

Risk Management for Health and Safety in Construction Industry of Pakistan



Final Year Project UG 2019

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Risk Management for health and safety in the construction Industry of
Pakistan

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Has been accepted towards the requirements

for the award of Bachelor's degree

in

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Declaration

We certify that this research work titled “*Risk Management for health and safety in the construction Industry of Pakistan*” is our own work. The work has not been presented elsewhere for assessment. The material that has been used from other sources has been properly acknowledged / referred.

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*Dedicated to Our Project Advisor
Dr. Khurram Iqbal Ahmad Khan and
Group Leader Muhammad Ahmad.*

Abstract:

This study provides an insight about the risks affecting health and safety in construction industry of Pakistan and to develop framework to mitigate those risks. The basic purpose of health and safety is to protect stakeholders from hazards and accidents on jobsite. But there isn't any detailed framework or strategy to mitigate these risks. This study uses a research-based approach to collect the data and then the data is analyzed using an appropriate analysis method. The Health and Safety inspector can use the frameworks to avoid or mitigate major risks to create zero accident jobsite.

The rate of accidents, fatalities and injuries in the construction industry is more than any other profession due to which contractors must pay large amounts of compensation to the workers. These factors become the cause of unnecessary delays and increased cost of the overall project. Thus, health and safety in construction is in dire need of consideration.

The research is done by collecting data using web-based questionnaire and semi-structured interviews to gain insight into the problems and major risks to enhance the standards of health and safety, also to develop conceptual framework models to improve health and safety in construction industry.

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INTRODUCTION

1.1 BACKGROUND

An important factor in a country's social and economic development is the construction industry. In Pakistan, the construction sector contributes almost 2.74% of the country's GDP. According to (Zahoor et al., 2017)ⁱ, The construction industry in Pakistan employs more than four million people, provides 2.39% of the nation's GDP, and The construction industry in Pakistan has the highest ratio of workplace accidents to total employment. Despite advancements in technology, Pakistan's construction sector continues to rely on manual labor and antiquated practices. About 7% of workers worldwide are employed in the construction business, and 30–40% of all fatalities occur in that sector (Sunindijo et al., 2012)ⁱⁱ.

Construction is one of the riskiest industries in developing countries like Pakistan. Due to numerous dangers that have an impact on health and safety, the construction industry is dangerous. It also stressed the connection between occupational accidents and the prevalence of respiratory illnesses, stress-related disorders, and musculoskeletal illnesses among construction workers. In addition to the injuries, disabilities, and fatalities brought on by construction accidents, construction enterprises also suffer financial losses because of legal liability, project delays, and higher insurance rates. Additionally, unfavorable health and safety conditions can harm a construction company's credibility and reputation, which makes it harder for them to recruit and keep talented workers (Lingard et al., 2021).

Safety and health must always come first in the workplace. The adoption of health and safety regulations in the construction industry has several significant benefits. By lowering the risk of accidents, injuries, and fatalities, it helps to protect worker safety. Along with preserving people's physical health, this improves retention rates, work satisfaction, and staff morale. By lowering work interruptions due to illness or accidents, it boosts productivity and ensures that projects are completed on time and under budget. It lessens the financial strains that worker compensation

claims, medical expenses, and legal requirements have on construction businesses. Construction companies may improve their reputation, attract competent workforce, and boost client confidence in their ability to finish projects with the support of a strong health.

Therefore, the purpose of this study is to identify the risks that pose a threat to health and safety in the construction sector and to present a conceptual framework for reducing such hazards. The framework provided in this study can assist Pakistani construction companies in creating and implementing efficient health and safety programs.

1.2 PROBLEM STATEMENT

An essential factor in Pakistan's economic development and employment prospects is the building industry. Nevertheless, despite the existence of safety norms, procedures, and regulations, industry employees face challenging issues and pervasive threats that endanger their health and safety. These risk factors are to be identified, assessed in Pakistan's construction industry, and solutions to mitigate them are to be suggested. The study aims to achieve this by offering policymakers and stakeholders ideas on how to enhance safety and health procedures in industry.

Inadequate training, a lack of safety equipment, bad site conditions, and noncompliance with laws are a few of the issues that AFFECT health and safety. Accidents and injuries may be influenced by the pressure to fulfil deadlines and budgets as well as the absence of a safety culture.

The study will analyze current accident and injury data, survey workers, and interview government representatives and construction businesses to determine the dangers in Pakistan's construction industry. The study will recommend actions including enhancing safety training programs, providing safety equipment, enforcing safety laws, and encouraging a safety culture in the sector to reduce these risks. The study will also look at how government organizations can promote safety and how crucial it is to educate and raise stakeholders' knowledge of these issues. The overall goal of this study is to identify hazards to the health and safety of construction workers in Pakistan and to offer suggestions for enhancing safety procedures and regulations in the sector.

1.3 OBJECTIVES

The objectives of the study are explanations that make an interpretation of the vital point into lucid statements and work on their implementation. There are three major goals of this study:

- To identify the potential risks that affect health and safety in the construction

industry.

- To assess the importance of these risks affecting health and safety in the construction industry of Pakistan.
- To develop a risk mitigation framework for improved health and safety on construction sites.

1.4 RESEARCH METHOD

To effectively accomplish a predetermined study target especially designed for the construction business, this thesis uses a systematic strategy made up of a few processes, techniques, and procedures. We created frameworks to reduce those risks after conducting a thorough literature review to identify the risks that have an impact on health and safety. This was followed by content analysis, a question-and-answer survey to determine the importance of those risks in Pakistan's to assess the importance of these risks affecting health and safety in the construction industry of Pakistan.

