Health and Safety Risk Assessments in Contruction Sites in Oman

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It is well known to everyone that construction field is a very dangerous workplace especially if health and safety regulations are not applied in a professional way. In this project a field of survey was conducted through making interviews with experts in risk management and in health and safety risk assessment in the construction field. In order to understand and evaluate the type of risks and hazards which are normally found at any construction project, the issue in sites were analyzed in five different categories. Analysis were done based on the responses from the professionals involved in the construction site through using software. The aim of this project is study the awareness of the participants of carrying out health and safety risk assessments in a professional way, to identify the most risks found in the construction field such as; working at heights, working without using the safety equipment, working on unstable roofs. From the studies, it was concluded the following points Recognize and control hazards in your workplace , set risk management standards, based on acceptable safe practices and legal requirements, save costs by being proactive instead of reactive. All the respondents who were part of this project have said that it is very important to apply the occupational risk assessment matrix with considering the local regulations of the country.

1. Introduction

Health and safety risk assessment is very important at any constriction project. the word risk assessment is used to explain the process where the hazards and the factors that have the ability to cause harm are identified. There are few steps to minimize the accidents in the construction field. Firstly the hazards should be identified. Decide who might get harmed and how. Evaluate the type of risks and provide a proper solution. Finding to be recorded to implement them. Updated the assessment if necessary after its reviewed.

It is known that the percentage of injuries found in construction industry is very high compared with other industries and goes back to several reasons which will be discussed in this project (House, 2019).

The construction industry is growing up very fast and it is actually a good thing to the national economy however this growth needs to be followed with occupational health and safety regulations. The construction industry suffers from the high percentage of injuries and fatalities and this percentage keeps increase year by year. This project aims to increase the awareness to people who are involved in the construction industry in order to reduce the number of injures and accidents by evaluating the different types of risks and hazards and what are the causes behind them and decide who might get harmed as well. In this project a field survey was conducted followed by a questionnaire form divided to 3 different location to insure well distribution (House, 2019)

It is very important to understand the difference between the hazards and risks and based on that action to be taken. Hazards is basically anything that could lead to causing harm such as chemicals, electricity, noise and so many things. Risk is only chance of the hazard to happen whether in a high or low percentage.

It is well known that risk assessment process in construction sites is very important because it is a requirement for most of the legislation as well as safety standers. Most of the companies; small medium ones don't really have the enough amount of knowledge about risk assessment concepts and methods. Actually, the companies face some difficulties to find a person who is qualified and expert in order to carry out a proper risk assessment. The used method in this paper has some new features which introduce a new method for evaluating risk assessment. This method is to replace the traditional definition of probabilities with control levels because it is easy to apply and produce less risk scores and provide accurate results. The method was actually applied on 22 different construction projects. It was noticed that the method used is much easier where then the small and medium companies decided to update their risk strategies during the construction stages. The proposed method provides a strong and practical control level which provides a safer, healthier and competitive workplace for construction projects. (Nabil Watfa, 2014).

Risk assessment methods are often used to eliminate or minimize the risks of sites through safe and healthy environment protection applications. The risk assessment aims at measuring risks and then starting to reduce or eliminate them. Some methods of risk assessment are used on the basis of certain statistics and data which we know to be the result of which we mean quantitative risks. In addition, risk is also known depending on the quality of the decision and the risk. In fact, it is necessary to recognize risk assessment because risk assessment is important in raising awareness of risks and risks. (Dionne, 2013).

A study that was conducted recently shows the responds awareness about risk assessment problems. All the people who participated showed their knowledge of the term risk assessment. They were asked if they have the required information on how to carry out the risk assessment in professionally. According to the results; 23.3% couldn't give a strong answer which shows that they are not sure if they can carry out the risk assessment in a right way. 19.9% of the participants have clearly said that they don't know how to carry risk assessment when 57% said that they have a full knowledge on how to carry out risk assessment in a professional way. (Pinto A, et al, 2011).

