

AN ALTERNATIVE INTEGRATED OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT SYSTEM FOR SMALL AND MEDIUM-SIZED ENTERPRISES (SMEs) IN THAILAND

*Thepporn Jaroenroy and Chutarat Chompunth

School of Environmental Development Administration, National Institute of Development Administration, Thailand

*Thepporn Jaroenroy, Received: 27 Dec. 2018, Revised: 22 Jan. 2019, Accepted: 15 Feb. 2019

ABSTRACT: Small and medium-sized enterprises (SMEs) are drivers of Thailand's economy and represent the largest number of all firms in Thailand. SMEs in Thailand always face safety and environmental issues, while worldwide safety and environmental management systems are difficult to implement within limited resources. This research aimed to develop a conceptual framework for an alternative integrated occupational health, safety, and environmental management system (OHS&EMS) that fits the characteristics of small and medium-sized steel manufacturer. This research is qualitative, and a literature review on the safety and environmental management system literature and interviews with experts as well as focus group discussions were conducted. The results were analyzed using content analysis. It was determined that the Plan-Do-Check-Act (PDCA) is the cycle that must be maintained for an alternative integrated management system with key requirements, including organization and stakeholder assessment, hazard identification and risk assessment, environmental aspects, action plans for risk and impact mitigation, internal audit, and corrective action and management review. For the success of alternative management system implementation, communication processes that will convince SMEs to accept and realize the benefits of an integrated OHS&EMS must be carried out prior to its implementation. Less documentation must be considered in order to avoid the difficulty of management system implementation. Furthermore, it is suggested that SMEs need support from external parties in terms of finances and consultation, as well as surveillance audits in order to ensure the continual improvement of their safety and environmental performance. The Thai government should improve the legal framework, provide financial support and training to promote OHS&EMS to Thai enterprises.

Keywords: Safety management system, Environmental management system, Alternative management system, Integrated management system, Small and medium-sized enterprises (SMEs)

1. INTRODUCTION

SMEs represent 99.72% of all firms in Thailand and account for 80.44% of employment as well as contribute 41.1% to the total GDP in Thailand [1]. A large number of SME firms and a large amount of employment from SMEs influence the high injury and illness rate in Thailand. There is clear evidence that occupational accidents in SMEs are greater than those in large enterprises [2]. In environmental terms, SMEs generate approximately 70% of global pollution [3]. Currently, Thailand is still facing air quality problems and increasing hazardous waste from industries, and a large number of SMEs in Thailand are realizing that SMEs are significant sources of pollution [4].

Many scholars have indicated that SMEs have difficulty managing occupational health, safety, and environmental issues in their firms. With the limitations of SMEs in terms of economic, human, and technology resources, specific methods are necessary for SMEs to promote occupational health and safety (OHS) awareness and management within their organization [5]. Moreover, SMEs need

alternative environmental management systems that better suit the characteristics of SMEs [6]. In order to ensure good results in terms of profit and reliability, many companies have implemented quality, environmental, and occupational health and safety management systems [7]; however, in order to obtain more benefits from the adoption of various management systems, many organizations are selecting the implementation of integrated management systems instead each management system being implemented separately [8]. Thus, the safety and environmental problems in SMEs in Thailand require a specific integrated OHS&EMS in order to fit the characteristics of SMEs successfully so that their safety, occupational, and environmental performance can be elevated.

2. SIGNIFICANCE OF THE STUDY

Thailand has paid a great budget for its rapid development including vast environmental deterioration and become one of the countries in South East Asia most threatened urban and rural

environments and resources. Steel manufacturers in Thailand are upstream in terms of the production chain; however, steel manufacturers generated the highest injury and illness rate per 1,000 employees in 2014 and 2015, with 34 cases and 29 cases respectively [9]. Further, the iron and steel industries have had a significant impact on the global environment by generating a huge amount of pollutants, solid by-products and residue, and wastewater sludge [10]. In order to reduce the accident rate and environmental problems from the operation of the steel manufacturers' business, effective occupational health, safety, and environmental practices are needed. However, it has been proven that the models developed for large enterprises are ineffective and difficult to implement in relation to SMEs—many aspects are different between large enterprises and SMEs, especially in terms of financial resources and organizational structure [11].

The limitations of resources in SMEs might be the reason why an environmental management system (EMS) has been implemented by larger companies and its use has decreased with smaller companies [6]. The EMS is a designed system to improve environmental managing performance beyond what is required by regulations and eventually contributes to sustainable development. The EMS is based upon the PDCA cycle concept.

