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SAFE WORK BEHAVIOR IN GAZA STRIP CONSTRUCTION INDUSTRY

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Abstract: Safety is the most challenging issue in Gaza Strip construction industry. Palestinian construction industry suffers recently from poor safety and health conditions as safety rules do not exists and work hazards at the workplace are not perceived. The objective of this paper is to investigate the perceptions of construction workers regarding safey behavior in Gaza Strip construction site . The methodology adopted is based on questionnaire targeting the construction workers. A total number of 300 questionnaires were distributed to workers in the construction sites, while 246 questionnaires were completed which represent the perception of construction workers in Gaza strip and then analyzed to achieve the research objective. The results showed that the workers attitude towards safety varies according to type of work and the perception of the degree of risk associated with their jobs. In addition, more than one-third of respondents have a bad degree of risk awareness as they believe that working with a certain amount of risk exciting.

التصرف الآمن في صناعة التشييد في قطاع غزة

ملخص: تعتبر السلامة الموضوع الأكثر تحدياً لصناعة الإنشاءات في قطاع غزة، كما أن واقع السلامة في فلسطين يعاني من ضعف الإجراءات والقوانين مع عدم ادراك المخاطر الموجودة في موقع العمل، يهدف هذا البحث لدراسة وجهة نظر العمال في قطاع غزة فيما يتعلق بالتصرف بأمان في مواقع العمل، وتم اعتماد الاستانة كمنهج لهذا البحث حيث تم توزيع 300 استبانة للعمال في مواقع العمل في حين تم استعادة 246 استبانة فقط والتي تم تحليلها للوصول إلى هدف البحث، وقد أظهرت النتائج أن موقف العاملين في صناعة التشييد تجاه السلامة يختلف حسب نوع العمل ونسبة الإدراك لحجم الخطر الذي يصاحب العمل الذي يقومون به، كما دلت النتائج أن أكثر من ثلث العاملين في هذه الصناعة لا يملكون وعي كافي بالمخاطر الموجودة ويؤمنون أن العمل بوجود نسبة معينة من الخطر مثير.

I. Introduction

Construction industry is characterized by having many players of multiple disciplines who are brought together at various stages throughout a single project. Construction projects are complex and time-consuming undertakings [1]. The structure must be designed in accordance with applicable codes and standards, culminating in working drawings and specifications that describe the work in sufficient details for its accomplishment in the field The construction projects have been divided

into four main categories: residential construction, building construction, heavy engineering construction and industrial construction. Management in construction industry have been characterized as being weak, insufficient, nebulous, backward and slow to react to changing conditions. Nevertheless, in the overall picture, the construction industry is at or near the top in the annual rate of business failures and resulting liabilities [2]. Although the construction industry plays a vital role in social and economic development, when compared to other (labor intensive) industries, the construction industry experienced a disproportionately high rate of disabling injuries and fatalities for its size [3]. In the construction fatality is five times more likely than in a manufacturing based industry[4]. This industry alone produces 30% of all fatal industrial accidents across the European Union (EU), yet it employs 10% of the working population; in the United States it accounts for 20% of all fatal accidents and only 5% of the employed [5]. In Japan, construction accidents account for 30% - 40% of the overall total of industrial accidents, with the total beings 50% in Ireland and 25% in the United Kingdom [6]. It is widely accepted that unsafe behavior is intrinsically linked to workplace accidents. A positive correlation exists between workers' safe behavior and safety climate within the construction site environments. Construction workers' attitudes towards safety are influenced by their perception of risk, management, safety rules and procedures [7].

Safety is one of the most difficult issues facing the construction industry in the Gaza Strip. The accident rate in construction is highest when compared with other industries. The Palestinian Ministry of Labour [8] stated that work-injuries since 2006 to 2011 approximately 611 injury, which resulted in 11 deaths, 37% of the total number of these incidents were in the construction industry. The most important reasons for increasing number of injuries is the lack of employers cooperation to find workers safety tools and the lack of commitment by workers to use these tools if it is available , the construction work is not well organized and the marked increase in the reconstruction in Gaza strip.