During the site visits, it was noticed that most of the construction companies aren't carrying out risk assessment at all. Some of the companies do know how to carry out risk assessment but without having a clear vision of reference such as hazard identification studies. The matrices which one followed currently evaluate the occupational risks considering other factors such as environmental risks, cost risks and reputation risks. In some of these cases the combination compromises on workers safety and life. The outcome of the study supports the idea to have a matrix.

2. Results

2.1 Demographics

All the workers who participated in this survey were all men. As shown in the figure number 1. 70 % of the answers were in the young age (under 40 years). This confirms the importance on following the safety procedures because of the short experience, cost and harm of illness and disability. Nearly 1% of the answers were above 60 years old which shows that most of the workers retire at this age which means there are still low percentage who are working in construction industry after the age 60 as per the government indicates which explains that the government still doesn't have full control regarding the age of retirement.

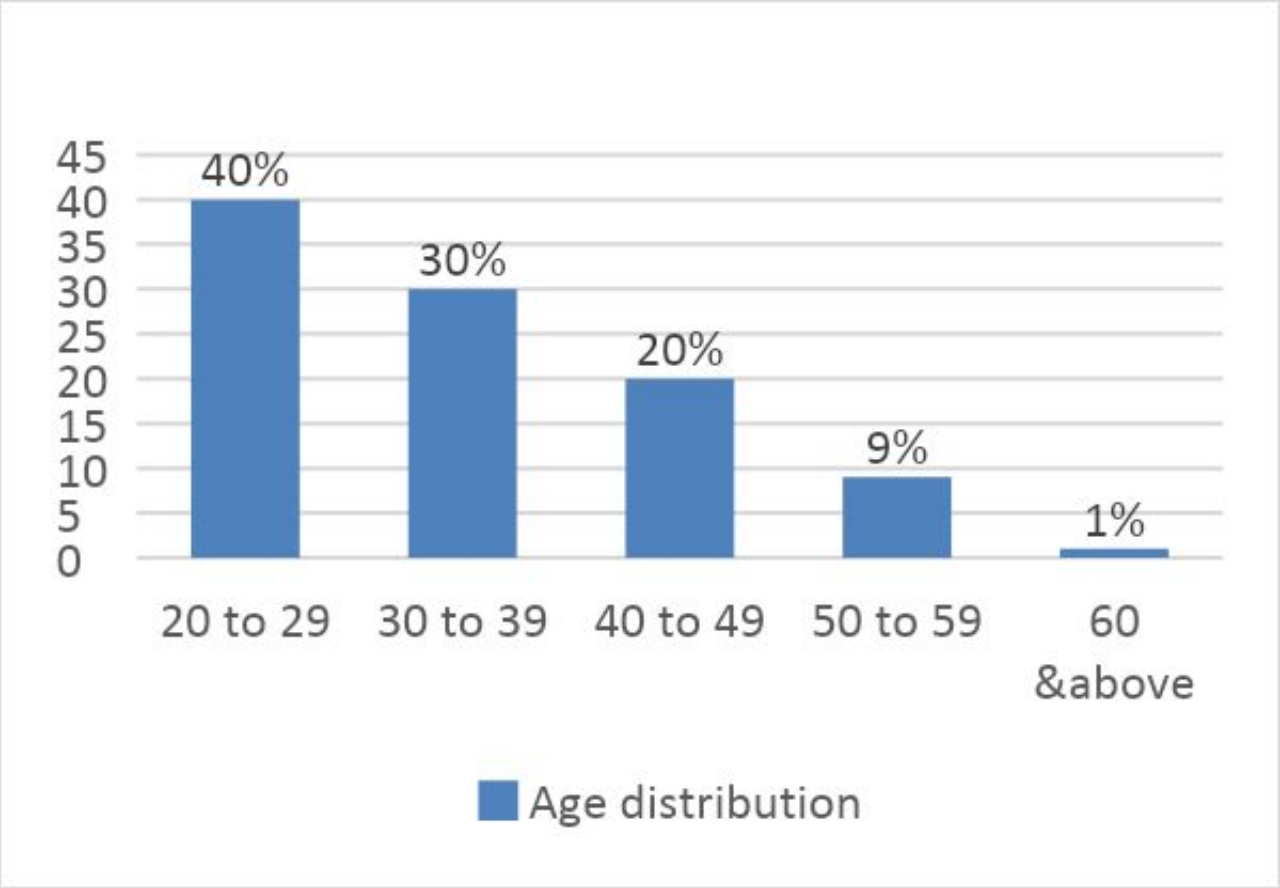

Figure 1. *Shows the age distribution in percentage*

The below figure 2 which refers to the education level, the result shows that 61% were equal or below than diploma. 22% are illiterate without any certification. These figures shows the importance and how cost it is to educate these people to enhance their knowledge about health and safety in order to reduce the number of accidents caused by the lack of experience and knowledge.

