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Enhancing Road Safety Along Critical Stretches of NH-57: A Case Study in Odisha

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ABSTRACT

NH-57 serves as a vital link from Khurda to Baghamari, facilitating the transportation of goods and passengers. This study focuses on two critical stretches: from Post office Chhak to Baghamari square (Km 1/0 to Km 13.6) and from Baghamari square to Begunia Chauk (Km 13.6 to Km 18.6) in Odisha. With a growing volume of vehicles, the incidence of accidents has surged annually, prompting the identification of black spots—locations prone to frequent accidents.Utilizing accident frequency and severity index analysis, this thesis identifies safety deficiencies along the studied stretches. The findings underscore the urgent need for remedial measures to safeguard road users. Proposed interventions aim to mitigate accident risks and enhance overall road safety.

Key Words: Expansion in the Road Network, Traffic Light Post, Safety Measures

Introduction:

Road crashes claim the lives of 3,000 individuals daily, constituting a global humanitarian crisis rooted in human actions . This alarming statistic underscores road safety as a paramount societal concern. Each year, an estimated 1.2 million to 50 million individuals experience fatalities or injuries due to road accidents. Projections suggest that by 2020, road traffic accidents are poised to become the third most significant contributor to the global burden of disease and injury. This information is particularly pertinent to India., unfortunately, bears the ignominious distinction of witnessing a high number of fatalities due to road accidents worldwide, further accentuating the urgency of addressing road safety issues (Shivkumar and Krishnaraj, 2012).

The aftermath of accidents goes beyond mere statistics, imposing economic burdens and resulting in loss of life, health, and property. They also contribute to social distress and environmental degradation.

Road safety endeavors to curtail the incidence and severity of crashes within a specific timeframe. These accidents stem from a complex interplay of factors. In India, road users exhibit a diverse spectrum, ranging from pedestrians and animal-drawn carts to various motorized vehicles. The proliferation of vehicles, driven by changing lifestyles, exacerbates the challenge, as limited road infrastructure contends with an expanding vehicular population. Consequently, a meticulously crafted policy on road safety assumes paramount importance. Notably, in India, the rate of accidents mirrors the growth trajectory of the vehicle population, highlighting the pressing need for proactive measures in safeguarding road users.

Table.1 Road accident in India (2012-2021)

Number of Road Accidents and Number of Persons Involved: 2012 to 2021					
Accident Year	Number of Accidents		Effect on persons		Severity of accidents
	Total	Fatal	Killed	Injured	
2012	4,99,628	1,19,558	134,513	527,512	26.9
2013	4,97,686	1,21,618	1,42,485	5,11,394	28.6
2014	4,84,704	1,06,591	119,860	523,193	24.7
2015	4,86,384	1,10,993	125,660	515,458	25.8
2016	4,60,920	93,917	105,749	496,481	22.9

2017	4,79,216	1,01,161	114,444	513,340	23.9
2018	4,29,910	79,357	92,618	464,521	21.5
2019	4,39,255	83,491	94,968	465,282	21.6
2020	4,07,497	73,650	84,674	408,711	20.8
2021	4,06,726	73,589	85,998	435,122	21.1

The causes of accidents and their impact can be delineated through the statistics of road accidents in India for the year 2021.

Drivers fault-	70.5%
Defects in road condition-	2.5%
Defects in motor vehicle-	2.6%
Fault of bicyclist-	2.3%
Fault of pedestrian-	3.4%
Weather condition-	2%
All other causes-	16.7%

ACCIDENT INVESTIGATION

Accident no-1

Accident type: Head-on collision

Location: Khurda-Baghamari area near Pubusahi

Date and Time: May 10, 2019; 10.30AM

It's tragic to hear about the hit-and-run incident near Pubusahi Chowk in Khurda district. The victim, while returning home on his motorcycle, was struck by a speeding vehicle, which callously fled the scene, resulting in the loss of life. Emergency services arrived after a significant delay, and despite efforts, the victim succumbed to their injuries at the scene.Law enforcement authorities swiftly responded, recovering the victim's body for post-mortem examination and initiating investigations into the incident. Preliminary findings suggest that the accident occurred due to the reckless speeding of the vehicle, compounded by the absence of cautionary signboards warning about upcoming rumble strips.Such incidents underscore the critical need for enhanced road safety measures and stricter enforcement of traffic regulations. Adequate signage and road markings play a crucial role in alerting drivers to potential hazards, thereby reducing the risk of accidents. Additionally, swift emergency response and timely medical assistance are imperative to mitigate the severity of injuries and save lives in such tragic circumstances.

