A COMPARATIVE STUDY OF FACTORS AFFECTING THE OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM EFFECTIVENESS BETWEEN LARGE AND SMALL AND MEDIUM ENTERPRISES

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Sumitra Chanapa

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ABSTRACT

This research was a descriptive study which compared key success factors between small and medium (SME) and large enterprises that have conducted the Occupational Health and Safety Management System (OHS-MS). The selected samples were 103 enterprises which applied to join the Training Lead Consultancy project (TLC) of the Ministry of Industry during 1999-2001. The samples were divided into two groups based on successful or unsuccessful implementation of OHS-MS. The samples were given a questionnaire designed to ascertain what they thought were the key success factors. A validity test was performed in order to check the precision and accuracy of the questionnaire. 81.6% of the sample returned the questionnaire for analysis.

The results of this study were that the key factors of effective OHS-MS for both large and small and medium enterprises were OHS-MS representative (OH&SMR), the reasons for joining the OHS-MS (pressure from management or employer, competitors, and press or society) the implementation team, communication and employee involvement in each activity. However they were two extra factors where there was a statistically significant difference between SME and large enterprises. Overall program management and management commitment about management by objective, time frame and budget in large enterprises were provided more efficiently than in SME enterprises.

KEY WORDS: OCCUPATIONAL HEALTH AND SAFETY, MANAGEMENT SYSTEM, EFFECTIVENESS, SME

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การศึกษาเปรียบเทียบปัจจัยที่ทำให้การจัดทำระบบการจัดการอาชีวอนามัยและความปลอดภัย เกิดประสิทธิผล ระหว่างโรงงานขนาดกลางและเล็กกับโรงงานขนาดใหญ่ (A COMPARATIVE STUDY OF FACTORS AFFECTING THE OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM EFFECTIVENESS BETWEEN LARGE AND SMALL AND MEDIUM ENTERPRISES)

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บทคัดย่อ

การวิจัยนี้มีวัตถุประสงค์เพื่อเปรียบเทียบปัจจัยในการจัดทำระบบการจัดการอาชีวอนามัยและความปลอดภัยระหว่างสถานประกอบการขนาดใหญ่กับขนาดกลางและเล็ก กลุ่มตัวอย่างคือ สถานประกอบการ 103 แห่งที่เข้าร่วมโครงการฝึกอบรมและให้คำปรึกษา ของกระทรวงอุตสาหกรรม ในช่วงปี 2542-2544 โดยแบ่งเป็น 2 กลุ่ม คือกลุ่มที่จัดทำระบบสำเร็จและไม่สำเร็จ เครื่องมือที่ใช้คือแบบสอบถามโดยมีการทดสอบค่าความเที่ยงตรง แม่นยำ และส่งไปให้กลุ่มตัวอย่างเพื่อสอบถามถึงปัญหาและปัจจัยที่ส่งผลให้การจัดทำระบบสัมฤทธิ์ผล ผลการตอบกลับแบบสอบถามเป็น 81.6% ของทั้งหมด แล้วจึงนำมาวิเคราะห์ข้อมูลทางสถิติเพื่อสรุปผล

ผลการศึกษาพบว่าปัจจัยที่มีผลต่อการจัดทำระบบของสถานประกอบการทั้งโรงงานขนาดกลางและเล็กกับโรงงานขนาดใหญ่ได้อย่างมีประสิทธิผลคือ ความรู้ความสามารถของผู้ที่ทำหน้าที่เป็นผู้แทนระบบ เหตุผลที่ต้องจัดทำระบบ (โดยเฉพาะเป็นนโยบายจากนายจ้าง ผลกระทบด้านการแข่งขันทางการค้า และภาพพจน์ ชื่อเสียงขององค์กร) ความสามารถของทีมงาน การสื่อสารและพนักงานมีส่วนร่วมในกิจกรรมต่างๆ ล้วนส่งผลให้เกิดผลสำเร็จในการทำโครงการ ส่วนปัจจัยที่แตกต่างอย่างมีนัยสำคัญคือการบริหารงานด้านความปลอดภัยโดยภาพรวม และการสนับสนุนจากผู้บริหารจะแตกต่างกันในด้านการกำหนดวัตถุประสงค์เป้าหมาย กรอบเวลาและงบประมาณในการจัดทำระบบซึ่งโรงงานขนาดใหญ่มีมากกว่าโรงงานขนาดเล็ก

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CHAPTER I
INTRODUCTION

1.1 Background and rationale

Rapid industrialization in Thailand and Southeast Asian countries create a great demand for the transfer of technology and information. People need information for their work development. At the same time, they need necessary information for safety and their workplace. One of the keys to success, in suitable development and improvement of working life is the transfer of information. Every government must have clear policies and appropriate measure to assure that their people are informed of necessary information.

A part of Thailand's national economic goals has been conspiring the small and medium-sized enterprises to increase investment. There are varying active promotions such as decreased taxes and duty, taxes wave or loan etc. The government began to pay attention to the business in small and medium-sized enterprises. From political and financial point of view, the important of small and medium-sized enterprises companies is becoming more and more noticeable. They constitute the majority of companies and they provide employment for a large part of the working population. Therefore, the important of health and safety in small and medium-sized enterprises is also large. (1) The ministry of Industrial has established a clear policy on support by set up the Bureau of Industrial promotion. So authorize person is not permitted to consider appropriately about potential of harm in term of ill health, workplace environment and public in first step.

From occupational injuries and illness records it can be seen that trends for fatalities and industrial injuries are rising in Thailand from 1988-1996. The first nine years industrial injuries Thai legislation was set up case by case after serious accident that had been occurred such as a dead child from the construction site in 1988. In 1996 had the highest injuries 245,616 and fatalities 1,033 a circle of 13 years and was slow down after that. Observation of this graph was suggested that the most workers were

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laid off because Thai economy has started problem in 1998. However SMEs is more than 90 percentages of total the enterprises of Thailand so it is large segment of the workforce (SMEs 130,000 from total about 135,000). Most of this people's work lack in health, safety and welfare and incident caused by work are not as well known as the large scale.

Later the Thai's government tries to reduce accident cases and these problems by set up regulations, safety award, and other voluntary programs for the potential risk plant. Government, employer, employee's representative and Technical Experts in related field worked together to developed occupational health and safety standards. In 1998 the Ministry of Labor and Social Welfare, the Ministry of Industrial, the Ministry of Public Health, the Ministry of Science, Environmental and Technology and the Ministry of Education cooperated in setting up the Thai Industrial Standard on Occupational Health Management System (TIS 18001) first edition. The additional amendment was performed in 1999 and this standard also voluntary programs. The main objectives are as followings:

- To eliminate or minimize risk to employees and other interested parties who may be exposed to OH&S risks associated with its activities.
- To implement, maintain and continually improve the OH&S management system.
- To demonstrate such conformance to others. (2)

This specification is applicable to any organization however the level of detail and complexity of OH&S management system dependent on the size of and organization and nature of its activities as same as ILO-OHS 2001 and OHSAS 18001-1999. Tailored OSH-MS procedures for SMEs in ILO-OSH 2001, which is used as a powerful tool to improve safety and health in most countries in Asia and the Pacific, was present that a special need was felt for establishing effective OSH-MS in small and medium-sized enterprises in different enterprises. There were limited but useful development in that regard in the countries surveyed. The most important step was to offer OSH-MS tailored in accordance with the specific features and needed of those enterprises. (3)

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Occupational health and safety management system is continually applied nationwide company. Training Lead Consultancy Project of the Ministry of Industrial (TLC) supports these. Until now successful and failure industry about 103 enterprises (during 1999-2001) from 162, which implement this program and about 49.0% pass certified.

During 1998-2001 TIS 18001 was stated to used in Thailand, however, small and medium-sized enterprises meet target only 25.5 percentages and almost all ones have problems such as project had been stopped, delayed or canceled 74.5 percentages of all. As the large sized enterprise meet target 69.2 percentages and have problem only 30.8 percentages. This is some reason of topic equation why small and medium-sized enterprises that started in the same time frequently failed or delayed their program.

1.2 Objectives

1.2.1 General objective

The general objective is to compare problem and the key success factors for completing Occupational Health and Safety management system in the SME and large enterprises.

1.2.2 Specification objectives

1.2.2.1 To identify success factors in applying effective OH&S management system between small and medium-sized and large enterprises which successful-implemented OHS-MS and unsuccessful implementation OHS-MS.

1.2.2.2 To compare the success factors of the effective OHS-MS between small and medium-sized and larger enterprises.

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1.3 Study hypotheses

1.3.1 The successful-implemented OHS-MS in SME and large enterprises are not significant different among the key success factors for OHS-MS.

1.3.2 Unsuccessful implementation OHS-MS in SME and large enterprises are not significant different among the key success factors for OHS-MS.

1.3.3 The key success factors of successful-implementation OHS-MS and unsuccessful implementation ones in small and medium-sized enterprises are not different.

1.3.4 The key success factors of successful-implementation OHS-MS and unsuccessful implementation ones in large enterprises are not different.

1.4 Variables

1.4.1 Independent variables

1.4.1.1 Size of enterprise (Number of employee and total fixed assets)

1.4.1.2 General characteristics of the enterprises

1.4.1.2.1 Industry type

1.4.1.2.2 Race of top management

1.4.1.2.3 Safety officer at professional level

1.4.1.2.4 Education of the employee

1.4.1.3 The key success factors for OHS-MS implementation

1.4.1.3.1 Management commitment and support

1.4.1.3.2 Occupational Health and Safety Management Representative (OH&SMR)

1.4.1.3.3 Initial system status

1.4.1.3.4 The reasons for joining OHS-MS

1.4.1.3.5 Implementation team

1.4.1.3.6 Employee involvement and cooperation

1.4.1.3.7 Communication

1.4.2 Dependent variables

1.4.2.1 Successful-implemented OH&S management system

1.4.2.2 Unsuccessful implementation OH&S management system

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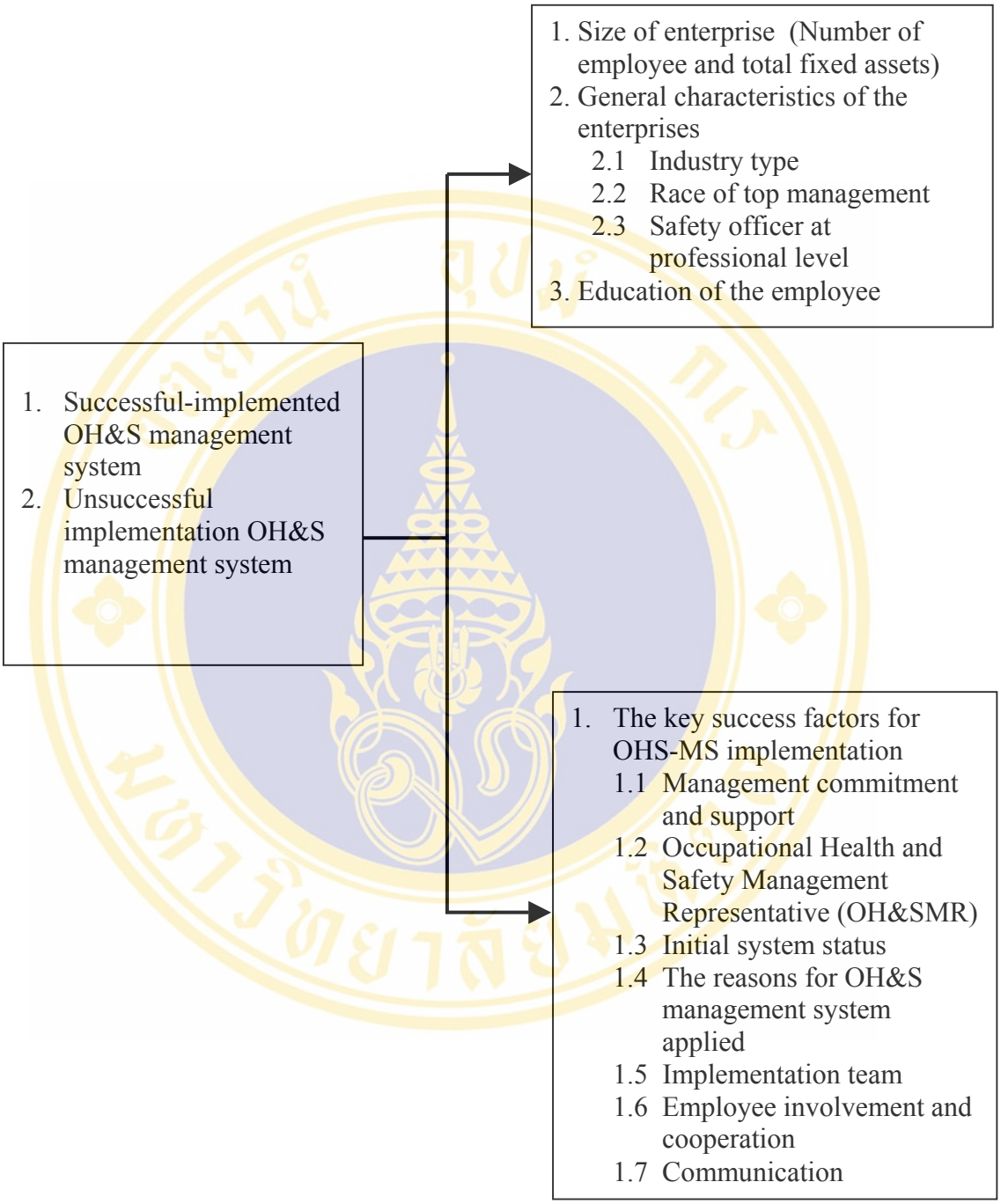
1.5 Conceptual framework



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1.6 Scope of this study

The enterprises are applied in Training Lead Consultancy Project of the Ministry of Industrial (TLC) which successful and unsuccessful enterprises during 1999-2001.

1.7 Expected outcome

1.7.1 To identify the key success factors for the OH&S management system of the small and medium-sized enterprises.

1.7.2 To identify the key success factors that should prepare themselves for apply effective occupational health and safety management system

1.7.3 To access the factors that influence negativity to the system and final the means for correction

1.8 Terms and definitions

1.8.1 Audit: systematic independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extend to which audit criteria are fulfilled.

1.8.2 Competence: demonstrated ability to apply knowledge and skills.

1.8.3 Effectiveness: extent to which planned activities are realized and plan result achieved. Having introduced a program aimed at achieving a high standard of safety, performance must be measured to confirm that the program is effective.

1.8.4 Successful-implemented OHS-MS: It is necessary to measure the criteria as following:

1.8.4.1 Certified TIS or OHSAS 18001 or other related OHS-MS or

1.8.4.2 Implement cover all phases (initial review, implementation, audit, management review, corrective and preventive action, and pre-assessment) more than 90 percentages that was evaluated by consultant from Safety and environmental business services center, National Petrochemical Public Company Limited.

1.8.5 Unsuccessful implementation OHS-MS: It cannot meet the successful-implemented OHS-MS criteria.

1.8.6 Information: meaningful data.

1.8.7 Management: coordinated activities to direct and control an organization.

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1.8.8 Management system: system to establish policy and objectives and to achieve those objectives.

Note: A management system of an organization can include difference management system, such as a quality management system, a financial management system or an environmental management system.

1.8.9 Occupational Health and Safety Management System (OHS-MS): part of the overall management system that facilitates the management of the OH&S risks associated with the business of the organization. This includes the organization structure, planning activities, responsibility, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing, and maintaining the organization's OH&S policy.

1.8.10 Occupational health and safety (OH&S): condition and factors that affect the well-being of employees, temporally workers, contractor personnel, visitors and any other person in the workplace.

1.8.11 Organization: company, operation, firm, enterprise, or part thereof whether incorporated or not, private, that has it own functions and administration.

1.8.12 Management system to direct a control and organization with regard to quality.

1.8.13 Review: activities undertaken to determine the suitability, adequacy and effectiveness of the subject matter to achieve established objectives.

1.8.14 Requirement: need or expectation that is started, generally implied or obligation

Note: The term of "Generally implied" means that it is custom or common practice for the organization, its customers and other interested parties, that the need or expectation under consideration is implied

1.8.15 Safety: freedom from unacceptable risk of harm (ISO/IEC Guide 2)

1.8.16 Small and medium-sized enterprise (SME): companies with less than 200 employees and fixed asset less than 200 millions Baht.

1.8.17 System: set of interrelated or interacting elements.

1.8.18 Top management: person or group of people who direct and control an organization at the highest level.

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CHAPTER II
LITERATURE REVIEW

The design of safety management program follows a variety of styles and concepts. Some of them are simple in structure; others rely on engineering concept; and yet generally call on management strategies to achieve their objectives. (4)

2.1 Definition of small and medium enterprise (SME)

2.1.1 Most often a "small company" only refers to the size in terms of employees, and 250, 100, and 50 are common numbers used. A turnover of less than 38 million ECU (European Currency Unit), and not more than 1/3 owned by an organization larger than an SME, if not financial investor (e.g., a bank; European Commission, 1955). (5)

2.1.2 SMEs Definitions in each organization of Thailand

Table 2-1 Definition of Small and medium enterprise in Thailand

Organization	Medium		Small	
	Capitalization (million Baht)	Number of Employees	Capitalization (million Baht)	Number of Employees
Bureau of Industrial promotion	Fixed assets 20 – 100	50 - 200	≤ 20	≤ 50
The Federation of Thai Industries	Total assets 20 – 100	50 - 200	≤ 20	≤ 50
Industrial Finance Company of Thailand	Total assets 100 – 500	-	≤ 100	-
Bank of Thailand	≤ 500*	-	≤ 50	-
The Notification of the MOI (6)	Total assets 50-200	50-200	Total assets ≤ 50	≤ 50

(*The Notification of the Ministry of Industry B.E.2545 Definition of SME by employment and total fixed assets)

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2.2 Characteristics of the large and small and medium enterprises

2.2.1 Safety, Health and Environment (SHE) in small and medium process plants-results from a European survey research finds the companies' attitude to SHE issues is positive, and most companies declared that they have adequate resources for the work with SHE related matters. The findings do not support the common view that problem with SHE issued are related to the size of the companies. (5)

2.2.2 The Entrepreneurship Development Program of the Department of Industrial Promotion, Thailand. The program targets existing and new entrepreneurs and persons with entrepreneurial potential. It provides investment opportunities research as well as training and follow-up service. The training program consists of five categories: successful entrepreneurship, business management, feasibility studies, business establishment and technical information. (7)

2.3 Management systems used in the enterprises

Small and medium enterprises have experienced the used of voluntary certification schemes for quality management, it was considered appropriate to assess interest in a scheme for health and safety management that would enable their to begin recognition for achievement in health and safety management. In addition to wanting to meet the requirements of customers they sought to improve management systems. Motivate managers and employees. And improve internal communications. Furthermore, there is some evidence to suggest that where small and medium enterprises do implement elements of management systems, the enterprise performance has been enhanced management system.

2.3.1. ISO 9001:2000 and A successful SME needs to:

2.3.1.1. Identify and meet the needs and expectations of its customers and other interested parties, i.e. employees, suppliers, owners, society, to achieve competitive advantage and to do this in an effective and efficient manner.

2.3.1.2. Achieve, maintain and improve overall performance and capabilities.

There are both advantages and disadvantages in implementing and achieving certification. In summary, these are perceived benefits/advantages of certification in

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order to improve in "bottom line" profit through better efficiency, continual improvement, less waste, consistent control of key processes, possible reduction in insurance premiums, promotion and standardization of good working practices, greater marketing appeal and improved public relations, provision of a vehicle for training new employees, the effective management of risk, provision of a vehicle for introducing a culture for opportunity, and increasing the potential for world-wide recognition. Perceived disadvantages of certification because costly to obtain and maintain, lengthy time-scale to obtain certification, time-consuming development, difficult to implement, organizational resistance to change, staff resistance to change, hard to maintain enthusiasm for the system, and more documentation.

Few companies fail to issue documented invoices, retain accounts and issue contracts of employment and job descriptions/specifications to their employees. The quality management system is simple in its basic concept.

2.3.2 The element of occupational health and safety management is six items the process of implementation as shows in figure 2-1. The aims and goals of implementation are usually based on an organization's need for performance improvement and an increase in bottom line profit, the effective management of risk, and reduction of the risk of occurrence of a safety incident or accident.

