

Studies on Road Accidents Due to BMTC Buses in Bengaluru City-A Review

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Abstract– This review paper investigates the incidence and root causes of bus accidents in Bengaluru caused by the Bangalore Metropolitan Transport Corporation (BMTC). The study is based on a thorough analysis of the existing literature, which includes reports from governmental organizations, scholarly works, and news articles. The paper discusses the trends and patterns of BMTC bus accidents over the past ten years, emphasizing the most frequent causes of accidents and identifying the contributing factors that increase the likelihood that they will occur. It also looks at the steps BMTC has taken to address the problem and the success of those steps in lowering accident rates. The paper ends with suggestions for additional study and plans to increase road safety in Bengaluru. Overall, this review paper offers a thorough analysis of BMTC bus accidents in Bengaluru and identifies critical areas that require additional research and action.

Index Terms– BMTC, Bus Accidents, Causes Of Bus Accidents, Preventive Measures for Bus Accidents.

I. INTRODUCTION

Bengaluru, the state capital of Karnataka, is one of India's fastest-growing cities, with a population of over 12 million people. The city's rapid urbanization and growing population have resulted in a significant increase in the number of vehicles on the roads, causing traffic congestion and an increased risk of road accidents. The Bangalore Metropolitan Transport Corporation (BMTC) runs a large bus fleet that transports millions of people every day. While BMTC buses play an important role in the city's transportation network, they are also involved in a significant number of accidents each year that result in injuries and fatalities.

For several years, the frequency and severity of BMTC bus accidents in Bengaluru have been a source of concern, with many stakeholders urging action to

improve road safety and reduce the number of accidents. Several studies have been conducted to investigate the causes of these accidents, the factors that contribute to their occurrence, and the steps taken by BMTC to address the problem.

II. ANALYSIS OF DATA

In Bengaluru, there are typically 400–500 non-fatal crashes and 100–120 fatal collisions involving buses each year, up from 58 in 2000 to 113 in 2008. Almost 85% of bus accident fatalities and injuries took place on the city or municipal roads and in 12 significant geographic areas. 22% of fatalities happened during transportation, 24% during the crash, and 44% happened in the hospital.[3].

The total number of fatal crashes in 2007 was 957, of which 12 percent involved buses of the public transport system. The fleet of buses has increased by almost 80 percent during this period (2003-2007), as have the number of crashes. The number of fatalities in bus accidents has not changed over time, demonstrating that, in the absence of specifically targeted effective countermeasures, the number of crashes is almost directly proportional to fleet size.[5] [6]

III. ANALYSIS OF THE MODE OF TRANSPORT OF VICTIMS

The risk associated with different modes of transportation for being a victim of a fatal bus crash varies. To analyze this, victims' modes of transportation were divided into six categories: auto rickshaw, cyclist, four-wheeler, two-wheeler, bus passenger, and pedestrian. In terms of absolute numbers, motorized two-wheeler riders account for 40% of fatalities, while cyclists account for about 10%. However, when the risk of a fatal crash is calculated per million kilometers

traveled by a specific mode, cyclists are roughly six times more vulnerable than motorized two-wheelers. This could be due to the lack of separate bicycle lanes on arterial roads, forcing bicyclists to share the left lane with buses.

Riders of cars and other four-wheelers are extremely unlikely to be killed in a collision with a public transportation bus.

A detailed conflict-analysis study [6] looked into the high involvement of buses and trucks. According to the authors, these vehicles must use the city's curbside lane and frequently collide with pedestrians, bicyclists, and motorized two-wheelers because they share the same space on the road. As a result of the lack of dedicated bicycle paths and adequate space for pedestrian movement, vulnerable road users are frequently involved in fatal crashes.

According to the analysis, 36% of the victims were crushed under the wheels of the buses. The rear wheels were reported to have crushed 85 percent of the cases. This indicates that the victim during the crash went. From the sides, crawl under the bus. This was most likely due to the bus's side skirting having a large ground clearance of 700-800mm, allowing the victim to go under [4] [5] [6].

IV. FATAL BUS CRASHES: UNDERSTANDING PASSENGER INVOLVEMENT

Seventy-three percent of all pedestrians killed in fatal collisions with buses died while attempting to cross the street. In a similar vein, 71% of all two-wheeler fatalities in collisions with buses happened while the victims were moving in the same direction as the bus. This highlights the need for safer pedestrian crossings as well as better traffic management and speed control.

