Safety Manager Competencies In Managing Construction Projects In Malaysia

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Abstract. This paper aims to identify the core competency required by safety manager in managing construction safety on construction projects and their level of effectiveness. Total of 30 questionnaires received from 100 questionnaires distributed to qualified safety managers within Klang Valley registered with the Department of Occupational Safety and Health (DOSH) and National Institute of Occupational Safety and Health (NIOSH), Malaysia with various post of safety officer, manager and consultant. It was found that safety managers consume of several important skills and knowledge on general management functions, practices, and procedures regarding safety and occupational health concepts, principles, practices, methods, and techniques based on the working experience on the construction field. The skills and knowledge on general management functions, practices and procedures can be accomplished by presenting personal concerns for the health and safety of employees, conducting the job-training program, participating in the management of safety committees, considering safety in job design, and reviewing the level of work. It has been recommended that safety managers must invest time and energy themselves for own development of skill, knowledge, and other competencies for more efficient professional safety manager.

1. Introduction

Construction is a highly hazardous industry, which consists of a wide range of activities involving construction, alteration, and repair. However, based on National Safety Council \([1]\) construction contributes for approximately 12% of disabling injuries, which is nearly 25% of work-related fatalities. As compared to any other industry, there are substantially more injuries and lost workdays due to injuries or illnesses in construction as the activities involve may expose themselves to serious hazards; such as falling from rooftops, unguarded machinery, being struck by heavy construction equipment and others.

2. Background

Generally, the main duties of safety manager are to comply safety precaution, strategies and policy through site inspection and execute good safety practices to motivate workers for keeping safety measures at the workplace. Safety during a construction project is also fully affected by decisions made during the planning and design stage which depends largely upon education, alertness, and cooperation during the construction process. The need for unique skills and competencies to effectively manage safety arrangements is significantly a great issue, especially in construction industry environments that are described as highly complicated, dangerous and uncertain. These arrangements are also described as multi-sectoral, under-organized, and multi-organizational systems that exclusively require unique management skills and competencies. Thus, it can be proved that the availability of specialized
management expertise and skills is the criteria for the successful implementation of safety management to effectively manage the construction projects by the safety manager.

2.1 **Responsibilities of a Safety Manager**

Construction safety management deals with actions of managers at all levels and enables them to create an organizational goal or setting, where workers will be trained and motivated to perform safe and productive construction work. The system should include the responsibilities and accountabilities, the outline procedures to eliminate potential hazards before they become the factors that contribute to unfortunate accidents [2]. In other words, safety management is a concept that brings extensive approach, allow participation and contribution for all management and workforce level, by taking all the consideration on the actual site risks.

Effective safety management has three main purposes, which is to ensure a safe environment, making the job safe, and making workers safety conscious [3]. The concept of safety management is based on a well-planned system, where the main pillars of this system are the roles and responsibilities of the consultants or participants involved within the specific project. As construction site is the main source of fatalities and accidents in the construction industry, the safety management able to eliminate the hazard risks that usually occur on the construction site [3].

2.2 **Core Competencies of Safety Manager**

Safety managers play important roles in conducting and managing the safety of the construction site as it is the priority of every personnel in order to achieve the key successful factors in any project. Safety manager performs a significant role in the workplace in regard to safety and health at a workplace, where they are the driving component of the operational aspects of safety management systems. It is vitally important for safety managers to have a clear understanding of their duties and responsibilities within the organization. The three important aspects of safety that are important by every safety manager are the rules and regulation of the workplace, a socio-humanitarian aspect that consider the human lives involved, and lastly is the accidents aspects, which give a direct and indirect impact on costs. Competency is the critical factor in organizational survival that comprises of a set of knowledge, skills, interests, personality, traits, experiences and job-related capabilities, which make the person successful in work [4]. Furthermore, a study on managerial competencies bring out different classifications and approaches which are knowledge-based, skill-based and value-based competencies that should be acquired by safety managers [5]. A connection mechanism between competencies, capabilities, resources, assets, and core competencies are interrelated. For instance, [7] defined the core competence as a capability, which is central to a firm’s value generating activities instead of only ownership of a resource. Core competence somehow differentiates an organization from its competitors [7]. There are six (6) core competencies of the safety manager in the construction industry, which are Occupational, Health and Safety Legislation, Safety Technology, Construction Technology, Risk management, Safety Management and Change Management. Other Competencies required includes Business, Accounting, and Marketing, Management Competencies, Personal Credibility, Information Technology (Web-Based, Building Information Modelling (BIM) and IT- Based Site Monitoring.

