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Assessment and Enhancement of Safety Practices on Construction Sites in Nepal

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ABSTRACT - Construction Safety is an essential talk topic all over the world especially in countries like Nepal where the construction sector is a major contributor to the economy. Nepal is a developing country. The growth is driven by urbanization to a large degree. We are constructing buildings and all other infrastructures to satisfy the needs of the people who live in the city (water supply, power supply). The rate of construction of infrastructures is increasing. In Nepal most of the projects are labor intensive. The construction industry involves large skilled and unskilled personnel. Nepal is young in practicing construction and lacks experience. Any construction project has risk of accidents as they are inevitable. The site accidents are the most important factor to be considered for a project to be successful. We do not have the exact accident data recording system here in Nepal. The basic problem in Nepal is negligence towards the constructional safety and lack in use of proper safety equipment's and tools. In addition to that labors are unskilled, illiterate and untrained. Accidents that result in the loss of life, damage of property and many injuries during construction are the major challenges of construction field. The major causes of accident in construction industries are physical, physiological, psychological and mental. One of the main causes of accidents is the unsafe working conditions. Also due to low level of awareness towards safety and importance of human values, development of effective safety management system etc. is the major problem of safety at construction sites in Nepal.

Key Words: Construction Safety, Nepal, Safety Practices, Construction Industry, Workplace Safety, Safety Challenges, Safety Training Programs, Regulatory Frameworks, Safety Culture, Construction Accidents

1. INTRODUCTION

In Nepal, the construction industry is very vital for infrastructure building and economic development. However, the industry has to bear a considerable number of accidents because of the lack of safety, ignorance, and regulation. Nepal also happens to have one of the highest accident rates in South Asia in terms of construction - according to some recent research. These are the issues which can be solved only through a holistic understanding of the problem and individual solutions to improve safety.

The country's peculiar socio-economic and geographical situation makes the issue even more hazardous. Safety on construction sites is made difficult by a small number of workers, lack of technical support, and the hostile terrain. What is more, stakeholders - contractors, employees, policy-makers - don't often know what they are doing for safety reasons. All this points to the importance of a regular safety assessment and tailored approaches for the specific safety issues in the given context.

People in construction project do not give enough attention to safety and they do not know its importance. The basic motto at any construction site must be "Prevention is better than cure." Construction safety involves many different areas to keep employees safe. Safety deals with Time, Cost and Quality. Also, many experts do not realize the value of safety and people forget about it while at work on site. It is very important to be safe and to keep others safe. And many people do not care about it because they have not met any accidents. If they do meet one, at work the consequence can be disastrous and sometimes fatal too. Therefore "SAFETY" has to be considered seriously in every walk of life. Construction safety includes steel erection, wood truss construction, chemical and electrical hazards as well as fall protection. Working in the construction industry might be dangerous. Work-related accidents can cause some serious injuries, while most of these accidents are preventable. Safety training to fall protection and hazard communication may be provided to prevent accidents. Many workers lose their life because of accident and many serious accidents bring about the disability in many workers who happen to lose either their limbs or some other parts of body.

The paper attempts to fill this gap, by talking about the status of construction safety in Nepal, the root causes of safety failure, and a comprehensive system to enhance safety standards. The article opens with literature review and the challenges, solutions and implementation strategies are discussed in detail. It even explores how the Nepal's construction industry growth impacts on the safety needs hence data-driven knowledge to drive the future safety efforts.

2. LITERATURE REVIEW

Safety in the construction industry has been broadly researched, with many developed frameworks and practices around the world. Construction safety has become one of the most broadly explored subjects of research on every continent. It emerges from studies that appropriate safety practices reduce the incidence of injury and fatality in the workplace. International standards include the ISO 45001 and OSHA guidelines, thus laying a sound framework for occupational health and safety management. Conversely, Nepal's construction industry has fragmented and poorly enforced safety laws.

