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### International Journal of Research in Commerce and Management Studies



English title: International Journal of Research in Commerce and Management Studies  
 ISSN: 2582-2292 (online)  
 DOI: 10.38193/ijrcms  
 Website: http://ijrcms.com/  
 Publisher: Chronopub Publications  
 Country: IN  
 Language of publication: n/d

Deposited publications: Full text % | Abstract % | Keywords % | References % [Issues and contents](#)

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To cite this article: Makara Ngorsurachet, Narathip Naewkhamdee and Khaunviman Warndee (2023). APPLICATION OF THE ISO 45001 SYSTEM TO REDUCE ACCIDENTS AT A HAZARDOUS WAREHOUSE OF COMPANY IN THE SINSAKHON INDUSTRIAL ESTATE, International Journal of Research in Commerce and Management Studies (IJRCMS) 6 (2): 20-30 Article No. 243 Sub Id 461

## APPLICATION OF THE ISO 45001 SYSTEM TO REDUCE ACCIDENTS AT A HAZARDOUS WAREHOUSE OF COMPANY IN THE SINSAKHON INDUSTRIAL ESTATE

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DOI: <https://doi.org/10.38193/IJRCMS.2024.6201>

### ABSTRACT

This study is a quantitative research project aimed at investigating perspectives on the hazardous warehouse management manual and its impact on accidents in hazardous warehouses. Examine elements involved in establishing a work safety management system. Train operators in safety techniques for handling hazardous warehouses.

Research was conducted in the actual operational environment using a sample group consisting of warehouse safety workers within the Sinsakhon Industrial Estate. The researcher utilized a validated questionnaire and a calculating form to gather data. Analyze the data using quantitative statistics.

The research results indicate that familiarity with the hazardous warehouse management manual contributes to the proficiency of operators in hazardous warehouses, leading to a decrease in accidents at the company's hazardous warehouse in Sinsakhon Industrial Estate. This is achieved through the implementation of a safety management system that focuses on occupational health, working environment, and organizational context requirements. The company's hazardous warehouses at Sinsakhon Industrial Estate have seen a decrease in accidents due to the implementation of measurements, monitoring, and ongoing improvement processes. This is achieved by a cyclical and really continuous approach of measuring, tracking, and correcting.

**KEYWORDS:** ISO 45001 system, hazardous warehouse, tracking, and correcting, implementation of measurements, Industrial Estate.

### 1. INTRODUCTION

An explosion and fire took place at the JWD warehouse in Laem Chabang, Chonburi Province on August 29, 2023 at 11:00 a.m. The setting was a receptacle holding hazardous materials classified as

UN.2014 class 5. 1, which experienced a chemical spill. A strong, pungent odor was detected at the location where the incident occurred. The container involved has the number TLLU2697694 Class 5. 2 UN 3106 and has 378 boxes of chemicals, specifically Organic peroxide type D, solid (organic peroxide), which reacted and led to a fire. A large plume of monochrome smoke and flames ascended into the sky. The explosion and fire were caused by the extremely hot air reacting with things inside the container. The product comprises oxidizing chemicals that are inherently combustible.

Thailand has legislation, laws, and standards for workplace safety that are deemed to be promising. The ISO 45001:2018 system aims to prevent accidents, occupational diseases, and ensure a safe working environment. It is beneficial for enterprises working worldwide since it crosses geographic barriers by providing a single international standard. It is crucial for commerce and society to have a robust occupational health and safety management system that safeguards assets and personnel, allowing an organization to attain business excellence in the future. The ISO 45001:2018 system benefits workers. Enhancing organizational resilience by proactively preventing risks and continuously improving occupational health and safety performance. Strengthening compliance with laws and regulations related to workplace safety. Displaying social responsibility via the dedication of all stakeholders to safe, healthy, and sustainable work. Improving the working conditions for employees and reducing workplace accidents. Corporate image and reputation protection

Many enterprises in Thailand have their own warehouses, some with stringent safety protocols. Some firms are negligent. Occupational safety is a prevalent issue worldwide, not limited to Thailand. Occupational safety issues exist. Annually, there are several fatalities, injuries, and impairments. The operators incurred significant financial losses. The primary objective is to safeguard the health of employees and avoid physical and property damage by implementing systematic methods to prevent or minimize dangers. Preventing occupational accidents and diseases helps the organization avoid potential losses associated with these risks. This circumstance is crucial for minimizing inefficiency and maximizing staff morale. Adhering to the ISO 45001:2018 system's standard standards will boost a business's reputation and help it maintain a competitive edge in its operations.