Besides, a formal safety management system is difficult to maintain in SMEs because of an informal culture [12]. Thus, SMEs need a specific integrated OHS&EMS. This study aims to create a new integrated OHS&EMS for steel manufacturer SMEs in Thailand so that they can manage the environmental aspects of their operations, prevent injuries and illness, as well as manage their business risks with fewer resources. Moreover, this study identifies the motivators and barriers to implementing an integrated management system, how to implement such an integrated management system in SME organizations, and what the resources are that the government should support in order to implement an integrated OHS&EMS effectively. Steel manufacturer SMEs are the target business of this study especially, in Eastern Economic Corridor (EEC) of Thailand (Chonburi, Rayong, and Chachoengsao province) to support economic growth in this area.

3. METHODOLOGY

In this study, a qualitative approach was applied

to establish an alternative integrated OHS&EMS for the small and medium-sized enterprises of steel manufacturers in Thailand. Expert interviews and document reviews were conducted to collect data for creating a conceptual framework for an alternative integrated OHS&EMS and then focus group discussion with experts was employed to review the conceptual framework in order to ensure that it would fit the characteristics of steel manufacturer SMEs in Thailand. The occupational health, safety and environmental management system consists of ISO 14001:2015, ISO 45001:2018, and OHSAS 18001:2007, which have been reviewed so that they could be integrated together; additionally, research on the management of safety, occupational health, and the environment of SMEs has been reviewed in order to understand how SMEs manage their risks and environmental aspects. In this study, the key informants were experts that had specific knowledge and experience about safety, occupational health, and environmental management systems, and that was familiar with the work of SMEs. Expert semi-structured interviews were conducted with 14 experts in order to meet theoretical saturation that is a point where no new information is obtained from further data [13] in order to create a framework for an alternative integrated OHS&EMS from the point of view of professionals regarding safety, occupational health, and the environment.

Finally, focus group discussion with 10 experts was employed to discuss the constructed alternative integrated OHS&EMS for SMEs in Thailand in order to ensure it would be simple and effortless to implement and also fit the characteristics of steel manufacturer SMEs.

4. RESULTS AND DISCUSSION

4.1 A Conceptual Framework for an Alternative Integrated OHS&EMS for SMEs in Thailand

The integrated OHS&EMS of an organization is a systematic process of identifying its risks and environmental aspects and how to manage those risks and environmental aspects, including embedding this system into the organization. The data from a literature review and expert interviews as well as focus group discussion were analyzed using content analysis and a conceptual framework was constructed, as shown in figure 1.

The PDCA cycle is a mandatory concept for the construction of the conceptual framework according to the agreement of all experts with the following requirements.

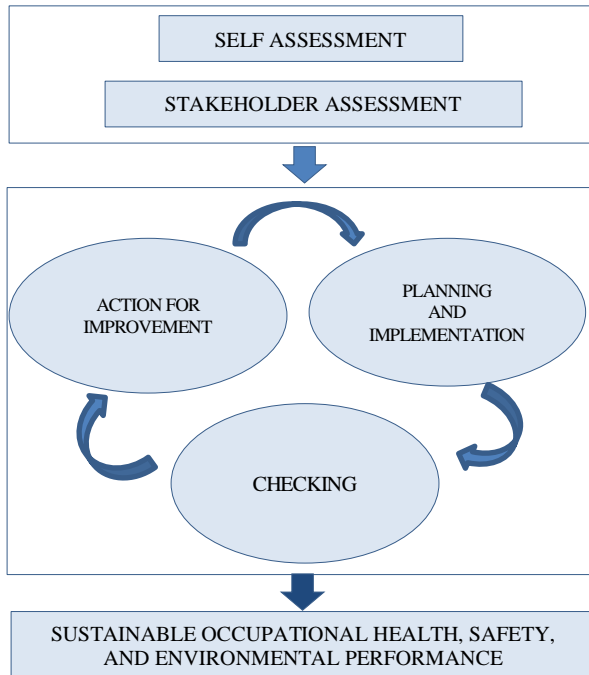


Fig. 1 Conceptual framework for an alternative integrated OHS&EMS for SMEs in Thailand

1. Organization assessment consists of 2 requirements: 1.1) self-assessment is an important part for identifying the organization's processes, strengths, and weaknesses for a better understanding of their business and for eliminating all business threats for sustainable growth; and 1.2) stakeholder assessment must be carried out in order to define the demands of all stakeholders. The data for the self-assessment and stakeholder assessment were used to establish occupational health, safety and environmental policy.

