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Scaffolding accidents Relative Rumaila oil field

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Abstract: - Scaffold-related fatalities are among the most common causes of death on construction sites. Therefore, the goal of this research is to examine, from the perspectives of safety personnel, the most common triggers for accidents involving scaffolding on construction sites. Data for this study was gathered through the administration of questionnaires to site safety workers in the Rumaila oil field. The Relative Importance Index (RII) and SPSS were used to examine the data. This study's results provide Scaffold workers on construction sites most frequently suffered from falls owing to tripping or falling, being struck by an object, or becoming entangled in or between two objects, according to the data collected. Further analysis of the data revealed that unsafe behavior and settings were the primary causes of scaffolding accidents. Disassembly, physical handling, and erecting were proven to be the most dangerous times on a scaffold. Where it is recommended to provide special training for scaffolding works in terms of dismantling and assembling and providing full awareness to the staff.

Keywords: construction, accidents, scaffolding, Rumaila, safety.

I. INTRODUCTION

Due to factors including constant shifts in project sites and conditions, the construction sector is widely regarded as one of the most exciting and innovative in the world[1]. Scaffolding, a vital part of any building site, is a useful equipment. The Occupational Safety and Health Administration (OSHA)[2] more than 2 million, or around 65%, of all building sites reportedly make use of scaffolding, Scaffolding's primary function is to provide support for builders working in inaccessible or hazardous locations or at great heights. scaffolding offers a safe space for personnel to do their jobs and allows them to access regions they wouldn't be able to go to otherwise[3]. Scaffolding provides safe and easy access to work areas for workers (Whenever a temporary platform or ramp is required to facilitate the transportation of building materials and equipment, we refer to this as "scaffolding.")[4] Scaffolding is used for a wide variety of purposes, each of which carries with it the potential for injury to workers or the collapse of scaffolding when it is moved to a location other than a construction site [3][5][6]. There are two possible causes of accidents involving scaffolding: falls from the scaffolding or collapse of the scaffolding [7]. To ensure worker safety, scaffolds are always constructed from uniform, modular components made of metal, wood, or bamboo and joined together to form an attractive and functional whole. The dangers of employing this approach, however, are growing as building efforts expand around the world. Incidents involving people falling from great heights are common and steadily rising in frequency. Construction site fatalities account for over 40% of all accidents, and 75% of these deaths are caused by falls from scaffolding and other elevated work platforms [8][9]. scaffolding accidents account for an estimated 52 annual deaths and 10,000 annual injuries, making them the second largest cause of death by accident due to collapse or fall from height. Factors such as subcontracting, bad weather, natural and man-made disasters, a lack of trained personnel, high employee turnover, and the accumulation of unnecessary gain over the provision of best materials for construction are all common in the construction industry and contribute to the prevalence of accidents. Salminen found that these issues impacted construction workers' health and safety. Some expert studies suggest that mistakes made by workers during construction are a greater contributor to building collapses than mistakes made during the planning and design stages [10] The most common reasons for scaffold collapse were found to be lack of proper construction anchoring (28%), Excessive load on the structure (25%), Defective parts (13%), Temporary Excessive Load on the Structure (7%), Inadequate Bracing (9%), and Other (12%) [11]

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II. METHODOLOGY

During this phase, we consulted with British Petroleum and Kent company safety specialists to determine which questions were most important to ask, where the questionnaire could be improved, and where additional comments should be added. Over 125 people were surveyed and 116 responses were tallied to find out what factors led to scaffolding mishaps in the Rumaila oil field. Scaffolding professionals such as site managers, foremen, safety officers, workers, foremen in charge of scaffolding crews, and quality assurance inspectors were polled. the data was analyzed using the relative importance index method to rank the hazards in order of importance and to

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describe the reasons for this ranking using SPSS (Statistical Package for the Social Sciences) version 24 as the statistical tool.