II. Literature Review

Behavior based safety BBS which got its start in the 1970s, but has gained in popularity in the 1990s is founded on the principles and procedures of a particular sub discipline of psychology called applied behavior analysis. Behavior based safety programs focus on effort (behavior) rather than results (i.e., number of accidents). Proponents of behavior-based safety believe that focusing on safe work behaviors lead to reduction of at-risk-behaviors and, ultimately reduced accidents and injuries [9]. It is the urgent

need to guarantee safety, normal production and workers' life safety in coal mine by enhancing the risk management and scientifically controlling workers' unsafe behavior [10]. Petersen [11] states that the concept of ''safe behavior reinforcement'' is not new and it is not invented by a specific individual. Authors merely borrowed it from the field of psychology and suggested their potential application to safety. He adds that the fundamentals of BBS have been known for almost 90 years, used in industry for 50 years, and applied to safety for 30 years. However, the serious and systematic application of this method in safety was first conducted by [12]. Behavior is defined in the American Heritage College dictionary as "The actions or reactions of persons or things in response to external or internal stimuli"(1993). In Scott Geller's book Working Safe, Scott states that a key assumption of a behavior-based approach to safety, is that behavior (desirable and undesirable) is learned, and can be changed by providing people with new learning experiences. Mill [13] defines behavior as being safe when it reacts to or compensates for a hazard in such a way as to minimise the risk of injury to people or loss of equipment or process. NSCA [14] refers safe behavior to any behavior that is required to minimise risk to health and safety. Humphrey [15] considers that safety-related behaviour is essentially composed of two parts: (1) a set of operational definitions of the behaviours critical to safety at a specific facility, and (2) the ability to measure the frequency of behaviors known to precipitate injuries and accidents. Krause and Russell [16] confirmed that risky behavior is commonly present in most injury situations where people are injured. When an injury related to behavior occurs, it is highly likely that this same attitude has not caused injury previously. Behavior-based safety interventions are people focused and are often based upon one to one or group observations of employees performing routine work tasks, feedback on safety related behavior, coaching and monitoring [17].

Krause [18] states that there are two reasons to focus on behavior. First, that behavior can be measured and therefore managed, and secondly that a change in behavior can lead to a change in attitude. Reed [19] has subtly pointed out that over 90% of accidents are caused by unsafe behaviour and safety is a function of behaviour. Behavour-based safety is a concept that uses human psychology to help promote workplace safety. It works by decreasing behaviours that are risky and promoting those that are safe [20]. NSCA [14] defines behavior as the occurrence of observable actions. Cooper [21] demonstrated that implementing BBS program achieved better results for improving site safety. Geller et al., [22] stated that BBS principles can be applied in many domains of occupational safety, including

ergonomics, human error prevention, incident analysis, hazard identification and corrective action, and training. Komaki, Barwick, and Scott [12] applied the approach at a large wholesale bakery for a 25-week period. During the feedback intervention period, workers in two departments improved from performing safety behaviors from 70% and 78% to 96% and 99%, respectively.

Zohar [23] applied a behavioristic approach to modify the earplug wearing behavior of workers in a large metal fabrication plant. He used individual feedback to workers regarding their temporary hearing loss on randomly selected dates at the beginning and at the end of their work-shift on two non-consecutive days. Workers used earplugs during one of their testing days in order to observe the difference in the temporary loss of hearing after the work-shift; the behavior sampling tours of earplug usage continued for five months. The result revealed that the percentage of earplug use improved from a baseline level of 35% to 85% by the end of the 5-month follow-up study period.

