



## AN ASSESSMENT TO OCCUPATIONAL HEALTH AND SAFETY PRACTICES IN BUILDING AND URBAN ROAD CONSTRUCTION SITES

### Introduction/Background:

As Nepal's urban centres grow rapidly, the demand for modern infrastructure becomes increasingly pronounced. Buildings are vital for accommodating the growing population density within limited urban land areas. These structures not only symbolize economic progress but also offer solutions to the challenge of urban scatter. However, the rapid development has brought with it a number of challenges, including health and safety of workers involved in construction, operation and maintenance activities. Construction industries in Nepal have not effectively implemented health and safety measures at construction sites due to lack of proper organizational policy & guidelines, adequate resources and effective management.

In this context, National Research Centre for Building Technology (NRCBT) under Ministry of Urban Development has carried out a study to assess occupational health and safety hazards, risks and control measures which can be used to mitigate the risks in the different building and urban road construction sites and as a outcome of this assessment, NRCBT has prepared a set of comprehensive and context-specific guidelines for occupational health and safety, which is evidence-based and adapted to the specific needs and regulations. However, this guideline is yet to be finalized by the Ministry of Urban Development.

### Objective:

The study aimed to develop comprehensive occupational health and safety (OHS) guidelines for building and urban road construction. Other specific objectives were to access and analyse existing OHS hazards and risks at construction sites, analyse OHS practices and identify the key challenges and gaps, review best OHS practices and relevant legal frameworks, promote the adoption of safe work practices and build a culture of safety within construction sector, improve the long-term health and well-being of workers and contribute to the development of a strong occupational health and safety framework for the construction sector in Nepal..

### Methodology:

In order to fulfil the objectives, the study was designed to extract relevant information from stakeholders. Besides this, the past studies concerning the occupational health and safety hazards were reviewed thoroughly. Data were collected by utilizing field-based survey. Diverse construction sites of building and urban road projects were selected for site visits. The target group of survey were managers, supervisors and construction workers. Direct interviews/interactions with managers, supervisors, workers and other stakeholder as required by the objective were conducted. During site visits, occupational health and safety practices, worker's attitudes, potential hazards and safety measures were observed. Brief semi-structured interviews with supervisors and workers were conducted. Observations were also made to collect data on worker behaviors, equipment usage, and environmental hazards. Further, documents including published reports, research papers, legal documents, media articles and international OHS standards were analyzed with focusing OHS practices, challenges, regulations, incident analysis and best practices relevant to Nepal's construction sector. The data collected from field visits and survey were analyzed using the MS-Excel Software. Since the study is a descriptive type, simple frequency distributions were used as analytical tool. Data were analyzed, interpreted and presented using simple descriptive statistics, tables, bar charts and pie charts.

The study undertook the field visit to ongoing projects comprising of three government buildings, three apartments/private high-rise buildings, three residential buildings, three hospital buildings and three urban road projects in different locations of Kathmandu valley.

### General Observations:

Conditional assessment at different ongoing building construction sites were carried out to identify site-specific health and safety hazards and their risk. The observations were also focused on implementation of site specific safety plan, safe work

practices, role and responsibility of engineers and supervisors, safety communications, hazard identification and control measures, enforcement of regulations and compliances, emergency preparedness and response, training and education, occupational health management plan, living facilities, sanitation and hygiene, and suggestions for improving OHS practices. The field visit identified the OHS hazards and assessed the risk in the different building sites outlined as follows:

**Site 1:** This high-rise apartment building site had several occupational health and safety hazards. There were safety hazards having high risk such as fall hazards due to heights of building, struck by hazards due to falling objects, which might come from dismantling work, caught in objects hazards posed by dismantling of existing brick walls, slipping and tripping hazards due to poor housekeeping work. Similarly, improper installation and fixing of scaffolding created the possibility of fatal accident. Chemical hazards, noise and dust hazards were also significant. There was partial compliance with safety regulations.

**Site 2:** This high-rise apartment building site had several occupational health and safety hazards which is needed to be addressed to ensure compliance with safety regulations and protect the well-being of workers. Fall hazards, falling objects, slipping and tripping hazards were prominent. There was partial compliance with safety regulations.