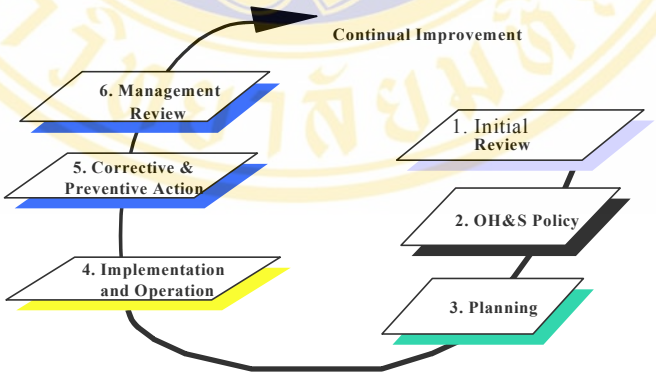

Figure 2-1 Element of OH&S management

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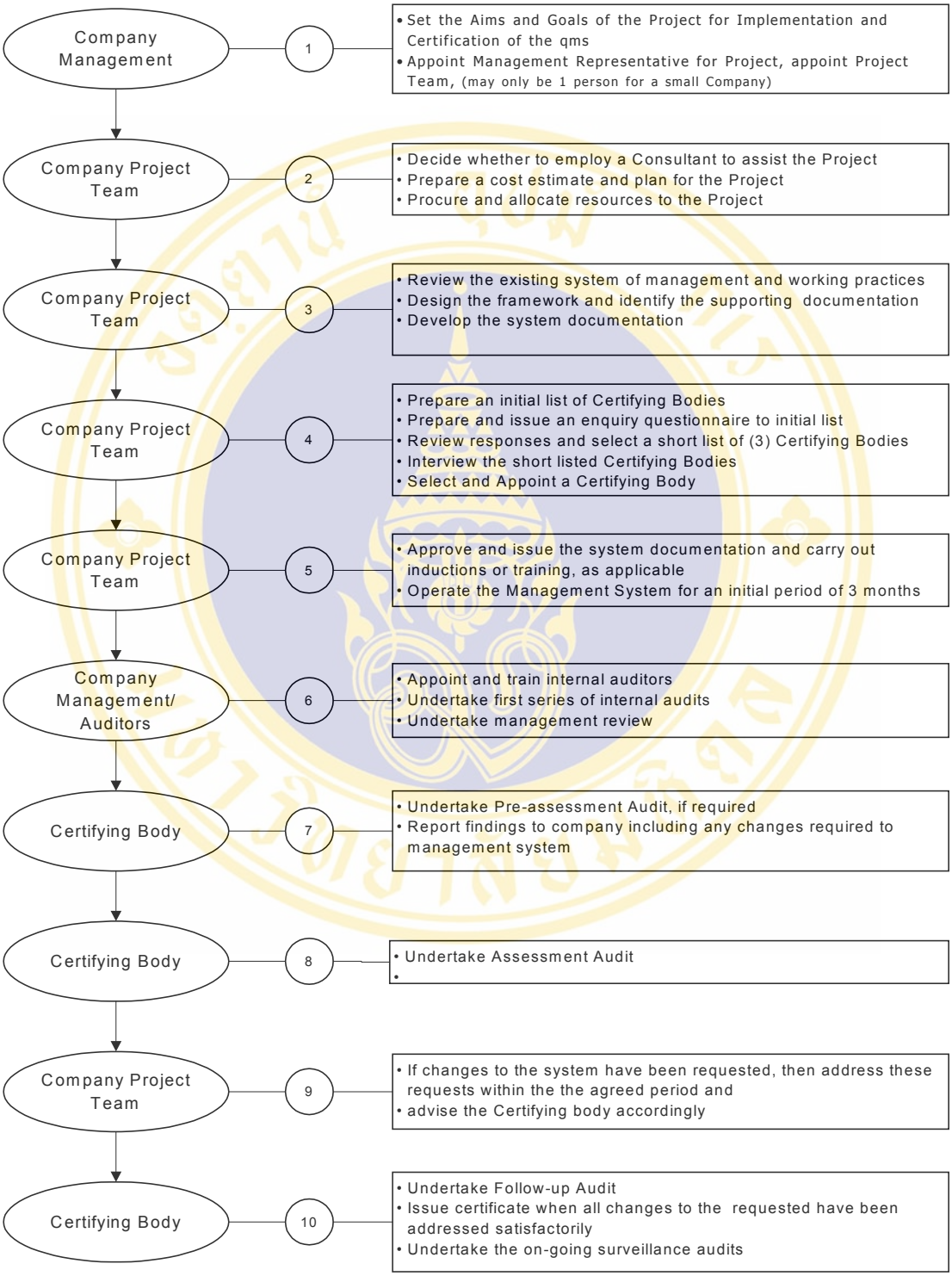

Figure 2-2 The Process of Implementation & Certification of the management system

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A detailed explanation of how to implement a management system is outside the scope of this publication but figure 2-2 sets out the basic stages that should be followed.

The process of implementation

Institute of Quality Assurance guides that the implementation of a formal management system is best handled as a specific project with a Project Manager, who should be a key member of the organization's management and appointed at the outset of the project. It is important that none of the stages detailed in the flowchart in figure 2-2 are omitted. The existing system of management and working practices must be known in some detail before the framework of the formal management system documentation can be designed. The system is best designed around existing processes as the development of new systems that require additional resources may simply delay the implementation process.

The first task is to develop the initial framework of the management system, identifying the various processes that are used to deliver the products or services to the Customer. From the framework of the management system the project team will identify the required supporting documentation, firstly in terms of defined processes and then in terms of the supporting competencies and procedures that will underpin these processes. Once the full framework of the management system has been designed and the supporting documentation identified, it is important to prepare a plan for implementation so that all participants understand their responsibilities. The plan will detail the authors of the various documents, the personnel responsible for the later stages of implementation and will include the associated deadlines for completion.

Training in system requirements

Organization can provide training in system requirements through a series of induction or training workshops for the people who have not been involved in the writing of procedures and who will be required to work to them. In addition to developing a full understanding of the system requirements, the training will extend ownership of the procedures to those who work to them. New employees will also require induction or training in the management system.

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Evidence of execution

Organization will usually work to the system documentation for three to six months. During this time organization will generate the required evidence of execution. Following this, organization can undertake the first series of internal audits.

Measuring the success of the process of implementation

It is important that the project team and those involved measure the success of the implementation process either at predefined stages during or at the conclusion of the process. Measurement should be against the original aims and goals and the key indicators of an effective management system described below:

– Top management is fully committed to the management system and owns the appropriate processes.

– The management system is designed around the business processes and not ISO 9001 or any other management system standard.

– Staff know how to access management system documentation.

– Visibility of process and clarity of instruction, ie management system documentation is clear, concise and readable. The documentation is easily maintained by document custodians.

– The organization has a culture for opportunity, focussed around continual improvement, rather than a "person-to-blame" culture.

– Management representatives are key organization personnel rather than side-lined personnel.

Selecting and working with a consultant

Management system is a task that needs continuing commitment and dedicated attention. It can be provided from within an enterprise, but external help from a consultant specializing in management may be valuable. Medium and large sized organizations generally utilize middle management staff that can be deployed on special assignments such as quality system development. Small and medium enterprises cannot always do this. The development of the management system must aim at meeting the needs of the organization and its customers, not a certification body. Regard the

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management system as a business improvement exercise. Determining its overall strategy, its objectives and practices must reside with the organization itself. Therefore, it is preferable to choose a consultant with direct experience of industry. However, it is probably more important that the consultant has had experience of a small and medium enterprise as an employee or as a consultant and that he or she has such referees as to his/her success rate. Ensure that your consultant has the resources and back up to see your project through to a timely conclusion

Working with a consultant

Once organization has confidence in choice, regard consultant as an adjunct to management team. This should include participation in the selection of and negotiation with any certification body and in negotiations with key clients.

2.3.2 What problems do SMEs have with ISO 14001 and how can we help them?

ISO 14001 is difficult for small and medium enterprises (SMEs) to understand, adopt and use. SMEs are defined by the International Organization for Standardization (ISO) as companies with less than 500 employees. That is why INEM has raised the question: What problems do SMEs have with ISO 14001 and how can we help them?

The problems seem to fall in three categories: The following statements may be connected to three categories of problems stated above:

1. Company-internal obstacles to implementation

– SMEs' interest in environmental management was not present or had only been recently developed.

– Less than 10 % of the companies had documented policies concerning environmental matters.

– Less than 20% of the companies had written measures concerning environmental matters.

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– About 30% had so far decided that they would not apply for certification and less than 50% of the companies were still undecided about whether or not they wanted to obtain certification.

– The majority of SMEs have either no or very few employees who are able to understand the requirements of ISO 14001.

– The companies often lack sufficient knowledge of regulatory and legal requirements.

– They cannot economically cope with the task of implementing an environmental management system (EMS), especially if they use complicated processes, which have significant environmental impacts.

– They have difficulties in understanding the importance audit methods may have for them and the advantages they may get while using this tool.

– It can be difficult for them to define any economic benefits if the certificate has no clear market-value or if the EMS does not clearly help them to ensure compliance with legal requirements.

– Top management of the companies assign management of EMS implementation to others.

– Other comments were included as the following:

– They think that the EMS will have no positive environmental effect.

– They think that ISO 14001 is only a money-making machine for consultants. Just one more bill to pay.

2. Company-external obstacles to implementation

– There are a lot of regulatory and legal requirements and the companies have difficulties to comply with all of them.

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– The companies cannot bear the burden of EMS implementation without help from external consultants or sector associations.

3. The lack of user- friendliness

ISO 14001 does not offer guidance on ensuring compliance with regulatory and legal compliance requirements. This may mean that interpretations made by the certification bodies are more restrictive than expected by the companies as a result of the requirements that the accreditation authorities put on the certification bodies. On the other hand, ISO 14001 is a flexible standard without too many restrictive limitations. Again this gives room for interpretation. To keep prices for consultation low, consultants often try to work out matrices for systems, but it is not too easy for small and medium enterprises to use and maintain systems implemented in this way. Because of lack of user-friendliness, SMEs think that it will be impossible for them to use the standard before everyone else does it.

How do we help the SMEs?

1. The following measures are recommended in order to overcome the internal obstacles to the implementation

2. The following governmental measures are recommended in order to overcome the external obstacles to the implementation: Carry out a nation-wide programme comprising information, sponsored demonstration projects and the provision of indirect financial support. Ease the regulatory pressure on companies, implementing (certifiable) EMS. Ease the tax burden on companies, implementing (certifiable) EMS. And apply EMS and environmental management principles to governmental activities.

3. The following measures are recommended to SMEs: Participate in seminars or training courses. Find an experienced and reliable consultant, who can act as an effective sparring partner for organization during the whole project. Do it in small, "edible" portions. It is also expected that SMEs will cope with the above problems, if: They document their EMS in a simple, unambiguous and easy to understand way. They write down what they do, adjust it according to the requirements of the standard and then do what they wrote. And they document the EMS as a natural part of already existing systems (e.g. the quality system). Management highlights all cases where the EMS has

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been help in the marketing process, has saved some money, and/or has eased the daily work.

2.3.3 Research studies the environmental management system of ISO 14001 problem and obstacles at the initial implement and operation stage and the result after the application of it. Before the program implement, the following steps were conducts as follow: firstly, the employees at all levels underwent extensive training and well versed in the ISO 14001 procedures. Secondly, they were delegated to perform their own duties and responsibilities. Thirdly, the well-organized communication system and the EMS documentation control system are simultaneously set up to serve the organization. However every procedure of operation is regularly recorded and reported to the top management respectively for monitoring and measurement. The problems and obstacles are found at an initial stage resulting from negligence and lack of understanding of the ISO 14001 requirements and procedures. This problem is solved by providing the employee and staff with extensive training, organization special meetings among its employees and staff, and performing, monitoring and measurement methods. Besides these solutions mentioned above, consulting experts for their valuable advice is a must. (8)

2.3.4 A certified management system existed in 48% of the responding companies, and a further 30% of them planned to introduce such a system. This effectively this means that about 80% of the companies were concern with a management system, while 20% were not. Almost all were using or planed to use a standard related to International Organization for Standardization (ISO) 9000. A certified environmental management system existing in only 5% of the responding companies. However, a further 35% of the companies planed to introduce such system. Risk analysis is applied by 44% of the companies and a further 7% indicated that they have planed to use it in the futher. About one third of the companies responded that they have a program for safety and environment-the most being the Chemical Industries' Responsible Care Program. (5)

2.3.5 European business was thus faced with the challenges of implementing this legislation, following proliferation in the late 1980s and onwards of accredited qualities management systems (e.g., the ISO 9000 series). In some cases, the introduction of

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quality management systems has led to improvements in health and safety performance(Redman, Snape,& Willkinson,1995) and it is acknowledge in the UK and Spain that the principles of quality management apply equally to health and safety management (HSE,1997;Blazquez Martin, 1997. However in the case of small and medium enterprises (employing fewer than 500 employees), such emphasis on formalized management systems has been met with criticisms. In particular, UK SMEs considered BS 5750 (British Standard Intitution (BSI),1987. “costly,” “bureaucratic”,” “paper work driven” and “sales gimmick. Small and medium enterprises in the UK who have achieved BS 5750 described themselves as unwilling converts having been forced down the route by their customers who operate on a “no BS 5750, no contract” basis. (Redman et al.,1995). Undoubtedly this discomfort with accreditation of quality systems lies in the fact that many SMEs operate under simple and relatively informal management system (Storey & Westhead,1994) and some traditional approaches to management do not befit an organization concerned primarily with survival in a turbulent environment(Banfield, Jennings, & Beaver,1996). (9)

2.4 OH&S management system’s problem of SMEs

Within the UK, supporting small and medium enterprises in managing health and safety risk continues to be priority for the UK Health and safety commission (HSC, 1998) and they have undertaken several supportive actions (Borley,1997). A survey by the British Chambers of Commerce (1995) indicated that the majority of small and medium enterprises regarded health and safety as important, but adopted a “ common sense” approach to it. They also considered that regulations were too complex and time consuming and were reluctant to approach the UK Health and Safety Executive for fear it might stimulate a visit. Likewise, Spanish SMEs are also encouraged to participate in health and safety activities. The prevention of Risks at Work Act provides for mechanisms to promote improvements in health and safety management, particularly in SMEs (European Agency for safety and Health at Work, 1998). Given that steps have been taken to encourage SMEs in both the UK and Spain to actively manage health and safety, it is interesting to examine how SMEs in these countries currently manage health and safety. Furthermore, since SMEs in both countries have experienced the use of

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voluntary certification schemes for quality management, it was considered appropriate to assess interest in a scheme for health and safety management that would enable SMEs to gain recognition for achievement in health and safety management. As indicated, both countries operate within the scope of the Framework Directive, although there are differences between their legal frameworks for dealing with health and safety. (10)

2.4.1 Occupational health and safety management system is continually applied nationwide company. Between 1999-2002 Training Lead Consultancy Project of the Ministry of Industrial (TLC) supports these. Until now about 300 enterprises, which implement this program and about 33% pass certified.

Table 2-2 OH&S management system implementation status of Industrial in TLC PROJECT during 1999-2002

Size	System performance		
	Total	Failure	Success or certified
SMEs	51	38	13
Larges	52	16	36
Total	103		

From table 2.2, however, during 1999-2002 51 Small and medium enterprises meet target only 25.5 percentages and almost all ones have problems such as project had been stopped, delayed or canceled 74.5%. As the large sized enterprise meet target 69.2 percentages and have problem only 30.8 percentages. This is some reason of topic equation why small and medium enterprises that started in the same time frequently failed or delayed their program.

2.4.2 The number of people working in the small and medium enterprises sector is important when considering both the size and nature of occupational health and safety problems, and the strategies required for successfully delivering OHS information and services to that sector. In summary, while it would appear that small and medium

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enterprises has a lower overall incidence of work-related injury and disease, there is much to be done in terms of improving performance in terms of getting injured workers back to work and containing overall costs. For government, while it would appear that the same types of hazards need to addressed across all industry sectors, the challenge with small and medium enterprise is to reach the over one million small operating throughout Australia.

Consequences of Poor OHS performance for small and medium enterprise

The first one to five years of small and medium enterprise operation can be critical in the survival of a new business. Thirty percent (30%) of small and medium enterprises are considered unsuccessful in the first year of operation. A further 10% are considered unsuccessful at the end of a further four years. Using an incidence rate adjusted for 30% underreporting, a small and medium enterprise with less than 5 employees has a one in twelve (1:12) chance over a five year period, of losing a worker (25% of its workforce) as a result of a serious, compensated, work-related injury or disease. On average, an occurrence entails 119 lost working days at an average direct cost of $18,000. Most of these costs are offset by workers compensation insurance payments. However, there are many indirect costs associated with workplace injury and disease. These include costs for replacement workers, downtime, opportunity costs, lost contracts, etc. These costs are conservatively estimated as at least matching direct costs. In this example, this would be in the order of $18,000, none of which is recoverable through workers' compensation insurance. Consequently, work-related injury and disease occurrences can seriously threaten the financial viability and growth rate of a small and medium enterprise, particularly during the period when it is attempting to establish itself as a long-term ongoing concern. Underreporting: small and medium enterprise OHS performance would still be at least as good as the all industry average, and in some cases, significantly better than larger sized businesses.

2.4.3 Bill Glass said that small and medium enterprises were a widespread, fundamental and essential form of production. Yet, the workers who work in them frequently lack coverage by health and safety legislation and regulation, and lack adequate occupational health and safety services. Consequently, reflecting the unique

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characteristics of the small and medium enterprises, workers in them have greater exposures to work hazards. Current trends in the global economy were increasing the extent and the degree of exploitation of workers in small workplaces and, thereby, increasing the risk of exposure to hazardous chemicals. Appropriate international, national and local measures have been designed to diminish such risks and enhance the health and well being of those working in small and medium enterprises. As a result, workplace environmental conditions, which generally reflect available capital, are inevitably inferior to those in larger enterprises: cheaper raw materials will be purchased, maintenance of machinery will be reduced and personal protective equipment will be less available.(11)

2.4.4 The Small Workplace program is a nationwide action program for small workplaces. The program is being implemented during the period 1995-98. Its aim is to enhance the well being of small workplaces and their personnel, and to promote the company's activity by means of occupational health services, occupational safety and professional expertise. The small workplace program is making an extensive contribution to the working capacity and professional skill of people employed at small workplaces. Training plays a key role in activities for maintaining working capacity. It support the work done by employees, employers, and occupational health units to make the work environment, the work itself, and the work community more user-friendly, taking into the account the individual characteristics of employee. The program also seeks to motivated people to attend to their own capacity to work and ability to function. The working capacity of an aging employee, who may often display symptoms of poor health, can be improved by making it possible for the individual to the expand his or her the professional skills at the present job, which is often in a small and medium enterprise operating within a risk-prone sector.

The Small Workplace program functions on threes on three levels: 1) at the practical level in the workplace, through co-operation with the occupational health services; 2) at the sectoral level, though co-operation with the labor market organization and the authorities: and the 3) at the general level, though the media. The FIOH will compile the relevant information into pratical guidelines, booklets, checklists, manuals and databanks that can be utilized easily both by small and by occupational health service units. The

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services offered and the division of work between the Institute, the Ministry of Social Affair and Health, the Ministry of Labour and other institutions in the field will be agree upon. This program can be expected to approve the availability of services to small and medium enterprises, leading to better occupational health and safety as well as increased productivity in small and medium enterprises.(12)

2.4.5 The problems faced some of the common are:

1) disparate business environments
2) limited finanacial resourses
3) lack of a good distribution network

2.4.6 The data gained from the effectiveness of occupational health service in industry (in medium sized factories in Samutprakarn Province) by occupational health nurses study showed that training course provided were useful for them. However it difficult to implement due to budget, lack of support administration, and knowledge among managements. (13) The potential of SMEs in European economic growth has been recognized by the European Union and a number of supportive activities developed to improve the business environment for SMEs (European Commission, 1998). Projects aimed at facilitating improvements in environmental, health and safety, and quality management in SMEs gave been developed.

From occupational injuries and illness records it can be seen that trends for fatalities and industrial injuries are rising in Thailand from 1988-1996. In 1996 had the highest injuries 245,616 and fatalities 1,033 a circle of 13 years and was slow down after that. Observation of this data was suggested that the most workers were laid off because Thai economy has started problem in 1998.

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Table 2-3 Industrial Injuries in Thailand during1988-2000 (Year book of Labor statistics)

Type of Injuries/ Year	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Temporary Disability <3days	26,471	36,277	47,227	60,671	78,787	97,099	119,407	142,283	160,765	155,562	126,486	117,739	127,076
Temporary Disability >3days	20,937	24,519	29,934	38,871	50,248	53,023	61,411	67,626	78,829	68,480	55,489	50,239	48,338
Permanent Partial Disability	1,179	1,582	1,291	2,141	2,010	5,436	4,406	5,469	5,042	5,272	3,714	3,396	3,516
Permanent Total Disability	7	15	12	9	15	10	13	17	18	29	19	12	16
Death	282	373	564	581	740	980	816	940	962	1,033	790	611	620
Total	48,912	62,766	79,028	102,273	131,800	156,548	186,053	216,335	245,616	230,376	186,498	171,997	179,556

2.5 Key factors of a successful Occupational Health and Safety Management

A key tool for and effective safety and health program: In The Electricity Generating Authority of Thailand (EGAT), worker involvement is one of the key tools for an effective safety and health program. Five key tools known as " Pentagon model" (Figure 2-3) has guided practitioners for their project undertaking. A tool of worker involvement which has been introduced and wildly utilizes in EGAT cover quality circle, safety circle, suggestion system, and housekeeping activity. This mentioned technique fully supported from top management have been successful in this organization.