3. **Aim of the Study and Problem Statement**

The safety managers must give more attention to the important elements identified in the study to help them in enhancing performance on the construction sites and reduce the frequency of accidents occurrence. However, there is also a gap in construction industry itself, where there is a lot of issue on improper and ineffective safety management ethics in the construction industry. If the competencies required for performing the safety duty have not been clearly recognized, it will be difficult to decide the required training and experience. It indicates that safety should be embedded or integrated into a management concept within each company level and every part of a cross-organizational project. Therefore, the study aimed to identify and analyse the competency required by safety manager in handling construction safety on sit. In order to achieve the aims, three objectives have been identified,
which are to identify the scope of safety manager job duties with emphasis on the safety management
criteria on site, to identify and analyses the basic and core competency, knowledge, abilities, and skills
required by construction safety manager and to recommend the other competencies required to improve
the level of competency of safety manager in construction industry.

4. Methodology

The information and data gathered from the survey were arranged and prepared using the frequency and
percentage method and average index method in relation to the targets, objectives, scope, and extent of
the study. Two statistical methods were applied, namely descriptive statistic and inferential statistic. The
formula being used is:

\[
\text{Percentage} \% = \left( \frac{n}{N} \right) \times 100\% \\
\text{Where, } n = \text{Number of respondents} \\
N = \text{Total number of respondents received}
\]

100 copies of questionnaires were distributed to the targeted respondents working in the construction
industry within Klang Valley. Only thirty percent (30%) of respondents response with complete
information. The respondents were among safety consultants, safety officer, safety managers from those
who are qualified safety officer from the Department of Occupational Safety and Health (DOSH) and
National Institute of Occupational Safety and Health (NIOSH) within Klang Valley, Malaysia.

Questions based on Likert scales were analysed by using average index method, and the outcomes
have been presented in the form of an average score or mean. For the Likert scales questions,
respondents were needed to give answers in the form of scale 1 to 5. A scale of five (5) categories has
been used for the average index method to show priority. The weighting scale for the analysis was based
on the thirty (30) respondents. Likert scale was based on 5 points, which was 1 for strongly disagree, 2
for not agree, 3 for fairly agree, 4 for agree and 5 for strongly agreed. The questionnaire also required
the demographic profiles of the respondents.

5. Finding

5.1 Participant’s Profile

There were 7 questions asked from the respondents that consisted of gender, age, present designation,
professional qualification, highest academic qualification, working experience, and number of
employees in the company. The questions provided were used for the identification purpose of
respondents. It has further reflected the credibility of the respondent by providing input in the
questionnaire. The participant’s profile was analysed by using frequency and percentage method.

| Table 1. Participant Profile |
|-----------------------------|
|                            | Frequency (F) | Percentage (%) | Rank |
| Gender                     |               |                |      |
| Male                       | 26            | 87             |      |
| Female                     | 4             | 13             |      |
| Age                        |               |                |      |
| 26 - 35                    | 13            | 43             | 1    |
| 36 - 45                    | 8             | 27             | 2    |
| Above 45                   | 6             | 20             | 3    |
| Below 25                   | 3             | 10             | 4    |
| Present Post               |               |                |      |
| Safety manager             | 11            | 37             | 1    |
| Safety officer             | 7             | 23             | 2    |
| Safety consultant          | 6             | 20             | 3    |
| Others                     | 6             | 20             | 4    |
5.2 Present Job Duties

The present job duties were analysed to identify the job duties competencies on safety and health practices that should be conducted by every competent safety manager.

