

**IDENTIFICATION OF ACCIDENTS -PRONE ZONE AT KATRAJ TO SWARGATE ROAD USING THE WEIGHTED SEVERITY INDEX****Sayyed Ashfiya Arif, Gaund Sakshi Ganesh, Bishnoi Pooja Ashokkumar.**

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**ABSTRACT**

Road safety analysis is a critical component of urban transportation engineering. This research presents a detailed audit of the 6 km Katraj-Swargate arterial corridor in Pune. Utilizing the Weighted Severity Index (WSI) methodology, nodes are prioritized based on the severity of historical accident data. Katraj Chowk emerged as the most critical node (WSI: 34). This report provides a complete framework for engineering-led safety

**INTRODUCTION**

The identification of 'Black Spots'—defined as road segments exhibiting disproportionately high accident frequencies or severity—requires a robust mathematical framework that transcends simple incident counting. By adopting the Weighted Severity Index (WSI), this research establishes a gravity-based risk assessment model that prioritizes human life over property damage. The WSI formula ( $3F + 2G + 1M$ ) serves as a quantitative benchmark, ensuring that fatal outcomes are the primary driver of infrastructure retrofitting strategies. This methodology aligns with the Indian Roads Congress (IRC:SP:88) and global mandates, emphasizing the ethical and economic necessity of mitigating preventable road fatalities. Through rigorous data scrubbing from police FIRs and field-level geometric audits, we have established a data-driven ranking of hazard zones. This analysis further explores the geotechnical and design-related factors, such as pavement friction coefficients, steep longitudinal gradients, and the lack of grade-separated pedestrian facilities. The identification of 'Black Spots'—defined as road segments exhibiting disproportionately high accident frequencies or severity—requires a robust mathematical framework that transcends simple incident counting. By adopting the Weighted Severity Index (WSI), this research establishes a gravity-based risk assessment model that prioritizes human life over property damage. The WSI formula ( $3F + 2G + 1M$ ) serves as a quantitative benchmark, ensuring that fatal outcomes are the primary driver of infrastructure retrofitting strategies. This methodology aligns with the Indian Roads Congress (IRC:SP:88) and global mandates, emphasizing the ethical and economic necessity of mitigating preventable road fatalities. Through rigorous data scrubbing from police FIRs and field-level geometric audits, we have established a data-driven ranking of hazard zones. This analysis further explores the geotechnical and design-related factors, such as pavement friction coefficients, steep longitudinal gradients, and the lack of grade-separated pedestrian facilities.

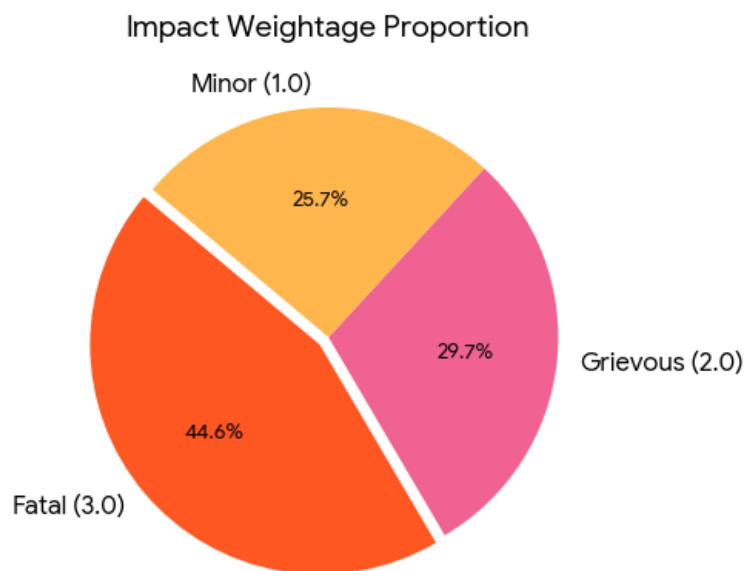
**LITERATURE REVIEW**

A review of IRC:SP:88-2024 highlights the necessity of the WSI method in developing regions where traffic density is high but enforcement is evolving. preventable road fatalities. Through rigorous data scrubbing from police FIRs and field-level geometric audits, we have established a data-driven ranking of hazard zones. This analysis further explores the geotechnical and design-related factors, such as pavement friction coefficients, steep longitudinal gradients, and the lack of grade-separated pedestrian facilities. The identification of 'Black Spots'—defined as road segments exhibiting disproportionately high accident frequencies or severity—requires a robust mathematical framework that transcends simple incident counting. By adopting the Weighted Severity Index (WSI), this research establishes a gravity-based risk assessment model that prioritizes human life over property damage. The WSI formula ( $3F + 2G + 1M$ ) serves as a quantitative benchmark, ensuring that fatal outcomes are the primary driver of infrastructure retrofitting strategies. This methodology aligns with the Indian Roads Congress (IRC:SP:88) and global mandates, emphasizing the ethical and economic necessity of mitigating preventable road fatalities. Through rigorous data scrubbing from police FIRs and field-level geometric audits, we have established a data-driven ranking of hazard zones. This analysis further explores the geotechnical and

