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Methodology for Safety Ranking of Road Networks

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ABSTRACT: *Rapid economic expansion has resulted in a remarkable increase in the number of motor vehicles. The current study assesses road safety on road networks in the Gorakhpur area of Uttar Pradesh (India). A proforma based on several road factors accountable for road traffic accidents was created for this study. With the assistance of field specialists, a total of 27 roads were assessed on-site and weighted based on their safety rating. The roads are then rated based on their overall score. This analysis may assist policymakers in identifying the roads in the worst condition and taking necessary steps to improve them.*

KEYWORDS: *Road accidents, road safety in Gorakhpur, Indicators, Traffic safety*

I. INTRODUCTION

Gorakhpur division includes the district. In Gorakhpur, there are arterial roads, sub arterial roads, local streets, state highways, and national highways. However, the majority of the roadways are small, with poor geometrics and surface conditions. The road lane markers were not done properly. Intersections are too close together and poorly built. Vehicles of all sizes, shapes, and combinations share the same right of way.

The Gorakhpur Traffic Police and the Uttar Pradesh Police are in charge of traffic operations in the city. Both agencies operate in distinct regions. The data received from Gorakhpur Police within its jurisdiction was utilised in the current study.

Figure 1: District map of Gorakhpur (U.P.)

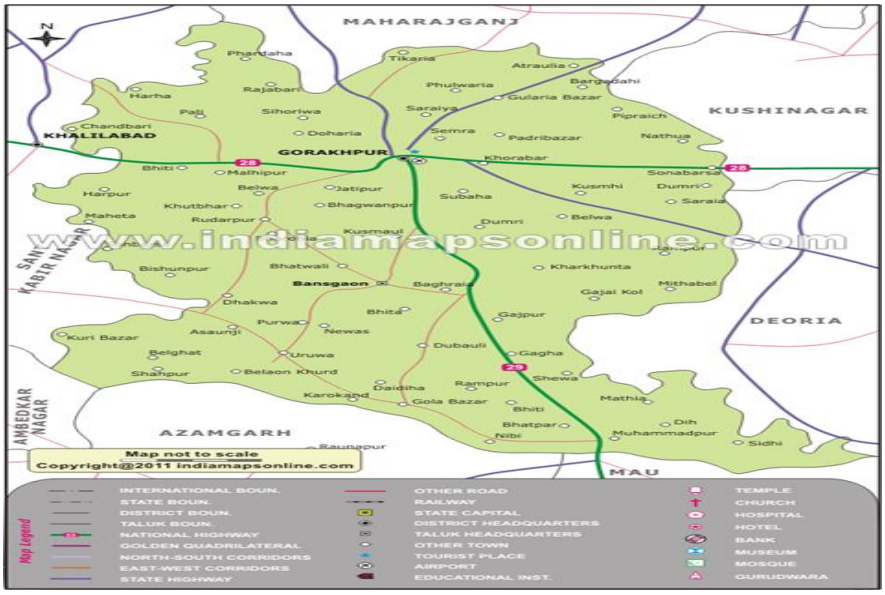

Figure 2: Road map of Gorakhpur (U.P.)

II. TRAFFIC ACCIDENT SITUATION IN GORAKHPUR

Traffic accidents occur in Gorakhpur for a variety of causes. Poor traffic management, particularly reckless driving of buses, minibuses, and auto rickshaws, inefficient traffic control at intersections, poor road geometrics, lack of public awareness, indiscipline and inefficient movement of road users, undefined bus stops, and other factors are major causes of road accidents.

In the recent past, the city has implemented various initiatives to enhance traffic operations. Some of these initiatives include implementing a one-way road system on a number of important

arterials, building new roads, improving intersection geometrics, and paying more attention to road markings and signals. As a result, the average vehicle travel speed has increased somewhat.

III. LIST OF FACTORS SELECTED

The following considerations are taken into account while evaluating accident-prone road locations:

1. Road cross-section dimensions
2. Number of vehicles per day
3. Width of road
4. Type of road
5. Drainage
6. Speed
7. Lighting condition
8. Traffic Signs
9. Traffic Signals

IV. METHODOLOGY

1. The road networks in Gorakhpur district have been chosen for safety evaluation.
2. In Gorakhpur, a total of 27 road networks have been chosen for analysis.
3. To evaluate each route in a comparable fashion, a proforma was created based on the aforementioned factors.
4. The numerous indications that impact the occurrence of road accidents are assigned weights on a scale of 0-10, with the elements that increase the likelihood of the accidents having lower weights.
5. The total weight allocated to each road connection is calculated by summing all of the individual weights and normalising the result using the maximum weight (in this example 151) that may be assigned.
6. Total Weight = (sum of individual weights multiplied by 100) / maximum weight
7. Thus, road linkages with a high final weight are less likely to be involved in an accident than road links with a low final weight.

V. SURVEY RESULTS

Road network survey results are shown in table no. 1.

TABLE 1: LIST OF SELECTED ROAD NETWORKS AND THEIR FINAL WEIGHTS

S.N.	Road Link	Final Weights
1	Gorakhpur – Mohaddipur Road	64.23
2	Mohaddipur Crossing	62.91
3	Paideleyganj Crossing	62.91
4	Deoria Bypass road, Taramandal	58.27
5	Rustampur Crossing	58.27
6	Transport Nagar Road	58.27
7	Nausarh Tiraha to ITM, GIDA road	62.25
8	Shiv Shakti Hanuman mandir (GKP to Varanasi Road)	58.64
9	ITM, GIDA road Gorakhpur	73.50
10	Chhatrasangh Crossing	71.52
11	Shastri Chauk	62.91
12	Golghar Road Gorakhpur	80.79
13	Kali Mandir Crossing Golghar	71.52
14	**Asuran Crossing**	**57.67**
15	Medical College Road	66.88
16	Padri Bazar Gorakhpur	60.26
17	Kauwa Bagh Kotwali(T-Junction)	64.90
18	Mohhadipur to Asuran road via flyover	67.54
19	Kachahari Bus stand road	66.88
20	Railway station road	67.54
21	Dharamashala road	61.58

22	Gorakhnath Mandir Road	68.87
23	In Front of NILET, MMMUT Gorakhpur	100
24	Ranidiha crossing	69.53
25	Deoria Gorakhpur Bypass	76.82
26	Mohhadipur to University crossing	75.49
27	Kurnaghat to Nandanagar road	68.21

VI. RANKING METHOD

The categorization method given in table 2 is used to classify roads for the occurrence of accidents based on final weights.

TABLE 2: WEIGHTING SCHEME

Final weight (%)	**Accident prone level**
80-100	Very low
60-80	Low
40-60	Medium
0-40	High

VII. RESULT & DISCUSSIONS

- According to the findings of the survey, the safest roads are Golghar Road, Gorakhpur Road, and NILET MMMUT Road.
- Accidents are common on the Deoria Bypass Road, Taramandal, Rustampur Crossing, and Asuran Crossing.
- The key benefit of employing this technique for finding accident black spots on roadways is that it takes very little extra data aside from the road network map.
- As a result, the results of this technique may be simply used to develop road safety measures.
- Furthermore, the findings might serve as a rapid reference for road network planners and agencies concerned with accident mitigation methods.

- There are several causes of road accidents, the most common of which are driver error, vehicle error, road features, climate, and other variables.
- In reality, the contribution of road characteristics to road accidents is less than 10%, although it is claimed that all accidents are impacted by road features.
- For example, the fault of the driver is impacted by the state of the road, road signs, illumination, and the fault of the vehicle is influenced by the surface condition of the road, among other things.

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