


**NON CONFORMITY TO THE OCCUPATIONAL HEALTH AND
SAFETY ASSESSMENT SPECIFICATION IN THE
MANAGEMENT OF AN ALUMINIUM MANUFACTURING
PLANT IN PHRA NAKHON SI AYUTTHAYA**

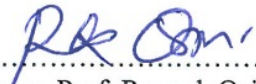
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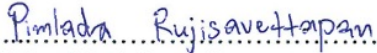

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Pimlada Rujisavettapan

NON CONFORMITY TO THE OCCUPATIONAL HEALTH AND SAFETY ASSESSMENT SPECIFICATION IN THE MANAGEMENT OF AN ALUMINIUM MANUFACTURING PLANT IN PHRA NAKHON SI AYUTTHAYA

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ABSTRACT

This study was a descriptive research that aimed to compare the requirements of OHSAS 18001 to occupational health and safety operation of an aluminum manufacturing plant in Phra Nakhon Si Ayutthaya Province, to identify any inconsistency between the requirements of OHSAS 18001 and the occupational health and safety operation. A checklist was created according to the requirement of OHSAS 18001 as an instrument in evaluating the consistency in the company's occupational health and safety operation.

Findings revealed that 33% of the company's operations according to 40 topics from 122 topics were inconsistent with the requirements. The inconsistency was found in the following regulations. Requirement 4.2 Safety Policy: there was no schedule for policy and regulation revision. Requirement 4.3.1 Hazard Identification, Risk Assessment and Control Measures: there was no action on hazard identification and risk assessment. Requirement 4.3.3 Objective and Project: there was no schedule for objective and purpose revision. Requirement 4.4.1 Resources, Roles, Responsibilities, and Authority: there was no designation of OHSMR roles and responsibilities for all staff. Requirement 4.4.2 Capability, Training, and Awareness: there was no organization training on hazards and risks for each department, as well as the training on the caution for the visitors. Requirement 4.4.4 Documentation: there was no safety manual to identify the scope and document structure. Requirement 4.5.3 Incident, Nonconformity Investigation, Correction and Prevention: there was no procedure for correction in occupational health and safety system and no corrective and preventive measures for complaints or suggestions regarding occupational health and safety. Requirement 4.5.5 Internal Audit: there was no internal audit regarding occupational health and safety. Requirement 4.6 Executive Revision: there was no scheduled topics for revision such as assessment result, participation and consultation results, revision of objectives, purpose, communication, complaints, and accident records.

From the findings, the guidelines, for the improvement of the occupational health and safety operations to be consistent with the OHSAS 18001, were classified into three stages. The first stage was the arrangement step: to arrange the procedure for hazard identification and risk assessment, procedure for correction of occupational health and safety system, procedure for internal audit and Safety manual. Moreover, this stage included the training on OHSAS 18001 regulations, hazard identification and risk assessment, as well as the training on the risk in organization for visitors. The second stage was the revision and proceeding step: to set the revision of policy, objective, purpose, and plan, the revision of executives, the designation of OHSMR, and set the responsibility for occupational health and safety of all staff. Further, risk assessment was included in this stage. The third stage was the improvement step: to develop and revise the occupational health and safety plan to be consistent with the risk assessment result.

KEY WORDS: OHSAS 18001/ ALUMINIUM MANUFACTURING/ NON-CONFORMITY/ OCCUPATIONAL HEALTH AND SAFETY/ CONSISTENT

84 pages

การจัดการความไม่สอดคล้องตามระบบการจัดการด้านอาชีวอนามัยและความปลอดภัยในโรงงานผลิตท่ออลูมิเนียมแห่งหนึ่งในจังหวัด
พระนครศรีอยุธยา (NON CONFORMITY TO THE OCCUPATIONAL HEALTH AND SAFETY ASSESSMENT SPECIFICATION IN
THE MANAGEMENT OF AN ALUMINIUM MANUFACTURING PLANT IN PHRA NAKHON SI AYUTTHAYA)

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บทคัดย่อ

การวิจัยครั้งนี้เป็นการวิจัยเชิงพรรณนามีวัตถุประสงค์เพื่อเปรียบเทียบข้อกำหนดของระบบ OHSAS 18001 กับการ
ดำเนินงานด้านอาชีวอนามัยและความปลอดภัยของบริษัทผลิตท่ออลูมิเนียมแห่งหนึ่งในจังหวัดพระนครศรีอยุธยา เพื่อให้ทราบถึงที่ยังไม่
สอดคล้องตามข้อกำหนดและจัดทำแผนเพื่อปรับปรุงการดำเนินงานด้านอาชีวอนามัยและความปลอดภัยให้มีประสิทธิภาพมากยิ่งขึ้น โดย
การศึกษานี้ได้จัดทำแบบรายการตรวจสอบ (Checklist) ตามข้อกำหนดของระบบ OHSAS 18001เพื่อใช้เป็นเครื่องมือในการประเมิน
ความสอดคล้องของการดำเนินงานด้านอาชีวอนามัยและความปลอดภัยของบริษัท

ผลการศึกษาพบว่า การดำเนินงานของบริษัทมีความไม่สอดคล้องตามข้อกำหนดร้อยละ 33 หรือ 40 หัวข้อ จากทั้งหมด
122 หัวข้อ ได้แก่ ข้อกำหนด 4.2 นโยบายความปลอดภัย คือยังไม่ได้กำหนดให้มีการทบทวนนโยบาย ข้อกำหนด 4.3.1 การชี้บ่งอันตราย
การประเมินความเสี่ยงและการตัดสินใจมาตรการควบคุม คือยังไม่ได้มีการดำเนินการใดๆเกี่ยวกับการชี้บ่งอันตรายและการประเมินความ
เสี่ยง ข้อกำหนด 4.3.3 วัตถุประสงค์และโครงการ คือยังไม่ได้มีการกำหนดให้มีการทบทวนวัตถุประสงค์และเป้าหมาย ข้อกำหนด 4.4.1
ทรัพยากร บทบาทหน้าที่ ความรับผิดชอบและอำนาจคือยังไม่ได้มีการแต่งตั้งตัวแทนฝ่ายบริหารด้านอาชีวอนามัยและความปลอดภัย
(OHSMR) และการกำหนดบทบาทหน้าที่ของบุคลากรทุกระดับข้อกำหนด 4.4.2 ความสามารถ การฝึกอบรมและจิตสำนึก คือยังไม่มีการ
อบรมเรื่องอันตรายและความเสี่ยงในองค์กรให้กับแต่ละแผนกได้ทราบ รวมถึงยังไม่ได้มีการกำหนดให้มีการอบรมผู้เข้ามาเยี่ยมชมเรื่องสิ่ง
ที่ต้องระวังขณะเข้ามาภายในองค์กร ข้อกำหนด 4.4.4 การจัดทำเอกสาร คือยังไม่ได้มีการจัดทำคู่มือด้านอาชีวอนามัยและความปลอดภัย
(Safety manual) ที่กำหนดขอบข่ายและระบบโครงสร้างของเอกสาร ข้อกำหนด 4.5.3 การสอบสวนอุบัติการณ์ สิ่งที่ไม่เป็นไปตาม
ข้อกำหนด การแก้ไข และการป้องกันคือยังไม่ได้มีการจัดทำระเบียบปฏิบัติเรื่องการแก้ไขข้อบกพร่องในระบบอาชีวอนามัยและความ
ปลอดภัย และกำหนดกระบวนการแก้ไขและป้องกันสำหรับข้อร้องเรียนหรือข้อเสนอนี้ต่างๆที่เกี่ยวข้องกับอาชีวอนามัยและความ
ปลอดภัยข้อกำหนด 4.5.5 การตรวจสอบภายใน คือยังไม่ได้มีการตรวจสอบภายในเรื่องอาชีวอนามัยและความปลอดภัย ข้อกำหนด 4.6 การ
ทบทวนโดยผู้บริหาร คือยังไม่ได้มีการกำหนดระยะเวลาในการทบทวนหัวข้อ ต่างๆ เช่น สิ่งที่ตรวจพบจากการประเมิน ผลการมีส่วนร่วม
และการให้คำปรึกษา การทบทวนนโยบาย เป้าหมาย ประสิทธิภาพ วัตถุประสงค์ การสื่อสาร ข้อร้องเรียน สถิติอุบัติเหตุ

จากผลการศึกษาได้จัดทำแนวทางการปรับปรุงการดำเนินงานด้านอาชีวอนามัยและความปลอดภัยให้สอดคล้องกับ
ระบบ OHSAS 18001 โดยแบ่งออกเป็น 3 ระยะคือ ระยะที่ 1การจัดทำสิ่งที่จะต้องดำเนินการคือการจัดทำเอกสารระเบียบปฏิบัติเรื่องการชี้บ่ง
อันตรายและการประเมินความเสี่ยง ระเบียบปฏิบัติเรื่องการแก้ไขข้อบกพร่องในระบบอาชีวอนามัยและความปลอดภัย ระเบียบปฏิบัติเรื่อง
การตรวจติดตามภายในของระบบอาชีวอนามัยและความปลอดภัยคู่มือความปลอดภัย (Safety manual)และการฝึกอบรมเรื่องข้อกำหนดของ
ระบบ OHSAS 18001ฝึกอบรมเรื่องการชี้บ่งอันตรายและการประเมินความเสี่ยง และจัดให้มีการฝึกอบรม Visitor ให้ทราบเกี่ยวกับความ
เสี่ยงในองค์กรระยะที่ 2ระยะการทบทวนและการดำเนินการ สิ่งที่ต้องดำเนินการคือ กำหนดให้มีการทบทวนนโยบาย วัตถุประสงค์
เป้าหมายและแผนงาน กำหนดให้มีการทบทวนของฝ่ายบริหาร กำหนดให้แต่งตั้ง OHSMR กำหนดให้มีการจัดทำหน้าที่ความรับผิดชอบ
ด้านอาชีวอนามัยและความปลอดภัยของทุกคนในองค์กร และให้ดำเนินการประเมินความเสี่ยง ระยะที่ 3. การปรับปรุง สิ่งที่ต้องดำเนินการ
คือ ปรับปรุงแผนงานด้านอาชีวอนามัยและความปลอดภัยให้สอดคล้องกับผลการประเมินความเสี่ยงของบริษัท

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CHAPTER I

INTRODUCTION

1.1 Background and Rationale

Thailand is stepping into free trade that the competition is very intense in terms of quality and price. Moreover, there are trade barriers by firms or businesses in the partner countries. There are conditions that the manufacturers or distributors need to follow standards or apply the acceptable international system. Partial regulation is safety at work management. It is to say that the establishment needs to have the management of health and safety at work and it should be in the standard accepted by the partner countries. Therefore, the executives of establishment must have an explicit policy of safety at work. This would help to make the safety operations of the establishment become clear and accurate. As a result, the establishment will be certified the standard or be awarded for outstanding occupational safety, health and environment workplace. It breaks the wall or trade barrier at some point in order to avoid Non-Tariff Barriers (NTB) and Technical Barrier to Trade (TBT) (1).

Occupational Health and Safety Assessment Series OHSAS 18001 is the management system that the executives often seen as an investment that may not return, only legal compliance is sufficient. Actually, they consider it as a worthless investment and non-profitable. However, the establishments that have already implemented the system, approximately 129 establishments currently, have more reasons to do so. The organization gives importance to human resource, one of production factors, as well as the sustained improvement and development of Occupational Health and Safety (OH&S) system according to the standard's purpose (2).

Occupational Health and Safety management prevents injury and sickness of employee and it complies with relevant laws and standards. Consequently, there are more companies implement the policy and follow the objectives of occupational health and safety. Likewise, there are number of evidence to prove that occupational health

and safety is the efficient tool for the company that is attempting to decrease the number of injury and work accident record while technical improvement and the compliance with law are restricted. OH&S system is similar to other management systems that enhance business profits. There are many benefits of OHSAS 18001 such as less work accident and the decrease of barrier to production, the decrease of occupational disease, better working condition, more motivation for employees, a better image of company, and an upgrade of national competitiveness. Moreover, it can be concurrently implement with ISO 9001 and ISO 1400, and helps decrease the casualty insurance policy since it decreases the risk (3).

The aluminum pipe manufacturing plant has high risk of causing hazard to plant operators. From the statistics on the accident of employee in the aluminum pipe manufacturing plant in Phra Nakhon Si Ayutthaya Province during 2012-2014, the statistics increased. In 2012, there were five accidents: two lost time accidents (more than three days away from work), two lost time accidents (less than three days away from work), and one without lost time accident. There were five injured in total. In 2013, there were five injured: two lost time accidents (more than three days away from work), one lost time accident (less than three days away from work), one without lost time accident, and one accident with no injured. There were four injured in total. In 2014, there were eight accidents: two lost time accidents (less than three days away from work), one without lost time accident, and five accidents with no injured. There were three injured in total. From the statistics, it indicated that OH&S system of the company had insufficient efficiency to prevent accident.

