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Analysis of the Implementation of the General National Safety Plan (RUNK) Policy on National Road Traffic in East Java Province

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Abstract

This study analyzes the implementation of the National Road Safety General Plan (RUNK) in East Java Province, Indonesia, and its effectiveness in reducing road traffic accidents and fatalities. Despite the national framework, East Java consistently records one of the highest accident rates in the country. The research evaluates the application of the five RUNK pillars—road safety management, safer roads, safer vehicles, safer road users, and post-crash response—using secondary data from 2010 to 2023, including accident frequencies, fatality counts, vehicle ownership, and population statistics. Quantitative methods such as accident rate (AR) and case fatality rate (CFR) analyses, along with comparative statistical tests (t-test and Mann–Whitney), were employed to assess regional performance disparities and policy consistency across districts. The findings reveal that the implementation of RUNK remains inconsistent, particularly in Pillars 3 and 5, contributing to the failure in achieving national targets. This study contributes to the UN Sustainable Development Goals (SDGs), especially SDG 3.6 by providing evidence to support the reduction of road traffic deaths and injuries, and it also aligns with SDG 11.2, SDG 9.1, and SDG 16.6 through recommendations for safer transport systems, improved road infrastructure, and stronger inter-agency governance. The study highlights the need for stronger inter-agency coordination, improved road safety infrastructure, and enhanced public education to effectively address road safety challenges at the regional level.

Keywords

RUNK, Traffic accidents, Traffic safety, CFR, Accident Rate

INTRODUCTION

Traffic accidents remain a significant issue in Indonesia, especially in East Java, which has seen alarmingly high accident rates in recent years [1], [2]. The increase in vehicle ownership and the rapid urbanization of the province have only worsened the problem, leading to both tragic loss of life and major economic consequences [3]. East Java, as one of the most populous and industrialized provinces, is particularly affected by these challenges, with traffic accidents being one of the leading causes of death and injury. In fact, the province's accident rates are among the highest in the country, highlighting the urgent need for effective solutions to address the growing concern of road safety [4].

In response to this pressing issue, the Indonesian government introduced the National Road Safety General Plan (RUNK), aiming to reduce road accidents and fatalities across the country. RUNK is built on five key pillars: road safety management, safer roads, safer vehicles, safer road users, and post-crash response [5]. These pillars are designed to work together to create a more comprehensive and effective road safety system, supported by global frameworks such as those recommended by the WHO and UNICEF [6][7]. The policy's goal is to reduce traffic-related deaths and injuries by addressing the problem from multiple angles, including improving infrastructure, enhancing vehicle safety, and promoting responsible driving behavior [8].

Despite the good intentions behind the RUNK policy, its implementation has faced significant challenges, especially in East Java. While some areas have made progress in achieving the set targets, others have struggled to meet the objectives outlined by the national government [9]. This disparity raises important questions about the factors influencing the success or failure of the policy in certain regions, including the effectiveness of traffic police roles, local government capacity, and public education campaigns [10]. Understanding these factors is crucial to improving road safety outcomes and ensuring that the policy reaches its full potential [11].

Road safety is not just a matter of public health; it also has profound economic implications. The costs associated with traffic accidents—ranging from medical expenses to lost productivity—are staggering, with research linking traffic

accident impacts to poverty cycles and socioeconomic inequality [12]. According to the World Health Organization (WHO), road traffic injuries are one of the leading causes of death globally, particularly among young people. In Indonesia, the economic toll of traffic accidents is significant, making it an urgent issue that requires immediate attention. This research, therefore, seeks to evaluate the implementation of the RUNK policy in East Java and identify the key factors that contribute to the success or failure of road safety initiatives in the region [9].

By analysing secondary data from local police departments and relevant authorities, this study will explore trends in accident rates, fatalities, and vehicle populations in East Java over the past decade. The aim is to evaluate how effectively the five pillars of the RUNK policy have been implemented and where improvements can be made. The findings from this study will offer valuable insights into how road safety measures can be better enforced and tailored to meet the unique challenges of East Java. This research also aims to shed light on the role of local governments and institutions in implementing the policy, including the management of toll roads and the integration of advanced monitoring technologies [13]. It will examine the coordination between national and local agencies, the effectiveness of road safety education programs, and how public awareness campaigns impact driving behaviour. By providing a clear picture of the current state of road safety in East Java, this study will contribute to the ongoing efforts to improve road safety across Indonesia and offer recommendations on how to achieve the national targets for reducing road traffic accidents [12].