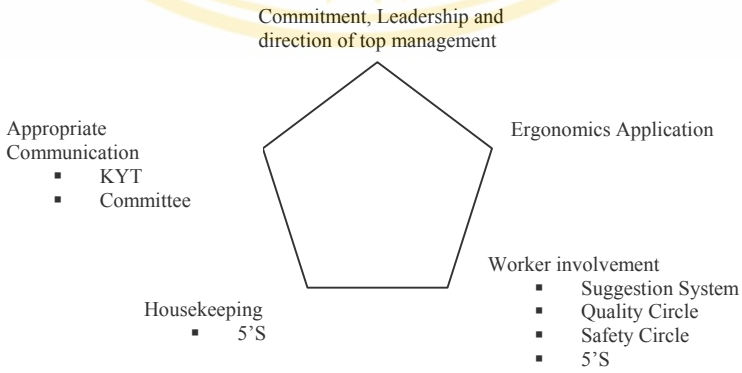

Figure 2-3 Pentagon model (14)

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The key to success in any business is policy and decision making process. Successful organizations are usually found amongst those with clear and unambiguous objectives supported by an effective management which directs and controls the organization. A successful management program requires program the application of conventional management system and techniques. It must be seen as part of the normal management of the company, making demands on management time and competing for available resources and cash in the same way as other relevant factors such as research and development, new machinery, wages and salaries and quality control.

A successful safety program must have the backing of top management and the cooperation of its employees. If top management is not interested in accident prevention, it is most likely that others in the management structure will reflect that attitude. And so will the workers-because they can sense and detect what's going on.

Employee safety programs are successful only when there is a genuine commitment by all of the management groups. Such commitment must filter down through the entire organization-from plant manager, to the line supervisor, to the employee. Mere lip service, regardless of any motivational principles, will eventually undermine the program and cause it to lose effectiveness. Safety, perhaps more than any other effort, requires constant and unrelenting vigilance.

Assignment of responsibility

It has always been an important gesture for top management to endorse safety programs. It made for good public relations. Today, it is imperative that top management become involved and participate in its safety programs because of the vast scope and potential consequences of new comprehensive state and federal legislation dealing with occupational safety and health. The role of safety in the American workplace is exemplified by the number and variety of regulations, law, and court decisions.

Therefore, the elements that top management must provide in order to have an effective safety program are:

1. Top management must provide a forceful and continuous leadership role in the safety program.
2. Plant layout, machines, and equipment must be made safe.

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3. Supervisors must be competent and must be safety trained.

4. Employee cooperation in accident prevention must be maintained.(15)

2.5.1 Management commitment to provide system support and intent: a successful occupational health and safety program requires recognizing hazards early and addressing them effectively. Companies can use several tools to effectively recognize, evaluate and control hazards.

Management must first adopt a proactive approach to occupational health and safety. Senior managements commitment and involvement are crucial factors in the success of a hazard identification, evaluation, and control program. Management has a key role in communicating an occupational health and safety-orientated vision, establishing policies and allocating resources. Effective management will produce work conditions and practices that result in job occupational health and safety. A management system that focuses on total quality management through continuous improvement will address occupational health and safety. Successful occupational health and safety performance is possible when the organization has a clear, well-communicated, performance-oriented vision for occupational health and safety. The vision must come from senior management and must be carried out by safety and health professionals, managers and employees, with senior management involvement throughout the process. Successful safety performance depends on the continuing involvement, interest and financial support of senior management. Table 2-4 identifies occupational health and safety considerations with respect to business issues.

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Table 2-4 Occupational health and safety considerations in business

Business issue	**Occupational health and safety considerations**
Financial	Consider the short- and long-term cost of adopting effective occupational health and safety standards versus the increased cost of workers' compensation claims, lost time and other direct and indirect costs associated with a less effective program.
Regulatory/ legal	Regulatory agencies aggressively enforce regulations; they can impose fines and cost operations interruptions. Companies and individuals may be held criminally liable for violations. The cast of litigating citations and proposed penalties against the company can lose some flexibility in how it allocates its resources. For uncontested violations, abatement must occur within the mutually agree upon time period.
Humanist	Protecting safety and health of employees is the humanitarian thing to do-a company's moral obligation—regardless of legal obligation.
Employee/ labor relations	Employee involvement is a major tool in achieving quality occupational health and safety. Consider areas in which employees can have a positive impact on safety performance.

Performance objectives help employees and management meet their occupational health and safety responsibilities by providing a target or benchmark against which to measure their progress. An action plan should be designed to help achieve objectives. The action plan consists of steps that, when accomplished, will result in achieving the performance objective.

The managing Director decides what the safety objectives are. It is difficult to justify aiming to be 'the best' but it is certainly practicable to be 'above average' or, 'better still', 'in the upper quartile'. Once the goals are set and the top management really committed, the OH&SMR can help to achieve those goals by turning them into a set of safety and environment principles or safety ethics backed up by relevant standards. (15)

A safety program must always start with top management-management that realizes its accident problems and demands safe operation. Top management's attitude toward

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accident prevention is almost invariably taken up by supervisors and employees. If the top executives are not genuinely interested in preventing accidents and the resultant injuries, no one else in the organization is likely to be. Any accident control program, therefore, must start with the top management's announced and demonstrated interest, if employee cooperation and participation are expected to be obtained. Employers or managers owe it to themselves and to their employees not only to promote safety and safe working conditions, but also to provide a safety policy implemented by rules that are enforced. Mere lip service-regardless of any motivation principles-will eventually undermine the program, which will lose its effectiveness. The time is right for American industry to do what it should have done long ago, and that is to properly educate and train workers concerning the safety and health aspects of their jobs.

Management's attitude toward the safety of its employees must be demonstrated in the form of a written policy statement and made known to all levels of management and employees alike. This policy should outline the organization's aims and objectives for its safety program and should designate the authority and responsibilities for achieving them. Because of the importance of an organizational safety policy and of making that position clear, many companies regard the safety and health policy as the cornerstone of their safety program. The policy should be given wide publicity and should set the pace for both management and worker responsibilities to the program. Its style of presentation should be as important as the clarity with which it identifies functional authority and responsibilities. (16)

5.2.2 Occupational Health and Safety Management Representative (OH&SMR): OH&SMR is a valuable resource in the efforts to attain safe operations. Ultimate responsibility for occupational health and safety rests with top management. The organization shall appoint a member of top management (e.g. in a large organization, a board or executive committee member) with particular responsibility for ensuring that OH&S management system is properly implemented and performing to requirements in all locations and spheres of operation within the organization. The organization's management appointee shall a defined role, responsibility and authority for:

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5.2.2.1 Ensuring that OH&S management system requirements are established, implemented and maintained in accordance with this TIS/OHSAS specification;

5.2.2.2 Ensuring the reports on the performance of the OH&S management system are presented to top management for review and as a basis for improvement of the OH&S management system.(15)

5.2.3 Employee involvement: employees are being given more and more responsibility in program implementation. By participating through various company-sponsored means such as teams and committees, the helps set performance goals, develop measures to gauge performance and have a vested interest in the program success.

By involving employees in the decision-making process, management affords them a greater sense of "owning" the resulting policies. Ownership translates into increased acceptance of and support for those activities. Management can facilitate a cooperative effort to improve the occupational health and safety program through employee participation.

Guidelines for Accountable employee involvement: Employee teams who perform well in the application of the behavior-bases safety process are guided by the following points.

1. They know their process—this means being able to understand and communicate the signature characteristics of behaviors-based safety.

2. They know their goals—this translates as specifics, achievable improvements for the site.

3. They know the barriers—resistance to change is natural; take stock of the barriers to implementation, plan to address them.

4. They know their resources—addressing barriers to archive site goals requires a detailed assessment of resources already on hand.

5. They know their needs—make a responsible shopping list of resources above and beyond those already available.

6. They know their action plan—this is a detailed schedule for the deployment of existing and acquired resources to overcome barriers and achieve goals.

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7. They know their progress—this requires ongoing soon-certain measures of the implementation effort itself. (17)

5.2.4 Safety awareness: there are three elements to achieving commitment to safety:

- Getting attention by
  - Reviewing recent incidents or their consequences from an individual viewpoint
  - Using photograph, records or other information
  - Using scenarios and tests
  - Etc.
- Achieving commitment: convince personnel that familiarity can lead to accidents to themselves.
- Maintaining involvement

Pooling knowledge and experience can generate major advances in safety and risk induction. Participation increase 'ownership' –a key element in implementing actions and changes—and achieving the goal of safety becoming 'everyone's business' so that nothing is so important that it can be done safely. (15)

5.2.5 Regulatory compliance management: effective regulatory compliance requires staying informed about current regulatory requirements and anticipating future issues. Compliance should be considered only a minimum standard. Successful occupational health and safety management system go beyond compliance and strive to manage risk to worker safety and health.

All employers have a general common law duty to provide a safe place of work, to provide proper plant and equipment, to organize and maintain a safe system of work and to employ competence people. The duty to train and supervise employees efficiently is implicit in both criminal law and civil law, including the provision of training, instruction and information to employees.

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5.2.6 Information collection**:** information is a key to decision making in all areas of business. For occupational health and safety, data can be use to determine workplace hazard and identify areas for improvement. The following components of successful occupational health and safety management system can help generate information:

- Regulations and relevant legal
- Injuries/illness/incident investigations
- Industrial hygiene surveys and other occupational health assessment
- Risk assessment
- Maintenance reports
- Plant layout and design
- Training of the workforce
- Etc.

Since management is dependent on the quality of the information it receives, it is essential that the company OH&SMR provides an adequate advisory service leaving executive decision to line managers.

ISO 9001 and ISO 14001 also support OHS-MS status because OHSAS 18001 is computable with the quality systems and environment systems standards, in order to facilitate the integration of quality, environmental and occupational health and safety management system by organizations. (18)

One of many attributes of well-managed enterprises that, in addition to producing a quality product or service, it will also invariably provides a safe working environment. In the successful company safe operation not a separate discrete function outside the mainstream activities, but an integral part of everyone's job and hence part of the management process. Safety management is one component of quality management system which should be based on a national or international quality assurance standard. An effective safety management system influences every aspect of company operation as well as the management of safety:

- Corporate strategy, attitudes and ethics;
- Company image;
- Investment decision;
- Cost and budgetary control;

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- Product reliability and standards;
- Personnel policies;
- Personnel development and career planning;
- Employee participation and consultation;
- Employee motivation and commitment;
- Operating policy and procedures;
- Environment management;
- Use of information technology.

5.2.7 Motivation, Behavior and Attitudes: motivation involves moving people to action that supports or achieves desired goals. In occupational health and safety, motivation increases the awareness, interest and willingness of employees to act in ways that increase their personal safety and that of co-worker, and that support an organization's stated goals and objectives. Motivation aims primarily at changing behavior and attitudes and is generally defined by tree factors: direction of behavior, intensity of action and persistence of effort.

5.2.8 Training and Orientation: today, organization must comply with a multitude of new regulations include standard requirement such as ISO 9001 ISO 14001 etc. training and education are among the most important functions in an organization today because knowledge is growing exponentially. Information has become the commodity of the future; learning is how it is acquired. ISO 9000 is a set of five universal quality system standards. They state requirements but do not dictate how to meet them. ISO certification is accomplished by a third-part audit. Training is required in the first tree ISO phases, as showed in table 2-5

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Table 2-5 ISO Training Requirements

Phase	Objectives	Training
1	Gain management commitment and involvement and develop a strategic plan	Senior management receives an introductory session to ISO 9000 then works to develop a plan.
2	Develop an organization to implement ISO 9000	Train the people who will be implementing the standards, so they are familiar with them.
3	Identify and develop procedures, policies, and practices to meet requirements; prepare a quality manual and documenting system	Include a training program that provides instruction and hands-on experience in writing the manual. Extensive training is required for people who will be conducting the internal ISO 9000 audits.
4	Achieve independent registration	

A series of occupational health and safety training courses was conducted in Thailand to transfer ready-to-use safety and health information directly to the workers' representative and to develop their leadership for self-generating health promotion activities. For joint cooperation between workers' representative and expert, participatory approach emphasizing small group discussion technique was used. Our experience confirmed that successful training courses could be built on the workers' own safety and health experiences and ideas. Practical measures were discussed and recommended. (3)

The company should lay down minimum standards of training aims at ensuring that personnel are aware of the hazards association with their work, the control measures necessary to minimize the risk of personal harm, or loss or damage to property or the environment. The training standards are designed to inform all concerned who should be trained and the standard they should reach, thus ensuring uniform and consistent implementation. (15)

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Employee Safety Training

Employee safety training should being on the first day at the workplace and should continue periodically for the length of the worker's affiliation with the company. It should being in the form of a formal safety indoctrination program on the worker's first day at work. Training is one of the best methods that can be used to influence human behavior for the purpose of developing sound and work habits.

A safety training program is needed:

1. for newly hired employees
2. for employees reassigned to other jobs
3. for employees returning to work after an extended lay-off period or medical leave
4. when new equipment and processes are introduced or installed in the workplace
5. whenever the need arises to improve and update safe work practices and procedures

There is no set of objectives that will serve all organizations and all situations. Each set must be designed and developed to meet its own circumstances and special needs. Many organizations with good safety records believe that continuous safety training, supported by a sincere positive attitude on the part of management, is the key to a successful safety program. (16)

5.2.9 Organization Communications: management leadership that clearly communicates an occupational health and safety vision supported in word and action. Management policies are key information to communicate. An occupational health and safety policy statement is a key communication tool to show management's commitment and involvement. Different types of communications examined here are oral, written, action and mechanical devices. Filter that hamper understanding include knowledge, biases, moods and physical and mental limitations.

Defining Communication: communication is an exchange of information. One-way communication make the sender has no way to ensure that the message was received and

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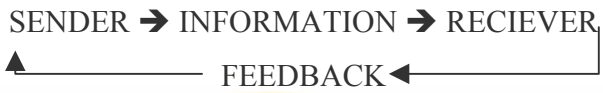
understood correctly. To be effective, communication must include feed back; it must be two-way. A more effective model is:



With the feedback showed in this model, the sender can more certain that the intended receiver actually received and understood the message.

Occupational Health and Safety program facilitate two-way communication between workers and management. It also makes the relationship between management and worker closer. Management should be aware that if workers are given the right to information, the right to participation and the right to refuse dangerous work, they can influent the work environment significant. This will result in effective injury prevention and loss control program in the organization. There is thus no single channel of worker involvement, no single means of promoting it. (14)

5.2.10 Environmental Management: occupational health and safety and environmental management have many similarities. The all focus on identifying and controlling hazards. Whereas occupational health and safety management address hazards to people in the workplace, environmental management broadens the focus to people and other living things in the surrounding community and in other places affected by organizations operations. As with occupational health and safety management, effective environmental management requires careful assessment of environmental hazards and their solutions followed by prioritization and action. This process involves evaluating all business operations for existing and potential adverse environmental effects and compliance issues, identifying solutions to eliminate or minimize the impact, and, where feasible, implementing them.

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5.2.11 Implementation team planning and staffing: an effective occupational health and safety management system addresses issues associated with work force planning, staffing and placement. Occupational health and safety rules or requirements, are usually part of a company's safety and health program. Keys to success of work rules include employee involvement in their development, effective communication and consistent enforcement. Implementation team is one-way employers address personal problems that can affect an employee's ability to perform on the job. These system can be an important pert of a safety and health effort.

Staff organizations generally encompass both supervisory and non-management persons such as engineers, time-study people, labor relations people, and "front-office" types. They generally give some from of service or direction to production and other shop-related departments within the organization. Hence, they, too, are exposed to the same workplace environment, as are the employees. Subsequently, the nature of their decisions or recommendations can at times create an impact on the safety performance of the departments they service or partially control. Therefore, it is equally important that they understand the responsibilities and accountability in the various levels of line management and act accordingly. (16)

5.2.12 Time management and Follow up: knowing where and how specific safety policies and programs are succeeding or failing is crucial to continuous improvement. Management must be establishing standards for assessment reports and procedures for follow-up that facilitate continuous improvement. (19) The key person is the chief Executive, who must understand and recognize the importance of safety, health and environmental protection so the proper judgments may be made and clear policies generated. The chief Executive has the prime responsibility and is the ultimate custodian of authority. This means ensuring that there is an effective monitoring system in place and working, to allow confirmation that agreed actions are being implemented and progress is being made towards the company objectives and goals. (15)

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CHAPTER III
MATERIALS AND METHODS

3.1 Study design

This study was descriptive study which were determined problem and the key success factors to complete Occupational Health and Safety management system for small and medium enterprises (SMEs) appropriate.

3.2 Population and sample groups

Population: The study population was all of the enterprises, which were developed an OH&S Management system in 1999-2001 and subscribed in Training Lead Constancy (TLC) Project of Thai Industrial Standard institute, Ministry of Industry. Thailand.

Sample: The sample used for this research were OH&SMR or relevant person who directly in charge with OHS-MS implementation in each enterprises.

The sample size: Researcher calculated sample size from the following formula, when sampling is from an infinite population. (20)

$$n = \frac{z^2_{1-a/2} P(1-P)N}{d^2(N-1) + z^2_{1-a/2} P(1-P)}$$

n = sample size

P = proportional of the answer in the positive direction = 0.5 (24)

1-P = proportion of the answer in the negative direction =0.5

d = maximal error that allow to happen (0.05)

z = normal standard score from z-table at α =0.5 value =1.96

$$n = \frac{(1.96^2) + (0.5)(0.5)103}{(0.05^2)(102) + (1.96^2)(0.5)(0.5)} = 82 \text{ enterprises}$$

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From equation above the sample size should not less than 82 enterprises in the study, however, in order to the high efficiency all population were criteria in this study.

3.3 Instrumentation: Questionnaire

This study used two questionnaires instrument; first, the pre-assessment report which audit by the system consultant from National Petrochemical Public company limited on the last phase of TLC project. The enterprise would be evaluated by system and compliance audit for determined what were they implementation status of OHS-MS on TLC project. The second, the primary data will be collected by this questionnaire which created by the researcher.

The questionnaire form was created by researcher for compare the key success factors which drive the management system success between small and medium enterprises and the larger ones. Data were gathering through questionnaires distributed to successful-implemented OHS-MS group and the unsuccessful implement OHS-MS group between small and medium enterprises and the larger enterprises. The content of questionnaire form is divided into two parts namely:

Part I General information: This part contained questions regarding characteristic of the enterprise, number of employees, capitalization, race of top management, OH&S management implemented status, safety representative, and ranking of the reasons for company to be active in this system.

Part II Question for determined the key success factors and problems from the organizations that were applied OH&S management system complete: This part is the tool for determined the problems from small and medium enterprises and compare with its in the success of enterprises. It is contains of seven items or 39 questions as table 3-1 below. A postal questionnaire developed, which comprised a mixture of multiple choice and open-ended question.

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Table 3-1 Table of the program management scoring

Key success factors for OHS-MS	Score				Remark
I. Management's commitment and support (20%)					
1. Management by objective	0	-	-	10	
2. Time frame	0	-	-	10	
3. Participation and carefulness	0	1	2	3	
4. Budget support	0	5	10	15	
5. Knowledge and competence support	0	-	-	10	
6. Responsibility, authority and assignment	0	5	10	15	
7. Monitoring and evaluation	0	5	10	15	
8. System need	0	-	-	10	
II. OH&SMR (10%)					
1. Sex	-	-	-	-	
2. Age	-	-	-	-	
3. Education	-	-	-	-	
4. Business relation	-	-	-	-	
5. Work experience	-	-	-	-	
6. OH&S management experience	-	-	-	-	
7. Job title	-	-	-	-	
8. OH&S Competence and application	1	2	3	4	
9. Management system competency	1	2	3	4	
10. OH&S Training	0	5	10	15	
11. Vision	0	-	-	10	
III. Initial system status (15%)					
1. -27. Questions	0	-	-	10	
IV. The reasons for OH&S management system applied (20%)		(1/11)			

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Table 3-1 Table of the program management scoring (Continued)

Key success factors for OHS-MS	Criteria				Remark
V. Implementation team (15%)					
1. Keep objective and target clear	1	2	3	4	
2. Team selection	0	5	10	15	
3. Competence and application	0	1	2	3	
4. Requirement	1	2	3	4	
5. Legislation	1	2	3	4	
6. Management system competency	1	2	3	4	
7. OH&S Training	0	5	10	15	
8. Participation	1	2	3	4	
9. Time management	5	10	15	20	
VI. Employee involvement and cooperation (15%)					
1. Education	-	-	-	-	
2. Safety awareness	1	2	3	4	
3. Activity participation	0	-	-	10	
4. Cooperation	1	2	3	4	
VII. Communication (5%)					
1. Sources of information	0	(1/7)			
2. Opinion	0	-	-	10	
3. Communication	0	5	10	15	
4. Books, handbooks, publication	0	5	10	15	
5. OH&S Training	0	-	-	10	

Program measurement

Below 40	Poor or ineffective program
40-70	Fair program with inconsistent results
71-90	Good program, results show improving safety performance
91-100	Outstanding safety program with excellent results

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Scoring method

The value of each question or item in the questionnaire is indicated in parentheses following the question. Points are attained in three different ways:

1. When the question has a Yes or No answer, points are awarded on an "all or nothing" basis. If a Yes answer can be substantiated without reservation or exception, award the full value. In any other case, no points are awarded.