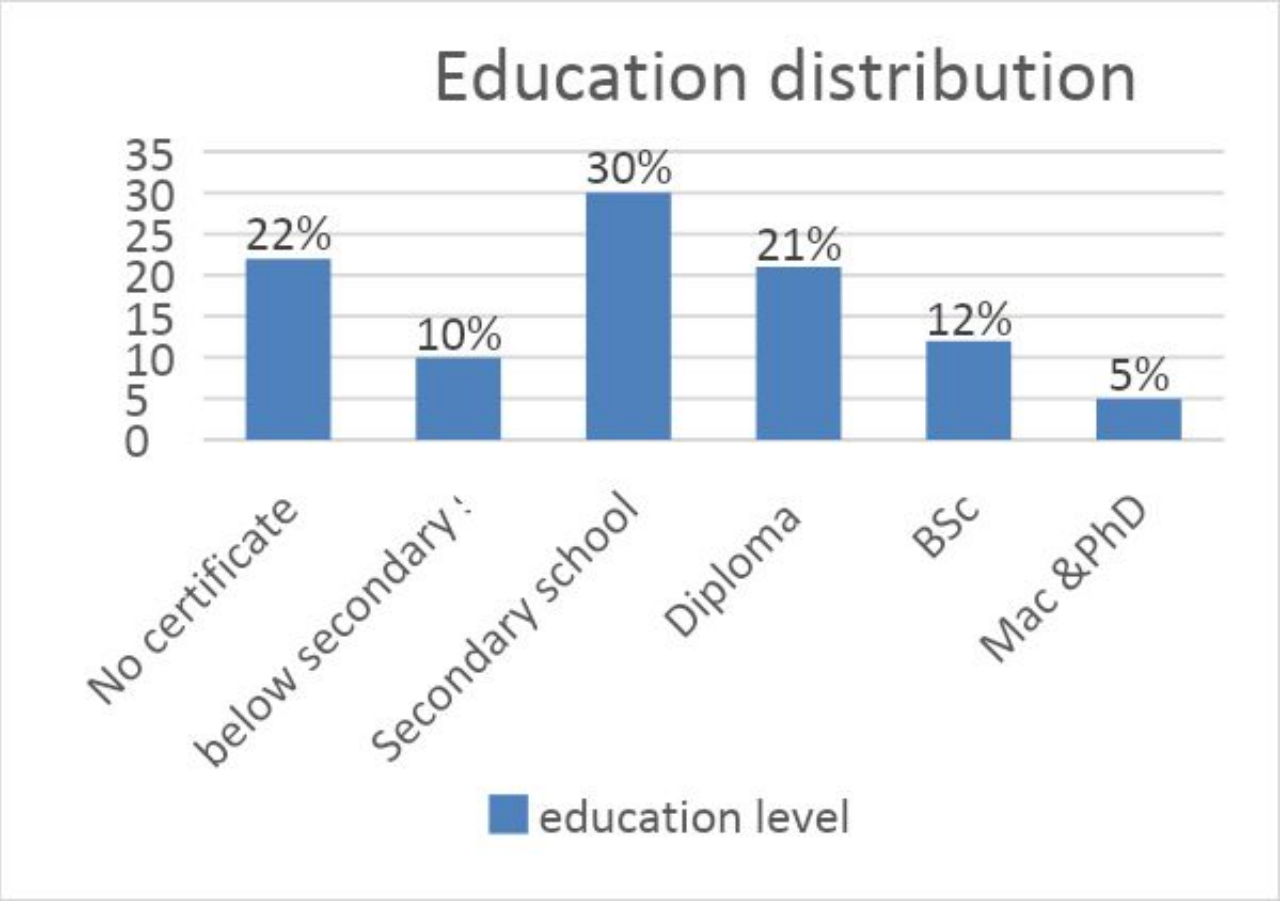

Figure 2. *Shows education level distribution in percentage*

The below figure 3 shows the percentage years of the experience where almost 53% of the respondents were having from 1 to 5 years of experience and 80 % were having less than 10 years of experience in the construction projects. It is known that working in the construction industry which is having the most hazardous working areas. The concerned authorities in Oman such as the ministry of manpower and ministry of social insurance have decided to put the minimum years of working experience especially for the companies who are considered as first class companies and responsible for big projects, because workers with less years of experience are less familiar with the several types of hazards which can cause accidents.

