

## ABSTRACT

Since modernization and industrialization have led to human loss and tragedies, due to industrial accidents all over the world, it is significant to look at the aspects that lead to success of environmental safety and health (ESH) situation. The safety statistics indicate high fatality and injury rates among the manufacturing employees. This paper focuses on developing an ESH Conceptual Model, based on related recommended OSHMS models in the existing of OHSAS: 18001 Standard and Guidelines. Besides, the effectiveness of OSHMS implementation was evaluated, by identifying the potential hazards and practical methods in minimizing workplace accidents. A case study has been conducted at Steel Factory Sdn. Bhd. which is located in Selangor that has implemented OSHMS, with the certification on OHSAS: 18000 in Year 2008. The methodologies consisted of review of the company's data, documentations and literature review, questionnaire surveys, site surveys, site observations, safety inspection checklist and site interviews. The findings from this study indicated that, based on Company' Yearly Incident Case Comparism (Year 2005 until Year 2011), by the implementation of OSHMS in Year 2008, it shows the reduction of fatal and major cases, from 27 cases in Year 2009 and 25 cases in Year 2010, decreased to 16 cases of reported to ESH Department in Year 2011. The employees' attitude and behaviour were the main factors that contribute to accidents. The potential hazards and practical methods have been identified by Hazard Identification, Risk Assessment and Risk Control (HIRARC) method, based on Guideline of HIRARC by DOSH, 2008. As a result, the health hazard, safety hazard and environmental hazard were the potential hazards identified in this study. A sophisticated approach was implemented by the management to control and prevent the hazards, which includes the elimination of the source, engineering controls, administration controls and implementation of the PPE. Many programs and training were provided by management to increase safety

awareness and decrease the accident occurrences among employees. Other than that, there are three important elements which lead to the successful of OSHMS identified in developing the ESH Conceptual Model for the steel factory, which includes the management leadership and organizational commitment, potential hazard identification and also practical methods and prevention. By understanding the OSHMS concept, the application of legislation that needs to be followed by industries is easily to be understood, where evidences showed that various benefits could be yielded from OSHMS implementation which includes the reduction of death and injury rates at the steel factory.

## ABSTRAK

Semenjak arus pemodenan yang berkembang pesat dalam bidang perindustrian diseluruh dunia, satu kajian diperlukan bagi meneliti aspek- aspek kejayaan Keselamatan dan Kesihatan Persekitaran (ESH), bagi kemalangan industri yang mengakibatkan berlakunya pelbagai tragedi dan kehilangan nyawa. Statistik keselamatan menunjukkan bahawa kadar kematian dan kecederaan yang tinggi di kalangan para pekerja pengeluaran. Kajian ini memberi tumpuan kepada penghasilan Model Konseptual ESH, berdasarkan kepada model-model Sistem Pengurusan Keselamatan dan Kesihatan Pekerjaan (OSHMS) yang berkaitan dengan Standard dan Garis Panduan OHSAS:18001. Selain daripada itu, pelaksanaan keberkesanan OSHMS telah dinilai, dengan mengenal pasti bahaya yang mungkin terjadi berserta kaedah praktikal mengatasinya, bagi mengurangkan kemalangan di tempat kerja. Satu kajian telah dijalankan di Steel Factory Sdn. Bhd. yang terletak di Selangor dan telah melaksanakan OSHMS, berdasarkan kepada pensijilan OHSAS:18000 pada tahun 2008. Metodologi kajian terdiri daripada meneliti data-data syarikat, pendokumentasian dan kajian literatur, kajian soal selidik, peninjauan dan pemerhatian di lokasi, senarai semak pemeriksaan keselamatan, dan temuramah di lokasi. Hasil kajian ini menunjukkan bahawa, berdasarkan perbandingan Kes Insiden Tahunan Syarikat (dari Tahun 2005 hingga Tahun 2011), dengan pelaksanaan OSHMS pada Tahun 2008, ia menunjukkan pengurangan kes-kes utama dan kematian, dari 27 kes pada Tahun 2009 dan 25 kes pada Tahun 2010, menurun kepada 16 kes pada Tahun 2011, seperti yang dilaporkan kepada Jabatan Keselamatan dan Kesihatan Persekitaran syarikat. Sikap dan tingkah laku pekerja merupakan faktor utama yang menyumbang kepada kadar kemalangan. Bahaya yang mungkin terjadi dan kaedah praktikal telah dikenal pasti oleh kaedah Pengenaln Bahaya, Penilaian dan Kawalan Risiko (HIRARC), yang berdasarkan

