

Road is a Construction Intended for the Transportation of People and Motor Vehicles

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Abstract

A roadway is a structure designed for the movement of individuals and vehicles, functioning as a public route, a street within a community, or an unclassified passage where traffic occurs. In its most comprehensive definition, a roadway may be regarded as any surface that facilitates travel or movement and links two locations. A roadway constitutes a designated area of land that is either prepared for or utilized by some form of traffic that connects two endpoints.

Keywords : Road, Roadway, Travel Movements, Alcohol, Accidents

1. Introduction

Roadways represent a crucial part of the transportation infrastructure, and the details of their design greatly influence traffic performance [1]. There are two fundamental types of services offered by roadways and their systems:

- **Accessibility**
- **Mobility**

Accessibility denotes the straightforward connection to adjacent properties and land uses facilitated by roadways. This accessibility manifests through features such as curbside parking, entrance to off-street parking through driveways, bus stops, taxi pickup areas, loading zones, access to loading locations via driveways, and similar characteristics. The access feature allows a driver or passenger to leave the vehicle to reach the specific land use. Conversely, Mobility denotes the movement of individuals, goods, and vehicles from one point to another within the system. The primary challenge for traffic engineers lies in the particular design features that enhance access—such as parking areas, driveways, and loading zones—often hinder uninterrupted movement, or mobility. Consequently, the two primary services offered by a roadway system frequently conflict with one another. This necessitates the development of roadway systems in a hierarchical format, where different classifications of roadways are intentionally designed to serve distinct purposes.

Mobility and the function of streets have long been recognized as

vital in urban environments, yet they have primarily been the focus of engineers and transportation planners, who tend to examine movement mainly through quantitative models from regional science or the geometrical aspects of roadway design [2]. This focus is understandable due to the practical difficulties involved in systematically analyzing and organizing urban traffic, which involves complex flows connecting individuals and locations at various levels from local to global. Crafting safe and efficient roadways in an era defined by rapid and high-volume vehicle traffic necessitates specialized knowledge such as professional engineering, alongside extensive legal frameworks or regulations to ensure public safety.

As a result, transportation geography has developed alongside civil engineering and economics, aiming to create quantitative and model-driven insights into transportation within and between cities, as well as the relationships between transport systems and locations in terms of spatial dynamics, networks, distance-related friction, and the connections between spatial interactions and places. Such methodologies are crucial for the systematic examination and design of transportation networks, allowing transport geographers to significantly influence policy and investment choices. However, quantitative and model-driven perspectives tend to overlook (by their nature) the social intricacies of mobility as experienced, leading to increasing critiques of technology-focused transportation research and policymaking.

2. Transportation

Transportation planning has primarily focused on creating long-term strategies for multifunctional transportation networks for both urban and suburban transit [3]. Plans related to transportation have encompassed enhancements to current facilities and services, as well as decisions regarding the location and design of new ones. Currently, various methodologies are employed across a wide range of operational, planning, design, and policy contexts in both private and public sectors, taking into account both short-term and long-term viewpoints. The central focus of all these methods has been to predict travel demand and to strategize and create facilities that can efficiently cater to the anticipated travel demands, thereby enhancing the flow and speed of transported goods and individuals.

The adverse external factors connected to transportation systems include detrimental emissions, noise pollution, and traffic accidents leading to property damage and loss of life. There has been an increasing recognition of the importance of factoring in these negative externalities within the transportation planning framework, aiming for transportation strategies that tackle the need for enhanced mobility while also minimizing the transport system's detrimental effects. Addressing the tension between mobility and safety demands the following approach. The recognition of benefits and hazards can be shaped by implementing the appropriate methodology. For instance, metrics for assessing mobility could focus on the number of individuals transported per unit of time rather than solely on the time spent in transit.

A deeper comprehension of how streets function, and their space usage, will inform us about varied design standards. For instance, in residential neighborhoods, streets also serve as playgrounds for children, pedestrian paths, and spots for social gatherings; thus, they should be constructed to allow maximum vehicle speeds of 5-10 km/h. Likewise, in urban centers with diverse land uses, infrastructure should be designed to accommodate the needs of walkers and cyclists, as these areas require slower movement to facilitate shopping and browsing. Pedestrians and cyclists can utilize space much more efficiently in comparison to vehicles.