1.2 Objective

1. To compare the requirements of OHSAS system 18001 on the implementation of occupational health and safety in the company.
2. Plans to improve the performance of occupational health and safety of the company.

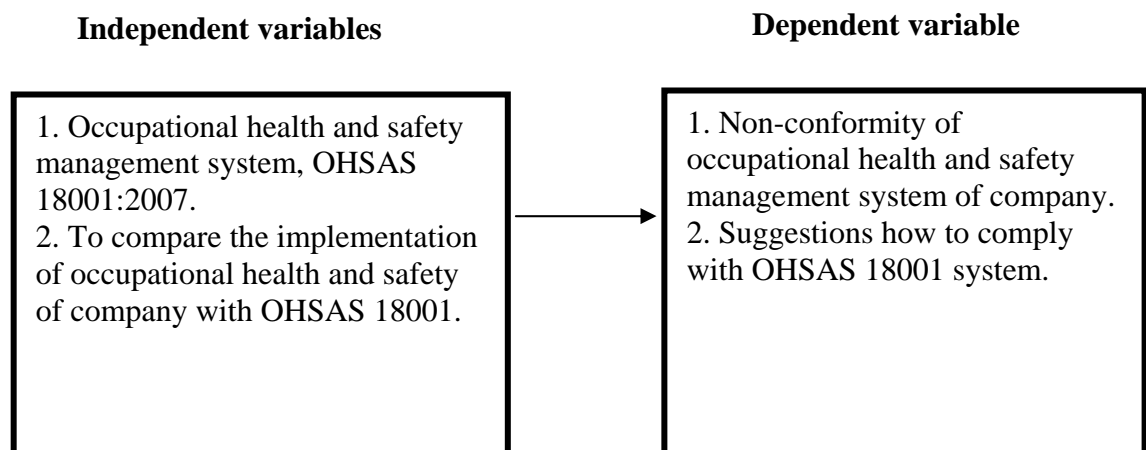
1.3 Scope of the study

To study occupational health and safety management system in an aluminum manufacturing plant in Phra Nakhon Si Ayutthaya to know the non-conformity and to develop the implementation for an effective occupational health and safety management system based on the guidelines of the OHSAS 18001.

1.4 The benefits expected

1. Known the problems of occupational health and safety management system of the company.
2. To develop a system to manage occupational health and safety effectively.
3. To guide other organizations who want to get the certification of OHSAS 18001 can bring the findings to be used to benefit.

1.5 Conceptual Framework



CHAPTER II

LITERATURE REVIEW

2.1 The definition and importance of occupational health and safety

Occupational means career, livelihood, working for living.

Health means without disease, perfection both physical, mental, social and psychological.

Safety means harmless, no danger, no risk.

When these words come together as the occupational health and safety, it means taking care of the health and safety of workers, including prevention and health promotion to maintain the physical and mental integrity, as well as the status of the well-being of all workers (4)

The nature of occupational health and safety by the ILO (International Labor Organization; ILO) and WHO (World Health Organization; WHO) has defined the characteristics of occupational health and safety into five items.

1. Promotion means to maintain all employees have healthy body, perfect mind as well as good being in society.
2. Prevention means jobs about prevention employees not to have deteriorated health or disorders caused due to abnormal operating conditions.
3. Protection means to protect employees from hazards that could be the cause of the accident.
4. Placing means the design of work condition and workers for work in the proper environment with body and mental as much as possible by considering the appropriate fields, taking into account the appropriateness of the investment.
5. Adaptation means the design of work condition and worker for work appropriately taking into account the physiological in the difference between the physical and mental condition, to suit the physical condition of the workers to make the most efficient operation of the most productive.

2.2 Occupational Health and Safety management system

2.2.1 The purpose of occupational health

To prevent accidents and occupational diseases of workers. Thus, the occupational health and safety management system aimed as below.

1) To control the risks to workers and the public.

Because of the operation, whether in industry, agriculture and commerce are always dangerous and is likely to cause injury, such as injury or illness. Control and eliminate hazards that exist, thereby controlling risks more effectively. It prevents the cause of the problems (4)

2) To increase the performance

The loss of the accident be the cause of enormous damage such as the loss present in the form of an iceberg found that indirect loss is approximately 6-53 times that of the direct losses. It also results in lower performance. The occupational health and safety management system can reduce the loss of accident and contribute to the collaboration of each section (4)

3) For the concrescence or visible of the corporate social responsibility

Nowadays, the demands of corporate social responsibility of enterprises are more than ever and is used as a tool to do business instead of barriers in the West. The occupational health and safety management system is concrete to show to the social of the social responsibility of enterprises can be seen from the public about the standards of occupational health and safety in factories (4)

2.2.2 The importance of occupational health and safety management systems

The business must would be the profits and reduce losses as much as possible. A good management of occupational health and safety will make the profits, increase efficiency and reducing the loss, occupational health and safety management system are so important as following.

1) To meet the needs of customers: Due to the Western countries that are requested of the corporate social responsibility in Thai factory to

develop and maintain of occupational health and safety management system, so as not to be accused by the society that its products are derived from the blood and lives of workers. If not, it will change or find another factory to manufacture the products therefore Thai factory must be developed that system (4)

2) The benefits of doing business: Due to the corporate social responsibility, making competition in business is not measured or judged on the quality or value, but the occupational health and safety management system is the basis for consideration commissioning operation also (4)

3) The system is in the works: Conventional Health and Safety Management is the primary responsibility of the safety division. Other departments did not consider themselves to be responsible. As a result, the past will focus on the defense and Safety division will do the same. No involvement of management and employees, resulting in poor performance. But occupational health and safety management system have the requirements for the parties involved have a clear responsibility and participation in the implementation. Makes the work more systematic (4)

4) The good quality of life of workers and reduce the losses that occurred from the work: When accident occurred in each time it's causing more loss. Whether it's a medical fees, revitalize the body and mind, loss of capacity and opportunity to do business and even the reputation of the organization. When implement seriously the occupational health and safety management system in the organization, according to the requirement. Enabling organizations to minimize injury and loss statistics, and some organizations have also profited from the funds to invest in safety at work (4)

5) The image of the organization There are several agencies in foreign country, was highlighted the safety is of value to organization including the value of occupational health and safety, such as the UK - Health and Safety Executive (HSE), an agency under the Ministry of Labour of UK has campaigned this by saying that "Good health and safety is good business"

The organization with occupational health and safety management system to enable an organization with pride and a positive image. Impact on the morale of the workers on the coexistence of communities (4)

2.3 Standards of occupational health and safety management systems.

The importance of occupational health and safety management system, so there are many organizations in both the public and private sectors as well as international organizations have developed and defined the format of such systems as follow;

- 1) BS 8800: 2004 Guide to Occupational health and safety management system
- 2) OSHA, Voluntary Protection Program (VPP)
- 3) Work Safety Western Australia, Work Safe Plan
- 4) Thai Industry Standard 18001-2011 Occupational Health and Safety management system
- 5) Thai Industry Standard 18011-2011 Occupational Health and Safety management system: guidelines for auditing management systems, occupational health and safety
- 6) Thai Industry Standard 18012-2005 Occupational Health and Safety management system: Guidelines for determining the ability of the auditor to management systems, occupational health and safety
- 7) ILO-OSH 2001 Guidelines on Occupational Health and Safety management system
- 8) BS OHSAS 18001: 2007 Occupational Health and Safety management system

2.4 BS OHSAS 18001 Occupational Health and Safety management system

Occupational health and Safety management System: OHSAS 18001 is an international standard that evolved from the British Safety Standards (BS 8800), based on the principles of quality (ISO 9001) and environmental (ISO 14001) management systems guidelines are an extension to the implementation of occupational health and safety.

OHSAS 18001 is an international standard that deals with the safety and health of people in the organization, from the top management to the operational level, a system focused on management to reduce the risk of harm, causing injury, illness and loss of property.

Therefore if there is a management system for occupational health and safety came into operation with the management of the organization will also help organizations to solve problems and the danger that could affect the health and welfare of personnel as well as personnel of organizations to help assure the safety of the operation as well.

2.4.1 OHSAS 18001 Occupational Health and Safety management system requirements

The total requirement of OHSAS 18001 was 6 topics, the summary as following; (6)

1. General Requirements

The organization shall establish, document, implement, maintain and continually improve an OH&S management system in accordance with the requirements of this OHSAS Standard and determine how it will fulfill these requirements.

2. Occupational Health and Safety policy

Top management shall define and authorize the organization's OH&S policy and ensure that within the defined scope of its OH&S management system.

3. Planning

3.1 The organization shall establish, implement and maintain a procedure(s) for the ongoing hazard identification, risk assessment, and determination of necessary controls.

3.2 Legal and other requirements

The organization shall establish, implement and maintain a procedure(s) for identifying and accessing the legal and other OH&S requirements that are applicable to it.

3.3 Objectives and programme(s)

The organization shall establish, implement and maintain documented OH&S objectives, at relevant functions and levels within the organization.

4. Implementation and operation

4.1 Resources, roles, responsibility, accountability and authority

4.2 Competence, training and awareness

4.3 Communication, participation and consultation

4.4 Documentation

4.5 Control of documents

4.6 Operational control

4.7 Emergency preparedness and response

5. Checking

5.1 Performance measurement and monitoring

5.2 Evaluation of compliance

5.3 Incident investigation, nonconformity, corrective action and preventive action

5.4 Control of records

5.5 Internal audit

6. Management review

Top management shall review the organization's OH&S management system, at planned intervals, to ensure its continuing suitability, adequacy and effectiveness. Reviews shall include assessing opportunities for improvement and the need for changes to the OH&S management system, including the OH&S policy and OH&S objectives. Records of the management reviews shall be retained.

2.4.2 The benefits of the Occupational Health and Safety Management System OHSAS 18001

1. Keep and prevent for life and property from the accident.

2. Preparedness for emergency and accident before the event occur that has resulted in damage to both life and property.

3. Make employee morale, confidence in the safety of the working life of the organization, which will have a direct impact on increasing efficiency and productivity.

4. Promote a positive image of the organization to the society, which will enable organizations to be used in advertising to enhance the image of the organization even further and be accepted in society.

5. Prepare to enter to the competition in the global market, lower costs related to compensation fund and to reduce insurance rate due to the accident and emergency in the organization.

2.4.3 The steps of implementing an Occupational Health and Safety Management System OHSAS 18001 in an organization

The application for certification of occupational health and safety management system. Organizations must be made according to the requirements of the standard. The main steps as following;

Step 1 Study for OHSAS 18001 system and related laws.

Step 2 Meeting with management team for request the supporting for making Occupational Health and Safety Management system.

Step 3 Establish a committee to prepare and supervise the system according to the requirements.

Step 4 Prepare occupational health and safety policy, planning and procedure.

Step 5 Follow the Occupational Health and Safety Management System that has defined.

Step 6 Monitoring occupational health and safety management system to verify that the system meets the standards and requirements of the plans and are used constantly.

Step 7 Resolve non-conformity are found from the internal audit and management systems, occupational health and safety to be even more effective.

Step 8 The executive who responsible for the project review and monitoring the performance of management system and evaluation, including consideration of various factors then adjust the policies, plans and goals to assess management systems to ensure that they are ready for certification.

Step 9 Contact the agency to certify and submit the application.

2.5 Related Research

Beatriz Fernandez-Muniz, et al. conducted the study on the safety on the manufacturing plant that had certified of OHSAS 18001 by creating the model to define the background and safety behavior of employee. The researcher selected 131 manufactures that had certified of OHSAS 18001 in Spain. Instrument used was questionnaire and was distributed to safety officer at professional level. Findings showed that the determination of management and the participatory communication affected the safety behavior, safety efficiency, employee's satisfaction, and competitiveness. Research result was very significant, particularly for management since there was the discovery of the factors that should be promoted in order to reduce risk and increase work efficiency in organization (7).

Jesus Abad, et al. examined the relationship between implementing OHSAS 18001 system to safety efficiency and labor efficiency. Firstly, the researcher studied the acceptance of OHSAS 18001 by considering the safety indicator that affecting the work accident. Secondly, they evaluated the impact of OHASA 18001 on safety efficiency and labor efficiency. Data were gathered from 149 manufacturing plants that had certified of OHSAS 18001 in Spain since 2006-2009. The information was gathered from three main resources. There were three independent variables that represented safety efficiency, first, work accident ratio (number of accident divided by number of employees), second, serious accident ratio (serious accident ratio divided by number of accident in the manufacture) and third, the average of loss of working time. Findings revealed that size of manufacture, expense of requesting OHSAS 18001 certify, and the period of the manufacturer's operation were not the factor to

implement OHSAS 18001 system in the manufacture. This exploration implied that the manufacture that had the high accident rate and those that had high serious accident rate were more likely to have investment on OH&S and to implement OHSAS 18001. Besides, findings also indicated that the manufacture that implemented OHSAS 18001 had less accident rate than those applied experience in safety management. Moreover, the manufacture that implemented OHSAS 18001 had higher average circulation than those who did not implement OHSAS 18001. Hence, this research proved that OHSAS 18001 system was worth investment and it was the key tool to improve safety and operations' efficiency (8).