III. Reliability and Validity

Cronbach's alpha approach is used to examine the reliability (α) of the questionnaire findings using equations (1), in which the typical value of Cronbach's coefficient (alpha) falls somewhere between (0.0) and (1.0). When Alpha is near to 1, it indicates that the data have a high degree of internal consistency. [12]. The formula that determines alpha is fairly simple and makes use of the items (variables), k, in the scale and the average of the inter-item correlations, r:

$$\alpha = \frac{k\,r}{1+(k-1)r} \qquad (1)$$

In most cases, the Alpha coefficient gives us a passing grade; we can use this technique to evaluate the continuity of one paragraph's performance relative to another, and we may use it to extract stability based on the results of that evaluation. Because this equation reflects the internal consistency of paragraphs, alpha value was 0.813 within acceptable bounds, with sufficient dependability, for inclusion in the analysis of the questionnaire data.

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IV. Relative Important Index

According to [13], meaning of the relative importance index (RII) technique is used to identify the relativity relevance of the various risk sources, and this may be used to compute relative importance. we utilize the five-point Likert scale on which responses can vary from 0 (not important) to 5 (extremely important) to calculate relative importance indices (RII) for every component of the survey.

RII = Σ W/ (A * N)

where:

W - weighting sum for each characteristic.

A - top ranked (we used 5 here).

N - total of respondents for this feature.

V. Results and Discussion

A. Types of Accidents

The opinions of the respondents are displayed in Table 1 below and figure 1. With a RII of 0.4259, 8.6 percent of respondents believe that slips, trips, and falls incidents are frequent, while 6.8 percent believe that scaffold collapse incidents are frequent with RII 0.3862, 6% believe that caught in/between objects incidents are very frequent with RII 0.3741, and 46.5% believe that falling from heights incidents are very frequent with a RII 0.8068. An overwhelming majority of respondents (74.1%), believe that struck by/hit by objects accidents never occur on construction sites with RII 0.3. According to [14]the most common causes of injury on scaffolds are slips, trips, and falls. and being hit or struck by an object is the rarest hazard faced by scaffold workers. It is important to note that majority of the respondents strongly disagree that scaffold collapse affect scaffold workers.

TABLE I
Type of Accidents

Type of Accident	RII	Rank
Falling from height	0.8069	1
Slips, trips	0.4259	2
Scaffold collapse	0.3862	3
Caught in /between objects	0.3741	4
Struck by / hit by objects	0.3	5

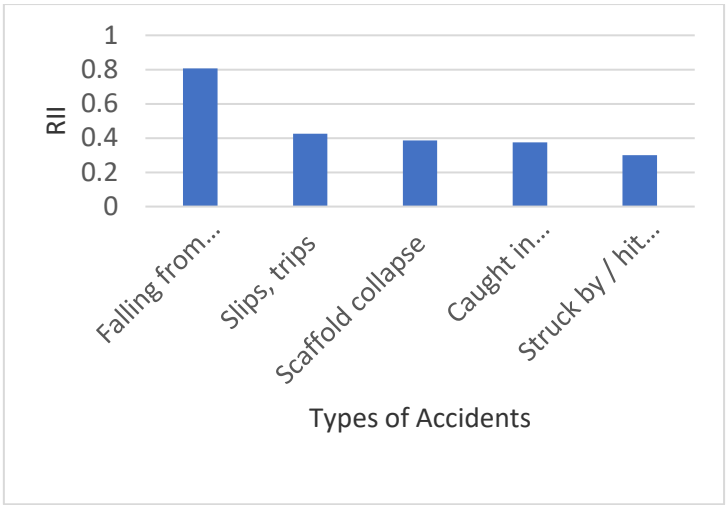

Fig. 1 type of accident

B. CAUSES OF ACCIDENTS

The opinions of those who participated are displayed in Table 2 and figure 2. (59.4%) of respondents strongly agree that unsafe conditions contribute to scaffold construction accidents with a relative importance index (RII) of 0.8603; (44.8%) of respondents strongly agree that unsafe acts contribute to scaffold construction accidents with a RII of 0.8086; however, only (6%) of respondents strongly agree that job contribute to the accidents with a RII of 0.3758; and (4.3%) strongly agree that personal factors contribute to the scaffold construction accidents with RII 0.3758. This conforms to the results that dangerous behavior and unsafe environments are primary causes of industrial accidents [15]. It seems that individuals are the least contributing component in scaffolding mishaps. Since accidents can happen for a variety of reasons and result in varying degrees of injury, it's crucial that all potential sources of construction accidents be taken seriously in order to foreclose the possibility of future mishaps.