2. When a question has several possible answers or compliance could vary in degrees, partial scores can be awarded. This is indicated by a value for each part, a diagonal line, and the total value of the question, such as "1/7" (indicating one point for each of seven possible answers.).

3. When the degree of compliance could be partial, the score is based on percentage of compliance. Multiply the percentage of compliance measured by the number to calculate the value to be awarded for that question.

This scoring method and program measurement are applied from Chevron's rating process (21) and International Safety Rating System's award scoring. (22)

3.4 Production and the test of the instrument

1. Study and review theories and literature in order to set up questionnaire.

2. The questionnaire was created to find out the key success factors and problems from the organizations that were applied OH&S management system.

3. All of contain imply the objective of this thesis.

4. The theoretical framework and the revision literature were considered by the researcher in order to check content validity. The questionnaire form was future improved by the experts for the qualified content validity. It should be modified to be the try out questionnaire form.

5. The try out questionnaire form was introduced to 30 enterprises which were not a target population (The enterprises were applied in Training Lead Consultancy Project of the Ministry of Industrial (TLC) which 7 successful-and 23 non-successful enterprises during January-May, 2002) in order to test the content validity by four subject matter specialists and reliability analysis by Conbrach's Alpha Coefficient technique. It is showed which reliability coefficient (Alpha) passed 0.8492 for multiple-choice questions

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and 0.8994 for yes or no answer (Alpha of reliability coefficient should not more than 0.70). It should be modified to be the final questionnaire form in term of simplified and suitable language. After that the experts examined it for the most suitable and simplified language.

6. Finally, the final questionnaire form was issued to be the instrument in this study.

3.5 Data collection: data were collected by the following steps:

3.5.1 The information such as the number, contact person or OH&SMR, and list of success and non-success enterprises which joint with TLC project between 1999-2002 find out from training section, Thai Industrial Standard Institute, the Minister of Industrial and Safety and environmental business service center, National Petrochemical public company limited.

3.5.2 The enterprises that were criteria this scope were contacted by only the researcher before sent the questionnaire in order to guide them about what and how to do. In additional, the OH&SMR each enterprises were informed about the purpose of the study again after they received questionnaire. Then they were also clarified about the steps of data collection.

3.5.3 All questionnaires were identified due date (about two weeks) for sent back data to the researcher.

3.5.4 Before 2 days due date the researcher asked contact person again so as to confirm the completely data which required or suggest some item that not clear. The particularly, repeat due date again to should sent data back.

3.5.5 The answer questionnaires were proved data as upon the criteria and called the contact person back again if needed any further information for fulfills the complete answer.

3.5.6 The data obtained was preceded and analyzed statistically with appropriate computer statistical software.

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3.6 Statistics

3.6.1 Descriptive analysis: They were showed by the frequency and percentage.

3.6.1.1 The characteristic of enterprises; industry type, race of top management, safety officer at professional level, existing OHS-MS implemented status, and education of the employee.

3.6.1.2 The results of key success factors for OHS-MS implementation; management's commitment and support, OH&SMR's characteristics, initial system status, the reasons for occupational health and safety management system applied, implementation team, employee involvement and cooperation, and communication.

3.6.1.3 Ranking of the reasons which were influenced the OHS-MS implementation. (Analyzed by frequency, percentage and ranking)

3.6.2 Analytical analysis:

3.6.2.1 Test of normality by Kolmogorov-Smirnov test

3.6.2.2 General characteristic of the enterprises and OH&SMR, each of seven key success factors, overall program management, and duration depend on industry size were compared means by independent-sample t-test.

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CHAPTER IV
RESULTS

The results of this study were presented in three parts as the following:

Part 1 The characteristic of enterprises, personal factors, existing OHS-MS implemented status

Part 2 The results of key success factors for OHS-MS implementation. They were analyzed by each part and entire factors in seven items. It is contains of management's commitment and support, OH&SMR's characteristics, initial system status, the reasons for occupational health and safety management system applied, implementation team, employee involvement and cooperation, and communication.

Part 3 the comparison of program management scores of seven key success factors and duration for set up OHS-MS implementation

Part 4 Ranking of the reasons which are influenced the OHS-MS implementation.

The result of responded of questionnaires

The number of questionnaires sent out to 103 enterprises (all population) though the sample size which minimum required 82 enterprises. The number of replies can be seen in table 4-1. It can be noted that 84 enterprises (81.6% response rate) responded were received from all sizes, however it was more than the sample size. It was found that overall response rate the questionnaire in successful-implemented OHS-MS group (98% response rate) is higher than the unsuccessful implementation OHS-MS group (66.7% response rate).

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Table 4-1 Number of responded questionnaires

Size	Successful-implemented OHS-MS			Unsuccessful implementation OHS-MS		
	No. Sent	No. Received	%Responded	No. Sent	No. Received	%Responded
SMEs	13	12	92.3	38	23	60.5
Larges	36	36	100.0	16	13	81.3
Total	49	48	98.0	54	36	66.7

Table 4-2 Distribution of responding enterprises classified as industry type and successful-implemented OHS-MS status

Status	Industry type	Industry size (%)	
		SMEs	Large enterprises
Successful-implemented OHS-MS	Food and kindred products	50.0	50.0
	Chemical and allied products	20.0	80.0
	Petroleum and coal products	0.0	100.0
	Plastic materials and synthetics	14.3	85.7
	Paper and allied products	66.7	33.3
	Motor vehicles and equipment	25.0	75.0
	Construction	50.0	50.0
	Metal industrial	0.0	100.0
	Others	20.0	80.0
Total		25.0	75.0

The number of questionnaires sent out to 49 enterprises in successful-implemented OHS-MS group. The number of replies can be seen in table 4-2. It can be noted that 66.7% response rate were received from paper and allied products, 50.0% response rate from food and kindred products and construction in small and medium enterprises. In the large enterprise, 100.0% response rate as showed in table 4-1. It was found that responded were

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from petroleum and coal product (100.0%), metal industries (100.0%), chemicals and allied products (80.0%), and other industry types (80.0%).

Table 4-3 Distribution of responding enterprises classified as industry type and unsuccessful implementation OHS-MS status

Status	Industry type	Industry size (%)	
		SMEs	Large enterprises
Unsuccessful implementation OHS-MS	Food and kindred products	57.1	42.9
	Chemical and allied products	75.0	25.0
	Petroleum and coal products	50.0	50.0
	Plastic materials and synthetics	81.8	18.2
	Paper and allied products	100.0	0.0
	Paint and allied products	0.0	100.0
	Construction	0.0	100.0
	Electric services	50.0	50.0
	Others	0.0	100.0
Total		63.9	36.1

The number of questionnaires sent out to 54 enterprises unsuccessful implementation OHS-MS group. The number of replies can be seen in table 4-3. It can be noted that responded were received from paper and allied products (100.0%), plastic materials and synthetics (81.8%), and chemical and allied products (75.0%) in small and medium enterprises. In large enterprise, it was found that responded were from construction (100.0%), paint and allied products (100.0%), and Electric services (50.0%).

From table 4-2 and 4-3, it showed that the numbers of replies from the large enterprises (75.0%) were more than five times of the small and medium enterprises (25.0%) in successful-implemented OHS-MS group. More than half of the responded questionnaire from unsuccessful implementation OHS-MS group was replied from small and medium enterprises (63.9%). The large enterprises sent back only 36.1%.

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Part 1 The characteristic of enterprises, personal factors, existing OHS-MS implemented status.

1.1 General characteristics of the enterprises

Table 4-4 General characteristics of qualitative variable of the enterprises

Qualitative variables	SMEs (N=35)		Large enterprises (N=49)	
	No.	%	No.	%
Industry type				
1. Food and kindred products	8	22.9	7	14.3
2. Chemical and allied products	8	22.9	10	20.4
3. Petroleum and coal products	1	2.9	7	14.3
4. Plastic materials and synthetics	10	28.6	8	16.3
5. Paper and allied products	4	11.4	1	2.0
6. Paint and allied products	0	2.9	1	2.0
7. Motor vehicles and equipment	1	2.9	3	6.1
8. Construction	1	2.9	2	4.1
9. Metal industrial	0	0.0	3	6.1
10. Electric services	1	2.9	1	2.0
11. Others	1	2.9	6	12.2

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Table 4-4 General characteristics of qualitative variable of the enterprises (Continued)

Qualitative variables	SMEs (N=35)		Large enterprises (N=49)	
	No.	%	No.	%
Race of top management				
1. Thai	24	68.6	31	63.3
1. Japanese	2	5.7	1	2.0
2. American	3	8.6	1	2.0
3. European	3	8.6	6	12.3
4. Thai-Japanese	1	2.9	10	20.4
5. Thai-American	1	2.9	0	0.0
6. American-European	1	2.9	0	0.0
Safety officer at professional level				
1. None	10	28.6	0	0.0
2. Part time	4	11.4	0	0.0
3. Bachelor degree in related field	6	17.1	14	28.6
4. Certification (180 hours training)	14	40.0	14	28.6
5. Both Bachelor degree & Certification	1	2.9	21	42.9
Existing OHS-MS implemented status				
1. Incomplete	23	65.7	13	26.5
2. Success	12	24.5	36	73.5
Mean (Months)	14.25		14.21	
SD	7.225		6.050	
Min	4		4	
Max	24		24	
Education of the employee				
1. Primary	4	11.4	2	4.1
2. High school	15	42.9	5	10.2

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Table 4-4 General characteristics of qualitative variable of the enterprises (Continued)

Qualitative variables	SMEs (N=35)		Large enterprises (N=49)	
	No.	%	No.	%
3. Diploma	6	17.1	28	57.1
4. Bachelor	6	17.1	13	26.5
5. Master or higher	4	11.4	1	2.0

The population was full selected among 103 enterprises from TLC project between 1999-2001 and divided two group as presented in table 4-1,4-2, 4-3 and table 4-4. The top three of them were chemical and allied product (21.4%), plastic materials and synthetics (21.4%) and chemical and allied products (17.9%). Most of the industry type in small and medium enterprises was plastic materials and synthetics (28.6%) and one in the large enterprises was chemical and allied product (20.4%). The majority of the race of top management supported that introduced OHS-MS was Thai (65.5%), Thai-Japanese (13.1%) and European (10.7%) as the same portion from small and medium enterprises and the large ones. The most of race of top management in small and medium an enterprise was Thai (68.6%), American (8.6%), and European (8.6%), whereas in the large enterprises was Thai (63.3%), Thai-Japan (20.4%), and European (12.3%).

In this study found that in the enterprises hired safety officer who had certification-180 hours training (33.3%), both bachelor degree in related field and other person who got certification (26.2%), only bachelor degree (23.8%), not all of them had safety officer (11.9%), safety officer in part time (4.8%). This study presented that two fifth of them graduated by certification (40.0%), not all of small and medium enterprises had them (28.6%), and bachelor degree (17.1%). All of the large enterprise had both bachelor degree in related field and other person who got certification (42.9%), certification (28.6%) and bachelor degree (28.6%).

Almost of enterprise had been succeed in OHS-MS (57.1%), and in complete (42.9%). In small and medium an enterprises had the number of success (24.5%), and incomplete (65.7%), whereas the large enterprise success (73.5%), incomplete (26.5%). Duration for set up OHS-MS similarity in both groups ranged 4 to 24 months with a mean

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score of 14.25 (SD=7.225) in small and medium an enterprises, 14.21 (SD=6.050) in the large. Education level of the employee had diploma (40.5%), high school (23.8%), bachelor degree (22.6%), primary school (7.1%), and master degree or higher (6.0%). The most of them in small and medium an enterprises had high school (42.9%), diploma (17.1%), and bachelor degree (17.1%), whereas more than half of them in the large enterprises had diploma (57.1%), bachelor degree (26.5%) and high school (10.2%).

Table 4-5 The comparison of general characteristics of top management by size

Race of top management	SMEs (N=35)		Large enterprises (N=49)		Total	χ^2 (df=2)	p-value
	No	%	No	%	No.		
Thai	24	43.6	31	56.4	55	4.063	0.131
Foreign	9	52.9	8	47.1	17		
Thai &foreign	2	16.7	10	83.3	12		

p<0.05

It was revealed that the general characteristics of them in small and medium enterprises group and larger ones as following: race of top management among three types of race was not statistically significant difference.

Table 4-6 The comparison of safety officer at professional level by size

Safety officer at professional level	SMEs (N=35)		Large enterprises (N=49)		Total	χ^2 (df=1)	p-value
	No	%	No	%	No.		
No	14	100.0	0	0.0	14	23.520	0.000
Yes	21	30.0	49	70.0	70		

p<0.01

Chi-Square test was processed to the comparison of means score. It was found that presented in table 4-6. In response to the first, third, fourth and fifth objectives of this study, to compared study between small and medium and large enterprises in 1) factors in applying effective OHS-MS, 2) to compare the key success factors of the effective OHS-

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MS between small and medium and large enterprises, this part showed that the characteristics of the personal factor were directly related OHS-MS implementation phase. It was revealed that the general characteristics of them in small and medium enterprises group and larger ones as following: safety officer at professional level (χ^2 = 23.520) was statistically significant between small and medium enterprises group and larger ones ($p<0.01$).

Part 2 The results of key success factors for OHS-MS implementation.

The score of program management in seven key success factors: the results are as following:

2.1. Management commitment and support

Table 4-7 Percentage of enterprise on items of management commitment

Qualitative variables	Scales	SMEs (n=35)		Large enterprises (n=49)	
		No.	%	No.	%
1. Management by objective		19	54.3	43	87.8
2. Time frame		13	37.1	42	85.7
3. Participation and carefulness	No need	7	20.0	1	2.0
	Poor	2	5.7	2	4.1
	Fair	11	31.4	11	22.4
	Good	15	42.9	35	71.4
4. Budget support	Yes	33	94.3	47	95.9
	Case by case	24	72.7	6	12.8

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Table 4-7 Percentage of enterprise on items of management commitment (Continued)

Qualitative variables	Scales	SMEs (n=35)		Large enterprises (n=49)	
		No.	%	No.	%
	Yearly budget	4	12.1	22	46.8
	Yearly& special budget	5	15.2	19	40.4
5. Knowledge and competence support		21	60.0	38	77.6
6. Responsibility, authority	Yes	28	80.0	47	95.9
	By individual	6	21.4	6	12.8
	By management	14	50.0	14	29.8
	By management & committee	8	28.6	27	57.4
7. Monitoring and evaluation	Yes	26	74.3	45	91.8
	Seldom	3	11.5	6	13.3
	Almost	15	57.7	5	11.1
	By plan	8	30.8	34	75.6
8. “OHS-MS is not useful and too expensive”	Disagree	28	80.0	44	89.8
	Agree	7	20.0	5	10.2

In table 4-7 it could be seen the most of enterprises thought that they need to set management by objective and the time frame before set up management system. However, one fourth of the enterprises were lack of participation or carefulness. They did not prepare it because their had not project information support, not priority, need require only comply minimum requirement as legislation, disagree from management or internal factor changed, etc. The scores of good participation and carefulness were 71.4% in the large enterprises and 42.9% in small and medium enterprises. It was presented by provided sufficient resources, business competition, priority, or management recognition, etc. Clearly, provided enough resources such as participation, knowledge and competence, assignment, and monitoring and evaluate frequency by plan from the management. It was different to management in OHS budget, responsible persons, and monitoring and

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evaluation. The most of small and medium enterprises provided OHS budget 72.7% as case by case, 50% set responsibility by management, 57.5% almost monitoring and evaluation project from management but it was not documented plan. The majority of large-sized enterprises was set budget 46.8% by yearly plan and 40.4% also support especially resources (if any), 57.4% set responsibility by management and committee, and follow up this project by documented planning. Some items showed that the similarities between two groups were knowledge and information provided 60.0% in small and medium enterprises and 77.6% in the large, and more than half of both group disagree with OSH-MS was too expensive and waste to implement in the organization.

2.2 Occupational Health and Safety Management Representative (OH&SMR)

In gender, age, education level, business relationship, job title, working experience, and occupational health and safety experience and to examine the relationship them with implemented OHS-MS status.

Table 4-8 OH&SMR's personal factors and other background characteristics data

Items	Scales	SMEs (n=35)		Large enterprises (n=49)	
		No.	%	No.	%
1. Sex	Male	27	77.1	44	89.8
	Female	8	22.9	5	10.2
2. Age (years)	20-29	2	5.7	2	4.1
	30-39	23	65.7	18	36.7
	40-49	8	22.9	24	49.0
	50-59	2	5.7	5	10.2

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Table 4-8 OH&SMR's personal factors and other background characteristics data (Continued)

Items	Scales	SMEs (n=35)		Large enterprises (n=49)	
		No.	%	No.	%
	Mean	36.8		40.43	
	SD	6.466		6.478	
	Min	27		26	
	Max	55		56	
3. Education	High school	2	5.7	1	2.0
	Diploma	7	20.0	0	0.0
	Bachelor	21	60.0	34	69.4
	Master or higher	5	14.3	24	28.6
4. Business relationship	Employee	28	80.0	48	98.0
	Self-employed	6	17.1	1	2.0
	Investor	1	2.9	0	0.0
5. Title	Vice president or higher	4	11.4	3	6.1
	Manager	16	45.7	14	28.6
	Safety manager	3	8.6	4	8.2
	Environment manager	2	5.7	1	2.0
	Safety& environment manager	2	5.7	9	18.4

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Table 4-8 OH&SMR's personal factors and other background characteristics data (Continued)

Items	Scales	SMEs (n=35)		Large enterprises (n=49)	
		No.	%	No.	%
	Management system manager	2	5.7	11	22.4
	Safety officer	3	8.6	3	6.1
	Other officer	3	8.6	4	8.2
6. Work experience	< 10	12	34.3	7	14.3
	10-19	16	45.7	30	61.2
	20-29	6	17.1	10	20.4
	30-39	1	2.9	2	4.1
	Mean	13.06		15.86	
	SD	6.782		6.949	
	Min	2		1	
	Max	30		34	
7. Work experience in occupational health and safety (OH&S) field	0	16	45.7	9	18.4
	1-9	15	42.9	29	59.2
	10-19	3	8.6	9	18.4
	20-29	0	0.0	1	2.0
	30-39	1	2.9	1	2.0
	Mean	36.8		40.43	
	SD	6.466		6.478	
	Min	27		26	
	Max	55		56	

The majority of OH&SMR include in this study were male (84.5%). About 77.1% of them were in small and medium and enterprises and 89.8% in the large ones. Their age ranged from 26 to 56 with a mean of 39 years old (SD=6.7), a mean of 36.8 years old

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(SD=6.466) in small and medium and enterprises and a mean 40.43 years old in the large ones. More than half of them had got bachelor degree (65.5%), whereas about one fourth reported master degree of education (22.6%). This trend of education level was similar in both small and medium and enterprises and large enterprises.

The most business relationships of the OH&SMR were employee (80.0%), self-employed or business owner (17.1%), and investor in small and medium and enterprises only (2.9%). The most OH&SMR's title in small and medium and enterprises were manager (45.7%), vice president or higher (11.4%), whereas the most of them in the large enterprises were middle-line management (28.6%), health safety, environmental and quality management system manager (22.4%) and vice president or higher (6.1%).

Years of work experience range from 1 to 34 years with a mean 14.7 (SD=6.9). About half of them had 10 to 19 years of work experience. Work experience in small and medium and enterprises were between 10 to 19 years (45.7%), less than 10 years (34.3%), however, the majority of them in the large enterprises had 10 to 19 years (61.2%) and 20-29 years (20.4%).

Years of work experience in occupational health and safety field ranged from 0 to 34 years with a mean 5.1 (SD=6.4). About half of OH&SMR had it in this field one to nine years (52.4%), not all of this field experience (29.8%), 10 to 19 years (14.3%), 3 to 39 years (2.4%), and 20-29 years (1.2%). The most of them whose had not get this experience (45.7%), and one to nine years (42.9%) in small and medium and enterprises, whereas half of them had one to nine years (59.2%), not all of them were worked to this field (18.4%), and got experience between 10 to 19 years (18.4%), as showed in table 4-6.