RESEARCH SIGNIFICANCE

This study is important for evaluating the implementation of the National Road Safety General Plan (RUNK) in East Java, highlighting gaps and challenges in its regional application. The findings will guide local policymakers in refining road safety strategies and improving resource allocation, ultimately helping reduce traffic accidents and fatalities. This research can also serve as a model for other regions facing similar road safety issues in Indonesia.

METHODOLOGY

This study adopts a quantitative approach to evaluate the effectiveness of the implementation of the National Road Safety General Plan (RUNK) in East Java Province. The research aims to assess the extent to which the five pillars of road safety have been applied: road safety management, safer roads, safer vehicles, safer road users, and post-crash response. The study also focuses on identifying regional variations in performance and the underlying causes behind the failure to meet national road safety targets in the region.

A. DATA COLLECTION

The data for this study was primarily collected from Regional Police force in Surabaya, which include traffic accident reports, motor vehicle registration data, and road safety program documentation from various institutions in East Java. The primary source of data was the East Java Regional Police, which provided detailed records of traffic accidents, including the frequency of accidents, fatalities, and injuries occurring between 2010 and 2023. In addition to accident data, the study also incorporated data on the number of registered motor vehicles in each district and city within East Java, which was essential for calculating accident rates relative to vehicle populations. Data on road infrastructure, such as road conditions, safety features (e.g., traffic signs, lighting), and the implementation of road safety standards, was obtained from the East Java Transportation Department and other local government agencies. Additionally, information on public awareness campaigns and law enforcement activities aimed at improving road safety was gathered through reports from regional road safety councils and local police departments. These data sets provide a comprehensive view of the factors affecting road safety in East Java and form the basis for the subsequent analysis of the effectiveness of the RUNK policy in the region.

Table 1 Data Requirements for Each Pillar

RUNK Pillar	Data Needs
Pillar 1: Road Safety Management	LLAJ program documents, Coordination Team Decrees, regional monitoring reports
Pillar 2: Safe Roads	Data on road infrastructure conditions, accident-prone areas, completeness of signs and markings
Pillar 3: Safe Vehicles	Data on vehicle roadworthiness test results, compliance with vehicle standards, and vehicle safety audits
Pillar 4: Safe Road Users:	Data on traffic violations, education programs, and PPE use
Pillar 5: Post-Accident Management:	Emergency service response time, number of referral hospitals, ambulance and trauma center availability

The data utilized in this study consists of secondary data from traffic accidents in East Java Province from 2018 to 2023, along with baseline data from previous studies conducted between 2010 and 2011. These data were complemented by population and vehicle registration statistics from the Central Statistics Agency for the years 2012-2017, with interpolations performed for 2018-2023. This data is crucial for assessing the targets set by the National Road Safety General Plan (RUNK) and for identifying the traffic accident risk levels in East Java. The data analysis will utilize descriptive statistics to determine the effectiveness of the RUNK implementation. Traffic accident data obtained from the East Java Regional Police will be presented in tables and graphs using MS Excel and Minitab, which will facilitate the analysis of accident rate reductions over time. The data will be categorized into the following groups:

1. Case Fatality Rate (CFR)
2. Accident Rate
3. Fatality Index by Population (Total Population)
4. Fatality Index by Vehicle Population (Registered Motor Vehicles)

Table 2 Index Fatality Target per 10.000 Vehicle

Fatality Index per 10.000 Vehicle			
RUNK Period	**Target**	**Fatality Index per 10.000 Vehicle**	**Deductions per period**
2010	0%	3,93	0
2011-2015	20%	3,14	0,79
2016-2020	50%	1,96	1,18
2021-2025	65%	1,37	0,59
2026-2030	75%	0,98	0,39
2031-2035	80%	0,79	0,19

