Study of Occupational Health & Safety Management System (OHSMS) in Universities’ Context and Possibilities for its Implementation

A case study of University of Gavle

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Abstract

Healthier and safer working environment is always appreciated. Almost 2 million people at work die every year due to accidents or work-related diseases (source: ILO). Concept of Occupational Health and Safety (OHS) has significant importance in industrial sector as compare to universities. Therefore it is common among industries to have standardized Occupational Health and Safety Management System (OHSMS) than universities. Management systems for OHS provide a systematic way of managing health and safety with continual improvement. It is generally considered that management system of health and safety not only reduces loss and cost of accidents and ill-health, but it also improves the performance and efficiency of employees. Universities and colleges are meant to deliver education which is considered their core objective. Risks related to health and safety may weaken their aims and objectives.

There are few studies of OHSMS in the context of university. This study aims to contribute to knowledge pool by studying OHS work in universities and explore possibilities for the implementation of OHSMS. This study is based on literature, Standard and Guidelines of occupational health and safety management systems. In addition, study was performed on OHS work among different universities and a case study of University of Gävle (HiG), for possibilities of implementing OHSMS in universities. HiG has a good history of environmental work with ISO14001 certified Environmental Management system (EMS). SWOT analysis was performed for the possibilities of OHSMS implementation at HiG. There are several standards and guidelines which are based on OHSMS and most of them have compatibility with EMS standards. Most of the universities work for OHS of their employees and students without any management system. Selection of suitable OHSMS standard or guideline is dependent on the university structure and its present OHS work. Existing OHS works of Universities have capability to fulfill few OHSMS requirements defined in several standards and guidelines which is positive sign for possibilities of OHSMS implementation at Universities.
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In the beginning, I am thankful to almighty Allah for giving me courage for my studies. I will use this opportunity to say thanks to all faculty, management, staff and students of HiG who cooperated with me during the interviewees. I am also grateful to my supervisors for giving me their precious time and valuable support throughout my thesis whenever I needed. In last but not least, I will especially thanks to my loving fiancée for designing the images which I used in my report.

I dedicate this thesis to my Parents and my fiancée for their moral support throughout my studies.

M. G. Subhani
List of abbreviations

AFS – The Work Environment Authority’s Statute Book (Sweden)
AML – Work Environment Act (Sweden)
AUSA – Australasian University Safety Association
CSG – Central Liaison Group
CSHEMA – Campus Safety, Health, and Environmental Management Association
EMS – Environmental Management System
HiG – University of Gävle
HSWA – Health and Safety at Work Act
ILO – International Labor Organization
ILO-OSH – International Labor Organization – Occupational Safety & Health
ISO – International Organization for Standardization
JHSC – Joint Health and Safety Committee
MS – Management System
MSD – Musculoskeletal disorders
NGO – Non Government Organization
OHS – Occupational Health & Safety (also OH&S or HS)
OHSA – Occupational Safety and Health Act
OHSAS – Occupational Health and Safety Assessment Series
OHSMS – Occupational Health & Safety Management System
SADT – Structured Analysis and Design Technique
SWEA – Swedish Work Environmental Authority
SWOT – Strengths, Weaknesses, Opportunities and Threats
USHA – Universities Safety and Health Association
WHO – World Health Organization
List of Figures

Fig. 1: Illustration of methodology

Fig. 2: Essential requirements of OHSMS in standards and guidelines (Modified from: OHSAS 18001 (2007), BS 8800 (2004) and ILO-OSH (2001))

Fig. 3: SADT Box (Source: Hale, Heming et al. (1997))

Fig. 4: Model for OHSMS operations (Modified from: Hale, Heming et al. (1997))

Keywords: OHSMS, health and safety, Universities
# Table of Contents

Abstract ......................................................................................................................... i  
Acknowledgement ........................................................................................................ ii  
List of abbreviations ...................................................................................................... iii  
List of Figures ................................................................................................................. iv  
Table of Contents .......................................................................................................... v  

1 Introduction .................................................................................................................. 1  
1.1 Background and significance of OHSMS .............................................................. 1  
1.2 Definition of OHSMS .............................................................................................. 2  
1.3 Purpose .................................................................................................................... 3  
1.4 The University of Gävle (HiG) ............................................................................... 3  
1.5 Outline of the report ............................................................................................... 4  

2 Methodology .............................................................................................................. 5  
2.1 Literature review .................................................................................................... 6  
2.2 Standards, guidelines and model for OHSMS ....................................................... 6  
2.3 Qualitative data ...................................................................................................... 7  
2.3.1 Universities and association’s internet home pages ....................................... 8  
2.3.2 Interviews of management and faculty .............................................................. 8  
2.3.3 Interviews of staff and students ....................................................................... 9  

3 Theoretical Framework .............................................................................................. 10  
3.1 Standard and guidelines on OHSMS ................................................................. 10  
3.1.1 Requirements of OHSMS in standards and guidelines .................................... 10  
3.2 Model for OHSMS operation .............................................................................. 17  
3.3 Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis .... 19
4 Findings and Description of study .............................................................. 20
  4.1 Comparison of OHSMS standard and guidelines ................................. 20
  4.2 Relationship of OHSMS and EMS ....................................................... 21
    4.2.1 Compatibility of OHSMS with ISO14001 ................................. 21
  4.3 OHSMS operation .............................................................................. 22
  4.4 What are international and national organizations doing for OHS?........ 23
  4.5 Significant outcomes from the literature review .................................. 25
    4.5.1 Management commitment ......................................................... 25
    4.5.2 Musculoskeletal disorders (MSD) ................................................. 26
    4.5.3 Health and Safety Committee .................................................... 26
    4.5.4 Occupational health services ..................................................... 27
    4.5.5 Promotion of OHS ..................................................................... 28
  4.6 OHS in Universities around the World ................................................. 31
    4.6.1 National associations of universities OHS around the world ............ 32
    4.6.2 Universities of AUSA ................................................................ 33
    4.6.3 Universities of USHA ................................................................. 34
    4.6.4 Universities of CSHEMA ............................................................. 35
  4.7 OHS work at HiG ............................................................................... 35
  4.8 Interviews ......................................................................................... 37
    4.8.1 Interviews of management and Faculty ......................................... 37
    4.8.2 Interviews of staff and students .................................................. 42
5 Discussion and Analysis ....................................................................... 45
  5.1 Suitable Standard or guidelines for OHSMS ....................................... 45
  5.2 OHS activities in universities ............................................................... 45
    5.2.1 Relationship of OHS associations .............................................. 46
    5.2.2 Relationship of universities from three countries .......................... 46
5.3 Analysis of HiG work for OHS .................................................. 47
  5.3.1 Awareness of health and safety ........................................... 47
  5.3.2 Individual commitment ..................................................... 48
  5.3.3 OHS activities and services ................................................ 48
  5.3.4 Comparison of HiG OHS activities with other universities ...... 49

5.4 Status of OHSMS requirements at HiG ....................................... 49

5.5 SWOT analysis for OHSMS implementation at HiG ...................... 51

6 Conclusion .................................................................................... 52
  6.1 Limitations ................................................................................ 53
  6.2 Recommendations and future work .......................................... 54
  6.3 Closure ..................................................................................... 54

References ........................................................................................ 56

Appendix 1 (Interviews questions of management and faculty) .............. 61

Appendix 2 (Interviews questions of staff and students) ......................... 64
1 Introduction

1.1 Background and significance of OHSMS

Universities and colleges are meant to deliver education which is considered as a core objective of such institutions. Occupational health and safety (OHS) is linked with any employee in any organization including universities. There are cases of injuries and even deaths of students and instructors in universities (Wu et al. 2006). Risks related to OHS may weaken the aims and objectives of universities.

According to International Labor Organization (ILO), “every year more than 2 million people die from occupational accidents or work-related diseases” (ILO Safety and Health at Work, 2010) and rate of injuries and ill-health is much higher than this figure. Several studies like Robson et al. (2007), Fernández-Muñiz et al. (2008), Seoul Declaration (2008), ILO-OSH (2001) and BS 8800 (2004) indicates that the OHS based management systems not only reduce accidents and injury rates but it also improves the business and productivity of an organization. Extent of such view has increased considerably in the past few years. According to Robson (2007), professionals who are working for OHS also have similar views. Fernández-Muñiz et al. (2008) said that occupational accidents and unsafe working conditions not only have a bad effect on human resource but also it damages the material, reduces the productivity and diminishes the motivation of workers. According to ILO-OSH (2001), this conviction is now also recognized by governments, employers and workers. BS 8800 (2004) presumes Occupational Health & Safety Management System (OHSMS) is critical to keep health and safety in working conditions and human factor has a significant effect of performance of the management system.

Robson et al. (2007) in their systematic literature review which was based on 8 bibliographic databases evaluated the effects of OHSMS interventions on employee health and safety and associated economic outcomes. Adoption of OHSMS may be mandatory due to government legislations or it may be voluntary as a result of incentives from insurance carriers. Robson et al. (2007) results show that after the intervention of OHSMS, there was a decrease in injury rates, which
was 18% for mandatory OHSMS organizations and 24 to 34% for voluntary OHSMS organizations. Koh (1995) expressed that better OHSMS reduces the health cost and due to fewer accidents it increases the productivity.

1.2 Definition of OHSMS

The boundary of OHSMS is wide and there is no specific or precise definition of it. In majority cases, it does not clear if it is only MS or it includes technical aspects as well. According to Robson et al. (2007, p332), unlike Non-MS Programs of OHS, OHSMS have properties like proactive, internally integrated, elements of evaluation and continuous improvement. Definition of OHSMS according to ILO-OSH (2001) is “A set of interrelated or interacting elements to establish OSH policy and objectives and to achieve those objectives”. Occupational Health and Safety Assessment Series (OHSAS) 18001 (2007) define OHSMS as, “Part of an organization’s management system used to develop and implement its OH&S policy and manage its OH&S risks.” Both definitions illuminate the OHSMS as implementation of OHS policy to achieve the safety and health targets but it missed the extent to which OHSMS is applicable in the company. Nielsen (2000) has pointed out this as, “OHSM systems are not, of course, a well-defined set of management systems. Indeed there are not clear boundaries between OHS activities, OHS management, and OHSM systems”.

In last few decades, the idea OHSMS has been developed and adopted by several sectors including public, private and NGOs. Some of internationally available standard and guidelines for OHSMS are ILO-OSH (2001), BS 8800 (2004) and OHSAS 18001 (2007). These standard and guidelines provide the requirements for any type or size of organization which is willing to develop and implement OHSMS.

Fernández-Muñiz, et al. (2008) has identified some features for an effective OHSMS. Safety Policy is developed to show the management commitment and principles towards OHS. Promotion of OHS among employees is done by introducing Incentives for Employee Participation. Competency of employees is improved by Training and Development. Information sharing can reduce the risk of poor communication. Preventive and emergency planning is to avoid and tackle
any unwanted situation. Last feature is control and review of activities which will help in improving the overall system.

Makin and Winder (2008) explained the base of any OHSMS is the identification of hazards and measures to control them. This base determines the scope and content which contributes in the success of the system and any negligence in the base can letdown the performance of OHSMS. Fernández-Muñiz, et al. (2008) have said that satisfactory working conditions give benefits directly to workers and indirectly to insurers, contractors, consumers, families and society.

1.3 Purpose

Concepts of OHSMS implementation are very common in the industrial sector as compare to the education sector (especially universities). Many studies are performed on OHSMS in industries but it is hard to directly relate it with universities. The purpose of this thesis is to contribute to the knowledge pool by studying the working of Occupational Health & Safety (OHS) and possibilities for implementation of OHSMS in universities using University of Gävle (HiG) as a case university. Following research questions served as a base to achieve the purpose of thesis work:

**RQ1.** What are the standards and guidelines for OHSMS and their relationship with Environmental Management System (EMS)?

