



A STUDY ON FIRE SAFETY OF APARTMENT BUILDINGS IN NEPAL

Introduction/Background:

The rapid urbanization witnessed in Nepal has spurred a significant increase in the construction of high-rise apartment buildings. While this development addresses the housing needs of a growing population, it also brings forth critical challenges in ensuring the fire safety of residents in these multi-story structures. The unique characteristics of apartment buildings, such as shared spaces, complex evacuation routes, and the potential for rapid fire spread, necessitate a specialized approach to fire safety management.

The current landscape of fire safety regulations and guidelines in Nepal reveals a gap in addressing the specific needs of apartment buildings. Existing codes and standards, while providing a general framework for fire safety, often lack the detailed provisions and requirements necessary to ensure the effective prevention, detection, and suppression of fires in these complex structures. This regulatory gap, coupled with the limited awareness and preparedness among residents and building management, creates a potential for increased fire risks and devastating consequences.

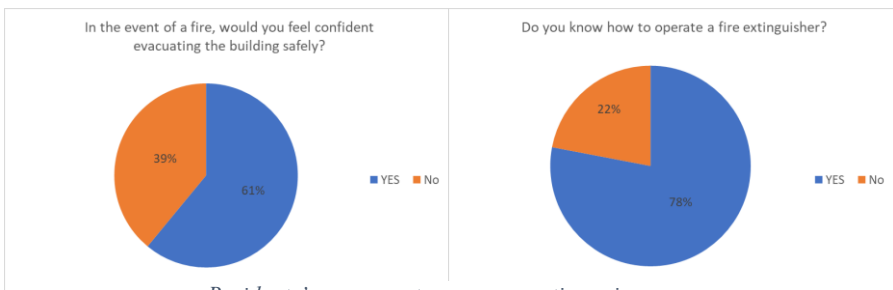
The absence of comprehensive fire safety measures in apartment buildings can have far-reaching implications. In the event of a fire, the lack of proper fire detection and suppression systems, inadequate evacuation routes, and insufficient emergency preparedness can lead to significant loss of life, injuries, and property damage. The impact extends beyond the immediate physical and financial losses, affecting the psychological well-being of residents and eroding public confidence in the safety of high-rise living. Therefore, addressing the fire safety challenges in Nepal's apartment buildings is of paramount importance to safeguard the lives and well-being of its residents and ensure sustainable urban development.

Objective:

The primary objective of this study was to assess the current state of fire safety in apartments of Nepal and develop a set of working procedures and guidelines to enhance fire safety measures. The study aimed to identify deficiencies in existing fire safety systems, evaluate emergency preparedness and response capabilities, and assess the overall fire safety management practices in these buildings. The ultimate goal was to provide actionable recommendations to improve fire safety and mitigate the risks associated with fire incidents in apartment buildings across Nepal.

Methodology:

The study employed a multi-faceted methodology, combining literature review, field visits, fire safety audits, conditional assessment and questionnaires to gather comprehensive data. A thorough review of existing fire safety regulations, codes, and guidelines, both national and international, was conducted to establish a baseline for comparison. Field visits were conducted to seven apartment buildings to assess the condition of their fire safety systems, including fire alarms, hydrants, sprinklers, and fire pumps. Fire audits were performed in five apartment blocks to evaluate their emergency preparedness and response capabilities. Questionnaires were administered to both residents and fire safety experts to gather insights into their awareness, preparedness, and perceptions of fire safety risk.



Residents' responses to survey questionnaires.

General Observations:

The assessment of fire safety preparedness in apartment buildings has unveiled a series of critical deficiencies that underscore the urgent need for comprehensive improvements. The evaluation of fire alarm systems revealed a concerning lack of proper installation and functionality. Many buildings either lacked complete systems or had components that were non-operational or poorly maintained. The absence of smoke detectors within individual units, coupled with the frequent disabling of fire alarm systems due to faults or false alarms, significantly compromises the effectiveness of early fire detection and response.