Phaopimol Suksusorn studied on the development of factory to OHSAS 18001: A case study of Canon Hi-Tech (Thailand) Ltd. The direct qualitative benefit from entering OHSAS 18001 was that the company was prepared to protect life and assets of employees and company. Indirect qualitative benefit was that the organization had good image, employees had awareness and confidence in safety and occupational health. In regard to problem and obstacle, the company encountered the problem of system management because of the readiness and the misunderstanding of working process and industrial standard of the executives, as well as the problem of individual understanding of operating, conflicts, attitudes, and self-importance to operate OHSAS 18001 (9).

Pratchaya Phongsai examined the comparison of performance before and after implementing OHSAS 18001 in sugar mill. It was found that after implementing OHSAS 18001, safety system became more systematic and had more standard of operation. Comparing cost of OH&S system and the benefits from preventing lost at the feasibility 0.5, it was found that the benefit rate was 6.18. Furthermore, the accident record decreased after implementing OH&S system and that resulted in the decrease of expenses. Accident record decreased 35% and affected the expenses to decrease to 80.36% (10).

Amornrat Uthaisang studied Occupational Health and Safety Assessment Series OHSAS 18001 in Thailand. It was found that health and safety of the employees was the motivation to set the system. Although most organizations had problems and obstacle with time management to proceed, with the determination and strong intention of the executives, the organization finally succeeded. Consequently,

the record of lost time accident, without lost time accident, and near miss record decreased. Furthermore, there were some factors related to each other and affected OH&S system. For instance, time duration, relationship with current management system such as quality development system or environmental management system, or the duration was related to the technique (11).

CHAPTER III

MATERIALS AND METHODS

The study of OHSAS 18001 non-conformity management of an aluminum manufacturing plant in Phra Nakhon Si Ayutthaya is a descriptive study aimed to study the occupational health and safety management system of the sample company to guide to the system standard, divided the findings into five steps as 3.2.

3.1 Study design

Descriptive research by document study and survey

3.2 Research process

The step of this research is divided into 5 steps as following;

3.2.1 Study of the Occupational Health and Safety Management System OHSAS 18001: 2007 as follows

1. Requirements of the Occupational Health and Safety Management System OHSAS 18001: 2007.
2. Benefits of the Occupational Health and Safety Management System OHSAS 18001: 2007.
3. The steps of implementing an Occupational Health and Safety Management System OHSAS 18001 in an organization.

3.2.2 Review the current situation of occupational health and safety management system in an organization

Collected the data on occupational health and safety of an organization include the policy, plan, procedure, manual, rule, form then separate into categories based on the OHSAS 18001:2007 requirements.

3.2.3 Prepare the checklist

After review the requirements of OHSAS 18001 then apply the knowledge to prepare checklist for use to assess the conformity of OHSAS 18001.

3.2.4 Compare the conformity between OHSAS 18001 requirement and occupational health and safety management system of an organization then prepare the action plan for improve

Compare the conformity between OHSAS 18001 requirements and occupational health and safety management system of an organization from checklist that are prepared then summary the non-conformity results by number and percentage then prepare action plan and identify responsibilities for improvement.

3.2.5 Present the result of the study to oral thematic paper defense committee

Present the results of the non-conformity and action plan for improvement of Aluminum manufacturing plant in Phra Nakhon Si Ayutthaya to thematic paper defense committee.

3.3 Studied instrument validation

A checklist that the researcher developed based on the requirements of the Occupational Health and Safety Management System OHSAS 18001

3.4 Data collection procedure

1. Coordinate with all departments to collect data.
2. Request research ethics from Mahidol University.
3. The researcher collects the data by checklist.

3.5 Data analysis

After evaluated of compliance between the requirements of OHSAS 18001 and occupational health and safety management system of the company. The results will be shown as number and percentage. In order to know the current situation of occupational health and safety management system. Then, plan to improve about occupational health and safety management system for the company.

CHAPTER IV

RESULTS

The study of OHSAS 18001 non-conformity management of an aluminum manufacturing plant in Phra Nakhon Si Ayutthaya was a descriptive study aiming to study the occupational health and safety management system of the sample company to guide to the system standard, divided the findings into three parts below.

4.1 The current situation of occupational health and safety management of the company.

4.1.1 The evaluation form of OHSAS 18001.

4.1.2 The results of the evaluation of compliance based on OHSAS 18001.

4.2 Non-conformity and action plan.

4.3 The process of developing to comply with the Occupational Health and Safety Management System (OHSAS 18001).

4.1 The current situation of occupational health and safety management of the company

4.1.1 The evaluation form of OHSAS 18001

The manufacturing plant of aluminum in Phra Nakhon Si Ayutthaya located in the Rojana Industrial Park is Japanese company. Total employees were 110 persons divided into 70 men, 40 women. It was established on 2555, divided into 4 departments include Production, Quality, Technology and Maintenance, Sales, HR and Accounting. There was one person of Safety officer at professional level that reporting directly to the President. There were 11 persons of Safety Committee. There were 6 persons of Safety officer in management level and 16 persons of Safety officer in supervisor level.

The study of the occupational health and safety situation of the company. The researcher prepared checklist based on requirements of OHSAS 18001. To be used as a tool to assess the status of implementation of occupational health and safety in the current situation of the company.

The total requirements of OHSAS 18001 had 6 topics or subdivided into 18 sub-topics. The researcher concluded and prepared checklist for evaluation according the OHSAS 18001: 2007 self assessment checklist from NSC International (15). There were 122 topics that required. The detail as following;

Table 4.1 The compliance evaluation checklist of OHSAS 18001

No.	Details	Evaluation		Responsibilities
		Yes	No	
4.2 Occupational Health and Safety policy				
1	Has established a written policy?	✓		Top management
2	Has top management defined and authorized your organization's OH&S policy?	✓		Top management
3	How is the policy communicated to all persons working under the control of the organization?	✓		Top management
4	Is the policy appropriate to the nature, scale and OH&S risks in your activities, products or services?	✓		Top management
	Is the OH&S policy including the specifications to:			
5	- Does the OH&S policy include a commitment to comply with applicable OH&S legislation and regulations, and with other requirements to which you subscribe that relate to your OH&S hazards (e.g. Industry sector guidelines)?	✓		Top management
6	- What commitment does your policy make to the prevention of injury and ill health in the workplace?	✓		Top management

Table 4.1 The compliance evaluation checklist of OHSAS 18001 (Cont.)

No.	Details	Evaluation		Responsibilities
		Yes	No	
7	- What commitment does your policy make to continual improvement?	✓		Top management
8	- Does the policy provide the framework for setting and reviewing OH&S objectives?	✓		Top management
9	- Is the OH&S policy documented, implemented and maintained?	✓		Top management
10	Is the policy made available to the interested parties?	✓		Top management
11	Is the policy reviewed at regular intervals and what triggers will result in the review to be undertaken by the organization?		✓	Top management
4.3.1 Hazard Identification, Risk Assessment and Determining Controls				
12	Has the organization established and implemented a procedure for the hazard identification and risk assessment of OH&S?		✓	Safety officer
13	Do the organization's procedures for hazard identification and risk assessment take into account routine and non-routine activities?		✓	All Dept.
14	Does the organization identify, for the management of change, the OH&S hazards and OH&S risks associated with the changes in the organization, the OH&S management system, or its activities, prior to introducing the changes?		✓	All Dept.
15	Is the risk assessment includes the abnormal case and emergency case?		✓	All Dept.

Table 4.1 The compliance evaluation checklist of OHSAS 18001 (Cont.)

No.	Details	Evaluation		Responsibilities
		Yes	No	
16	Does the organization document the results of identification of hazards, risk assessments and determined controls?		✓	All dept.
17	Does the organization ensure that the OH&S risks and determined controls are taken into account when establishing, implementing and maintaining the OH&S management system?		✓	All dept.
4.3.2 Legal and Other Requirements				
18	Has the organization established and implemented a procedure to identify OH&S legal requirements that are applicable to it?	✓		Safety officer
19	Does the organization keep information about its legal and other requirements up-to-date?	✓		Safety officer
20	Does the organization communicate relevant information on legal and other requirements to persons working under the control of the organization?	✓		Safety officer
21	Does the organization ensure that these applicable legal requirements and other requirements to which the organization subscribes are taken into account in establishing and implementing its OH&S management system?	✓		All Dept.
22	Has the monitored for new laws and regulations on occupational health and safety?	✓		All Dept.

Table 4.1 The compliance evaluation checklist of OHSAS 18001 (Cont.)

No.	Details	Evaluation		Responsibilities
		Yes	No	
4.3.3 Objectives and Programme(s)				
23	Are the organization's OH&S objectives consistent with its OH&S policy?	✓		OHSAS committee
24	Is the activity plan includes the people, risks, dangers and people who want to achieve the successful?		✓	OHSAS committee
25	Are the organization's OH&S objectives consistent with its commitment to compliance with applicable legal requirements?	✓		OHSAS committee
26	Has the communication to the related employees aware and implement to meet the purposes?	✓		OHSAS committee
27	Has the organization established procedures to ensure that programme for achieving OH&S objectives is reviewed at regular and planned intervals, and adjusted as necessary, to ensure that the objectives are achieved?		✓	OHSAS committee
4.4.1 Resources, Roles, Responsibility, Accountability and Authority				
28	Has the organization documented roles, responsibilities, accountabilities and authorities for OH&S management?		✓	All Dept.
29	Has the organization communicated roles, responsibilities, accountabilities and authorities for OH&S management?		✓	All Dept.

Table 4.1 The compliance evaluation checklist of OHSAS 18001 (Cont.)

No.	Details	Evaluation		Responsibilities
		Yes	No	
30	Do all persons with management responsibility within the organization demonstrate their commitment to the continual improvement of OH&S performance?		✓	All Dept.
31	Has the organization appointed a member(s) of top management with specific responsibility for OH&S, irrespective of other responsibilities?		✓	Top management
32	Does the member(s) of top management with specific responsibility for OH&S have the defined roles and authority for ensuring that reports on the performance of the OH&S management system are presented to top management for review and used as a basis for improvement of the OH&S management system?		✓	OHSMR
33	The implementation covers the requirements or not, such as compliance with the law, emergency practice and follow-up.		✓	All Dept.
34	Has management reviewed and follow-up the recommendations for improving the occupational health and safety?		✓	Top management
35	Is OHSMR know their duties and ensure that implementation is consistent with the occupational health and safety management system?		✓	OHSMR

Table 4.1 The compliance evaluation checklist of OHSAS 18001 (Cont.)

No.	Details	Evaluation		Responsibilities
		Yes	No	
36	Is OHSMR know and follow on occupational health and safety management system?		✓	OHSMR
4.4.2 Competence, Training and Awareness				
37	Has the organization established and implemented a procedure for the training?	✓		Admin Dept.
38	Has trained all employees to be aware of the dangers and risks in the organization, according to their responsibilities?		✓	Safety officer
39	Has identified specific person who work in occupational health and safety and already trained?	✓		Safety officer
40	Has training program for outsource, sub contractor and supplier?	✓		Safety officer
41	Has training need survey for all departments?	✓		Admin Dept.
42	Has the new employee training program?	✓		Safety officer
43	Has the visitor training program?		✓	Safety officer
44	Has the training record?	✓		Admin Dept.
45	After survey of training need, Has prepared the training plan?	✓		Admin Dept.
46	Has a training schedule and preparing for an emergency situation?	✓		Safety officer
4.4.3 Communication, Participation and Consultation				
47	Has the organization established and implemented a procedure for the communication?	✓		OHSAS committee

Table 4.1 The compliance evaluation checklist of OHSAS 18001 (Cont.)

No.	Details	Evaluation		Responsibilities
		Yes	No	
48	Has the communicated to all employees?	✓		OHSAS committee
49	Has the organization ensured that workers are informed about arrangements for their participation in OH&S management?	✓		OHSAS committee
50	Has the suggestion way?	✓		OHSAS committee
51	Does the organization ensure that, where appropriate, relevant external interested parties are consulted about pertinent OH&S matters?	✓		OHSAS committee
52	Has the record of external complains and feedback?	✓		OHSAS committee
53	Has the organization established and implemented a procedure for communication with contractors and other visitors to the workplace with regard to its OH&S hazards and the OH&S management system?	✓		OHSAS committee
4.4.4 Documentation				
54	Does the organization's OH&S management system documentation include the OH&S policy and objectives?	✓		OHSAS committee
55	Does the organization's OH&S management system documentation include a description of the scope of the OH&S management system?		✓	OHSAS committee
56	Has determined a structure system of the document?		✓	OHSAS committee

Table 4.1 The compliance evaluation checklist of OHSAS 18001 (Cont.)