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Table 4-9 The comparison of general characteristics of OH&SMR by size

Personal factors of OH&SMR	SMEs (N=35)		Large enterprises (N=49)		Total	χ^2 (df=1)	p-value
	No	%	No	%	No.		
Age (years)							
< 36	17	63.0	10	37.0	27	7.425	0.006**
≥ 36	18	31.6	39	68.4	57		
Work experience (years)							
< 13	19	54.3	16	45.7	35	3.931	0.047
≥ 13	16	32.7	33	67.4	49		
OH&S work experience (years)							
< 6	25	43.9	32	56.1	57	0.351	0.554
≥ 6	10	37.0	17	63.0	27		
Title							
Manager or higher	29	40.9	42	59.2	71	0.127	0.721
Less than manager	6	46.2	7	53.9	13		

** p<0.01

The Levene's Test for quality of variance was introduced to determine equal variances. Then, independent-sample t-test was processed to the comparison of means score. It was found that presented in table 4-9. In response to the first, third, fourth and fifth objectives of this study, to compared study between small and medium and large enterprises in 1) factors in applying effective OHS-MS, 2) to compare the key success factors of the effective OHS-MS between small and medium and large enterprises, 3) problem in OHS-MS preparation phase, this part showed that the characteristics of the

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personal factor were directly related OHS-MS implementation phase. It was revealed that the general characteristics of them in small and medium and large enterprises as following: OH&SMR's work experience and wok experience in occupational and safety field were not statistically significant difference. OH&SMR's age at t=-2.533 ($p<0.05$) was statistically significant different.

Table 4-10 Percentage of OH&SMR on items of competence

Items	Scales	SMEs (n=35)		Large enterprises (n=49)	
		No.	%	No.	%
1. OH&S competency and application	Poor	5	14.3	3	6.1
	Fair	10	28.6	4	8.2
	Good	11	31.4	24	49.0
	Excellent	9	25.7	18	36.7
		Mean=2.69, SD=1.022		Mean=3.16, SD=0.825	
2. ISO 9000 competency	Yes	1	97.1	1	97.9
	Poor	6	17.6	2	4.2
	Fair	7	20.5	5	10.4
	Good	11	32.4	13	27.1
	Excellent	10	29.4	28	58.3
		Mean=2.66, SD=1.162		Mean=3.33, SD=0.966	
3. QS 9000 competency	Yes	5	14.3	7	14.3
	Poor	13	43.3	4	9.5
	Fair	7	23.3	4	9.5
	Good	4	13.3	9	21.4
	Excellent	6	20.0	25	59.5
		Mean=1.80, SD=1.324		Mean=2.84, SD=1.491	

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Table 4-10 Percentage of OH&SMR on items of competence (Continued)

Items	Scales	SMEs (n=35)		Large enterprises (n=49)	
		No.	%	No.	%
4. ISO 14000 competency	Yes	19	54.3	14	28.6
	Poor	9	56.3	11	31.4
	Fair	3	18.8	8	22.9
	Good	4	25.0	8	22.9
	Excellent	0	0.0	8	22.9
		Mean=0.77, SD=1.031		Mean=1.69, SD=1.461	
5. Others management system competency	Yes	31	88.6	35	71.4
	Poor	0	0.0	1	7.1
	Fair	0	0.0	0	0.0
	Good	3	75.0	6	42.9
	Excellent	1	25.0	7	50.0
		Mean=0.37 SD=1.060		Mean=0.96, SD=1.594	
6. OHS-MS implementation training or visiting	Yes	19	54.3	35	71.4
	1-2 courses	16	84.2	14	40.0
	3-4 courses	2	10.5	15	42.9
	>4 courses	1	5.3	6	17.1
6. Vision; interested in OHS-MS for achieving improvements health and safety	Disagree	4	11.4	2	4.1
	Agree	31	88.6	47	95.9

Note: Criteria; excellent ≥3.60, good =2.80-3.59, fair=1.60-2.79, poor < 1.60

An analysis of the characteristics of competence for OH&SMR were found difference in small and medium enterprises were good understand level in OH&S system competency and application (mean=2.69, SD=1.022), ISO 9000 (mean=2.66, SD=1.162), QS 9000 (mean=1.80, SD=1.324). And poor understand in ISO 14000 (mean=0.77, SD=1.031), other management system such as HACCP, TPM, etc. (mean=0.37,

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SD=1.060). They were learn OHS-MS implementing by train or visit other best practice enterprises between 1-2 courses (84.2%), 3-4 courses (10.5%) and more than 4 courses (5.3%). The number of OH&SMR 45.7% had not been provided additional courses because they had not information about the relevant training or it was not necessary because the consultant adequately supports them. The difference in the characteristics of competence for OH&SMR in the large-sized enterprises were excellent understand level in OH&S system competency and application (mean=3.16, SD=0.825), ISO 9000 (mean=3.33, SD=0.966), QS 9000 (mean=2.84, SD=1.491). And fair understand in ISO 14000 (mean=1.69, SD=1.461), other management system such as HACCP, ISO/IEC Guide 25, TPM, TQM, etc. (mean=0.96, SD=1.594). They were learned OHS-MS implementing by train or visit other best practice enterprises between 3-4 courses (42.9%), 1-2 courses (40.0%), and more than 4 courses (17.1%).

A part was similarity between both groups. The most OHS-MS presented that the OHS-MS are necessary to introduce this system for achieving implements in health and safety in small and medium enterprises (88.6%), 95.5% in the larger and disagree this ones (11.4%) in small and medium enterprises, (4.1%) in the larger.

2.3 Initial system status

Table 4-11 Percentage of enterprise on items of the initial OH&S status

Existing system	SMEs (n=35)			Large enterprises (n=49)		
	%	Mean(SD)	Level	%	Mean(SD)	Level
1) Risk assessment techniques	14.3	2.86 (0.355)	VI	61.2	2.86 (0.408)	VI
2) Site Plan	85.7	2.34 (0.873)	IM	93.9	2.86 (0.408)	VI
3) Process Flow Chart	94.3	2.69 (0.530)	IM	93.9	2.35 (0.948	IM
4) Legislation and other requirements	54.3	2.94 (0.236)	VI	85.7	2.53 (0.892)	IM

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Table 4-11 Percentage of enterprise on items of the initial OH&S status (Continued)

Existing system	SMEs (n=35)			Large enterprises (n=49)		
	%	Mean(SD)	Level	%	Mean(SD)	Level
5) OHS planning	45.7	2.89 (0.404)	VI	85.7	2.90 (0.306)	VI
6) OHS Job Description	45.7	2.80 (0.473)	VI	83.7	2.82 (0.486)	VI
7) OHS Organization	51.4	2.83 (0.453)	VI	93.9	2.86 (0.354)	VI
8) Material Safety Data Sheet	48.6	2.83 (0.514)	VI	81.6	2.82 (0.441)	VI
9) Warning sign	62.9	2.89 (0.323)	VI	95.9	2.78 (0.422)	VI
10) Permit to work system	31.4	2.74 (0.657)	VI	71.4	2.80 (0.577)	VI
11) Industrial hygiene measurement	40.0	2.77 (0.646)	VI	81.6	2.86 (0.540)	VI
12) Health check up (pre-placement)	37.1	2.60 (0.651)	IM	75.5	2.76 (0.480)	VI
13) Yearly health check up	77.1	2.94 (0.236)	VI	98.0	2.88 (0.331)	VI
14) Incident record	54.3	2.83 (0.568)	VI	93.9	2.86 (0.3540	VI
15) Accident investigation system	54.3	2.83 (0.453)	VI	91.8	2.90 (0.306)	VI
16) Safety committee	51.4	2.89 (0.530)	VI	98.0	2.84 (0.426)	VI
17) Safety program sustainable	8.6	2.43 (0.815)	IM	36.7	2.16 (0.965)	IM
18) 5 s	51.4	2.34 (0.639)	IM	79.6	2.53 (0.680)	IM
19) KYT	5.7	2.20 (0.833)	IM	26.5	1.98 (0.989)	MI
20) Safety day or safety week	20.0	2.43 (0.850)	IM	59.2	2.49 (0.617)	IM
21) Preventive maintenance	80.0	2.83 (0.382)	VI	98.0	2.90 (0.306)	VI
22) Training	62.9	2.97 (0.169)	VI	98.0	2.90 (0.306)	VI
23) Safety rule and regulation	77.1	2.97 (0.169)	VI	95.9	2.92 (0.277)	VI
24) Suggestion system	48.6	2.29 (0.893)	MI	83.7	2.59 (0.643)	IM
25) ISO 9001	57.1	2.49 (0.702)	MI	85.7	2.61 (0.606)	IM
26) ISO 14001	14.3	2.49 (0.702)	MI	65.3	2.47 (0.892)	IM

Note: 1. Criteria; VI (very important) ≥2.70,IM (important) =2.10-2.69, MI (moderately important)=1.20-2.09, LI (less or not important) < 1.20

2. Mean (SD) and level for the important of initial system used.

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A set of questions addressed the important of the method and system used by each enterprise. Some of the information obtained as follows. Almost all used process flow chart (94.0%), site plan (90.5%), preventive maintenance (90.5%) yearly health check up (89.3%), safety rule and regulation (88.1%). The most existing system in the small and medium enterprises had process flow diagram (94.3%), site plan (85.7%), and preventive maintenance (80.0%), whereas difference from the larger industries that had yearly health checkup, safety committee, preventive maintenance, and training (98.0%). KYT (5.7%), safety program sustainable (8.6%), ISO 14001 (14.3%) and hazard identification and risk assessment tools in small and medium enterprises were the least used option given, the same in the larger ones used KYT (26.5%), safety program sustainable (36.7%), hazard identification and risk assessment (61.2%) and ISO 14001 (65.3%).

A set of questions addressed the important of the method and system used by each enterprise. The information showed items of the initial OH&S status used were important for support OHS-MS implementation. It was presented that the items were very important (16 items), and important (10 items) in small and medium enterprises, and very important (17 items), and important (9 items) in the larger. However, it was considered that the majority which both groups scored similarity as showed in table 4-10 except site plan and health check up in pre-placement the large though that it was very important and they used the most of this system (93.9 and 75.5%), whereas the small and medium enterprises had used 85.7%(site plan) and 37.1% (health check up in pre-placement) and identified them at important level.

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2.4 The reasons for OH&S management system applied

Table 4-12 The reasons for application in OHS-MS project.

Key reason for OHS-MS implemented	SMEs (n=35)		Large enterprises (n=49)	
	No.	%	No.	%
Pressure from authorities	12	34.3	13	26.5
Pressure from insurance companies	0	0.0	0	0.0
Pressure from customers	5	14.3	14	28.6
Pressure from employees	6	17.1	10	20.4
Pressure from labor unions	3	8.6	1	2.0
Pressure from management or employers	23	65.7	41	83.7
Pressure from interest group	5	14.3	17	34.7
Pressure from competitors	17	48.6	16	32.7
Pressure from press or society	8	22.9	15	30.6
Publicity/image	27	77.1	28	57.1
Others	2	5.7	5	10.2

A summary of the most important reason for the enterprises to apply with OHS-MS issues can be found in table 4-11, which also showed data obtained in the small and medium enterprises and the large enterprises. The most reasons for introduced with OHS-MS according to this study were pressure from management or employer (76.2%), publicity/image (65.5%), pressure from competitors (39.3%), pressure from authorities (29.8%), pressure from press or society (27.4%). Pressure from labor union was the least reason and pressure from insurance company was not the reason of the options given.

In each group, the small and medium enterprises had the most reasons were publicity/image (77.1%), recognized from management or employers, (65.7%) and pressure from competitors (48.6%). The larger enterprises had the top three reasons as following; pressure from management or employers (83.7%), to publicity/image (57.1), and pressure from interest group such as interested party, investor, etc. (34.7%).

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2.5 Implementation team

Table 4-13 Percentage of Implementation team on items of competence and participation

Items	Scales	SMEs (N=35)		Large enterprises (N=49)	
		No.	%	No.	%
1. Keep objective and target clear	Poor	16	45.7	7	14.3
	Fair	6	17.1	5	10.2
	Good	7	20.0	18	36.7
	Excellent	6	17.1	19	38.8
		Mean=2.09, SD=1.173		Mean=3.00, SD=1.041	
2. Team selection	Yes	19	54.3	47	95.9
	By job description	4	21.1	7	14.9
	By (ISO) experience	4	21.1	14	29.8
	By involvement	11	57.9	26	55.3
3. OH&S competency and application	Poor	14	40.0	13	26.5
	Fair	13	37.1	19	38.8
	Good	8	22.9	17	34.7
	Excellent	0	0.0	0	0.0
		Mean=1.83, SD=0.785		Mean=2.08, SD=0.786	
4. Requirement TIS 18001/OHSAS 18001	Poor	15	42.9	3	6.1
	Fair	7	20.0	10	20.4
	Good	8	22.9	23	46.9
	Excellent	5	14.3	13	26.5
		Mean=2.09, SD=1.121		Mean=2.94, SD=0.852	

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Table 4-13 Percentage of Implementation team on items of competence and participation (Continued)

Items	Scales	SMEs (N=35)		Large enterprises (N=49)	
		No.	%	No.	%
5. Legislation	Poor	12	34.3	11	22.5
	Fair	11	31.4	8	16.3
	Good	8	22.9	19	38.8
	Excellent	4	11.4	11	22.5
		Mean=2.11, SD=1.022		Mean=2.61, SD=1.077	
6. ISO 9000 competency	Yes	32	91.4	48	98.0
	Poor	10	31.3	1	2.1
	Fair	8	25.0	7	14.6
	Good	9	28.1	21	43.8
	Excellent	5	15.6	19	39.6
		Mean=2.09, SD=1.222		Mean=3.14, SD=0.890	
7. QS 9000 competency	Yes	26	74.3	40	81.6
	Poor	17	65.4	6	15.0
	Fair	2	7.7	7	17.5
	Good	3	11.5	8	20.0
	Excellent	4	15.4	19	47.5
		Mean=1.31, SD=1.278		Mean=2.45, SD=1.555	
8. ISO 14000 competency	Yes	18	51.4	17	65.3
	Poor	14	77.8	14	43.8
	Fair	3	16.7	10	31.3
	Good	1	56	4	12.5
	Excellent	0	0.0	4	12.5

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Table 4-13 Percentage of Implementation team on items of competence and participation (Continued)

Items	Scales	SMEs (N=35)		Large enterprises (N=49)	
		No.	%	No.	%
		Mean=0.66, SD=0.765		Mean=1.27, SD=1.255	
9. Others management system competency	Yes	7	20.0	11	22.4
	Poor	1	14.3	0	0.0
	Fair	0	0.0	1	9.1
	Good	4	57.1	6	54.5
	Excellent	2	28.6	4	36.4
		Mean=0.60, SD=1.288		Mean=0.73, SD=1.411	
10. OHS-MS implementation training or visiting	Yes	15	42.9	31	63.2
	1-2 courses	13	86.7	17	54.8
	3-4 courses	1	6.7	4	12.9
	>4 courses	1	6.7	10	32.3
11. Participation	Poor	7	20.0	2	4.1
	Fair	12	34.3	9	18.4
	Good	11	31.4	24	49.0
	Excellent	5	14.3	14	28.6
		Mean=2.40, SD=0.976		Mean=3.02, SD=0.803	
12. Time management (hours/week)	< 2	23	65.7	16	32.7
	2-4	6	17.1	13	26.5
	4-6	4	11.4	10	20.4
	> 6	2	5.7	10	20.4

Criteria; excellent ≥3.60, good =2.80-3.59, fair=1.60-2.79, poor < 1.60

In table 4-13, the majority of implementation team in the large enterprises was represented from all interested party, they were clear objective and target, OHS-MS

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requirement, and ISO 9000 at good level. On the items of OH&S competency and application, legislation, QS 9000, and ISO 14000 fair understood level. And poor competency level on the item of others management system. More than half of them take additional course about OHS-MS implementation (63.2%), took 1-2 courses (54.8%), more than 4 courses (32.3%). and 3-4 courses (12.9%).

For the smaller ones were found that fair level at keep objective and target, OH&S competency and application, OHS-MS requirement, legislation, ISO 9000 and fair participation. On the items of poor scores were QS 9000, and ISO 14000 and others management system. Less than half of them take additional course about OHS-MS implementation (42.9%), took 1-2 courses (86.7%), 3-4 courses (6.7%)and more than 4 courses (6.7%).

They provided time to set up this management system almost between 2-4 hours per week and the almost level of participation was good.

2.6 Employee involvement and cooperation

Table 4-14 Percentage of employee on items of awareness and participation

Items	Scales	SMEs (N=35)		Large enterprises (N=49)	
		No.	%	No.	%
1. OH&S awareness	Poor	9	25.7	3	6.1
	Fair	15	42.9	8	16.3
	Good	9	25.7	25	51.0
	Excellent	2	5.7	13	26.5
2. Activity participation		25	71.4	46	93.9
3. Cooperation	Poor	9	25.7	2	4.1

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Table 4-14 Percentage of employee on items of awareness and participation (Continued)

Items	Scales	SMEs (N=35)		Large enterprises (N=49)	
		No.	%	No.	%
	Seldom	15	42.9	12	24.5
	Almost	8	22.9	21	42.9
	Every time	3	8.6	14	28.6

From table 4-14, the most of employee had been well perceived in occupational health and safety awareness in the large more than small and medium enterprises. Awareness involved the employee moving to action that supported or achieved desired goals. It's showed that the percentage of the employee participation in occupational health and safety activities were 93.9%, almost cooperation (42.9%) in the large enterprises and 71.4% in small and medium enterprises involvement, however, seldom cooperation (42.9%). The most reasons of they though that they had not take time off from busy routine job.

2.7 Communication

Table 4-15 Sources of information

Sources of OH&S issues	SMEs (n=35)		Large enterprises (n=49)	
	No.	%	No.	%
1. Trade association	4	11.4	6	12.2
2. Head office or industrial group	9	25.7	21	42.9
3. Federal of industry	11	31.4	29	59.2
4. Safety association	9	25.7	26	53.1

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Table 4-15 Sources of information (Continued)

Sources of OH&S issues	SMEs (n=35)		Large enterprises (n=49)	
	No.	%	No.	%
5. Visit to/contact with authorities	8	22.9	24	49.0
6. Health and safety journals	10	28.6	25	51.0
7. Others	5	14.3	6	12.2

Where do the small and medium enterprises find their information about occupational health and safety? This was addressed in one question and the responses are showed in table 4-15. The sources could be Federal of industry (31.4%), health and safety journals (28.6%), head office or industrial group (25.7%), and safety association (25.7%). Also the large enterprises used Federal of industry (59.2%), health and safety journals (51.0%), visit to/ contact with authorities (49.0%), and head office or industrial group (42.9%).

Table 4-16 The ways of communication

Items	Scales	SMEs (N=35)		Large enterprises (N=49)	
		No.	%	No.	%
1. OH&S issues	Yes	29	82.9	48	98.0
	1-3 sources	6	20.7	1	2.1
	4-6 sources	25	86.2	34	70.8
	> 6 sources	4	13.8	14	29.1
2. Opinion	Disagree	16	45.7	15	30.6
	Agree	19	54.3	34	69.4

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Table 4-16 The ways of communication (Continued)

Items	Scales	SMEs (N=35)		Large enterprises (N=49)	
		No.	%	No.	%
3. Communication	Yes	25	71.4	48	98.0
	1 activity	10	40.0	10	20.8
	2 activities	9	36.0	8	16.7
	≥3 activities	6	24.0	30	62.5
4. Books, handbooks, publication	Yes	20	57.1	46	93.3
	1-3 sources	12	60.0	3	45.7
	4-6 sources	7	35.0	21	37.0
	> 6 sources	1	5.0	17	17.4
5. Basic OH&S training		12	34.3	40	81.6

Both of the enterprises group had source of OHS-MS issues 4-6 sources and 1-3 books, handbooks or publication in occupational health and safety. The large provided communication 3 activities or higher (62.5%), whereas small and medium enterprises provided only an activity communication (40.0%) and never communication by anyway (29.6%). However the majority of them fairly good provided basic concept about OHS-MS for all employee (61.9%). Most enterprise thinks small and medium enterprises cannot compliance with all relevant legislation.

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Part 3 The comparison of program management scores of seven key success factors and duration for set up OHS-MS implementation

3.1 The comparison of key success factors between the successful-implemented OHS-MS in small and medium and large enterprises.

Table 4-17 The comparison of key success factors in successful-implemented OHS-MS

Key success factors	SMEs (N=12)		Large enterprises (N=36)		T (df=46)	p-value
	Mean	SD	Mean	SD		
1. Management commitment	76.23	14.443	88.35	13.256	-2.684*	0.010
2. OH&SMR	53.00	17.626	64.26	19.096	-1.748	0.087
3. Initial system used	64.81	20.981	82.66	12.980	-3.505**	0.001
4. Reason for OHS-MS applied	31.06	9.056	30.30	15.056	0.164	0.870
5. Implementation team	54.51	17.117	63.86	17.978	-1.577	0.122
6. Employees	84.26	7.7967	88.73	11.914	-1.213	0.231
7. Communication	53.36	21.085	63.84	16.528	-1.773	0.083
8. Overall program management	60.00	10.715	68.64	9.194	-2.706*	0.10

* p<0.05, ** p<0.01

Independent-sample t-test is the tool to compare the means key factor score of OHS-MS performance between the successful-implemented OHS-MS in small and medium enterprises group and the larger ones. Mean OHS-MS score in seven key success factors and overall program management were respectively as presented in table 4-17. According to the test result, initial system used between the successful-implemented OHS-MS in small and medium enterprises group and the larger ones was statistically significant difference at t= -3.51 (p<0.01). The mean OHS-MS performance of management

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commitment and support showed statistically significant different at t= 13.26, respectively ($p<0.05$). It was found that the characteristics of OH&SMR (t=-1.75), reason for OHS-MS applied (t=0.16), implementation team (-1.58), employees (-1.21), and communication (-1.77), and overall program management (–2.71) between the successful-implemented OHS-MS in small and medium enterprises group and the larger ones was not statistically significant difference.