**RQ2.** How do universities work with OHS?

**RQ3.** Which is the suitable standard or guideline for implementing an OHSMS in the university and how is it related with HiG?

1.4 The University of Gävle (HiG)

HiG was established in 1977. Now it has 12000 students and offering more than 40 training programs and about 1000 courses in humanities, social and natural sciences and technology. University has ISO 14001 certified EMS. Certification covers the organization's main activities like teaching, research and collaboration with the community. HiG has good history of environmental work. It started environmental work in 1995 even before the Swedish Directives on it, which
came in 2001 (Sammalisto, 2006). Similarly, the university got its EMS certified status in 2004 where as Swedish directives on it came in 2009 (SFS 2009:907). EMS is in operation and after the revision of 2005 it also has focus on Sustainable development.

1.5 Outline of the report

This thesis is comprised of six chapters. Chapter 1 tells the purpose of thesis and background of the key topic OHSMS. Chapter 2 is about the method which was chosen to achieve the purpose. It covers literature review, standard, guidelines and qualitative data. In chapter 3, standard, guidelines and models are explained that are used in this thesis. Findings from research related to the purpose are explained in chapter 4. Answers of research question are explained in chapter 5 with the help of analysis and discussion of findings from chapter 4. Chapter 6 is about the conclusion and limitations of report and recommendation for future work.
2 Methodology

The research method was divided into three parts in order to achieve the purpose. Overall methodology is illustrated in the Figure 1 First part used literature, Standard and Guidelines to study OHS, OHSMS and requirements for implementation of OHSMS as per standard and guidelines. Part 1 contributed in the answer of research question one. Part 2 was mainly the collection of qualitative data. This part was further divided into two steps. First step used websites of OHS associations and selected universities along with some literature, Standard and Guidelines to study health and safety in universities and collection of observations. While step 2 was the collection of qualitative data in the form of

![Figure 1: Illustration of methodology](image)

Part 1
- **Resources:**
  - Literature
  - Standard and Guidelines
- **Standard and Guidelines of OHSMS**
  - OHSAS 18001:2007
  - BS:8800:2004
  - ILO-OHS:2001
- **Model for OHSMs operations**
- **OHSMS study**
  - OHS Internationally
  - OHSMS and EMS
  - Significant factors in OHSMS
    - Management Commitment
    - Musculoskeletal disorder
    - Safety Committee
    - Occupational health services
    - OHS promotion

Part 2
- **Resources:**
  - Literature
  - Standard and Guidelines
  - Universities websites
  - Interviews
- **Study of OHS/OHSMS in Universities**
  - OHS Associations
    - AUSA (Australia)
    - USHA (UK)
    - CSHEMA (USA)
  - (Three universities from each association)
- **Interviews at HiG**
  - Faculty and Management
  - Students and Staff

Part 3
- **Resources:**
  - Study and outcomes of Part 1 and Part 2
- **Discussion, analysis and conclusion for:**
  - Possibilities of implementing management system for OHS in universities
  - How is HiG’ work on OHS and need of OHSMS at HiG
  - Suitable standard or guideline for implementing OHSMS at HiG

Figure 1: Illustration of methodology

implementation of OHSMS as per standard and guidelines. Part 1 contributed in the answer of research question one. Part 2 was mainly the collection of qualitative data. This part was further divided into two steps. First step used websites of OHS associations and selected universities along with some literature, Standard and Guidelines to study health and safety in universities and collection of observations. While step 2 was the collection of qualitative data in the form of
interviews at HiG. Part 2 aimed at second research question about OHSMS and universities. In Part 3, conclusion was developed on the basis of analysis of first two parts. Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was also used to analyze the possibilities of OHSMS implementation at HiG. Answer of research question three developed in Part 3.

2.1 Literature review

A large portion of research was based on literature review. For this purpose databases of Emerald, Science Direct, Google Scholar and Ebrary e-books were searched with key words Occupational Health & Safety Management System, OHS, OHSMS, health and safety, health management system, safety management system, 18001, OHSAS, OSHA, ILO-OSH, 8800 and all these key words with university. Abstract of articles was studied for selection of articles. Majority of articles is from journals of Safety Science, International Congress Series, Journal of Safety Research and International Journal of Industrial Ergonomics. Few articles are from Environmental Science & Policy, International Journal of Occupational and Environmental Health, Journal of Cleaner Production, and International Journal of Hygiene and Environmental Health. Some books and internet websites are also used for literature.

2.2 Standards, guidelines and model for OHSMS

To study a management system for occupational health and safety, it was useful to consider internationally available standard and guidelines for OHSMS. For this, ILO-OSH (2001), BS 8800 (2004) and OHSAS 18001 (2007) was studied. These standard and guidelines provide the requirements for any type or size of organization which is willing to develop and implement OHSMS.

ILO has developed guidelines for Management System of occupational safety and health “ILO-OSH 2001”. These are voluntary guidelines which do not require any certification or recognition. International principles on OHS and ILO’s tripartite constituents were considered during the development of these guidelines. Tripartite is “The interaction of government, employers and workers (through their representatives) as equal and independent partners to seek
solutions to issues of common concern” (Tripartism - ILO Thesaurus 2005). It mainly focuses on the protection of worker from ill-health and accidents. These guidelines can be used for national level framework on OHS or Organizational level OHS management system.

OHSAS 18001 (2007) provides the standards to implement OHS management system which may be certified from accreditation body. OHSAS based management system also focuses on legal requirements of OHS via policy and objectives. It may be applied to any size of organization and it is compatible with other management systems which includes ISO 9001, ISO 14001 and ILO-OSH.

Technical Committee HS/1 of British Standards Institution has developed Guide for a management system of occupational health and safety in line with the national and international OHS issues known as BS 8800 (2004). It provides guidance to the organizations for OHS and its integrations in overall MS of the organization. It also comprises of some other international standards and guideline related to occupational health and safety like OHSAS 18000 series and ILO-OSH. BS 8800 (2004) is based on HSG65 (2003) - Successful health and safety management. HSG65 (2003) is a guideline issued by Health and Safety Executive aims at safety and health with the same importance as any other important activity. It is volunteer guideline which also considers legal requirements and auditing criteria of health and safety which make it more helpful for the organizations. HSG65 (2003) focuses at managers and professionals related with OHS by helping them about developing and implementing health and safety management.

2.3 Qualitative data

As mentioned before, qualitative data was collected via a study of universities’ websites and interviews performed at HiG. Collection of qualitative data was in line with Patton (2002), Silverman (1993), Creswell and Miller (2000) and Golafshani (2003) for reliability and validity. Triangulation was used at a different level in qualitative data.

Creswell and Miller (2000) explained triangulation as a technique to increase validity in which researchers examine the similarities among several sources to
develop some conclusions. Sources may be same or different. According to Golafshani (2003), validity and reliability is improved with triangulation which is the use of more than one method of data collection or analysis. She further explained “methods chosen in triangulation to test the validity and reliability of a study depend on the criterion of the research” Golafshani (2003, p604). Silverman (1993) explained an assumption that if the findings obtained from triangulation’ method are similar then the validity has been established. However, Patton (2002) describes a misunderstanding about triangulation that it is not necessary for different type of data must lead to same results, it may yield different results.

Two different methods of collecting of data (interviews and universities homepages) were aimed to increase the validity of the research. Reliability of interviews was managed by developing questions relevant to the research work and by relating interviews data with the information available on HiG website. For reliability of universities observations, relevant data from different universities situated in three different countries were collected. HiG was selected as a case study due to its impressive environmental work history.

2.3.1 Universities and association’s internet home pages

To study the working of health and safety in universities, internet websites were used. UK, USA and Australia have national level associations working for OHS in the education sector mainly Universities. These associations are Australasian University Safety Association (AUSA), Universities Safety and Health Association (USHA) and Campus Safety, Health, and Environmental Management Association (CSHEMA). These three associations were studied along with three universities from association. Similarities and comparison was made to know the health and safety work among different universities in different countries.

2.3.2 Interviews of management and faculty

Interviews of faculty and management were aimed to know about their perceptions, thinking, experiences and suggestion about Occupational Health and Safety Management System in Universities, particularly at University of Gävle.
Due limitation of time and scope, five OHSMS based and one EMS and MS based interview were conducted. One interview was with management personal working for safety and one interview was with personal dealing with health issues. Another interview was conducted with a management personal from administration. Only one health and safety representative from faculty could be interviewed due to busy schedules of management and faculty. There was an interview with a management personal working in the president office. In the end, an interview was conducted with the leading personal of Environmental Management System implementation. The last interview was aimed to know the reasons and driving forces for a Management System at HiG.

Interview was recorded (voice only) and notes were taken during the interview. After the interview, transcription summary was performed. Structure of OHSMS interview was divided into three parts. First and last section was same for all interviewees but second section was based on interviewee. Reason to ask aimed questions was to increase the reliability of the interview. Interviews questions are in Appendix 1.

2.3.3 Interviews of staff and students

Students and staff interview was aimed to know their perceptions and expectations regarding health and safety. Short interview questions were developed for students studying at the campus and for staff working at HiG. Students were chosen randomly on the basis of different buildings of campus not departments. It was tried to focus on students who used to spend more time at the campus for which after lunch time was selected for students studying in different locations of the university. Staff selection was performed on the basis of availability. In the start of the interview, interviewee was asked about his or her knowledge regarding health and safety and then he or she was told about the concept of Health and Safety before going to the detail of interview. Interviews questions are in Appendix 2.
3 Theoretical Framework

3.1 Standard and guidelines on OHSMS

Some of internationally available standard and guidelines for OHSMS are ILO-OSH (2001), BS 8800 (2004) and OHSAS 18001 (2007). These standard and guidelines were studied for the research work. Requirements defined in these standard and guidelines are described below.

3.1.1 Requirements of OHSMS in standards and guidelines

In order to implement OHS management system under any particular standard or guideline, it is necessary to fulfill all the requirements given in that standard or guideline. The essential requirements of OHSAS 18001 (2007), BS 8800 (2004) and ILO-OSH (2001) are shown in Figure 2 and discussed below in their defined sequence:

Figure 2: Essential requirements of OHSMS in standards and guidelines (Modified from: OHSAS 18001 (2007), BS 8800 (2004) and ILO-OSH (2001))
3.1.1.1 Initial status review

In BS 8800 (2004), the initial step towards OHSMS is Initial status review. Initial status review gives an overall image of OHS condition in the organization which is going to implement an OHS management system. It is required for all organizations even for those which already have some type of OHS management and also those which do not have any system before. It should identify the applicable legal and other regulations and requirements, risk and hazards to and from the work environment regarding health and safety and arrangements for auditing. Initial status review is the base of OHSMS in BS 8800 (2004) and it is required to document it. It also contributes in the continuous improvement of the system.

This Initial status review is not the initial step in OHSAS 18001 (2007) and ILO-OSH (2001), however in ILO-OSH (2001) initial review is described in the third step under the section of planning and implementation.

3.1.1.2 OHS Policy

Generally, overall idea of OHS policy in these three standard and guidelines is similar that the OHS policy should be developed by senior management which should also show their commitment towards protection of health and safety of its employees by reducing ill-health and accidents. In addition, ILO recommends the contribution of workers in policy making. Policy should show that the organization will fulfill the legal and other requirements which will be applicable on the organization. ILO also mentioned to meet voluntary programs.

