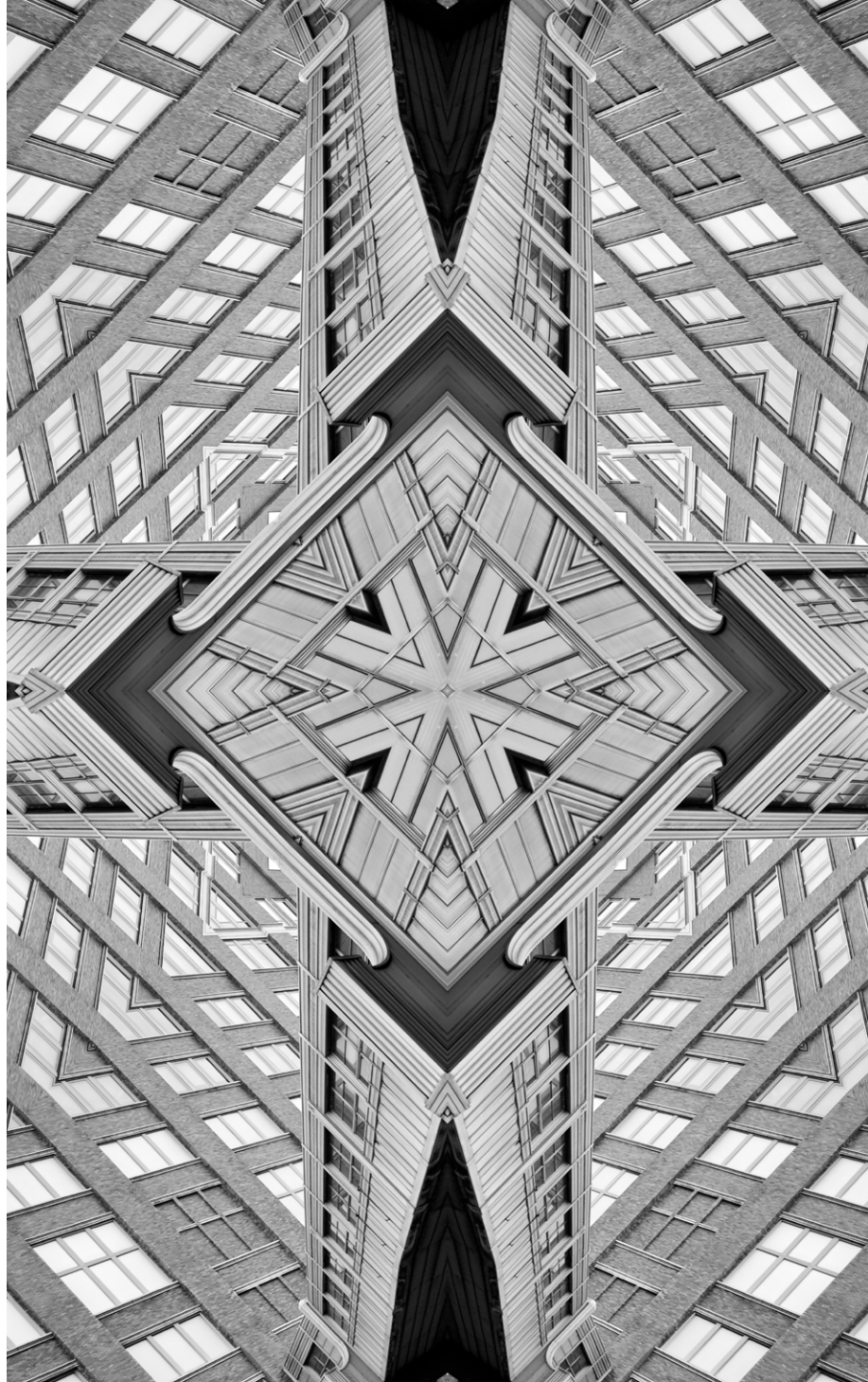


Issue

Brief

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The Need for Due Diligence in Urban Road Planning

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Abstract

Urban roads enable mobility, the delivery of services and transportation of goods, and empower social interaction. In many countries like India, they also provide space for micro enterprises as well as community activities that may be religious, social, or political in nature. It is, therefore, necessary to provide adequate land space for the construction of roads in Indian cities. Furthermore, due care needs to be taken for the quality of construction and in design of essentials such as traffic lights, road markings, barriers, and guardrails. To improve the functioning of a city, issues of traffic congestion and human safety, parking and maintenance also need to be adequately addressed.