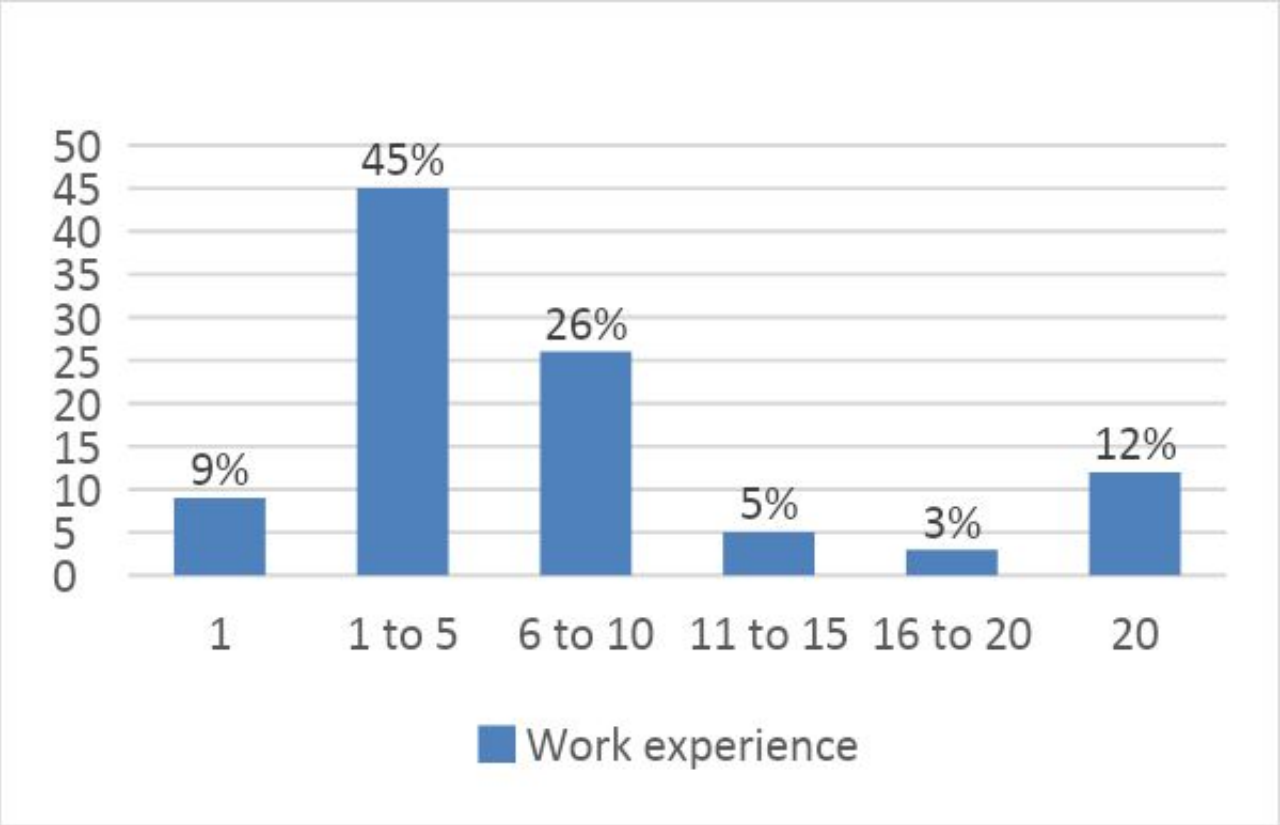

Figure 3. *Shows years of experience*

Figure 4 refers to the percentage of facing a major accidents at construction site. The results say that almost 60% of the respondents have faced major accidents which is actually a very high value. 9%of the participants have faced major accidents in less than a year. The percentage of the major accidents is expected to increase within 5 year and it can be observed by comparing the current percentage to the percentage of 6 years back. This can be caused by several factors, such as; Not a having a specialist on how to apply safety in a professional way, the lack of experience of the workers, Not applying, wearing safety rules and equipment.

Figure 4. *Shows years of experience in major accidents*

2.2 Risk assessment problems

Table 1 lists the respondents awareness of evaluating risk assessment problem. All participants said that they do know the term' Risk assessment' when they were asked if they are able to carry risk assessment in a professional way. 22% couldn't give a strong answer because they were not sure if they can actually carry risk assessment in a right way. The reason of this can be the lack of training. 20% of the respondents have clearly said that they don't know how carry risk assessment professionally. 57% assured their knowledge on how to carry risks . 65% have said that they can't trust other people to carry out risks instead of them. When 11% couldn't give a proper answer and 24 have said yes they do know how to carry risks.

50% of the participates have said that they don't have any matrix that's independent for occupational health and safety. When 2% didn't have a proper answer and 47% actually have matrix used for occupational safety and health. It was noticed during the visits conducted that most of the companies don't carry risk assessments totally, however, there are few companies who actually carry risk assessment but without knowledge of references like how identify hazards.