TABLE II
CAUSES OF ACCIDENT

CAUSES OF ACCIDENTS	RII	RANK
UNSAFE CONDITIONS	0.8603	1
UNSAFE ACTS	0.8086	2
JOB FACTORS	0.3758	3
PERSONAL FACTORS	0.3758	3

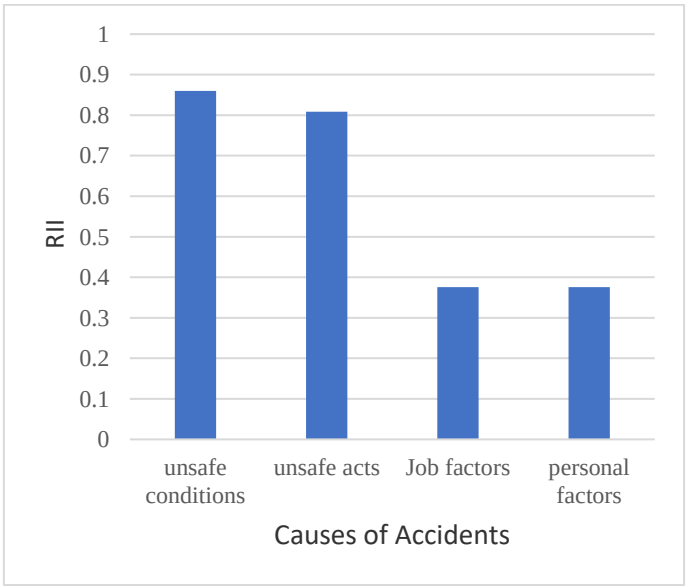

Fig. 2 causes of accident

C. ACTIVITIES OF SCAFFOLDING ACCIDENT

Both table 3 and figure 3 show how respondents' views. Dismantling scaffolding is associated with the highest rate of injury incidence (RII) (0.7620), followed by physical handling (20.6%) and stacking/storage (11.2%). Forty-five percent of respondents are in agreement that dismantling scaffolding is associated with the highest rate

of injury incidence. Among those polled, 10.3 percent are in agreement that accidents are more likely to occur during scaffold building (RII = 0.4551), while 6.8 percent hold the same view regarding scaffold alterations (RII = 0.4327). According to the National access and scaffolding confederation [15], the rate of injuries from manual handling has increased by about 15% in the last decade. The scaffolding workers' material-handling methods are likely to be severely tested by this increase. More people believe that accidents on scaffolds occur most often when people are tearing down and re-building them. As a result, it can be deduced that scaffold workers spend the vast majority of their time performing tasks related to the handling of goods. During both the dismantling and the alterations to the scaffolding, personnel need to handle the scaffolding components in order to do their jobs safely and effectively.

TABLE III

ACTIVITIES OF SCAFFOLDING ACCIDENT

Activities of Scaffolding Accident	**RII**	**Rank**
Dismantling of scaffolding	0.7620	1
Scaffolding manual handling	0.4913	2
Erection of scaffolding	0.4551	3
Modification of scaffolding	0.4327	4
Stacking and storage of scaffolding	0.4155	5