Table 3 Index Fatality Target per 100.000 Populations

Fatality Index per 100.000 Vehicle			
RUNK Period	**Target**	**Fatality Index per 100.000 Vehicle**	**Deductions per period**
2010	0%	13,14	0
2025	30%	9,53	3,61
2030	40%	7,62	1,91
2035	55%	6,04	1,58
2040	65%	4,63	1,41

B. RUNK TARGET DETERMINATION

The determination of the targets for the National Road Safety General Plan (RUNK) in this study is based on the analysis of historical traffic accident data, vehicle population, and road infrastructure conditions in East Java. The targets for accident reduction and safety improvements are derived from national guidelines outlined by the Indonesian Ministry of Transportation, which sets specific road safety goals to be achieved by local governments. These targets are framed around key performance indicators, including reductions in accident frequency, fatalities, and injuries. In this study, the targets for each of the five pillars of RUNK—road safety management, safer roads, safer vehicles, safer road users, and post-crash response—are calculated by comparing the current performance of East Java with the national benchmarks. The data from the years 2010-2023, including traffic accident rates, fatality counts, and vehicle registration statistics, provide the baseline against which the progress of each district in East Java is assessed.

Table 4 Interpretation of significance level and confidence level

Significance Level (%)	Confidence Level (%)	Interpretation
0.1	99.9	Very Acceptable
1	99	Very Acceptable
5	95	Acceptable
10	90	Moderately Acceptable
20	80	Can Be Considered

Additionally, a comparative analysis using trend forecasting methods, including time-series analysis and regression models, is conducted to predict future accident rates and the impact of ongoing safety interventions. The target determination process also involves the interpolation of data gaps, especially for the years 2012-2017, using statistical estimation techniques. These targets not only help to monitor the effectiveness of the RUNK policy but also guide local governments in setting regional priorities for safety improvements. The analysis is further supported by the validation of targets through consultation with local road safety authorities and experts.

The long-term target for the National Road Safety General Plan (RUNK) is to reduce the fatality rate of road traffic accidents by 80% by 2035. This target is based on 2010 data, measured by the fatality rate per 10,000 vehicles, or what is known as the fatality index per 10,000 vehicles. In 2035, the target fatality index is expected to be 0.79 per 10,000 vehicles, compared to the 2010 rate.

C. DATA ANALYSIS

Statistical analysis is used to assess the extent of traffic accident occurrences in specific locations, with a focus on identifying dominant accident events and their correlation with road conditions. The analysis involves calculating several key indicators, including the Accident Rate (TK), Case Fatality Rate (CFR), and Fatality Index. These measures are computed based on traffic accident and fatality data from East Java Province, specifically from the years 2010-2024. The following formulas are used to determine the key indicators:

1. Accident Rate

   Accident Rate is calculated by dividing the total number of accidents (JK) by the total number of registered vehicles (KB), and multiplying by 10,000, as shown in Equation (3.1):

$$TK = \frac{JK\ (Number\ of\ Accidents)}{KB\ (Number\ of\ Vehicles)} \times 10.000 \qquad (1)$$

Table 5 Annual RUNK Achievement of Actual Fatality Rate with Realization of East Java Province

Year	Fatality Reduction Target /10,000 Motor Vehicles (Data)	Fatality Rate Index / 10,000 Motor Vehicles	Actual Fatality Rate/10,000 Motor Vehicles	Difference between Actual and Target	Comply/Not Comply
2010	0	0.31	0.000		**Baseline**
2011	4%	0.25	18.82%	14.80%	**Comply**
2018	38%	0.21	30.25%	-7.75%	**Not Comply**
2019	44%	0.20	34.82%	-9.19%	**Not Comply**
2020	50%	0.22	28.87%	-21.14%	**Not Comply**
2021	53%	0.22	26.97%	-26.03%	**Not Comply**
2022	56%	0.18	41.44%	-14.56%	**Not Comply**
2023	59%	0.17	45.83%	-13.17%	**Not Comply**

2. Case Fatality Rate (CFR)

   Case Fatality Rate (CFR) is calculated as the ratio of the number of fatalities (MD) to the total number of accidents (JK), as shown in Equation 2.