Poorly maintained valves and cabinets



Fire Extinguisher obstructed with cabinet in corridor



Leakage in Fire Hose Reel pipe



Fire hose cabinet blocked by personal item (fridge) installed in front of cabinet

The fire hydrant systems also exhibited significant shortcomings. A considerable number of systems were found to be non-operational or had not undergone proper testing. Even in buildings with testable systems, testing was often limited to the ground level, hindering a comprehensive evaluation of their functionality at higher elevations. The lack of proper maintenance, including blocked hose cabinets and leaking hose reels, further diminishes the effectiveness of fire suppression efforts. The reliance on overhead water tanks as the sole water source in some cases, due to non-functional fire pumps, raises concerns about the adequacy and reliability of water supply during fire emergencies.

The limited presence of automatic sprinkler systems, primarily restricted to basement parking areas in a few buildings, is another area of concern. The absence of these crucial systems in the majority of the assessed buildings leaves them vulnerable to rapid fire spread and extensive damage. The lack of zone control valve assemblies and drain points in existing sprinkler systems further raises questions about their effectiveness and maintainability.

The assessment of fire pump rooms revealed a mixed picture, with many rooms being inaccessible or cluttered with extraneous items, hindering maintenance and emergency response efforts. The lack of clear identification tags on fire pumps can further complicate maintenance and troubleshooting during critical situations. While most apartments had fire department connections, their accessibility and condition were not always optimal, potentially delaying firefighting efforts.



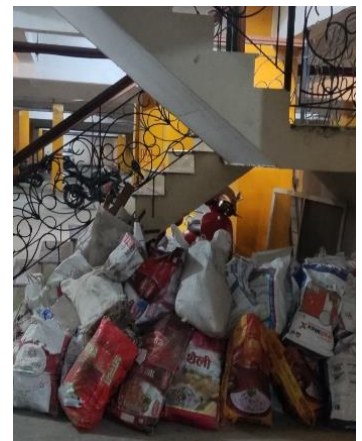
Fire Escape stair with exit signage



Testing of Fire Hydrant System



Evacuation staircase open to basement



Combustible waste stored under open staircase



Outdoor valves and cabinet in bad condition due to lack of maintenance



Expired Fire Extinguisher still installed



Flow testing of Fire hydrant with pressure gauge



Fire pump information tag being painted over

Escape routes were often poorly marked and lacked emergency lighting, and fire drills were infrequent or non-existent. The lack of awareness among residents and staff about fire safety procedures further exacerbated the risks. Additionally, the study found that existing fire safety regulations and guidelines were outdated and lacked specific provisions for apartment buildings, hindering effective fire safety management.

