SIAM

Society of Indian Automobile Manufacturers

Building the Nation, Responsibly.

सुरक्षित सफर
SAFE JOURNEY

An initiative by SIAM

A D V A N C I N G

ROAD SAFETY

THROUGH SYSTEMIC POLICY REFORM

CONTEXT PAPER

FEBRUARY 2026

CONTENTS

About **SIAM**

The Society of Indian Automobile Manufacturers (SIAM) is an apex national body representing all major vehicle and vehicular engine manufacturers in India. It is a society with charitable objectives registered under the Societies Registration Act, 1860. Its objectives include enhancing the contribution of automobile industry to the growth and development of Indian economy, assisting the automobile industry to meet its social obligations and encouraging the efficiency of industry in general and automobile industry particularly in India. SIAM focuses on activities related to improvement of environment and ensuring safety and protection of automobile vehicle users and public at large. Recognising these objectives, SIAM has been granted registration under the Income Tax Act, 1961 as an institution with charitable purpose.

To meet these objectives, SIAM works closely with stakeholders in the formulation of the economic, environment and commercial policies, regulations and standards relating to automobiles. It provides economic and statistical information as well as technical and public policy services to the stakeholders on behalf of Indian Automobile Industry. It publishes Monthly Industry Statistics, Monthly Commodity Price Monitor and other periodic reports. SIAM organises seminars and workshops on the subjects of topical relevance and interest to the industry. It also carries out various public policy activities, particularly in the field of Road Safety and Environment.

SIAM works closely with various Government departments, both at Central and State level and with international bodies like International Organisation of Motor Vehicle Manufacturers (OICA), International Motorcycle Manufacturers Association (IMMA) and coordinate with other counterpart international associations.

SIAM, jointly with ACMA and CII, organises the Auto Expo - The Motor Show, an exhibition showcasing the trends in the Automobile Industry.

SIAM aims to promote Sustainable Mobility through focused initiatives and campaigns on **जैविक पहल** (Bio Initiative), **हरित हाइड्रोजन** (Hydrogen Mobility), **गैस गतिशीलता** (Gas based mobility), **विधुतीकरण** (Electrification), **चक्रीयता** (Circularity) and **सुरक्षित सफर** (Safe Journey) in alignment with Sustainable Development Goals, 2030 and Net Zero by 2070.

About **SAFE**

In order to achieve advancement of Inspection and Certification (I&C) of vehicles and increased safety on roads, the Society of Indian Automobile Manufacturers (SIAM) has incorporated an independent body named as Society for Automotive Fitness & Environment (SAFE) with membership from Industry, Testing Agencies and NGOs.

SAFE works to spread awareness among the various stakeholders on the concerns of in-use vehicles which would lead to safer vehicles and cleaner environment

SAFE organizes inspection clinics for in-use vehicles and training workshops in various parts of the country for technicians in the area of pollution checking. These programmes are aimed at creating awareness amongst vehicle owners on importance of regular maintenance of their vehicles. It is one of the most effective ways to control emission levels from vehicles in the country.

In addition, SAFE also organizes seminars and interactions on these subject with State Governments and other stakeholders for fostering better and safer mobility.

SAFE has also commenced various initiatives for imparting road safety education to students, drivers and the public at large. Through Road Safety Awareness Programmes, SAFE tries to sensitize the community on traffic rules and also to inculcate correct and responsible attitude towards fellow road users.

SAFE is a catalyst in the automobile industry's endeavour to fulfil its commitment towards a cleaner and a safer environment and will continue to support and enhance the industry's role as a responsible corporate citizen in the country.

1 Executive Summary

Road safety remains a significant and multifaceted challenge for India, driven by rapid motorization, expanding road networks, increasingly complex traffic conditions, and a combination of institutional and behavioral factors. While India has strengthened its legislative and policy framework in recent years, road traffic injuries continue to impose substantial human, social, and economic costs. Global experience demonstrates that road safety outcomes are determined not only by the presence of laws and standards, but by how effectively they are implemented through coordinated systems that integrate infrastructure design, vehicle safety, enforcement, behavior change, and post-crash response.