Table 2. Rank of the Job Duties Competencies Required by Safety Manager

| Job Duties                                                                 | Mean/Average Score | Overall Rank |
|---------------------------------------------------------------------------|--------------------|--------------|
| Monitor occupational health and coordinate, review and analyse hazard and risk assessment and environmental impact assessment | 4.43               | 1            |
| Plan, lead and monitor a team of safety committee                         | 4.40               | 2            |
| Monitor all health and safety matters via coordination with contractors and/or authorities | 4.37               | 3            |
| Conducting safety training to meet the identified training needs          | 4.33               | 4            |
| Implementing safety and health policy to meet the statutory, contractual and social obligations | 4.30               | 5            |
| Reviewing procedures for emergency preparedness                           | 4.27               | 6            |
| Acting as consultant and technical adviser to the safety committee        | 4.23               | 7            |
| Issue non-compliance checklist and submit statistics report to the project team | 4.20               | 8            |
| Conduct health and safety committee meeting and follow up with action status | 4.17               | 9            |
| Organising team for safety programmes and activities                      | 4.13               | 10           |
| Provide urgent response to operational issues from the investigation of non-compliance OHS incidents | 4.13               | 10           |
| Conducting accident and incident investigation and making recommendations for preventing their recurrence | 4.10               | 11           |
| Outline all safe operational measures in order to identify all the relevant hazards | 4.07               | 12           |
| Implementing or reviewing process control programmes                      | 4.07               | 12           |
| Conduct site inspections and audits in order to identify areas of improvement | 4.03               | 13           |
| Participation in pre-site planning                                       | 4.00               | 14           |
| Provide sufficient safety equipment to all site staff or workers          | 3.67               | 15           |
Table 2 shows that the rank and average score of job duties competencies required by safety manager in implementing safety in construction projects. In order to be a competent safety manager, they must be able to carry out the safety job duties and practices as well. Most of the respondents rated very high mean or average score (Rank 1) on monitor occupational health and coordinate, review and analyses hazard and risk assessment along with environmental impact assessment. It had the highest mean score of 4.43 and highest percentage of sixty percent (60%) on the strongly agree weighting scale as compared to others, which were under the category of strongly agree by most respondents.

Most of the respondents also rated high mean or average score on the plan, lead and monitor a team of the safety committee, where the overall rank is (Rank 2) with a mean score of 4.40. Monitoring of all health and safety matters via coordination with contractors and/or authorities secured overall Rank 3 with a mean score of 4.37, conducting safety training to meet the identified training needs. The overall rank was Rank 4 with a mean score of 4.33. Implementing safety and health policy to meet the statutory, contractual and social obligations was observed with the average score of 4.30 and ranked 5. All these were observed under percentages between forty-three percent (43%) to fifty-three percent (53%). Meanwhile, the results of the analysis showed that the respondents were agreed on reviewing procedures for emergency preparedness with the average score of 4.27 with the overall Rank 6. The other respondents stated that they were also agreed on acting as a consultant and technical adviser to the safety committee, where the overall rank was 7 with a mean score of 4.23. The issue on non-compliance checklist, conduct of health and safety committee meeting, where the overall rank was (Rank 8) with a mean score of 4.20. Conducting health and safety committee meeting and follow up with action status, where the overall rank was 9 with a mean score of 4.17.

It was found that the organizing team for safety programs and activities provided an urgent response to operational issues from the investigation of non-compliance OHS incidents. It received the overall Rank of 10 with a mean score of 4.13 for both job duties. These were all ranked under the same category, which was in the favour by majority of the respondents with the percentage between forty-three percent (43%) to fifty-three percent (53%) on the strongly agree on weighting scale.

It was shown that the respondents were moderately or fairly agreed on conducting accident and incident investigation; and making recommendations for preventing their recurrence, where the overall Rank 11 with a mean score of 4.10. Moreover, outlining all the safe operational measures to identify the relevant hazards and implementing or reviewing process control programmes secured rank 12 with a mean score of 4.07 for both job duties. Site inspections and audits to identify areas of improvement were at rank 13 with a mean score of 4.03 and participation in pre-site planning with the mean or average score of 4.00 (Rank 14). These were all under the category of fairly agree with the percentage between forty percent (40%) to forty-seven percent (47%) on the strongly agree on weighting scale. It was observed that some of the respondents ranked the lowest mean of 3.67 on providing sufficient safety equipment to all site staff or workers with only thirty percent (30%) of percentage for the strongly agree weighting scale.