$$CFR = \frac{MD(Number\ of\ Fatalities)}{JK(Number\ of\ Accidents)} \quad (2)$$

3. Fatality Index by Registered Vehicle (FR)

   Fatality Index is determined by comparing the number of fatalities to the number of registered vehicles per 10,000, as shown in Equation (3)

$$FR = \frac{MD(Number\ of\ Fatalities)}{KB\ (Number\ of\ Accidents)} \text{ x } 10.000 \quad (3)$$

4. Fatality Index by Population (FP)

   Fatality Index is calculated to measure the death rate from traffic accidents among specific population groups, using the formula in Equation (4)

$$FP = \frac{MD(Number\ of\ Fatalities)}{JP\ (Number\ of\ Populations)} \text{ x } 100.000 \quad (4)$$

These calculations provide a thorough understanding of the relationship between road accidents, fatalities, and vehicle populations, allowing for a more accurate assessment of road safety in East Java. The statistical methods employed also include tests for normality and differences between various accident hotspots, using Chi-Square and Normality Tests. The results from these statistical analyses will support the identification of critical areas in need of policy interventions and safety improvements.

RESULTS AND DISCUSSIONS

The results of this study present the implementation performance of the General National Safety Plan (RUNK) in East Java Province based on secondary data from 2010 to 2023. The analysis compares district-level trends using accident rate (AR) and case fatality rate (CFR) indicators to identify regional disparities and evaluate the consistency of policy implementation across the five RUNK pillars. The reported values are summarized using the most critical (worst) district-level outcomes to highlight priority areas for intervention and to assess progress toward national road safety targets.

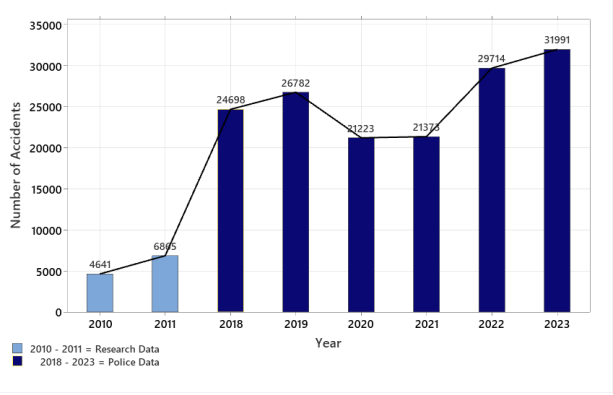

Figure 1 Number of Accidents in 2010-2023 in East Java Province

A. DATA ANALYSIS OF EAST JAVA PROVINCE

In this section, the analysis of traffic accident data in East Java Province from 2010 to 2023 is presented. The data used includes the total number of accidents, fatalities, accident rates, case fatality rates (CFR), and fatality indices based on registered motor vehicles and population.

The findings show that the total number of fatalities in East Java increased significantly from 2010 to 2022, with the highest number recorded in 2021 at 4.81 fatality index per 10.000 vehicles. Although there was a slight decrease in 2023, the fatality rate remained high.

Based on Figure 1 until Figure 6, the total number of accidents followed a similar trend, with a sharp increase after the COVID-19 pandemic restrictions were lifted, reaching 31,991 cases in 2023. This increase can be attributed to the rise in vehicle mobility and population after the pandemic. The accident rate per 10,000 vehicles fluctuated significantly, peaking in 2021 due to the rebound in mobility post-pandemic. However, the CFR showed a reduction from 0.31 in 2010 to 0.17 in 2023, reflecting improvements in road safety measures. The fatality index per vehicle was 4.68 in 2010, decreasing to 2.12 in 2023, indicating progress in vehicle safety regulations. Similarly, the fatality index per 100,000 population showed a rise in 2019 to 13.54, followed by a decline in 2020 due to the pandemic, and an increase again in 2023. The data highlights both successes and challenges in meeting the targets set by the National Road Safety General Plan (RUNK).