2. The planning and implementation stage consists of 6 requirements: 2.1) Occupational health, safety, and environmental policy: Policy must be identified by top management in order to direct the organization's commitment regarding occupational health, safety, and the environment. 2.2) Identification and assessment of safety and environment problems: Hazard identification and risk assessment must be conducted for all activities of the organization, including the assessment of significant risks. Environmental aspects of the organization's activities, products, and services must also be identified with criteria for significant aspect consideration. 2.3) Action plan for risks and impact mitigation: Occupation health, safety, and environmental targets shall be determined in order to ensure that policy will be fulfilled and that these targets will be implemented at the operation level of the organization to ensure that all risks and impacts are under the control of the organization. The risks from self-assessment and stakeholder assessment must be addressed with the action plan in order to

improve business performance. The action plan for each target must be employed by a responsible person, within the specified time frame and using essential resources to achieve the target and finally, all action plans must be followed up periodically by the organization. 2.4) Legal and other requirements: The organization shall identify the legal and other requirements regarding occupational health, safety, and the environment, as well as other requirements that are applicable, and this information shall be kept up to date. Further, the process of compliance evaluation must be carried out periodically. 2.5) Training: The organization shall provide occupational health, safety, and environmental training in order to ensure that related employees are aware of hazards and environmental aspects, and they also should know how to manage related risks and how to control and mitigate the impact on the environment. The following topics are a minimum for training courses related to the education of employees: 1) Occupational health, safety, and environmental policy; 2) Hazards and environmental aspects related to their work and how to manage those risks and environmental aspects; 3) Roles and responsibilities related to legal and other requirements. The organization shall identify the processes for evaluating training results. 2.6) Documented information: The organization shall identify the processes of document control in order to be certain that all documents in the management system are updated and used appropriately with the intention of each document. The organization shall control the documents using the following processes: 1) Approve the documents for adequacy prior to use; 2) Ensure that the changes and current version status of the documents are identified; 3) Documents must be reviewed appropriately; 4) Define the retention time of the records in the management system.

3. Checking: The effectiveness of an alternative integrated OHS&EMS needs to be monitored periodically. The checking phase consists of 2 requirements: 3.1) Internal audit: The organization shall conduct an internal audit at planned intervals to determine the conformity of the alternative integrated OHS&EMS for SMEs. Audit programs shall be planned. The determination of the audit method, audit criteria, the responsibilities of the auditors, and audit reporting shall be defined. 3.2) Accident investigation: The organization shall provide reports and investigate accidents if they have taken place. Investigations shall be conducted in order to determine the root causes of occupational health and safety deficiencies and other factors, and corrective action will be employed in order to identify and eliminate the root causes. The results of the investigation shall be communicated with related employees so that they are aware of the issues and can prevent the recurrence of accidents.

4. Action for improvement: Action for

improvement is the last phase to ensure the continual improvement of an alternative integrated OHS&EMS for SMEs. Action for improvement consists of 2 requirements: 4.1) Corrective action: The organization shall correct the nonconformity that has been found within the organization. A nonconformity investigation shall be conducted in order to determine its cause so that the recurrence of such nonconformity can be prevented, A record of corrective action shall be retained within the organization. 4.2) Management review: Top management shall review the organization's OHS&EMS at least once a year in order to ensure its continual adequacy and effectiveness. Input to management reviews shall include: 1) Follow-up actions from previous management reviews; 2) Safety, occupational health, and environmental policy; 3) Needs and expectations from stakeholders; 4) Significant hazards and environmental aspects; 5) Business risks; 6) Achievement of action plan for risks and impact mitigation; 7) Safety, occupational health, and environmental performance of the organization; 8) Adequacy of resources; 9) Recommendations for improvement. The output from the management review shall be provided with the decisions of top management and the actions for improving the performance of the management system shall be identified. Records of the management review shall be retained.