Policy should be clearly relevant to scope of organizational OHS activities and properly documented, communicated, signed with date and available to all the concern parties at any time. Periodic review of the policy should be mentioned in it. All three standard and guidelines recommend that the occupational health and safety policy should show the commitment for continuous improvement of the management system. ILO-OSH (2001) and BS 8800 (2004) in addition to OHSAS 18001 (2007) recommend that Policy should show OHSMS as an integrated part of the overall business and confirm the participation of all levels of organization.
3.1.1.3 Organizing

In BS 8800 (2004) and ILO-OSH (2001), second step after Policy is Organizing which is not a separate section in case of OHSAS 18001:2007. Organizing covers the allocation of responsibilities throughout the organization and the overall structure of OHSMS. In both guidelines, overall the ultimate responsibility is of employer or top management (directors etc.) and overall contribution of structure is for prevention of ill-health and injuries with continual improvement.

In BS 8800 (2004), management structure should; have control over OHS activities, promote OHS among employees and groups, keep competency of employees and effectively communicate and have leadership on OH&S. In addition to these, ILO-OSH (2001) also recommends for Organizing that it should; accomplish requirements of applicable guidelines including voluntary programs, have a procedure to recognize risks, make sure the participation of all employees and provide recourses. Responsibilities of top management cover ensure the development and implementation of system with compliance of all applicable requirements, appointing competitive person for appropriate job, management review of the performance of OHSMS and promotion of OHS. Both guidelines recommended that all employees should be aware about the responsibilities and have the competency to follow the OHS policy for achieving its objectives. Employees should not only know their own responsibilities but also should have awareness about the responsibilities of those to whom they are linked or they may affect during the work. Along with these clear responsibilities, employees should also be given resources to perform them.

Addition to these requirements, ILO-OSH (2001) has defined the documentation and communication of occupation health and safety management system under of the section or Organizing. It require clearly and properly maintained documentation of the management system which should cover OHS policy related documents, details of responsibilities, health and safety risks and records and all procedures related to it. It is necessary to review documents on a regular interval and keep them updated. The documents should be rapidly available, accessible and communicated to all employees. Procedures should be developed for internal
and external documented communication as well as for smooth flow of information within the organization. The procedures should also ensure feedback system of employees regarding improvements, observations and suggestions about occupational health and safety.

3.1.1.4 Planning

Only in OHSAS 18001 (2007), planning is a separate section while in BS 8800 (2004) and ILO-OSH (2001), planning and implementation is defined under the same section. All three standards and guidelines cover the planning of OHS Objectives, legal requirements and identification of hazards and risk of health and safety. Addition to these, ILO-OSH (2001) defined Initial review and detailed hazard prevention in procurement and contracting under planning and BS 8800 (2004) defined OHS management arrangements here which emphasize to focus on the plans for each element of the management model. Plans cover from overall system to contingency planning, working activities and corrective actions.

All three standards and guideline recommend for planning and defining of Objectives of OHS that these should be; related to the organization, practically possible to achieve and measure, in line with OHS policy and applicable legal and other requirements, and contribute in continual improvements of the system to improve the overall health and safety of organization. Plans and programs should be developed with appropriate resources to help in achieving these objectives. Like OHS policy, OHS objectives should be also documented and communicated throughout the organization. Criteria should be made to measure and review the objectives and relevant actions should be taken on regular basis.

Plans should be made for the development of procedure in OHS management system to identify and comply with all applicable legal and other requirements. Responsible employees or people linked with these requirements should be informed and kept updated.

Hazards and risks identification and assessment is defined in planning. It should be perform on continuous basis to identify, prevent, control and reduce it in the future before it happened. It should consider all the activities of the organization, behavior of people linked directly or indirectly to those activities and the effect of equipment being used. Reduction of hazards and risk should be performed by
eliminating, controlling or replacing of the main cause. Procedures should be made on the basis of these reduction methods. Regarding change management, the organization should make the assessment of linked OHS risks and hazards before making or implementing any change.

ILO-OSH (2001) defined Initial review under planning. Addition to initial status review defined in BS 8800 (2004), ILO-OSH (2001) required to focus voluntary requirements along with the legal requirement and it recommend to consider the health data of employees to examine the health stats of the organization. ILO-OSH-2001 has also defined detailed hazard prevention under this heading which also cover the emergency response and procurement and contracting, that it should be also in line with OHS procedures and laws. For contacting, selection should be made under health and safety criteria.

3.1.1.5 Implementation

In OHSAS 18001 (2007), implantation is defined with the operation in a separate section from planning unlike BS 8800 (2004) and ILO-OSH (2001). It is a requirement of all management systems to develop, implement and maintain procedures for smooth and continual working of the system. Under this section, OHSAS 18001 (2007) cover resource allocation, training, documentation and emergency related issues. Overall responsibility is on top management, who should assign well defined and accountable OHS responsibilities to a senior member to allocate the recourses and roles for the implantation of OHS management system among all the level and employees. These responsibilities should be documented and communicated.

All the activities which have some sort impact on OHS should be performed by competent personal who should be trained and give awareness about the work and its effect on OHS. These trainings should be arraigned throughout the organization as per concerned requirements. Communication procedures are also defined here that these should cover all levels of organization for internal communication as well as all contractors or visitors for external communication. Procedures should also cover the participation of workers for OHS activities and consultancy with contractors in OHS matters. Documentation like policy, objectives, procedures, OHS elements and records should be properly maintained, reviewed and updated.
All the operations related OHS activities are defined under Operational Control. Procedures on emergency should cover the response in such case and also identify the potential risks. These emergency procedures should periodically check and reviewed. In BS 8800 (2004) and ILO-OSH (2001), these procedures are defined under different sections.

### 3.1.1.6 Monitoring

After implementation of the management system, it comes the turn to monitor the working and performance of the system. In OHSAS 18001 (2007), BS 8800 (2004) and ILO-OSH (2001) the monitoring related activities are defined under *Checking, Measuring performance* and *Evaluation* respectively. It mainly covers the performance monitoring and measurement, investigations and auditing.

#### Performance (monitoring and measurement)

Monitoring and measuring of OHS performance is required to know the effectiveness and working or the system. It should be according to nature of organization and done for both *qualitative and quantitative*. Procedure should be developed and maintained for monitoring and measurement to know the objective conformance, effectiveness of control over risks and hazards, conformity of other procedures related to OHS and recording of OHS data. It should be done on both periodic as well as reactive basis. The performance measurement should be on the basis of risks and hazards defined in the system during review, policy and planning phase.

Performance procedures should also cover the compliance of legal and other requirements on a periodic basis. All records of monitoring and measurement should be documented and evaluated. Periodic monitoring and measurement is meant for daily activities and reactive monitoring is done in case of any incident or ill-health. Both contribute in controlling any unwanted situation of health or safety and it helps in continual improvement.

#### Investigations

It is necessary to find out and analyze the reasons for any poor performance of OHS via investigations by a competent person and support of employees. Procedures should be developed and implemented for investigations which should
point out the short come of OHSMS and determine the preventive and corrective actions. The recommendations and findings of investigations should be documented, communicated and send to management for review and further action plans. In case of any Legal and external factors, equal importance should be given. There should also be a procedure for the action plans determined on the basis of investigation. Investigations should also contribute in continual improvement.

**Audits**

Audits are required to assess all the elements of OHSMS that to what extend management is succeed to meet these elements with the standard or requirements. Audit should be based on the nature of OHS risks and hazards of the organizations and should be performed by competent and independent internal or external person. Audit should also check the policy and objective fulfillment, understanding of OHSMS, participation of employees, compliance with laws and continual improvement. The results of audits either favorable or unfavorable should be communicated to management for review and further actions. Procedures should be developed which clearly described the responsibilities, criteria, competency and schedule for audits. Results of audits and actions based on then should be communicated among the organization for improvements.

**3.1.1.7 Management review**

Management review is the final step in completion of one cycle of the management system and it contribute in continual improvement of the system. It is defined in all three standards. In addition, BS 8800 (2004) has defined two types of review, one to be performed at all levels of an organization called *periodic review* and other for top management is called *management review*. Top management should review the overall credibility of OHSMS on planned intervals. It should cover the evaluation of plans (objectives, demands and requirements) and identification of need for improvements (corrective and preventive). For review, management should consider audit reports, investigation results, feedbacks, relevant communication and follow-ups and the records of previous management reviews. On the basis on review, management should update polices, objectives and procedures etc., if required. All records of
management review should be documented and communicated with in the organization. In ILS-OSH (2001), after management review, corrective and preventive actions and continual improvement is defined in separate section.

3.2 Model for OHSMS operation

Hale et al. (1997) have developed a model for safety management system based on SADT (Structured Analysis and Design Technique). SADT was initially used in software and knowledge engineering and it also used in decision making models. In Figure 3 structure of SADT model is shown which is like a box. In SADT box, input (I) is either transformed or used up through the process of generating an output (O), in the presence and support of resources (R) and control/criteria (C). One or more than one input may be used to produce single or several outputs. In safety management system, input is mostly information and documentation. In case of certain activity, people are also inputs like in case of safety trainings. Resources may be in the form of people or hardware, which support the processes from input to output. Control/criteria serve as a benchmark to measure the performance of the activity. It includes are legal and other standards and requirements. Output is not only required result, but in some cases there are unwanted outcomes also. Authors have used this SADT model at every level of the model and activity. Feedback is used with in SADT boxes for continual improvement.

![SADT Box](image)

*Figure 4: SADT Box (Source: Hale, Heming et al. (1997))*
Hale et al. (1997) have divided levels of safety management system (SMS) into three. First and top most is System structure (S), second is Planning, organization and procedures (P) and last level which is directly affected by the deviations is Execution (E). Deviations are hazards and risks which cause non-conformities in safety management system. The modified model based on authors’ description is shown in Figure 4. At every level, SADT box is used with the addition of feedback which starts from the output of one level to the input of the same level and the levels above. Feedback acts for improvement of output/outputs of that level as well as overall system. This feedback is worked until the desired results (control/criteria) are achieved. Results of lower level are sent to upper level/levels for feedback and the results of upper level act as input, resource and control/criteria for the lower level/levels. Moreover, overall control/criteria are legal and other standards and requirements.

Execution (E) is the lowest level which is meant to reduce or remove the Deviations on its output. It also sends feedback to itself as well as to S and P level. It gets its other input, control/criteria and resources from P level. Planning, organization and procedures (P) level responsible for the execution of actions and decisions taken at S level as its outputs are send to E level and it gets its inputs,
resources and control/criteria from S level. P level sends feedback to itself and S level. System structure (S) is the top most level which is concerned with overall the working and responsibilities of safety management system. It is responsible all lower levels. Its inputs are inputs of overall SMS. Feedback acts as its resource to transform its inputs into outputs which will be used by lower levels. This model helps in decision making, the process of reducing or removing deviation is keep in working until the criteria is met which is decided by decision making.

3.3 Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis

Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis is an efficient tool to identify the internal strengths and weaknesses along with external opportunities and threats to an organization for decision making (Dyson, 2004; Houben et al., 1999; Yuksel & Dagdeviren, 2007; John, 2006). This technique is used in this research report to analyze the possibilities of implementing OHSMS at HiG. SWOT for this case can be explained at:

- **Strengths**: internal factors which will be positive for the implementation
- **Weaknesses**: internal factors which will be negative for implementing of OHSMS
- **Opportunities**: external conditions favorable for the implementation
- **Threats**: external conditions unfavorable for the implementation

Examples of internal aspects mentioned by Dyson (2004) are personnel, facilities and location. For external aspects, Dyson (2004) mentioned examples of political, economic, social and technological. For SWOT analysis, according to John (2006, p27) “You can then attempt to exploit your strengths, overcome your weaknesses, grasp your opportunities and defend yourself against threats”. Yuksel & Dagdeviren (2007, p3365) have also expressed the same idea “Organization can build strategies upon its strengths, eliminate its weaknesses, and exploit its opportunities or use them to counter the threats”.

