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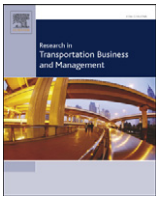

Managing urban freight transport in an expanding city — Case study of Ahmedabad

Shivanand Swamy [a], Deepak Baindur [b,*]

[a] Center for Environmental Planning and Technology, Kasturbhai Lalbhai Campus, University Road, Ahmedabad 380015, India
[b] Indian Institute of Human Settlements, No. 197/36, 2nd Main Road, Sadashivanagar, Bangalore 560080, India

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ABSTRACT

Urban freight transport is important because efficient flow of goods is essential for the effective functioning of the urban economy and sustaining existing lifestyles. In Indian cities, urban freight transport research has received limited attention from policymakers. Using the case study of Ahmedabad, this paper attempts to understand the characteristics of freight transport movements in the city and identify the main freight generating centres within the city. By linking property tax data with cordon survey data the main freight generating centres were identified and functionally categorised as warehouse clusters, wholesale markets and industrial areas. Field visits were conducted at 3 prominent clusters in the city to assess surrounding land use and transport infrastructure as well as identify main issues affecting access and evacuation of goods vehicles to these important freight generating centres. The main issues identified were outdated zoning and rent control regulations, conflicting land use mix, time and access restrictions on heavy goods vehicles and severe lack of adequate parking facilities around freight generating areas. The paper concludes with recommendations of a set of interventions based on successful replication in other cities.

1. Introduction

Urban freight transport is important because efficient flow of goods is essential for the effective functioning of the urban economy and for sustaining our existing lifestyles (Stopher, Verkehrsexperte, & Meyburg, 1977). This efficiency will determine the competitiveness of urban areas and the impacts on the costs of products, energy consumption, environment, safety, security and resource use. According to Oğuztimur and Çanci (2011), urban freight transport typically has an average share of 10% in the total urban transport. With the expansion of economic activities and globalisation of trade, the efficiency and smooth movement of urban freight are becoming increasingly critical for sustained economic growth of a city. Urban freight transport research has been receiving growing attention, although the focus has been mainly on passenger transport (Lindholm & Behrends, 2012). In Asian cities, urban freight transport is getting little attention in policy documents or city management (Timms, 2010).

Ahmedabad is the largest city in Gujarat and the seventh largest metropolitan area in India. According to the 2011 census, it has a population of 5.5 million, with 3.5 million residing within the municipal limits. The city has witnessed continuous growth in population over the past four decades in both area and population density. The last decade has seen the highest annual growth rate of 4.7% due to development of peripheral areas and sustained economic growth (AUDA, 2012). Ahmedabad's economy is gradually being dominated by the tertiary sector. The downturn in textile industry led to the weakening of the city's main industrial base. Other industries located in Ahmedabad, such as chemical, petrochemical and engineering, are less labour intensive. This has led to redundancy of a large labour force which has eventually been absorbed into the services sector. The city is the administrative centre and financial capital of the state, and contributes a share of 3.6% ($16 billion) to the country's GDP. Ahmedabad is divided by Sabarmati river into two physically distinct regions. The east bank comprises the old city area and the west bank is characterised by educational institutions, modern buildings, and new retail and commercial centres.

Taking Ahmedabad as a case study, this paper attempts to understand urban freight transport patterns, that is, location and characteristics of urban freight generating areas, transport infrastructure linkages and freight flows. In the process, the paper analyses the trends in urban freight vehicle movements, assesses the location and impacts of freight generators on the neighbourhood and the road network, and summarises the issues to be addressed. The paper concludes with recommendations for specific land use and transport planning measures that promote smoother freight movement, efficient use of infrastructure and road safety in Ahmedabad.

* Corresponding author.
E-mail address: baindurdeepak@gmail.com (D. Baindur).

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2. Research question, scope & methodology

For the purpose of this paper, urban goods or freight transport is defined as the delivery, pick-up or both of goods (from retail and manufacturing sectors) within the city of Ahmedabad. The urban freight movements are classified as follows:

1. External flows (External–External (E–E)) include movements which have both origin and destination outside the urban/study area.
2. Inter-urban flows (External–Internal (E–I) Or Internal–External (I–E)) include movements which have either origin or destination outside the urban/study area.
3. Intra-urban flows (Internal–Internal (I–I)) include movements which have both origin and destination within the urban/study area.

This research attempts to investigate and map the existing freight activity centres and movement of freight vehicles within the city of Ahmedabad in order to identify the major congestion points in the urban transportation network. It also seeks to identify major barriers to the smooth movement of urban freight traffic and suggest remedial measures in mitigating the urban logistics inefficiencies and road-safety-related issues around the freight activity centres in the city.