5.3 Competencies Required by Safety Manager
Table 3 shows that the rank and average score of basic skills competencies required by safety managers in implementing safety in construction projects.

Table 3. Rank of the Basic Skills Competencies Required by Safety Manager.

| Basic Skills                        | Mean/Average Score | Overall Rank |
|-------------------------------------|--------------------|--------------|
| Interpersonal communication skill   | 4.57               | 1            |
| Problem-solving skill               | 4.57               | 1            |
| Analytical skill                    | 4.53               | 2            |
| Contingency management skill        | 4.50               | 3            |
| Information skill                   | 4.47               | 4            |
| Critical thinking                   | 4.40               | 5            |
Most of the respondents rated very high mean or average score (Rank 1) on interpersonal communication and problem-solving skills, where it had the highest mean score of 4.57 and highest percentage of sixty percent (60%) on the strongly agree weighting scale. It was observed under the category of strongly agree by most respondents. It was followed by the analytical skill, which was also rated with high mean score of 4.53 with Rank 2 on overall rank with a higher percentage of fifty-seven percent (57%) on the strongly agree on weighting scale. Besides that, the results of the analysis from the questionnaire also showed that the respondents were agreed on information and contingency management skills; whereby, contingency management skill obtained the mean or average score of 4.50 with Rank 3. Information skill possess average score of 4.47 with Rank 4, having percentage of fifty-three percent (53%) for contingency management skill and fifty-three percent (53%) for information skill.

Critical thinking was ranked as fairly agree with a mean of 4.40 with Rank 5 and for overall rank with the percentage of fifty percent (50%) on the strongly agree on weighting scale. Respondents were not agreed on conceptual and task management skills, which were not really required for being a competent safety manager. These were observed with a mean or average score of 4.37, which ranked as Rank 6 and 4.33, which ranked 7 with the percentage of forty-three percent (43%) for conceptual skill and fifty-three percent (53%) for task management skill on the strongly agree weighting scale. However, technical and supervisory skills were ranked as strongly disagree, which were also not required by the safety manager. Moreover, technical skill was ranked 8 and supervisory skill as Rank 9.

### 5.4 Skills and Knowledge That Should Be Possessed

Table 4 shows the results obtained from the survey, which has been ranked and finalized according to respondent’s preferences on skills and knowledge.

| Skills and Knowledge That Should Be Possessed                                      | Mean/Average Score | Overall Rank |
|----------------------------------------------------------------------------------|--------------------|--------------|
| General Management Functions, Practices and Procedures                           | 4.67               | 1            |
| To understand organizational objectives, safety and occupational health principles, regulations, standards and work processes |                    |              |
| Safety and Occupational Health Concepts, Principles, Practices, Methods and Techniques | 4.67               | 1            |
| Capability to recommend substantive program changes or alternative new courses of managerial action |                    |              |
| General Safety Knowledge and Skill                                              | 4.63               | 2            |
| To advise or formally instruct supervisors and employees on safety techniques     |                    |              |
| Knowledge of The Body of Laws, Regulations, Policies and Procedures              | 4.60               | 3            |
| To sufficiently interpret and explain the reasons and purposes for applying measures and procedures |                    |              |
| Organizational Structure                                                         | 4.57               | 4            |
| To acquire data and information for preparation of accurate reports              |                    |              |

It shows that respondents strongly agreed with two highest rated (Rank 1) that safety manager must possess skills and knowledge on general management functions. Also, the practices and procedures on safety and occupational health concepts, principles, practices, methods, and techniques with a mean or average score of 4.67 for both skills and knowledge. From the result, general management functions, practices, and procedures obtained seventy-three percent (73%) of percentage; while safety and
occupational health concepts, principles, practices, methods and techniques obtained sixty-seven percent (67%) of percentage for the strongly agree weighting scale. The knowledge on general management functions, practices and procedures are basically focused on understanding organizational objectives, safety and occupational health principles, regulations, standards and work processes. Meanwhile, safety and occupational health concepts, principles, practices, methods and techniques focus on the capability to recommend substantive program changes or alternative new courses of managerial action.