No.	Details	Evaluation		Responsibilities
		Yes	No	
57	Is the safety manual including the OHSAS18001:2007's requirement?		✓	OHSAS committee
4.4.5 Control of Documents				
58	Has the organization established and implemented a procedure for control of document?	✓		OHSAS committee
59	Has the organization established and implemented a procedure to approve controlled OH&S documents for adequacy prior to issue?	✓		All Dept.
60	Has the organization established and implemented a procedure to review and update as necessary and re-approve controlled OH&S documents?	✓		All Dept.
61	Has the up-date document at workplace?	✓		All Dept.
62	Has the organization established and implemented a procedure to ensure that documents of external origin determined by the organization to be necessary for the planning and operation of the OH&S management system are identified and their distribution controlled?	✓		OHSAS committee
4.4.6 Operational Control				
63	Has the organization established and implemented a procedure for control of waste?	✓		Safety officer

Table 4.1 The compliance evaluation checklist of OHSAS 18001 (Cont.)

No.	Details	Evaluation		Responsibilities
		Yes	No	
64	Has the organization established and implemented a procedure for control of chemical?	✓		Safety officer
65	Has the organization established and implemented a procedure for control of forklift?	✓		Safety officer
66	Has the organization established and implemented a procedure for control of crane?	✓		Safety officer
67	Has the organization established and implemented a procedure for control of elevated work?	✓		Safety officer
68	Has the annual electrical monitoring schedule?	✓		Safety officer
69	Has the organization established and implemented a procedure for control of hot work?	✓		Safety officer
70	Has the organization established and implemented a procedure for control of hot work?	✓		Safety officer
71	Has the organization established and implemented a procedure for control of fire prevention and firefighting?	✓		Safety officer
72	Has a safety committee, which has been meeting and check for safety every month?	✓		Safety officer
73	Has the organization established and implemented a procedure for control of environment?	✓		Safety officer

Table 4.1 The compliance evaluation checklist of OHSAS 18001 (Cont.)

No.	Details	Evaluation		Responsibilities
		Yes	No	
74	Has the organization established and implemented a procedure for control of emergency in case chemical spill?	✓		Safety officer
75	Has a safety manual?	✓		Safety officer
76	Has a safety officer in management, supervisor, professional level and already registered?	✓		Safety officer
77	Has the organization established and implemented a procedure for control of natural gas?	✓		Safety officer
78	Has the organization established and implemented a procedure for control of outsource?	✓		Safety officer
79	Has the organization established and implemented a procedure for control of air quality?	✓		Safety officer
80	Has the organization established and implemented a procedure for control of waste water?	✓		Safety officer
81	Has the organization established and implemented a procedure for control of emergency response?	✓		Safety officer
82	Has a practical training of emergency plan and periodically review?	✓		Safety officer
83	Has a responsibilities person for an emergency plan?	✓		Safety officer
84	Has an assembly point?	✓		Safety officer

Table 4.1 The compliance evaluation checklist of OHSAS 18001 (Cont.)

No.	Details	Evaluation		Responsibilities
		Yes	No	
85	Has an investigated and record immediately when an accident occur?	✓		Safety officer
86	Has the checking for emergency equipment such as fire alarms, fire hose, sprinkler?	✓		Safety officer
88	Has the certainly schedule for emergency practical and comply with the law?	✓		Safety officer
4.5.1 Performance Measurement and Monitoring				
89	Has the organization established and implemented a procedure to monitor and measure OH&S performance on a regular basis?	✓		OHSAS committee
90	Are monitored of accident records for both employee and contractor?	✓		Safety officer
91	Monitoring instruments of environment has been calibrated or not such as a sound level meter.	✓		Safety officer
92	Has the communication to those concerned about the surveillance?	✓		Safety officer
93	Has the monitoring plan?	✓		Safety officer
94	The accident statistics are reviewed and updated to achieve its objectives or not.	✓		Top management
4.5.2 Evaluation of Compliance				
95	Has the organization established and implemented a procedure for periodically evaluating compliance with applicable legal requirements?	✓		Safety officer
96	Is this procedure maintained?	✓		Safety officer

Table 4.1 The compliance evaluation checklist of OHSAS 18001 (Cont.)

No.	Details	Evaluation		Responsibilities
		Yes	No	
97	Is the evaluation completely as the safety laws and OHSAS 18001:2007's requirement?	✓		Safety officer
98	Is the legal list up to date?	✓		Safety officer
99	Has the communication to those concerned about the compliance result?	✓		Safety officer
4.5.3 Incident Investigation, Nonconformity, Corrective and Preventive Action				
100	Has the organization established and implemented a procedure for dealing with nonconformities and for taking corrective and preventive action?		✓	OHSAS committee
101	Has the determination for responsibilities, investigation authorized of nonconformity?	✓		OHSAS committee
102	Does the organization ensure that any necessary changes arising from corrective and preventive action are made to the OH&S management system documentation?	✓		OHSAS committee
103	Has the procedure of the correction and prevention for the complaints or suggestions that related on occupational health and safety?		✓	OHSAS committee
104	Has the communication of the results of the accident investigation to all employees?	✓		Safety officer
4.5.4 Control of records				
105	Has the organization established and implemented a procedure for control records?	✓		Document controller

Table 4.1 The compliance evaluation checklist of OHSAS 18001 (Cont.)

No.	Details	Evaluation		Responsibilities
		Yes	No	
106	Does the procedure specifies the identification, preservation and destructions explicitly?	✓		Document controller
107	Has the control records that received from outside?	✓		Document controller
108	Does the organization ensure that its OH&S records are and remain traceable?	✓		Document controller
4.5.5 Internal audit				
109	Has the organization established and implemented an audit procedure?		✓	OHSMR
110	Has the schedule for internal audit?		✓	OHSMR
111	Has the consideration about risk level and internal audit result off the part?		✓	OHSMR
112	Has the audit for all department and all relevant requirements?		✓	OHSMR
4.6 Management review				
113	Has a record of management review meeting?		✓	Top management
114	Has a schedule of management review meeting?		✓	Top management
115	Has a assignment, define solutions and monitoring in the management review meeting?		✓	Top management
	Has a verification of below topic in management review?			
116	- Audit result		✓	Top management

Table 4.1 The compliance evaluation checklist of OHSAS 18001 (Cont.)

No.	Details	Evaluation		Responsibilities
		Yes	No	
117	- The results of participation and consultation.		✓	Top management
118	- The necessary to change policies, objective, target.		✓	Top management
119	- Internal and external factors such as the change in organization structure, corrective action according the laws		✓	Top management
120	- Communication, complaints		✓	Top management
121	- Accident statistics, accident investigation		✓	Top management
122	- Follow up the result of verification in past.		✓	Top management

4.1.2 The results of the evaluating consistency with the occupational health and safety management system (OHSAS 18001: 2007).

Due to the evaluating consistency with the occupational health and safety management system (OHSAS 18001: 2007) by checklist, the results are as following;

Table 4.2 The results of the compliance evaluation on occupational health and safety management system (OHSAS 18001)

Requirement	Number	Percentage
Conformity	82	67
Non-conformity	40	33
Total	122	100

4.2 The non-conformity and action plans

The evaluating consistency of the safety management of the company according to the occupational health and safety management system (OHSAS 18001: 2007) found the non-conformity with the requirements as 33 percent as following;

Requirement 4.2 Safety policy

The company had occupational health and safety policy as the detail as below. Top management prescribed and approved policy. Policy was communicated to all employees by the meeting, electronic mail and information board. The safety policy was appropriated to the organization and expressed a determination on the matter, lawfulness, to prevent injury or illness, already documented but it was not clearly and not defined to be reviewed.

<p>Occupational health, safety and environment policy Company name _____</p> <p>To prevent the accidents from working, the company is a leader in establishing safety and health to achieve the our goal, each employee to achieve the goal of zero accidents, each department shall implement the policy on safety and health as following;</p> <ol style="list-style-type: none"> 1. The company will comply with the laws and regulations of the government or other laws that related to safety. 2. The company considered the safety at work and 5S is the duty of all employees at all levels to work together to achieve compliance with the safety of themselves and others. 3. The company will provide support for the budget, personnel and other resources appropriately for achieve to targets of the occupational health and safety. 4. For achieve the target of safety and health, the company will continue to improve the environment, maintain and improving for occupational health of all employees. <p style="text-align: right; margin-right: 100px;">Sign.....</p> <p style="text-align: right; margin-right: 100px;">(_____) President</p>

Figure 4.1 Safety policy of company

Requirement 4.3.1 Hazard identification, risk assessment and determining controls.

The company did not conduct for the risk assessment both the preparation procedures and risk assessment for all activities.

Requirement 4.3.3 Objective and Programme(s)

The company had set objectives and targets of occupational health and safety. The objectives and targets set up in accordance with the laws and regulations. It communicated to all employees in the organization. The issue which did not comply with the requirements were unclearly schedule for review.

Requirement 4.4.1 Resources, roles, responsibility, accountability and authority

The issues that not comply with the requirements were not appointed of Occupational Health and Safety representative (OHSMR) and defining the roles and responsibilities of all employees.

Requirement 4.4.2 Competence, Training and Awareness

Because the company did not have a risk assessment, as a result make non-conformity with requirement include no training on the hazards and risks to each department, no training for the visitor to be careful for the risk.

Requirement 4.4.4 Documentation

The company did not have a Safety manual that defining the scope and structure of the document.

Requirement 4.5.3 Incident investigation, Nonconformity, Corrective Action and Preventive Action

The company did not have the procedures of the corrective and preventive action for nonconformity and complaints or suggestions that related to occupational health and safety.

Requirement 4.5.5 Internal Audit

The company did not have the procedure of internal audit that related to occupational health and safety.

Requirement 4.6 Management Review

Requirement of this term was not comply because it did not have the appointment of the Occupational Health and Safety Representative (OHSMR),

therefore it did not have schedule to review such topics as the result of audit, the results of participation and consultation, the policy, targets, objective, the communication, complaints and accident statistic.

4.2.1 Action plans for the improvement of the non-conformity with OHSAS 18001

The evaluating consistency of the safety management of the company according to the occupational health and safety management system (OHSAS 18001) found the non-conformity with the requirements as 33 percent (40 Topics). Researcher prepared an action plan to guide the preparation of Occupational Health and Safety management system (OHSAS 18001) by the operation divided into three phases include preparation, review and implement, improvement.

Table 4.3 Action plans for the improvement of non-conformity with OHSAS 18001

Item	Requirement	Process	Responsibilities	Period						relevant departments	
				Jan	Feb	Mar	Apr	May	Jun		
Phase 1 Preparation											
1. Document											
1.1 Prepare procedure Of Hazard Identification and Risk Assessment	4.3.1	1. Define the purpose 2. Define the scope of procedure 3. Define the definitions 4. Define the responsibilities 5. Define work instruction 6. Prepare the reference 7. Define the form 8. Define the period for keep the document 9. Register the document 10. Distribute document to the relevant departments	Safety officer	↔						All Dept.	
1.2 Prepare procedure of corrective action and prevention for occupational health and safety	4.5.3	1. Define the purpose 2. Define the scope of procedure 3. Define the definitions 4. Define the responsibilities 5. Define work instruction 6. Prepare the reference 7. Define the form	Safety officer	↔						All Dept.	

Table 4.3 Action plans for the improvement of the non-conformity with OHSAS 18001 (Cont.)

Item	Requirement	Process	Responsibilities	Period						relevant departments
				Jan	Feb	Mar	Apr	May	Jun	
2. Training										
2.1 Training for requirement of OHSAS18001	4.4.2	1. Prepare training plan 2. Contact guest speakers from outside agencies 3. Training 4. Evaluate this training course	HR	↔						All employees
2.2 Training for Hazard Identification and Risk Assessment	4.4.2	1. Prepare training plan 2. Contact guest speakers from outside agencies 3. Training 4. Evaluate this training course	HR	↔	↔					Leader and Supervisor
2.3 Training visitor about company's risk	4.4.2	1. Prepare training course for visitor	Safety officer	↔						All visitors

Table 4.3 Action plans for the improvement of the non-conformity with OHSAS 18001 (Cont.)

Item	Requirement	Process	Responsibilities	Period						relevant departments
				Jan	Feb	Mar	Apr	May	Jun	
5. Appoint the occupational health and safety management representative (OHSMR)	4.4.1	1. Appoint the occupational health and safety management representative (OHSMR) by President 2. Define the roles of OHSMR 3. Appoint OHSAS 18001 committee, which includes representatives from all department	Management	↔						All dept.
6. Define the role of all employees that related to occupational health and safety	4.4.1	1. Define the role of management 2. Define the role of Safety committee 3. Define to role of leader 4. Define the role of operator	All Dept.		↔					All Dept.
7. Conduct for Risk Assessment	4.3.1	1. Prepare procedure for hazard Identification and Risk assessment 2. Define the role and responsibilities of relate Persons	All Dept.		↔					All Dept.