Matilla [24] conducted a study at a veneer factory to improve safety by implementing behavior analysis during internal safety inspections. Safety performance was observed during the weekly inspections conducted on various days and times of tours. Feedback regarding the safety performance was presented as a graphic curve posted on a departmental wall. As a result of the experiment the safety index rose from the baseline level of 40% to above 71% during the feedback phase, and to 78% during the phase when extra feedback was provided to supervisors.Many authors now emphasize the behavioral approach to accident prevention [23], [24]. Several studies conducted in recent years have shown that the behavior modification technique is effective in occupational safety. Behavior modification is based on the idea that man learns to behave in a certain way as the outcome of consequences of such behavior. Behavior modification aims at reinforcing the positive consequences of the wanted behavior while reducing the positive consequences and/or strengthening the negative consequences of the unwanted behavior. Behavior analysis approach has been used to promote safe behavior in various industries, e.g. bakeries [27] the process industry [28] and research laboratories. Most studies are directed at improving some clear, unsafe acts or unsafe conditions [28] but some have dealt with the use of personal protective equipment [23], [29].

III. Methodology

A questionnaire was developed to measure safety behavior in the construction industry which is the most popular method of measuring safety management performance. Since the survey is confined to Gaza Strip, which

is a relatively small area, the questionnaires were administered personally at work places of crews which are the best way to collect the data. Moreover, any misunderstanding and doubts arising from the survey questions can be clarified immediately and the researcher can have honest answers from respondents. Ali [7] developed workers behavioural survey (WBS) including the common scenarios of working at heights; working on scaffolds, using ladders, and working on roofs. The most frequently work in Gaza strip include scaffolding, excavation, work on roofs, and cutting and welding. Therefore, a good way to measure workers behavior is to ask them questions regarding to the previous types of work. The worker was first asked if he works on scaffolds, in an excavated area, work on roofs, and if he use cutting or welding machines or not. Then they were instructed to give their perception towards two bad situations. Each situation was divided into two levels of risk, the frequency of occurrence, and prediction of workers behavior. Workers were asked to answer each question with related scenarios. Effort was made to clarify the questions because the educational level of some workers is limited. A total number of 300 questionnaires were distributed to workers in the construction sites, while 246 questionnaires were completed which represent the perception of construction workers in Gaza strip. The questionnaires were reviewed and checked out and the sample size was reduced to 209 respondents due to misunderstanding of the statements or ticking the same options in all the questions. The data collected from the questionnaire survey was analysed using Statistical Package for Social Sciences (SPSS) version 19. The analysis included: descriptive analysis and binary logistic regression analysis.

IV. Results

In the following sections, workers behavioral situations in construction will be explored. These situations include using scaffolding, working in an excavated areas, working on roofs, and working with cutting and welding machines.

A. Scaffolding

When a worker is asked to imagine the following situation: you have to carry out similar tasks than in your present job, but the job requires that you have to work at heights, on a scaffold, two situations were presented. The workers response data and analysis are presented in Table (1).

In response to whether the workers use scaffolding in their job, the Chi-Square value is equal to 59.148 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, it is concluded that the proportions associated with Never, Sometimes, and always in use scaffolds in worker's job are significantly different.

In Situation 1, responding to how risky the situation is, the Chi-Square value is equal to 24.430 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, it is concluded that the proportions associated with low risk and high risk in the situation's risky are significantly different. In response to how frequent the situation is, the Chi-Square value is equal to 44.311 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, it is concluded that the proportions associated with rare and frequent in finding this situation is significantly different.

As for the workers response if the situation happened, the Chi-Square value is equal to 4.358 with a very large significance associated with it (0.037), which is smaller than 0.05. Thus, it is concluded that the proportions associated with stop working and use it in doing if this happened are significantly different. In situation 2, the Chi-Square value is equal to 48.212 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, it is concluded that the proportions associated with low risk and high risk in the situation's risky are significantly different. In response to how frequent the situation is, The Chi-Square value is equal to 81.391 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, it is concluded that the proportions associated with rare and frequent in finding this situation are significantly different. As for the workers response if the situation happened, the Chi-Square value is equal to 0.021 with a very small significance associated with it (0.885). Thus, it is concluded that the proportions associated with stop working and use it in doing if this happened are similar to each other.