A research by Sharma et al. (2020) mentioned the safety training and awareness of construction workers in Nepal, which is very least. Research by Thapa and Singh (2019) notes that the safety equipment is scanty and there is not good

enforcement of existing laws in this regard. The same barriers identified in comparative studies conducted in the region, such as economic constraints and limited technical expertise, are accompanied by cultural attitudes toward safety issues.

However, research focusing on developing countries like Nepal, remains limited. Key themes in the encompass:

1. **Regulatory Frameworks and Compliance**: Studies highlight the importance of robust safety regulations and their enforcement. Nepal's regulatory environment, governed primarily by the Labor Act (2017) and –Building Codes, lacks stringent mechanisms for compliance monitoring.
2. **Training and Awareness**: Research illustrates the role of worker training and managerial awareness in mitigating accidents. In Nepal, however, safety training is often overlooked due to resource constraints.
3. **Cultural and Economic Factors**: Socio-economic conditions including poverty and informal labor markets that influence safety practices. Workers often prioritize immediate earnings over long-term safety, while contractors may disregard safety measures to reduce costs.
4. **Technological Advancements**: Emerging technologies like Building Information Modeling (BIM) and wearable safety devices are revolutionizing construction safety in developed countries. Nepal's adoption of such technologies is minimal due to financial and technical barriers.

3. METHODOLOGY

This is a mixed-methods research that integrates qualitative and quantitative data collection techniques:

1. **Literature Review:**

   Reviewing the studies about construction safety, mainly focusing on developing countries, particularly Nepal.
2. **Surveys and Interviews:**
   The approach of conducting surveys with construction workers, contractors, and policymakers to get firsthand information regarding safety challenges and practices.
3. **Field Observation:**
   construction site visits to observe safety and identify gaps.
4. **Data Analysis:**
   Apply statistical tools to analyze accident rates, regulatory compliance, and safety training coverage.
5. **Comparative Analysis:**
   Benchmarking Nepal's Safety Practices against International Standards.

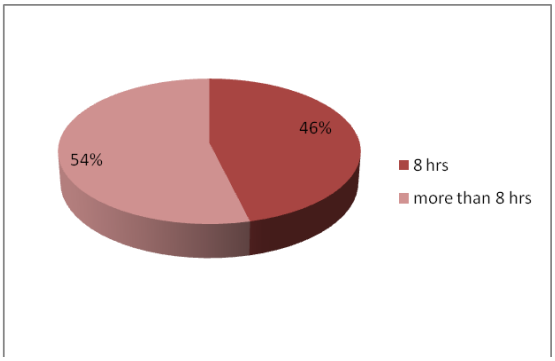

Fig: Working Hours

4. RESEARCH OBJECTIVES

- To assess the current state of safety practices on construction sites in Nepal.
- To identify the primary challenges contributing to poor safety standards.
- To propose effective strategies and frameworks for enhancing safety practices.
- To assess the current state of safety practices on construction sites in Nepal.
- To identify the root causes of safety challenges, including regulatory, cultural, and economic factors.
- To propose effective strategies and solutions for improving safety standards.
- To develop an implementation framework tailored to Nepal's unique context.
- To analyze the impact of construction industry growth on safety practices and requirements.

5. CONSTRUCTION SAFETY LAWS IN NEPAL

- No labor should be compelled to work overtime.
- No labor should be compelled to work in places where there is occupational health hazard of any form.
- The employer must form a Safety and health committee if his construction firm has got more than 20 construction workers. The representation of labor in the committee is a must.
- No employee of a construction firm should be taken any act when he or she reports the failure to implement the construction safety at the site to the concerned authority.