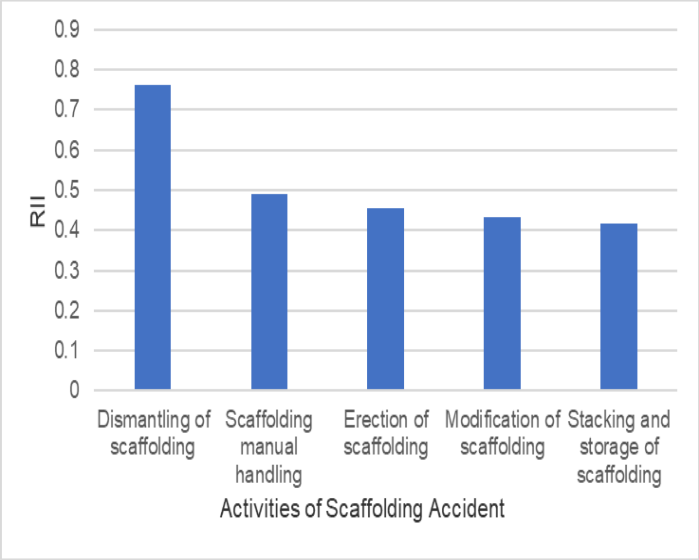

Fig. 3 activities of scaffolding accident

D. Scaffolding Workers accidents

Both table 4 and figure 4 show, 60.3% of respondents are in agreement that scaffold laborers are most affected by accidents (RII = 0.8879), 10.3% are in agreement that scaffold erectors/fixers are most affected by accidents (RI = 0.4275), 4.3% are in agreement that scaffold team leaders/charge hands are most affected by accidents (RI = 0.4155), and 5.1% are in agreement that scaffold inspectors are most affected by accidents (RI = 0.3689). According to [14] the majority of scaffolding incidents were the result of basic scaffolding workers, while advanced scaffolders and supervisors each accounted for 7%. Inspectors working on scaffolding are the least likely to be injured in an incident. Scaffolding is not something that inspectors set up, alter, or take down. As a result, it is safe to infer that their exposure is lower than that of scaffold erectors, charge hands, and workers. According to the vast majority of respondents, scaffold accidents mostly impact scaffold workers. Scaffolds can't be set up, altered, or taken down by scaffold workers.

TABLE IV

SCAFFOLDING WORKERS ACCIDENT

Scaffolding Workers accidents	**RII**	**Rank**
scaffold laborers	0.8879	1

scaffold erectors/fixers	0.4275	2
team leaders/charge hands	0.4155	3
scaffold inspectors	0.3689	4

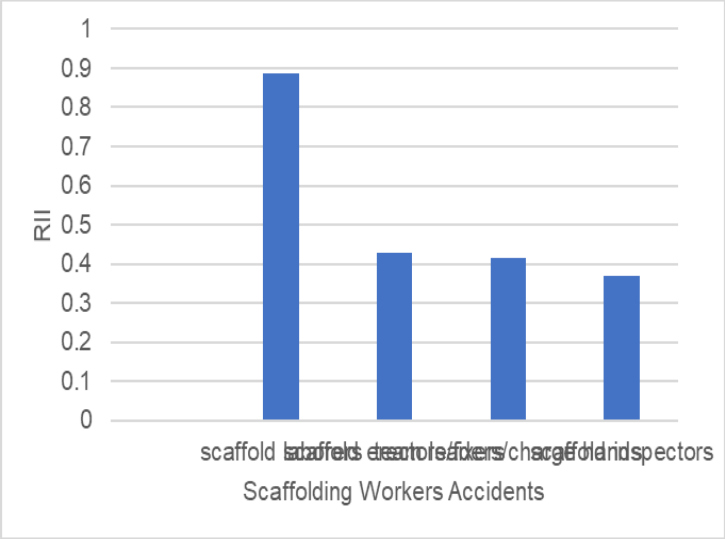

Fig. 4 scaffolding workers accident

VI CONCLUSION

The Analyzing of the collected data is vital for gaining insight into the nature of the dangers posed by scaffolding and for verifying the most significant contributor to construction site fatalities and injuries. Scaffolding workers, scaffolding falls, risky working conditions, and unsafe acts all come to mind. risks on scaffolding-using construction sites are categorized according to their frequency, severity, location, and who is at risk. Using the four groups of factors-the types of accidents, their causes, the activities that lead to them, and the Scaffolding Workers themselves-that have been identified. Accidents on scaffolds are most commonly caused by falls from great heights. Unsafe environments and dangerous behavior were identified as primary contributors. Unsafe dismantling of scaffolding by workers is a leading cause of accidents involving scaffolding.

The following suggestions should be considered by businesses and federal/state OSHA agencies:

A. 1 greater emphasis should be placed on safety for all parties involved in the building industry by government bodies charged with enforcing occupational safety and health.

B. The contractors are required to take courses on safety and health regulations, particularly those that pertain to scaffolding. The ability to foresee and pinpoint the origins of potential accidents on the job site is a direct result of this.

C. Workers who will be doing the actual work on the site are the best source of knowledge for the safety management team, since they will have firsthand experience with the potential hazards that will be present whenever scaffolding is used.

D. It is everyone's responsibility, regardless of their position, to ensure the workplace adheres to all applicable safety and health regulations. Hence, in order to increase the degree of safety and health on the building site, consultation, cooperation, and engagement of workers and employers are required.

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