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The Effect of Labor on Construction Performance in Crisis Situations

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ABSTRACT

As one of the key factors in the construction industry, labor has a significant impact on the performance of projects, especially in crisis situations where the industry faces numerous challenges. This paper examines the effect of labor force on construction performance in crisis situations and analyzes the factors affecting this relationship. In this regard, challenges such as the reduction of the workforce, changes in skills and abilities, and the psychological pressures caused by crises are examined. Also, the role of the workforce in crisis management and adaptation to new conditions is also considered. The results of this study show that investing in training and developing the skills of the workforce, improving working conditions, and creating supportive environments can help increase the efficiency and effectiveness of construction projects. This paper seeks to improve the status of the construction industry and strengthen its resilience to future challenges by providing practical suggestions to improve construction performance in the face of crises.

Introduction

Construction performance, as one of the fundamental pillars of any country's economic and social development, is influenced by several factors. In critical situations, such as economic, natural, or health crises, these effects increase significantly[1]. One of the most important factors affecting construction performance in these conditions is labor. Labor is not only recognized as the main source of production and implementation of construction projectsRather, it plays a key role in managing crises and maintaining continuity of activities. In crisis situations, challenges such as reduced workforce, changes in skills and abilities, as well as psychological pressures caused by unpredictable situations can significantly affect construction performance[2]. On the other hand, a workforce with flexibility and the ability to adapt to new conditions can help mitigate the negative effects of crises and improve the performance of construction projects. Considering the importance of these issues, people's minds may be preoccupied with the question of why many buildings were destroyed in critical conditions such as earthquakes, floods, etc. Although most of the research after each earthquake focuses on the lack of proper design and materials, and little attention has been paid to unskilled workers in the construction sector, it seems that human resources, especially in the field of skilled labor, play a critical role in the quality of construction projects. And urban development, the useful life of the building in Iran is about 20-30 years, while in the case of developed countries, this figure is estimated to be about 80-100 years. This study examines the impact of labor force on construction performance in crisis situations and seeks to provide insights to improve the status of the construction industry in the face of various challenges by analyzing the effective factors and providing appropriate solutions. The main purpose of this study is to identify the strengths and weaknesses of the workforce in critical situations and to provide suggestions for the optimal use of this valuable resource in order to increase the efficiency and effectiveness of construction projects.

2- Theoretical foundations

- **Human Resource Management**

Human resource management has been broadly defined as the area of specialized and professional performance and organizational activity, and it remains a complex and ambiguous symbol that is variously interpreted and interpreted by researchers and practitioners in different positions. Sloat et al. have defined human resource management as covering tasks and functions that are primarily related to training, career development, organizational development, and research and development. In addition, other tasks of organizational human resources are to nurture learning capacity at all levels of the organization to integrate the culture of learning with strategy and promote organizational efforts to achieve high-quality performance. On the other hand, human resource management can be conceptualized as all those activities that seek to facilitate all forms of learning and development at all levels of the organization. Human resources has been considered as a concept of strategic contribution to an institution since 1990. To some extent, the degree of progress and training of human resources is a strategic component of the program of how to determine and perceive the value of human resources and how to develop it to become an important area of research in the strategic management of an institution. Project HR management includes organizational planning, employee charge, and team development. However, training and motivation are two main components of team development and development practices. In fact, the focus is on research methods and tactics of motivation and training that are beneficial to the construction workforce.