6. DATA AND GROWTH TRENDS

During the last ten years, the Nepalese construction industry has been growing on average annually by 6.5%. This is basically caused by infrastructural projects involving roads, bridges, and hydropower plants. The industry, however, has still showed a high rate of fatality, standing at about 25 deaths per 100,000 workers yearly. For such outstanding growth to be sustained and improve the welfare of workers, safety concerns should be taken into consideration

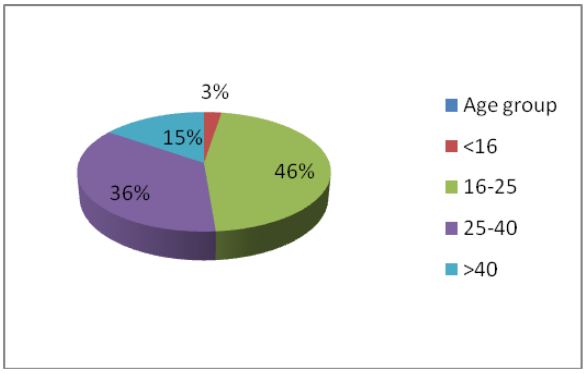

Fig: Working Group Age

7. CURRENT STATE OF SAFETY PRACTICES IN NEPAL

7.1 Overview of Construction Safety

Construction in Nepal ranges from the urban high-rise to various infrastructural projects in the rural countryside. In many cases, little resources or expertise are available, so safety is often not taken into consideration.

7.2 Existing Safety Regulations

The Labor Act 2017 of Nepal has provisions for workplace safety, but the enforcement remains weak due to poor monitoring and resource constraints. Most construction businesses put cost-cutting over safety regulations, resulting in unsafe working conditions.

7.3 Accident Statistics

According to reports, the most important types of construction accidents in Nepal are falls from skyscrapers building, electrocutions and injuries caused by equipment. These incidents harm the life of workers and also cause economic damages and project delays.

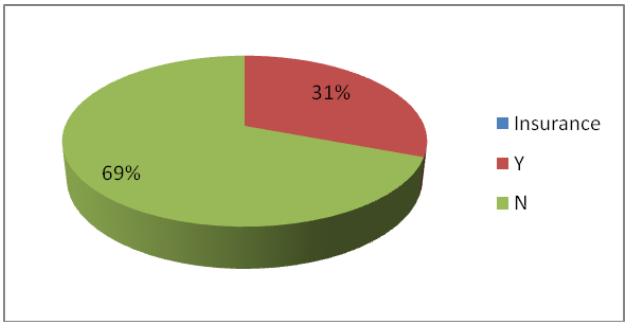

Fig: Labor Insurance

8. CHALLENGES IN ENSURING CONSTRUCTION SAFETY

8.1 Economic Constraints

Many construction projects in Nepal have fixed budgets, leaving low room for investment in safety equipment and training. Small contractors facing the financial hardship resources to utilize modern safety practices.

8.2 Lack of Awareness

Workers and site managers often do not pay the importance of safety measures. A lack of formal training programs rises the problem, especially in rural areas where literacy rates are seems to very low.

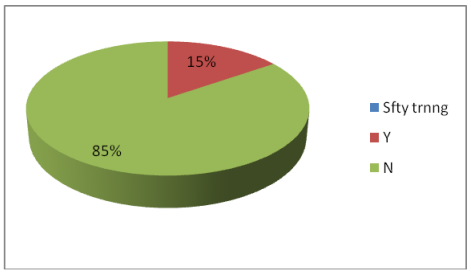

Fig: shift timing

8.3 Cultural and Behavioral Factors

Cultural view towards safety often dismiss protection measures as unnecessary. Workers might neglect safety protocols due to effect of slowing down their work.

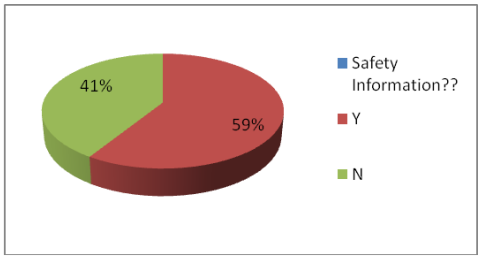

Fig: safety information

8.4 Regulatory and Enforcement Gaps

While regulations exist, their enforcement is hindered by inadequate inspection mechanisms and a lack of coordination among stakeholders.