LITERATURE REVIEW

2.1 INTRODUCTION

The construction industry is one of the most important aspects of social and economic development in all countries. The importance of the construction industry is immense, and we can find it by knowing that in 2021 construction industry constitutes 2.53% of the GDP of Pakistan (Board of investment). But if we compare it with other industries that are labor intensive, the construction industry has a very high rate of disabling injuries and deaths (Gambatese et al., 1997)^{iv}. According to studies the devised that construction industry constitutes more percentage of fatal industrial accidents than the percentage of the population they employ in some European countries. The number of fatalities is only one aspect of the construction industry accidents, there are many major injuries and minor ones throughout the world annually. The construction industry is very hazardous (Larcher et al., 1999)^v. Safety-related hazards along with high incident rates are considered common issues in the construction industry. These safety problems at construction sites are mostly associated with the insecure behavior of construction labor on site along with managerial and technological issues. Because of the intensity and extent of accidents in the construction industry, safety is a significant issue for various stakeholders in construction projects (Akroush, 2017)^{vi}. There is several safety metrics that have progressed through time, in addition, are used by way of measuring tools for safety performance, these metrics can be categorized as either lagging or leading indicators.

Leading indicators are considered metrics directed to preventive measures, whereas lagging indicators are aligned with the result of an accident. Many studies have found that a risk-based study is a crucial approach to the management and deterrence of accidents (Nabi et al., 2020)^{vii}. Accident causation theory demonstrated that several interlinked factors influencing hazards lead to safety accidents. Furthermore, these accidents do not remain independent and constant during the construction period, rather, they remain to change and interact with one another continuously. As (Xu et al., 2021)^{viii} pointed out, a few of these previous studies failed to consider the

associations among factors leading to hazards and accordingly miscarried to forecast the well-being state in a flexible and integrated manner. Generally investigating the causes of the unsafe behavior of workers is difficult as it varies from worker to worker. However, to effectively manage factors influencing safety hazards, a broader understanding of the primary hazards framework in mega construction projects is thus required. Therefore, the chief motive of the investigation/study is to modify a system dynamic model to formalize relationships among the safety management aspects such as human, managerial, environmental, and technical. These are the major aspects that are responsible for the safety situation at worksites of the construction industry. Subsequently, a system dynamic using SPSS Software will be implemented to investigate the factors affecting the safety of construction laborers by demonstrating the risks that are more severe than others. The model will try to discriminate between different risk issues and set goals to assist as an instrument for modeling numerous administrative decisions.

2.2 DEFINITIONS

2.2.1 Risk

The Project Management Institute (PMI) defines risk in its Project Management Body of Knowledge (PMBOK) as

“An uncertain event or condition that, if it occurs, has a positive or negative effect on at least one project objective, such as time, cost, scope, or quality. A risk may have one or more causes and, if it occurs, one or more impacts.”

But we will consider the risks that will have a negative impact on Health and Safety.

2.2.2 Risk Management

Risk management is a process of identifying, assessing, and mitigating the effects of risk in the construction industry.

2.2.3 Health

In 1948, **World Health Organization** defines Health as:

“Health is a state of complete physical, mental, and social well-being and not merely the absence of

disease or infirmity.”

In 1986, the WHO made further clarification:

“A resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources and physical capacities.

2.2.4 Safety

Safety has been defined as

‘A state in which hazards and conditions leading to physical, psychological or material harm are controlled in order to preserve the health and well-being of individuals and the community.’(Maurice et al., 2001)^{ix}

2.3 Importance of Health and Safety in Construction Industry

In 2021, The bureau of labor statistics (BLS) stated that the construction industry had the third highest fatality rate in America, which is one of the safer countries regarding construction safety laws. Occupational Safety and health administration (OSHA) noted that in 2021, the most common violations of health and safety laws were due to lack of proper fall protection measures. According to BLS, Falls are the leading cause of workplace deaths in the construction industry, causing 35% of the total deaths in 2021.

In 2012, Injuries and fatalities in the Construction industry of Pakistan constitute about 15% of total work force injuries and fatalities(Zahid et al., 2021). The second-highest rate of injuries in Pakistani workplaces has been outlined in the construction industry, which has been persistently increasing yearly and human cost exacted by the poor occupational safety and health practices worldwide result in an annual economic burden of 3.94% of the global gross Domestic Product (GDP). (Noman et al., 2021)^{xi} So we can say the construction industry is inherently dangerous and important, with workers exposed to a range of risks. Health and safety measures are important to protect workers, reduce costs, comply with regulations, and improve productivity. Employers who prioritize health and safety are more likely to attract and retain talented workers and build a positive reputation in the industry.

2.4 Technology for Improved Health and Safety:

Technology can play an important role in improving health and safety conditions of the construction industry. Pakistan construction industry specifically is very much behind in adopting innovative technology. But in recent years the construction industry on a global scale has started adopting innovative technology, especially the first World Countries. Following are some of the uses of technology in construction industry which also tells us why there is a need of technology in improving health and safety conditions of construction industry:

2.4.1 Monitoring and Inspection

Now in most developed countries use of drones is a common practice for collecting data and information, they are equipped with high resolution cameras to capture high quality pictures. They are very useful in surveying the landscape without physically going to the place. With high resolution images better analysis of Job site and detection of safety concerns can be possible. By using Drones and UAS, improved hazard identification and risk assessment can be possible.

2.4.2 Communication and Collaboration

Advancement in technology has greatly increased communication between the construction team. Use of mobile phones or walkie-talkie can play an important role in achieving this. Through effective communication the other team can inform the personnel at job site or in work area of a possible hazard danger or any unfortunate event. With the help of technology improved communication between the personnel can be achieved and thus better planning or response is possible in case of an emergency.

2.4.3 Accident Prevention

Accidents and injuries can be prevented on jobsite by using technology. New technology like wearable devices and sensors can track a person's movement and can detect unsafe behavior or a potential hazard. This real time data can be very useful and help the team to take precautionary measures and can prevent accidents from happening. These technologies provide in real time self-monitoring and reporting to avoid the hazards.

2.4.4 Risk assessment

Comprehensive risk assessment can be made using technology. For this purpose, Building Information Model (BIM) can be a useful tool. It is a proactive approach to minimize risks and create a safer environment. *“BIM (Building Information Modelling) is an intelligent 3D model-based process that gives architecture, engineering and construction (AEC) professionals the insight and tools to more efficiently plan, design, construct and manage building and infrastructure”*.(Autodesk 2018)

By utilizing 4D BIM technology safety can be achieved on construction sites by connecting site layout and safety plans to reduce hazards on site. Hazards can be analyzed before accidents occur by visualization of the site.