4 Findings and Description of study

4.1 Comparison of OHSMS standard and guidelines

Majority of elements described in the standard and guidelines are similar, except some additional requirements. The comparison of these exceptions is described below:

- All three standard and guidelines are aimed on the safety and health of people linked with organization by developing a management system. In addition to this, ILO-OSH (2001) has more focus on workers.
- BS 8800 (2004) required initial status review where in OHSAS 18001 (2007) there is no such requirement. However ILO-OSH (2001) covers initial review under planning with the addition of worker’s health data analysis.
- There is no significant difference in the Policy. ILO-OSH (2001) further mentioned the participation of workers by consulting them.
- OHSAS 18001 (2007) described Organizing in planning and implementation where as other two have separate section for it.
- Under Organizing in ILO-OSH (2001), requirements for procurement and contracting are defined in detail which is not covered in such detail in other two.
- Risk and Hazards requirements are almost same but explained in deferent manner and different places. ILO-OSH (2001) in addition required the access of OHSMS records and documents to workers.
- OHSAS 18001 (2007) and BS 8800 (2004) explained corrective and preventive actions with risk and hazards identification and assessment which is comes before implementation and monitoring. However ILO-OSH (2001) has defined its requirement in a separate section after the management review.
- Audit requirements are same in all, in addition of workers participation requirement in ILO-OSH (2001).
There is only management review in OHSAS 18001 (2007) and ILO-OSH (2001), however BS 8800 (2004) has additionally recommended periodic review which should be performed at all levels in an organization.

In ILO-OSH (2001), continual improvement is explained in separate section at the end after review, while in OHSAS 18001 (2007) and BS 8800 (2004) it is explained throughout the requirements.

4.2 Relationship of OHSMS and EMS

Implementation of occupational health and safety MS with an environmental MS as an integrated management system has advantages for the organization which are studied by Honkasalo (2000). The first thing is evading repeated work as most of the requirements of both management systems are similar, so single task can cover both activities such as risk assessment. Secondly, “people can consider occupational safety risks more easily than environmental risks as a natural part of their work” Honkasalo (2000, p44) which can help in effectiveness and ease of managing the system. The additional demand of OHSMS is the involvement of employees which is not required in case of EMS. Unlike EMS, in occupational health and safety management system contributions of employees has effect on the performance of the overall system.

4.2.1 Compatibility of OHSMS with ISO14001

Fundamentals of OHSMS and EMS are very much similar and the standard and guidelines of OHSMS are also compatible with EMS guidelines such as ISO14001. OHSAS 18001 (2007) was developed in compatibility with other ISO standards like 9001 and 14001. Whereas BS 8800 and ILO-OSH are not totally similar to ISO14001 but they can be integrated with it. Model of elements of ISO14001 is similar to OHSMS models, with some exceptions. Unlike BS 8800 and ILO-OSH, ISO14001 does not have any requirement of initial status review which is also same for OHSAS 18001. Initial review is helpful for implementing EMS but it is not compulsory element for ISO14001.

Like OHSMS, EMS also has a policy which is called environmental policy. Majority of requirements are same which covers continual improvement,
management commitment, nature of organization, documentation and communication. Requirements explained under organizing in BS 8800 and ILO-OSH are covered under implementation in ISO14001 which is same in OHSAS 18001. In all OHSMS standard and guidelines, Risk assessment is essential whereas there is no such requirement in case of EMS in ISO14001. Instead it required Environmental aspects in the planning section. ISO14001 also have a separate section for Planning and Implementation like OHSAS 18001. Under implementation, ISO14001 takes the requirement of accountability for responsibilities, whereas OHSMS has a requirement of accountability. Similarly, ISO14001 do not have any requirement of participation.

Investigation is an important element of OHSMS which help to diagnose the incidents and ill-health. Its requirements is explained in OHSAS 18001 (2007), BS 8800 (2004) and ILO-OSH (2001) and these investigations results support the decisions regarding preventive actions and management review. There is no such requirement in EMS standard ISO14001. Audit requirement is same in both EMS and OHSMS. ISO14001 required only management review like OHSAS 18001, whereas BS 8800 have defined periodic review in addition to management review.

4.3 OHSMS operation

The model of Hale et al. (1997) can be used in the operation overall OHS management system. This model aims on continual improvement, which is an important requirement of OHSMS. SADT based model of Hale et al. (1997) can be followed to keep the OHSMS operational and decision making at all levels. This can be explained with an example. Let consider an organization whose OHS Policy tells that particular risk factor ABC should not exist in the organization. In that case, presence of risk factor ABC is deviation. Once deviation occurs, the level E will start working to remove it. If this level could not remove the deviation, the higher levels P and S will get feedback and these levels will change its outputs in order to help level E in removing deviation. After the removal of deviation, system will come to normal.
4.4 What are international and national organizations doing for OHS?

Healthier and safer working environment is always appreciated and it should be not only right of the people to have such a working environment but also others should also give it priority and consider as one of the fundamental human right (Seoul Declaration (2008), ILO Safety and Health at Work, 2010). According to LaDou (2002), International organizations should also give priority to health and safety. It does not have any harm in improving safety and health at work but in fact it meliorates working conditions, productivity and economic and social development (Seoul Declaration, 2008). Goldstein et al. (2001) say that the importance of OHS is clear to many countries which also have standard working conditions but unfortunately most parts of World are below the minimum standards which were set by International Labor Organization (ILO) and the World Health Organization (WHO).

ILO is the international organization working for the work rights of men and women. One of the themes of ILO is “Safety and health at work”. ILO encourages all countries for OHS policies and it also set standards for OHS. ILO conducts conventions which guide all participant countries to promote OHS programs but regrettably only 37 ILO members out of 175 sanctioned “ILO Convention on Occupational Safety and Health” LaDou (2002). WHO, a coordinating authority of United Nations is also working on OHS and it has a program on Occupational Health (Occupational health - World Health Organization, 2010). Responsibility of WHO is to provide technical support of OHS such as medical services and hygienic standards. World Health Assembly Resolutions promote the national OHS policies like “WHO Global Strategy on Occupational Health and Safety” (LaDou, 2002; Goldstein et al., 2001). ILO and WHO also works jointly for OHS and the recent effort is “Seoul Declaration on Safety and Health at Work”. The Seoul Declaration on Safety and Health at Work was adopted on June 2008 by some 50 high-level decision-makers from around the world as a major new blueprint for constructing a global culture of safety and health at work” (Goldstein et al., 2001). Since 1950, WHO and ILO are sharing common definition of Occupational Health and Safety (Stellman edt., 1998).
In parallel with international organizations, nations are also putting efforts to promote and encourage OHS. Elgstrand (2001) considers Sweden as a country which is prominent in exchanging knowledge with other countries and international organizations and participates in restoring OHS infrastructure of Eastern Europe.

In 1977, Swedish parliament passed Work Environment Act (AML) which is about health and safety of people at work. According to Sweden Work Environment Act, every employer has the responsibility to provide good work environment by preventing ill-health and accidents. This act also focused on the relationship of employers and employee to achieve safe and healthy working environment. Swedish government has also issued a Statute Book (AFS) which contains provisions of Work Environment Act (AML). In 2001, National Board of Occupational Safety and Health of Sweden along with 10 districts of the Labor Inspectorate merge and formed Swedish Work Environment Authority which has objective to “reduce the risks of ill-health and accidents in the workplace and to improve the work environment in a holistic perspective” (SWEA, 2010). All responsibilities of Swedish Work Environment Authority are based on Work Environment Act (AML) and explained in Statute Book (AFS).

Husman (2006) said that according to 1978 OHS Act of Finland, employer is compelled to provide occupational health services and half of the cost is reimbursed to employer from Social Insurance Institution. According to LaDou (2002) and Elgstrand (2001), even though Scandinavian system of OHS was welcomed by the industry as well as it was funded by the Government, but it could not provide transferable mode for industrializing countries.

U.S. and UK laws on OHS are well known and some countries used these laws to develop their OHS acts. United States of America have passed and act on OHS in 1970 for the safety and health of working men and women. This act is known as “Occupational Safety and Health Act of 1970” (OSHA). According to this act employer has reasonability to take care of Health and safety of employees against recognized hazards and to comply with OHS standards of this act. Employee is also required to comply with standards of OHS under this act. United Kingdom has act on health and safety at work which was passed in 1974 (HSWA, 1974).
This act has provisions not only for protection of health and safety of persons at work but also other people who might have any risk for such work. Employer is responsible to provide health safety to its employees under this Act. The act also required from employees to not only pay attention to their safety and health but also take care of other persons linked with to work.

In LaDou (2002), it is mentioned that Malaysia formed its OHS act in 1994 which is based on UK 1974 Health and Safety at Work Act (HSWA, 1974) and the U.S. 1970 Occupational Safety and Health Act (OSHA, 1970). In Australia, it is the responsibility of state to form OHS acts and business owners have responsibility of OHS in their workplace to ensure the safety and health of customers and public (business.gov.au). Countries which required support to develop OHS programs, they may get consultancy from WHO or ILO. ILO also provides information about Health and Safety in its ILO Encyclopedia. According to LaDou (2002), WHO and ILO are working their best to help and promote countries for OHS programs in spite of less financial support. OHS is not a program which can be achieved in isolation, all organizations and nations have to work together to achieve this goal.

4.5 Significant outcomes from the literature review

Among the several factors of OSHSM performance, the more significant factors for OHSMS found in the literature review are:

4.5.1 Management commitment

According to Robson et al. (2007) it is common that the management commitment for OHS is less than the importance and commitment of product or service quality. Fernández-Muñiz, et al. (2008) said that the reason behind the weak management commitment is a perception about the expenditure of preventive measures. Management considers preventive measures which has no direct effect on production targets. Koh (1995) in Feldman and Everly (1985) found that high management commitment was the significant factor for low injury rates at workplaces.
According to Vecchio-Sadus and Griffiths (2004), management commitment is a critical aspect for safety culture because employees used to copy the behavior of management, so it would be positive if management allocate resources for OHS and give some time to employees regarding health and safety. As Cadieux et al. (2006) said, “Managers set the example in OHS (e.g., wearing of protective equipment, respecting the rules)”. 

4.5.2 Musculoskeletal disorders (MSD)

According to Whysall et al. (2006), most common ill-health now-a-days is Musculoskeletal disorders (MSD). According to Handbook (2008, p203) Musculoskeletal disorders are pain in muscles, joints, tendons, cartilages, and skeleton which mainly covers neck, shoulders, arms and lower back. Main cause of musculoskeletal disorders is faulty work posture. Relevant factors include work premises, work sites, work objects and tools and psychological and social conditions of work. Human body is designed for movement but most of the people spend their time in sitting during the work. Also, large, long-lasting and one-dimensional loads are one of today’s greatest work-environment problems (Handbook, 2008, p203). In USA year 2002, 784000 musculoskeletal disorders cases were counted with an estimated cost of 2Billion US$ as mentioned by Whysall et al. (2006).

Use of computer has increased in last few years. From a survey performed by Statistics Sweden, 70% or employees use computer during their work (Handbook 2008, p203). One of the causes of musculoskeletal disorders is the use of computer in incorrect posture. SWEA has provisions on “manual goods handling, ASF2000:1”, “working with computer displays, ASF1998:5” and “Musculoskeletal disorders, ASF 1998:1” in The Work Environment Authority’s Statute Book (ASF).