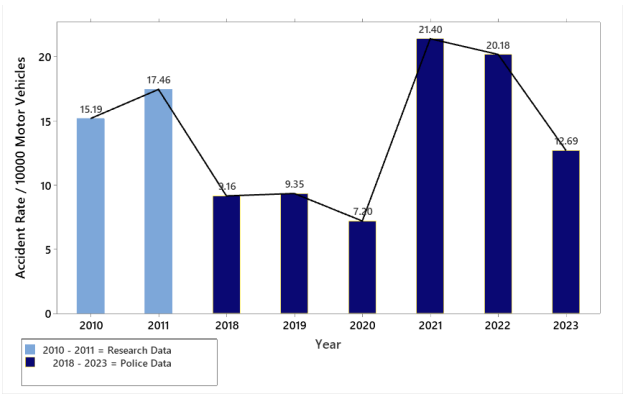

Figure 2 Accident Rate/10,000 Motor Vehicles at 2010-2023 in East Java Province

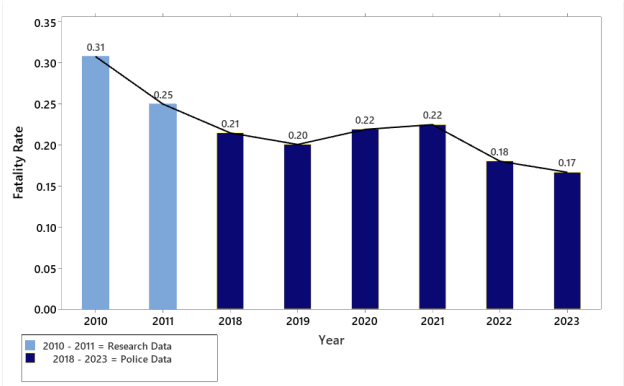

Figure 3 Fatality Rate of Motor Vehicles at 2010 – 2023 in East Java Province

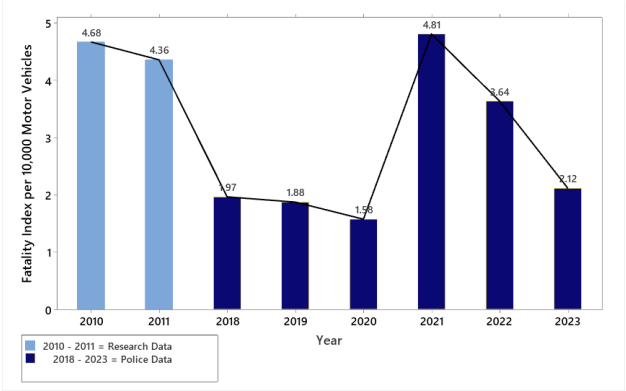

Figure 5 Fatality Index per 10,000 Motor Vehicles 2010-2023 in East Java Province

The RUNK target is calculated based on the 2010 baseline, in which the fatality rate was recorded at 0.31. In 2011, the target reduction of 4% was successfully achieved, with a resulting fatality rate of 0.25 and a positive deviation of +14.80%. Therefore, it was categorized as "Comply" according to the provisions outlined in the RUNK Document Ps. 2013 of Law No. 22 of 2009. However, from 2018 to 2023, all target achievements failed to meet the expected reductions, showing significant negative deviations. For example, in 2020, the target reduction of 50% only reached an actual achievement of 28.87%, resulting in a deviation of (21.14%). Similarly, in 2023, the target reduction of 59% only achieved 45.83%, with a deviation of (13.17%).

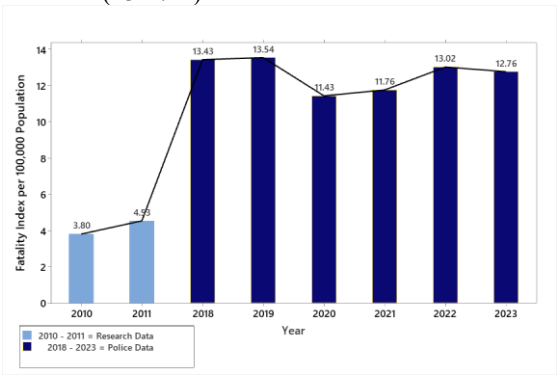

Figure 6 Fatality Index per 100,000 Population 2010-2023 in East Java Province

B. DATA ANALYSIS OF DISTRICTS AND CITIES IN EAST JAVA PROVINCE

In this section, a detailed analysis of traffic accidents in various districts and cities in East Java is provided. The data includes the number of accidents, fatalities, accident rates, and other relevant indicators for each district. Districts such as Sidoarjo, Banyuwangi, and Jember had the highest accident rates, indicating a need for more targeted road safety interventions.