Another crucial aspect related to the perception of mobility advantages and the assessment of risks is the belief that the time gained from driving at higher speeds is greater than what is actually experienced. Enhanced mobility tends to be shared among numerous road users, typically realized in tiny increments of just a few seconds. The safety benefits are primarily enjoyed by a relatively small group of individuals who save substantial amounts of time (in terms of avoiding premature death). A significant concern regarding transportation policies focused on raising the speeds of motorized vehicles is that the heightened risk of accidents is primarily borne by pedestrians and other non-motorized transport users who do not experience increased mobility (at least not when they are walking). Therefore, the gains are felt by one subgroup, while another subgroup faces disadvantages. When assessing

the overall advantages and disadvantages to society, it has been demonstrated that the time gained from improved mobility and the time lost due to fatal accidents and injuries roughly equate. In other words, the total minutes saved from quicker travel are approximately equal to the added minutes resulting from the experience of being deceased.

Planning transportation systems entails intricate interactions between the current transportation framework and the activity system, which encompasses socioeconomic, political, and land use patterns. Analyzing each subsystem in detail reveals differing demands for mobility and safety, often leading to conflicting needs. The selection of transportation planning approaches and the implementation of specific plans involve making choices to resolve conflicts and trade-offs regarding benefits and drawbacks that various groups experience. Hence, transportation planning approaches, plans, and policies reflect the value system of the dominant group.

3. Travel Movements

The critical components that make up traffic activities include drivers, vehicles, roads, and the surrounding environment [4]. Among these elements, the driver is viewed as the most significant influence on driving activities, as over 90% of traffic incidents are attributed to risky driving behaviors. Investigating the factors that contribute to risky driving is vital for promoting traffic safety, and this area has increasingly become a pivotal focus in transportation research. Operating a vehicle is a multifaceted task, and safely managing a vehicle is shaped not only by external factors like road conditions, weather, terrain, and infrastructure but also by personal aspects including the driver's experience, mental health, and physical fitness. To address the variable and unpredictable nature of drivers' conditions, research examining the elements that affect risky driving can offer insights that aid in enhancing driving habits. Current studies can be leveraged to target training for drivers who frequently engage in dangerous driving practices or to inform individuals about their driving capabilities.

According to the American Association of State Highway and Transportation Officials (AASHTO), up to six distinct travel movements may occur during an average trip [1]:

- **Main movement**
- **Transition**
- **Distribution**
- **Collection**
- **Access**
- **Termination**

The primary movement occurs in the through segment of a journey and serves as the essential link between the starting point and the endpoint. A transition takes place when a vehicle shifts from this through segment to the additional tasks necessary for access and completion of the journey. For instance, a vehicle may utilize an exit ramp to move from a highway to a roadway. The distribution function enables drivers and vehicles to exit a significant thoroughfare and navigate towards the general vicinity of their destinations.

The collection process brings the driver and vehicle closer to their final stop, whereas access and termination provide the driver with an opportunity to park and engage with the land use they desire. Not every trip will encompass all of these elements.

The roadway designs must correspond to the hierarchy of trip functions in order to achieve the objectives. A conventional trip has two endpoints: one at the start and one at the end. At the starting point, the access function creates a chance for a traveler to board a vehicle and for that vehicle to enter the road system. The driver might encounter various facilities, generally progressing towards those designed for higher speeds and through traffic, until they reach a facility or collection of facilities that ensure the main thoroughfare connection. Upon arriving at the trip's destination, the opposite takes place, as the driver moves systematically toward facilities that prioritize access until arriving at the desired land area.