4.5.3

4.5.4 Health and Safety Committee

Safety committee is a joint forum of employer and employees which improve the relationship of two domains. Key features of work environment managements are
developed and agreed by both parties in safety committee. So, it is necessary for Safety committee to be part of planning and monitoring of health and safety issues. According to Handbook (2008, p29), it is mandatory for a workplace with 50 or more employees. Some organizations try to merge OHS activities in consultative bodies to fulfill legal requirements. The Safety committee is also referred as Joint Health and Safety Committee (JHSC). Shannon et al. (1997) explained that JHSC prepared more quickly in smaller organizations than larger and it grows rapidly in workplaces of higher injury rates. According to Geldart et al. (2010), JHSC has significant role in collaboration of management and employees for safer and healthy work environment with low injury rates. In their study on University safety climate Wu et al. (2006) found that safety climate of the universities with safety committee was better than other because safety committee help management and employees in better communication of safety among them and it provide an opportunity to participate in safety planning. In some organization safety committee may have authority to make the decision while in other organizations its works as consultancy body (Roy, 2003).

4.5.5 Occupational health services

According to C161 convention of ILO which was on Occupational Health Services, "the term occupational health services means services entrusted with essentially preventive functions and responsible for advising the employer, the workers and their representatives in the undertaking on- (i) the requirements for establishing and maintaining a safe and healthy working environment which will facilitate optimal physical and mental health in relation to work; (ii) the adaptation of work to the capabilities of workers in the light of their state of physical and mental health” (C161 Occupational Health Services Convention, 1985). Similar description of Occupational health services has been explained in the handbook of better work environment (Handbook, 2008, p61), “mission and tasks of Occupational health services are to be an independent resource in the field of preventive work environment activities and rehabilitation”.

So, Occupational health services are like autonomous bodies which facilitate both employers and employees regarding Occupational Health and safety. This may be an external service or internal independent unit. It should have tendency to
interrelate organization’s goals and OHS issues. handbook of better work environment (Handbook, 2008, pp62-63) says that Occupational health services may support the organization in technical aspects like safety management, ergonomics, work-injury investigations and providing information for new stipulations on work environment. Under Preventive services in Walters (1996), it is mentioned that establishment of occupational health service in a large organization is obliged by law in most of the European countries. In Sweden, under Work Environment Act 1977 (SWEA, 2010) employers are obliged to provide an occupational health service.

In past few years, the demands of Occupational health services have been raised and clients expect a lot from Occupational health services personnel. According to Husman et al. (2006), Occupational health services personnel should learn networking and counseling skills because Occupational health services need to have better support service system. Higashi et al. (2006) in their study on Occupation health services describes that creating “service system for all workers” and “continuous review” is one of the significant matters in occupational safety and health. Scope of Occupational health services has been broadening to increase to provide independency and it may provide an Employee Assistance Program (EAP) which may act as consultancy of employee regarding occupational safety and health.

Higashi et al. (2006) said that Occupational health services should also move beyond prevention to promotion. As stated by Husman (2006) the effectiveness of Occupational health services depend on relations and communication between Occupational health services and clients. To cope with the changing working life, Occupational health services have to improve “their knowledge of client workplaces’ atmosphere.”

4.5.6 Promotion of OHS

Promotion of OHS can also contribute in the improvement of OHS activities. Although OHS is considered as important aspect, but still OHS programs are not traditionally viewed as part of core business (Vecchio-Sadus & Griffiths, 2004).
However it is necessary to link “OHS values to the business” so that all stockholders will consider OHS as a success factor of business.

During the XVIII World Congress on Safety and Health at Work in June 2008, ILO and WHO along with several other organizations signed “Seoul Declaration on Safety and Health at Work” (Seoul Declaration, 2008) which has one of key focus on promotion of OHS. First statement of Seoul Declaration is, “Promoting high levels of safety and health at work is the responsibility of society as a whole and all members of society must contribute to achieving this goal by ensuring that priority is given to occupational safety and health in national agendas and by building and maintaining a national preventative safety and health culture” (Seoul Declaration, 2008). Nevertheless, promoting OHS is challenging and OHS professionals would also agree to this fact. Problems rose from justification till the execution of such programs. Promotion of OHS may be performed either by conducting “Wellness Programs” as in Koh (1995) or by using marketing and promotional strategies as a tool to raise OHS within the organization as in Vecchio-Sadus and Griffiths (2004).

4.5.6.1 Wellness Programs

Koh (1995) have explained some features of “Wellness Programs”. According to him, main issue with such programs is the justification of resources and it is also reflected that people consider OHS as someone else’s responsibility. For an effective wellness program, he said that it should be welcomed by all and its activities should be relative to the nature of the work of people. The persons who performed as key persons to promote OHS in these programs are “wellness promoter”. Koh (1995) emphasize that the selection of wellness promoters should be given the importance during the planning of “Wellness Programs” as they will serve as coordinators throughout the program. According to Koh (1995) management support is a key factor for success of the program as “Top management in plants with the best health and safety records often state that they place the same emphasis on health and safety as on production and sales.”

4.5.6.2 Marketing tools in Promotion of OHS

Another method to promote OHS is by using marketing and promotional strategies as a tool. Three main objectives of marketing strategies explained in
Vecchio-Sadus and Griffiths (2004) are to inform, persuade and remind. As marketing strategies are based on customer, so it is necessary for promotion of OHS to keep in view about the audience or employees who are attached to that OHS system.

According to Fernández-Muñiz et al. (2008), safety culture in an organization can be achieved by Changing attitudes and behaviors of the employees. Encouraging people for their good efforts is very motivating. This type of motivation can be developed for promotion of OHS by introducing rewards for performance regarding to OHS in the form of awards or certificates etc. This can help in gaining the commitment of lower management as well as promotion of OHS at that level. By making promotion interesting and attractive, the awareness among the employees can be improved.

Vecchio-Sadus and Griffiths (2004) have explained promotion strategies for OHS that higher management should write “Mission statement” regarding health and safety in which clearly describe the commitment of management with OHS. Similar way is the use of “slogans logos, Posters and email” to spread the voice and attract the people towards OHS and its benefits. Vecchio-Sadus and Griffiths (2004) also mentioned some “Special campaigns” which are also very effective way to demonstrate and teach people about OHS which may be done as following ways:

- “Health and Safety Week” is promotion of OHS among people by delivering the information about health and safety. It is some kind of platform to refresh and give awareness about the importance of OHS and management commitment towards that.

- “Health promotion” encourages people to improve their health and provide them opportunity to do so like arranging health activates (sports), boosting people to better their health by guiding about health factors such as testing health factors like blood pressure etc.

- “Safety inductions” is some sort of initial training or awareness given to people to get familiarity with health and safety. It is performed via audio, video and text material which tell how to follow OHS system.
“Emergency response” is exercise to react any emergency situation. It teaches how to behave and react in any emergency situation. The most common example is “Fire drills” in which simulation or fire scenario is created and people are guided how to response to it.

“Incident reporting”. OHS is not just only the job of OHS people but it is linked to everybody. Incident reporting is a procedure by which any person in organization can note any incidents or any expected incident as well. “Near misses” is on one of the method in which any activity which has potential of accident is reported in order to keep OHS system continuous improving.

4.6 OHS in Universities around the World

Core objective of universities is to deliver education and risks related to OHS may weaken their aims and objectives. Some of such problems were studies by Wu et al. (2006), using employee’ survey of 100 universities and colleges in Taiwan where the accidents in laboratories was rising issue. Laboratories are places where students “learn skills or verify scientific theories”. Unfortunately there are accidents in laboratories which may be avoided if employers consider safety issues in “experimental lab management”. Some of accidents are so severe that it leads to “injuries and deaths to the students or the instructors”. It is more efficient to use “perspective of applied psychology” to manage the Safety as compare to engineering measures as safety performance of many organizations does not cross “plateau stage”.

Wu et al. (2006) explained that working environment of University has “organizational factors and individual factors” whose effectiveness depends on the performance and communication between principal, faculty and staff who try to achieve expectations of individuals and society. Generally “Organizational factors” of working environment are “size, ownership, safety manager, safety committee, and location”, however “individual factors” are “gender, age, job tenure, title, accident experience, safety training, and work site”. Safety structure of the organization make “Organizational factors” significant. Similarly “career
development and past experience” is the significance of “individual factor”. Perceptions of employee vary in different sectors.

Wu et al. (2006) from the results of their study on safety in universities, found the importance of “safety committee” which have a positive effect on the safety of university. “Safety committee” provides an opportunity to employee along with management to participate in safety planning. Another result about “accident experiences” showed that employees who never faced any accident have high perceptions of safety risks than others.

4.6.1 National associations of universities OHS around the world

Many universities in the world are working for Occupational health and safety. USA, UK and Australia have associations related to health and safety in universities. All associations have main objective to share information of OHS and promote this information sharing. Summaries working of these three associations are as follow:

**Australasian University Safety Association (AUSA)** is an association of institutes and professionals who are linked with the university or any type of educational organization working for occupational health and safety in Australasian tertiary. Objective of AUSA is to promote exchange of information in health, safety, environment and related sections among the professionals working for it in universities. Association also encourages and works in universities for “uniform approaches to OHS problems”. Members of AUSA are Universities and related institutes as well as individual professionals who are linked with this sector and working for OHS. First constitution of AUSA was established in 1999.

**Universities Safety and Health Association (USHA)** is UK based association who are working for the promotion of safety and health in higher education science 1970s with present strength of 150 universities. Main objective of USHA is to be a hub for exchange of information related to health and safety in higher education and encourage the safety practitioners. One of the promising steps from USHA is “Safety Awards” which is the reorganization of remarkable effort from
staff and students regarding the “developing and promoting health and safety within the higher education sector”. (Safety Awards – USHA, 2010)

Campus Safety, Health, and Environmental Management Association (CSHEMA) is USA based organization which was established in 1954 as “Campus Safety Association”. Like AUSA and USHA, CSHEMA also offers grounds to share health, safety and environmental (HSE) knowledge among “education and research communities”. Moreover, CSHEMA also have “Awards and Scholarship Program” to motivate students for continuing studies in HSE and encouraging professionals of HSE for creative problem solving. CSHEMA has more than 1000 HSE professionals in USA and abroad.

4.6.2 Universities of AUSA

University of Melbourne (UNIMELB, 2010) has combine management system for Environment, Health & Safety (EHS) with health and safety commitment for its Staff, students and visitors. “Policy & Guidance” is developed and SafetyMAP (4th edition) certification is attained for OHS. Performance and achievements are annually published in “University of Melbourne Annual Report”. It also has “EHS Committees” which are meant for managing, communicating and providing specialized advice on EHS issues. These committees include “Occupational Health & Safety Committee (OHSC), EHS Coordinators and EHS Working Groups”. To ensure the working of EHS system, Audits are performed both internally by departments and externally for certification. “Advice Topics” about chemical management, use of permits, “office ergonomics” and “Travelling and Working Off-Campus” is given provided for awareness and promotion of OHS. EHS also have incident reporting and emergency response system.

University of Sydney (USYD, 2010) also has a commitment for safety and health of its “employees, students and visitors” with “OHS policies, procedures and guidelines” in order to comply with legislations and follow Australian Standards. It mainly focuses on “office ergonomics, laboratory and chemical safety and emergency and incidents handling. OHS management also contains housekeeping and risk management guidelines. Most prominent feature is “Self Audit”. University of Sydney is not certified for its OHS.
Australian National University (ANU, 2010) aims to be a leader in OHS and injury management and committed its OHS policy to provide a safe work and study environment to its “staff, students, contractors and visitors”. It is not certified management system. It mainly covers hazards, radiation, noise and electrical safety and mental health.