Importantly, in order to encourage the SMEs to implement an integrated OHS&EMS easily, a manual for implementation should be provided with all details of the implementation steps, including all forms and templates. Especially, the methods for the identification and assessment of safety and environment problems should be simple and easy to understand, and a list of hazards and environmental aspects should be provided for steel manufacturers, in addition to a list of the methods for managing risks and environmental aspects. The methods for self-assessment and stakeholder assessment shall be identified in the implementation manual in order to provide ideas for SMEs regarding business risk assessment. An internal audit process for monitoring the effectiveness of the management system shall be conducted at least annually. Instructions for accident investigation must be provided in an easy form that can encourage an accident reporting system. Finally, a management review shall be conducted at least annually to guarantee the continual improvement of the integrated management system.

4.2 OHS&EMS Implementation within SMEs Organizations

The points of view of all 24 experts on how to implement an integrated OHS&EMS successfully in SMEs have been summarized. The motivators and barriers that need to be considered for SMEs to design

an alternative integrated OHS&EMS that fits SMEs are defined as follows.

4.2.1 Motivators

1) A flat and simple hierarchy of the organization is the strength of SMEs for implementing a management system. 2) The internal communication of SMEs can be done quickly due to the small number of employees within the organization. 3) Decision-making can be made by the owner-manager so that actions for eliminating all risks can be managed quickly. 4) A good relationship between the owner-manager and employees can encourage the participation of employees for implementing occupational health, safety and environmental management system. 5) There is no need for formal control and formal documentation for the implementation of an integrated OHS&EMS.

4.2.2 Barriers

1) Lack of internal experts to implement an integrated OHS&EMS within the organization. 2) Most of the SMEs focus on the day-to-day operations of their business to ensure that their business will survive and maximize benefits. SMEs consider that OHS&EMS is the management of constraints and not their main business [14]. 3) Lack of information concerning an integrated OHS&EMS. Although the Thai government is making an attempt to share information, many SMEs still do not have information on OHS&EMS, including the information on how to implement a management system within the organization. 4) Lack of time for OHS&EMS. Most of SMEs are faced with time to implement OHS&EMS because the owner-manager is the person that is responsible for most of the administration tasks, including safety and health management [15]. 5) Lack of a specific OHS&EMS for SMEs. 6) Existing international OHS&EMS, i.e. ISO 14001:2015[16], ISO 45001:2018[17], and OHSAS 18001:2007[18] require many documents in order to comply with the management system while SMEs need a management system with fewer documents. 7) A complex OHS&EMS is a barrier for SMEs because SMEs lack safety and environmental experts in the organization, so a simple management system is needed for SMEs. It could be said that the significant barriers to implementation of OHS&EMS are almost entirely economic considerations.

All findings of motivators and barriers to implementing an integrated OHS&EMS from the point of view of experts can be summarized, as shown in Table 1.

Table 1 Summary of motivators and barriers to implementing an integrated OHS&EMS

Items	Motivators	Barriers
1	A flat and simple hierarchy of the organization	Lack of internal experts
2	SMEs focus on the day-to-day operations	SMEs focus on the day-to-day operations
3	Decision-making can be made by the owner-manager	Cannot implement the complex OHS&EMS
4	A good relationship between the owner-manager and employees	Not familiar to create many documents
5	No need formal control and formal documentation	Lack of a specific OHS&EMS
6	-	Lack of information
7	-	Lack of time

4.3 How to Implement an Integrated OHS&EMS in SMEs?

In order to ensure the success of integrating an integrated OHS&EMS in SMEs, the strategy of implementation shall be prepared with the understanding of the nature of SMEs. The results from the experts can be categorized into 4 groups: resources, method, engagement, and awareness and monitoring.

1) Resources: Top management needs to provide the essential resources for the implementation of an integrated OHS&EMS; especially, top management must assign one staff member to implement the management system. The implementation time for the OHS&EMS in SMEs should take time more than for large enterprises due to the limitation of resources. 2) Method: An integrated OHS&EMS for SMEs must be constructed using the PDCA cycle in order to ensure the continual improvement of the management system and to reduce the documents that are generated for compliance with the requirements. In addition, self-assessment must be carried out in order to understand the current status of the occupational health, safety, and environmental performance of the organization before beginning to implement the management system, finally, hazard and aspect identification should be conducted first in the critical process that generates a high risk in term of safety and environment before extending the scope of all activities on the site that will make the implementation person feel comfortable to carry out this process. 3) Engagement and Awareness: The owner-manager of SMEs shall be educated and urged to understand the benefits of an OHS&EMS