Table 1: Scaffolding - Data Analysis

Do you use scaffolds in your job?				
Response	**N**	**%**	**Chi-Square**	**P-value**
Never	41	19.6	59.148	< 0.0001*
Sometimes	122	58.4		
Always	46	22.0		
Total	209	100.0		
Situation 1: Once you are ready to start your job, you climb the scaffold up to the level you must work at. Once there you realize that the scaffold is not totally boarded				
How risky is the situation?				
Low Risk	45	22.5	24.430	< 0.0001*
High Risk	155	77.5		
Total	**200**	**100.0**		
How do you find this situation?				
Rare	97	50.3	44.311	< 0.0001*

Frequent	96	49.7		
Total	193	100.0		
What will you do if it happened?				
Stop Working	111	57.5	4.358	0.037 *
Use It	82	42.5		
Total	193	100.0		
Situation 2: Now imagine that the scaffold looks OK, but you realize that a ladder has not been provided (or has been removed) and you must face the alternative of climbing up or down the scaffold.				
How risky is the situation?				
Low Risk	45	22.7	48.212	< 0.0001*
High Risk	153	77.3		
Total	198	100.0		
How do you find this situation?				
Rare	94	47.7	81.391	< 0.0001*
Frequent	103	52.3		
Total	197	100.0		
What will you do if it happened?				
Stop Working	97	50.5	0.021	0.885
Use It	95	49.5		
Total	192	100.0		

B. Excavation

In this section, the workers are asked to reply if they work at excavated area or not. Then, the workers response about two situations regarding to work in excavated sites as will be illustrated below. The response data & analysis are presented in Table (2).

In response to whether the workers work in excavation sites, the Chi-Square value is equal to 73.330 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with never, sometimes, and always in working at an excavated site in worker's job are significantly different.

In Situation 1, responding to how risky the situation is, the Chi-Square value is equal to 14.827 with a very large significance associated with it (0.001), which is smaller than 0.05. Thus, we conclude that the proportions associated with Low Risk and High Risk in the situation's risky are significantly different.

In response to how frequent the situation is, the Chi-Square value is equal to 84.953 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with rare and frequent in finding this situation are significantly different. As for

the workers response if the situation happened, the Chi-Square value is equal to 31.042 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with stop working and use in doing if this happened is significantly different. In Situation 2, the Chi-Square value is equal to 0.193 with a very small significance associated with it (0.908). Thus, we conclude that the proportions associated with low risk and high risk in the situation's risky is similar to each other.In response to how frequent the situation is, the Chi-Square value is equal to 130.817 with a very large significance associated with it (<0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with rare and frequent in finding this situation are significantly different.

As for the workers response if the situation happened, the Chi-Square value is equal to 28.821 with a very large significance associated with it (<0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with stop working and use it in doing if this happened is significantly different.

Table 2: Excavation - Data Analysis

Do you work at excavated sites in your job?				
Response	**N**	**%**	**Chi-Square**	**P-value**
Never	72	34.4	73.330	< 0.0001*
Sometimes	119	56.9		
Always	18	8.6		
Total	**209**	**100.0**		
Situation 1: The excavation is very deep within no any protections shutters				
How risky is the situation?				
Low Risk	43	21.9	14.827	0.001*
High Risk	153	78.1		
Total	**196**	**100.0**		
How do you find this situation?				
Rare	107	56.0	84.953	< 0.0001*
Frequent	84	43.9		
Total	**191**	**100.0**		
What will you do if it happened?				
Stop Working	134	70.2	31.042	< 0.0001*
Use It	57	29.8		
Total	191	100.0		
Situation 2: The excavation level is near to water table				
How risky is the situation?				
Low Risk	63	32.0	0.193	0.908

High Risk	134	68.0		
Total	**197**	**100.0**		
How do you find this situation?				
Rare	136	71.2	130.817	< 0.0001*
Frequent	55	28.8		
Total	191	100.0		
What will you do if it happened?				
Stop Working	132	69.5	28.821	< 0.0001*
Use It	58	30.5		
Total	**190**	**100.0**		

C. Roofs

In this section, the workers are asked to reply if they work on roofs or not. Then, the workers response about two situations regarding to work on roofs as will be illustrated below. The workers response data & analysis are presented in Table (3).