4.6.3 Universities of USHA

University of Oxford (OX, 1020) has “Occupational Health Service” which helps the university to fulfill the laws of Safety and health and at the same time it becomes a part of Risk management program. OHS is for university staff, students and visitors. It has policies and guidelines on OHS which also covers office and laboratory ergonomics. OHS program manly focus on “Health at Work”, “Health Service for overseas visitors” and Emergency procedures. “Health at Work” covers mental health (Alcohol, drugs, stress etc.), computer ergonomics, work related hazards and OHS for medical students. Oxfords’ OHS program is not certified.

Imperial College London (IMPERIAL, 2010) has “Safety Management System (SMS)” to provide health and safety to its “staff, students, visitors and contractors”. SMS structure is distributed from top level of Council/Rector to head of departments till individual level with a Safety Committee. University has a well-defined policy on health and safety and has several guidelines which covers almost all aspects from work and hazards safety till accidents and emergency response. SMS has software based audit system called “iCheck Audit System”. SMS is in line with the guidelines of “Successful Health and Safety Management (HSG65)”

University College London (UCL, 2010) has “Occupational Health team” working for “physical and psychological” health and safety under “Occupational Health Service” with Human recourse department. In additional to health advice and monitoring health activates, OHS also perform screening or employee and driver to ensure safe people for safe work.
4.6.4 Universities of CSHEMA

**Harvard University** (HARVARD, 2010) have “Safety and Health Management System” in compliance with Occupational Safety and Health Administration (OSHA). Its aim is to “eliminate hazards and reduce risks for employees, faculty and students”. Structure of the management system is comprise of three levels from University level, School level to the local level in order to provide customized system for all levels with respect to trainings and committees. This safety and health management system is working with environmental systems and also managing laboratory, radiation, fire and public health safety.

**University of Chicago** (UCHICAGO, 2010) has Environment, Health & Safety (EHS) program which aim to provide “a healthy, safe, and environmentally sound educational community” with the help of its students, faculty, staff and visitors contribution. It has a separate group of policies for Occupation Health and Occupation Safety. Purpose of policies on Occupation Health is “physical well-being” workers while Occupation Safety aims to “minimizing or eliminating hazardous conditions”. This EHS is not certified.

**Yale University** (YALE, 2010) has “Office of Environmental Health and Safety” which has an aim to reduce “injuries, accidents and environmental impact” in “partnership with students, faculty and staff”. All policies are in line with OSHA standards. Salient features are “EHS Awards and Recognition” and “Joint Health and Safety Committee” which keep the people motivated and representation of all people. It mainly covers laboratory, chemical and physical safety and many types of hazards.

4.7 OHS work at HiG

OHS working of University of Gävle was also studied through the information available on its official website (HiG). Aim of this exercise was to know the activities which HiG have regarding health and safety of its staff, faculty and students. For its faculty and staff, HiG have Occupational health service and Wellness Group. For students, Student Health Care Unit is in operation. HiG also
have focus for its good working environment, for which it has Systematic work (SAM), Protection Officer (or OSH Officer) and Central Liaison Group (CSG).

Wellness group is working as an advisory group for health issues of staff and faculty. Representatives of this group are from different departments. The group aims to encourage health activities of employees at HiG using several methods such as a subsidiary on activity cards and providing activities like swimming, weight training, strength training, sauna and solarium, walking, massage, tobacco cessation and yoga. As mentioned on HiG website, Wellness group meets about three times a semester.

HiG provides Occupational health service to its employees, which cover a wide range of services in health, safety, lifestyle, management, rehabilitation, organization and leadership. University has a contract with Previa to provide Occupational health services to its staff and faculty free of charge. Previa has Contract to create a healthy workplace for HiG employees. University has Occupational health service for preventive measure and the university may contact it for preventive health care, education and tutoring.

Student Health Care Unit at HiG has student welfare officers and nurse to deal with psychosocial issues amongst the students. This unit provides initial help to students on several issues like health and lifestyle, financial, relations etc. In case of medical or pharmaceutical treatments, student is referred to Local Health Care Center.

Good working environment covers physical conditions and psychosocial factors. To fulfill the regulations of Swedish Work Environment Authority (SWEA), HiG has Work Environment Policy and working with Systematic work (SAM). Work Environment Policy of HiG aims to create good working environment for its students and staff in accordance with applicable laws and regulations. Work Environment Policy focuses on the health and safety of employees and students at HiG and University has key responsibility for all activities. Further it defines to focus on both physical and psychosocial work environment of employees and students with annual review for continual improvement. This policy was developed in 2001 and since then there is no revision of the policy.
Under Systematic work, employer and employees work together to identify and assesses risks, addresses them and make regular follow-ups. For the purpose of Systematic work, Central Liaison Group (CSG) and Protection Officers/OSH Officer are working at HiG.

Central Liaison Group is consisted of representatives from employers, staff and students. This group deals with the issues of occupational health, action plans and comprehensive planning of the work environment, education, work adaptation and rehabilitation activities.

Protection Officers/OSH Officer is the representatives of employees for health and safety issues. He or she is elected for three years by the local unions at the University. Elected representative participates in all type of planning related to health and safety of employees.

4.8 Interviews

4.8.1 Interviews of management and Faculty

Six interviews were conducted on OHSMS and one interview was on EMS and Management system. Outcome of these interviews are as follow:

4.8.1.1 Interviews on OHSMS

Regarding the question about Health and Safety experience, all interviewees had some sort of interaction with either health or safety during their past work experience. Next two questions were about awareness of safety and health respectively. All of the interviewees were well aware of emergency and fire procedures. University has “Emergency response exercise” and “training on fire safety” which were mentioned by all those interviewees who were working at HiG at that time. They all shared the same experience that the evacuation of people was smooth and the participation of people in the training was satisfactory.

Regarding the health awareness, all interviewees talked about office ergonomics. They mentioned here that the university has a contract with occupational health service provider who provides varies health services such as office ergonomic, psychological services, doctors etc. All employees of HiG are entitled for this
service. Employees are using this service on a regular basis. University also supports employees for health activities through Wellness Group.

Most of the interviewees have mentioned the working of this group. Wellness group have representatives from each department and the university provides them money to do activities of personal health. Only staff and faculty are covered in these personal, not students. Wellness group provides facilities of gym, aerobics, boxing, yoga and some money for membership of fitness clubs. This is an independent group and working for many years as a voluntary activity form HiG. An additional question was asked regarding possibilities to broaden the scope of Wellness group among students. Interviewees answered to this question that it is not possible due to limitations of resources and student union is working for student’ health and safety.

On the question about behavior of people, interviewees said that it varies from department to the department, but overall it is improving. People are now getting more conscious about their health and safety. All the interviewees indicate that psychological related issues are more common. They all were satisfied from physical work environment but they showed some need of improvement in psychophysiological work environment. Interviewees were not much clear about the behavior of students towards health and safety.

To know OHSMS’ justification as economical point of view, interviewees were asked to share their views on the statement: “OHSMS not only reduce costs and losses of accidents and ill-health, but it also improves the performance and efficiency of employees” (Author). All the comments were in favor of this statement. They shared that better work environment will reduce the sickness rate at the university.

Interviewees were asked to share potential risks at HiG regarding health and safety. Fire is one potential risk which cannot be neglected, other potential risks for employees includes work stress, psychophysiological character and physical working environment. In laboratories, use of machines and chemicals has potential risk of safety and there is high need of training and awareness for health and safety in such places. In very rare cases, some of the employees need to move loads or work with electrical appliances, in such case injury could be a risk.
University has procedures to meet such risks. One of the interviewee has pointed out that safety of young students is also a risk which needs to be addressed.

Interviewee also shared that HiG is following systematic work environment (SAM) as described in by Swedish Work Environment Agency (SWEA). SAM has four levels (1-4) with Level1 as beginners. Current SAM level of HiG is not clear from interviews. Different interviewees replied level 1 and level 3.

University also has Central Liaison Group (CSG) which has representatives from several unions and aimed for good working environment. This group use to have regular meetings regarding the health and safety situation at the university. This group has health and safety representatives/coordinators that are looking over the activities of health and safety in their respective departments and areas.

Regarding the student health, interviewee mentioned Student Health Unit which provides the health advice and first aid serves to students. They also shared that student safety and health is important for the university management and it is a difficult job as well.

Interviewees were asked for suggestions for MS and OHSMS on the basis of EMS experience. Interviewees have positive remarks about the working of EMS and shared suggestion to improve the participation and involvement of staff and faculty in all possible activities in OHSMS. Interviewees also emphasize on the importance of the management system for the effectiveness of procedures and policies. They also shared that like impressive work in the field of environment, University should also work for health and safety. One of the interviewee said that the university has focus on Sustainable Development and working with health and safety contributes to social part if Sustainable Development.

During the interviews it was found that different departments have their own health and safety procedures and awareness trainings programs. But the effectiveness of such trainings could not found in the interviews. One of the interviewee stressed on the education and trainings on health and safety procedures to all employees and students. Last year, more than 10 OHS related incidents happened at HiG as told by one of the interviewee.
About the commitment of top management, interviewees said that the new president of the university is very much concerned with better working environment and she is committed to improve it systematically.

Currently, HiG have two separate units, one working for Personal Physical Security and other working for alarm and fire etc. One of the interviewee suggested that a Security Unit should be made with overall responsibility of security and safety at the university.

In the end, interviewees were asked if they are willing to contribute their part in the success of OHSMS. All employees replied positive to this answer and shared that they will not only take care of their own health and safety but also they will encourage other people for safer and healthier working environment.

4.8.1.2 Interview on EMS and Management system

An interview was conducted with a key person of Environmental Management System at HiG for. She was a leading personal during the implementation of EMS and she is now also leading the EMS work at HiG. Interview was conducting to know her experiences and views about EMS at HiG and Management System working in a university.

On a question about driving forces for EMS at HiG other than government directives, she refers to the initial work of HiG on the environment, which begun in 1995. She said at that time there was a group of people who were working with the environment because of their interest and repose of university management were positive toward it. Another driving force was the image of the university. Decision for certification of EMS with ISO14001 was taken place after a long discussion. Certification of the management system also worked as a driving force and it motivates towards a certain goal. She also shared that in the absence of goals or target, the chances are high that the aim will not be achieved.

On the second question about the driving forces which keep the EMS working, she said the main reason of government directive is still there and other driving force is the system itself. System is in place and now its need responsibilities to keep this working. Here she mentioned that initially Quality Management was also thought to be part of EMS but it was not feasible at that time. Now it is a time
that we may think about other things as well like quality, health and safety etc. Now university is focusing of sustainable development as well.

Next question was about the reasons to have Management System in universities. She replied on this question that management system is a tool to perform work in a structured way. She mentioned here that the management system has audits which keep the system working, in the absence of the management system there are high chances that no work will be done on a system. Here she described an example of public agencies that for Government Directives to be implemented correctly, a system is needed. She also said that Management System also gives feedback which can be used to communicate the working of the system to people. She further said that the management system gives a common language to communicate. Here she shared that the results of the recent environmental survey conducted among the faculty are very positive. Results show that EMS has contributed in the awareness of people and now faculty is thinking towards sustainability in their courses. The maturity of EMS improved in recent years.

On next question about need management system in HiG, the answer was quite same as above and she added that MS gives a procedure to implement, to check, feedback and follow up the policy or targets to achieve good results. On the other hand by just keeping a policy is not enough to get results.