kepada Garis Panduan HIRARC oleh Jabatan Keselamatan dan Kesihatan Pekerjaan (DOSH), 2008. Hasil kajian menunjukkan bahawa bahaya yang telah dikenal pasti dalam kajian ini adalah terdiri daripada bahaya kesihatan, keselamatan dan persekitaran. Pendekatan yang kompleks telah dilaksanakan oleh pihak pengurusan bagi mengawal dan mencegah bahaya, termasuklah penghapusan pada sumber, kawalan kejuruteraan, kawalan pentadbiran dan pemakaian alat kelengkapan perlindungan diri (PPE). Pelbagai program dan latihan telah disediakan oleh pihak pengurusan bagi meningkatkan kesedaran keselamatan dan mengurangkan kadar kemalangan yang terjadi di kalangan para pekerja. Selain dari itu, terdapat tiga elemen penting yang telah dikenalpasti dalam kejayaan sistem pengurusan OSH, bagi menghasilkan Model Konseptual ESH untuk kilang keluli, yang merangkumi kepimpinan pengurusan dan komitmen organisasi, mengenalpasti bahaya yang berpotensi dan juga kaedah yang praktikal dan pencegahan. Dengan memahami konsep OSHMS, penggunaan undang-undang yang perlu diikuti oleh industri- industri menjadi lebih efektif, di mana bukti-bukti telah menunjukkan bahawa pelbagai manfaat akan diperoleh daripada perlaksanaan sistem pengurusan OSH (OSHMS), termasuklah dapat mengurangkan kadar kematian dan kecederaan dikalangan para pekerja.

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## LIST OF ABBREVIATIONS

<b>AQG</b>	Air Quality Guidelines
<b>BAF</b>	Batch Annealing Furnace
<b>CCR</b>	Continuous, Casting and Rolling
<b>CPOL</b>	Continuous Pickling and Oiling Line
<b>CRC</b>	Cold Rolled Coils
<b>EAF</b>	Electric Arc Furnace
<b>(L<sub>Aeq</sub>)</b>	Equivalent Continuous Sound Level
<b>ERP</b>	Emergency Response Programme
<b>ERT</b>	Emergency Response Training
<b>ESH</b>	Environmental Safety and Health
<b>EU-OSHA</b>	European Agency for Safety and Health at Work
<b>HCP</b>	Hearing Conservation Program
<b>HIRARC</b>	Hazard Identification, Risk Assessment and Risk Control
<b>HRC</b>	Hot Rolled Coils
<b>ILO</b>	International Labour Office
<b>ILO-OSHMS</b>	ILO- Occupational Safety and Health Management Systems
<b>JHSC</b>	Joint Health and Safety Committee
<b>LCS</b>	Laminar Cooling System
<b>LF</b>	Ladle Furnace
<b>MIDA</b>	Malaysian Industrial Development Authority
<b>MITI</b>	Ministry of International Trade and Industry
<b>OHSAS</b>	Occupational Health and Safety Assessment Series
<b>OSH</b>	Occupational Safety and Health
<b>OSHA</b>	Occupational Safety and Health Act
<b>OSHM</b>	Occupational Safety and Health Management
<b>OSHMS</b>	Occupational Safety and Health Management System
<b>PPE</b>	Personal Protection Equipment
<b>SF</b>	Soaking Furnace
<b>SHC</b>	Safety Health Committee
<b>SHMS</b>	Safety and Health Management System
<b>SHO</b>	Safety Health Officer
<b>SPSS</b>	Statistical Package for Social Sciences
<b>SMR</b>	Steelmaking, Melting and Refining
<b>TSCC</b>	Thin Slab Continuous Caster
<b>WHO</b>	World Health Organization

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