2.4.5 Training and Education

With the advancement in technology in every field education can also be given to people through an interactive way. Now technologies like Virtual Reality (VR) and Augmented Reality (AR) can be used to create simulations and provide realistic scenarios for workers to practice safety precautions. Training manuals and protocols can also be provided through e-learning platforms.

2.4.6 Automation and Robotics

There is a new trend in utilizing the potential of automation and robotics in the construction industry. Some construction companies have already used advanced construction technologies to reduce waste and resource consumption (Bock and Linner, 2015)^{xiii}, and first approaches are on the way to employ automation and robotics for controlled disassembly of buildings and urban mining. 3D Printing is also used to pour concrete and do repetitive works without exposing worker to any risk.

2.5 Importance of Mitigation Frameworks

It's essential to have efficient frameworks to reduce hazards in the building sector. These frameworks provide a methodical way to assess risks and create plans to reduce or eliminate them. Construction sites are notorious for being dangerous places where workers are exposed to a variety of risks, including falling from heights, contact with dangerous chemicals, and being struck by large pieces of equipment or materials. Frameworks for risk reduction assist in locating potential dangers and formulating plans to stop mishaps and injuries. These frameworks may include conducting routine workplace inspections, offering suitable personal protective equipment (PPE), and putting safety procedures into place. Accidents and injuries can have a substantial financial impact on construction organizations due to medical expenditures, lost productivity, and legal fees. By putting risk mitigation frameworks into place, accidents and injuries can be prevented, saving construction companies a lot of money.

Frameworks for risk reduction can also stop damage to property and equipment, which further lowers expenses. Governments all over the world have put in place measures to make sure construction firms give workers a secure and healthy workplace. Fines, legal action, and reputational harm can result from a company's failure to adhere to these standards. Construction companies may find and follow these regulations with the aid of risk mitigation frameworks, making sure they are operating legally. Construction projects can be successfully completed with the use of efficient risk reduction strategies.

Construction businesses can guarantee that projects are finished on schedule, within budget, and to the needed quality standards by detecting and managing risks. Greater client happiness, recurring business, and an improved reputation may arise from this. Frameworks for risk mitigation are crucial in the construction sector, to sum up. Construction companies may operate more safely, effectively, and profitably by putting worker safety first, cutting costs, adhering to rules, and completing projects successfully. Businesses that put a high priority on risk management are better able to control hazards, safeguard their employees, and produce high-quality projects.

2.6 SUMMARY

Due to the high-risk nature of the work, which presents substantial difficulties to employees, contractors, and the public, health and safety is a crucial concern in Pakistan's construction

industry. It is crucial to prioritize health and safety in the workplace since it directly affects employee satisfaction, the industry's standing, and the growth of the national economy. Inadequate training, a lack of personal protective equipment, inadequate inspection and enforcement, and other health and safety issues plague the construction sector in Pakistan, which result in a high number of workplace accidents, fatalities, and injuries. The Pakistani government has put in place laws and rules requiring firms to give employees the right safety training, personal protection equipment, and a safe workplace to address these problems. Additionally, employers are required to keep track of workplace fatalities and injuries and notify the appropriate authorities.

Overall, creating a safer and healthier workplace requires the collaboration and commitment of all stakeholders, including the government, businesses, employees, and the public. This is especially true for Pakistan's construction industry.

RESEARCH METHODOLOGY

3.1 General

To collect both quantitative and qualitative information for the study, a web-based questionnaire was used, as well as data from prior studies. After that, the data was examined using statistical tools.

3.2 Risks Identification

The most current study studies on the subject have gathered the risks that the construction sector faces regarding health and safety. Based on the writers' attention to a certain risk, risks are categorized as low, medium, and high. Frequency is also used to describe how frequently an author discusses a risk in a work.

3.3 Assessment in Pakistan's Construction Industry

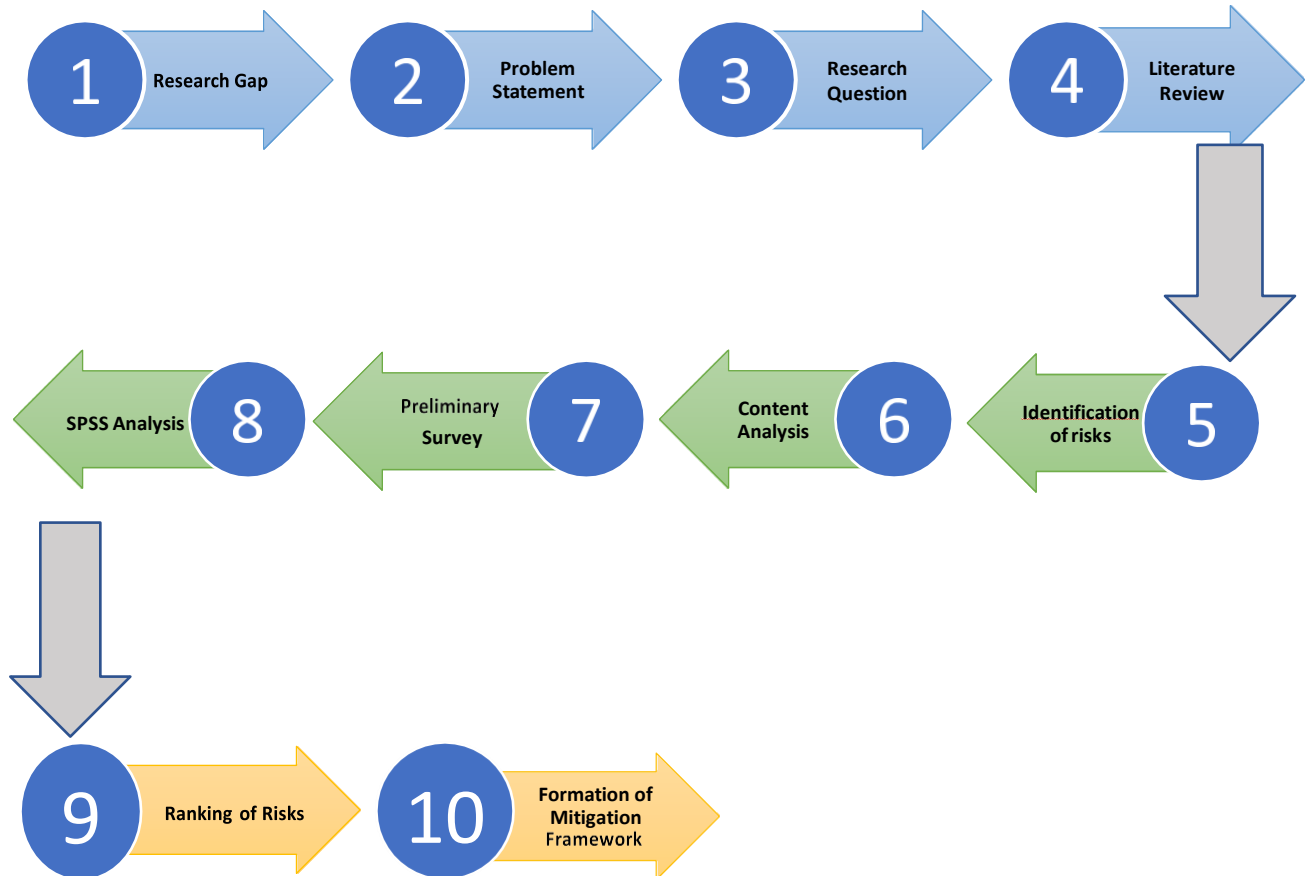
Based on a Pareto analysis of the risks, which resulted in the identification of the top 11 dangers out of 47, a questionnaire has been designed. People associated with Pakistan's building business were given a survey questionnaire, and a total of 40 replies were gathered. Yes, No, and Maybe are the available options on the form. After that risks are ranked from 1 to 11 based on analysis performed on SPSS.