V. DIRECTION OF TRAVEL OF THE VICTIM

The breakdown of the victims' directions of travel reveals that 73% of all pedestrians killed in fatal bus collisions died while attempting to cross the street. Similar to this, of all two-wheeler fatalities in collisions with buses, 71% of them occurred while the vehicle was moving in the same direction as the bus. This emphasizes the requirement for more secure pedestrian crossings, better traffic management, and speed restrictions.

VI. UNDERSTANDING THE CAUSES

1. *Higher floors:* According to the research findings, 92% of bus passengers involved in fatal crashes die while boarding or exiting the bus. This is consistent with the findings of a previous study on the operations of the Delhi Transport Corporation conducted in 1985 [4]. These high numbers of fatalities highlight the critical need for the implementation of safety measures such as automatic closing doors and low-floor designs in buses to prevent these tragic incidents from occurring. However now-a-days, buses are designed with lower floors that are convenient to passengers.
2. *Driver Fault:* According to research, in 33% of cases, the bus driver was "solely at fault," in 44% of cases, the driver was "also at fault," and in 23% of cases, the driver was not at fault.
3. *Driver age:* According to a survey, drivers under the age of 37 are more likely to be involved in an accident. [6] to crashes when compared to those aged 45-50.
4. *Absence of dedicated lanes:* There may be fatal crashes due to a lack of dedicated bicycle paths and adequate pedestrian space.

VII. PREVENTIVE MEASURES

1. *Better Personnel Policies:* According to the analysis, a driver's age has a big impact on their risk of being in a collision. Compared to their older counterparts between the ages of 45 and 50, younger drivers—especially those under the age of 37—are more likely to be involved in collisions. The personnel policies of public transportation utilities may be affected by this finding. Public transportation companies in India are owned by the government, and drivers must be at least 24 years old and have at least five years of experience operating heavy vehicles before they can be hired. Younger drivers are more likely to be involved in collisions, so efforts should be made to decrease their number, such as raising the minimum age for hiring or requiring experience as a pre-qualification. Finding the routes that are more

likely to cause accidents and using only experienced drivers on those routes could be another tactic to reduce collisions.

2. *Adequate Right-of-Way for All Modes of Transportation:* Cyclists and two-wheelers are the next most vulnerable groups on Indian roads, with pedestrians coming in third. The majority of fatal crashes occur when the bus and the victim are traveling in the same direction, and the fact that almost all fatal collisions take place on straight stretches of road is evidence that road design is forcing conflicts between these road users, which is a major cause for concern.
3. *Driver incentives:* There isn't currently a system in place to keep track of how well bus drivers are doing their jobs. The BMTC ought to develop a system in which the performance of the drivers is continuously evaluated. All minor errors committed by a driver should be documented, and the database should be used to provide the necessary training. If the drivers do not respond well, they may be fired from service as well.
4. *Implementing Ramp Meters for Safe Traffic Convergence at Flyover Exits:* To allow for safe traffic convergence near the flyover exit, provide signals (ramp meters) to regulate traffic inflow from below the flyover.

VIII. CONCLUSION

The review paper concludes by offering a thorough analysis of traffic mishaps involving BMTC buses in Bengaluru. According to the study, Bengaluru has experienced a significant increase in the frequency and seriousness of bus accidents as a result of the city's rapid urbanization, rising population, and expanding number of vehicles on the roads. The data analysis shows that a significant portion of fatalities and injuries occur on city roads and in particular geographic areas, emphasizing the necessity of targeted interventions in those areas. The lack of designated lanes and sufficient space for their movement is another issue that the study emphasizes as being a vulnerability for pedestrians and cyclists.

Bus accidents have many different root causes, including things like higher floors being used for

boarding or egress, driver error, and lack of designated lanes. The age of the drivers also affects the likelihood of accidents, with younger drivers being more likely to be involved in collisions. The paper makes recommendations for addressing these problems, including putting in place safety measures like low-floor designs and automatic closing doors for buses, enhancing personnel policies to ensure that experienced drivers are assigned to accident-prone routes, and ensuring adequate right-of-way for all modes of transportation.

Furthermore, the paper recommends the establishment of a driver evaluation system to monitor performance and provide necessary training, with potential consequences for repeated poor performance. It emphasizes the importance of continuous efforts to enhance road safety through infrastructure improvements, traffic management, and stricter enforcement of regulations.

Overall, this review paper highlights the crucial areas that need additional study and attention if bus accidents are to be decreased in Bengaluru. It is a valuable resource for policymakers, transportation authorities, and researchers, providing insights into the causes of BMTC bus accidents and potential solutions to improve road safety and reduce the impact of BMTC bus accidents on city residents.

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