About the problems linked with implementation of the management system at HiG, she said the main problem was related to the different parts of the university that in departments like Technology, Natural Sciences, Medical sciences etc., there is as structured way to perform tasks so it is easy to implement or work with Management system in such areas. But in the departments like social sciences, human sciences etc., the ideas of people working there is very different to structured way, which create a problem to work with management system. Similarly getting people in training is also some problem in different parts of University. Another problem she mentioned was in Auditing. She said that the auditors for environment do not have much expertise for the university sector, for which university have to train external auditors for university. Similar problem she shared for measuring the progress. Here she mentioned that the university is mainly focusing on indirect environmental aspects which are a little bit hard to
measure. She said it is also hard to measure consumptions of resources like electricity in order to perform motivating competitions among the department due to the physical structure of department. Regarding management commitment she said it is natural that commitment of management keep on changing high to low, overall commitment is positive.

Regarding the question about possibilities of intergradation of any other management system in EMS she said overall it is good. She mentioned here that the system is based on ISO which have very well designed and have possibilities to intergrade in other systems. Regarding workload of environmental representatives, she mentioned here “environmental coordinators” are working with the systematic work. Regarding resources, she said these can be shared between the departments. On the last question about the substituting of fresh minds in environmental committee, she said it depends on the respective department and recently young people are added to the committee.

4.8.2 Interviews of staff and students

Interviewed student were from various departments including technology, economics, Geomatics, logistics and management etc. All departments could not be covered due to limitation of time as per scope. Interviewees were from Sweden, Russia, Vietnam, China, France, Pakistan, Thailand, India and Iran. Total 25 students were interviewed of bachelors and masters classes. Results of the majority of students were same; very few students gave different answers.

Majority of students said yes to the first question that the university should implement some management system regarding health and safety. In explanation, most of them pointed out need of trainings and awareness. Students from technology were satisfied from the laboratory safety and health conditions. Students who said no to the first question explained the reason that HiG already have suitable arraignments from safety and health and the other said that students have a lot of work to do, so they cannot think for these things. Regarding health issues, most of students said that the furniture and lighting other than the library is not appropriate and comfortable to study for a longer time.
Regarding the experience of accident, only three students have experienced incidents in their school or college life. One student recently experienced female student got unconsciousness due to low diet issue. Second student was stuck in an elevator which could be severe and third student share that he saw a student slipped while coming down from stairs. Rest of the interviewed students faced or saw any incident.

On third and fourth question, almost all student replied yes that they have seen emergency signs and fire extinguishing equipment in the campus but very few were aware of the emergency exit near to their position. On the question about commitment, all students said they will contribute their part if they got spare time from studies.

Staff members from the department of room &services, Student Services, Economics & planning and administration were interviewed on the availability of personnel. On the first question all the interviewee replied positive that HiG should work for health and safety management system. One of the interviewee said that the university has procedures for good health but it quite possible due to work load that an employee could not follow them for his or her good health. She further added that the management system will give surety for the care of health and safety of all employees.

On the question, only one of the interviewee has experienced the incident in university. He shared that he got injury recently on his foot due to screwdriver which dropped on his foot. On the question about individual commitment, all of the interviewees said yes. Regarding the awareness of safety and health, all the interviewee replied satisfactory answers. In addition to these question, all of the interviewees have referred in their answers about the procedures of health and safety of HiG such as Occupational health service, office ergonomics, etc. but they were not much assure about such things and it was not regular part of their activities. Some of the employees have attended the trainings like fire safety etc. arranged by the university.
5 Discussion and Analysis

Research was based on 3 research questions and to answer these questions, methodology was developed. In this section, findings are discussed to meet the purpose. In the end, SWOT analysis is performed for the possibilities of OHSMS implementation at HiG.

5.1 Suitable Standard or guidelines for OHSMS

Out of three studied standard and guidelines for OHSMS, only OHSAS 18001 can be certified by an accreditation body. ILO-OHS (2001) has its orientation towards workers. It has additional requirements for workers representation in several activities from policy till review. In organizations like Universities, stakeholders are not only workers (staff and faculty) but also students and visitors as well. In such organizations, ILO-OHS (2001) might not be a suitable choice. OHSAS 18001 is internationally acceptable standard and it has high compatibility with several ISO standards as compare to BS 8800 (2004).

Selection of any guideline or standard is only dependent on the organization. Regarding case university (HiG), it already has a management system for its environment which is certified from ISO14001. In such a case OHSAS 18001 could be a suitable choice due to high compatibility of two standards. Compatibility helps in integration of the management system which has several advantages for the organization some of which are explained in previous chapter.

5.2 OHS activities in universities

To study OHS in university, methodology was developed to use more than one source and method in order to increase the validity and reliability to a possible extent. One method was the study of OHS activities among nine universities from three different countries. Another method was to study HiG via OHSMS interviews and its OHS working. As mentioned before, literature review was also performed on OHSMS and its significant outcomes are explained above. The relationship (analysis/discussion/comparison) of OHS activities under the light of above mentioned description is described below:
5.2.1 Relationship of OHS associations

Three different studied associations of “OHS in Universities” belong to different locations of the world and were created at different times. Study of the working of these associations reveals that the basic purposes of all are same, which are; sharing of information of OHS among the people in university sectors and promotion of OHS. Both things are important for the health and safety in the universities to develop and improve OHS management system and spread the awareness among students and people linked with universities. These types of associations have a positive impact of the motivation of its members.

5.2.2 Relationship of universities from three countries

Working of nine universities, three from each association of Australia, UK and USA were studied. All member universities of these associations have some kind of system for health and safety of students, staff and visitors. Only in few cases certification and management systems were also found. In these three countries, there are laws on health and safety which have significant factor to work for OHS. Almost all universities have OHS policy and very few have some sort of auditing schemes and continual improvement. Compression of universities within the group is as follow:

5.2.2.1 Comparison of AUSA universities

All selected universities of AUSA have a policy on health and safety. Focus is on the safety of students and employees and in some cases visitors also. The all have some kind of auditing system in place. Office ergonomics is also common for the health of personal. Only University of Melbourne (UNIMELB, 2010) has certification of OHSMS. There is no focus on continual improvement although they have auditing scheme, but there is no management review and corresponding actions. There are some legal requirements to work for health and safety.

5.2.2.2 Comparison of USHA universities

Three universities of USHA have some sort of system for health and safety of staff, student and visitors in order to comply with the legal requirements. Imperial College London (IMPERIAL, 2010) has a management system in compliance
with certain guideline (HSG65) and an auditing system. One university also focuses on the screening of new employees. Like AUSA, these universities also do not have continual improvements procedures.

5.2.2.3 Comparison of CSHEMA universities

The trend of having management system for OHS among the Universities of CSHEMA found more than AUSA and USHA universities. Two out of three universities (Harvard University (HARVARD, 2010) and Yale University (YALE, 2010)) have OSHA based management system. Also, it shows the trend of having same system for environment and health and safety. The focus of universities is on students, staff and visitors as well.

5.3 Analysis of HiG work for OHS

Qualitative data for HiG work on OHS was collected via interviews and from its official website (HiG, 2010). This chapter is about analysis and discussion of both sources of qualitative data for HiG.

5.3.1 Awareness of health and safety

From the interviews of management, faculty, staff and students it was found that management, faculty and staff have better awareness of OHS as compare to students. One of the reasons of awareness was trainings which HiG arranged for its employees. Nearly all interviewed students had some idea about emergency exits and fire hydrants/extinguishers but very few were aware about the nearest location and procedure. Majority of interviewee in both cases (employees and students) had not experience any incident during their studies or work at universities.

From management interviews, it is also found that the behavior of employees is improving toward health and safety. Similarly, from the interview of EMS, it is found that the behavior of faculty after the implementation of EMS is encouraging toward sustainable development which shows that EMS contributed its part for the betterment of environment. Employees are now incorporating environmental issues in their activities, which is a positive signal for the need of the management system.
5.3.2 Individual commitment

Success of the management system especially OHSMS is dependent on the contribution both management and employees. All the interviewees were asked for his or her individual commitment for OHSMS. All interviewees of management, faculty and staff replied positively to this question that they will contribute their maximum effort for success of OHSMS. However students reply yes to this answer with condition of availability of time other than their primary commitments of studies. This means from the selected interviewees that at HiG, employees and students are willing to work for OHSMS.

5.3.3 OHS activities and services

The analysis of several OHS activities and services under the light of significant OHS factors is as below:

5.3.3.1 OHS Policy

HiG has its Work Environment Policy which shows the commitments of its management. This Work Environment Policy is similar as OHS policy. The importance of management commitment is mentioned by Koh (1995) in Feldman & Everly (1985). Overall responsibility for arrangement OHS activities is on Top Management of the University. Further it defines annual review for continual improvement whereas this policy was developed in 2001 and since then there is no revision of the policy. From the OHS interviews, it was also found that management of HiG is now focusing on health and safety systematic way which also covers individual elements of MS.

5.3.3.2 Wellness program

Wellness program of HiG represents several factors of OHS. Wellness program not only playing role for OHS promotion but also it is providing services to employees. It is working as committee which covers the function of Health and Safety Committee. But, the wellness program at HiG is only limited to its employees due to limitation of resources. There is a need to focus on such activities and program for students at HiG.
5.3.3.3 OHS service

HiG has a contract with Occupational health service providing company for its employees only. These services are mandatory for organizations in Sweden. Many employees are getting benefits from this service. HiG has this service for preventive measure only, but can be also used as promotional activity to encourage employees for health and safety.

Musculoskeletal disorders are one of the main reasons for ill-health at the offices workplaces. Most of the employees and students at HiG are exposed to such factor during their working. Trend of using OHS service for office ergonomics among the employees has been improved recently. But students are still faced to such like musculoskeletal disorders while studying at HiG due to less awareness. There is a need of improvement concerning students in this regard.

5.3.3.4 OHS committee

University of Gävle has Central Liaison Group (CSG) which is formed by the representatives of management, staff and students. To have this type of committee or group is mandatory in Sweden. This group is working actively and has regular meetings.

5.3.4 Comparison of HiG OHS activities with other universities

OHS Activities of HiG are very much similar to other studied universities in this search. Like those universities, HiG has OHS Policy and to comply with the legal requirement it Occupational health service. But there is no auditing or review scheme for OHS at HiG (only mentioned in policy) which we found in some other universities. Auditing and continual improvement are key requirements of OHSMS. Due to the limitations, practical operations of these activities are not clear that to what extends these are effective and working in an organization.

5.4 Status of OHSMS requirements at HiG

As discussed before that OHSAS 18001 could be a suitable standard for HiG among three studied standard and guidelines i.e. OHSAS 18001 (2007), BS 8800 (2004) and ILO-OSH (2001). This section is about the status of OHSMS
requirements (especially OHSAS 18001:2007) that to what extends HiG’s current OHS activates met with these requirements:

**OHS Policy**

Apparently the OHS policy of HiG (*named as Work Environment Policy*) covers almost all the requirements of OHSMS but no further evidence found to check the practical applicability or reality of *review and continual improvement* requirements mentioned in this policy. Also, there is no review of OHS policy since after it was developed in 2001.

**Planning**

The basic requirements for *Planning* of OHSMS cover planning and defining of OHS Objectives in line with OHS Policy, development of procedure to identify and comply with all applicable legal and other requirements, hazards and risks identification and assessment. Among HiG’s OHS activities, only few indications about risk and hazards identification are found. There is no OHS Objectives found in this research at HiG.

**Implementation**

Under implementation, organization is required to develop, implement and maintain procedures for cover resource allocation, training, documentation and emergency related issues. Due to limitations of research, only emergency response procedures and some information about could be found.

**Monitoring**

It mainly covers the performance monitoring and measurement, investigations and auditing. HiG lag in these activities for its OHS activities. There is no specific procedure or activity found for monitoring of OHS except the meetings of OHS related groups and committees. Similarly no internal or external auditing was found.