As investigations progress, It is crucial to establish accountability for those at fault and enact measures to prevent the recurrence of similar incidents in the future. Ultimately, the goal is to create safer roadways for everyone.

Accident No-2

Accident type: 1 Critical, 4person severely Injured

Location: Baghamari-Begunia area near Begunia

Date and Time: Feb 6, 2018; 07.45AM

This morning, a series of collisions occurred on the Baghamari-Begunia road, resulting in injuries to five individuals. The chain of events began when a pick-up van transporting bananas collided with a motorcycle and subsequently overturned. Subsequently, two auto-rickshaws and a Tata AC vehicle collided with the overturned van. As a result, five people sustained injuries, with one individual in critical condition. Emergency services swiftly responded to the scene, transporting the injured individuals to Khurda Hospital for medical treatment. However, the accident has led to disruptions in traffic flow along the national highway in the Baghamari-Begunia road section.

Local law enforcement, represented by Baghmari police, has initiated an investigation into the incident to ascertain the sequence of events and determine factors contributing to the collision. Their efforts aim to establish accountability and prevent similar incidents in the future, ensuring the safety of road users in the area.

Data collected from Police Records

The accident data from two-lane highways were collected with prior permission from the respective Superintendent of Police (S.P), in collaboration with three police stations, as detailed in Table 2..

TABLE .2

Police Station	Road section covered under the police station
Baghamari	Km 0/0 to km 13.6 on NH-57
Begunia	Km 13.6 to km 18.6 on NH-57
Pichukuli,Rajsunakhala	Km 18.6 to km 27.2 on NH-57
Rajsunakhala	Km 27.2 to km 31.7 on NH-57

TABLE .3 Traffic volume data

YEAR	ADT	AV PCU PER DAY	PCU/HR
2012	10484	18102.4	754.2667667
2013	12700	21689.22	903.7175
2014	14533	24656.11	1027.338075
2015	12584	21501.46	895.8942667
2016	12679	21655.23	902.301225

CONCLUSIONS:

The literature on accident analysis highlights that a significant portion, 70.5%, of road accidents in India stem from driver errors. Heavy vehicles, particularly trucks, are prominently involved in accidents on two-lane roads, contributing to 59% of fatalities, followed by other vehicles (26%), bikes (7%), jeeps (5%), and buses (3%).To address this concerning trend, enhancing road safety awareness among all road users is imperative. Analysis reveals that "Stretch I" experiences the highest number of accidents, accounting for 34.1% of the total. Implementing measures such as roadside clearance,

shoulder maintenance, adequate lighting, and junction improvements could effectively reduce accident rates. Additionally, installing speed-reducing humps near accident-prone spots and ensuring unobstructed sight distances along curves are essential strategies.

Similarly, "Stretch II" records the second-highest number of accidents, comprising 32.5% of the total. Enhancing safety measures such as signalized junctions, further junction improvements, and shoulder clearance, coupled with hump installations and the removal of obstacles like poles and trees near pavements, could mitigate accident rates. In "Stretch III," which accounts for 29.6% of total accidents, interventions like shoulder clearance, speed limit reduction, junction improvements, median signals, and restructuring of roadside structures could significantly reduce accident occurrences.

Lastly, "Stretch IV" reports the least number of accidents, representing 3.7% of the total. Nonetheless, measures like reducing speed limits near junctions remain essential in preventing accidents in this area. Overall, a multi-faceted approach encompassing road infrastructure improvements, speed management strategies, and enhanced awareness campaigns is vital to effectively address road safety concerns and minimize accident rates across all stretches.

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