**Site 3:** This high-rise commercial building site had high likelihood of risk and severity of consequences caused by working at heights, scaffolds hazard and falling objects. Electrical hazards were also significant. Noise and dust were posing risk to workers and there was lack of proper and consistent use of PPEs.

**Site 4:** Multi-storied government building site had several occupational health and safety hazards, which were posing the risk to safety of the workers and other employees. Main hazards, which were found to be very likely to occur, were fall hazards, falling objects, dust hazards, lack and inconsistent use of PPEs etc. There was partial compliance with safety regulations.

**Site 5:** This particular multi-storied government building site had also several occupational health and safety hazards, posing risk to the safety of the workers. Potential hazards were fall hazards, falling objects, slipping and tripping hazards, dust hazards, lack and inconsistent use of PPEs etc.

**Site 6:** This high-rise corporate building site had occupational hazards such as fall hazards, falling materials, machinery operations, inconsistent use of PPEs etc., which were posing risk to the employees.

**Site 7:** In this multi-storied hospital building site, fall hazards were prominent. Similarly struck by hazards were very likely due to frequent shifting and lifting of materials, and working at heights. Scaffolds, lack of proper use of PPEs were also contributing for risk. Noise and dust were prominent health hazards.

**Site 8:** This hospital building site had occupational health and safety hazards that need to be addressed to ensure compliance with safety regulations and to protect the well-being of workers. The risk of fall hazards and struck by materials were likely to occur. Electrocutions were likely to occur with high severity. Lack of proper use of PPEs was also contributing for risk. Dust and noise were prominent health hazards to the workers.

**Site 9:** This multi-storied hospital building site had several occupational health and safety hazards. Due to its height, fall hazards were prominent. Similarly struck by hazards caused by falling objects were very likely due to frequent shifting and lifting of materials, and working activities at heights. Lack of proper use of PPEs was also contributing for risk. Dust and noise were prominent health hazards to the workers.

**Site 10:** Entrance Gate Construction and Road Upgradation site had several occupational health and safety hazards. Traffic hazards, heavy equipment operations risk, dust hazard, lack of consistent use of safety gears were major hazards found during survey.

**Site 11:** Box Culvert and Disaster Management Work site had mainly traffic hazards, dust hazards, heat stress, lack of proper PPEs and failure to use PPEs consistently, lack of proper signs etc. Overhead power cables were also posing risk.

**Site 12:** Upgradation of Road from Naikap football ground to Jogini Gupha had several occupational health and safety hazards mainly traffic hazards, dust hazards, heat stress, lack of proper PPEs, lack of proper signs etc.



Face of building without safety nets



Unguarded lift openings



Guardrails on stairways



Scattered debris in stairways posing slip and trip risks



Working at height



Safety first



A typical warning signs on road



Unsafe electrical installations



Unguarded stairways



Workers with safety gears



A typical safety signage board



Tower crane lifted materials



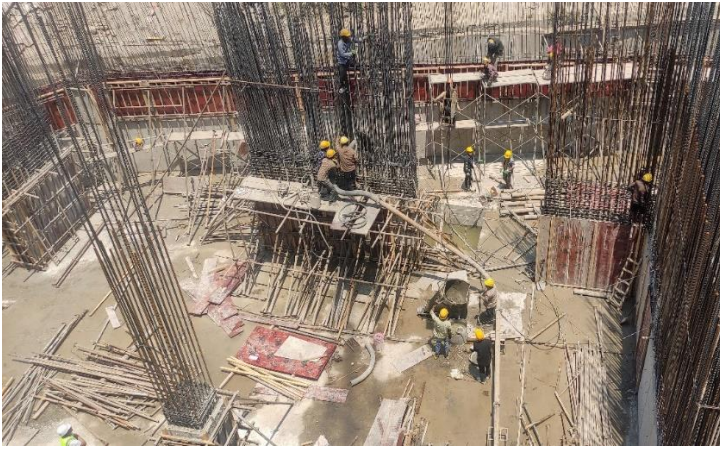
Excavated trench with protection work



Tower lifting materials



Working on roof, no proper safety gears



Ongoing reinforcement work, workers wearing safety helmet



Workers with no safety harness working in scaffold, a residential house



Overhead electrical cables posing risk in urban road construction site



Unsafe holes in roads



A typical urban road site, posing dust hazards



Workers with no safety gears in urban road construction



Production of asphalt concrete in urban road construction site, no PPE used by worker