Freeways are categorized as roadways that provide unimpeded traffic flow, characterized by complete access control [5]. Access control pertains to the rights of the public to enter from properties adjacent to the freeway; access is permitted only via designated public roads, commonly through on- and off-ramps. This allows freeways to function at higher speeds and greater capacities compared to urban arterial roads or local streets. Typical operating speeds are often high, around 60–70 mph, due to the low grades, flat horizontal curves, and median separation between opposing lanes of traffic found on freeways. The Green Book suggests lane widths of 12 feet along with continuous paved shoulders on each side of the roadway. In rural areas, freeways generally have more available right-of-way which allows for higher design speeds and more accommodating design features, supporting longer intercity travel. Conversely, urban freeways have more limited geometry and typically handle significant traffic volumes as they cater to urban commuters during peak morning and evening hours.

From an operational standpoint, freeways are designed to facilitate smooth mainline traffic flow. Vehicles enter the freeway mainline via on-ramps, which typically feature yield signs at the entry point; this allows vehicles to maintain or even increase their speed as they approach. Likewise, vehicles leave the freeway through off-ramps to connect with the surface arterial network.

4. Classification

All highway networks are structured in a hierarchical manner based on the combination of access and mobility functions they offer [1]. There are four primary categories of highways that can be recognized:

- **Limited-access facilities**
- **Arterials**
- **Collectors**
- **Local streets**

Limited-access facilities allow for complete through movement or mobility without allowing direct access to adjacent land uses. Arterials are surface roads primarily intended for through traffic

while still allowing some access to neighboring properties. Local streets are designed mainly for access to adjacent land uses, with through movement being a secondary feature, if it exists at all. Collectors serve as a middle ground between arterials and local streets, offering a blend of mobility and access. The term collector is derived from their common role in gathering vehicles from various local streets and directing them toward the nearest arterial or limited-access facility. The usual journey begins on a local street. The driver looks for the nearest collector to reach the closest arterial. If the trip is sufficiently lengthy, a freeway or limited-access road is pursued. Upon arrival at the destination, this process is reversed. Depending on the duration of the trip and the specific characteristics of the area, not every type of facility needs to be included for every journey.

5. Alcohol

Development of reliable technology for assessing alcohol content in the body and linking that to impairment and heightened accident risk formed the foundation for a major change in preventing drink-driving [6]. Norway was the pioneer in implementing legislation that criminalized driving with a blood alcohol concentration (BAC) exceeding a designated limit, initially established at 0.05%, with similar regulations quickly being passed by other Scandinavian nations. These laws were distinctive as they rendered driving at a particular BAC level an offence on its own, commonly referred to as *per se* laws.

The interest in using *per se* laws as a tactic to tackle the issue of drink-driving expanded to other regions. In 1967, Great Britain enacted a *per se* statute (the Road Safety Act) with a legal threshold set at 0.08%. The initial outcomes were considerably positive, showing a significant decline in the number of alcohol-related accidents; however, over time, collision rates seemed to revert to nearly the levels seen before the law was enacted. Regardless, the initial effects of these regulations were remarkable, prompting other nations to adopt similar measures in the years that followed. The implementation of *per se* laws in various European nations, Canada, the United States, Australia, Japan, and beyond has consistently influenced rates of drink-driving and related injuries and fatalities. A crucial element determining the effectiveness of these laws is how much they affect the perceived probability of being apprehended for inappropriate drinking and driving.

As a result, many regions that initially established higher legal limits (for example, at 0.08% or more) have opted to lower the permissible BAC limits over time. The reasons for lowering these legal thresholds include findings that driving-related skills can become substantially impaired at very low BAC levels, that collision risks are notably increased at 0.05% BAC or possibly even lower, and that implementing and reducing legal limits can lead to declines in alcohol-related accidents, injuries, and fatalities within the community. Generally, the reduction of legal limits has led to decreased rates of collisions, injuries, and deaths across numerous countries. In various regions, young drivers, inexperienced driv-

ers, and individuals with prior convictions for drink-driving have been recognized as being particularly vulnerable to involvement in collisions and have faced stricter BAC limits or complete bans on driving after consuming any alcohol. These focused BAC regulations seem to be effective in curtailing drink-driving among the targeted demographics, including young and inexperienced drivers and those with a previous drink-driving conviction.