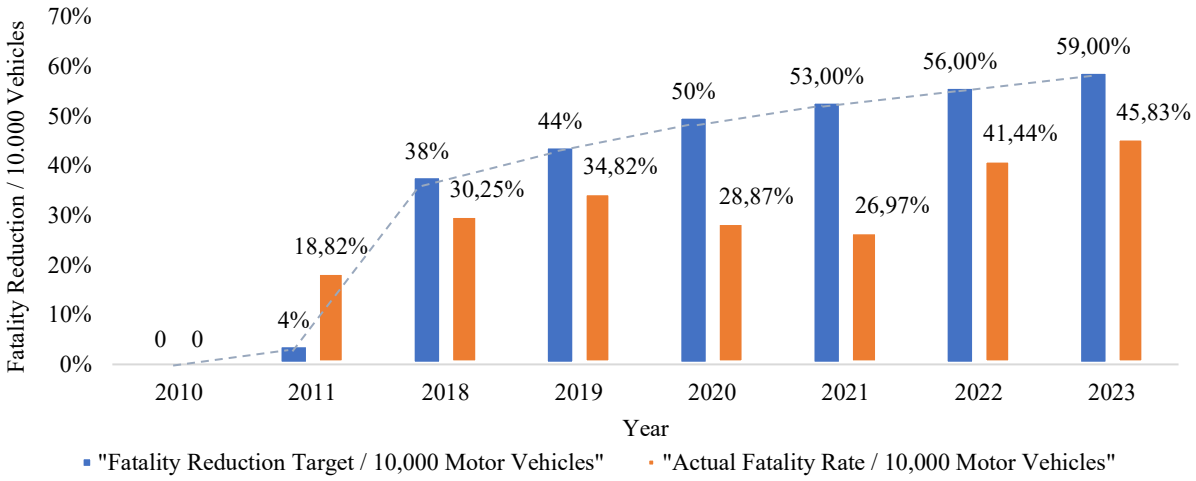

Figure 4 Target and Actual Fatality Rate per 10,000 Motor Vehicles in East Java Province

Table 6 Annual RUNK Achievement of Fatality Rate Reduction with Realization of East Java Province

Year	Fatality Index Target / 100,000 population	Fatality Rate Reduction Target	Fatality Index per 100,000 Population	Actual Fatality Rate/100,000 Population	Difference Between Fatality Rate Reduction Target and Actual	Comply/Not Comply
2010	13.14	0	6.60	0.000		**Baseline**
2011	12.90	2.00%	8.12	-23.04%	-25.04%	**Not Comply**
2018	11.21	16.00%	13.43	-103.55%	-119.55%	**Not Comply**
2019	10.97	18.00%	13.54	-105.24%	-123.24%	**Not Comply**
2020	10.73	20.00%	11.43	-73.26%	-93.26%	**Not Comply**
2021	10.49	22.00%	11.76	-78.22%	-100.22%	**Not Comply**
2022	10.25	24.00%	13.02	-97.38%	-121.38%	**Not Comply**
2023	10.01	26.00%	12.76	-93.45%	-119.45%	**Not Comply**

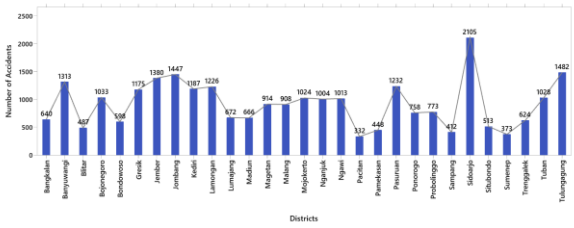

Figure 7 Number of Accidents in the Districts of East Java Province (2023)