3.4 Mitigation Framework

After that, a framework for mitigating of all risks that could negatively impact worker health and safety on construction sites was created.

3.5 Flowchart of Methodology

A flowchart of methodology is attached below;



RESULTS AND DISCUSSION

Identification of risks

To gain a comprehensive understanding of the risks that affect the health and safety of workers in the construction industry, we have conducted an extensive review of the literature. For this purpose, we have carefully selected 20 recent and highly credible articles that describe various risks that construction workers face. To analyze these risks in a more organized manner, we have developed a system to rank them on a scale of low, medium, and high based on the level of attention given to them by the authors. This scale enables us to better understand the severity of the risks and prioritize them accordingly. To further quantify the level of risk associated with each factor, we have used a three-point scoring system. Factors that pose low risks are assigned a score of 0.01, while factors that pose medium risks are assigned a score of 0.03. Factors that pose high risks, on the other hand, are assigned a score of 0.05. By utilizing this scoring system, we can objectively assess the level of risk associated with each factor based on the available literature. This allows us to identify the most pressing risks that need to be addressed to improve the health and safety of workers in the construction industry. Overall, our analysis of the literature has provided us with valuable insights into the risks that construction workers face daily. With this information, we hope to contribute to the ongoing efforts to create safer and healthier work environments for all construction workers. Risks and their literature scores table is attached on next page.

Sr .	Risks affecting Health and Safety	Frequency	High	Medium	Low	Significance	Literature Score
1	Poor safety awareness among firm's leadership	5	2	1	2	High	0.15
2	Lack of technical guidance/Improper Use	8	4	3	1	High	0.3
3	Lack of safety training for labors and other employees	6	4	2	0	High	0.26
4	Poor condition of equipment	5	1	4	0	Medium	0.17
5	Excessive overtime work for labor	4	1	1	2	Low	0.1
6	Lack of onsite first aid measures	2	1	0	1	High	0.06
7	Lack of certified labour	7	0	3	4	Low	0.13
8	Political instability	6	3	0	3	High	0.18
9	Caught in or between object	2	0	2	0	Medium	0.06
10	Site safety	7	0	3	4	Low	0.13
11	Improper project management	6	3	2	1	High	0.22
12	Labor strikes	3	0	1	2	Medium	0.05
13	War/Criminal acts	2	0	0	2	Low	0.02
14	Accident during sites	5	3	1	1	High	0.19
15	Discipline issue	1	0	1	0	Medium	0.03
16	Conflicts due to differences in culture	3	0	0	3	Medium	0.03
17	Unforeseen site conditions	3	0	3	0	Medium	0.09
18	Inaccurate execution plan/schedule	2	2	0	0	High	0.1
19	Force Majeure	3	1	1	1	High	0.09
20	Insufficient ventilation	1	0	1	0	Medium	0.03
21	Falling from height	8	6	1	1	High	0.34