In response to whether the workers work on roofs, the Chi-Square value is equal to 26.891 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with never, sometimes, and *always* in work on roofs in worker's job are significantly different.

In Situation 1, responding to how risky the situation is, the Chi-Square value is equal to 1.005 with a very small significance associated with it (0.605). Thus, we conclude that the proportions associated with low risk and high risk in the situation's risky is similar to each other.

In response to how frequent the situation is, the Chi-Square value is equal to 107.063 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with rare and frequent in finding this situation are significantly different.

As for the workers response if the situation happened, the Chi-Square value is equal to 29.145 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with stop working and use it in doing if this happened is significantly different.

In Situation 2, the Chi-Square value is equal to 29.485 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with low risk and high risk in the situation's risky is significantly different.

In response to how frequent the situation is, the Chi-Square value is equal to 84.104 with a very large significance associated with it (< 0.0001), which is

smaller than 0.05. Thus, we conclude that the proportions associated with rare and frequent in finding this situation are significantly different.

As for the workers response if the situation happened, the Chi-Square value is equal to 15.674 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with stop working and use it in doing if this happened is significantly different.

Table 3: Roofs - Data Analysis

Do you work on roofs in your job?				
Response	**N**	**%**	**Chi-Square**	**P-value**
Never	48	23.8	26.891	< 0.0001*
Sometimes	102	50.5		
Always	52	25.7		
Total	**202**	**100.0**		
Situation 1: Once you are ready to start your job, you climb up to the roof and you realize it is a fragile roof and crawling boards have not been provided.				
How risky is the situation?				
Low Risk	63	31.7	1.005	0.605
High Risk	136	68.3		
Total	**199**	**100.0**		
How do you find this situation?				
Rare	129	67.9	107.063	< 0.0001*
Frequent	61	32.1		
Total	190	100.0		
What will you do if it happened?				
Stop Working	134	69.4	29.145	<0.0001*
Use It	59	30.6		
Total	**193**	**100.0**		
Situation 2: The roof is OK but you have to work in bad weather				
How risky is the situation?				
Low Risk	70	35.4	29.485	< 0.0001*
High Risk	128	64.7		
Total	**198**	**100.0**		
How do you find this situation?				
Rare	117	60.6	84.104	< 0.0001*
Frequent	76	39.4		
Total	193	100.0		
What will you do if it happened?				
Stop Working	124	64.2	15.674	<0.0001*
Use It	69	35.8		
Total	**193**	**100.0**		

D. Cutting & Wedding

In this section, the workers are asked to reply if their work requires using cutting and welding or not. Then, the workers response about two situations regarding to work using cutting and welding machines as will be illustrated below. The workers response data & analysis are presented in Table (4).

In response to whether the workers use cutting and welding, the Chi-Square value is equal to 48.723 with a very large significance associated with it (<0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with never, sometimes, and always in cutting or welding machines in worker's job are significantly different.

In Situation 1, responding to how risky the situation is, the Chi-Square value is equal to 110.800 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with low risk and high risks in the situation's risky are significantly different. In response to how frequent the situation is, the Chi-Square value is equal to 69.556 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with rare and frequent in finding this situation are significantly different. As for the workers response if the situation happened, the Chi-Square value is equal to 7.681 with a very large significance associated with it (0.006), which is smaller than 0.05. Thus, we conclude that the proportions associated with stop working and use it in doing if this happened are significantly different. In Situation 2, the Chi-Square value is equal to 23.794 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with low risk and high risk in the situation's risky is significantly different.

In response to how frequent the situation is, the Chi-Square value is equal to 72.457 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with rare and frequent in finding this situation are significantly different.