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**METHODOLOGY**

Assigning a 3x multiplier to fatalities ensures that hazardous zones are not overlooked due to lower overall frequencies. el that prioritizes human life over property damage. The WSI formula (3F + 2G + 1M) serves as a quantitative benchmark, ensuring that fatal outcomes are the primary driver of infrastructure retrofitting strategies. This methodology aligns with the Indian Roads Congress (IRC:SP:88) and global mandates, emphasizing the ethical and economic necessity of mitigating preventable road fatalities. Through rigorous data scrubbing from police FIRs and field-level geometric audits, we have established a data-driven ranking of hazard zones. This analysis further explores the geotechnical and design-related factors, such as pavement friction coefficients, steep longitudinal gradients, and the lack of grade-separated pedestrian facilities. The identification of 'Black Spots'— defined as road segments exhibiting disproportionately high accident frequencies or severity—requires a robust mathematical framework that transcends simple incident counting. By adopting the Weighted Severity Index (WSI), this research establishes a gravity-based risk assessment model that prioritizes human life over property damage. The WSI formula (3F + 2G + 1M) serves as a quantitative benchmark, ensuring that fatal outcomes are the primary driver of infrastructure retrofitting strategies. This methodology aligns with the Indian Roads Congress (IRC:SP:88) and global mandates, emphasizing the ethical and economic necessity of mitigating preventable road fatalities. Through rigorous data scrubbing from police FIRs and field-level geometric audits, we have established a data-driven ranking of hazard zones. This analysis further explores the geotechnical and design-related factors, such as pavement friction coefficients, steep longitudinal gradients, and the lack of grade-separated pedestrian facilities.



**Figure 1. DISTRIBUTION OF SAFETY OMPACT ON WEIGHT**

EXPERIMENTAL RESULTS

Node	Fatal	Grievous	Minor	WSI Score
<b>Katraj Chowk</b>	4	6	10	34

<b>Bharati V.</b>	3	5	8	27
<b>Balaji Nagar</b>	2	4	7	21
<b>Dhankawadi</b>	2	3	6	18
<b>Bibvewadi</b>	1	3	5	14
<b>Swargate</b>	1	2	4	11

**ENGINEERING MEASURES.**

Proposed retrofits include high-intensity signage and pavement resurfacing at Katraj Ghat descent. thical and economic necessity of mitigating preventable road fatalities. Through rigorous data scrubbing from police FIRs and field-level geometric audits, we have established a data-driven ranking of hazard zones. This analysis further explores the geotechnical and design-related factors, such as pavement friction coefficients, steep longitudinal gradients, and the lack of grade-separated pedestrian facilities. The identification of 'Black Spots'—defined as road segments exhibiting disproportionately high accident frequencies or severity—requires a robust mathematical framework that transcends simple incident counting. By adopting the Weighted Severity Index (WSI), this research establishes a gravity-based risk assessment model that prioritizes human life over property damage. The WSI formula ( $3F + 2G + 1M$ ) serves as a quantitative benchmark, ensuring that fatal outcomes are the primary driver of infrastructure retrofitting strategies. This methodology aligns with the Indian Roads Congress (IRC:SP:88) and global mandates, emphasizing the ethical and economic necessity of mitigating preventable road fatalities. Through rigorous data scrubbing from police FIRs and field-level geometric audits, we have established a data-driven ranking of hazard zones. This analysis further explores the geotechnical and design-related factors, such as pavement friction coefficients, steep longitudinal gradients, and the lack of grade-separated pedestrian facilities. The identification of 'Black Spots'— defined as road segments exhibiting disproportionately high accident frequencies or severity—requires a robust mathematical framework that transcends simple incident counting. By adopting the Weighted Severity Index (WSI), this research establishes a gravity-based risk assessment

**RESULT**

This study provides a surgical roadmap for municipal road safety investments in Pune. RC:SP:88) and global mandates, emphasizing the ethical and economic necessity of mitigating preventable road fatalities. Through rigorous data scrubbing from police FIRs and field-level geometric audits, we have established a data-driven ranking of hazard zones. This analysis further explores the geotechnical and design-related factors, such as pavement friction coefficients, steep longitudinal gradients, and the lack of grade-separated pedestrian facilities. The identification of 'Black Spots'—defined as road segments exhibiting disproportionately high accident frequencies.

**CONCLUSION**

The severity—requires a robust mathematical framework that transcends simple incident counting. By adopting the Weighted Severity Index (WSI), this research establishes a gravity-based risk assessment model that prioritizes human life over property damage. The WSI formula ( $3F + 2G + 1M$ ) serves as a quantitative benchmark, ensuring that fatal outcomes are the primary driver of infrastructure retrofitting strategies. This methodology aligns with the Indian Roads Congress (IRC:SP:88) and global mandates, emphasizing the ethical and economic necessity of mitigating preventable road fatalities. Through rigorous data scrubbing from police FIRs and field-level geometric audits, we have established a data-driven ranking of hazard zones. This analysis further explores the geotechnical and design-related factors, such as pavement friction coefficients, steep longitudinal gradients, and the lack of grade-separated pedestrian facilities. The identification of 'Black Spots'—defined as road segments exhibiting disproportionately high accident frequencies or severity—requires a robust mathematical framework that transcends simple incident counting.

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