- **Training**

In the traditional model of on-the-job training, which promotes new practices, workers typically receive a pre-prepared course on new regulations, methods, or processes (often at a different location in their workplace) and are expected to apply this abstract knowledge to their workplace later. In-service experience and training are probably the most common methods of employee development and advancement that have been used at all levels of the organization, where the organization employs a large number of builders, carpenters, plumbers, fittings workers, skilled welders, etc. [7]. Common in-service methods include job rotation and alternate assignment. Job rotation involves common lateral transfers that force employees to work in different jobs. Both job rotation and alternate assignment are used to learn skills and techniques. Problem-solving and social skills are effectively acquired through training that is acquired outside of work. And there are a number of off-the-job training methods that managers may want to make accessible to employees. The most common methods are classroom lectures, videos, and simulation exercises. Classroom lectures are well-suited for conveying specific information. They can be used effectively to develop problem-solving and technical skills. Videos can also be used to explicitly demonstrate technical skills. Table 1 presents a comparison between on-the-job and off-the-job training and shows the main parts as the differences between the two methods of training. See the reference for more details on on-the-job and off-the-job training.

Table 1: Off-the-job training vs. on-the-job training

On-the-job training	Off-the-job training	Goal
e work is done.	rn basic skills and facts	**phasis on knowledge**
velopment of "Best Practices"	ow	**pics/Issues and Problems**
namic, pragmatic, located	tic, General, Meaningless	**rning Area**
sed and embedded in the working condition	en by the Curriculum st-class people	
ividuals, groups and organizations		

- **Purpose & Motivation**

Purpose and motivation may be defined as "the characteristic of an individual's willingness and desire to apply efforts toward a particular set of behaviors." In the educational context, motivation can influence an employee's willingness to attend a training program to apply energy to the program and apply what they teach about the job in the program. Therefore, it is likely that trainees cannot achieve the full benefits of education without considering the educational motivation. Reviews conducted by Cheng and Hu over the past decade have concluded that motivation and training affect trainees' educational performance and convey results. Colquitt et al. have suggested that even if trainees have the ability to learn the content of a course[10], they may fail to benefit from training due to low motivation. The key to motivating employees is to find the right ways to meet their needs. Each person has different needs. These needs can be divided into several main categories: employee engagement, team recognition and belonging. For employee engagement, many employees are motivated when they feel empowered and feel that their contribution is important to the company's success. When employees feel empowered in this way, they will work in ways that meet not only their own needs, but also the needs of the company as a whole. In order to encourage employee participation, managers have recommended the use of a system that identifies and rewards workers who do their jobs well. Construction

workers, for example, can receive a good financial tip to identify ways to improve the quality of the factory's financial performance. Finally, team belonging is another powerful motivator in construction workers. According to Barrett, workers feel more motivated where they are free to make suggestions and feel that they belong to the team [12-13]. Because the feeling of being part of a group is one of the basic needs of the human spirit, Nissan and Holt note that teams are especially motivated when they are given the opportunity to "manage." These conditions allow the participation of the members of the group [14]. While the group as a whole has increased responsibility for decision-making, a related issue is the promotion of good relations among all members of the organization, accordingly, the success of a construction organization largely depends on the quality and morale of its people. Therefore, human and human capital is becoming the most important wealth of an organization, provided that they are adequately nurtured and adequately develop and expand their potential.

3- Research Method

This study investigates the effect of labor force on construction performance in critical conditions and to achieve the research objectives, a combined approach including qualitative and quantitative methods is used. The main stages of this research are as follows:

1. Statistical population and sampling:

- The statistical population of this study includes contractors, project managers, engineers, and workers active in the construction industry.

- Sampling is done randomly and purposefully to collect the necessary diversity in data and opinions.

2. Data Collection:

- Quantitative method: To collect quantitative data, standardized questionnaires are used, which include questions about workforce characteristics (e.g., skills, experience, working conditions) and project performance. Questionnaires are distributed online and in person.

3. Data Analysis:

- Quantitative data are analyzed using SPSS statistical software . Regression correlation tests are used to investigate the relationships between labor variables and project performance.

4. Analyze the results:

- Results obtained from both quantitative and qualitative methods are combined to provide a comprehensive picture of the impact of labor on construction performance in crisis situations.

5. Conclusion and Suggestions:

- Finally, based on the results, conclusions will be made about the impact of labor on the performance of construction projects in crisis situations, and suggestions will be made to improve the situation of the labor force in this industry. This methodology allows us to comprehensively and accurately examine the various impacts of labor on construction performance in crisis situations.