As for the workers response if the situation happened, the Chi-Square value is equal to 26.064 with a very large significance associated with it (< 0.0001), which is smaller than 0.05. Thus, we conclude that the proportions associated with stop working and use it in doing if this happened are significantly different.

Table 4: Cutting & Welding - Data Analysis

Do you use cutting and welding machines in your job?				
Response	**N**	**%**	**Chi-Square**	**P-value**
Never	85	42.1	48.723	< 0.0001*
Sometimes	96	47.5		
Always	21	10.4		
Total	**202**	**100.0**		
Situation 1: There is no PPE of safety during the cutting and welding works				
How risky is the situation?				
Low Risk	36	18.5	110.800	< 0.0001*
High Risk	159	81.5		
Total	**195**	**100.0**		
How do you find this situation?				
Rare	92	48.7	69.556	< 0.0001*
Frequent	97	51.4		
Total	**189**	**100.0**		
What will you do if it happened?				
Stop Working	113	60.1	7.681	0.006*
Use It	75	39.9		
Total	**188**	**100.0**		
Situation 2: The execution of the cutting and welding in crowded areas workers.				
How risky is the situation?				
Low Risk	72	37.1	23.794	< 0.0001*
High Risk	122	62.9		
Total	**194**	**100.0**		
How do you find this situation?				
Rare	100	53.2	72.457	< 0.0001*
Frequent	88	46.8		
Total	188	100.0		
What will you do if it happened?				
Stop Working	129	68.6	26.064	< 0.0001*
Use It	59	31.4		
Total	**188**	**100.0**		

The findings of safety situations showed that in case of not totally boarded scaffolds, only 57.5% of workers will continue to work regardless of the dangerous situation. The results also showed that only 50.5% will stop working if a ladder has not been provided and the worker must face the

alternative of climbing up and down the scaffold, while 49.5% will continue to work.

On the other hand, in case of excavation works, 70.2% of workers will stop working if the excavation is deep and without protection shuttles and 71.2% will stop working in case the excavation is close to water table, which are a lot better results than in the previous situations, but still need more improvement. In the case of working on Roofs, 69.4% of workers will stop working if the roof is fragile and crawling boards have not been provided. However, 64.2% of workers will stop working in bad weather even if the roof is safe. In cutting and welding situations, 60.1% of workers will stop working if PPE is not used, and in case of crowded areas 68.6% will stop working as well.

Binary Logistic Regression

To determine whether the workers' intentional behavior is caused by their attitude or perception, a binary logistic regression analysis test was conducted. The aim of this test was to assess the independent effects of each of the four factors already identified on the eight behavioral situations. In other words, these eight situations were taken as dependent variables, with "using scaffolds, work at excavated sites, work on roofs, cutting or welding machines" as independent variables. The results for the binary logistic regression are presented in Tables (5).

A. Scaffolding

Table (5) shows that the first factor "using scaffolds", has statistically insignificant correlations (using the standard alpha level of 0.05) for the dependent variable "Working with the scaffold is not totally boarded for all situations" How risky the situation, How do you find this situation, and what will you do if happened. In addition, it shows that the first factor "using scaffolds" have statistically significant correlations (using the standard alpha level of 0.05) for "Accessing scaffolds by climbing up or down". This situation was perceived to be either never or always. The positive value of the B coefficient (B=1.385) was obtained, indicating that the higher the level of using scaffolds by workers, the higher the chance that workers would find this situation to be either rare or frequent. For the other situations, there are statistically insignificant correlations the other situations "How risky the situation and what will you do if happened" for "Accessing scaffolds by climbing up or down".

A. Excavation

Table (5) shows that the second factor "working at an excavated sites", has statistically significant correlations (using the standard alpha level of 0.05) for the two dependent variables "The excavation is very deep within no any

protections shutters" and "The excavation level is near to water table". These situations were perceived to be either never or always. The positive value of the B coefficient (B=2.374, 0.881) were obtained, indicating that the higher the level of working at an excavated sites by workers, the higher the chance that workers would continue working and use it. For the other situations, there is statistically insignificant correlations the other situations " how risky the situation and how do you find this situation " for these dependent variables.