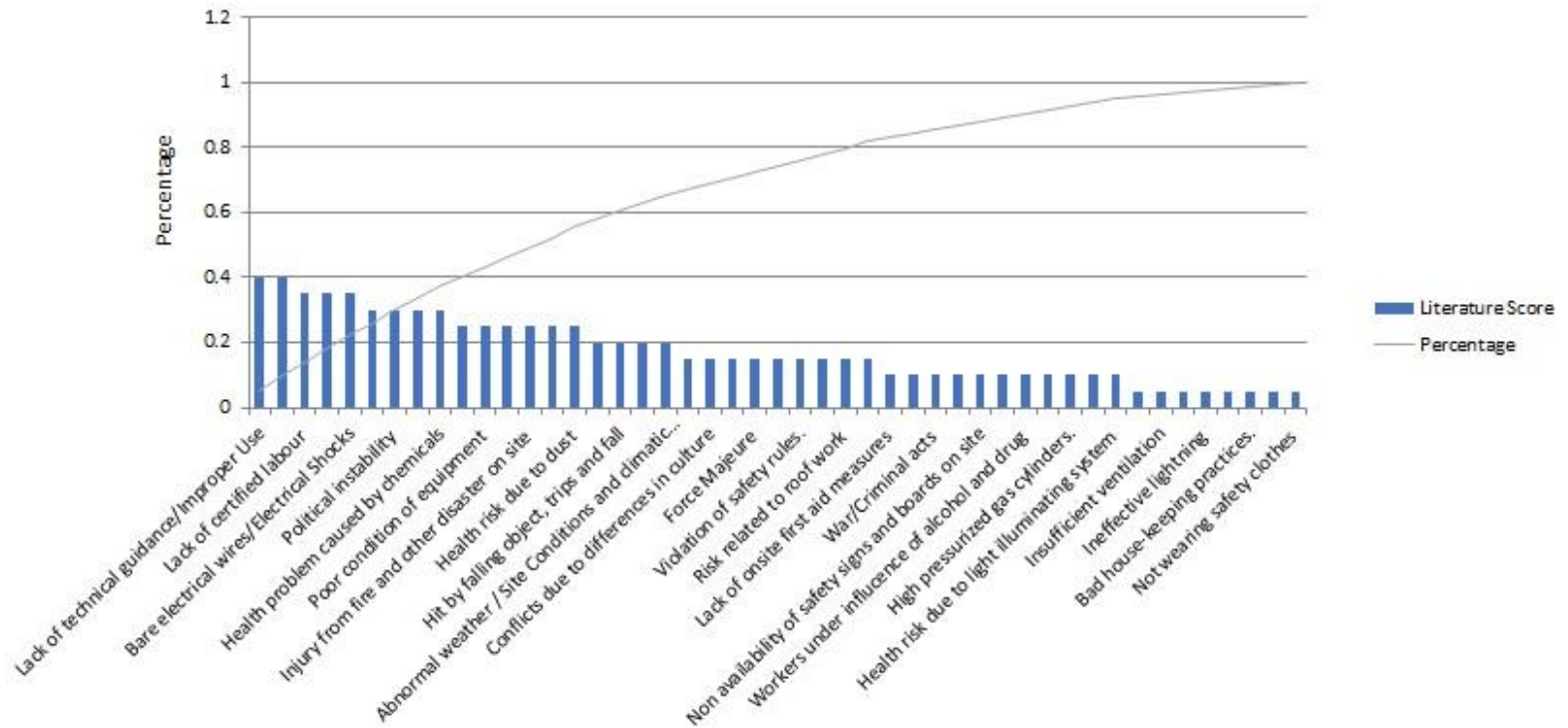
22	Hit by falling object, trips and fall	4	2	2	0	High	0.16
23	Back pain, muscular pain, due to manual handling	3	1	2	0	Medium	0.11
24	Health problem caused by chemicals	6	0	5	1	Medium	0.16
25	Non availability of safety signs and boards on site	2	1	0	1	High	0.06
26	Health problem caused by too long bending and twisting	1	0	1	0	Medium	0.03
27	Injury from fire and other disaster on site	5	4	0	1	High	0.21
28	Dislike to wearing PPE by unskilled labors	2	1	0	1	High	0.06
29	Ineffective lightning	1	1	0	0	High	0.05
30	Lack of space/Over crowded	4	2	0	2	High	0.12
31	Workers under influence of alcohol and drug	2	0	0	2	Low	0.02
32	Physical hazards	1	1	0	0	High	0.05
33	Violation of safety rules.	3	2	1	0	Medium	0.13
34	Bad house-keeping practices.	1	1	0	0	High	0.05
35	Communication issue	5	1	3	1	Medium	0.15
36	Hazardous substance	2	2	0	0	Medium	0.1
37	Risk associated with excavation	3	2	1	0	High	0.13
38	Risk related to roof work	3	2	1	0	High	0.13
39	High pressurized gas cylinders.	2	0	0	2	Low	0.02

40	Bare electrical wires/Electrical Shocks	7	4	2	1	High	0.27
41	Risk due to ladder/Scaffolding	3	1	2	0	Medium	0.11
42	Abnormal weather / Site Conditions and climatic conditions	4	0	2	2	Medium	0.08
43	Unathorized Operation of Vehicle	1	0	1	0	Medium	0.03
44	Hazards during manual materials handing.	2	0	2	0	Medium	0.06
45	Health risk due to dust	5	2	1	2	High	0.15
46	Not wearing safety clothes	1	1	0	0	High	0.05
47	Health risk due to light illuminating system	2	0	2	0	Medium	0.06

Pareto Analysis

The Pareto analysis is a valuable tool that enables decision-makers to focus on a small number of critical factors that significantly impact the outcome of a process or project. It is named after Vilfredo Pareto, an Italian economist who observed that 80% of the wealth in Italy was owned by 20% of the population. This principle has since been applied in various fields, including quality control, management, and safety, to identify and prioritize the most significant factors affecting a given outcome. In the construction industry, health and safety are of paramount importance, as workers are often exposed to numerous risks and hazards that can cause injury, illness, or even death. Therefore, identifying and mitigating these risks is crucial to ensure a safe and healthy working environment. The Pareto analysis can aid in this effort by pinpointing the most critical risks that require immediate attention. To perform a Pareto analysis, we first identified the problem or issue we wanted to analyze. In this case, we focused on health and safety risks in the construction industry. We then collected data on these risks, such as injury and illness statistics, incident reports, and feedback from workers and supervisors. Next, we used this data to create a frequency distribution of the contributing factors, such as falls from heights, electrical hazards, and exposure to hazardous materials. Once we had identified the contributing factors, we ranked them based on their impact, using a weighted scoring system that considered their frequency, severity, and likelihood. We then prioritized the top 20% of factors that were responsible for 80% of the risks and focused on addressing them first. This allowed us to allocate our resources more effectively and implement measures that would have the most significant impact on reducing risks to health and safety. In summary, the Pareto analysis is a powerful decision-making tool that can help identify and prioritize critical factors in any process or project. In the construction industry, it can be used to improve health and safety by identifying and mitigating the most significant risks. By following the steps of the Pareto analysis, we can focus our efforts on the most important factors and implement measures that have a tangible impact on worker safety and well-being. The graph depicting the results of the Pareto analysis is provided on the next page.

Pareto Analysis



After conducting the Pareto analysis, we have identified the top 11 risks that were considered to have the most significant impact on health and safety in the construction industry. These 11 risks were prioritized based on their frequency, severity, and likelihood, and will be addressed as a matter of urgency to mitigate their potential impact.

- Lack of technical guidance/Improper Use
- Falling from height
- Bare electrical wires/Electrical Shocks
- Lack of safety training for labors and other employees
- Improper project management
- Injury from fire and other disaster on site
- Accident during sites
- Political instability
- Poor condition of equipment
- Hit by falling objects, trips and fall.
- Health problem caused by chemicals.