## **2. RESEARCH OBJECTIVES**

1. To analyze perceptions of the handbook for overseeing hazardous warehouses and its impact on accidents in such facilities.
2. Examine the elements influencing accidents in hazardous warehouses to develop a work safety management system.
3. To provide personnel with training on safety protocols for handling hazardous materials in warehouses.

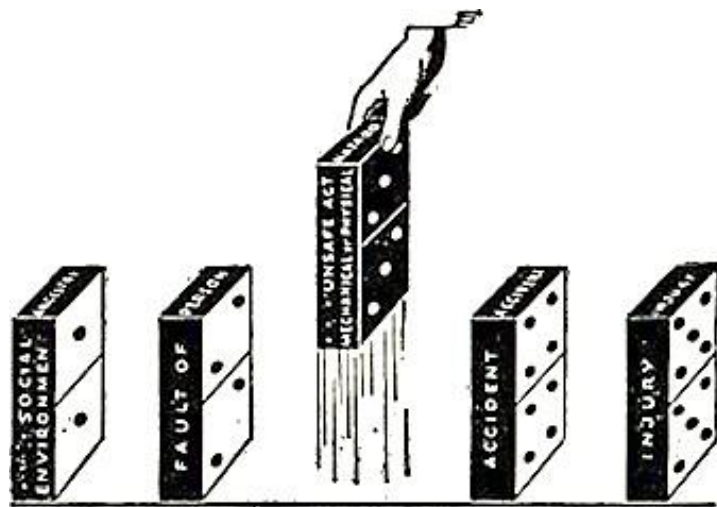
### 3. LITERATURE REVIEW

#### 3.1 Concepts and theories about accidents

Theories or concepts of various accidents It has been written in many forms. Here, I will present only three important theories: the Domino Theory, Bob Firenze's Security Model Theory, and Accident pattern theory (United States Army)

Kaewruethai Kaewchaitiam (2005, 13-14) has compiled theories regarding various accidents as follows:

- 1) The domino theory of accidents (Domino theory) can be linked to the safety philosophy of Heinrich on the causes of accidents: domino theory It states that injuries and damages are the direct result of accidents and accidents, resulting from unsafe actions or unsafe conditions, which is like the dominoes are arranged in a row. 5 animals close together \_ which can show the relationship of the theory as shown in Figure 1.1.

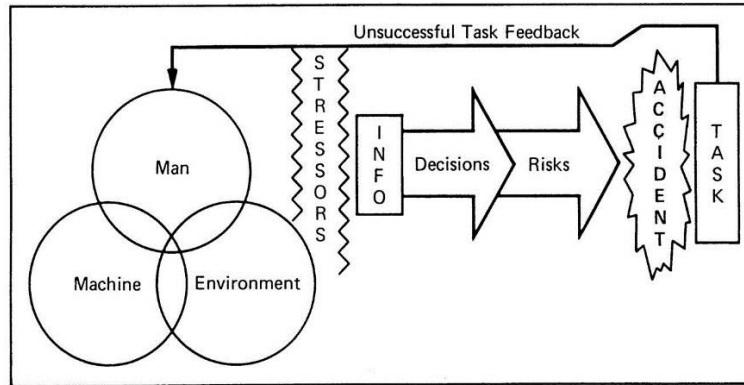


Picture 1.1. Domino theory of accidents.

Source: Retrieved from <https://safetyrisk.net/the-domino-myth-in-safety> on 10 November 2023

- 2) Bob Firenze's security system model theory (Firenze system model). Bob Firenze proposes a security system model that emphasizes the importance of evaluating all components of the system in connection to each other while investigating the causes of accidents. The aspects mentioned are individuals (Man), devices (Machine), and the surroundings (Environment), which can illustrate

the connection between these theories as shown in Figure 1.2.



**Figure 1.2 Bob Firenze's Security Model Theory.**

Source: Retrieved from <https://safetyresults.wordpress.com/2012/10/01/accidentincident-causation-models-pros-cons/Firenze> on 10 November 2023.