A. Roofs

Table (5) shows that the third factor "working on roofs" , has statistically significant correlations (using the standard alpha level of 0.05) for the two dependent variables" Working on fragile roof without crawling boards " and " Working on roof in bad weather". These situations were perceived to be either never or always. The positive value of the B coefficient (B=1.882, 1.064) were obtained, indicating that the higher the level of working on roofs by workers, the higher the chance that workers would continue working and use it.

It's also shown that for the dependent variable "Working on fragile roof without crawling boards", the third factor "working on roofs" , has statistically significant correlations for "how risky the situation". The positive value of the B coefficient (B=1.586) was obtained, indicating that the higher the level of working on roofs by workers, the higher the chance that workers will find it risky and would continue working and use it. In addition, For the other situations, there is statistically insignificant correlations the other situations " How risky the situation and how do you find this situation " for these dependent variables.

B. Cutting & Welding

Table (5) shows that the fourth factor "cutting or welding machines", has statistically significant correlations (using the standard alpha level of 0.05) for the two dependent variables "There is no PPE of safety during the cutting and welding works" and "The execution of the cutting and welding in crowded areas workers". These situations where was perceived to be either never or always. The positive value of the B coefficient (B=1.647, 2.188) were obtained, indicating that the higher the level of cutting or welding machines by workers, the higher the chance that workers would continue working and use it.

It's also shown that for the dependent variable "The execution of the cutting and welding in crowded areas workers", the fourth factor "cutting or welding machines", has statistically significant correlations for "how risky the situation". The positive value of the B coefficient (B=0.693) was

obtained, indicating that the higher the level of cutting or welding machines by workers, the higher the chance that workers will find it risky and would continue working and use it.

In addition, for the other situations, there is statistically insignificant correlations the other situations "How risky the situation and How do you find this situation" for these dependent variables.

Table 5: Logistic regression results of workers attitude and perceptions

Dependent Variable	How risky the situation			How do you find this situation			What will you do if happened		
	B	Wald	P-value	B	Wald	P-value	B	Wald	P-value
A. Scaffolding									
Working with the scaffold is not totally boarded	-0.223	0.234	0.628	-0.364	0.931	0.335	0.366	0.868	0.351
Accessing scaffolds by climbing up or down	0.009	0.000	0.984	1.385	10.961	**0.001***	0.195	0.258	0.612
B. Excavation									
The excavation is very deep within no any protections shutters	0.024	0.004	0.947	0.499	2.508	**0.113**	2.374	18.850	<0.0001*
The excavation level is near to water table	-0.462	1.830	0.176	-0.212	0.398	**0.528**	0.881	5.666	0.017*
C. Roofs									
Working on fragile roof without crawling boards	1.586	20.037	<0.0001*	-0.233	0.433	**0.510**	1.882	11.712	0.001*
Working on roof in bad weather	0.393	1.320	0.251	0.285	0.657	**0.418**	1.064	6.814	0.009*
D. Cutting & Welding									
There is no PPE of safety during the cutting and welding works	0.304	0.650	0.420	-0.061	0.041	**0.840**	1.647	19.897	<0.0001*
The execution of the cutting and welding in crowded areas workers	0.693	4.988	0.026*	0.034	0.012	**0.912**	2.188	21.932	<0.0001*

V. Conclusions and Recommendations

From previous results, it is concluded that workers' attitude towards safety is influenced by their perception of risk and type of work. The behavioral situations showed that more than one-third of workers had a bad degree of risk awareness. They find that working with some degree of risk exciting.

These results are not surprising as the workers have not received any safety training. It is recommended that a comprehensive training program must be conducted to raise safety culture and safety awareness of construction workers. Furthermore, strict safety procedures must be applied in the workplace. All related parties to construction industry must share responsibility to maintain good working relationships to prevent accidents and enhance the ability to identify hazards.

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