Roads enable movement and facilitate the delivery of services.¹ They are used for the transportation of goods to industries, markets and consumers, and for trade and commerce. In cities, the street system enables the ‘connectivity matrix’, which is the foundation for mobility.² The quality of mobility, in turn, is a key to economic productivity. Additionally, city roads enable the enjoyment of pleasures and recreations, as well as social interactions and cultural exchanges. They are perhaps the most important public spaces in a city.^{3,4}

City roads are not just a movement corridor. They also carry critical pieces of networked infrastructure^a—i.e., sanitation, drainage, water pipes, power cables sewers, street lighting, optical fibre, piped gas, traffic surveillance, parking slots, and other services.⁵ The better the roads are in quality, design, and adequacy, the higher is their multi-tasking efficiency and the city’s liveability quotient. In Indian cities, roads are used for other additional functions. Statutorily, urban roads have to provide space to street vendors. The Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014, was enacted by Parliament to protect the rights of street vendors.⁶ The municipal commissioner of a particular zone is authorised to delineate vending zones grounded on its holding capacity.⁷ The statute further provides that a maximum of 2.5 percent of a city’s population can be accommodated in the vending zones, depending on the city’s holding capacity.⁸

Moreover, during social and religious festivals, parts of roads get taken up by processions and marquees, or designated as pathways for visiting devotees and crowds.⁹ Many of these events attract huge crowds, adversely impacting traffic movement and leading to road closures or diversions.¹⁰ Various court rulings have ordered that traffic on city roads should not be obstructed during festivals.¹¹ Roads are also used for political gatherings.

a ‘Networked infrastructure’ comprises the physical road architecture, including bridges, flyovers, tunnels and underpasses, traffic management systems including traffic signals, road signages and lighting, utilities and public transport systems as well as digital connectivity that are all synchronised for the delivery of urban services.

Worsening Quality of Urban Roads

Indian city roads are used by motorised vehicles such as cars, buses, minibuses, trucks of all sizes, motorcycles, and autorickshaws. Vying for the same road space are bicycles, handcarts, animal-drawn carts, pedestrians, and stray animals. The different speeds at which these road users move, compounded by a lack of civic sense and discipline, deficits in the enforcement of traffic rules, and systemic neglect, make Indian city roads among the most unsafe in the world, as evidenced by the high number of road accidents every year, many of them fatal.¹² This imposes a heavy economic burden too, costing India 3 percent of its annual GDP.¹³

Furthermore, with the constant influx of more cars in cities, on-street parking has become a huge concern. Parked automobiles take up more road space that otherwise would have been available for moving buses, trucks, cars and two-wheelers. This worsens traffic congestion. Most cities do not have adequate parking spaces and many old residential areas were built at a time that pre-date parking regulations. Consequently—as a study in Colaba in Mumbai, for example, found—car owners from such residential societies park on city roads.¹⁴ The available parking supply in any Indian city is outstripped by parking demand. Most cities that are already heavily built become progressively unable to provide more and wider roads on account of the enormous difficulty in pulling down built structures and the huge cost of compensation and resettlement. Meanwhile, the number of cars proliferates unabated, worsening the situation.¹⁵