implementation and how occupational health, safety, and the environment can improve their business. Furthermore, all employees must participate in the OHS&EMS. Especially regarding safety management system implementation, the main motivators are the positive attitude of management and workers towards health and safety [19]. To ensure the engagement of all employees, all related employees must be communicated the benefits of the management system, especially, how safety, occupational health and environmental management system effect to them in term of safety workplace, prevent injury and illness as well as pollution prevention to ensure the smooth operation without plant shutdown from any complaints or noncompliance with legislation that effect in their work and income. 4) Monitoring: In order to maintain an OHS&EMS in SMEs, an annual surveillance audit program from a third party beyond the internal audit process with support from the government shall be provided with the external auditor who is a specialist in occupational health, safety and environment. An integrated OHS&EMS implementation flow chart was defined, as shown in figure 2.

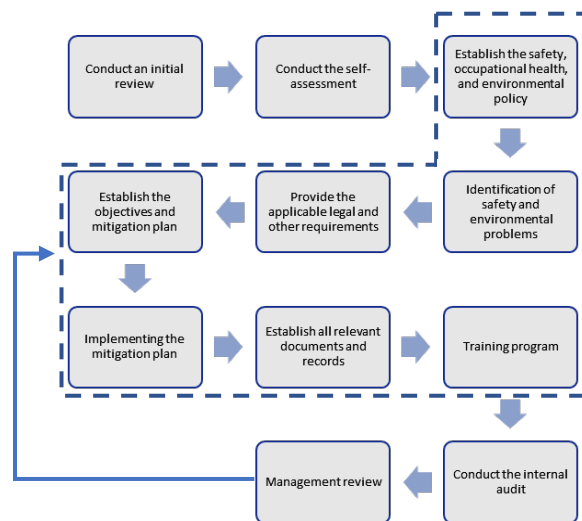


Fig. 2 The integrated OHS&EMS for SMEs implementation flow chart

4.4 Which Resources Should the Government Use to Support SMEs so that They Can Implement an Integrated OHS&EMS?

The government should provide assistance to SMEs in order to encourage them to implement an integrated OHS&EMS within their organization. The assistance for SMEs can be defined as follows. 1) A consultant should be provided to assist SMEs in implementing the integrated OHS&EMS, and the consultant should be a person that has experience in how to implement an integrated OHS&EMS in SMEs. 2) Financial support for integrated OHS&EMS implementation should be provided,

including training, consultant fees, surveillance audit fees, and a budget for unsafe condition and environmental issue improvements. 3) The knowledge sharing program should be provided to owner-manager of SMEs to ensure that they can understand their hazards, environmental aspects, and how to manage those risks and environmental aspects as well as how to cope with their business risks. The practices of knowledge sharing maybe done with the collaboration of SMEs that success to implement a management system, the meeting among SMEs should be carried out and the site visit program is another idea to demonstrate that the management system can improve safety and environmental performance, as well as improve the overall process of the business operation. Indeed, the government should provide training courses and seminars on the subject of environmental, occupational health and safety management for the management of SMEs and enterprises as the environmental and safety awareness is pivotal in adopting OHS&EMS. 4) The government should cooperate with large enterprises to add occupational health, safety, and the environment as criteria for selecting SMEs for the procurement process, which would be a significant driver for all SMEs to adopt an integrated OHS&EMS into their organization. 5) The government should provide special benefits: a tax reduction rate and financial support for workplace improvement to reward SMEs that have implemented management system SMEs, and all rewards should be demonstrated to SMEs that occupational health, safety, and environment implementation can provide benefits to the organization. 6) The government should provide an auditor for management system surveillance audits in order to urge SMEs to improve their integrated OHS&EMS as a concept of continual improvement by conducting a surveillance audit at least once a year. 7) The government should provide a list of SMEs that have implemented OHS&EMS so that their contribution to occupational health, safety, and the environment is recognized. Moreover, the list of SMEs that have demonstrated good performance in terms of safety and the environment can be used by large enterprises for their partner selection. 8) The local authority officers should take a role of the inspector in term of safety, occupational health and environment in the enterprises that located in their areas, to ensure that minimum requirements from safety and environmental legislation have been implemented. Moreover, the inspection program by the authority officers is a proactive measure that can prevent the case of an accident including serious environmental problems. 9) The supporting to implement safety, occupational health, and environmental management system should be provided for a long term to ensure the continual improvement of the safety and environmental performance in SMEs that implemented such a

management system.

