

A MAJOR PROJECT REPORT

ON

**A Structural Equation Modelling approach to Mitigate the Risky
Behaviour and Related Problems Perceived by Pedestrians at
Unsignalized Intersections**

(A Study of Traffic Safety Measures)

Submitted to the

Department of Civil Engineering

School of studies of Engineering and technology

In partial fulfilment

Of the requirements for the award of the degree of

Bachelor of Technology in Civil Engineering

By

Udit Dahiya 20102049

Korra Kamaraju 20102025

Anshul Panthi 20102009

Under the supervision of

Dr. Adheesh Kumar Vivek



**DEPARTMENT OF CIVIL ENGINEERING
SCHOOL OF STUDIES OF ENGINEERING AND TECHNOLOGY
GURU GHASIDAS VISWAVIDYALAYA, BILASPUR (C.G.)**

(A CENTRAL UNIVERSITY)

SESSION 2023-2024

DEPARTMENT OF CIVIL ENGINEERING
SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G)

(A Central University established by the Central University Act No. 25 of 2009)

Session 2023-2024



CERTIFICATE

This is to certify the minor project work entitled **“A STRUCTURAL EQUATION MODELLING APPROACH TO MITIGATE THE RISKY BEHAVIOUR AND RELATED PROBLEMS PERCEIVED BY PEDESTRIANS AT UNSIGNALIZED INTERSECTIONS”** presented by **Mr. Udit Dahiya (20102049), Mr. Korra Kamaraju (20102025), Mr. Anshul Panthi (20102009)**, students of B. Tech VIII semester, Civil Engineering Department, GURU GHASIDAS VISHWAVIDYALAYA, has been completed successfully and satisfactorily.

This project report is submitted in partial fulfilment of the requirement for the award of the Degree of Bachelor of Technology, SOS, Engineering & Technology, GURU GHASIDAS VISHWAVIDYALAYA, Bilaspur (C.G.).

We wish success in all future endeavors to graduating students.

Signature.....

External Examiner -1

Signature.....

Dr. Adheesh Kumar Vivek

Assistant Professor

Department of Civil Engineering

Signature.....

External Examiner -2

Signature.....

Dr. A. K. Parashar

Head of Department

Department of

विभागाध्यक्ष
HOD
सिविल इंजीनियरी विभाग
Department of Civil Engineering
प्रो. व.गु.घा.वि.वि.बिलासपुर (उ.ग.)
I.T., G.G.V. Bilaspur (C.G.)

ABSTRACT

Unsignalized intersections pose unique challenges for pedestrians, as they navigate through complex traffic dynamics without the aid of traffic signals. This research aims to investigate and mitigate the risky behavior exhibited by pedestrians at unsignalized intersections and the associated problems they perceive. The study employs perception-based surveys in both online and offline mode to gather comprehensive data. Surveys had been administered to pedestrians to understand their perceptions of risk and the factors influencing their decision-making at unsignalized intersections. A comprehensive literature review forms the foundation, outlining existing studies and gaps in understanding the multifaceted challenges faced by pedestrians. Methodologically, a structured survey instrument was meticulously designed to capture the nuanced perceptions of pedestrians frequenting unsignalized intersections. The survey, distributed across diverse demographic groups and geographic locations, gathered rich qualitative and quantitative data. In this regard, a total of 601 pedestrians' responses were gathered from distinct states of India.

This study employs a rigorous Structural Equation Modelling (SEM) framework to delve into the intricate dynamics of pedestrian safety and propose effective strategies for mitigating risky behaviours and related problems. The research begins by conducting Exploratory Factor Analysis (EFA) in SPSS (Statistical Package for Social Science) which served as a robust analytical tool to distil the intricate data, employing factor extraction methods to uncover latent constructs and interrelationships among perceived risky behaviours and associated problems. Through factor analysis, distinct dimensions emerged, shedding light on the complexity of pedestrian experiences encompassing issues of visibility, traffic flow, infrastructure, pedestrian behaviour, and perceived safety.

Confirmatory Factor Analysis (CFA) is then employed to validate and refine the identified constructs. CFA ensures the reliability and validity of the measurement model, confirming the underlying structure of the factors and assessing the model fit.

Following the validation process, path analysis is conducted to elucidate the direct and indirect relationships between the identified factors. This path analysis uncovers the intricate causal pathways linking pedestrian awareness, driver behaviour, infrastructure design, safety perceptions, and risky behaviour at unsignalized intersections.

The SEM framework provides a holistic understanding of the multifaceted nature of pedestrian safety, allowing for the exploration of complex interactions and interdependencies among various factors. By unravelling these complexities, policymakers, urban planners, and transportation authorities can develop targeted interventions to address pedestrian safety issues effectively.

The findings of this research have significant implications for urban planning and traffic management strategies. Evidence-based interventions derived from the SEM analysis can help create safer and more pedestrian-friendly urban environments, reducing the risk of accidents and enhancing overall quality of life.

In summary, this study contributes to the ongoing effort to improve pedestrian safety by offering comprehensive insights and actionable recommendations for addressing risks at