TomTom Traffic Index for Indian City Roads

In the TomTom Traffic Index 2024, Kolkata, Bengaluru, Pune, Hyderabad, Chennai, Mumbai, Ahmedabad and Ernakulam figure among the 50 most congested cities in the world.¹⁶ Jaipur and New Delhi also feature in the global list of the seriously congested cities.¹⁷ Part of the traffic congestion is due to defective or inadequate design of road networks and intersections, incorrect speed limits set in high-density areas, and too many traffic signals.¹⁸ Other reasons are seasonal traffic surges; disregard for road rules; unforeseen roadblocks such as accidents, construction projects, and road closures; and rerouting of traffic during demonstrations and ‘VIP’ movements. Certain weather conditions such as heavy rain, snow and fog impact visibility and lead to slower traffic.¹⁹

Prohibitive Costs of Road Construction

The significance of roads as a vital city infrastructure is matched by their high cost of construction. In 2011, the High Powered Expert Committee (HPEC) on Urban Infrastructure worked out approximate costs of eight critical pieces of infrastructure that cities need.²⁰ While these costs would now require serious

Worsening Quality of Urban Roads

revision, the fact remains that as a percentage of infrastructural costs, they would be more or less constant, as inflation would be applicable to all infrastructure. According to this, roads are about the most expensive infrastructure in a city.

Along with stormwater drains that are an accompanying infrastructure to roads, they amount to about 70 percent of a city's total infrastructure cost.^b It is, therefore, extremely important that roads are constructed with care and designed to sustain the load and volume of traffic on them. Decidedly, the big cities in India carry extremely heavy loads and huge volumes.

Poor Design and Maintenance

Some of the reasons for the run-down condition of urban Indian roads are: poor design and inadequate use of materials, huge increase in current traffic volumes, poor maintenance, waterlogging on account of either absence of stormwater drains or their dysfunction due to clogging, and interference with the road surface.²¹

The design deficits include a lack of safety features such as bright and adequate lane markings, poor road alignments that impair visibility and the frequent absence of pedestrian infrastructure. Indian city roads carry very heavy traffic for very long hours and need additional material strength to sustain them. This aspect is generally found lacking, resulting in frequent requirement of road repairs. Indian roads also suffer from frequent utility-related digging that cause them to deteriorate prematurely.

Low Level of Citizen Satisfaction with City Roads

The overall satisfaction of citizens with regard to the construction, management and upkeep of city roads by city administrations across the nation is low. Some feel they are treacherously unwelcoming to a large majority of citizens.²² Footpaths are broken and uneven and pedestrian crossings lack safety.²³ One has to walk along open drains, live electric wires, dark alleys and roads riddled with potholes. These factors make the use of roads an unpleasant task.²⁴ In many cities, footpaths do not even exist alongside some roads.

^b The calculations of HPEC have been used as a base. The percentage is calculated by working out the cost of roads and stormwater drains in a city against the total cost of all eight infrastructures costed by HPEC.

Worsening Quality of Urban Roads

Even in an internationally important city such as Hyderabad, footpaths were missing in over 60 percent of the city. According to the Telangana Socio-Economic Outlook 2024, out of the approximately 9,000 km of road network under the Greater Hyderabad Municipal Corporation (GHMC), footpaths extend to only 1,039 km.²⁵ There is also a general absence of appropriate road design and a lack of maintenance standards and seamless integration of underground utilities.²⁶

The general impression is that municipal engineers and contractors have huge capacity deficits²⁷ and there is frequent digging and road-cutting due to lack of proper coordination between municipal and state departments. There is also a widely held view that this situation has come about on account of malfeasance.²⁸ Others highlight the lack of civic discipline and the common flouting of traffic rules.

Possible Correctives: Roads and City-Land Use Plan

Although the quality of road construction and the fault lines in allocating tenders receive a lot of public attention, there are other equally important factors that worsen the quality of Indian urban roads. Among the primary concerns is poor land-use planning. Space allocation in land-use plans of roads does not factor in the realities of Indian society and the road laws in operation.

For transport and communications as a whole, the Urban Regional Development Plans Formulation and Implementation (URDPFI) guidelines of the Government of India suggest 10-12 percent allocation of land for small towns, 12 to 14 percent for medium towns, 14 to 16 percent for large cities, and 15 to 18 percent for metro cities.²⁹ These are for urban centres in plain areas, where most of India's metros are located. Narrowing down to roads as one major element of transport and communications, the guidelines classify them into arterial roads (roads for intra-urban traffic), sub-arterial roads (roads for intra-urban through traffic), collector roads (roads for collecting and distributing traffic from and to local streets) and local streets (streets for access to residences, businesses with parking and for pedestrians).³⁰ These are for proposed average demographic densities worked out in persons per hectare (pph).