Table 4.3 Action plans for the improvement of the non-conformity with OHSAS 18001 (Cont.)

Item	Requirement	Process	Responsibilities	Period						relevant departments	
				Jan	Feb	Mar	Apr	May	Jun		
		3. Define the Risk Assessment form									
		4. Provide training of Risk Assessment for all department									
		5. All department prepare for Risk Assessment and rating risk level									
		6. All department prepare for risk records									
		7. All department prepare for Risk control plan only moderate risk and high risk									
Phase 3 Improvement											
8. Revise Occupational Health and Safety plan by considering the risk level	4.3.3	1. Revise master plan of Occupational Health and Safety by addition item in Risk control plan to master plan	Safety officer					↔			All dept.

4.3 Process of developing guidelines to comply with the occupational health and safety management system (OHSAS 18001)

According to the Occupational Health and Safety Management System (OHSAS 18001) can be implemented in a systematic and effective. The researcher concluded that the implementation process is a three step as following;

Step 1 Policy and planning

Step 2 Implementation and operation

Step 3 Checking, correction and management review

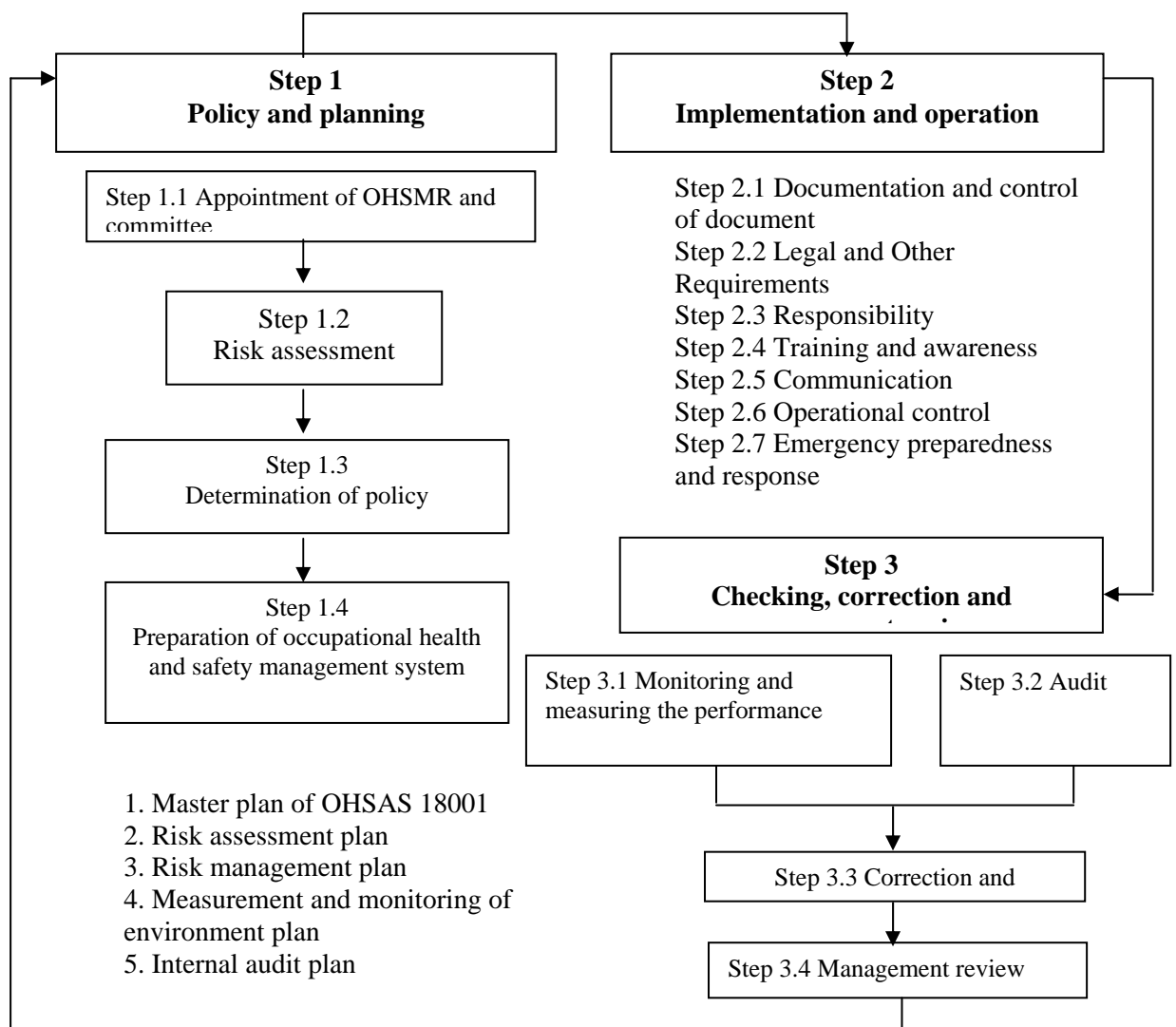


Figure 4.2 Process of developing guidelines to comply with the OHSAS 18001

Step 1 Policy and planning

Step 1.1 Appointment of OHSMR and committee

Objectives

To set a representative of the executive authority are clearly in ensuring occupational health and safety management system that was prepared. The adoption and implementation continues, including reporting to top management to be used to review and improve in the further.

Implementation approaches

1. President appoint the occupational health and safety management representative (OHSMR) as following properties;

1.1 Have a leadership.

1.2 Understands about OHSAS 18001.

1.3 Have the ability in management.

1.4 Have the communication skills.

1.5 Have the commitment and awareness of occupational health and safety.

1.6 Have the ability to incentives.

1.7 Have the acceptable and reliability.

1.8 Have a good support from the executive.

2. The duties of occupational health and safety management representative (OHSMR).

2.1 Ensuring the health and safety management system was prepared and implemented to meet the requirements accurately and continuously.

2.2 Report the performance of occupational health and safety management to executive to apply for a review of the management system and to guide the review of occupational health and safety management system.

3. President appointed a committee that included representatives from all departments to prepare a management system for occupational health and safety, such as risk assessment, the plan, operational procedures, etc. The committee has the authority as follow in;

3.1 Study for the OHSAS 18001 standards, laws and regulations that related to occupational health and safety.

3.2 Review the initial status of organization.

3.3 Review action plans for the Occupational Health and Safety Management System (OHSAS 18001).

3.4 Establish a sub-committee or revise a committee that already as appropriate.

3.5 Prepare a manual that must be followed in the implementation of occupational health and safety management system.

3.6 Implementation as plans and report progress in OHSAS 18001 committee meeting.

Step 1.2 Risk assessment

Objectives

In order to know of the dangers that existed in the organization by ranking the risk from risk assessment. So the organization can consider the risk control measures or planned are sufficient or not.

Implementation approaches

1. Prepare procedures for hazard identification and risk assessment.
2. Define the responsibilities and duties of person of each department.
3. Define the risk assessment form.
4. Training for risk assessment to all persons.
5. All departments assess and specify risk level by the risk assessment form.
6. All departments prepare the list of risk.
7. All departments plan to control the risks, only high risk and extreme risk.

Table 4.4 Process of Hazard Identification and Risk Assessment

Process	Approved By	Details	In Charge Person
		Risk Assessment Team consists of 1. Operator or Supervisor 2. Technician or Maintenance staff 3. Safety Officer, Supervisor Level	Plant Manager
		Relevant Documents 1. Company map 2. Limit of danger map 3. Company layout scale 1:100 4. Production Process 5. Number of employees and working shift	Risk Assessment Team
			Risk Assessment Team
			Risk Assessment Team
			Risk Assessment Team
		Manager consider to approve or not approve to set risk control plan for the moderate and high level risk. If not approve, process Step 3 again	Risk Assessment Team
			Risk Assessment Team
		Manager consider to approve or not approve to register the document. If not approve, revise the risk control plan.	Document Controller

Risk Assessment Process

1. Risk assessment team assess the risk of each section regarding 1) Operator or Supervisor or Engineer, 2) Technician or Maintenance staff or Maintenance Engineer, and 3) Safety Officer, Supervisor Level. Moreover, classify work activities and survey the area.

1.1 List all responsible jobs and activities using Hazards Identification & Risk Assessment Form (ST-F-XXX-XX) by:

(1) Identify the responsible job classified by production process or responsible job and risk code such as driving job, machinery maintenance job, and machine control job.

(2) Identify all responsible jobs by the assignment or important works such as electrical connection, and machine lubricating. Anyhow, responsible work/activity includes non-regular work/activity. It may be annual work or the work to be done every three years.

1.2 Divide the responsible area of each section according to the following criteria.

(1) Risk assessment area such as plant area and office area.

(2) If it is the specific area, and only one section can access the area, that section will be responsible for that area, although it is in the area of other section.

(3) Maintenance section is only responsible for workshop and office area.

(4) Road and lawn are under responsibility of Administration section.

2. Risk management team identify the hazard from the responsible activities (1.1) and from Occupational Safety, Health and Environment assessment (1.2) using Hazards Identification & Risk Assessment Form (ST-F-XXX-XX). To identify the hazard, three questions should be considered.

2.1 Is there a source of hazard? To consider the source of hazard, consider whether which source causes injury/illness or damage to property. Although it causes minor injury/illness, it is considered as the source of

hazard. If there is no source, keep the result in file. The factors to consider for source of hazard are as follows.

(1) Tools/machinery/equipment such as mechanical part, electrical part.

(2) The source relates to raw materials, products, or chemical substance such as radiation, electricity.

(3) Energy such as electricity, wind, steam.

(4) Work environment such as light, noise, heat, gas, dust, and ergonomics.

2.2 Who (or what) is the injured? Consider the impact that may occur in four aspects, which are:

(1) Impact on people - includes employees, contractor, surrounding community. The impact causes injury and illness.

(2) Impact on machine and equipment - identify which machine and where it is located. The impact causes the damage and the decrease of equipment efficiency.

(3) Impact on material such as waste

(4) Impact on work environment such as noise, polluted air, dust

2.3 How does hazard occur? Explain why the hazard occurs by identify cause and impact using the hazard quality in no. 3 to consider.

3. Risk assessment team assesses the risk level by applying the information acquired from work activities, area survey, and hazard identification using Hazards Identification & Risk Assessment Form (ST-F-XXX-XX). There are two aspects to consider.

3.1 Violence of hazard and violence quality can be classified into four levels as follows.

(1) Negligible Violence

(2) Marginal Violence

(3) Critical Violence

(4) Catastrophic Violence

		4	3	2	1
Violence	4	16	12	8	4
	3	12	9	6	3
	2	8	6	4	2
	1	4	3	2	1
		Likelihood			

Figure 4.3 Result of risk assessment

Risk assessment

$$\text{Violence} \times \text{Likelihood} = \text{Result}$$

4. Risk assessment team decides the risk, violence, and likelihood of hazard according to the details in the Hazards Identification & Risk Assessment Form (ST-F-XXX-XX). The criteria for making decision will consider from risk level, violence, and likelihood of hazard as details in the following table.

Score	Risk level	Conclusion
1, 2	Low	Acceptable
3, 4, 6	Moderate	Acceptable
8, 9	High	Unacceptable
12, 16	Extreme	Unacceptable

5. Supervisor considers approval

5.1 If the supervisor disapproves, risk assessment team should make a revision.

5.2 If the supervisor approved, signed document and return to risk assessment team.

6. Risk assessment team sets risk control plan according to the Hazards Identification & Risk Assessment Form (ST-F-XXX-XX) based on the following guidelines for risk management.

Authorized signatory considers risk control plan.

In case of approval, autograph risk control plan

In case of disapproval, return risk control plan to the risk assessment team to make revision

Remark: Make the revision for risk assessment for the following cases.

Have new activity or area in production process or have new machine.

Have the significant change of assessed activity

Review risk assessment every three years

Have critical accident in or have near miss accident, or negligible or marginal accident that tends to cause catastrophic accident.

Risk Control Plan Form (ST-F-XXX-XX)

Hazard SourceObjective.....Indicator

Department Approved Date

Risk Category	Risk Issue	Risk	Risk Management Plan			Remark
			Prevention	In Charge Person	Duration	

7. Document controller of the department stores the original result of hazard identification, risk level assessment, and risk control plan. Make one

set of copy for supervisor/in charge staff, Safety Department, and one copy for control the plan.

Guideline for risk management acquired from risk assessment

Risk Level	Action
Extreme Risk (4)	Stop operation immediately and make correction to reduce the risk by creating a plan to reduce the risk
High Risk (3)	Make a plan to reduce the risk
Moderate Risk (2)	Make risk control plan
Low Risk (1)	No need to make risk control plan

Step 1.3 Policy

Objectives

To create the guideline for considering information acquired from reviewing law and area survey to use in policy formation.

