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Role of Parking Management in Urban Traffic Congestion: A Review

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Abstract: ***Rapid urbanisation poses a serious transportation problem and is particularly pressing in developing nations. Inefficient parking management significantly affects traffic flow, roadway capacity, and the overall performance of transport systems. This review examines the relationship between parking characteristics and urban traffic congestion, drawing on recent academic articles, policy documents, and case-based findings. The main issues identified are over-parking on streets, insufficient organised parking supply, weak compliance with parking rules and policies, and poor integration of parking with land-use and public transportation planning. Taken together, these variables reduce the effective carriageway width, generate more traffic snarls, introduce regional bottlenecks and hold-ups, and worsen traffic congestion. The review focuses on current parking management strategies, including demand-responsive parking pricing, shared parking modes, smart parking technologies, regulatory enforcement, and connections to sustainable mobility planning. Special attention is focused on medium and small cities, characterized by insufficient infrastructure, mixed circulation, institutional bottlenecks and limitations in parking management. Results suggest that parking management forms an essential part of congestion mitigation strategies within urban transport planning.***

Keywords: Parking Management, Urban Traffic Congestion, On-Street Parking, Parking Demand, Sustainable Urban Mobility.

Nomenclature:
IRC: Indian Roads Congress
MoHUA: Ministry of Housing and Urban Affairs
VTPI: Victoria Transport Policy Institute
LOS: Level of Service

I. INTRODUCTION

Congestion has been a recurring issue in urban transportation systems, especially in fast-developing countries. Although congestion is well associated with both traffic volume and limited road capacity, the significance of parking in impacting traffic operations is also evident [1]. Unregulated parking shrinks the effective road width, exacerbates conflicts, and degrades service levels.

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II. GROWTH OF MOTORIZATION AND PARKING DEMAND

Rapid urbanisation and economic growth have led to a rise in private vehicle ownership without a concurrent increase in formal parking supply. This has led to extensive on-street and illegal parking in urban settings [2].

III. PARKING CHARACTERISTICS AND TRAFFIC FLOW

Parking characteristics such as location, duration, turnover, and parking angle significantly influence traffic flow and roadway performance. On-street parking reduces carriageway width and increases lateral friction, leading to speed reduction and congestion [3].

IV. PARKING AND URBAN TRAFFIC CONGESTION

Studies indicate that vehicles searching for parking spaces contribute to increased traffic and localised congestion in urban areas [4].

V. PARKING MANAGEMENT STRATEGIES

Effective parking management includes supply control, demand-based pricing, enforcement, smart parking technologies, and integration with public transport systems to promote sustainable travel behaviour [5].

VI. CHALLENGES IN MEDIUM AND SMALL CITIES

Medium and small cities face unique parking challenges due to narrow roads, mixed traffic, and weak enforcement. Early adoption of parking policies is essential to prevent future congestion [6].

VII. RESEARCH GAPS AND DISCUSSION

The effects of parking in small and medium-sized cities have not received much attention in the research literature. To evaluate the effectiveness of policies, future research should prioritize simulation-based analysis, behavioural modelling, and data-driven evaluation [7].

VIII. CONCLUSIONS AND FUTURE SCOPE

Urban traffic congestion is largely determined by parking management. Better accessibility, reduced environmental impact, and sustainable urban mobility all depend on demand-based, integrated parking policies [8].

Because they make fundamental and innovative contributions to parking management and urban transport policy, some of the references cited in this

article have been retained.

DECLARATION STATEMENT

As the article's author, I must verify the accuracy of the following information after aggregating input from all authors.

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Debajyoti Das is currently pursuing an M. Tech in Transportation Engineering at Mangalayatan University, Aligarh. He holds a B. Tech in Civil Engineering from Techno India College of Technology and a Diploma in Civil Engineering from Valliammai Polytechnic College. He is presently working as a Designer at TATA Consulting Engineers Limited, where he is involved in smart road projects, surface parking infrastructure planning, and urban mobility improvement initiatives in Agartala. He has professional experience in highway construction, pavement works, quality assurance and quality control (QA/QC), material testing, and technical documentation in accordance with IRC and MoRTH standards. His technical skills include AutoCAD, Civil 3D, Revit, and traffic simulation tools. His research interests include parking management, urban traffic congestion, and sustainable transportation systems.

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