**Management review**

It is final and important step in management system cycle and in contribution of continual improvement. It mainly covers the evaluation of plans (objectives, demands and requirements) and identification of need for improvements
(corrective and preventive). There is no such activity found in qualitative data of HiG, only OHS Policy has mentioned to have annual management review.

5.5 **SWOT analysis for OHSMS implementation at HiG**

In this section, SWOT analysis is used for implementation of OHSMS at HiG. By utilizing its strengths, defeating its weaknesses, availing its opportunities and opposing or justifying its threats, HiG can take a decision to develop and implement successful OHSMS. Findings of EMS interview are also used in this analysis in addition to all other findings and discussions of HiG’s OHS work.

**Strengths**

The most significant strength of HiG in this regard is its OHS work. One of the driving forces for EMS was its environmental work. Similar benefits can be achieved in the case of OHSMS.

**Weaknesses**

As mentioned in EMS interview, acceptance of the management system among certain departments of universities is difficult. The challenge will be same for OHSMS. Moreover, present OHS work of HiG has some deficiencies which need to be improved and are weaknesses for HiG. Moreover, student health and safety is not sufficient which need to be addressed.

**Opportunities**

Image of HiG history for its environmental work is impressive. Certification of ISO14001 is one of the examples. Implementing OHSMS and getting OHSAS 18001 certification is an opportunity for its better image. This objective can also work as a driving force for employees akin to EMS case. Moreover, working with OHSMS can contribute in achieving university’s goal of Sustainable development.

**Threats**

Developing and Implementing certified OHSMS demands cost. Justification of such cost is a threat in the implementation OHSMS at HiG which need to be addressed.
6 Conclusion

The purpose of this research was to study the working of Occupational Health & Safety (OHS) and possibilities for implementation of OHSMS in universities. Study was also interlinked with a case study of University of Gävle. Three research questions developed to achieve the purpose are explained below:

**RQ1. What are the standards and guidelines for OHSMS and their relationship with Environmental Management System (EMS)?**

There are several national and international standards and guidelines available for developing and implementing OHSMS, out of which only three were studied to find the answer of this research question. Basic aim of every standard or guideline is the focus on all the stakeholder’s health and safety with an effective management system based on continual improvements. New revision of these standards and guidelines are designed with appropriate compatibility with standards and guidelines of EMS. Basic requirements of these standards and guidelines are almost same, but the difference is in the approach and procedure to develop and implement OHSMS. Every requirement and element of OHSMS is necessary for effectiveness. These standards and guidelines only tell the path, but the results of OHSMS depend on commitment, motivation and attitude of the organization. Requirements of these standards and guidelines are explained, compared, discussed and analyzed on several places in this report. Just implementing OHSMS will not give fruitful results until and unless the OHSMS is properly maintained with commitment from both employer (Top management) and employees (faculty, staff and students).

**RQ2. How do universities work with OHS?**

To find the answer of this research question, some international universities and one case study was considered. Working of Universities towards OHS was found similar. Unlike industry, universities have fewer risk of ill-health or accident which is the reason of difference between OHS work of two sectors. Due to a smaller amount of data, the conclusion cannot be applied to all universities. However, from the qualitative study of people linked with Universities in case
study of HiG, it was found that people as an individual had a positive attitude for his or her health and safety. Even though university had OHS activities but lack of awareness has condensed the effectiveness of OHS Work. Once again, due to limited interviews at one University, the conclusion cannot be applied on all people or at all universities. Moreover lack of monitoring, review and improvements have changed OHS Working apparently impractical. Presence of an operational Management System not only improve the effectiveness of the OHS system but also it better the performance and efficiency of personals in safer and healthier working environment.

RQ3. Which is the suitable standard or guideline for implementing an OHSMS in university and how is it related with HiG?

Suitability of any standard or guideline for OHSMS concluded in RQ1 is absolutely dependent on the nature, present status of OHS work and other management systems implemented at the university. In the case of HiG, it has ISO14001 implemented and its OHS Work needs little attention for enhancements and addition of some of its elements to get OHSAS 18001:2007 based OHSMS. The possibilities of implementing OHSMS at universities especially at HiG are positive.

6.1 Limitations

Methods and models used in this research have some limitations. First limitation of the thesis was few available data related to OHSMS in Universities. Findings collected from interviews have some limitations that the conclusion based on it cannot be generalized for all universities. Similarly, secondary data which was collected form the universities home pages, it also has same limitation. Moreover, model of Hale et al. (1997) is just explained in this report in term of OHSMS operation, due to limitation of scope no practical implementation of this model was developed.

SWOT analysis used to study the possibilities of OHSMS at HiG and SADT is used for OHSMS operations model. Both SADT and SWOT have some limitations in that. For SADT, Congram & Epelman (1995) said, "SADT deals with the representation of a system's structure, not its behavior over time". SADT
does not explain how the model will behave after passing some time. According to Yuksel & Dagdeviren (2007), SWOT only points out the factors but it does not have any mathematical means to express the importance of factors.

6.2 Recommendations and future work

On the basis of research work, following are some recommendations for further research work and for HiG future OHS work:

- Keeping in view the history of environmental work, ISO 14001 certification for EMS, a new vision of Sustainable development and its Non-MS OHS Work, HiG may move toward the development and implementation of OHSMS in accordance with OHSAS 18001 standard.
- There is a need of in-depth study on OHS Work at university to analyze and check the effectiveness and drawbacks among the practical works being performed at Universities regarding health and safety.
- Universities aim to focus on health and safety of their employees and students. Employees related programs are directly managed by the university while student programs are organized by the student union. Here is a need of study to see the extent to which student programs are effective.
- Cost justification is the most significant factor for adopting OHSMS. There is a need of detail cost and benefit analysis for OHSMS in Universities.
- There is a need of in depth study to check the applicability of Hale et al. (1997) model as OHSMS Operations.

6.3 Closure

Significance of health and safety cannot be denied. Just having procedures to prevent ill-health or incident is not just enough. Promotion and awareness along with monitoring and improvement of its activities has noteworthy significance. OHSMS provide a system which gives a systematic way for not only performing all OHS related activities but also contribute in continual improvement. But, just adopting an OHSMS is not enough. Participation and involvement of stakeholders to keep OHSMS operation is necessary.

Many universities are working for the health and safety of its employees and students by developing OHS based activities. Just having such activities is not
enough unless there is a system to ensure the performance and effectiveness of such OHS activities. Existing OHS workings of Universities have capability to fulfill many requirements defined in several standards and guidelines of OHSMS. Possibilities of implementing an OHSMS in universities are positive. There is only a need of commitment and some efforts to develop standardized OHSMS for better working environment at universities.
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**Interviewed personal: (Management and faculty)**

Augustsson, Y., Staff Secretary, HiG, 2010-05-18, Duration 1hour

Fors, E., Head administration department, HiG, 2010-05-19, Duration 1hour

Gaude, T., Safety representative, HiG, 2010-06-04, Duration 30min

Johansson, H., Head of president office, HiG, 2010-05-31, Duration 1hour

Sammalisto, K., Associate Professor, HiG, 2010-05-24, Duration 1hour

Soderberg, L., Senior adviser, HiG, 2010-05-20, Duration 1hour
Appendix 1 (Interviews questions of management and faculty)

Introduction:

I am a student of Master of Sciences in Industrial Management. I am doing my MS thesis with Kaisu Sammalisto on Occupation Health and Safety management System (OHSMS) in University and HiG is my case study. I am conducting this interview to know about your perceptions, thinking, experiences and suggestion about OHSMS in University and in HiG as well. Let’s start from some basic questions:

- Have you heard name of Health and Safety before?
- How long you have been working in Education sector?
- How long are you working at HiG?

Initial questions (same for all)

Health and Safety (H&S) experience:

Q1. Did you (Directly or indirectly) work with Health and Safety before?
   - If yes: Will you share your experience?
   - If No: What has been your background so far?

(This question aimed to know about background and experience of interviewee related to H&S)

Awareness about Safety

Q2. Are you aware of Emergency and fire response procedure for your workplace? How do you work with that?

(This question aimed to know awareness of interviewee about occupational safety.)

Awareness about health
Q3. Use of computer may give aches or pain in neck, shoulders, arm or hands. Awareness about correct posture can avoid such pains. How much are you aware about those postures?

(This question aimed to know awareness of interviewee about occupational health.)

Behavior of people for H&S

Q4. What do you think about over all behavior regarding Health and safety of the people you interact at HiG?

(This question aimed to know the behavior of different people from the point of view of interviewee who use to meet lot of people.)

OHSMS justification and economics

Q5. It is generally believed that OHSMS not only reduce the costs and losses of accidents and ill-health, but it also improve the performance and efficiency of employees. What do you say about this regarding universities and HiG?

(This question aimed to know the perception and thinking of interviewee about the feasibility and justification of OHSMS in Universities and HiG.)

End questions (same for all)

Potential OHS risks

Q1. According to you, what are the potential risks for health and Safety in HiG? In your department or anywhere in HiG.

(Purpose is to know potential risks in different areas.)

OHSMS implementation

Q2. What is your opinion and suggestion, Should HiG implement Management System for Occupation Health and Safety?

(This question aimed not only to know point of view of interviewee about OHSMS but also to get some suggestion for it.)

Individual Commitment
Q3. Success of OHSMS is based on the contribution of both employer and employee. Are you willing to contribute your part in its success?

(This question aimed to know the commitment of interviewee for OHS.)

Specified questions (Depending upon interviewee)

Q1. How will you describe the orientation of Top Management of HiG towards Health and Safety?

Q2. On the basis of your experience with Environmental Management System at HiG, what suggestions will you give for any upcoming management system?

Q3. How do you monitor the safety for the workers who perform physical work in university premises?

Q4. While hiring for work from outside, how do you ensure the safety of work?

Q5. What could be the hindrances in implementing OHSMS at HiG?

Q6. On the basis of your experience with Environmental Management System at HiG, what suggestions will you give for any upcoming management system?

Q7. Being a safety representative, what are major health and safety incidents and causes which you notice at HiG?

EMS Interview questions

Q1. What where the driving forces for HiG for implementation of Environmental Management Systems (EMS)?

Q2. What are the driving forces to keep EMS running?

Q3. What are the reasons of using Management Systems (MS) in Universities?

Q4. Why Management Systems in HiG?

Q5. What problems you faced as MS point of view in HiG EMS?

Q5. What are the possibilities of integrating any other MS in EMS at HiG?

Q6. Adding or substituting new people in Environmental Committee can give chance to fresh minds to work for EMS. What is your opinion about it?
Appendix 2 (Interviews questions of staff and students)

Introduction:
I am a student of Master of Sciences in Industrial Management. I am doing my MS thesis on Occupational Health and Safety management System (OHSMS) in University and HiG is my case study. I would like to ask few questions about your perceptions and expectations regarding Health and Safety at HiG.

Which department do you belong at HiG?
What is your level of study?

Q1. Do you want HiG to have some management system for you safety and health?
   If yes: Will you explain how?
   If No: May I know reason for that?

Q2. Success of OHSMS is based on the contribution of both employer and employee. Are you willing to contribute your part in its success?
   If yes: Will you explain how?
   If No: May I know reason for that?

Q3.a Did you ever experience any incident or accident in your school, college or university? (Students)
   If yes: Will you share that?

Q3.b Did you ever experience any incident or accident in your workplace? (Staff employee)
   If yes: Will you share that?

Q4. Do you know where are emergency exists near you? Please explain.

Q.5 Do you know what to do in case of fire? Please explain.