3.2 The comparison of key success factors between unsuccessful implementation OHS-MS in small and medium and large enterprises.

Table 4-18 The comparison of key success factors in unsuccessful implementation OHS-MS

Key success factors	SMEs (N=23)		Large enterprises (N=13)		t (df=34)	p-value
	Mean	SD	Mean	SD		
1. Management commitment	43.92	29.697	61.71	28.117	-1.759	0.088
2. OH&SMR	41.26	15.682	57.95	14.038	-3.181**	0.003
3. Initial system used	38.50	20.589	66.87	19.187	-4.066**	0.000
4. Reason for OHS-MS applied	26.48	10.934	27.97	14.593	-0.348	0.730
5. Implementation team	28.34	18.672	41.99	15.633	-2.228*	0.033
6. Employees	52.17	32.684	75.21	27.085	-2.154*	0.038
7. Communication	26.47	28.105	46.56	23.976	-2.167*	0.037
8. Overall program management	37.38	16.902	53.67	13.359	-2.982**	0.005

*p<0.05, ** p<0.01

From Independent-sample t-test, the key factor score of OHS-MS performance between unsuccessful implementation OHS-MS in small and medium and large enterprises in tale 4-18 showed that the characteristics of OH&SMR (t= -3.18), initial

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system used (t=-4.07), and overall program management (t=-3.18), was statistically significant difference at p<0.01. Implementation team (t= -2.23), employees (t=-2.15), and communication (t=-2.17) was statistically significant different at p<0.05. However, two key success factors between unsuccessful implementation OHS-MS in small and medium and large enterprises were not statistically significant different.

3.3 The comparison of key success factors between successful-implementation OHS-MS and unsuccessful implementation ones in small and medium enterprises.

Table 4-19 The comparisons of key success factors in SMEs by OHS-MS performance

Key success factors	Incomplete (N=23)		Successful (N=12)		t (df=33)	p-value
	Mean	SD	Mean	SD		
1. Management commitment	43.92	29.697	76.23	14.443	-3.538**	0.001
2. OH&SMR	41.26	15.682	53.33	17.626	-2.074*	0.046
3. Initial system used	38.50	20.588	64.82	20.981	-3.566**	0.001
4. Reason for OHS-MS applied	26.48	10.934	31.06	9.064	-1.243*	0.223
5. Implementation team	28.34	18.672	54.51	17.117	-4.045**	0.000
6. Employees	52.17	32.684	84.26	7.797	-3.329**	0.002
7. Communication	26.47	28.104	53.36	21.085	-2.907**	0.006
8. Overall program management	37.38	16.902	60.00	10.715	-4.199**	0.000

* p<0.05, ** p<0.01

From Independent-sample t-test, the comparison of key success factors between successful-implementation OHS-MS and unsuccessful implementation ones in small and medium enterprises presented in table 4-19. According to the test result, management commitment and support (t=-3.54), initial system used (t=-3.57), implementation team (t=-4.05), employee (t=-3.33), communication (t=-2.91), and overall program

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management (t=-4.20) were statistically significant difference at p<001. In additional it showed that the characteristics of OH&SMR (t=-2.07) and reason for OHS-MS applied between successful-implementation OHS-MS and unsuccessful implementation ones in small and medium enterprises were statistically significant difference at p<0.05.

3.4 The comparison of key success factors between successful-implementation OHS-MS and unsuccessful implementation ones in the large-sized enterprises.

Table 4-20 The comparison of key success factors in the large-sized enterprises by OHS-MS performance

Key success factors	Incomplete (N=13)		Successful (N=36)		t (df=47)	p-value
	Mean	SD	Mean	SD		
1. Management commitment	61.71	28.117	88.35	13.256	-4.513**	0.000
2. OH&SMR	57.95	14.039	64.26	19.097	-1.087	0.283
3. Initial system used	66.87	19.187	82.67	12.980	-3.296**	0.002
4. Reason for OHS-MS application	27.97	14.593	30.30	15.056	-0.482	0.632
5. Implementation team	41.99	15.63	63.86	17.978	-3.881**	0.000
6. Employees	75.2	27.09	88.74	11.914	-2.441*	0.018
7. Communication	46.56	23.98	63.84	16.528	-2.854**	0.006
8. Overall program management	53.67	13.36	68.64	9.194	-4.440**	0.000

* p<0.05, ** p<0.01

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3.5 The comparison of duration for implements OHS-MS between small and medium and large enterprises.

Table 4-21 The comparison of duration for implement OHS-MS

Variable	SMEs (N=16)		Large enterprises (N=38)		t (df=52)	p-value
	Mean	SD	Mean	SD		
Duration	14.25	7.225	14.21	6.050	0.02	0.984

From Independent-sample t-test, this table showed that duration for implements OHS-MS between small and medium and large enterprises were not statistically significant different.

From table 4-17,4-18, 4-19, 4-20, and 4-21, it could be conclude as the objectives that gap analysis factors support system set up, the comparison of the key success factors of effective OHS-MS between small and medium enterprise group and the large enterprises group and within small and medium enterprises group were identified. The result showed that management commitment and support, initial system used and overall program management in between the successful-implemented OHS-MS in small and medium and large enterprises were statistically significant different. The six factors; the characteristics of OH&SMR, initial system used, implementation team, employee, communication, and overall program management between unsuccessful implementation OHS-MS in small and medium and large enterprises were statistically significant different, in additional it presented that all seven key success factors and overall management system between successful-implementation OHS-MS and unsuccessful implementation ones in small and medium enterprises were statistically significant different. The score of all performance was not find outstanding level in both industry sizes. The good program, results show improving safety performance 34.7% in large and 2.9% in small and medium enterprises, fair program with inconsistent results 57.1% in large and 61.2% in small and medium enterprises and Poor or ineffective program results 4.1% in large and 40.0% in small and medium enterprises.

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Part 4 Ranking of the reasons which were influenced the OHS-MS implementation.

Table 4-22 Frequency, percentage and ranking of the key success factors

Rank	SMEs (N=35)		Large enterprises (N=49)	
	Key success factors	Scores	Key success factors	Scores
First	Management commitment	335	Management commitment	467
Second	OH&SMR	250	Implementation team	355
Third	Implementation team	231	OH&SMR	349
Fourth	Internal factors	229	Internal factors	321
Fifth	External factors	186	Employees	281
Sixth	Employees	170	External factors	224
Seventh	Capitalizations	152	Initial system used	186
Eighth	Communication	147	Communication	175
Ninth	Initial system used	133	Size of enterprise	164
Tenth	Size of enterprise	110	Capitalizations	156

A summery of the factors which are influenced on the OHS-MS implementation for the enterprises to set up management system can be found in table 4-22, the priority for working with implementation matters according to this study was “management commitment and support”, followed by, “occupational health and safety management system (OH&SMR), “implementation team” which the top three important for all size industries.

For management commitment in the large enterprises mean that more than 80 percentages they prior in details of management by objective setting, time frame, budget support, responsibility, authority, evaluating and monitoring this project. Additional the safety awareness of them was also important and consistent with part 2 the result of key success factors for OHS-MS implementation. Because of sharply mission policy target and the strongly management commitment also has been aware and alert to involve from

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employee. Most of the small and medium enterprises (80%) recommended to the budget support were important indicated how much the management commit.

The second priority of the large-sized enterprises for OHS-MS recommended to working group or implementation team also important followed from management. The main determinations for this subject were team should be kept objective clear, and selection criteria for put the right man on the right job for gain experience from management system. They represented quality of project set up and duration. They experience in occupational health and safety techniques, ISO 9000, ISO 14001, or relevant management systems were supported to integrate or apply OHS-MS simply and efficiently. And this priority of the small and medium enterprises recommended to Occupational Health and Safety Representative (OH&SMR). The most of them were employer or shareholder, so they had authority and key of success for drive this project and enforce organization to success. OH&SMR was the key man to guide and control direction of implementation team that set up management system. Therefore the representative was more important than working team (3rd priority). The opposite from the large ones they prior the implementation team before OH&SMR who was management level employee. The reason shown that their organization always had been support occupational health and safety's activities, so load of this project was paper work at initial step before sent to OH&SMR for approved and reported to steering committee. The most representatives were appointed from a member of top management or executive committee member. Their competences of international management system were found that difference in small and medium enterprises were good understood in system and application. The organization's OH&SMR defined for ensure OHS-MS requirement are established, implemented and maintained in accordance with this specification and reported on the performance of OHS-MS to top management for review and as a basis for improvement of management system. The OH&SMR was the third priority for key success of this project in the large organization.

In the different factors was "initial system used" "size of enterprise" in small and medium enterprises, whereas "size of enterprise" and "capitalization" in the larger was the least priority of the option given in this management system.

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CHAPTER V
DISCUSSION

5.1 Discussion of study design.

This descriptive study was conducted to explore key success factors related to complete the effective of Occupational Health and Safety Management System (OHS-MS) for small and medium enterprises. The number of 103 enterprises which were applied in Training Lead Consultancy project (TLC project) of the Ministry of industry were all selected as the subjects. They were divided into two groups which successful-implemented and unsuccessful implementation OHS-MS group to compare between small and medium enterprises and the larger ones. There were four hypotheses; (1) the successful-implemented OHS-MS in small and medium enterprises and the large ones are different among the key success factors for OHS-MS, (2) unsuccessful implementation OHS-MS in small and medium enterprises and the large ones are different among the key success factors for OHS-MS, (3) the key success factors of successful-implementation OHS-MS and unsuccessful implementation ones in small and medium enterprises are different, (4) The key success factors of successful-implementation OHS-MS and unsuccessful implementation ones in large enterprises are different. These hypotheses were tested. The characteristic of the enterprises, personal factors, existing OHS-MS implemented status and ranking of the reasons which are influenced the system implementation were analyzed by descriptive analysis. The examination of relationship among each seven key success factors and overall program management, existing OHS-MS implemented status, and industry size was analyzed by correlation analysis. Additionally, in compare means analysis was used to analyze the comparison of program management scores of key success factors. The error of data collection and analysis might be occurred. Thus, the researcher controlled the errors by the lists below:

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5.1.1 Systematic error

5.1.1.1 Personal error: The result of qualitative on questionnaire may have an error from meaning or mislead objective. However, this study conducted by the researcher as guide the subjects about what and how to do according to collection procedures and activities in order to prevent any error.

5.1.1.2 Method error: the error can be occurred from the data collection and analytical method. In this study, to classified the population in two sizes by the number of employee and fixed assets. The researcher informed the purpose of the study before sent questionnaires and confirmed again to some item that they were not clear. Additional, verified with initial review report from their management system consultant.

5.1.1.3 Instrument error: The scoring method and program measurement is applied from Chevron's rating process, and International Safety Rating System's award scoring. To control the instrument error the researcher conducted the study as follows: first, the researcher created the questionnaire form considering on the theoretical framework and the revision literature. Moreover, the boundary and the construction of content were made covering all of the objectives in the thesis. Meanwhile, the researcher improved this instrument base on theory framework, review literatures and relevant management standard guideline. The instrument was examined for content validity by experts. Then it was introduce to 30 enterprises which were not a scope population in order to test the content validity and reliability coefficient. Finally, the questionnaire form was improved for simplification and suitability of the target.

5.1.2 Random error: Random error can be reduced by increasing the sample size. In this study a target population only 103 enterprises that applied in TLC project and the calculating sample size were 82 enterprises. They were calculated from normal approximation formula. The sample size was the amount of the program management scores of key success factors between industry size and OHS-MS implemented status which were available for the data collection. The researcher prevented other variation which may occur by an error. Thus the study was conducted by collected data from all population. The number of replies were 81.6% response rate that was very good criteria response rate for postal questionnaire statistics. Reference from Babbei E.R. (1973), mail

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questionnaires is low. Normally the first time the number of replies 30 to 40 %, then the researcher should distribute it again in the second or the third time for collect enough data. However the number of reply in finally almost 60 to 70%. From the record the response rate 50% is fair, 60% is good and 70% or higher is very good responded. It was similarity to response rates reported from other postal survey distributed to small and medium enterprises that were received 11.4-13.9% response rate from a comparative study health and safety management in UK and Spanish SMEs (5) and 2-42% responded rate in the European countries are returned in safety, health and environment in small plants survey. (9)

5.2 Discussion of study results.

The score of all performance was not find outstanding level in both industry sizes. The results showed that the most small and medium enterprises were poor to fair level safety performance (57.1% and 40%) whereas fair to good level safety performance in large enterprises. In details would be showed as follow:

5.2.1 The characteristic of enterprises, personal factors, existing OHS-MS implemented status.

In this study focused on small and medium enterprises and successful-implemented OHS-MS enterprises. It showed that the majority was chemical and allied products, and plastic materials and synthetics enterprises. Thai's industries were the most applied OHS-MS which set up by Thailand Industry Standard Institute as the similarity both two groups. In the large enterprises employ a full time safety officer at professional level by bachelor degree in related field and 180 hours training certification, the number of 18 percentages in small and medium enterprises did not employ safety officer at professional level. A part of reasons, they were out of scope of this legislation effect. Education level of the employee in small and medium enterprises was 42.9 % high school. There could also be a difference in the large-sized enterprises that the majority of employee was the diploma and bachelor degree. However, the data concerned the size of

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the enterprises was safety officer at professional level (t=-5.78) was statistically significant between small and medium enterprises and the larger ones ($p<0.01$). It was similarity to report from other survey distributed to small and medium enterprises in UK and Spanish. In most cases the small and medium enterprises did not employ a full-time health and safety professional and that health and safety management was only part of the respondent's job. (5) The owner of small and medium enterprises may have special problems in safety or in medical service, and is not likely to be in a position to hire trained experts in these fields such as a full-time safety professional, a full-time industrial hygienist, and accident prevention leadership. Still technical information about occupational health and safety is not available to the owner of small plant from many sources. (16)

Race of top management and education level of the employee was not statistically significant different. Almost of both enterprises group had been succeed in OHS-MS nearly as same as d incomplete it. For details, in small and medium enterprises had been unsuccessful implementation OHS-MS more than success about three times, the larger ones success more than incomplete about three times alike. Duration for set up OHS-MS implementation phase ranged 4 to 30 months with a mean score of 1.2 years (SD=0.5). This data was used to study the enterprises that introduced quality management system (ISO 9000) in electronics manufacturing. It supported that longer time to consume for set up; the more complicate or difficult to implement system success because of the continuous process might be loss.

5.2.2 The results of key success factors for OHS-MS implementation. They were analyzed by each part and entire factors in seven items. It is contains of management's commitment and support, OH&SMR, initial system status, the reasons for occupational health and safety management system applied, implementation team, employee involvement and cooperation, and communication.

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Management's commitment and support

The key to success in any business is policy and decision making process. Employers or managers owe it to themselves and to their employees not only to promote safety and safe working conditions, but also to provide a safety policy implemented by rules that are enforced. (4) Employee safety programs are successful only when there is a genuine commitment by all of the management groups. Such commitment must filter down through the entire organization-from plant manager, to the line supervisor, to the employee. Mere lip service, regardless of any motivational principles, will eventually undermine the program and cause it to lose effectiveness. Safety, perhaps more than any other effort, requires constant and unrelenting vigilance. In table 4-6 it could be seen the most of enterprises thought that they need to set management by objective and the time frame before set up management system. Successful organizations are usually found amongst those with clear and unambiguous objectives supported by an effective management which directs and controls the organization. A successful management program requires program the application of conventional management system and techniques. (15) However, one fourth of the enterprises were lack of participation or carefulness. They did not prepare it because their had not project information support, not priority, need require only comply minimum requirement as legislation, disagree from management or internal factor changed, etc. The scores of good participation and carefulness were 71.4% in the large enterprises and 42.9% in small and medium enterprises. It was presented by provided sufficient resources, business competition, priority, or management recognition, etc. Clearly, provided enough resources such as participation, knowledge and competence, assignment, and monitoring and evaluate frequency by plan from the management. It was different to management in OHS budget, responsible persons, and monitoring and evaluation. A successful safety program must have the backing of top management and the cooperation of its employees. (15) The most of small and medium enterprises provided OHS budget 72.7% as case by case. It must be seen as part of the normal management of the company, making demands on management time and competing for available resources and cash in the same way as other relevant factors such as research and development, new machinery, wages and

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salaries and quality control. (15) It has always been an important gesture for top management to endorse safety programs and assign the responsible person. It made for good public relations. Today, it is imperative that top management become involved and participate in its safety programs because of the vast scope and potential consequences of new comprehensive state and federal legislation dealing with occupational safety and health. The percentage of all sizes 50% set responsibility by management, 57.5% almost monitoring and evaluation project from management but it was not documented plan. The majority of large-sized enterprises was set budget 46.8% by yearly plan and 40.4% also support especially resources (if any), 57.4% set responsibility by management and committee, and follow up this project by documented planning. Some items showed that the similarities between two groups were knowledge and information provided 60.0% in small and medium enterprises and 77.6% in the large, and more than half of both group disagree with OSH-MS was too expensive and waste to implement in the organization. Therefore, the elements that top management must provide in order to have an effective safety program are:

1. Top management must provide a forceful and continuous leadership role in the safety program.
2. Plant layout, machines, and equipment must be made safe.
3. Supervisors must be competent and must be safety trained.
4. Employee cooperation in accident prevention must be maintained. (15)

Management's commitment and support had significant positive relation to OH&SMR, initial system used, implementation team, employee cooperation, communication. This has also been confirmed by policy, specialist, work place existing status and external factor (reason for apply system) has significant positive relation to management requirement and implementation status. (4)

The characteristics of OH&SMR

The majority of OH&SMR include in this study were male (84.5%). Their age with a mean of 36.8 years old (SD=6.466) in small and medium and enterprises and a mean 40.43 years old in the large ones. OH&SMR's age at $t=-2.533$ ($p<0.05$) was statistically

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significant different. More than half of them had got bachelor degree (65.5%) This trend of education level was similar in both small and medium and enterprises and large enterprises. The most business relationships of the OH&SMR were employee. The most OH&SMR's title in small and medium and enterprises were manager and vice president or higher, whereas the most of them in the large enterprises were middle-line management and specific position in health safety, environmental and quality management system manager. It was supported to make TLC project progress as following:

- Vice president or higher; full authority, quickly approved budget,
- Plant manager; well understand nature of hazard, process flow, organization culture, authority and making decision, directly report to top management, and command all department.
- Management system manager; good basic competence in management system standard and how to apply, directly responsibility.
- Safety manager or officer; directly responsibility, good competence and experience in OH&S field which can support by consultation.

OH&SMR's work experience and wok experience in occupational and safety field were not statistically significant difference. An analysis of the characteristics of competence for OH&SMR were found difference in small and medium enterprises that were good competence level in OH&S system competency and application, ISO 9000, QS 9000. And poor understand in ISO 14000, and other management system such as HACCP, TPM, etc. They were learned OHS-MS implementing by train or visit other best practice enterprises between 1-2 courses (84.2%), 3-4 courses (10.5%) and more than 4 courses (5.3%) in safety officer at basic level and introduction TIS 18001. The number of OH&SMR 45.7% had not been provided additional courses because they had not information about the relevant training or it was not necessary because the consultant adequately supports them. The characteristics of competence for OH&SMR in the large-sized enterprises were excellent competence level in OH&S system competency and application, ISO 9000, QS 9000. And fair understand in ISO 14000, other management system such as HACCP, ISO/IEC Guide 25, TPM, TQM, etc. They were learn OHS-MS implementing by train or visit other best practice enterprises between 3-4 courses

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(42.9%), 1-2 courses (40.0%), and more than 4 courses (17.1%). The advance courses that were provided for them as followings;

- Basic safety
- Lead assessor
- Safety management
- Introduction to OHSAS 18001
- TIS 18001 implementation (additional courses)
- OHS-MS requirement and legal
- Risk assessment
- Hazard and effect management
- HAZOP study
- Chemical hazard control
- Noise reduction program
- Accident investigation techniques
- Emergency responses plan
- Occupational health experience
- Safety at management level
- ISO 9001:2000
- ISO 14001
- Problem in TIS 18001 implementation

It was not necessary to take additional course in 28.6% in the large enterprises because the consultant adequately supports them. A part was similarity between both groups. The most OHS-MS presented that the OHS-MS are necessary to introduce this system for achieving implements in health and safety in small and medium enterprises because improved the systematic management, strong necessary for the employee to prevent the accident loss and return high profit, support to high productivity and moral.