3) The security management of the United States Army has evolved as new technologies have been introduced to protect it. The United States Army has therefore studied safety technology along with production and use technology. With the model presented here, it is a model that shows the occurrence of accidents, which can be summarized as the causes of accidents. The causes can be divided into 3 factors:

- 3.1 Human errors occur when workers engage in unsafe behavior and unsafe working conditions.
- 3.2 System errors may result from improper design as a result of improper policies of the agency.
- 3.3 Management error, the main cause may be failure from information management. Improper use of technology and work systems

### **3.2 Dangerous goods warehouse requirements**

A working group established norms for the storage of hazardous substances in 2020. The warehouse contains storage space for hazardous chemicals, equipment for storing them, a hazard prevention system, and operations for managing information and communicating safety measures to workers. Immediate response to hazardous chemical spills and fires. To reduce dangers, impacts, and losses resulting from inappropriate storage of hazardous chemicals in business establishments. Safety practices are outlined in Figure 1.3.

ประเภทการจัดเก็บ	1	2A	2B	3A	3B	4.1A	4.1B	4.2	4.3	5.1A	5.1B	5.1C	5.2	6.1A	6.1B	6.2	7	8A	8B	10	11	12	13
ติดผนัง	1	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ถังเหล็ก ถังอลูมิเนียม หรือถังพลาสติกความดัน	2A	-	17	4	-	-	-	-	-	-	-	-	10	-	-	-	18	5	-	-	5	-	-
ถังพลาสติกความดันในขณะบรรจุขนาดเล็ก (รวมถังเหลว)	2B	-	4	-	1	1	-	-	-	-	-	-	10	-	2	2	-	18	4	4	6	6	6
ของเหลวทั่วไป	3A	-	-	1	17	-	-	-	-	-	-	-	-	-	-	-	18	9	9	-	3	-	-
	3B	-	-	1	-	-	12	4	-	4	-	-	-	7	-	-	18	-	-	-	-	-	-
ของแข็งทั่วไป	4.1A	-	-	-	-	12	17	12	-	-	-	-	-	14	-	-	-	12	12	12	12	12	12
	4.1B	-	-	-	-	4	12	-	4	4	-	-	-	13	8	-	-	18	-	-	-	-	-
สารที่มีความเสี่ยงต่อการถูกไฟไหม้ได้เอง	4.2	-	-	-	-	-	4	-	4	-	-	-	-	-	-	-	18	4	4	4	4	-	-
สารที่ไวไฟเมื่อสัมผัสกับน้ำ	4.3	-	-	-	-	4	-	4	4	-	-	-	-	-	-	-	18	4	4	4	4	4	4
สารออกซิไดซ์	5.1A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5.1B	-	-	-	-	-	-	-	-	-	-	10	10	-	15	15	-	18	11	-	11	11	-
	5.1C	-	10	10	-	-	-	-	-	-	-	10	17	-	-	-	-	18	10	10	10	10	10
สารประกอบไฮโดรเจนเปอร์ออกไซด์	5.2	-	-	-	-	7	14	13	-	-	-	-	-	-	-	17	-	-	-	-	16	16	16
สารติดไฟที่มีคุณสมบัติความเป็นพิษ	6.1A	-	-	2	-	-	8	-	-	-	-	15	-	-	-	-	-	18	-	-	-	3	-
สารไม่ติดไฟที่มีคุณสมบัติความเป็นพิษ	6.1B	-	-	2	-	-	-	-	-	-	-	15	-	-	-	-	-	18	-	-	-	3	-
สารติดเชื้อ	6.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ติดตู้เย็นหรือตู้แช่	7	-	18	18	18	18	-	-	-	-	-	18	18	-	-	-	18	18	-	-	-	-	-
สารติดไฟที่มีคุณสมบัติการกัดกร่อน	8A	-	5	4	9	-	12	-	4	4	-	11	10	-	-	-	-	18	-	-	-	-	-
สารไม่ติดไฟที่มีคุณสมบัติการกัดกร่อน	8B	-	-	4	9	-	12	-	4	4	-	10	-	-	-	-	-	18	-	-	-	-	-
ของแข็งชนิดผงในถังขนาด 3A หรือ 3B	10	-	6	-	-	-	12	-	4	4	-	11	10	16	-	-	-	18	-	-	-	-	-
ของแข็งติดไฟ	11	-	5	6	3	-	12	-	4	4	-	11	10	16	3	3	-	18	-	-	-	-	-
ของเหลวติดไฟ	12	-	-	6	-	-	12	-	4	-	-	-	10	16	-	-	-	18	-	-	-	-	-
ของแข็งไม่ติดไฟ	13	-	-	6	-	-	12	-	-	-	-	-	10	16	-	-	-	18	-	-	-	-	-

Picture 1.3 Table of storage of hazardous chemicals.