Respondent also agreed on knowledge of general safety and skill, which was to advise or formally instruct supervisors and employees on safety techniques. It was ranked 2nd, having the percentage of sixty-seven percent (67%) for the strongly agree weighting scale. This score was observed in the important range with the mean score of 4.63. But, the knowledge of the body of laws, regulations, policies, and procedures was ranked as unimportant to be a competent safety manager. It was under the category of not agree with only 4.60 mean score, which was ranked 3 with the percentage of sixty-seven percent (67%) for the strongly agree weighting scale for the overall rank. It mainly focused to sufficiently interpret and explain the reasons and purposes for applying measures and procedures. However, knowledge and skill on organizational structure fall under the category of strongly disagree, which was ranked 4 with the lowest mean or average score of 4.57 and lowest percentage of sixty percent (60%) on the strongly agree on weighting scale.

5.5 Core Competencies

Table 5 shows that the result obtained from the survey, which has been ranked and finalized according to respondent’s preferences on core competencies.

| Core Competencies                                           | Mean/Average Score | Overall Rank |
|-------------------------------------------------------------|--------------------|--------------|
| Safety Management                                           | 4.73               | 1            |
| Develop safety plans (i.e. safety programme, budgeting,     |                    |              |
| scheduling, assessment, training, measure)                  |                    |              |
| Occupational, Health and Safety Legislation                 | 4.57               | 2            |
| Ensure health and safety are compliance with OHS            |                    |              |
| construction requirements                                   |                    |              |
| Risk Management                                             | 4.57               | 2            |
| Identification, analysis and evaluation stages in the risk   |                    |              |
| management process                                          |                    |              |
| Safety Technology                                           | 4.33               | 3            |
| Provides instruction on how to implement and administer a   |                    |              |
| company’s safety program                                    |                    |              |
| Change Management                                           | 4.27               | 4            |
| Develop and implement OHS programmatic changes              |                    |              |
| Construction Technology                                     | 4.17               | 5            |
| Principles of construction including demolition works and    |                    |              |
| erection techniques of plant and equipment                  |                    |              |

Table 5 shows that the rank and average score of the core competencies that are required by safety manager in implementing safety in high rise construction building. The highest rate of core competency was safety management by the respondents, who strongly agreed that safety managers must possess core competencies in safety management as the key element to be competent with the highest result of mean or average score of 4.73 which is ranked as (Rank 1). This safety management includes developing safety plans such as safety programme, budgeting, scheduling, assessment, training, and measure.

The second highest rated core competency was on occupational, health and safety legislation and risk management with the same mean or average score of 4.57. It was ranked 2 with the percentage of sixty-three percent (63%) on the strongly agree weighting scale for both core competencies. The occupational, health and safety legislation include ensuring health and safety with OHS construction
requirements, meanwhile, the risk management includes identification, analysis and evaluation stages in the risk management process. These two elements ranked under the category of agree based on the average index obtained, which also play an important criterion to achieve the competency in managing construction safety by the safety manager.

Besides that, safety technology that focuses on providing instruction on how to implement and administer a company’s safety program fall under the category of not agree by the respondents, where competency in this field area is not really required or important in the research with only 4.33 mean score, which was ordered as Rank 3 with only forty-three percent (43%) of percentage on the strongly agree on weighting scale. However, change management and construction technology were ranked under the category of strongly disagree, whereby change management was ranked 4 and construction technology was ranked 5 with the percentage of forty-three percent (43%) and forty percent (40%) on the strongly agree weighting scale. This was also not required at all by the safety manager with the lowest mean or average score of 4.27 and 4.17. This change management includes develop and implement OHS programmatic changes; whereas, the construction technology includes principles of construction including demolition works and erection techniques of plant and equipment.

### Table 6. Rank of the Other Competencies Required by Safety Manager

| Other Competencies | Mean/ Average Score | Overall Rank |
|--------------------|---------------------|--------------|
| Personal Credibility<br>E.g. professional integrity, meeting commitments, accurate works, self-confidence and providing alternative insights on business issue | 4.40 | 1 |
| Management Competencies<br>E.g. adaptability, building relationships, conflict management, coaching and organizational awareness | 4.23 | 2 |
| Business Knowledge<br>Knowledge of business practices other than safety and health practices e.g. operation, financial, human resource, quality and environmental management practices | 4.10 | 3 |
| Information Technology<br>Competence in new technologies e.g. Web-Based, Building Information Modelling (BIM) and IT-Based Monitoring | 4.07 | 4 |

Table 6 shows that the respondents strongly agreed (Rank 1) with the highest mean or average score of 4.40 and with the percentage of fifty percent (50%) on the strongly agree weighting scale that safety manager must possess other competencies on personal credibility as the additional competency to be an efficient safety manager. This personal credibility includes professional integrity, meeting commitments, accurate works, self-confidence and providing alternative insights on the business issue.