Questionnaire Development

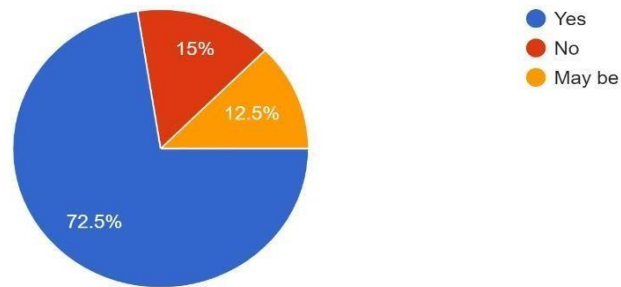
Based on the top 11 risks identified through the Pareto analysis, we have developed a questionnaire aimed at assessing the significance of these risks in the construction industry of Pakistan. The questionnaire was distributed to individuals associated with Pakistan's construction industry, and a total of 40 responses were collected. Questionnaire is attached at annex A.

Results

Below are the findings from the questionnaire we used to gauge the significance of Pakistan's top 11 construction sector concerns. This survey was created to get opinions from persons connected to Pakistan's building industry and was based on the hazards discovered through the Pareto analysis. A wide range of people, including employees, managers, supervisors, and safety experts in the construction business, received the questionnaire. A total of 40 responses were gathered, offering insightful data on how risks are seen and how important they are to the sector. The results of the survey showed that the respondents believed the top 11 dangers determined by the Pareto analysis to be extremely serious.

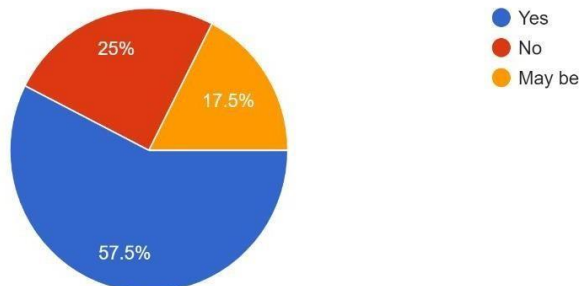
1-Lack of Technical Guidance and Improper Use of Machines