9. STRATEGIES FOR ENHANCING SAFETY PRACTICES

9.1 Implementing Safety Training Programs

Safety awareness can be considerably raised by implementing thorough training programs that are adapted to the requirements of supervisors and employees. Regular refresher courses and hands-on workshops should be required.

9.2 Adoption of Modern Safety Equipment

Accident risk can be decreased by promoting the use of reasonably priced yet efficient safety equipment. Small contractors could benefit from subsidies or incentives for the purchase of safety equipment.

9.3 Strengthening Regulatory Frameworks

• The creation of a specific safety inspection organization.

- Frequent inspections of construction sites.
- Tougher sanctions for noncompliance.

9.4 Promoting a Safety-First Culture

Stakeholder cooperation is necessary to establish a culture that prioritizes safety. Managers and employees might be inspired by campaigns emphasizing the value of safety and success stories of projects that have been completed without accidents.

10. PROPOSED IMPLEMENTATION FRAMEWORK

10.1 Stakeholder Collaboration

It is critical for government agencies, NGOs, and construction companies to work together.

10.2 Phased Implementation

- **Short-term Goals:** Safety equipment distribution and basic education initiatives are examples of quick actions.
- **Mid-term Goals:** Establishing monitoring mechanisms and revising safety regulations.
- **Long-term Goals:** Promoting research on construction safety and incorporating safety into school curricular.

11. NEED FOR SAFETY IN CONSTRUCTION SITE

Modern construction project involves many hazardous materials, equipment, plant, manpower, methods etc. therefore many accidents occur in construction projects. It involves thousands of different types of dangerous construction materials and substances. They include chemical, powder, dust, fiber, steel, aggregate, sand, cement, stone, brick and gases lots of equipment, tunneling equipment, plant etc. also radioactive substance such as Troxler, a nuclear density testing device etc. and people work in difficult sites, different working condition like under water drilling, blasting, tunneling, underground work etc. hence construction process is itself dangerous and hazardous so give adequate attention for safety in construction site. In context of Nepal, we do not have any rules to protect construction workers against accident and not adequate safety standard has been set for construction industry.

The contractors are not properly trained and they wrongly believe that they can save money by lowering safety standard. In Nepal the worker is un-organized and not trained properly. Workers work as seasonal they mainly focus on agriculture-based economy. And when they become free from agricultural work then they join the construction work as a seasonal worker. Hence Safety on construction site is needed more in Nepal than other country. In construction industry, most of accidents can be predicted before they occur, hence they can be prevented. Construction is basic activity for development of Nation. Also, the rate of accident can be minimized if adequate attention is given for safety in construction.

You should believe without any doubt that the SAFETY IS NEEDED for following reasons:

- To minimize rate of accident.
- Raising morale of construction workers.
- To increase efficiency of works.
- To improve quality of works.
- To eliminate fatal accident.
- To reduce cost of construction etc.

12. CONCLUSION

Tackling economic, cultural, and regulatory obstacles is essential for improving safety procedures on Nepalese building sites. Such initiatives will not only protect lives but also contribute to sustainable development in Nepal.

This research study explores the area of construction safety, particularly to prioritize different factors that are the key influencers to the construction safety behavior of workers. This paper presents the factors affecting workers' safety work behavior, compiled from a rigorous literature review and validated by industry experts. The identified personal and organizational factors have been analyzed and prioritized with the help of statistical methods and multiple iterations. The results showed that all the factors are substantial regarding safety behavior. The appropriate grouping provides closer insights into the factors. It presents that the most significant organizational and personal factors are cautionary/warning systems and Perception of Probable risks respectively. The information and knowledge gained can be applied to the design and implementation of Occupational Safety and Health Systems for the construction industry in Nepal. Also, the insights gained from this study can help make decisions regarding the encouragement of workers to develop safety work behavior in the workplace. These findings will help understand the construction safety culture, and its utilization at the policy level will surely benefit the construction industry and the nation.

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