4- Data analysis

Most construction projects and projects are highly dependent on the workforce and human

resource management that is working there. There are many different types of human resources working on construction projects, such as engineers, project managers, consultants, architects, and the workforce. But this research emphasizes the role of skilled workers andthe ways in which companies and governments can train them. Most of the negotiations, researches, and studies that take place after an earthquake sometimes occur in another incident. Unfortunately, with the passage of time, many issues are forgotten. Previous research shows that many of the damages to buildings during an earthquake are due to the poor quality of the structure, which can be due to lack of supervision. Enough, low quality of materials, unskilled labor, etc. In many cases, the destruction of buildings during the Bojnord, Ardabil, Jam, etc. earthquakes in Iran has been mainly caused by unskilled labor.

Considering the above discussion, it seems necessary to investigate the lack of skilled workers in construction projects in different parts of Iran. In turn, this research focuses on the unskilled workforce, the methods, barriers, and the practical solution to their training.

The research findings will be discussed as mentioned above. First of all, the study describes the respondents' organizational background and occupations, as all analyses were based on the respondents' qualifications.

As mentioned earlier, the companies examined in this study were divided into four categories: governmental, semi-governmental, private, and others. In contrast, 17.3% were in state-owned enterprises. 1.9% were in semi-governmental enterprises and the remaining 3.8% were in other sectors. In addition, most of the respondents (43.6%) were in contracting companies, 23.6% were developers, 20% were consultants, 12.7% were project management companies. The results show that most of the respondents in this study were supervisors who were directly related to construction workers.

The respondents to the surveys of this study were mainly contractors of private companies with different building classifications such as residential buildings (21%), commercial (23%), forced (27%). According to Figure 1, according to the percentage of different types of labor in construction projects on any given day, skilled labor constitutes only 20% of construction workers in Mashhad. In contrast, 50% of the workforce was unskilled and 20% was semi-skilled. This means that most of the workers employed in construction projects were unskilled.

- **Types of Workforce**

During the research, respondents were asked about their plans for job training. The findings show that the majority of the companies were as follows: 26.5% of the companies had specific training programs and courses for their workforce, and 73.5% stated that there was no specific training course or program in this regard. It has sent some of the workforce to the training centers of the construction industry and has equipped the supervisors to train some of the workforce during construction.