Implementation approaches

1. Organize OH&S Committee meeting to review vision, mission, and OH&S policy by considering the following aspects.

- Qualifications and size of organization, activities, scope and administration

- Result of hazard identification from risk assessment

- Relevant laws and standards

- OH&S policy

- Other policies such as quality policy, environment policy that has to be compatible. Occupational Safety, Health and Environment policy and quality policy may be combined.

- Relevant people

2. OHSAS 18001 committee publicizes announces the policy, and informs other sections to sign acknowledgement and express opinion. Then, send it to the officer to gather and propose to OHSAS 18001 committee for consideration.

3. OHSAS 18001 committee considers the opinion of employees on the policy draft and revises or keep the original based on OHSAS 18001 standard regulations. Propose the policy to top management to autograph.

4. Committee announces the policy to the organization to acknowledge and understand thoroughly via email, announcement board, or in the meeting.

Step 1.4 Preparations and Planning

Objectives

1. To be the guidelines for OH&S plan for in charge person in the organization

2. To make the efficient plan that is consistent with policy and risk assessment

3. To monitor and assess the progress or success of the plan

Implementation approaches

1. OHSAS 18001committee set the master plan for OH&S management system

2. Professional safety Officer gathers all risk control plan from all sections and creates risk management master plan.

3. All sections controls, supervises, and monitors the activities in risk control plan.

4. OHSAS 18001committee monitors risk management plan as follows.

4.1 Define the presentation day twice a year

4.2 Submit progress report according to risk control plan every 4 months

Step 2 Implementation and operation

Step 2.1 Documentation and control of document

Objectives

1. To make accurate documentation according to OHSAS regulations.
2. To direct the performance of organization to the same direction
3. To show the connection of document in the system
4. To assure the continuity of OHSAS
5. To ensure that the officers and relevant persons have the latest document to use as necessary.

Implementation approaches

1. Prepare the procedure for document control system.
2. Responsibilities
 - 2.1 The documentation of each department is responsible for documenting, changes, canceled and registration documents.
 - 2.2 Manager/Leader responds to review and approve documents after issuing.
 - 2.3 MR (Management Representative) responds to
 - Issue Company manual
 - Review documents including on Document Action Request; DAR and approval.
 - 2.4 Document Control Staff: (DCC), ISO section is responsible to.
 - Running number of document
 - Review correctly of document
 - Control, cancel and distribute document
 - Storage, control and cancel original document
 - Disposition obsolete documents

Table 4.5: Authority for issue/revise/cancel/review and approve documents
Issue/ revise/ cancel / review and approve document for registration

Documents Level	Type of document	Issue/revise / cancel/ dispose	Review	Review
Level 1	P : Policy, Objective, Manual	Manager/MR	GM	President
Level 2	S : Standard, Regulation, Procedure	Supervisor	Manager	GM
Level 3	- W : Work Instruction - QCN : Quality Condition Notification - PCN : Process Condition Notification - OPL: One Point Lesson - Packing Standard - OUT : Outside Document - Drawing	Leader	Supervisor	Manager
Level 4	F : Record, Form	Leader	Supervisor	Manager

Step 2.2 Legal and other requirements

Objectives

To understand the laws and regulations as well as relevant guidelines applied to occupational health and safety management systems.

Implementation approaches

1. Prepare Procedures for monitoring and assessing compliance with laws and regulations.

2. Determine the responsibilities for the procedures of monitoring and assessing compliance with laws and regulations as following;

2.1 Safety officer is responsible to

2.2.1) Identify the laws and regulations of environmental, occupational health and safety which is related to company's implementation.

2.2.2) Summarize the applicable legal and other requirements of environmental, occupational health and safety including monitoring on revising and changing.

2.2.3) Evaluate compliance the applicable legal and other requirements for company.

2.2.4) Suggestion and manage company's activities to comply with environment, occupational health and safety laws, as well as coordination with relevant governmental agencies.

2.2 All employees is responsible to

Perform laws and regulations of environment, occupational health and safety.

2.3 OHSMR is responsible to

2.3.1) Review suggestions and management of company's activities to comply with environment, occupational health and safety laws.

2.3.2) Consider evaluated compliance result of the applicable legal and other requirements, as well as follow up progressive from the relevant functions who respond to implementation for compliance and inform to managers to be acknowledged.

3. Implementation approaches

3.1 Safety officer monitors the change of laws and regulations on environmental, occupational health and safety that include act, royal act, ministerial regulations, regulations, ordinance, local law etc., for 1 time/month from <http://www.krisdika.go.th/> and evaluate the applicable with company and report

3.3 Safety officer review the compliance of the applicable laws and regulations for every month.

3.3.1) In case not comply, shall define action and finished date to be comply on Assessment of compliance with laws and regulations (ST-F-018) then issue CPAR (DCC-F-008) to define person in-charge for action and follow up according to “Corrective and Preventive Action (DCC-S-XXX).

3.4 Safety officer keep the documents of permits of government and outside agencies then report to OHSMR to be acknowledged.

3.5 Each manager shall ensure that laws and regulations of environmental, occupational health and safety is informed to all employees for acknowledgment.

3.6 In case cannot perform laws and regulations of environmental, occupational health and safety, head of function shall inform to department manager / OHSMR / Safety officer to be acknowledge immediately. In order to OHSMR / Safety officer will inform government agencies or follow up corrective action according to “Corrective and Preventive Action (DCC-S-XXX)”.

3.7 OHSMR report result of compliance to management review meeting according to Management Review (DCC-S-XXX).

Step 2.3 Structures and Responsibility

Objectives

1. To assign the authority and responsibility to be consistent with internal relationship in organization.
2. To identify OH&S obligation to be consistent with administrative structure and chain of command.

Implementation approaches

1. Define administrative structure of OH&S that shows the chain of command, authority, responsibility, and relationship in organization.

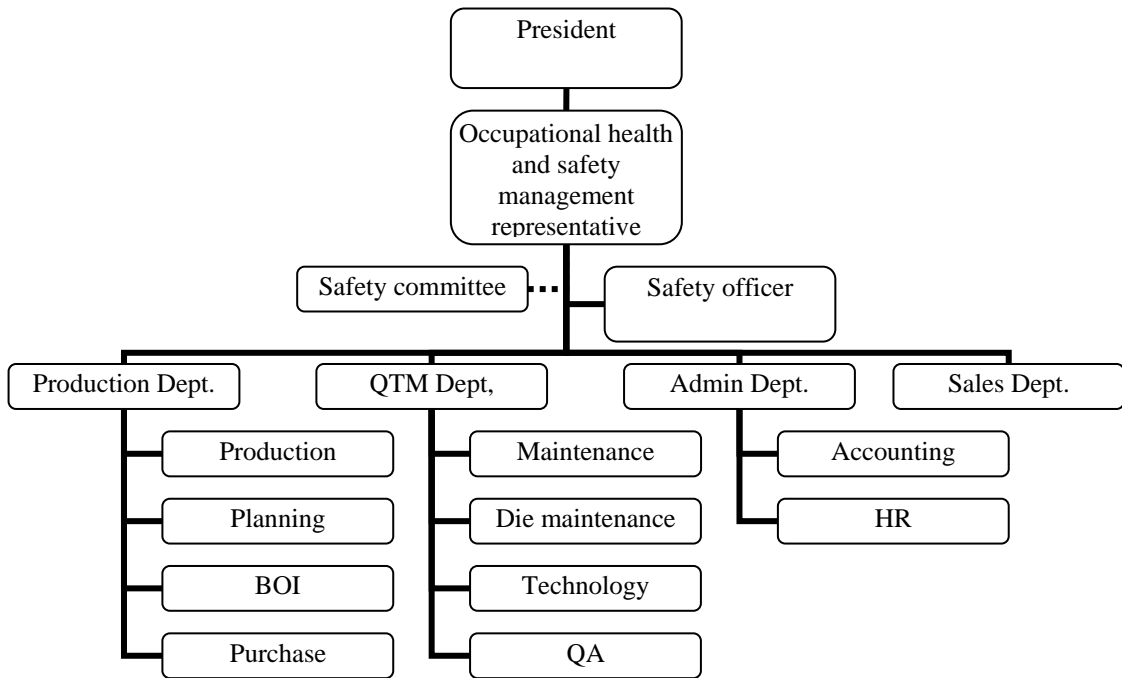


Figure 4.4 Organization charts of occupational health and safety management

2. Define OH&S obligation to employees in each level: top management, middle management, relevant operation teams, as well as employees, and publicize to other in organization

Responsibilities of Chairman

Responsibility and authority to determine to develop and implement OH&S system constantly by:

1. Communicate with organization about the importance of achieving regulations.
2. Create OH&S policy.
3. Ensure that the objective of OH&S is completed.
4. Make the review by the management team and ensure the readiness of resources.
5. Ensure that the responsibility and authority is defined and communicated within the organization.

Responsibilities of Executive

1. Set and implement OHSAS.

2. Set and review objectives, purposes, and project.
3. Perform efficient operation of relevant project to OH&S
4. Have internal communication and promote safety awareness.
5. Be the leader to monitor OH&S problems
6. Organize the meeting every six months
7. Manage and monitor the non-conformity, correct, and prevent to ensure that the measure is proceeded to reduce the impact.
8. Report operating result for the review and for the improvement of management system
9. Make sure to define, operate, and maintain the necessary procedure for OHSAS.
10. Organize activities assigned by OHSMR

The Committee shall have the duties as follows:

1. To consider the policy and work plan on occupational safety and out-of-work safety to prevent and reduce accidents, dangers, sickness, or annoyance resulting from work, for presenting to the employer.
2. To report and give recommendations to the employer the measures or means of improvement and correction of mistakes complying with the law on occupational safety and standards of occupational safety of the employees, contractors, and outsiders who are entering the workplace for working or for receiving services.
3. To support and contribute occupational safety activities of the workplace.
4. To consider the regulation and guidance as stated in Clause 3 including the standards on occupational safety of the workplace for presenting to the employer.
5. To survey, at least once a month, the operational performance of occupational safety and examine the statistics of dangers occurred in the workplace.
6. To consider the project or training plan on occupational safety, including the project or training plan on roles and responsibilities for safety of

the employees, supervisors, executives, employer, and staffs in every level, in order to give suggestions to the employer.

7. To systemize the reporting on unsafe working conditions to be a duty complied by all employees.

8. To follow up the reports presented to the employer.

9. To make an annual report on the operational performance, including specifying problems, obstacles, and suggestions on the operation of the committee when completing one year period of service to present to the employer.

10. To assess the operational performance of occupational safety of the workplace.

11. To conduct other occupational safety activities as assigned by the employer.

The safety officer in supervising level shall have duty as follows:

1. To direct and supervise employees in the responsible unit to follow the regulation and guidance as prescribed in Clause 3.

2. To analyze the work of the responsible unit to primarily find risks or dangers, in collaboration with safety officers in technical, advanced technical and professional levels.

3. To teach correct working procedures to the employees in the responsible unit for working safely.

4. To check working conditions of machinery, tools and equipment to be in safe condition before starting daily work.

5. To direct and supervise the use of personal protective equipment of the employees in the responsible unit.

6. To report the accidents or illness or annoyance caused by working of the Employees to the employer, and report it to the safety officers in technical, advanced technical and professional levels. As for a workplace that has safety department, it shall be reported to the department promptly after the incident takes place.

7. To investigate the cause of the accident, illness or annoyance caused by working of the employees in collaboration with the safety officer

in technical, advanced technical and professional level and report the result together with suggesting resolution promptly.

8. To promote and support the activities for safety at work.

9. To conduct other activities for work safety as assigned by a safety officer in management level.

The employee shall have duty as follows:

1. The Employee is obligated to cooperate with the Employer in operating and promoting of occupational safety, health and environment in order to ensure safety to the Employee and the Establishment.

2. An Employee who works in the establishment under paragraph one including an Employee who works in other workplaces which do not belong to the Employer shall also comply with criteria on occupational safety, health and environment applied to such establishment.

3. An Employee is obligated to maintain the working environment according to the standards as prescribed in the Ministerial Regulation issued under Section 8 in order to create safety of life, physique, mentality and health, with regard to working condition and the Employees' responsible areas.

4. Whereas the Employee is aware of a defect or damage and unable to rectify by himself/herself, the Employee shall inform a Safety Officer, a Supervisor or an Executive and then the Safety Officer, the Supervisor or the Executive shall notify an Employer in writing without delay.

5. The Employee is obligated to wear the personal protective equipment and to maintain the equipment under paragraph one, in good condition as working condition and nature throughout the working period. Whereas the Employee does not wear such equipment, the Employer shall order the Employee to cease working until the Employee wears such equipment.

Step 2.4 The ability, training and awareness.

Objectives

To ensure the training and awareness is the ability to perform accurate and appropriate for occupational health and safety management system.