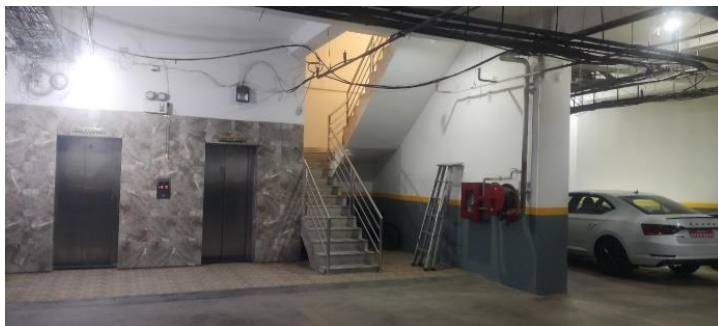


Fire pump room congested because of storage of empty containers

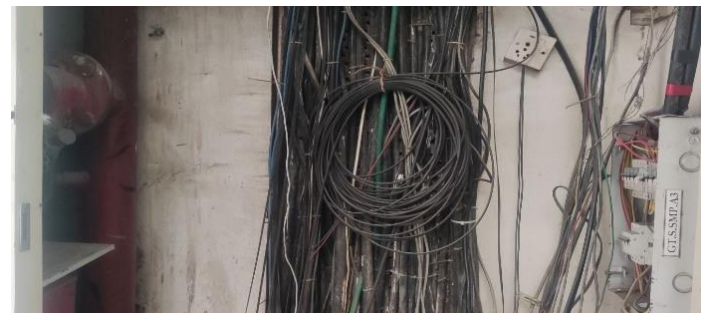


Congested fire pump room with extreme storage of waste materials

The overall fire safety management practices in the assessed buildings were found to be lacking. The absence of clear evacuation plans, designated fire wardens, and regular fire drills indicates a need for significant improvement in emergency preparedness and response capabilities. The lack of awareness among residents and staff about fire safety procedures and the proper use of fire safety equipment further highlights the need for comprehensive education and training programs. The findings emphasize on pressing need for a proactive and multi-faceted approach to fire safety management in apartments, encompassing the installation and maintenance of essential fire safety systems, the development and implementation of effective emergency response plans, and comprehensive education and training programs for residents and staff.



Evacuation Staircase and lift shaft open to basement



Firefighting riser and electrical cable and panels installed in same duct



Generator installed next to open evacuation staircase



Clean and easily accessible fire pump room

Results:

The study's findings emphasize on the urgent need for a comprehensive overhaul of fire safety measures in apartment buildings in Nepal. The following key results highlight the critical areas that demand immediate attention:

- **Deficiencies in Fire Safety Systems:** The assessment revealed a widespread lack of essential fire safety systems or the presence of systems that were either non-functional or poorly maintained. Fire alarm systems, crucial for early detection and timely evacuation, were often incomplete, not operational, or lacked coverage in individual units. Fire hydrant systems, intended for fire suppression, were frequently untested, inaccessible, or plagued with maintenance issues such as blocked hose cabinets and leaking hose reels. The limited availability of automatic sprinkler systems, even in basements, further increased the vulnerability of these buildings to rapid fire spread. The poor condition and inaccessibility of fire pump rooms, coupled with the non-functionality of fire pumps in many cases, raised serious concerns about the ability to provide adequate water supply for firefighting operations.
- **Inadequate Emergency Preparedness:** The study revealed a significant gap in emergency preparedness and response capabilities. Evacuation plans were often absent or poorly communicated, and fire drills were conducted infrequently or not at all. The lack of clear signage, emergency lighting, and designated assembly areas further hindered effective evacuation in the event of a fire. The absence of trained fire wardens and the lack of staff preparedness to handle fire emergencies highlighted the need for comprehensive training and drills.
- **Lack of Awareness:** The study found a concerning lack of awareness among both residents and staff regarding fire safety procedures and the proper use of fire safety equipment. Many residents were unaware of evacuation plans, the location of fire extinguishers, or how to operate them. This lack of knowledge and preparedness can lead to delayed evacuations, increased panic, and greater risks to life and property during a fire.
- **Outdated Regulations:** The existing fire safety regulations and guidelines in Nepal were found to be outdated and inadequate to address the specific fire safety need of apartment buildings. The lack of specific provisions for high-rise structures, coupled with the absence of clear enforcement mechanisms, has contributed to the current state of fire safety unpreparedness. The study emphasizes the urgent need for updated regulations that incorporate international best practices and standards, ensuring that fire safety measures in apartment buildings are comprehensive, effective, and enforceable.

Considering the urgent need for a comprehensive overhaul of fire safety measures in apartment buildings in Nepal., NRCBT has developed a working procedure and a basic guideline for safeguarding fire safety in apartment buildings. These documents are yet to be approved from the Ministry of Urban Development.

Conclusion and Discussions:

The study concludes that fire safety preparedness in apartment buildings in Nepal is critically inadequate, posing significant risks to residents' safety. Key issues include the absence or poor maintenance of essential fire safety systems and components, lack of comprehensive fire safety management plans, and insufficient fire safety education for both residents and staff. The study recommends mandatory installation and regular maintenance of fire safety systems, development and implementation of detailed fire safety management plans, and enhanced education and training programs. Additionally, it calls for updating existing fire safety regulations and codes to incorporate international best practices and launching public awareness campaigns to prioritize fire safety and advocate for necessary reforms. Immediate action is crucial to address these deficiencies and ensure the well-being of apartment dwellers in Nepal.