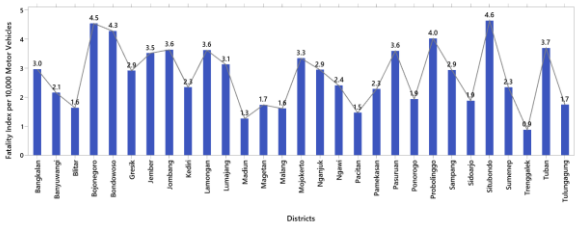

Figure 10 Fatality Index per 10,000 Motor Vehicles in the Districts of East Java Province (2024)

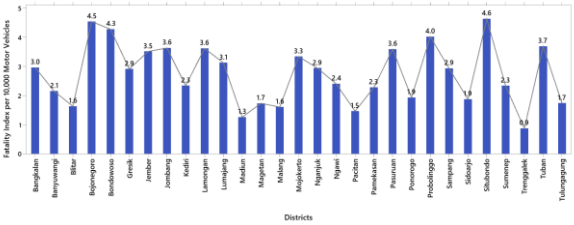

Figure 8 Number of Accident Rates/10000 in the Districts of East Java Province (Year 2023)

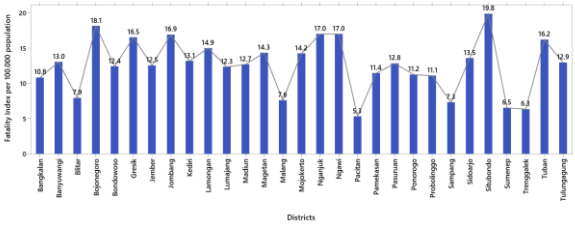

Figure 11 Fatality Index per 100,000 Population in the Districts of East Java Province (Year 2024)

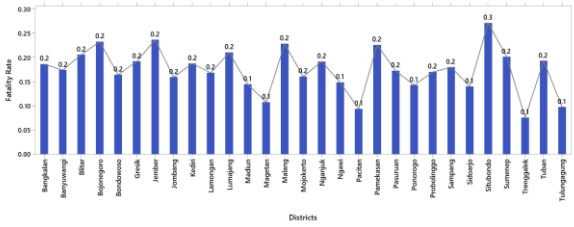

Figure 9 Number of Fatality Rates in the Districts of East Java Province (2023)

Based on Figure 7 until Figure 11, when comparing the achievements against the targets set by RUNK, some regions have made significant progress, while others are still far from meeting the established goals. The analysis shows that in areas with high accident rates, improvements in road infrastructure, stricter enforcement of traffic regulations, and better public awareness campaigns are crucial to reducing accidents and fatalities. Moreover, the comparison of fatality indices across districts highlights the disparities in road safety measures, with some districts needing more focused efforts to reduce road-related fatalities and injuries

Table 6 outlines the achievement of fatality index reduction targets per 100,000 population from 2010 to 2023, as illustrated in Figure 12. The baseline was established in 2010 with an index value of 13.14, as stated in Table 2.2. In the subsequent years, none of the annual targets were successfully met, including in 2011, which recorded only a slight decrease in the index to 12.90, while the actual analysis showed a value of 8.12, resulting in a deviation of (25.04%). The mismatch became more severe in the post-2018 period. For instance, in 2020, the target reduction of 20% was drastically different from the actual analysis, which indicated a (73.26%) achievement, resulting in a deviation of (93.26%). The most significant shortfall occurred in 2023, where the target reduction of 26% only achieved a decrease of (9.45%), leading to a deviation of -119.45%, and thus was declared “Not Comply.”