Implementation approaches

1. To determine the training need.
2. The preparation of training plans.
3. Training
4. The evaluation of training.
5. Training record

Table 4.6 Yearly training plans on occupational health and safety management system

Training course	Training method			Training plan	Remarks
	Training by leader	Inside training	Outside training		
Safety policy	✓			Jan 2016	
Related law		✓		-	Orientation
OHSAS 18001:2007			✓	Jan 2016	
Occupational health and safety awareness		✓		-	Orientation
Hazardous identification, risk assessment and risk control			✓	Feb 2016	
Ergonomic			✓	Feb 2016	
Working with chemical for safety		✓		May 2016	
Working with electrical for safety		✓		Mar 2016	
Safety officer in supervisor level			✓	Mar 2016	
Safety officer in management level			✓	Apr 2016	
Safety committee			✓	May 2016	
Fire drill and fire escaping plan		✓		Dec 2016	
Basic fire training		✓		Dec 2016	
Practical training in case chemical spill		✓		Jul 2016	

Table 4.6 Yearly training plans on occupational health and safety management system (Cont.)

Training course	Training method			Training plan	Remarks
	Training by leader	Inside training	Outside training		
Working with Forklift for safety		✓		Mar 2016	Only Forklift driver
Working with crane for safety		✓		Mar 2016	Only crane user

The training record that include as the topics as following;

Name of trainee

Training course name

Training date

Training result

Training category

Orientation for new employees

The annual training specifically as required by law or regulation.

Training to review and increase knowledge.

Training for new operational processes such as new equipments, new technology, new materials and substances.

Step 2.5 Communication

Objectives

To ensure the necessary communication of occupational health and safety management system is managed effectively.

Implementation approaches

1. Prepare procedure of the communication.
2. Provide the responsibilities of the procedure.

2.1 Management Representative (MR) and management is responsible for define and classify information and communication,

both internal and external communication. And also improve company's communication. Respond to inquiries from external organizations, including the news media.

2.2 Staff / Supervisor / Head of function is responsible for the notification of problem and others within the company to MR for acknowledge.

2.3 Purchasing Manager and/or Safety officer is responsible for;

Contact suppliers to be acknowledged and perform with the company's quality and environmental management system.

Receive the information who contact with contractors, subcontractors and suppliers in order to acknowledge and perform the company's system.

2.4 Security guard is responsible for receiving information of Complaint / Suggestion of Quality and Environment from the outside, then submit to Management Representative.

Table 4.7 The communication of OHSAS 18001

Topic	Person in charge	Receiver	Communicated Method
Internal communication			
Policy	President	- Management - MR	- Minutes of Management Review - Manual
	Head of function /Department	Employee of function / Department	Manual, Meeting, booklet
	Leader, Forman	All employee	Booklet, Sign, Board
Audit result	MR	Management team	Meeting, Notice

Table 4.7 The communication of OHSAS 18001 (Cont.)

Topic	Person in charge	Receiver	Communicated Method
Emergency plan	MR	All employees	Notice
OHSAS 18001 news	OHSMR	All department	Notice
Related law	Safety officer	All department	Meeting, Information board, Email
Accident statistic	Safety officer	All department	Meeting, Information board
The continuous improvement and performance	MR and all dept. manager	All employees	Management review, Notice, Meeting
Safety policy	Safety officer	External agencies	Information board, letter
Regulation	Safety officer	External agencies	Meeting
Job description, duties and responsibilities	MR and administration manager	All employees, New employees	Explication, Document, Orientation
Outside communication			
Policy, objective, target	President	Individuals / agencies	Inform by brochures
	Purchase or safety officer	Vendors, subcontractors	Inform by brochures
	MR	External agencies, publicly	Information board in front of company or public place

Step 2.6 Operation control

Objectives

To determine the method for control of all operational such as all activities related the cause of all the problems of occupational health and safety or related objectives and targets and ensure that they can put into practice effectively.

Implementation approaches

1. Head of all function monitoring to be based on a risk management plan by requiring key strategies of risk management on occupational health and safety as following;

1.1 Policy, plan, safety program are writing.

1.2 Engineering measures, such as improving machinery and working environment, changing to less hazardous chemicals, reducing consumption.

1.3 Management measures include the setting of standards how to work safely (Standard Operating Procedure - SOP), training operator, monitoring in the section, warning sign installation.

1.4 Provide the personal protective equipment and control to use if necessary.

1.5 The yearly monitoring of environment and annual health check.

1.6 Documenting such as activity record, result of the environment measurement, annual health check result, etc.

1.7 Evaluation of activities (How to evaluate the activities, measuring the changes such as behavior, concentration of chemical, monitoring of index indicators, etc).

2. Auditor of internal or external monitoring all section as the schedule plans for monitor all process on occupational health and safety management system.

3. Provide training on the preparation of safety work instruction and a work permit.

4. All departments sent the safety standard operation to staff for prepare the operation control plans.

Step 2.7 Emergency preparedness

Objectives

To enable organizations can prepare to handle emergencies efficiently and to control the loss of life, property and the environment with minimal impact.

Implementation approaches

1. Determine the emergency plan and response.

OHSMR and Occupational Health and Safety committee are meeting to establish emergency preparedness and response plan which can be occurred and impact on environment, safety of employee and property by following.

- OHSMR and Occupational Health and Safety committee survey all area within company for considering on emergency situations which maybe occur.

- OHSMR and Occupational Health and Safety committee consider on environmental aspect on List of Significant Environmental Aspects.

- OHSMR and Occupational Health and Safety committee consider about emergencies that occurred within company or other companies in the past.

- OHSMR and Occupational Health and Safety committee consider on results of hazard identification and risk assessment.

2. Identify each case of emergency and also provide emergency preparedness and response plan or instruction that covers all emergencies that shall be included in case of fire emergency at least.

3. Safety officer at professional level / Occupational Health and Safety committee join to meeting for define detail on emergency preparedness and response plan including as following.

- Define organization and responsibility in case emergency
- Define contact name of person in-charge when emergency occur and available contact route such as telephone number etc.

- Define contact name of external parties when emergency occur such as fire team, hospitals including details on the name and telephone number.

- Communicated route for internal / external company

- Provide chemical information including environmental impact, safety of employee and instruction in case of those chemical leaks to environment and disposal method of chemical leakage.

4. Exercise of emergency plan

4.1 Safety officer / Occupational Health and Safety committee review emergency plan as annual in order to provide exercise plan and training.

4.2 Safety officer cooperate with related functions for exercise and perform defined plan.

4.3 Safety officer check equipment which is necessary in case of emergency to be completely and readily available such as availability of fire-fighting equipment and emergency situations.

4.4 Perform to exercise plan as defined that provide simulated emergency situations in order to determine the effectiveness and efficiency of operations.

4.5 During emergency exercise shall observe activities to ensure plan and actual situation to correct and conduct the information to update the plan if necessary.

4.6 When emergency exercise is finished, shall record and evaluate in order to conduct for reviewing next yearly plan.

5. Review and revise emergency and response plan

Safety officer at professional level / Occupational Health and Safety committee join to meeting to review and revise emergency and response plan for annual, after exercise on plan is finished or after emergency occur.

6. Emergency protection

6.1 Safety officer at professional level check available equipment which is used for prevention, suppression, emergency mitigation at each area and record to be evidence such as extinguisher, absorb material or response chemical leak emergency according defined period as follows:

- Evaluation of environment and safety management every month

- Extinguisher and personal protective equipment are checked every month

- Fire Exit Way, chemical absorbent equipment, fire connection are checked every 3 month.

6.2 Safety officer provide warning signs for defined area.

7. Emergency suppression and response

7.1 In case of fire emergency, all employees must perform on work instruction, fire protection and fighting plan (ST-W-XXX)

7.2 In case of chemical spills, all employees must perform on work instruction emergency plan in case of chemical spills (ST-W-XXX).

8. Exercise and Training

Safety officer provide exercise and Training at workstation as follow annual plan at least 1 time per year.

- Fire protection and fighting plan

- Chemical spill emergency plan

9. Accident investigation

When emergency occur, safety officer will investigate cause as following accident record and investigation form.

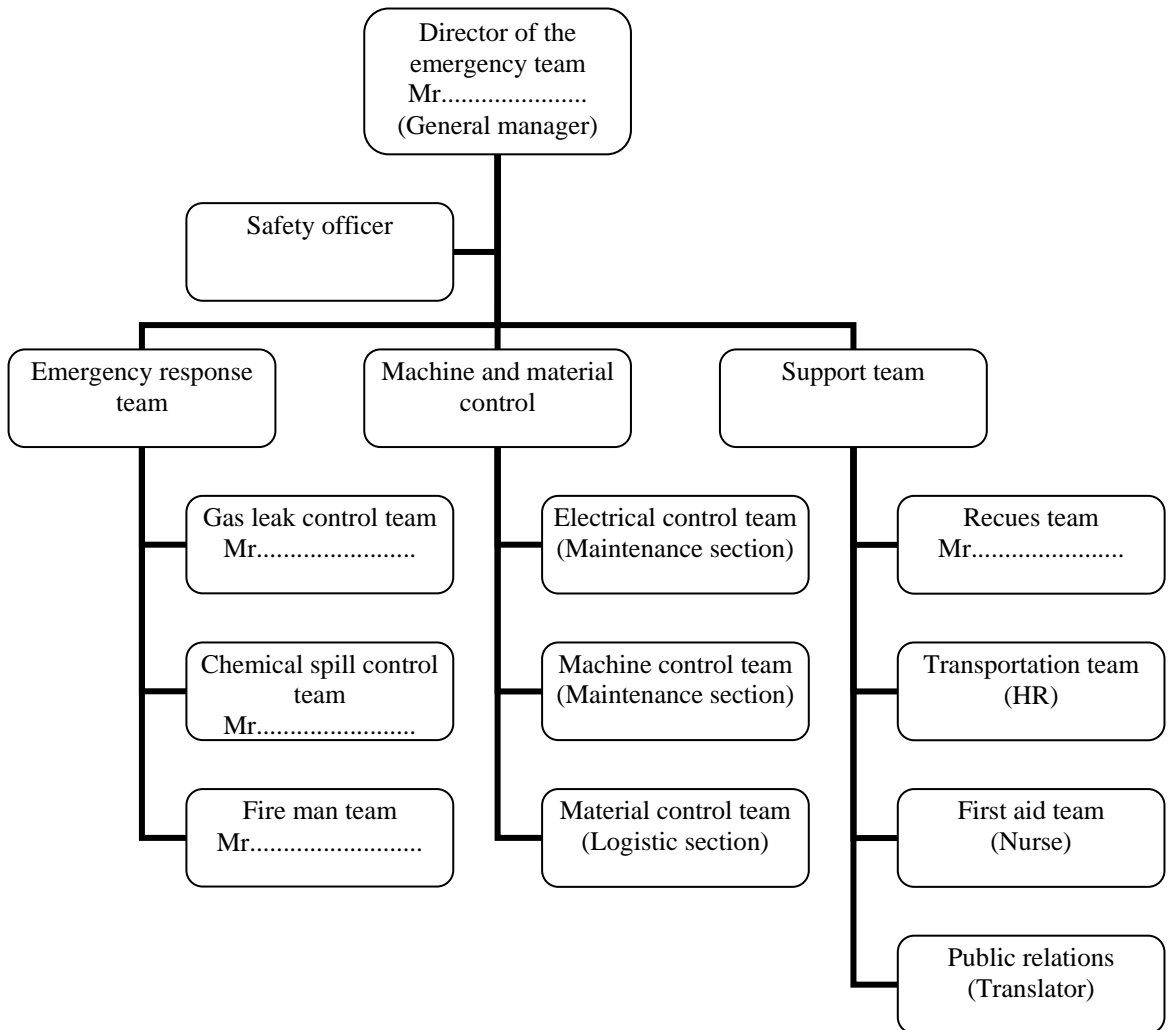


Figure 4.5 Emergency response organization charts

Table 4.8 Telephone number for contact to outside agencies

Agencies	Telephone number
Division of Fire police	035-21111 or 199
Kham harm fire dept.	035-800654
U-Thai fire dept.	035-356199
Rathanee hospital	035-335555
U-Thai police station	035-356181
Ayutthaya industrial Dept.	035-336579
Narenthorn Medical Center	1669

Step 3 Monitoring, correction and management review

Step 3.1 Monitoring

Objectives

1. To determine how to monitor and measure the performance of occupational health and safety. The environmental monitoring to determine the effectiveness of the implementation of occupational health and safety management plans and contribute to the prevention / control to prevent the loss repeatedly.

2. In case to measure environmental quality. The instruments must be calibrated, maintained and repaired properly.

Implementation approaches

1. Preparation the procedure for monitoring and measuring the performance of occupational health and safety management system.

2. OHSAS 18001 committee determines the procedures for monitoring and measuring the performance by determine the frequency and responsible that cover the performance.