Source: Department of Industrial Works, 2012

### 3.3 Concepts about the ISO 45001-2018 system

The requirements of ISO 45001-2018 are important in order to be beneficially applied, which must be understood in the following requirements:

- 1) Scope
- 2) Reference
- 3) Definition
- 4) organizational context
- 5) Leadership and employee participation
- 6) Planning
- 7) Support
- 8) Operation
- 9) Performance evaluation
- 10) Improvements

### 4. RESEARCH METHODS

This study is a quantitative research project that involves gathering data through a survey of authorities working on warehouse safety within the Sinsakhon Industrial Estate. The research intends to investigate the factors that influence the decrease in accidents occurring in the area. Questionnaires were utilized within the warehouse to collect data from 86 samples taken from Crazy and Morgan's sample size table. The data collected will be used for analysis and to derive statistical information.

The research will be segmented based on specific objectives to align with the established research goals.

**5. DATA ANALYSIS**

The data was evaluated by the researcher. The process began with verifying the 86 questionnaires for completeness, followed by coding and scoring the information gathered from them based on specific criteria. The scores were analyzed statistically utilizing data processing methods in a statistical software. The research findings will be presented based on the objectives utilizing tables and basic statistical analysis. Here are the specifics:

1. Analyzed data from respondents using basic statistics such as frequency and percentage.
2. Analyzed elements influencing accident reduction in a hazardous warehouse in the Sinsakhon Industrial Estate of a company. The primary statistical measures utilized are mean and standard deviation.

**6. RESEARCH RESULTS**

The research findings on implementing the ISO 45001 system to reduce accidents in a hazardous warehouse at a company in the Sinsakhon Industrial Estate can be summarized as follows:

- 1) Level of opinion about Hazardous warehouse management manual, ISO 45001 system and reducing accidents in hazardous warehouses It is shown as shown in Table 1.

**Table 1: Level of opinion regarding factors affecting accident reduction.**

Related factors	$\bar{X}$	SD.	Interpretation of results
Hazardous Warehouse Management Manual	3.75	0.32	Strongly Agree
ISO 45001 -2018 system	3.83	0.49	Strongly Agree
Reducing accidents in hazardous warehouses	3.79	0.42	Strongly Agree

Table 1 indicates the presence of a manual for overseeing hazardous warehouses and a corresponding system. ISO 45001-2018 focuses on occupational health and safety management. Ensuring a safe working environment is crucial for preventing hazardous warehouse accidents in the Sinsakhon Industrial Estate.

**Researcher's Comments:** Due to the manual Hazardous warehouse management, it is an important



practice in managing safety in the storage and movement of hazardous materials in warehouses, which plays an important role in reducing accidents. And having the ISO 45001-2018 system guarantees that the company There are safety management standards that make employees confident in reducing accidents in the workplace.

2) Factors in adopting the dangerous warehouse management manual used in operations, resulting in reducing accidents within dangerous warehouses It can be shown as in Table 2.

**Table 2 Analysis of data on the use of warehouse management manuals in operations.**

	Unstandardized		Standardized	t	Sig.
	B	Std. Error	Beta		
Constant	3.11	0.70	0.00	4.48	0.000
knowledge	0.13	0.12	0.12	1.13	<b>0.015</b>
understanding	-0.02	0.14	-0.02	-0.15	0.885
Expertise	0.07	0.12	0.06	0.34	<b>0.049</b>
R = 0.14		R 2 = 0.2		Adj R 2 = -0.2	Std. Error = 0.36

Table 2 shows that the knowledge factors in the Hazardous Warehouse Management Manual and the expertise of hazardous warehouse operators are linked to a decrease in accidents in hazardous warehouses at Sinsakhon Industrial Estate with a significance level of .05

Researcher's Comments: Conducted a trial utilizing a management manual on safety protocols for storing and transporting hazardous materials in a hazardous warehouse. Most personnel at the Sinsakhon Industrial Estate lacked awareness regarding risky commodities. As knowledge in this area grew, staff working in hazardous goods warehouses got more skilled. These two crucial criteria are deemed integral. It will significantly decrease accidents in the warehouse.

3) Considerations for applying the ISO 45001:2018 system in operations to decrease accidents in hazardous warehouses. This can be illustrated in Table 3.