Lack of Technical Guidance or Improper Use of Machines
40 responses



2- Falling from Height

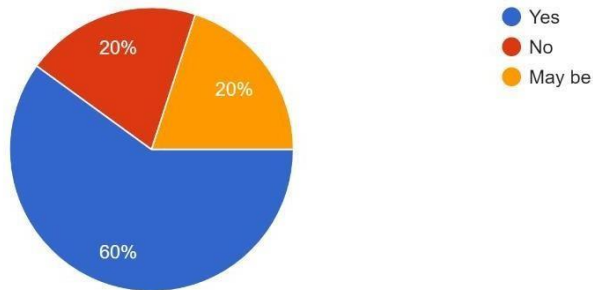
Falling From Height
40 responses



3- Hit by falling objects

Hit by falling objects

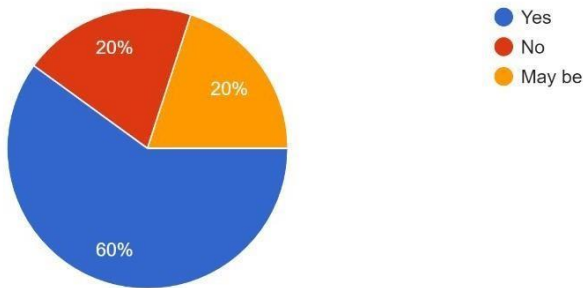
40 responses



4- Bare Electric wires or Electric Shock

Bare Electric wires or Electric Shock

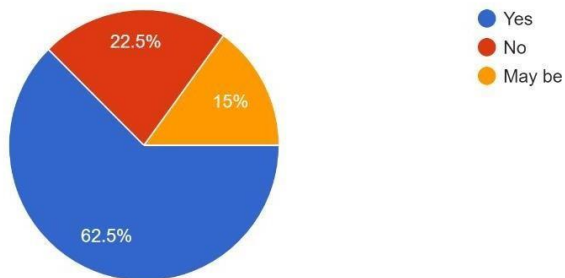
40 responses



5- Lack of training Regarding Safety

Lack of training Regarding Safety

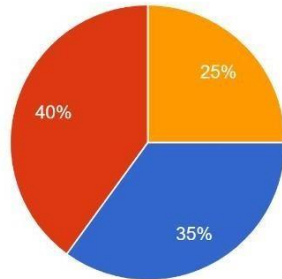
40 responses



6- Political Instability

Political Instability

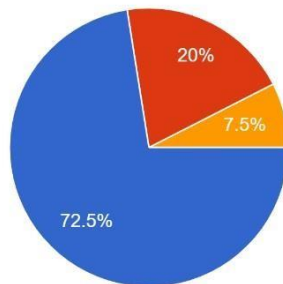
40 responses



7- Improper Project Management

Improper Project Management

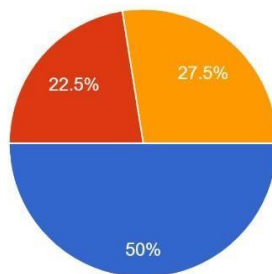
40 responses



8- Affect due to Harmful Chemicals

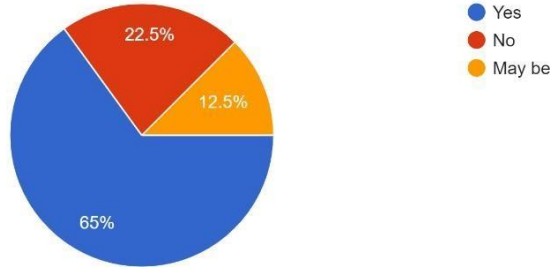
Affect due to Harmful Chemicals

40 responses



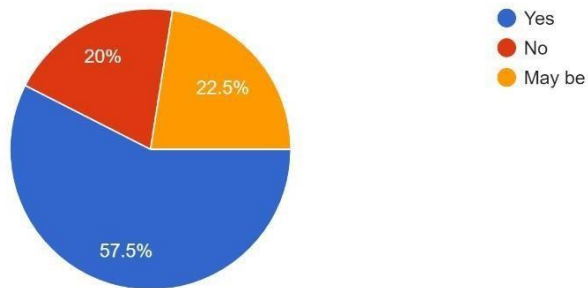
9- Poor Conditions of Equipment

Poor Conditions of Equipment
40 responses



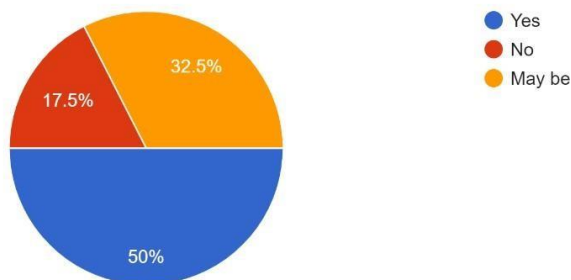
10- Accident during site

Accident during site
40 responses



11- From Fire or other Disaster

From Fire or other Disaster
40 responses



Analysis on SPSS

SPSS (Statistical Package for the Social Sciences) is a versatile software tool for statistical analysis, data management, and visualization. It is widely used in social sciences research and other fields. SPSS offers a range of statistical procedures, data cleaning and transformation capabilities, data visualization options, and supports automation through syntax programming. It has a user-friendly interface and can handle large datasets, making it popular in academia, government agencies, and businesses.

After collecting responses to the questionnaire on the top 11 risks in Pakistan's construction industry, we needed to analyze the data to rank these risks. To do this, we first replaced "yes" responses with a score of 3, "no" responses with a score of 0, and "maybe" responses with a score of 1. This allowed us to convert the qualitative data into quantitative data that we could then analyze in SPSS. Once we had the data in SPSS, we used descriptive statistics to calculate the mean score for each risk. The mean score represents the average score given by respondents for each risk, with a higher score indicating a greater perceived importance of that risk. We then ranked the risks based on their mean score, with the highest mean score indicating the most important risk and the lowest mean score indicating the least important risk. This ranking allowed us to identify the top risks that should be prioritized to improve health and safety in Pakistan's construction industry. By using a combination of qualitative and quantitative methods, we were able to collect and analyze data on the top risks in Pakistan's construction industry and prioritize actions to address these risks. This approach can help to improve decision-making and promote a safer and more sustainable construction industry in Pakistan.

		Lack of Technical Guidance or Improper Use of Machines	Improper Project Management	Poor Conditions of Equipment	Lack of training Regarding Safety	Hit by falling objects	Bare Electric wires or Electric Shock
N	Valid	40	40	40	40	40	40
	Missing	0	0	0	0	0	0
Mean		2.30	2.25	2.08	2.03	2.00	2.00
Median		3.00	3.00	3.00	3.00	3.00	3.00
Mode		3	3	3	3	3	3
Std. Deviation		1.181	1.256	1.309	1.310	1.281	1.281
Variance		1.395	1.577	1.712	1.717	1.641	1.641
Minimum		0	0	0	0	0	0
Maximum		3	3	3	3	3	3

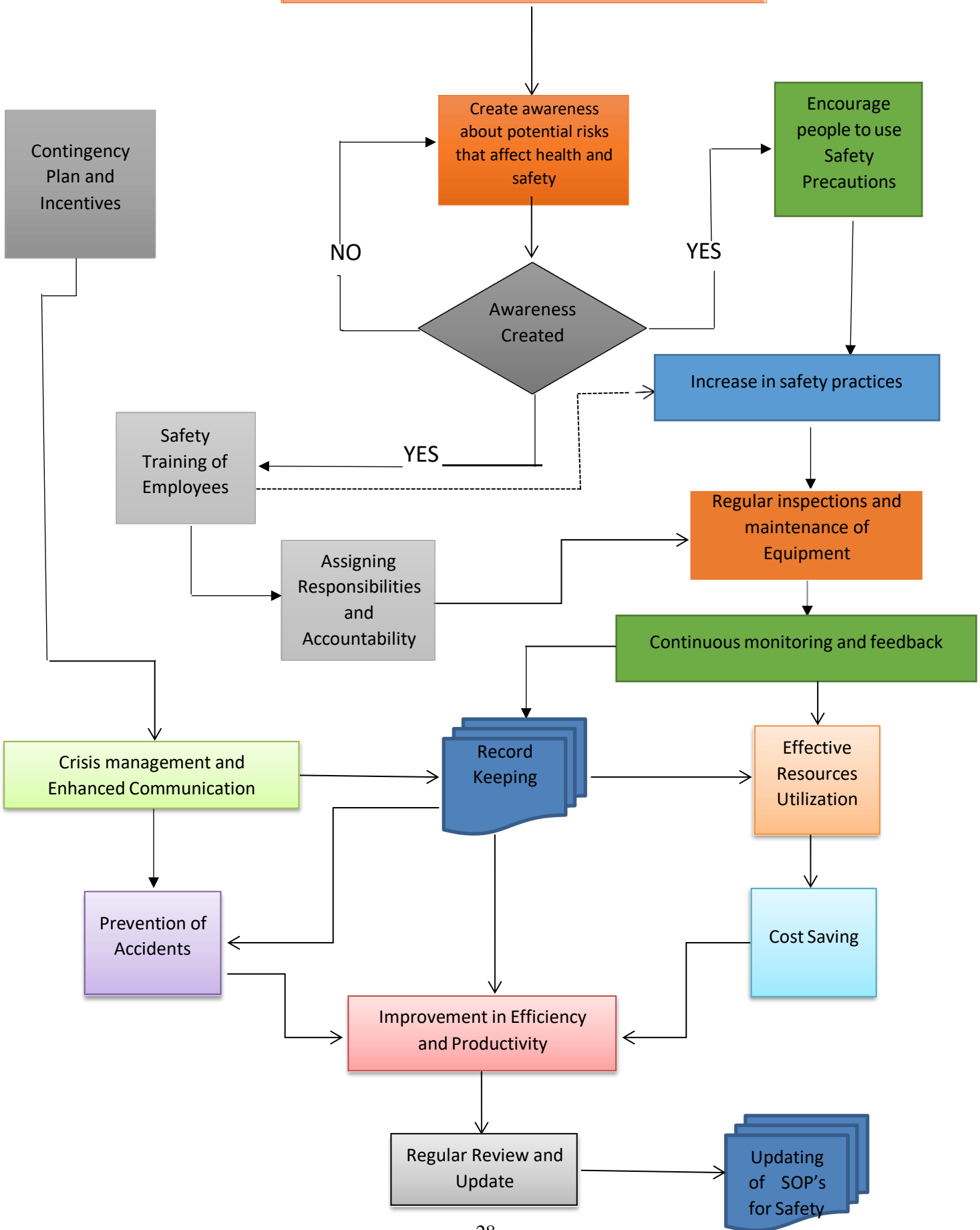
		Accident during site	Falling From Height	From Fire or other Disaster	Affect due to Harmful Chemicals	Political Instability
N	Valid	40	40	40	40	40
	Missing	0	0	0	0	0
Mean		1.95	1.90	1.83	1.78	1.30
Median		3.00	3.00	2.00	2.00	1.00
Mode		3	3	3	3	0
Std. Deviation		1.280	1.336	1.238	1.291	1.324
Variance		1.638	1.785	1.533	1.666	1.754
Minimum		0	0	0	0	0
Maximum		3	3	3	3	3