Table 4.9 Occupational health and safety management system plans for meet the requirements of occupational health and safety consists of the 6 items

Plans	Responsibilities	Detail
1. Master plan of OHSAS 18001	OHSAS 18001 committee	This article
2. Risk assessment plan	Safety officer	Article 1.3
3. Master plan of risk management and operational control	All department	This article
4. Environment monitoring plan	Safety officer	Article 3.1
5. Internal audit plan	ISO staff	Article 3.2
6. Management review plan	OHSAS 18001 committee	Article 3.4

3. OHSAS 18001 committee requires the person responsibilities for monitoring and performance measures as defined in the OHS plan reports the progress in the OHSAS 18001 meeting. Report the jobs that do not comply with requirement the report in the meeting to find the solutions.

4. The instruments for measuring the environment must be properly calibrated and standardized including maintenance and keep a history of the instrument and can be presented.

Tool name	Brand/Model	Amount	Next calibration	Status
Sound level meter	Mini sound meter Model; DT-85A	1	Nov 2016	Normal
Lux meter	Tenmars LXM-TM-202	1	Nov 2016	Normal

Step 3.2 Audit

Objectives

1. To assess the occupational health and safety management system complies with the requirements of OHSAS 18001 or not as well as complies with the occupational health and safety management plan or not.

2. In order to report the results of the Occupational Health and Safety Management System to management.

Implementation approaches

1. Prepare internal audit procedure
2. Responsibilities
3. Procedure

3.1 Preparation before the audit

3.1.1) Auditor team selections

OHSMR appoints auditor leader and auditor team, and register name list of auditors in order to internal audit effectively based on qualification following.

Internal auditor qualification**General qualification**

- Confidentiality of the organization
- Independent from auditee's organization

Personnel qualification

- Human relations
- Communication skills
- Management skills
- Presentation skills
- Open mind to other opinionKnowledge
- Knowledge of internal audit and training
- Understanding for requirement which auditing
- Understanding system of auditing area

Assessment skills

Ability for preparing auditing

Ability to be leader of meeting

Reporting skill by accurately

The company establishes training to staff in order to be qualified to perform the annual audit plan as necessary.

Table 4.10 Example for auditor name list

No.	Name	Dept.	Training course			
			Requirement			Internal audit
			ISO 9001	ISO 14001	OHSAS 18001	
1	Mr.A	Production	✓		✓	✓
2	Mr.B	Sale	✓	✓	✓	✓
3	Mr.C	HR	✓	✓	✓	✓
4	Mr.D	Maintenance		✓	✓	✓

3.1.2) Audit Schedule

3.1.2.1) OHSMR defines internal audit plan based on each department shall be audited for at least 2 times a year that cover all quality management related processes, activities and shifts. That considers the importance of each activity, each area and the previous internal audit results. Increasing the frequency of audit plan can be done base on considering customers complaints internal audit result such as number of CAR and NCR, management review report.

3.1.2.2) MR or assigned person notify internal audit schedule before auditing to relevant functions

3.1.3) Reviewing documents and preparing “Internal audit check list

3.2 Perform auditing

3.2.1) Before auditing, lead auditor/audit explain to auditee for the intended scope, objective, schedule, instruction, date and time for auditing.

3.2.2) Lead auditor/auditor perform audit as follow internal schedule base on internal audit technique following.

Use "Internal audit check list" to be only way of audit as well, find audit evidence more than specified on check list.

Consider about 'What are the inputs and output of audited activity or process. If the input is not sufficient, cannot get good output etc.

Audit requirement / document/ actual operation

Consider the relation of each process because output of one process shall be input for next process as figure below. That makes audit process to be more systematic audit.

Record objective evidence by systematic on “Internal audit check list” to completely in order to judgment about operation of auditee comply with defined system or not. As well as, consider effective of operation for report result and evident finding that found from following.

- Each document such as manual, procedure, reference etc

- Interview of auditee
- Observation such as surrounding, instruction of operator etc.
- Each records such as Training plan training record etc.

In case of auditor team found non-conforming, shall issue "Corrective/Preventive Action Request" for observation, consider issuing "Corrective/Preventive Action Request" as appropriate.

Audit team meeting after the completion of the audit and clarify with the responsibility of all auditee to acknowledge and understand finding of non-conforming or observation.

3.3 Closing finding

3.3.1) Lead auditor follow up non-conforming on CPAR by reply report within 7 working days and action within 7 working days from the date of issuing document, and record the results then submitted to the MR.

3.3.2) If the results are effective, Lead auditor close CPAR by the following considerations.

- Actions were taken as define and was completed on schedule.
- Effectiveness corrective action has been completed. There is some point to be a monitored period to ensure that are effective reality and not reoccurred.

3.3.3) When it was ineffective, Lead auditor and auditor issue a new document in order to the next audit.

3.3.4) If the New CPAR is still not action after a defined period, Lead auditor must report to the MR for inform on management review meeting.

3.4 Summary auditing result for management review meeting

3.4.1) After internal audit is completed, MR shall prepare a report on internal audit to notice employees at all levels.

3.4.2) MR report internal audit result to management as following “Management review meeting” in order to review and improve of company system, and determine the next appropriate action.

Table 4.11 Example for internal audit plan for 2016

Activities	Auditee	Auditor	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Purchase	Mr.A	Ms.A						↔						
Sale	Mr.B	Ms.B							↔					
Maintenance	Mr.C	Ms.C							↔					
HR	Mr.D	Ms.D								↔				
Production	Mr.E	Ms.E									↔			

Step 3.3 Correction and prevention

Objectives

1. To define procedures for implementing corrective and preventive issues those arise and ensure that have been corrective and preventive action effectively.
2. To determine analysis corrective and preventive action that arising from the organization activities.

Procedure

1. Corrective action for monitoring objective, claim, environmental monitoring, operational control monitoring and evaluating suppliers, evaluation compliance and other non-conforming found by OHSMR

1.1 Person in charge of safety in each department or someone who found non-conforming, inform to MR for issuing CPAR to in charge department and record CPAR into “List CAR” in order to follow up corrective action with them or establish meeting base on OHSMR consideration.

1.2 Person in charge of each issue have to find out the root cause of the non-conforming and proposed to solve non-conforming indefinite. In some cases may be a meeting to discuss ways to action appropriate.

1.3 Related function corrective action and must be completed by the scheduled time.

1.4 OHSMR or those assigned by MR follow up the progress of corrective action by a specified period.

2. Preventive action of analysis data and others.

2.1 OHSMR defines preventive action by discussion with related functions at least every 6 months. Considering data analysis, trend of information by monitoring such as measurement by legal, monitoring objectives and goals or other that are likely to be non-conforming, then MR issue CPAR to an function that is expected to raise non-conforming.

2.2 OHSMR selects the information above that needs to carry out CPAR to related department and record into "List CAR"

2.3 Persons in charge of each issue have to find out the root cause of the non-conforming and proposed to solve non-conforming indefinite.

2.4 Related function preventive action and must be completed by the scheduled time.

2.5 OHSMR or those assigned by MR follow up the progress of corrective action by a specified period.

3. Non-conforming found by internal audit. Perform procedure for internal audit

4. Summary result of corrective and preventive action to management review meeting

OHSMR reports results of corrective and preventive action to management review meeting according procedure management review in order to review and improve the company's management system and determine the next appropriate action.

Step 3.4 Management review

Objectives

1. To assess the occupational health and safety management system that has been implemented that policy and achieve objectives or not.

2. To improve the occupational health and safety management system that do not comply with the requirements of OHSAS 18001.

Procedure

1. President is a chairman of meeting and control for complete information on the review meeting which was defined at least the following.

1.1 The performance of all occupational health and safety system.

1.2 The performance of each requirement.

1.3 The findings of audits.

1.4 The appropriateness of occupational health and safety management policy.

1.5 The solutions of occupational health and safety issues.

1.6 The result of the resolve of occupational health and safety management review at last time (if any).

1.7 The effective of occupational health and safety management system.

1.8 Internal and external factors such as changes in organizational structure, revised as safety law requirement, new technology.

2. OHSMR prepares the data for meeting and distribute.

3. The key question in management review meeting according the system requirements 4.6 at the following.

3.1 Is the system also suitable for other activities?

3.2 Is the system effectively and understandable to concern persons?

3.3 The system can be improved, however?

4. The minute meeting must be recorded in writing and the case has been assigned the task must identify the responsibilities.

CHAPTER V

DISCUSSION CONCLUSION AND RECOMMENDATION

The results of the research on OHSAS 18001 non-conformity management of an aluminum manufacturing plant in Phra Nakhon Si Ayutthaya. There are important issues that should be discussed below.

5.1 Discussion and conclusion

5.1.1 Objective 1: A study on occupational health and safety management system: OHSAS 18001

The requirements of OHSAS 18001: 2007 with all 6 major is divided into 18 subsections. The researcher concluded the guidelines for the implementation of the Occupational Health and Safety Management System OHSAS 18001: 2007 as follows.

Step 1 Policy and planning; the company should appoint the OHSMR, Committee conduct risk assessment, review safety policy and OHS plan.

Step 2 Implementation and operation; the company should set up a document filing, comply the legal and other requirements, define the roles, responsibility, accountability and authority, competence, provide the training and awareness, define the communication system, control of the operational, emergency preparedness and response.

Step 3 Checking, Correction and management review; the company should check the performance measurement and monitoring, perform the internal audit, correct the non-conformity, and set up a management review.

The researcher suggested that having the clear step of operation makes the operation follow the set direction. Moreover, it allows the organization to implement OHSAS 18001:2007 clearly and know what to do in order. The first step is to designate the OHSMR and operation team in order to assign the clear responsibility.

5.1.2 Objective 2: To compare the requirements of OHSAS 18001 system on the implementation of occupational health and safety in the company

From the evaluation by a checklist found the non-conformity of the occupational health and safety management system (OHSAS18001:2007) is 33 percent or 40 items from total 122 items. At present, the company has complied with the laws and some standards, including the quality management system (ISO 9001), environmental management system (ISO 14001) and quality management systems for the automotive and auto parts (ISO / TS 16946) makes the implementation of occupational health and safety system as some have done already. If the company wants to make the occupational health and safety management system (OHSAS 18001: 2007), the company needs to implement something more according to the results of the evaluation by the checklist. It can be divided into groups as following;

1. Documentation

There were no document for some procedures, such as risk assessment, the correction and prevention in occupational health and safety, the audit in occupational health and safety management system, safety manual.

2. Training

To provide the additional training course, including training on the requirements of occupational health and safety management system (OHSAS 18001: 2007) to all employees, risk assessment, the regulation for contractor, customer or visitor to aware the risk point due to the results of the risk assessment.

3. Review and implementation

Because the company did not have safety manual, there was no determination of what to be reviewed and operated: the determination to review policy, objective, purpose, and plan, the determination of administration review, the designation of OHSMR, the determination of roles and responsibilities of employee regarding OHSAS and risk assessment.

4. Improvement

Because there was no risk assessment in the company which did not comply with the requirements to improve occupational health and safety plan.

From 40 topics that did not comply with the requirements. When considered all requirements found there were related. If no any action for one requirement may cause other requirement not comply.

5.1.3 Objective 3: Plans to improve the performance of occupational health and safety of the company

As the evaluation of consistency in the objective 2, found the nonconformity as the requirements of occupational health and safety management system (OHSAS 18001), which the researcher has prepared an action plan to guide the implement for this system and include the detail, responsibilities and period time. The fourty non-conformity were divided into three stages of operation as following;

Phase 1 preparation

1.1 Documentation must provide the document as following for the system.

1.1.1 Procedures for risk assessment as well as the form for used in the risk assessment process include identification and risk assessment form, risk register form, risk control plan form.

1.1.2 Procedures for deficiencies solving for occupational health and safety management system.

1.1.3 Procedures for auditing occupational health and safety management system.

1.1.4 Safety manual specifies the requirements of occupational health and safety management system (OHSAS 18001).

1.2 Training, there are safety training that need additional training as following.

1.2.1 Provide training to employees about the requirements of the occupational health and safety management system (OHSAS 18001).

1.2.2 Provide training to employees about hazardous identification and risk assessment.

1.2.3 Provide training for contractor and visitor to caution point.

Phase 2 review and implementation.

2.1 Determine a review of policies, plans, target and objectives.

2.2 Determine the management review process.

2.3 To appoint the occupational health and safety management representative (OHSMR).

2.4 Determine the roles and responsibilities of everyone on occupational health and safety.

2.5 Implement the risk assessment to all departments.

Phase 3 improvements

3.1 Revise the occupational health and safety plan by consider the result of risk assessment and add the relate item.

5.2 Suggestions for further research

5.2.1 This research was to study the implementation of occupational health and safety management system (OHSAS 18001) in a manufacturing plant of aluminum only. Should study compare the occupational health and safety management system in other manufacturing plant.

5.2.2 Should compare the accident statistics between the factory with the occupational health and safety management system and the factory that have been conducted on occupational health and safety by legal compliance.

5.2.3 The further study should is consider in occupational health not only safety.

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