Other initiatives based on deterrence have demonstrated effectiveness in decreasing fatal accidents related to drink-driving. Administrative licence suspensions (ALSs) involve the revocation of a driver's licence by the governing body, usually for a brief duration (ranging from a few days to several months), at the moment a drink-driving charge is filed or when an individual is caught driving with a blood alcohol concentration (BAC) exceeding a set limit. This practice was initially adopted in the United States to establish uniformity in licensing decisions concerning impaired drivers and to enhance the deterrent impact of such measures. Studies evaluating ALS regulations have indicated they can lead to diminished frequencies of self-reported drink-driving incidents and fatalities on the road. Implementing spot-checks, sobriety checkpoints, or 'blitz' operations serves as a strategy to uphold a heightened sense of the probability of being stopped by law enforcement. Research supports that spot-check initiatives, which combine public awareness campaigns with highly visible enforcement, can effectively lower accident rates during the operation of these measures. In Australia and many regions in Europe, random breath testing (RBT) has been initiated, allowing law enforcement to request breath tests from drivers without any prior suspicion of impairment. This approach enables a larger number of drivers to be assessed, likely increasing the driving population's perception of the chances of being caught. Evaluations of RBT indicate it can considerably lower instances of drink-driving and traffic accidents associated with alcohol, especially when paired with visible enforcement practices.

Individuals who engage in impaired driving or face drink-driving charges exhibit significantly higher rates of alcohol-related issues compared to the general populace. Many jurisdictions have rolled out rehabilitative or corrective programmes for those convicted of drink-driving, often incorporating alcohol education and brief interventions, with some requiring extended treatment. These programmes offer significant advantages to participants, including enhanced traffic safety outcomes, lower rates of alcohol and drug consumption, and health improvements such as decreased mortality rates. Other strategies intending to modify drink-driving behaviors, particularly ignition interlock programmes, appear to hold potential for enhancing road safety.

6. Crime

Road traffic offenses fall into a type of crime where the identity of the offender is frequently known upon the discovery of the act [7]. These offenses are typically identified by law enforcement through direct observation from officers, information obtained from the

general public, participants in traffic or accidents themselves (offenders, victims, or bystanders), details provided by medical facilities treating the accident victims, notifications from emergency services, and occasionally through anonymous or pseudonymous tips, which are less frequent. These sources represent the primary means of gathering information regarding the potential occurrence of a crime.

The initial details received can vary significantly in their content and informational value. There are cases where this information clearly reveals that a traffic incident has taken place, yet it may not clarify whether a criminal act has occurred or even confirm that it is a traffic incident. Furthermore, initial observations may merely suggest the potential that an event possesses traits of a traffic accident, or that the circumstances of a traffic event may exhibit characteristics consistent with a crime, and determining if a criminal act transpired may require a thorough expert analysis, which can sometimes be extremely complex.

Frequently, however, the early data will suggest a likelihood of a traffic offense. In real-world situations, the details surrounding the incident can often remain ambiguous on key points, leaving uncertainty as to whether it constitutes a criminal act or an accident due to unforeseen circumstances. Ultimately, the most prevalent scenario is that initial evidence suggests a traffic accident may indeed be a criminal infraction stemming from a breach of traffic regulations, possibly influenced by additional contributing factors. This scenario necessitates a comprehensive and intricate evaluation of all relevant elements.

These actions, by their very nature, involve forming hypotheses regarding the incident, which can be viewed as a preparatory activity that will rarely formally enter the procedural framework, and when it does, it is usually in an indirect manner, serving to clarify specific aspects of the occurrence (such as pinpointing the exact timing of the incident). Upon receiving a report, it is crucial for the receiver to adopt a critical yet swift response, distinguishing potential false alarms, urgently verifying the report's authenticity, and dispatching the necessary personnel to the location, while also initiating other immediate actions that cannot be postponed.

7. Conclusion

A road refers to a built structure designed for the movement of individuals and motor vehicles. It is an established surface that serves as a travel area for all or specific users of transportation, according to legal standards and other rules. Any area where any form of movement occurs is classified as a road [8].

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