The scope of the study is the assessment of goods flows and identification of salient issues related to goods flows and freight activity centres in Ahmedabad. These assessments are based on 3 data sources — classified volume count (CVC) survey, roadside interviews of truck drivers, field visits to 3 types of freight-generating areas in the city and semi-structured interviews with various stakeholders at these freight-generating areas. CVC surveys of freight vehicles by type, time and direction were carried out at eight locations by CEPT University in 2006. CVC surveys were conducted over a period of 24 h on three working days in both directions of freight traffic flows at eight entry points of Ahmedabad.

The survey collected freight-vehicle data such as flows (external flows and inter-urban flows), origin–destination, commodity type and vehicle type. This was supplemented by roadside interviews of truck drivers. A total of 1000 truck drivers were interviewed at the entry points which constituted 10% of freight vehicles by type and direction to understand the frequency, purpose of city visits and amenities (such as driver lodging, vehicle repair and parking) that were available at loading/unloading locations within the city. Field visits were conducted to assess surrounding land use, available transport infrastructure and built form of three types of urban freight generating centres — industrial estates, warehousing centres, and markets in the historic inner city of Ahmedabad. During these field visits, 15 stakeholders comprising 5 factory managers, 6 warehouse managers, and 4 truck-terminal managers were interviewed.

3. Freight flow analysis of Ahmedabad

The CVC survey revealed that approximately 34,182 trucks per day enter or exit Ahmedabad through eight major entry/exit points (Swamy & Sharma, 2007).

Assuming a 6% compounded annual growth rate, 48,485 trucks/day were estimated to enter/leave Ahmedabad in 2012. Fig. 1 provides the average daily number of freight vehicles by type crossing the eight road entry points in Ahmedabad. Of these, about 29% of truck trips were internal to external trips and 34% were external to internal trips (inflows). It is observed that Adalaj in the north, Aslali in the south and Sanand/Sanathal in the south-west constitute the major directional flows of freight traffic by road to and from the city. A significant number of trips are transits through Ahmedabad (37% of total freight trips) and add to the urban freight mobility within the city (see Fig. 2).

For the freight vehicles that were entering the city, 60% of the trucks were observed to be running with a full load, 10% with half load, and 30% of the trucks involve empty runs. This is comparable to the UK figures where empty runs of heavy goods vehicles (HGVs) from 1984 to 2007 fell from 31.4% to 27.4% (Allen & Brown, 2010). Considering the fragmentation of the Indian road freight transport market, near absence of Information Technology and the dependence on a large number of transport agencies to match supply and demand in freight transport market, the city wide efficiencies seem to be relatively good.

Looking at the directional flows of freight vehicles, the data showed a slightly higher inflow of trucks compared to the percentage of outflows. This can be explained by the fact that the imbalance of inflows and outflows could have been a temporary phenomenon, caused because many vehicles get parked within the city limits awaiting return loads. It can also be observed in Fig. 2 that more than a third of total freight vehicles transits through the city along the outer ring road causing a significant addition to the traffic on the city's road infrastructure.

3.1. Freight flows by commodity type

In terms of commodity trade, the origin–destination of trucks indicated that construction materials, food grains, textiles, industrial products, oil and oil-based products, and consumer goods were the predominant goods traded in Ahmedabad. In the case of consumer products, construction material, oil & oil-based products and textiles, import is much more than export. In the case of other goods, import and export are more or less balanced. This suggests that a significant proportion of truck movement occurs for re-distribution within the western region rather than consumption within the city.

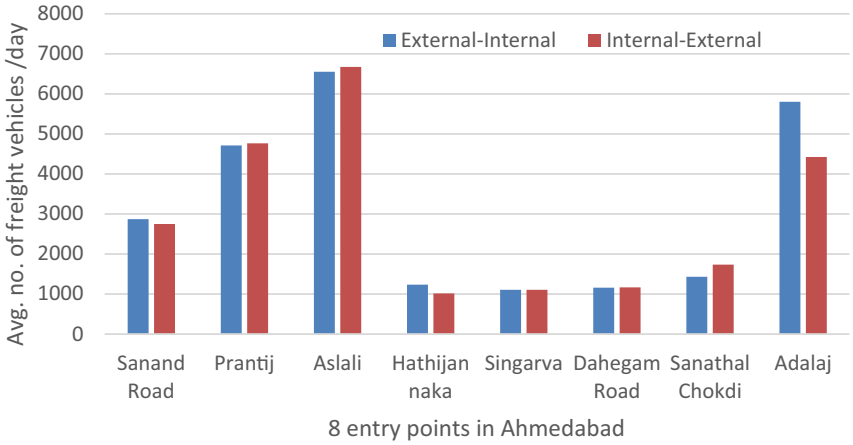

Fig. 1. Average number of freight vehicles crossing eight entry points to Ahmedabad per day (2012).