The current model evaluate the vocational risks combined together with external factors like cost, environment and reputation risks. In some cases, it could affect the workers life and safety. The outcomes supports the idea that in building construction industry should have its independent risk assessment matrix for vocational safety and health. 55% have said that they never had a proper training on how to carry out risks, the shortage in such a training can actually cause big accidents however, some workers don't have a problem to do any task asked for them and they would still do the job because they have not evaluate the hazards on their own (Sudicky, 2004).

Activity	No %	I don't know %	Yes %
Do you know what is risk assessment?	0	0	100
Do you know how to carry out risk assessment in a professional way ?	20	20	60
Did you get any certified training in how to carry risk assessment ?	50	15	35
Will you trust somebody carrying out risk assessment on your behalf	65	11	24
If' high risk' assessment is reported in your workplace do you take an immediate action	6	3	91
Are you satisfied with your company risk assessment matrix?	17.5	2.5	80

Table 1. ***Shows the risk assessment problems responds:***

2.3 Risk assessment principles

In table 2 shows the importance of respondents replying to the following items which are included in evaluating occupational safety and health at their work place. Respondents think that it is actually very important to consider the matrix of occupational risk assessment according to the local rules. In addition, most of the participants said it very essential to have a proper plan which includes a clear path to escape if there is emergency, place of fire alarm system, emergency exit door. 100% of the respondents have said that it is very important to increase the level of risk assessment and make sure it is conducted before starting any task for any project. It was noticed from results obtained from the questionnaire that 95% said that ORA needs some improvements which actually a high percentage. This need a serious look from both ministries manpower and public authority of social insurance to ensure that ORA procedures are followed especially at the places who has recorded injures and accidents (Corporate Compliance Insights, 2019).