Overall, despite a slight decline in the realization of targets over time, the achievement of RUNK targets in each period still falls short of the established goals. This indicates that a thorough evaluation of road safety strategies is needed, including enhancing the effectiveness

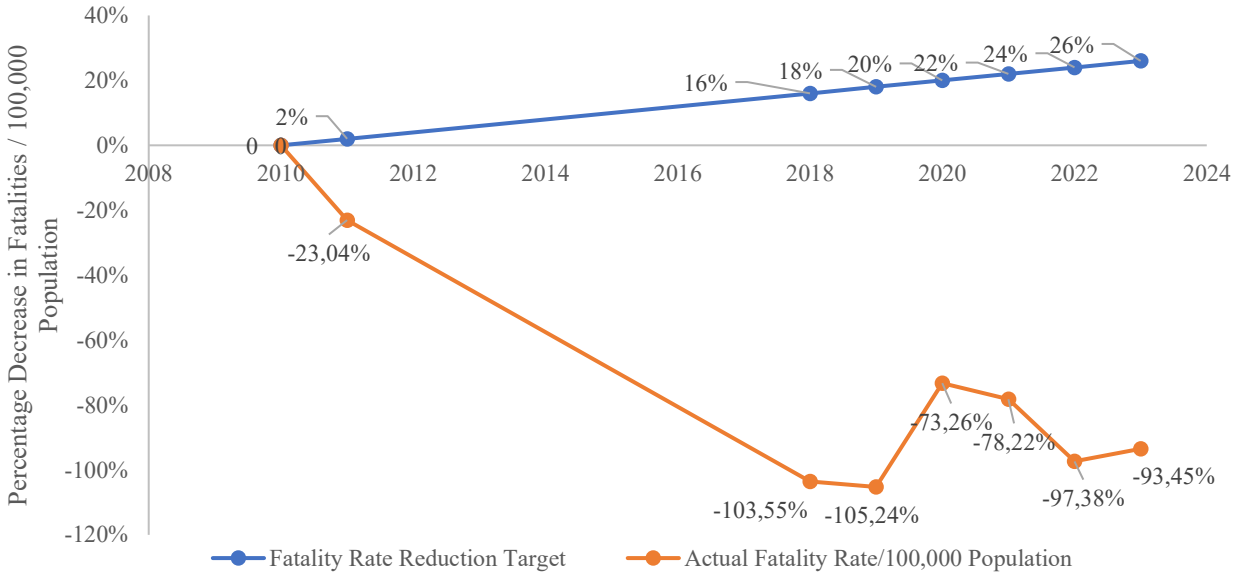

Figure 12 Target and Actual Fatality Rate per 10,000 Motor Vehicles in East Java Province

of program implementation, adjusting policies based on evaluation results, strengthening synergy between relevant agencies to ensure optimal strategy execution, and adopting more innovative, data-driven approaches to improve policy effectiveness and road user compliance. With improvements in strategy and better coordination, it is hoped that the achievement of RUNK targets in the future will be more optimal in reducing accidents and fatalities on the roads.

CONCLUSIONS

This study has provided a general analysis of implementation of the General National Safety Plan (RUNK) Policy on National Road Traffic in East Java Province with conclusion as follows:

1. The research shows that the implementation of the National Road Safety General Plan (RUNK) in East Java has led to mixed results. While some regions, particularly urban areas, have seen improvements in road safety, many others, especially in suburban and rural districts, still experience high accident rates and case fatality rates (CFR). Despite some progress, several districts have not met the national targets set by RUNK, particularly regarding the reduction of fatalities per 10,000 vehicles. The main factors contributing to these issues include the lack of effective inter-agency coordination, insufficient public awareness, and subpar road infrastructure in certain areas.
2. Based on data analysis for the period 2010–2023, the accident rate (number of accidents per 10,000 motor vehicles) in East Java Province has shown fluctuating values but, overall, has yet to meet the national targets set under the National Road Safety General Plan (RUNK) and Presidential Regulation No. 1 of 2022. The national RUNK targets for the fatality index per 10,000 vehicles for the 2010–2025 period have, for the most part, not been achieved at either the provincial or district/city level. Similarly, the RUNK targets for the fatality index per 100,000 population for the 2010–2025 period have also largely not been met at both the provincial and district/city levels, indicating that the set targets remain unfulfilled. Furthermore, data presented in the annual RUNK evaluation show that, across the four evaluation periods (2010, 2011–2015, 2016–2020, and 2021–2025), the targets established in the RUNK have still not been achieved. This performance is also not aligned with the global vision of the Decade of Action for Road Safety 2021–2030, which aims for a significant reduction in accidents and fatalities worldwide.

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