**Table 3 Analysis of information regarding the implementation of the ISO 45001:2018 system in operations.**

	Unstandardized		Standardized	t	Sig.
	B	Std. Error	Beta		
Constant	4.07	0.66	0.00	6.16	0.000
organizational context	-0.02	0.09	-0.03	-0.22	<b>0.028</b>
Leadership planning	0.00	0.08	0.00	-0.03	0.976
Support practice	0.01	0.09	0.02	0.16	0.874
Measurement improvements	-0.14	0.11	-0.16	-1.35	0.182
	0.00	0.08	0.00	0.02	0.985
	0.10	0.10	0.12	1.02	<b>0.09</b>
	-0.03	0.07	-0.04	-0.38	<b>0.05</b>
R = 0.19		R 2 = 0.4		Adj R 2 = -0.5	Std. Error = 0.37

Table 3 shows that implementing the ISO 45001-2018 system has reduced accidents in hazardous warehouses by meeting organizational context requirements related to safety management, occupational health, and working environment through measurement, monitoring, and continuous improvement with a significance level of 0.05 in Sinsakhon Industrial Estate

Researcher's Comments: several enterprises in the Sinsakhon Industrial Estate have not implemented an ISO 45001-2018 system. Most employees identified challenges in comprehending the organizational context related to shortcomings based on the research. Proficiency in occupational safety will enhance the significance of safety policies and practices. Internal audit measurement is a crucial component of the safety management system. Occupational health and the working environment are ongoing. Enhancing safety inside the business establishment will result in the continuity of safety within the same establishment.

## 7. DISCUSS THE RESULTS

Research on Application of the ISO 45001 system to reduce accidents at a hazardous warehouse of a

company in the Sinsakhon Industrial Estate. The researcher has given study findings on fascinating subjects and consistent with the research aims as follows:

Level of opinion about Hazardous warehouse management manual, ISO 45001 system and reducing accidents in hazardous warehouses Most of them agreed to a high level. Part of the reason is confidence in warehouse management standards established by the Institute for the Promotion of Occupational Safety and the application of an international system such as the ISO 45001-2018 system, which results in the continuous implementation of safety activities, which is in line with Nongnuch Aksornpim and Jutharat Chompan. (2022) who researched the factors that Resulting in the success of the operation of the environmental management standard system ( ISO 14001 : 2015) and the occupational health and safety management standard system ( ISO 45001: 2018) of a forklift distribution company in Amata City Industrial Estate Chonburi. The research results found that Factors affecting success Occupational health and safety management standards system (ISO 45001: 2018) using index techniques. There are four balanced indicators of success: effectiveness Stakeholder side Management and learning and development

Knowledge factors in Hazardous Warehouse Management Manual and the expertise of hazardous warehouse operators has an effect on reducing accidents within hazardous warehouses in Sinsakhon Industrial Estate When knowledge is increased in this area, employees who have to work with dangerous warehouses become more proficient. These two important factors are considered to be important parts that will help reduce accidents within the warehouse very well, in line with Kamonthip Sangiam. Chuen (2 0 1 9 ) who studied the awareness of safety and occupational health of company employees. M.S. First Enterprise Co., Ltd., the results of which found that Employee awareness is related to with the behavior of employees, which plays an important role in reducing accidents and safety experience includes Regularly attending safety training will play an important role in reducing accidents. Factors in implementing the ISO 45001 - 2018 system regarding safety management Occupational health and working environment by the organizational context requirements Measurement, monitoring and continuous improvement have resulted in a reduction in accidents within hazardous warehouses. in Sinsakhon Industrial Estate Issues in understanding the organizational context regarding weaknesses Strengths in safety in the workplace will allow setting safety policies and practices that are relevant, which can lead to reducing accidents within hazardous warehouses to zero or Zero Accident, which is consistent with Chaiyakarn Gokaphan (2017) that studies the relationship between occupational health management systems and organizational performance. Case study of industrial factories in Phra Nakhon Si Ayutthaya Province The results of the research found that Compliance with the guidelines of the occupational health and safety management system as required by law has a positive relationship with the organization's performance in terms of business continuity management. Safety human resources and financial economics

## 8. SUGGESTIONS FOR THIS RESEARCH

This research helps manage safety in Managing warehouses, especially dangerous warehouses, to get the most benefit. Promotion of dangerous goods warehouse management manual. The results of this research can be explained as providing knowledge and understanding of correct work practices will play an important role in creating expertise among employees, which has a direct effect on reducing accidents in the business establishment.

## 9. SUGGESTIONS FOR NEXT RESEARCH

It is worth noting that research on dangerous goods warehouses in Thailand has done very little research on this topic, where dangerous goods warehouses have a relatively high value. And often there will be accidents that are quite severe. The researcher hopes that Navigating the manual of Office of Basic Education Commission on Hazardous Warehouse Management and Application of ISO 45001 - 2018 System It will be an extension of knowledge in the future.

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