Activity	Not important %	Important %	Very important %
A proper risk assessment to be carried out based on local regulations	0	20	80
Introduce risk control, risk reduction	0	35	65
Provide a proper training for the staff	2	70	28
Conduct risk assessment before starting any activity	0	6	94
Improve the matrix of occupational risk assessment in construction industry	2.5	40	57.5

Table 2. ***shows the importance of each activity in working place:***

2.4 key risks in construction

Many different activities are there in the construction industry. The following table (3) has listed down the most common risks which is a result of a questionnaire that was prepared by experts in health and safety, labors and risk management staff. 11 activities were a result of the interviews. After the results were analyzed, it was noticed that 6 activities have recorded a high risk percentage of happening and these risk are working at heights, working on weak roofs, the use of the electric equipment, working under high voltage, working in tight spaces, the lack of knowledge on how to use the emergency equipment. The remaining activities have scored less in percentage in risks which shows that the respondents have given these results according to their experience (Prres.net, 2019).

Activity	Never%	Sometimes %	Often%	Always %
Working at heights	0	2	28	70
Working on unstable roofs	0	4	10	86
Falling of objectives	0	3	50	47
Before excavation	0	0	35	65
Electrical equipment	0	5	15	80
Manual handling	0	5	30	70
Lifting of materials	0	0	35	65
Working at confined places	0	5	25	70
Working without using safety tools (PPE)	0	0	44	56
The lack of knowledge in using emergency equipment	4	0	25	71

Table 3. ***Shows the respondents of facing accidents of the following activities:***

2.5 Process of risk assessment

In this part task which shows the respondents replying on how much do you follow the task mentioned in table (4) . It was noticed that most of the replies if not all of them have given a solid answer with either always or often which shows that the workers are having the ability to apply the risk management. The planning control options has scored the lowest positive results which shows the weakness of taking a proper measures for identified and evaluated risks. This is because the health and safety measures which should be taken are considered as less importance (Risk Management, 2019).

Activity	Never %	Often %	Always %
Planning of risk assessment	0	40	60
Work activities analysis	0	41	59
Identifying hazards	0	24	76
Estimation of risks	0	15	85
Risks evaluation	0	20	80
Planning control options	0	51	49

Table 4. ***Shows the respondents of applying the following activities***

Conclusion

There are two methods used in completion of this project. firstly a field of survey was conducted

with a help of a construction company named falcon eye which is located in Al-Azaiba. Three different locations were selected by the company. Interviews were conducted with health and safety experts, site engineers and management as mentioned earlier. The selection of the three locations were chosen after an agreement with the owner of the company. The three places were in Muscat in different areas to ensure that the questionnaire are distributed well and to get a proper and accurate results. The second method used which a questionnaire form that was prepared based on previous researches which were conducted in Muscat. The questionnaire form was divided into 5 sections which are as follows: Demographics , Risk assessment problems , Risk assessment principles , Process of risk assessments , Construction key risks. The main objective of this project was to find the awareness and available information of occupational health and safety risk assessment in the construction project in Muscat. In addition, to find out the most risk activities which are as follows: working at heights, working on weak roofs, the use of the electric equipment, working under high voltage, working in tight spaces, the lack of knowledge on how to use the emergency equipment. Moreover, these results were obtained from the company and the results were reviewed and analyzed through using the Microsoft Excel.

All the participants in this paper were from men. Around 70% of them were under 40 in age. 61% having educational level below diploma. Constructors had the highest level of the type of organization with 70%. Technicians and worker had the height value of specialization with 55%. Commercial buildings had the highest value of type of project with 48% followed by the residential buildings with 22%. 53% of the workers are having experience less than 5 years in construction projects. 60% of the respondents didn’t face fatality while they are working. Generally, it was noticed the most of the responds are having the ability to apply risk assessment.

Acknowledgements

This research was supported by middle east collage As well as the civil engineering department I would like to thank M. Adams Joe who has provided insight and expertise that greatly assisted the research. Finally the engineers and experts for their assistance in preparing the questionnaire

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