Besides that, respondents also moderately ranked on management competencies, which were under the category of fairly agree. This element also plays an important role to achieve the competency in managing construction safety by the safety manager with a moderate mean score of 4.23, which was ranked as Rank 2. This management competency mainly focuses on adaptability, building relationships, conflict management, coaching and organizational awareness with thirty-three percent (33%) of percentage on the strongly agree on weighting scale. However, business knowledge and information technology were ranked under the category of strongly disagree, which was not required at all by the safety manager with the lowest result of mean or an average score of 4.10 which was ranked as Rank 3 and 4.07 which was ranked as Rank 4. The business knowledge generally focuses on knowledge of business practices other than safety and health practices such as operation, financial, human resource, quality and environmental management practices. Whereas, it is mainly focused on competency in new technologies for the information technology; such as Web-Based, Building Information Modelling (BIM) and IT-Based Monitoring. Respondents strongly believed that business knowledge and
information technology were not required or vitally important to possess these competencies in the study.

6. Discussion
The results suggested that the safety managers must be able to carry out the safety job duties and practices and have competencies within the area of their job duties as well to be a competent manager. The results can be compared with the study by [8] which stated that safety manager must be competent and able to monitor occupational health and coordinate, review, and analyses hazard and risk assessment along with environmental impact assessment.

The three tasks were identified as the most important in reducing injury, which include challenging unsafe behaviours and attitudes; monitoring subcontractor activities; and carrying out hazard identification, risk assessments, and control. It was supported by the study [9] which stated that a safety management system, which comprises elements of policy, incentives, training, communication, control, and planning, has been found significantly related to safety, competitiveness, and economic-financial performance. Hence, safety manager must have the ability to recognize and proactively manage hazards and to provide greater understanding of the reasons for conducting certain OHS activities.

6.1 Basic Skills
Respondents strongly agreed that safety managers must possess basic skills in interpersonal communication, problem-solving and analytical skills. The results showed that interpersonal communication and problem-solving skills were the highest skills ranked in the analysis.

Interpersonal Communication Skill
The purpose of this competency is to improve working relationships on site and to reduce conflict. By doing this, it will be easier to collaborate and consult regarding OHS issues. It is because daily communication on site was regarded as critically important to support OHS and provide the most effective way to communicate about OHS with the workforce. Through communication, any safety issue, problem or matter that arise can be easily communicated through effective communication between safety manager and other workers. Furthermore, according to [10], safety communications stressed the message of staying focused and analysing the safety standards; further, it raises awareness for every job. Thus, according to all the supported details, it has been assessed that interpersonal communication skill is one of the most important types of basic skill competency that is required by safety manager.

6.1.1 Problem-Solving Skill
Problem-solving skill is the knowledge of how to strategize and implement strategies to handle an immediate crisis; while, at the same time preparing for the possible occurrence [11]. From the result obtained, it is important for safety manager to have this basic skill to immediately solve the problem related to safety as this will have an impact on the performance and competency of safety manager. Thus, as a result with all the supported details, it has been observed that problem-solving skill is one of the most important types of basic skill competency that is required by safety manager.

6.1.2 Analytical Skill
Analytical skill is a proactive approach that seeks to prevent or mitigate the occurrence of accidents, injuries, and incidence. It has been strengthened by [12], who stated that the diagnostic and analytical skills enable the manager to design the most appropriate response in a given situation. Meanwhile, according to the Government of Alberta [12], there is a need to incorporate a well thought-out Emergency Response Plan (ERP) into the overall Safety system because there is lack of assurance against certain natural disasters like earthquake and explosions which can spell grave consequences on operational safety. Thus, as a result with all the supported details, it has been demonstrated that analytical skill is one of the most important types of basic skill competency that is required by safety manager.
6.2 Skills and Knowledge

According to the results, it is important for every safety manager to have knowledge and skill on general management functions, practices, and procedures, which are mainly to understand organizational objectives, safety and occupational health principles, regulations, standards, and work processes.