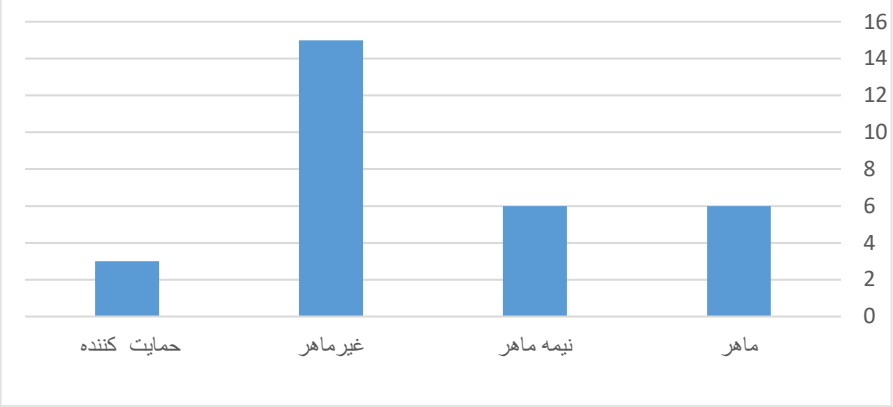

Figure 1: The type of workforce in the construction project

The question that may arise is why companies don't have an integrated training program for their workers? According to the respondents' responses, some of the main problems and obstacles to having an integrated training program for employees and workers are as follows: high cost of construction training courses, financial problems, short-term contracts of workers and a large number and variety of construction learning tips, low level of workforce education, lack of motivation among employees for training, inappropriate relationships between contractor or customer and workforce, On the other hand, some of the barriers to job training point to the personal problems of the workers themselves. Some of the critical problems of Iranian workers are low level of education, low income, lack of motivation, and family conflicts. This graph shows that 26.8% of the respondents believe that the low level of education of the workforce is the most important obstacle to their training, as well as low income (25%), lack of motivation (21.4%), family conflicts (17%), and other important barriers were in line with the respondents' view. The public sector and little control by governments that use skilled and unskilled labor in projects. Unfortunately, workers' incomes are low, and they often have high-cost, well-funded families. For this reason, they face many family problems, such as their children's education, sports, recreation, and addiction. All of the obstacles listed above are due to companies not being able to play an important role in workforce training.

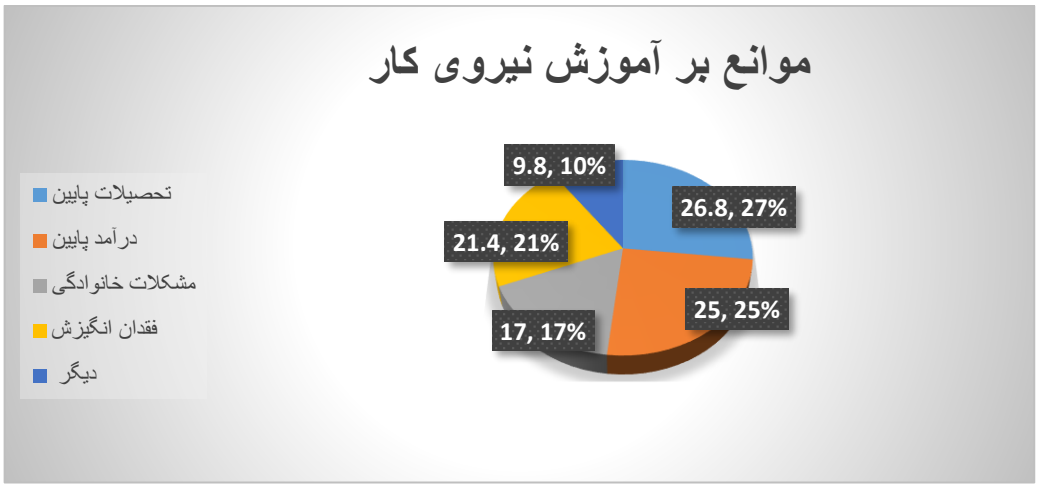

Figure 2: Percentage of Barriers to Workforce Training

According to the respondents, the determination of the types of damages was delayed, and the cost of the projects increased (additional costs) and the quality of construction decreased.

Chapter 2: The Importance of Skilled Labor in the Field of Labor

mulative Percentage	lid Percentage	·centage	undance	
				lled Workforce Efficiency edit ree with all
1				reeable
7	5	4		sentee voting
2	5			ponents
)	2	5		ponents of all
	)	8		tal
				st System
		)		tal

The results also showed that about 56% of the projects were faced with low quality of construction, which is due to the use of unskilled labor. This shows that many of the construction projects in these studies have a low quality of construction that is created by outsourcing the work to an inexperienced workforce. The following phrase indicates other issues and problems that projects face in this regard:

- **Additional Project Costs**

Research states that 77 percent of projects faced financial difficulties due to the use of unskilled labor, while 23 percent of other projects that outsourced their work to skilled labor had less additional costs. This suggests that skilled labor plays an important role in reducing additional costs on construction projects. According to respondents, often the additional costs of projects are related to activities and rework due to a workforce that is not sufficiently skilled.

- **Delays and postponements**

Respondents' statements show that 36.5% of projects face delays and delays, while 63.5% of them do not have any delays related to unskilled workforce. This states that unskilled labor has little effect on project procrastination.