OH&SMR is a valuable resource in the efforts to attain safe operations. Ultimate responsibility for occupational health and safety rests with top management. The organization shall appoint a member of top management (e.g. in a large organization, a board or executive committee member) with particular responsibility for ensuring that OH&S management system is properly implemented and performing to requirements in all locations and spheres of operation within the organization. The organization's management appointee shall a defined role, responsibility and authority for:

– Ensuring that OH&S management system requirements are established, implemented and maintained in accordance with this TIS/OHSAS specification;

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– Ensuring the reports on the performance of the OH&S management system are presented to top management for review and as a basis for improvement of the OH&S management system. (15)

Initial system status

A set of questions addressed the important of the method and system used by each enterprise. The information showed items of the initial OH&S status used were all important for support OHS-MS implementation. It was presented that the most items were very important (16 items), and important (10 items) in small and medium enterprises, and very important (17 items), and important (9 items) in the larger. This has also been confirmed by several studies (5) reported that steps have been taken to encourage SMEs in both the UK and Spain to actively manage health and safety, it is interesting to examine how SMEs in these countries currently manage health and safety. Furthermore, since SMEs in both countries have experienced the use of voluntary certification schemes for quality management, it was considered appropriate to assess interest in a scheme for health and safety management that would enable SMEs to gain recognition for achievement in health and safety management. ISO 9001 and ISO 14001 also support OHS-MS status because OHSAS 18001 is compatibles with the quality systems and environment systems standards, in order to facilitate the integrations of quality, environmental and occupational health and safety management system by organizations. (4) Additional occupational health and safety and environmental management have many similarities. The all focus on identifying and controlling hazards. Whereas occupational health and safety management address hazards to people in the workplace, environmental management broadens the focus to people and other living things in the surrounding community and in other places affected by organizations operations. As with occupational health and safety management, effective environmental management requires careful assessment of environmental hazards and their solutions followed by prioritization and action. This process involves evaluating all business operations for existing and potential adverse environmental effects and compliance issues, identifying solutions to eliminate or minimize the impact, and, where feasible,

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implementing them. The following components of successful occupational health and safety management system can help generate information.

- Regulations and relevant legal
- Injuries/illness/incident investigations
- Industrial hygiene surveys and other occupational health assessment
- Risk assessment
- Maintenance reports
- Plant layout and design
- Training of the workforce
- Etc.

Since management is dependent on the quality of the information it receives, it is essential that the company OH&SMR provides an adequate advisory service leaving executive decision to line managers. ISO 9001 and ISO 14001 also support OHS-MS status because OHSAS 18001 is compatible with the quality systems and environment systems standards, in order to facilitate the integration of quality, environmental and occupational health and safety management system by organizations. (4)

The reason for OHS-MS applied

A summary of the most important reasons for introduced with OHS-MS according to this study were pressure from management or employer, publicity/image, pressure from competitors, pressure from authorities, pressure from press or society. Pressure from labor union was the least reason and pressure from insurance company was not the reason of the options given. In each group, the small and medium enterprises had the most reasons were publicity/image, recognized from management or employers, and pressure from competitors. The larger enterprises had the top three reasons as following; pressure from management or employers, to publicity/image, and pressure from interest group such as interested party, investor, etc.

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Implementation team

The majority of team structure in the large enterprises that management and committee choose fit it a particular culture and organization. The objectives and targets that support the successful information of goal-implemented OHS-MS were clear before launce project. The advantage of selection team that they had knowledge in management program, basic safety and experience in process or job was support strongly cooperate between department involvement and progress on schedule with high commitment to meet target. Guidelines for Accountable teams who perform well in the application of the behavior-bases safety process are guided by the following points.

1) They know their process—this means being able to understand and communicate the signature characteristics of behaviors-based safety.

2) They know their goals—this translates as specifics, achievable improvements for the site.

3) They know the barriers—resistance to change is natural; take stock of the barriers to implementation, plan to address them.

4) They know their resources—addressing barriers to achieve site goals requires a detailed assessment of resources already on hand.

5) They know their needs—make a responsible shopping list of resources above and beyond those already available.

6) They know their action plan—this is a detailed schedule for the deployment of existing and acquired resources to overcome barriers and achieve goals.

7) They know their progress—this requires ongoing soon-certain measures of the implementation effort itself. (22)

In the large enterprises had OHS-MS requirement, and ISO 9000 at were a good level. On the items of legislation, QS 9000, and ISO 14000 fair understood level. And poor competency level on the item of others management system. More than half of them take additional course about OHS-MS implementation as following courses:

- Basic safety
- Lead assessor
- OH&SMR responsibility
- Accident investigation techniques

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- TIS 18001 implementation (additional courses)
- OHS-MS requirement
- Risk assessment
- Hazard and effect management
- HAZOP study
- Emergency responses plan
- Improve the environment in SME
- Basic fire fighting
- Safety at management level
- Safety at supervisor level
- Visit other plant
- Visit safety week exhibition

Occupational health and safety competency legislation of the team in both groups had similar fair level because they were not directly obligation. They also considered as an about half of enterprises though that it is impossible to know and clear all complex legislation. The implementation team several question pointed at the need for harmonization of rules and for simpler legislation. However they solved this problem by consult with the authorities or TLC project consultant. For the smaller ones were found that fair level at keep objective and target because lack of commitment from the management and the limitation of the number person in charge and time for other without routine job, OHS-MS requirement, ISO 9000 and fair participation. On the items of poor scores were QS 9000, and ISO 14000 and others management system because the system had not apply in their organization. Performance objectives help team and management meet their occupational health and safety responsibilities by providing a target or benchmark against which to measure their progress. An action plan should be designed to help achieve objectives. The action plan consists of steps that, when accomplished, will result in achieving the performance objective. Less than half of them take additional course about OHS-MS implementation only 1-2 courses. In the same result in other study which organization should carefully weigh up the advantages and disadvantages of the alternatives. Institute of Quality Assurance suggests that if organization decides to use in-house resources, then the member of the organization assigned the responsibility of implementation, the implementer, should have an understanding of the organization's activities, an in-depth understanding of basic management principles and should have undertaken some training in the requirements of ISO 9001. The majority of small and medium enterprises have either no or very few employees who are able to understand the

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requirements of ISO 14001. The companies often lack sufficient knowledge of regulatory and legal requirements. They provided time to set up this management system almost less than two hours per week. This has also been confirmed by several studies (e.g.4,5, 9, 23,) For the reason of this study were:

- Limitation of the number responsible person
- Busy in routine job
- Not adequate knowledge
- Not recognition
- Productivity is the priority
- They were other project committee such as ISO 9000, HACCP, and TPM

The research studies the environmental management system problem find that They were delegated to perform their own duties and responsibilities. The problems and obstacles are found at an initial stage resulting from negligence and lack of understanding of the ISO 14001 requirements and procedures. Providing the employee and staff with extensive training, organization special meetings among its employees and staff, and performing, monitoring and measurement methods solves this problem. Besides these solutions mentioned above, consulting experts for their valuable advice is a must. (14) An effective occupational health and safety management system addresses issues associated with work force planning, staffing and placement. Keys to success of work rules include employee involvement in their development, effective communication and consistent enforcement. Implementation team is one-way employers address personal problems that can affect an employee's ability to perform on the job. These system can be an important pert of a safety and health effort. Staff organizations generally encompass both supervisory and non-management persons such as engineers, time-study people, labor relations people, and "front-office" types. They generally give some from of service or direction to production and other shop-related departments within the organization. Hence, they, too, are exposed to the same workplace environment, as are the employees. Subsequently, the nature of their decisions or recommendations can at times create an impact on the safety performance of the departments they service or partially control. Therefore, it is equally important that they understand the responsibilities and

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accountability in the various levels of line management and act accordingly. (4) By participating through various company-sponsored means such as teams and committees, the helps set performance goals, develop measures to gauge performance and have a vested interest in the program success.

Employee involvement and cooperation

The most of employee had been well perceived in occupational health and safety awareness in the large more than small and medium enterprises. Awareness involved the employee moving to action that supported or achieved desired goals. Awareness in the small and medium enterprises was low because a part of low incident or injuries experience, lack of knowledge and training, a long investment, old employee, illiterate especially drivers, to be habitual. Employee involvement is a major tool in achieving quality occupational health and safety. Consider areas in which employees can have a positive impact on safety performance. (15) For the good scores awareness they though that high risk in workplace, they always had adequate safety measures cover all procedures and instruction, the most of employees are young-blood, they had others management system such as TPM which concerned in occupational health and safety, training, public relation, and communication. The data gained from the effectiveness of occupational health service in industry (in medium sized factories in Samutprakarn Province) by occupational health nurses study showed that training course provided were useful for them. However, it was difficult to implement due to budget, lack of support administration, and knowledge among managements. (13) It's showed that the percentage of the employee participation in occupational health and safety activities were 93.9%, almost cooperation (42.9%) in the large enterprises and 71.4% in small and medium enterprises involvement, however, seldom cooperation (42.9%). The most reasons of they though that they had not take time off from busy routine job, lack of specialist, lack of knowledge, no any safety promotion activity, the management did not support, process shut down. Employees are being given more and more responsibility in program implementation. The most of activities were brainstorming, group meeting, safety day/week, wireless, exhibition, safety corner, suggestion, 5s, safety committee, training, tool box, public relation, safety inspection, etc. and the essential that employee awareness

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related with activity participation. By involving employees in the decision-making process, management affords them a greater sense of “owning” the resulting policies. Ownership translates into increased acceptance of and support for those activities. Management can facilitate a cooperative effort to improve the occupational health and safety program through employee participation. (16) Participation increase ‘ownership’ –a key element in implementing actions and changes—and achieving the goal of safety becoming ‘everyone’s business’ so that nothing is so important that it can be done safely. (15)

Communication

Management must first adopt a proactive approach to occupational health and safety. Senior managements commitment and involvement are crucial factors in the success of a hazard identification, evaluation, and control program. Management has a key role in communicating an occupational health and safety-orientated vision, establishing policies and allocating resources. Effective management will produce work conditions and practices that result in job occupational health and safety. A management system that focuses on total quality management through continuous improvement will address occupational health and safety. Successful occupational health and safety performance is possible when the organization has a clear, well-communicated, performance-oriented vision for occupational health and safety. The vision must come from senior management and must be carried out by safety and health professionals, managers and employees, with senior management involvement throughout the process. Successful safety performance depends on the continuing involvement, interest and financial support of senior management. Where do the small and medium enterprises find their information about occupational health and safety? This was addressed in one question and the responses are showed in table 4-14. The sources could be Federal of industry (31.4%), health and safety journals: safety life, safety & environmental review, safety management, safety association, Safetech newsletter, and journal from the government organization, (28.6%), head office or industrial group (25.7%), and safety association (25.7%) such as safety authorities administration, National Petrochemical public company limited, safety health

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association, Rayong environment and safety association (RESA). Also the large enterprises used Federal of industry (59.2%), health and safety journals (51.0%), visit to/ contact with authorities (49.0%), and head office or industrial group (42.9%). Both of the enterprises group had source of OHS-MS issues 4-6 sources and 1-3 books, handbooks or publication, additional from Internet, the government gazette, PTIT, and training in occupational health and safety. The large provided communication 3 activities or higher (62.5%), whereas small and medium enterprises provided only an activity communication (40.0%) and never communication by anyway (29.6%). However the majority of them fairly good provided basic concept about OHS-MS for all employee (61.9%). Most enterprise thinks small and medium enterprises cannot compliance with all relevant legislation because the complexity and difficult to understand, high investment, lack of information transmission, lack of awareness, the plenty of legislation, and lack of competence. Management leadership clearly communicates an occupational health and safety vision supported in word and action. Management policies are key information to communicate. An occupational health and safety policy statement is a key communication tool to show management's commitment and involvement. Different types of communications examined here are oral, written, action and mechanical devices. Filter that hamper understanding include knowledge, biases, moods and physical and mental limitations. Occupational Health and Safety program facilitate two-way communication between workers and management. It also makes the relationship between management and worker closer. Management should be aware that if workers are given the right to information, the right to participation and the right to refuse dangerous work, they can influent the work environment significant. This will result in effective injury prevention and loss control program in the organization. There is thus no single channel of worker involvement, no single means of promoting it. (14) Information is a key to decision making in all areas of business. For occupational health and safety, data can be use to determine workplace hazard and identify areas for improvement.

From table 4-17,4-18, 4-19, 4-20, and 4-21, it could be conclude as the objectives that gap analysis factors support system set up, the comparison of the key success factors of effective OHS-MS between small and medium enterprise group and the large enterprises group and within small and medium enterprises group were identified. The

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result showed that management commitment and support, initial system used and overall program management in between the successful-implemented OHS-MS in small and medium enterprise group and the larger ones were statistically significant different. The six factors; the characteristics of OH&SMR, initial system used, implementation team, employee, communication, and overall program management between unsuccessful implementation OHS-MS in small and medium enterprise group and the larger ones were statistically significant different, in additional it presented that all seven key success factors and overall management system between successful-implementation OHS-MS and unsuccessful implementation ones in small and medium enterprises were statistically significant different.

5.2.3 The successful-implemented OHS-MS in small and medium enterprises and the large ones are different among the key success factors for OHS-MS.

Independent-sample t-test is the tool to compare the means key factor score of OHS-MS performance between the successful-implemented OHS-MS in small and medium and large enterprises. Mean OHS-MS score in seven key success factors and overall program management were respectively as presented in table 4-17. According to the test result, initial system used between the successful-implemented OHS-MS in small and medium and large enterprises was statistically significant difference at t= -3.51 ($p<0.01$). The mean OHS-MS performance of management commitment and support showed statistically significant different at t= 13.26 respectively ($p<0.05$). It was found that the characteristics of OH&SMR (t=-1.75), reason for OHS-MS applied (t=0.16), implementation team (-1.58), employees (-1.21), and communication (-1.77), and overall program management (–2.71) between the successful-implemented OHS-MS in small and medium and large enterprises was not statistically significant difference. Safety, Health and Environment (SHE) in Small process plants-results from a European survey research finds the companies' attitude to SHE issues is positive, and most companies declared that they have adequate resources for the work with SHE related matters. The findings do not support the common view that problem with SHE issued are related to the size of the companies. (9)

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5.2.4 Unsuccessful implementation OHS-MS in small and medium and large enterprises are different among the key success factors for OHS-MS.

In table 4-18 the key factor score of OHS-MS performance between unsuccessful implementation OHS-MS in small and medium enterprise group and the larger ones showed that the overall program management (t=-3.18) was statistically significant difference at $p<0.01$. Characteristics of OH&SMR (t= -3.18), initial system used (t=-4.07), and was statistically significant difference at $p<0.01$. Implementation team (t= -2.23), employees (t=-2.15), and communication (t=-2.17) was statistically significant different at $p<0.05$. However, two key success factors between unsuccessful implementation OHS-MS in small and medium enterprise group and the larger ones were not statistically significant different.

5.2.5 The key success factors of successful-implementation OHS-MS and unsuccessful implementation ones in small and medium enterprises are different.

In table 4-19, presented the comparison of key success factors between successful-implementation OHS-MS and unsuccessful implementation ones in small and medium enterprises. Overall program management (t=-4.20) was statistically significant difference at $p<001$. According to the test result, management commitment and support (t=-3.54), initial system used (t=-3.57), implementation team (t=-4.05), employee (t=-3.33), and communication (t=-2.91) were statistically significant difference at $p<001$. In additional it showed that the characteristics of OH&SMR (t=-2.07) and reason for OHS-MS applied between successful-implementation OHS-MS and unsuccessful implementation ones in small and medium enterprises were statistically significant difference at $p<0.05$.

5.2.6 The comparison of key success factors between successful-implementation OHS-MS and unsuccessful implementation ones in the large-sized enterprises.

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In table 4-20, presented the comparison of key success factors between successful-implementation OHS-MS and unsuccessful implementation ones in large-sized enterprises. Overall program management (t=-4.44) was statistically significant difference at p<001. According to the test result, management commitment and support (t=-4.51), initial system used (t=-3.30), implementation team (t=-3.88), and communication (t=-2.85) were statistically significant difference at p<001. In additional it showed that the characteristics of employees (t=-2.44) between successful-implementation OHS-MS and unsuccessful implementation ones in large-sized enterprises were statistically significant difference at p<0.05. However, two key success factors as OH&SMR and reason for OHS-MS applied were not statistically significant different.

There were essentially two ways of undertaking the program of implementation. The first was to undertake it using in-house resources and the second was to employ a consultant. Bear in mind that even if organization decided to use a consultant, organization will still have to devote a significant amount of time to his support. This time must be allocated if the management system was to be effective and ownership by the organization's personnel is to be ensured. The competence and qualification of the external consultant in each enterprise may interfere or affect a part of the effective of the OHS-MS set up project. They were the key person who closely consulted for the responsible person and each enterprise in this research study had variety qualification person. In the effective they should be understood and gained in deeply detail of business process for identify the potential risk completely and cover all source or activities.

5.2.7 Ranking of the reasons which were influenced the OHS-MS implementation.

A summery of the factors which are influenced on the OHS-MS implementation for the enterprises to set up management system can be found in table 4-22, the priority for working with implementation matters according to this study was "management commitment and support" (the topics of management by objective, time frame setting, budget support, responsibility and authority, and monitoring from the management level

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were more than 80% importance in the large enterprises, while attitude and budget support were more than 80% important in small and medium enterprises. Followed by, “occupational health and safety management system (OH&SMR), “implementation team” which the top three important for all size industries. The key success factors to determine the effective of OH&SMR in small and medium enterprises are business relationship to drive system initiated and work experience in relevant management system. The competence from implementation team was also important for all size enterprises. In the different factor were “internal factors” “capitalization” in small and medium enterprises, whereas “communication” and “capitalization” in the large enterprises were the least priority of the option given.

In summery from this study was found that the successful-implementation OHS-MS would be dependent on vary factors especially management support and commitment initial system used, pressure or reason for apply system, implementation team, employees and communication and other factors in each enterprises. The majority problem that found in small and medium enterprises difference from the large ones were lack of the management commitment and support, the implementation team could not take time for this project preparation, lack of the competence, the employees lack of awareness. This has also been confirmed by several studies. (8, 23, 24, 25) Additional Training lead consultancy project were supported budget and allowance from the government. It’s may be any causes for make this study subjects which capability and size of enterprise was not the prior in OHS-MS apply.

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CHAPTER VI
CONCLUSION AND RECOMMENDATION

6.1 Conclusion

This descriptive study was conducted to explore key success factors related to complete the effective of Occupational Health and Safety Management System (OHS-MS) for small and medium enterprises. The number of 103 enterprises which were applied in Training Lead Consultancy project (TLC project) of the Ministry of industry were all selected as the subjects. They were divided into two groups which successful-implemented and unsuccessful implementation OHS-MS group to compare between small and medium and large enterprises. The result from this study were summarizes as followings:

6.1.1 The priority for working with implementation matters according to this study was “management commitment and support”, followed by, “occupational health and safety management system (OH&SMR), “implementation team” which the top three important for all size industries. In the different factor were “internal factors” “capitalization” in small and medium enterprises, whereas “communication” and “capitalization” in the larger were the least priority of the option given

6.1.2 The score of all performance was not find outstanding level in both industry sizes. The results showed that the most small and medium enterprises were poor to fair level safety performance whereas fair to good level safety performance in large enterprises.

6.1.3 The mean key factor score of overall program management between the successful-implemented OHS-MS in small and medium enterprises group and the larger ones was not statistically significant difference.

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6.1.4 The mean key factor score of overall program management between unsuccessful implementation OHS-MS in small and medium and large enterprises was statistically significant difference at $p<0.01$.

6.1.5 The mean key factor score of overall program management between successful-implementation OHS-MS and unsuccessful implementation ones in small and medium enterprises was statistically significant difference at $p<001$.

6.1.6 The mean key factor score of overall program management between successful-implementation OHS-MS and unsuccessful implementation ones in large enterprises was statistically significant difference at $p<001$.

6.2 Recommendations

6.2.1 **Recommendations from this study**

6.2.1.1 Regard to the result of the research, the most key success factors management for successful implementation in OHS-MS for all sizes enterprises should be strong preparation of overall program management especially management commitment and support, initial system used, communication. And the first ranks of both size enterprises are first management commitment especially in management by objective, timeframe, budget support, responsibility and authority, and monitoring for ensured in schedule. The second and third levels were competence and keep objective clear for implementation team and who had positive attitude and experience in management system for OH&SMR.

6.2.1.2 The result of this study revealed needs of compare the key factor between small and medium and large enterprises in order to make more effectiveness management system. Both industry sizes should well prepare seven factors; the management commitment and support, the characteristics of OH&SMR, initial system used, implementation team, employee, communication, and overall program management and other specific factors that depend on organization culture.

6.2.1.3 The competence and qualification of the external consultant in each enterprise may be a part of key success factors that affect the OHS-MS set up project.

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They should be understood and gained in deeply detail of business process for identify the potential risk completely and cover all source or activities.

6.2.2 **Recommendation for future study**

1. To study how to comply with the occupational health and safety's legislation and identify the problem in small and medium enterprises.

2. To compare the key success elements of the occupational safety and health program between SME and large enterprises in order to improve the appropriate tools for SME.

3. To compare behavior-base of employees in small and medium (SME) and large enterprises in order to raise safety awareness.

4. To study how to manage the high risk in chemical enterprises and set up simplify program for identify their risk.

5. To identify the minimum qualification of occupational health and safety management system's consultant who may be gap of the key success in small and medium enterprises.