The guidelines suggest 75-125 pph for small towns, 100-150 for medium towns and large cities and 125-175 for metro cities. This can also be expressed in terms of persons per km² (ppk): 7,500-12,500 ppk for small towns, 10,000-15,000 ppk for medium towns and large cities, and 12,500-17,500 ppk for metro cities.³¹ In practice, most Indian cities do not follow the URDPFI guidelines regarding space allocation for roads and end up with inadequate road-land allocation. The situation is made worse on account of the very high population density of Indian cities that make road land allocation doubly insufficient.

In comparison to the urban settlements of the United States and Europe, land allocated to roads in India is low. According to UN-Habitat, the United Nations Human Settlements Programme, the percentage of land in developing countries varies from 6 to 12 percent,³² whereas in developed countries it averages 29 percent.³³ Bangui (Central African Republic) and Yerevan (Armenia) had just 6 percent of city area taken up by roadways in 2024 as against 36 percent in Manhattan, 34 percent in Hong Kong, and 33 percent in Barcelona.³⁴ Roads in US metropolitan areas account for approximately a fifth to a quarter of urbanised land, and in some cases, 30 percent of city space.³⁵ Similarly, land allocated to roads in European cities is substantial, though a little more conservative than the US.³⁶

Lack of Space for Road Widening

Road construction and street patterns require planning at the initial stages of city growth. As cities become denser, introduction of wider streets can be costlier. The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act 2013 (RFCTLARR) requires 2x the market cost to be paid as land acquisition cost. Furthermore, widening roads requires pulling down parts of or entire built structures where people live or work, or introducing new road lines over densely built areas—an almost impossible task.

The consequences of such initial failure “are congestion, inequalities, segregations and lack of street light [sic] and safety. Together, this jeopardizes the chances of prosperity for the people living in the city.”³⁷ However, there is another angle to this issue. All widened roads soon get consumed by ‘induced demand’^c over time, restoring the earlier traffic situation.³⁸ Therefore, there are additional precautions that cities ought to take while making provisions for adequate road space *ab initio*. Given the uses of urban roads in India as discussed earlier, it would appear that cities should target 30 percent land allocation for roads to achieve reasonable order.³⁹

Poor Quality of Roads

Experts have suggested that city roads ought to be designed with “densely graded bituminous/concrete so that they can withstand heavy axle loads and very high load repetitions.”⁴⁰ They should also be able to endure heavy rainfall. Furthermore, quality checks during and after construction ought to be mandatory. Construction of pre-planned utility ducts by their side would prevent road digging. The roads could be covered with outlets for utility ducts requiring the installation of pipes below the road surface with access points at regular intervals. The surface above could then double up as footpaths. Paver blocks can be pressed into service where roads experience very heavy standing loads. The provision of holding ponds can prevent damage caused by flooding.⁴¹

c ‘Induced demand’ refers to a transportation theory that believes that enhancing resource capacity results in increased consumption, thereby negating the benefits sought to be achieved. Thus, wider roads would lead to more vehicles and more traffic, resulting in restoring the earlier traffic congestion.

A contrarian view is that concrete roads are poor in riding quality as compared to tar roads. They generate a huge amount of vehicle vibration and noise; they are bumpy to drive on, making it an unpleasant experience for drivers and passengers alike. When repaired, it is difficult to achieve smooth joints in concrete roads; plus, their construction and repair take longer. Temperature fluctuations cause them to crack and wet concrete roads turn slippery. They are ecologically more polluting, have high heat generation, and lead to greater wear and tear of tyres. Despite tar roads having certain disadvantages, their overall quality can be superior if they are scientifically constructed.⁴²

