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Safety improvement on building construction sites in Qatar

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Abstract

The construction industry is an essential national backbone, especially for developing countries. Poor project performance and lack of construction control could have long-reaching detrimental effects on slowing down the country's development pace and on impacting the prosperity of its citizens. The State of Qatar is currently experiencing an unprecedented rate of economic growth and urban development. As the host of the FIFA World Cup in 2022, Qatar plans to invest over \$40 billion in infrastructure projects in preparation of such a significant event. The plan includes a new airport, metro system, high-speed rail, and addition of 40,000 hotel rooms. Such an explosive boom has raised concerns about the construction industry, especially regarding its health and safety problems. Qatar National Provisional Safety Committee prepared a safety guide for construction work. The aim of the guide is to ensure worker safety and mandates that contractors, owners, and consultants abide by the established safety rules. The purpose of this study is to: 1) identify safety issues in Qatari jobsites, and 2) use risk management techniques to minimize the impacts of the risk factors. The risk management process consists of risk identification, risk assessment, risk response and risk control. In risk identification, 38 safety risk factors related to Qatari building construction sites were compiled based on an extensive literature review and recommendations of safety experts. The risk assessment was addressed through safety questionnaires to rank the risk factors in order to guide the application of risk management. Safety personnel were included in the data collection. After analyzing the questionnaires, the risk factors were ranked as low, moderate, and severe based on their degree potential impact. To address the risk response, interviews with safety experts were conducted to determine mitigation measures. These measures include: 1) developing comprehensive safety plans, 2) clearly defining the role of managers, supervisors, and employees in safety implementation and 3) teaming up managers and workers to accomplish the safety objectives.

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1. Introduction

The construction industry is perceived as a pillar industry in national economies. Construction projects encounter significant risks and uncertainties in term of safety, cost, time, and quality. These risks threaten the successful completion of these projects, slow the pace of development, and could impact the whole society.

The construction industry, however, is recognized as the one of the most hazardous industries [1]. The construction industry is also well known for its safety challenges [2]. The harsh work environment and the high workforce turnover negatively impact jobsite safety [3]. The work environment features high intensity of physical work, constantly changing site conditions, and less formally defined construction processes [4]. Its labor-equipment intensive nature places workers in harm's way. It is common that multiple trades work in the same area and therefore creates congestion and possible lack of coordination that could affect the safety of individual workers. All these factors dramatically increase the work-related injuries and fatalities. Site injuries and fatalities do not only bring suffering to the workers and their families, but also cause project delays and additional costs due to loss of productivity, disrupted schedules, and accident investigation and reporting.

In preparation to host the 2022 FIFA World Cup in Qatar, more than \$40 billion in infrastructure projects are planned. This includes a new airport, a metro system, a high-speed rail network, and 40,000 more hotel rooms. It is estimated that 500,000 construction workers are currently in the country. Additional thousands of workers are likely to arrive as mega infrastructure projects are launched [5]. Such a huge construction boom raises concerns about workers safety. Similar to other developing countries, Qatar is experiencing high percentage of construction-related injuries and fatalities. Since 2012, almost 900 worker deaths were reported in Qatari infrastructure construction projects. The International Trade Union Confederation [6] stated that if the conditions did not get any better, at least 4,000 construction workers fatality are expected by the time the World Cup kicks off. This situation has recently raised many concerns about the construction industry health and safety problems. Several governmental agencies are currently monitoring and regulating work safety in their respective area of interest. The National Provisional Safety Committee prepared a safety guide for construction workers. The objective of the guide is to ensure worker safety by mandating that contractors, owners, and consultants abide by its safety rules. The purpose of this study is to identify the factors affecting safety in Qatari construction sites.

2. Objectives and Methodology

2.1. Objectives

The objectives of the paper are to: 1) investigate the factors affecting the safety in Qatari building construction sites and 2) apply risk management process to reduce risk factor and improve safety on Qatari building construction sites.

2.2. Methodology

A literature review was carried out to identify the safety risk factors on Qatari construction sites. Safety experts in Qatari building projects were consulted to refine these safety risk factors. A survey was also designed and distributed to safety experts in building construction projects. The purpose of the questionnaire was to acquire safety data from respondents actively involved in Qatari building construction. Data was collected and analyzed. Risk factors were assessed and then risk factors were classified according to severity.

3. Risk Factor Identification

The risk factors that affect the safety in Qatari construction projects were obtained from: 1) available reports and literature, and 2) interviews with safety experts in Qatari building construction. The risk factors identified by Farooqui [7], Yung [8], and Tabtabai [9] were used to select the risk factors affecting Qatari construction sites. Sixty two risk factors were identified at the onset. Similar risk factors were then merged based on the suggestions made by safety

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