Traditional bitumen boiling work, no PPE used by workers



Heavy machinery used in road pavement work



Spreading of bitumen

Figure 1: Construction Site Practices

## Results:

Among all ongoing building construction sites under survey, 44% sites fully implement a safety plan, 44% partially implement it, and 12% have no safety plan. For urban road projects, 67% lacks any safety plan. 45% building sites under survey lack warning signs in hazardous work area, and while 67% of sites provide personal protective equipment (PPE), workers of 78% site do not consistently use it. Additionally, 67% of urban road sites do not have guardrails or barriers in hazardous areas. Only 33% of building construction sites have defined roles for engineers and supervisors regarding occupational health and safety, and only 33% have designated safety officers. In all urban road and residential building sites, there are no defined safety roles and responsibilities among engineers, supervisors and workers. Communication gaps between employers, supervisors, and workers further impede safety in all sites. Building construction sites have provided Personal Fall Arrest Systems (PFAS) but only 33% have fixed toe-boards and safety nets. In road construction, 67% have designated traffic control personnel, and 67% lack safe zones or barriers separating workers from traffic. Both types of sites have significant issues with electrical safety training and PPE provision.

Noise, dust, and chemical hazard controls measures are generally found insufficient across sites. Ergonomic hazards are prevalent, with no site implementing safety procedures to prevent related injuries. Emergency preparedness and response programs are largely inadequate, with only 22% of building sites having effective protocols. Regulatory compliance is inconsistent, with many sites not following safety regulations or being regularly inspected. Health management plans are mostly absent, with 67% of building and road sites lacking such plans. Living facilities and sanitation are generally adequate, but medical facilities are often lacking. Communication with neighboring residents about construction impacts is common, but control measures for noise and dust pollution are inadequate.

These findings highlight a substantial need for enhanced safety plans, training, communication, and stricter enforcement of regulations to improve occupational health and safety on building and urban road construction sites. In response, NRCBT has prepared a set of comprehensive, context-specific guideline for occupational health and safety, which is yet to be finalized by the Ministry of Urban Development.

## Conclusion and Discussion:

The study highlights several critical issues related to occupational health and safety (OHS) in construction sites. The findings emphasize the urgent need for the development and implementation of site-specific safety plans and programs to effectively assess and control hazards. A concerning observation is the lack of financial provision for safety measures, with none of the surveyed sites having allocated a separate budget for safety within their contracts. This budgetary shortfall hampers the investment necessary to ensure site safety, particularly in the procurement of safety equipment and the execution of safety programs. To elevate safety standards across all construction projects, it is imperative that each site develops and implements comprehensive safety plans tailored to its specific needs. Additionally, integrating dedicated budgets for safety measures within project contracts is essential to facilitate the acquisition of necessary safety equipment and the effective implementation of safety programs.

The study also highlights the critical need for comprehensive and consistent application of guardrails, barriers, warning signs, and signals in all hazardous areas. There must be a concerted effort to enforce the consistent use of personal protective equipment (PPE) among workers to mitigate risks and enhance overall site safety. The absence of designated safety officers at most sites further complicates the enforcement of safety measures and the communication of hazards. Establishing clear OHS roles and responsibilities for engineers and supervisors is crucial, and each site should ensure the presence of dedicated safety officers to oversee and enforce safety protocols, thereby fostering a safer working environment.

The lack of structured communication impedes the proactive identification and mitigation of safety risks, reducing overall site safety. To address this, it is essential to establish regular, structured communication channels focused on health and safety, ensuring that all workers are informed about potential hazards and the measures in place to address them. Training and awareness programs on OHS not only enhance the safety and health of workers but also contribute to the overall efficiency and productivity of construction projects. Well-structured training and education programs are required to enhance knowledge, promote a safety culture, reduce accidents and injuries, and meet legal and regulatory requirements. All surveyed sites must ensure proper living facilities, sanitation, hygiene, and first aid provisions, which are essential for preventing disease outbreaks, promoting mental well-being, reducing injuries, and increasing productivity.

In conclusion, the study emphasizes the pressing need for enhanced safety measures, structured communication, dedicated safety officers, and rigorous training programs to improve occupational health and safety standards across construction sites. Addressing these issues holistically will lead to safer, healthier, and more productive work environments in the construction industry.