Absent Maintenance

City road maintenance services need to take care of potholes, surface cracks and drainage fixes to prevent larger structural damage.⁴³ City authorities need to perform the following tasks: frequent inspections and monitoring of road stretches along with checking the cleanliness and efficiency of stormwater drains and culverts; using durable material for road construction such as asphalt overlays and slurry seals as well as latest technologies such as infrared asphalt repair and automated crack sealing while carrying out repairs;⁴⁴ and using technologies such as ‘Aquaphalt’ and ‘ChipFill’ for repair of potholes.⁴⁵

The repairs should be undertaken during off-peak periods, especially at night, with proper signage for commuter information and after a study of alternate routes, which would help maintain safety and the smooth flow of traffic.⁴⁶

Traffic Congestion

Given the mounting traffic congestion in many Indian cities, state governments will soon have to take steps to control the situation. These will comprise, on the supply management side, the introduction of more means of public transport, more elevated and multilayered roads, more off-street, multi-storeyed parking and better traffic signalling systems.⁴⁷

On the regulation side, the steps would include regulating on-street parking and the introduction of congestion pricing. It also appears inevitable that at some point, state governments would have to direct cities to cap the vehicle number based on road and parking capacity of urban local bodies (ULBs) and bring in a policy of disallowing car purchases without proof of parking space at the owner’s place of residence.

Insufficient Parking

Insufficient parking space in Indian cities is emerging as a significant challenge. A few cities, such as Ahmedabad, Bengaluru, Pune and Mumbai, have attempted creating parking stipulations in new constructions, new technologies to facilitate smooth parking, off-street parking provisions and regulations and pricing as a management tool. Some of the pricing strategies for parking management are based on demand and occupancy, encouraging quick parking space turnover through pricing by duration and zone-based pricing by charging more in high-congestion areas.⁴⁸

However, there are a large number of governance issues, since the responsibility of administering parking in any city is divided between the state government, ULBs, the police, and parastatals. The state needs to play a central role by erecting an overarching mechanism that brings different authorities together. In Mumbai, the city's experiment with creating a comprehensive parking authority is currently stalled at the level of the state government for approval.⁴⁹ These attempts at innovation need serious consideration.

Safety Issues

With the increase in human density on Indian urban roads and given the heterogeneous mix of traffic,⁵⁰ crashes, injuries and road fatalities have been on the rise.⁵¹ Vulnerable road users (travelling on two-wheelers, in autorickshaws and pedestrians) are at greater risk and bear greater burden of injury.⁵² These vulnerabilities can be reduced through improvements in infrastructural safety designs, such as walkable footpaths, road shoulders, road markings and signages, medians, safe road crossings at reasonably short distances, segregated bicycle lanes, sufficient road illumination during nights and more prompt emergency response.⁵³

Better enforcement of road rules is essential, especially against speeding and drunken driving. Adequate number of surveillance cameras and penalties for violations are also needed. The general design principles advocated are that travel speeds in cities must be limited, 90-degree impact angles should be avoided, physical separation of vulnerable road users should be attempted and points of conflict should be limited.⁵⁴ Citizens must show better commuter behaviour too—avoiding speeding, wearing helmets, and not driving on the wrong side of the road.

Roads in Indian cities start with a grave disadvantage as they are loaded with functions that are greater than the usual. Despite this, they start with a planning standard that ab initio does not equip them with sufficient land space. The situation is made worse by two additional factors: Most cities do not even meet the prescribed road standards that are already in deficit. Furthermore, demographic densities of many cities are higher than URDPFI guidelines and therefore need more space allocation for roads.

While better street design and construction quality, greater coordination and higher maintenance are all important factors, it is even more vital that statutory, high-density, social and cultural factors are not ignored. Their recognition requires the upward revision of land-use standards—around 30 percent for Indian cities—to allow reasonable order to emerge on the roads. Additionally, given the central significance of roads in the city's economy and social and cultural life, more attention needs to be paid to their support infrastructure. At the same time, maintenance, quick and quality repair, and due focus on human safety and regulation are all vital. [ORF](#)

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