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Non-Motorized Transport Safety in Urban Corridors

Raghav S. Bhaskar
Assistant Professor
Department of Civil Engineering
Dhanalakshmi Srinivasan Engineering College, Perambalur, Tamil Nadu
Email Id: *raghav.bhaskar.civil@rocketmail.com*

Abstract

Non-Motorized Transport (NMT), encompassing walking, cycling, and other human-powered means of travel, forms a crucial aspect of sustainable urban mobility. With increasing concerns over environmental degradation, traffic congestion, and urban health, there has been a significant push toward promoting NMT in cities worldwide. However, safety issues concerning pedestrians and cyclists in urban corridors remain a significant barrier to widespread adoption. This paper explores the factors influencing NMT safety, the challenges faced in urban corridors, design strategies for safer NMT infrastructure, successful international case studies, and future directions. Emphasis is placed on the importance of integrated urban planning, policy reforms, technological interventions, and community engagement in ensuring that urban corridors are not only accessible but also safe for non-motorized users.

Keywords: *Non-Motorized Transport, Urban Corridors, Pedestrian Safety, Cyclist Infrastructure, Urban Planning, Road Safety, Sustainable Mobility*

INTRODUCTION

Non-Motorized Transport (NMT) represents a cornerstone of urban sustainability, offering energy-efficient, environment-friendly, and health-promoting means of transportation. Modes such as walking, cycling, and skating play vital roles in connecting transit systems, reducing vehicular emissions, and fostering vibrant city life. Yet, despite their benefits, non-motorized users are among the most vulnerable groups in urban transport networks. The World Health Organization (WHO) highlights

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that pedestrians and cyclists constitute a significant share of road traffic deaths globally (WHO, 2023).

Urban corridors, the principal arteries facilitating city movement, often prioritize motorized vehicles, leaving NMT users at a higher risk of accidents. Therefore, ensuring the safety of non-motorized transport in urban corridors is essential for promoting sustainable cities under frameworks like the United Nations Sustainable Development Goals (UN SDG 11).

This paper systematically examines the key components of NMT safety in urban corridors, barriers to safe mobility, best practices worldwide, and frameworks for integrating NMT safety into urban planning policies.

LITERATURE REVIEW

GLOBAL PERSPECTIVE ON NMT SAFETY

Studies such as Peden et al. (2022) indicate that countries with high NMT usage, such as the Netherlands and Denmark, have achieved lower accident rates through dedicated infrastructure, stringent laws, and cultural integration of cycling and walking.

In contrast, cities in low- and middle-income countries (LMICs) often neglect NMT needs, leading to higher injury rates. For instance, urban centers like Nairobi, Delhi, and Manila report that over 40% of road fatalities involve pedestrians or cyclists (ITDP, 2023).

INDIAN SCENARIO

In India, non-motorized modes account for a substantial share of urban trips, especially in smaller cities (Singh & Tiwari, 2023). However, the infrastructure remains largely inadequate, characterized by narrow or absent footpaths, encroachments, poor lighting, and lack of dedicated cycling tracks.

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DESIGN PRINCIPLES FOR SAFETY

Literature emphasizes principles such as Complete Streets, traffic calming measures, separated bike lanes, and pedestrian-first intersections (Gehl, 2022). These design philosophies enhance NMT safety by minimizing conflicts with motorized traffic.

CHALLENGES IN ENSURING NMT SAFETY IN URBAN CORRIDORS

1. INFRASTRUCTURAL DEFICIENCIES

Urban corridors frequently lack fundamental NMT facilities:

- Narrow sidewalks or their complete absence
- Non-continuous cycling lanes
- Poor-quality pavements
- Lack of crossing points at intersections

2. TRAFFIC SPEED AND VOLUME

High-speed motorized traffic poses a major threat to NMT users. Speeding vehicles in urban corridors discourage walking and cycling due to the perceived and actual risk.

3. INSTITUTIONAL FRAGMENTATION

Multiple agencies often share responsibilities for road design, maintenance, and enforcement, leading to fragmented approaches toward NMT safety.

4. LACK OF PUBLIC AWARENESS

Motorists frequently disregard pedestrian and cyclist rights due to poor traffic education, resulting in hostile urban environments.

5. POLICY GAPS

While some Indian cities have non-motorized transport policies on paper, enforcement remains weak, and budgetary allocations are inadequate.

SCOPE FOR IMPROVEMENT

1. INTEGRATED URBAN PLANNING

Prioritizing NMT in city master plans, transport strategies, and zoning regulations can institutionalize safety considerations at the planning stage.

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2. DESIGN INNOVATIONS

Examples include:

- Protected intersections
- Grade-separated crossings
- Tactile paving for visually impaired users
- Traffic calming devices like speed humps and narrow lanes

3. ENFORCEMENT AND LEGISLATION

Strict speed limits, motorist education programs, and penalties for traffic violations impacting NMT users must be instituted and enforced vigorously.

4. COMMUNITY PARTICIPATION

Engaging citizens through participatory planning processes ensures that the needs of diverse NMT users are incorporated.

5. TECHNOLOGY INTEGRATION

Smart sensors, automated pedestrian crossings, and GPS-based navigation tools customized for cyclists and pedestrians enhance urban corridor safety.

CASE STUDIES

AMSTERDAM, THE NETHERLANDS

- Amsterdam’s urban corridors prioritize cycling with:
- Dedicated cycling tracks separated from motor vehicles
- Comprehensive bike parking solutions
- Low speed limits in residential and mixed-use zones

This has resulted in over 40% of trips being made by bicycle with minimal accidents (Dutch Cycling Embassy, 2023).

BOGOTÁ, COLOMBIA

Bogotá's Ciclovía program closes major corridors to motorized traffic every Sunday, allowing over 2 million residents to cycle and walk safely.

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CHANDIGARH, INDIA

Chandigarh stands out for better NMT infrastructure compared to other Indian cities:

- Wider sidewalks
- Dedicated cycle tracks
- Ample green spaces

Yet, safety challenges remain due to growing car ownership.

DESIGN STRATEGIES FOR SAFER URBAN CORRIDORS

Table no: 1

Design Strategy	Description	Expected Benefit
Complete Streets	Streets designed for all users	Reduced accidents, inclusivity
Protected Cycle Lanes	Physically separated lanes	Decreased cyclist injuries
Traffic Calming	Measures like chicanes, speed tables	Lower vehicle speeds
Safe Intersections	Raised crossings, advanced stop lines	Improved pedestrian visibility
Urban Greening	Shade and greenery along corridors	Enhanced comfort, heat protection

FUTURE DIRECTIONS

- **Data-Driven Planning:** Regular audits and data collection on NMT accident hotspots should inform infrastructure improvements.
- **School and Workplace Initiatives:** Programs promoting walking and cycling to school or work should be backed by safety interventions.
- **Public Transport Integration:** Seamless NMT access to metro stations, bus stops, and interchanges will enhance corridor utility.
- **Funding Mechanisms:** Dedicated budgets for NMT infrastructure, potentially sourced from congestion pricing or green funds.

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CONCLUSION

Non-Motorized Transport forms an essential pillar for achieving sustainable, inclusive, and livable cities. Urban corridors, serving as key conduits of daily mobility, must be reimagined to protect and promote the movement of pedestrians and cyclists. This necessitates a shift in planning paradigms from car-centric designs to human-centric urbanism. Building safe, comfortable, and continuous NMT networks, supported by public engagement, robust policy frameworks, and innovation, is the way forward. Investing in NMT safety not only saves lives but also nurtures healthier, more vibrant, and equitable urban societies.

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