6.2.1 General Management Functions, Practices and Procedures

Based on [13], stressed that good management practices have a positive impact on overall project safety. This was further strengthened by [14], who stated that the management of health and safety should be an integral part of the management of the work. It has also been reported that whoever is responsible for coordinating the activities of others on site must ensure that health and safety are effectively managed. Thus, as a result with all the supported details, it showed that knowledge and skill on general management functions, practices, and procedures are the most important types of skill and knowledge that should be possessed by safety manager.

6.2.2 Safety and Occupational Health Concepts, Principles, Practices, Methods and Techniques

Safety manager was required to possess skill and knowledge on safety and occupational health concepts, principles, practices, methods and techniques. This is important to create awareness among [15] stated that effective safety knowledge among construction professionals can reduce accidents that directly or indirectly reduce project cost.

6.3 Core Competencies

6.3.1 Safety Management

Safety management includes developing safety plans such as safety programme, budgeting, scheduling, assessment, training, and measure. This implies that an effective safety management system requires the implementation of core structures and processes by key players. Based on the result obtained, [16] stated that an effective safety system management requires management commitment to OHS, assignment of responsibilities, OHS procedures, OHS communication mechanisms, hazard identification, prevention, and control, accident investigation, OHS training, documentation and evaluation of program effectiveness. This is then strengthened by [17] that safety manager should implement and actively manage general EHS management system, including EHS programs that go beyond regulatory compliance. Moreover, they need to develop or refine mission, vision, directives, procedures or policies, and work instructions to ensure regulatory compliance, best practices, and voluntary commitments.

6.4 Other Competencies

The personal credibility includes professional integrity, meeting commitments, accurate works, self-confidence and providing alternative insights on the business issue.

6.4.1 Personal Credibility

Personal credibility is related to the personal behaviour or attitudes of a person in relation to management abilities. This has been supported by [18] who stated that safety awareness has far more to do with personal credibility and attitudes than anything else. Thus, as a result with all the supported details, it has been observed that personal credibility is one of the most important types of another competency that is required by safety manager in this study.

For the basic skills competencies, most of the respondents strongly agreed on interpersonal communication, problem-solving and analytical skills. Effective interpersonal communication is very important as the employee’s safety related performance increases when the safety manager explains all operating procedures. Also, when there is organizational commitment to continually improve work processes and to mitigate or reduce risks to a reasonable level among affected employees. The safety managers should communicate the end-user all the time regarding the safety issue on site and must be responsible to find ways of communicating with the clients, staffs and other personnel involved. Besides
that, safety manager must also have the basic skill competency in problem-solving skill so that safety problem or accidents arising can be solved immediately with proper safety action plan.

For the core competencies, the respondents strongly agreed on safety management, considering it as one of the core elements for being a competent safety manager. It is important to have the core competency in safety management as this covers the aspects of the organization’s safety management system that includes safety officers, safety committee, safety equipment, and policies. This is because implementing successfully safety management practices are associated with lower accident rates on construction site.

7. Conclusion

It is important to realize that the companies or organizations should have competent safety manager in carrying out their job duties, who is responsible to develop and provide active and effective leadership as a safety manager. As a result, safety performance can be enhanced through good working environment and surrounded by high awareness on safety among workers and competence safety personnel on any type of construction project. Safety managers should be able to conduct other safety related job duties; such as proactively identify the potential conflict situations and workplace issues. The manager must provide an open and participative environment for employees to raise workplace issues in accordance with OHS requirements. They should also be expert to monitor, assess, and review the impact of safety training in order to improve the training based on the feedback received. Safety managers are recommended to actively participate in the execution of safety plans. This development is vital in improving their roles and to achieve the standard of competencies in the construction industry.

It is also recommended to safety managers to strengthen the basic or core competencies that had been possessed; while, they should also develop other basic or core competency; such as social-interpersonal skills. Besides that, they also need to have the advisory skill to provide safety advices to other workers and personnel regarding safety matter and safety awareness on the site.

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