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APPENDIX A

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APPENDIX A

The questionnaire form of factors in Occupational Health and Safety management system setting

Part 1General Information

Instruction: Check ✓in ❑ as required and fill in the blanks with your company information.

1. Type of Industry
   - ❑ Food and kindred products
   - ❑ Chemical and allied products
   - ❑ Petroleum and coal products
   - ❑ Plastics materials and synthetics
   - ❑ Paper and allied products
   - ❑ Paint and allied products
   - ❑ Motor vehicles and equipment
   - ❑ Others (Please identify)…….
2. How many employees does the enterprise have? Number of employee……Persons
3. Total assets ……Baht
4. Race of top management (over one choice can be answered)
   - ❑ Thai
   - ❑ Japanese
   - ❑ American
   - ❑ European
   - ❑ Others (Please Identify)……....

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5. Have do you employ Safety officer at professional level? (Over one choice can be answered)
   - ❑ None
   - ❑ Assign for part time position
   - ❑ Safety officer at professional level: Bachelor degree in direct field
   - ❑ Safety officer at professional level: Certification by 180 hours Training
6. Where do you exist OHS-MS Project Status?
   - ❑ Certified. It's spent. ……Months finishing this project.
   - ❑ Waiting for main audit. It's spent ……Months finishing this project.
   - ❑ Just completed project. It's spent ……Months finishing this project.
   - ❑ On possessed. It's foreseen by spent ……Months finishing this project.
   - ❑ Cancelled this project because…….
7. Please rank by the need of OHS-MS management system.

Ranking Priority	Factors
First …….	❑ Size of Company
Second …….	❑ Capitalizations
Third ……	❑ Management commitment and support
Forth ……	❑ Occupational Health and Safety Management Representative (OH&SMR)
Fifth …….	❑ Implementation team
Sixth ……	❑ Employees
Seventh ……	❑ Internal factors
Eighth ……..	❑ External factors
Ninth ……	❑ Communication
Tenth ……	❑ Initial system status
	❑ Others (Please identify)……

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Part 2 Indication factors for Occupational Health and Safety Management System (OHS-MS) affected.

I. Management commitment and support

1. Have you set management by objective?
   - ❑ None
   - ❑ Yes. It can be supported OHS-MS (Please identify the advance)……
2. Have you set timeframe for Training Lead Consultancy Project (TLC)?
   - ❑ None
   - ❑ Yes. It can be supported OHS-MS (Please identify the advance)……
3. What does important level that you give by participation and carefulness?
   - ❑ Poor or No need
   - ❑ Fair
   - ❑ Good
   - ❑ Excellent
4. Have you support budget for Occupational Health and Safety improvement?
   - ❑ None
   - ❑ Yes. It's only special budget for case by case.
   - ❑ Yes. It's yearly budget.
   - ❑ Yes. It's yearly and special budget
5. Is OHS-MS implementation training or visited others best practice enterprise given to working team?
   - ❑ None because……..…
   - ❑ Yes. It can be supported OHS-MS (Please identify the advance)…….
6. Is Job description and assignment documented for responsible person?
   - ❑ None because ……...
   - ❑ Yes, it is assigned by individual person.
   - ❑ Yes, it is assigned by upper management.

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❑ Yes, it is assigned by both top management and steering committees. It can be supported OHS-MS (Please identify the advance)……

7. Have you set follow up plan?

❑ None because……

❑ Sometime

❑ Added in other meeting

❑ Set monitoring plan. It can be supported OHS-MS (Please identify the advance) ……...

8. What do you think about "OHS-MS is not useful and too expensive"?

❑ Agree, because……..

❑ Disagree, because ……

II. Occupational Health and Safety Management Representative (OH&SMR)

1. Gender

❑ Man

❑ Woman

2. How old are you? …..…….years old (over 6 months quoted as 1 year)

3. Education

❑ Junior high school

❑ Senior high school

❑ Diploma

❑ Bachelors

❑ Master degree or higher

❑ Other (Please identify)……

4. What is your business relationship?

❑ Employee

❑ Own business

❑ Shareholder

5. How long have you work experience?…years old (over 6months quoted as 1 year)

6. How long have you Occupational health and safety experience?

…….years old (over 6 months quoted as 1 year)

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7. What is your existing position? ……...
   How is support you to make TLC Project progress?……...

8. Have you got knowledge related to Occupational health and safety?

   ❑ Poor ❑ Good

   ❑ Fair ❑ Excellent

9. Have you got knowledge related to other Management systems?

	ISO 9001	QS 9000	ISO 14001	Others(Please identify)
Poor	❑	❑	❑	❑
Fair	❑	❑	❑	❑
Good	❑	❑	❑	❑
Excellent	❑	❑	❑	❑

10. Is implementation team trained or visited other best practice given to OH&SMR?

    ❑ None

    ❑ Yes about 1-2 times (Please identify the course subject and period)……

    ❑ Yes about 3-4 times (Please identify the course subject and period)……

    ❑ Yes more than 5 times (Please identify the course subject and period)……

11. Would you be interested in participating in an OHS-MS as mean for achieving improvements in health and safety in the enterprise?

    ❑ Yes. Because……..…

    ❑ No. Because ……

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III. Initial OHS-MS status

What the initial OHS systems did the enterprise have in place for managing health and safety?

Activities or data	Priority by important				Initial status		
	None	Moderate important	Impor-tant	Very important	Yes	No	Unknown
1) Hazard Identification and Risk assessment ex. HAZOP Fault Tree Analysis, WHAT IF, Job Safety Analysis) (Please identify)……							
2) Site Plan							
3) Process Flow Chart							
4) Relevant legislation and other requirements							
5) Occupational Health and Safety (OHS) planning							
6) OHS Job Description							
7) OHS Organization							
8) Material Safety Data Sheet							
9) Warning sign							
10) Permit to work system							
11) Industrial hygiene measurement							
12) Health check up (prior work)							
13) Yearly Health check up							
14) Incident record							
15) Accident investigation system							
16) Safety committee							
17) The ministry of Labor social and affair's Safety program sustainable							
18) 5 s							
19) KYT							
20) Safety day or Safety week							
21) Preventive Maintenance							

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Activities or data	Priority by important				Initial status		
	None	Moderate important	Impor-tant	Very important	Yes	No	Unknown
22) Training							
23) Safety rule and regulation							
24) Suggestion system							
25) Quality Management Systems (ISO 9001)							
26) Environmental Management systems (ISO 14001)							
27) Others (Please identify)……							

IV. The reasons for Occupational Health and Safety Management System (OHS-MS) applied

What are the Key reasons for your enterprise to be active in the OHS-MS? (over one choice can be answered)

- ❑ Pressure from authorities
- ❑ Pressure from insurance companies
- ❑ Pressure from customers
- ❑ Pressure from employees
- ❑ Pressure from labor unions
- ❑ Pressure from management or employers
- ❑ Pressure from interest group
- ❑ Pressure from competitors
- ❑ Pressure from press or society
- ❑ Publicity/image
- ❑ Others (Please identify)……

V. Implementation team

1. Have you keep management by objective of OHS-MS clear?
   - ❑ Poor
   - ❑ Fair
   - ❑ Good
   - ❑ Excellent

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2. Team selection

❑ None

❑ Select by involved in managing OHS because ……

❑ Select by management system or ISO experiences because ……

❑ Select by involved in managing OHS/management system/ISO experiences

3. Have you got knowledge related to occupational health and safety?

❑ Poor ❑ Good

❑ Fair ❑ Excellent

4. Have you got knowledge related to Occupational health and safety management system specification (such as TIS 18001 or OHSAS 18001 etc.)?

❑ Poor ❑ Good

❑ Fair ❑ Excellent

5. Have you got knowledge related to relevant Occupational health and safety legislation?

❑ Poor ❑ Good

❑ Fair ❑ Excellent

6. Have you got knowledge related to other Management systems?

	ISO 9001	QS 9000	ISO 14001	Others(Please identify)
Poor	❑	❑	❑	❑
Fair	❑	❑	❑	❑
Good	❑	❑	❑	❑
Excellent	❑	❑	❑	❑

7. Is OHS-MS implementation training or visited other best practice given to team?

❑ None

❑ Yes about 1-2 times (Please identify the course subject and period)……

❑ Yes about 3-4 times (Please identify the course subject and period)……

❑ Yes more than 5 times (Please identify the course subject and period)……

8. How do you participate for OHS-MS set up?

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❑ Poor ❑ Good

❑ Fair ❑ Excellent

9. How often do your team manages time for OHS-MS set up?

❑ Not more than 2 hours per week because……

❑ Between 2-4 hours per week because……..

❑ Between 4-6 hours per week because……..

❑ More than 6 hours per week because……...

VI. Employee involvement and cooperation

1. The most of education level of employees.

❑ Junior high school ❑ Bachelors

❑ Senior high school ❑ Master degree or higher

❑ Diploma ❑ Other (Please identify)……

2. Occupational Health and Safety (OHS) Awareness

❑ Poor ❑ Good

❑ Fair ❑ Excellent

3. Are Occupational Health and Safety (OHS) Activities provided to all employees?

❑ No. Because…… ❑ Yes. Because……

4. How often do you participate in an Occupational Health and Safety (OHS) Activities?

❑ Poor. Because…… ❑ Almost. Because……..

❑ Seldom. Because…… ❑ Every time. Because……

VII. Communication

1. How do you update yourself on Occupational Health and Safety issues?

❑ None. Because……

❑ Trade associations

❑ Head offices or Industrial group

❑ Federal of industry

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- ❑ Safety associations (Please identify) …….
- ❑ Visit to/contact with the relevant authorities
- ❑ Health and safety journal (Please identify) ……...
- ❑ Others (Please identify) ……

2. What do you think about "for small and medium enterprise/plant it is not possible to know and comply with all regulation?
   - ❑ Agree. Because……...
   - ❑ Disagree. Because……..
3. Do you communicate Occupational Health and Safety (OHS) information?
   - ❑ None. Because……...
   - ❑ Yes, it is conducted 1activities.
   - ❑ Yes, it is conducted 2 activities.
   - ❑ Yes, it is conducted from 3 activities up.
4. How many sources of Health and safety information books/handbooks or publications?
   - ❑ None. Because……
   - ❑ 1-3 sources
   - ❑ 4-6 sources
   - ❑ More than 6 sources
5. Do you provide Occupational Health and Safety (OHS) training to all employees?
   - ❑ No. Because……
   - ❑ Yes. Because……..

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APPENDIX B

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APPENDIX B

รหัสลูกค้า.....

รายงานการทบทวนสถานะเริ่มต้น
Initial review report

ระบบการจัดการอาชีวอนามัยและความปลอดภัย มอก. 18001

บริษัท จำกัด

วันที่

ประเภทและขอบข่ายการดำเนินธุรกิจ

โครงสร้างการบริหารงาน และหน้าที่ความรับผิดชอบของหน่วยงานต่าง ๆ ขององค์กร

สถานะการดำเนินงานขององค์กร
จุดแข็ง

จุดอ่อน

ขอบข่ายการจัดทำระบบการจัดการอาชีวอนามัยและความปลอดภัย

สิ่งที่ต้องปรับปรุงในหน่วยงานย่อย ในขอบเขตของระบบการจัดการอาชีวอนามัยและความปลอดภัย

ผังภารกิจตามขอบข่ายของระบบการจัดการอาชีวอนามัยและความปลอดภัย

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ลำดับที่	ข้อกำหนดตามมาตรฐาน	ผลการทบทวนสถานะเริ่มต้น	ข้อเสนอแนะ
1.	การทบทวนสถานะเริ่มต้น		
2.	นโยบาย		
3.	การวางแผน		
3.1	การประเมินความเสี่ยง		
3.2	กฎหมายและข้อกำหนดอื่น ๆ		
3.3	การเตรียมการจัดการฯ		
4.	การนำไปใช้และการปฏิบัติ		
4.1	โครงสร้างและความรับผิดชอบ		
4.2	การฝึกอบรม การสร้างจิตสำนึก และความรู้ความสามารถ		
4.3	การสื่อสาร		
4.4	เอกสารและการควบคุมเอกสาร		
4.5	การจัดซื้อและการจัดจ้าง		
4.6	การควบคุมการปฏิบัติ		
4.7	การเตรียมพร้อมสำหรับภาวะฉุกเฉิน		
4.8	การเตือนอันตราย		
5.	การตรวจสอบ และการแก้ไข		
5.1	การติดตามตรวจสอบและการวัดผล		
5.2	การตรวจประเมิน		
5.3	การแก้ไขและการป้องกัน		
5.4	การจัดทำและเก็บบันทึก		
6.	การทบทวนการจัดการ		

ผลการดำเนินงานของแต่ละองค์กรตามที่ที่ปรึกษาได้มอบหมายในครั้งก่อน

สิ่งที่มอบหมายให้องค์กรดำเนินการภายหลังการดำนินการทบทวนสถานะเริ่มต้น

ปัญหา อุปสรรค และการแก้ไข

ข้อเสนอแนะ ชื่อที่ปรึกษา :

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APPENDIX C

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APPENDIX C

รหัสลูกค้า.....

รายงานผลการประเมินเบื้องต้น ระบบการจัดการ.....

Pre-assessment report

บริษัท จำกัด

วันที่

กิจกรรม

ระบบมาตรฐาน

หน่วยงาน

ขอบเขต

วันที่ตรวจประเมินเบื้องต้น

วัตถุประสงค์การตรวจประเมินเบื้องต้น

วิธีการตรวจประเมินเบื้องต้น

ผู้ตรวจประเมิน

เอกสารแนบท้าย

☐ Audit Checklist

☐ อื่น ๆ

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National Petrochemical Public Company Limited Safety and Environmental Service Center

ผลการตรวจประเมินเบื้องต้น บริษัท _____

ผลการตรวจประเมินเบื้องต้นของแต่ละองค์กร

ผลการดำเนินการตรวจประเมินเบื้องต้น ระบบการจัดการ_____

ลำดับที่	CLAUSE (หัวข้อ)	รายละเอียดการไม่เป็นไปตามข้อกำหนด	(N/C) / (OBS)

หมายเหตุ :

1. NON-CONFORMANCE (N/C) หมายถึง N/C ในระดับความไม่สอดคล้องกับระบบมาตรฐาน ระเบียบ/วิธีการปฏิบัติงาน
2. OBSERVATION (OBS) หมายถึง ควรพิจารณาปรับปรุงการดำเนินการในเรื่องนั้น ๆ เพื่อให้ประสิทธิภาพของระบบดีขึ้น

สรุปผลการดำเนินการ

ความพร้อมในการยื่นขอรับการตรวจประเมินจากผู้ตรวจประเมิน เพื่อให้การรับรองมาตรฐาน

ข้อเสนอแนะ

ปัญหา/อุปสรรค

ชื่อที่ปรึกษา :

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Training Lead Consultancy project

โครงการฝึกอบรมและให้คำปรึกษาแนะนำการจัดทำ

ระบบการจัดการอาชีวอนามัยและความปลอดภัย ตาม มอก. 18001

ความเป็นมาและวัตถุประสงค์

สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม ได้ประกาศกำหนดมาตรฐานระบบการจัดการอาชีวอนามัย และความปลอดภัย มอก. 18001 ขึ้น เพื่อเป็นแนวทางให้หน่วยงานต่าง ๆ นำไปปฏิบัติเพื่อแก้ไขปัญหาอาชีวอนามัย และความปลอดภัยในการทำงาน การที่หน่วยงานจะสามารถพัฒนาให้เข้าสู่ระบบการจัดการดังกล่าวได้ จำเป็นต้องมีความรู้ ความเข้าใจในข้อกำหนดมาตรฐานและวิธีการดำเนินการ ในการจัดทำระบบดังกล่าว สำนักงานฯ จึงได้จัดให้มีโครงการ ซึ่งเรียกว่าโครงการฝึกอบรมและให้คำปรึกษาแนะนำการจัดระบบการจัดการอาชีวอนามัยและความปลอดภัยตาม มอก. 18001 เพื่อให้ความช่วยเหลือหน่วยงานพัฒนา และจัดทำระบบการจัดการอาชีวอนามัยและความปลอดภัยได้สำเร็จ

วิธีการ

- สำนักงานฯ จัดหน่วยงานที่เข้าร่วมโครงการเป็นกลุ่ม ๆ ละ 10 หน่วยงาน
- สำนักงานฯ จัดจ้างที่ปรึกษาที่มีความรู้ ความสามารถ มาให้การฝึกอบรมและให้คำปรึกษาแนะนำการจัดทำระบบการจัดการอาชีวอนามัยและความปลอดภัย ตาม มอก. 18001 แก่หน่วยงานที่เข้าร่วมโครงการ

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ระยะเวลาโครงการ

โครงการใช้เวลาดำเนินการทั้งสิ้น 10 เดือน โดยแบ่งเป็น 5 ช่วงเวลา ระยะห่างระหว่างช่วงเวลาประมาณ 1 เดือน

กิจกรรมดำเนินการตามโครงการ ช่วงเวลาที่ 1

- ที่ปรึกษาฝึกอบรม รวมทั้งกลุ่ม 10 หน่วยงาน เป็นเวลา 3 วัน เนื้อหาที่ฝึกอบรม คือ ข้อกำหนดตามอนุกรม มอก. 18001 กฎหมายและข้อกำหนดที่เกี่ยวข้อง และ การชี้บ่งความเสี่ยง
- ที่ปรึกษาให้คำปรึกษาแนะนำแต่ละหน่วยงาน ณ สถานที่ทำการ หน่วยงานละ 1 วัน เพื่อกำหนดขอบข่ายการจัดทำระบบ

ช่วงเวลาที่ 2

- ที่ปรึกษาฝึกอบรม "การจัดทำคู่มือคุณภาพ" รวมทั้งกลุ่ม 10 หน่วยงาน เป็นเวลา 2 วัน
- ที่ปรึกษาติดตามความคืบหน้าการจัดทำระบบเอกสาร ตรวจสอบความถูกต้อง และให้คำปรึกษาแนะนำเพิ่มเติม ณ สถานที่ทำการ หน่วยงานละ 2 วัน

ช่วงเวลาที่ 3

ที่ปรึกษาฝึกอบรมเชิงปฏิบัติ "การตรวจประเมินภายใน" (Internal Audit) ให้แต่ละหน่วยงานๆ ละ 2 วัน โดยหน่วยงานสามารถส่งผู้เข้าฝึกอบรมได้ไม่เกิน 25 คน และให้คำปรึกษาแนะนำเพิ่มเติม

ช่วงเวลาที่ 4

ที่ปรึกษาติดตามผลการนำระบบเอกสารไปปฏิบัติ ติดตามผลการตรวจประเมินภายใน และติดตามผลการปฏิบัติการแก้ไข/ป้องกัน และให้คำปรึกษา แนะนำเพิ่มเติม ให้แก่หน่วยงาน ๆ ละ 2 วัน

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ช่วงเวลาที่ 5

ที่ปรึกษาตรวจประเมินเบื้องต้น และแนะนำการปรับปรุงระบบแก่หน่วยงาน ๆ ละ 1 วัน

ค่าใช้จ่าย สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม รับผิดชอบค่าใช้จ่ายดังนี้

- ค่าจ้างเหมาที่ปรึกษา ซึ่งรวมค่าเดินทาง ค่าที่พัก และอื่น ๆ ในส่วนของที่ปรึกษา
- ค่าใช้จ่ายในการจัดการฝึกอบรมรวมของโครงการ เฉพาะหน่วยงานราชการ จำนวน 5 คน

หน่วยงานผู้เข้าร่วมโครงการ รับผิดชอบค่าใช้จ่าย ดังนี้

หน่วยงานภาคเอกชนรับผิดชอบค่าใช้จ่ายสมทบในการเข้าร่วมโครงการ (15,000 บาท ต่อ 1 หน่วยงาน : ยังไม่ได้รวมภาษีมูลค่าเพิ่ม)

เงื่อนไขผู้เข้าร่วมโครงการ

- หน่วยงานที่สมัครเข้าร่วมโครงการจะต้องรับผิดชอบปฏิบัติตามกิจกรรมตลอดโครงการ
- ผู้บริหารระดับสูงต้องมีความมุ่งมั่น ที่จะจัดทำระบบ และนำไปใช้ในองค์กรอย่างจริงจัง
- ผู้บริหารจะต้องจัดสรรบุคลากร (ผู้รับผิดชอบด้านอาชีวอนามัยและความปลอดภัย-OH&SMR และคณะ) และให้การสนับสนุนอย่างเต็มที่ในการดำเนินการจัดทำระบบจนสำเร็จ
- ผู้บริหารจะต้องมีความมุ่งมั่นที่จะยื่นขอการรับรอง และต้องดำเนินการให้ได้รับการรับรองภายในระยะเวลาอันสมควร
- เมื่อได้รับการรับรองแล้ว ต้องเปิดโอกาสให้ผู้สนใจเข้าชมกิจการ และถ่ายทอดความรู้ และประสบการณ์ เพื่อเป็นวิทยาทานตามสมควร

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