Mitigation Framework

A risk mitigation framework involves a systematic approach to identify, assess, and reduce risks. It includes risk identification, assessment, prioritization, mitigation strategies, monitoring, communication, and continuous improvement. This framework helps organizations proactively address risks and increase project success and business continuity.

The first step in creating a safe and healthy work environment in construction sites is to raise awareness among laborers and employees about the health risks caused by chemicals and the measures necessary to protect themselves against these risks. Without proper knowledge, workers may act carelessly around dangerous chemicals, putting themselves and others at risk. To increase knowledge about workplace risks, stakeholders should provide workers with personal protective equipment (PPE) and other safety tools that are essential for safeguarding their lives. It's not enough to simply provide these tools; workers also need to be trained on how to use them effectively. In addition to ensuring proper tool usage, training sessions and seminars can also help create and increase the amount of skilled labor. Governments can support the safety of laborers and employees by providing incentives for PPE and tools, encouraging stakeholders to buy them more willingly and show greater intent in their use. Adoption of PPE and other safety equipment should be mandatory to ensure the safety of workers. If a major accident occurs on a construction site, there will be a delay before work can continue. By taking proactive measures and following established standard operating procedures (SOPs), these types of delays can be avoided. To create awareness, risk assessments can be a valuable tool. They involve a thorough assessment and evaluation of all work areas and processes, and the involvement of workers is also helpful in identifying potential hazards. Maintaining good housekeeping practices is also essential to make the construction site a safe place. Workers should be properly trained to keep the site clean and free of debris and hazards. In summary, to create a safe and healthy work environment in construction sites, stakeholders should prioritize raising awareness about risks, providing PPE and other safety equipment, training workers on how to use these tools effectively, and maintaining good housekeeping practices. By taking these steps, the risk of accidents and injuries can be significantly reduced, and workers can feel confident and safe in their jobs.

Risk Mitigation framework for improved for Health and Safety



CONCLUSION

The study aims to emphasize the importance of identifying potential risks that can impact the health and safety of workers in the construction industry. In Pakistan, this industry is exposed to numerous risks such as falls, hazardous material exposure, and accidents involving heavy machinery. Evaluating the significance of these risks is crucial to develop strategies to prevent accidents and injuries. Risk mitigation framework plays a vital role in enhancing health and safety on construction sites. They involve regular site inspections, the provision of appropriate personal protective equipment (PPE), and the implementation of safety protocols to identify and minimize potential hazards. By adopting this framework, construction companies can save costs associated with accidents, prevent damage to property, and comply with regulations. In conclusion, the construction industry in Pakistan faces various risks that can threaten the health and safety of workers. To prevent accidents and injuries, a risk mitigation framework is essential. These frameworks help construction companies comply with regulations, complete projects on time, and satisfy customers. Prioritizing risk management can lead to a safer, more efficient, and ultimately more successful construction industry in Pakistan.

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Annex-A

Risk Management for Health and Safety in Construction Industry of Pakistan

Greetings!

We are students of undergraduate civil engineering program at NUST. The following questionnaire is for our final year project. The title of our project is "Risk Management for Health and Safety in Construction Industry of Pakistan." It highlights the risks that affect Health and Safety in the construction industry of Pakistan. It would be highly appreciated if you could spare some of your precious time and fill the questionnaire survey.

Thank you!

*** Required**

1. Name *

2. Gender *

Mark only one oval.

Male

Female

Other: _____

3. Qualification *

Mark only one oval.

Diploma Holder

Graduation

Post Graduation

P.hD

4. Years of Professional Experience *

Mark only one oval.

- 0
- 1-5
- 6-10
- 11-20
- 20+

5. Job Title *

Mark only one oval.

- CEO
- Project Director
- Project Manager
- Project Engineer
- Planning EngineerSite
- Engineer Architect
- Student
- Other: _____

6. Understanding of Risks that affect Health and Safety in Construction Industry *

Mark only one oval.

- No Understanding
- Slightly
- Moderate
- Good
- Exceptional

**Risks that Affect
Health and Safety in
Construction Industry.**

These are few risks that affect Health and Safety in Construction Industry of Pakistan. Kindly mark a suitable option.
Thank You!

7. Lack of Technical Guidance or Improper Use of Machines *

Mark only one oval.

Yes

No

May be

8. Falling From Height *

Mark only one oval.

Yes

No

May be

9. Hit by falling objects *

Mark only one oval.

Yes

No

May be

10. Bare Electric wires or Electric Shock *

Mark only one oval.

Yes

No

May be

11. Lack of training Regarding Safety *

Mark only one oval.

Yes

No

May be

12. Political Instability *

Mark only one oval.

Yes

No

May be

13. Improper Project Management *

Mark only one oval.

Yes

No

May be

14. Affect due to Harmful Chemicals *

Mark only one oval.

Yes

No

May be

15. Poor Conditions of Equipment *

Mark only one oval.

Yes

No

May be

16. Accident during site *

Mark only one oval.

Yes

No

May be

17. From Fire or other Disaster *

Mark only one oval.

Yes

No

May be