other PSM elements because PSI is a core element in the PSM [1]. PSI element has the greatest influence on the development and execution of the other PSM elements [2]. PSI provide the basis information for identifying and understanding the hazards of process for reducing the risk. PSI consist of information on the hazards of highly hazardous chemicals, technology, and equipment of the process. In PSM standard, the organization must complete a compilation of written PSI before developing Process Hazard Analysis (PHA). Complete PSI is necessary for complying with other provisions of PSM such as Management of Change (MOC) and Mechanical Integrity elements [3].