SMEs need a great deal of support from the Thai government in order to improve their performance in terms of occupational health, safety, and the environment because SMEs have limitations in terms of human and financial resources [20]. A needed supports of SMEs from the Thai government that can influence the steel manufacturer SMEs to adopting an integrated OHS&EMS and guarantees that SMEs will implement an integrated OHS&EMS effectively and successfully can be summarized, as shown in figure 3.

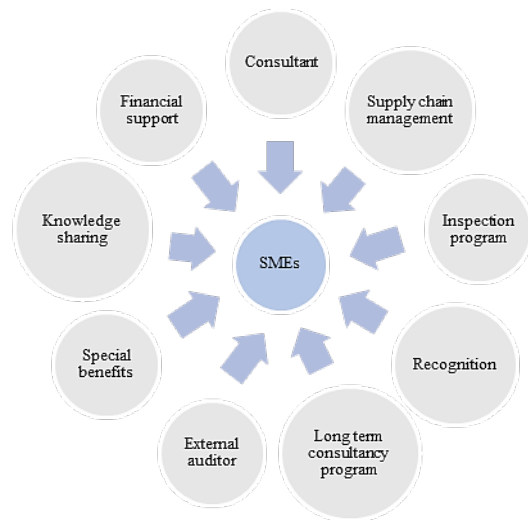


Fig. 3 A needed supports of SMEs from the Thai government to ensure SMEs can implement an integrated OHS&EMS

5. CONCLUSIONS

Simpler and fewer documents and a specific integrated OHS&EMS are needed for the steel manufacturer SMEs in Thailand. With the integration of ISO 45001:2018, ISO 14001:2015, and OHSAS 18001:2007, the PDCA cycle is necessary for management system construction in order to ensure continual improvement of the management system. The requirements of an integrated OHS&EMS should contain only the key requirements in order to reduce the time of implementation and to involve fewer staff members and to create a few documents in the management system as possible. Integrated OHS&EMS implementation should begin with organization assessment, which consists of self-assessment and stakeholder assessment, in order to understand business strengths and weaknesses. The planning and implementation step, focusing on occupational health, safety, and environmental policy, will be generated from the organization assessment. The identification and assessment of safety and environment problems, and how to manage and eliminate hazards and significant environmental

aspects, as well as how to manage the business risks that have been identified by the organization's assessment, are an important part of this management system so that safety, occupational health, and environmental performance can be improved. In order to fulfill compliance with local legal and other requirements, the organization should identify related occupational health, safety, and environmental laws and other requirements, and implement and conduct compliance audits. Training also needs to be provided in order to be certain that employees can work properly without harm and without an impact on the environment. Documents in the management system should be updated and provided in order to demonstrate evidence of system implementation. Checking steps will focus on the internal audit process and accident investigation in order to identify nonconformity and the lack of control measures in the management system. Action for improvement steps consists of corrective action and management reviews in order to ensure that all nonconformities are solved, and actions to improve the management system must be considered and generated annually for continual improvement.

For the successful implementation of an integrated OHS&EMS in SMEs in Thailand, especially in the steel industry, a manual of implementation should be provided with specific instructions. Clearly, the implementation of OHS&EMS has its benefits to enterprises. At the organizational level, the implementation of OHS&EMS can put enterprises at an international spot with quality standards and procedures, which in turn can lead to enlarged organizational productivity and achievement. At the employee level, implementation of OHS&EMS can be precise challenging with improved capacity and changes in the way tasks are done, principally with additional documentation and procedures to follow which can be very administrative and unnecessary at times. However, SMEs must be communicated with concerning the benefits of an integrated OHS&EMS to convince and motivate them to adopt it within their organization voluntarily.

Although a simple and well-integrated OHS&EMS can be constructed for steel manufacturer SMEs, Thai steel manufacturer SMEs still need support from external parties in terms financial resources and consultants, as well as auditors for surveillance audits in order to strengthen the effectiveness of the management system adoption within their organization. Based on research finding, it is necessary that the government should pay more attention to improve the legal and regulation framework, provide sufficient financial support and training to promote OHS&EMS to the Thai enterprises. It is essential for the government to offer energetic support in the following aspects: 1) compulsory policy establishment of an appropriate

legal structure and related regulations for promoting OHS&EMS; 2) encouraging policy provision of soft loans or short term subsidies to the Steel manufacturer industry; 3) and supporting policy training the leaders of Steel manufacturer industry to produce environmental and safety awareness.