- **Other Damages and Injuries**

About 94.2% of the respondents believed that their projects had not suffered any other damages. In summary, these findings suggest that construction projects were faced with two main problems, poor quality and additional construction costs, which are due to the use of unskilled labor.

5- Findings

According to Qili districts, one of the main problems that most construction projects faced in crisis situations is the lack of specialized personnel. As mentioned earlier, companies face many obstacles and problems in training their employees and workers, although most of the respondents pointed to the government as the main reason for these problems. For example, companies can create a friendly environment where managers, employees, and workers can discuss and learn from each other. This will create a work environment that influences the

creativity and initiative and personal commitment of the employees. In the same way, it (the work environment) uses incentives such as participation, knowledge of employees, and team belonging to motivate employees and workers, introducing and recommending specialized centers to their workers and encouraging them to participate in those courses.

The need for effective training is another important factor in implementing human resource management in construction projects. Managers also need to develop and develop methods that evaluate the performance of their employees. As stated by Nissan and Holt, a "performance appraisal" system is needed to monitor improvement and progress (or lack thereof) among construction teams. In addition, governments can play an important role in increasing the quality of construction projects by improving training methods and providing suitable facilities for the workforce to encourage them to participate in training courses.

Research has shown that some of the main problems faced by Iranian project workers are low levels of education, low income, lack of motivation, and family conflicts. The government plays an important role in improving the situation by enacting new laws and regulations to support the workforce. Some of the efforts that governmentscan employ are as follows: Increasing social security, paying for their living expenses, requiring companies to use the workforce by issuing employment suitability certificates, social security, etc. Also, educational institutions, in both the public and private sectors, should be developed and expanded by the government. Some of the useful methods that can be used by educational organizations to train construction workers are as follows:

1) Short-term training courses in fixed centres (off-work training): In this case, the government should provide facilities for the workers to pay their essential living expenses. Often they face a lot of problems and problems, and without this motivation, they are not motivated to learn.

2) Sending instructors to construction sites (on-the-job or on-the-job training): So far, training and development have largely been limited to environmental and regional efforts. In addition, emphasis should be placed on domestic education and greater use of foreign courses. This method is less expensive than the previous one. In this case, educational organizations send instructors to construction sites and provide in-service training as facilities.

3) Self-learning and participation in standardized tests: There is a greater need for motivation than other methods. In this regard, the government can use effective incentives such as increasing the wages of the workforce with technical and vocational certificates or the need of companies by entrusting the work to skilled workers. The workforce can learn independently and create a survey to assess their abilities.

6- Conclusion

Labor, as one of the fundamental pillars of the construction industry, plays a vital role in the success and efficiency of projects. In crisis situations, several challenges such as labor shortages, changes in skills, and psychological pressures can significantly affect the performance of projects. The research showed that investing in training and developing workforce skills, improving working conditions, and creating supportive environments, It can help to increase the efficiency and effectiveness of construction projects. Therefore, some of the main results found by this research are as follows:

- Many of the workforce have low levels of education, low incomes, lack of motivation, and family problems.

- The government, by enacting new laws and regulations to support the workforce, can play an important role in improving the working situation. Some of the efforts that could be implemented by governments include increasing social security, paying for some living expenses, requiring companies to use the workforce by issuing appropriate certificates of employment in projects, and social security insurance.
- Educational institutions should be developed and expanded in both the private and public sectors.
- A friendly environment should be created through managers, employees, workers who can discuss with each other, and where learning takes place.
- Awork environment should be created that influences personal commitment, initiative, and creativity of employees.
- The use of incentives such as employee recognition and participation and team belonging is used to motivate employees and workers.

In addition, the results show that the quality of construction projects has a strong correlation with workforce training in human resource management practices. Ultimately, it is hoped that these studies will make governments, companies, and crisis managers aware of the consequences of poor construction quality and the lack of skilled workers in different parts of Iran, and guide them to develop the right methods. They work to prevent social damage and harm.

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