6. REFERENCES

- [1] The Office of Small and Medium Enterprises Promotion (2015), Chapter 4, SMEs Annual Report, pp. 4-3-4-8
- [2] Sørensen, O. H., Hasle, P., & Bach, E. (2007). Working in small enterprises—is there a special risk?. *Safety Science*, 45(10), pp. 1044-1059.
- [3] Jamian, R., Ab Rahman, M. N., Deros, B. M., & Ismail, N. Z. N. (2012). a conceptual model towards a sustainable management system based upon 5s practice for manufacturing SMEs. *Asia Pacific journal of operations management*, 1(1), pp. 19-31.
- [4] Pollution control department (2016). Thailand state of pollution report 2016, pp. 5-9.
- [5] Pingqing, L., Fang, L., & Chunjing, G. (2006). Occupational Health and Safety (OHS) in Small and Medium Size Enterprises (SMEs): A Primary Review1/SANTE ET SECURITE PROFESSIONNELLES (OHS) DANS LES PETITES ET MOYENNES ENTREPRISES (PME): UNE REVUE PRIMAIRE. *Canadian Social Science*, 2(3), pp. 7.
- [6] Granly, B. M., & Welo, T. (2014). EMS and sustainability: experiences with ISO 14001 and Eco-Lighthouse in Norwegian metal processing SMEs. *Journal of Cleaner Production*, 64, 194-204.
- [7] Sanz-Calcedo, J. G., González, A. G., López, O., Salgado, D. R., Cambero, I., & Herrera, J. M. (2015). Analysis of integrated management of the quality, environment and safety on the industrial projects. *Procedia Engineering*, 132, pp. 140-145.
- [8] Raišienė, A. G. (2011). Advantages and limitations of integrated management system: the theoretical viewpoint. *Social technologies*, 1(1), 25-36.
- [9] The social security office of Thailand (2015). Injury and illness report 2015, pp. 16.
- [10] South East Asia Iron and Steel Institute (2008). Dealing with Environmental Pollution in the Iron and Steel Industry: The China Case Study. Available at: <http://www.seaisi.org/News/662/Dealing+with+Environmental+Pollution+in+the+Iron+and+Steel+Industry:+The+China+Case+Study> [Accessed May 16, 2018].
- [11] Surienty, L. (2012). Management practices and OSH implementation in SMEs in Malaysia. School of Management, USM Minden, Pulau Pinang.

- [12]Bragatto, P. A., Ansaldi, S. M., & Agnello, P. (2015). Small enterprises and major hazards: how to develop an appropriate safety management system. *Journal of Loss Prevention in the Process Industries*, 33, pp. 232-244.
- [13]Suchart Prasithrathsin (2011), *The new era of Qualitative Research Methodologies*, pp. 248-251
- [14]Duijm, N. J., Fiévez, C., Gerbec, M., Hauptmanns, U., & Konstandinidou, M. (2008). Management of health, safety and environment in the process industry. *Safety Science*, 46(6), pp. 908-920.
- [15]Mudavanhu, N., Zhou, T., & Dzomba, P. (2013). An assessment of small and medium enterprise owners' occupational safety and health efforts: the case of Southerton, Harare, Zimbabwe. *Journal of Scientific Research & Reports*, 4(3), 407-418.
- [16]International Organization for Standardization (ISO) (2015) ISO 14001: Environmental management systems – Requirements with guidance for use. 3rd Edition, ISO Copyright Office, Geneva.
- [17]International Organization for Standardization (ISO) (2018) ISO 45001: Occupational health and safety management systems – Requirements with guidance for use. 1st Edition, ISO Copyright Office, Geneva.
- [18]British Standards Institution (BSI) (2007) BS OHSAS 18001: Occupational Health and Safety Management Systems – Requirements. 2nd Edition, BSI Limited, London.
- [19]Masi, D., Cagno, E., & Micheli, G. J. (2014). Developing, implementing and evaluating OSH interventions in SMEs: a pilot, exploratory study. *International Journal of Occupational Safety and Ergonomics*, 20(3), pp. 385-405.
- [20]European Union Commission. (2003). Commission recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises. *Official Journal of the European Union*, 46, 36-41.

Copyright © Int. J. of GEOMATE. All rights reserved, including the making of copies unless permission is obtained from the copyright proprietors.