This paper examines India's road safety landscape in comparison with global benchmarks, drawing on experiences from high-performing and emerging road safety systems. The analysis highlights that India's policy intent is increasingly aligned with global principles, including system level safety thinking and long-term fatality reduction goals. However, gaps remain in execution consistency, institutional coordination, enforcement predictability, and data-driven decision-making. Progress across the five key dimensions of road safety, Engineering, Enforcement, Education, Emergency care, and Evaluation has been uneven, with weaknesses in one area often constraining gains in another.

Looking ahead, the paper outlines a way forward focused on strengthening both technical interventions and the enabling conditions required for sustained impact. Global examples show that durable improvements are achieved when actions across the five Es are supported by strong governance, stable funding, accountable institutions, and structured collaboration with industry, civil society, and academia. For India, the priority lies in translating policy intent into consistent on-ground outcomes by improving coordination across levels of government, building execution capacity, and leveraging partnerships to scale effective road safety interventions.

2 Introduction

Road safety has emerged as a critical public policy challenge for India, with road traffic injuries continuing to impose a high human, social, and economic burden. Rapid motorization, expanding road infrastructure, and increasing freight and passenger movement have significantly improved mobility and connectivity, but have also heightened exposure to road-related risks. The scale and persistence of road accidents underscore the need to examine road safety not as an isolated transport issue, but as a systemic challenge cutting across public health, urban development, enforcement, and institutional governance.

Globally, road safety outcomes have progressed at different rates. Countries that have achieved sustained reductions in fatalities and serious injuries have done so by adopting long-term policy commitments, system-oriented safety design, and disciplined execution. This policy driven design approach has shifted the focus from treating crashes as isolated incidents caused by individual behavior to addressing underlying system factors such as road design, vehicle safety standards, enforcement predictability, and post-crash care. In contrast, many developing and rapidly motorizing economies continue to experience rising or stagnant fatality trends due to weaker governance capacity and limited system readiness.

India's road safety journey reflects the contrast between global best practice and the realities of rapid motorization. Over the past decade, the country has undertaken legislative reforms, expanded national programs, and progressively aligned policy intent with global road safety principles. However, outcomes remain uneven across states, cities, and road types, indicating that the primary challenge lies less in defining appropriate policies and more in translating policy intent into consistent, system-wide execution.

This paper presents a structured assessment of India's road safety policies, drawing on global experience to examine policy evolution, benchmark India's approach, identify key gaps, and outline a way forward to strengthen road safety outcomes.

3.1 Global Road Safety Milestones

Road traffic injuries today cause ~1.35 million deaths annually worldwide, making them one of the leading causes of death globally and the single largest cause of death among people aged 5 to 29. Critically, over 90% of these fatalities occur in low- and middle-income countries (LMICs), despite these countries accounting for only about 60% of the global vehicle fleet.[1] This divergence highlights that road safety outcomes are driven less by mobility levels and more by policy maturity, institutional capacity, and system design. High-income regions began addressing road safety earlier through regulation and vehicle standards, while many developing economies experienced rapid motorization without commensurate safety systems.

From the 1990s onward, road safety increasingly came to be treated as a public health and economic issue, rather than a traffic management problem. Countries that institutionalized road safety by setting national targets, strengthening lead agencies, and investing in data systems, achieved sustained reductions in fatalities. For example, the European Union reduced road deaths by 13% between 2018 and late 2023[2], even as vehicle ownership rose steadily. In contrast, global road deaths plateaued rather than declined over the same period, reflecting limited progress in LMICs. Nine in ten deaths occur in LMICs, which is significantly higher when benchmarked against the vehicle count, they have[3]. Regulation alone delivered early gains, but coordination, enforcement, safer infrastructure, and vehicle standards were necessary to sustain momentum.
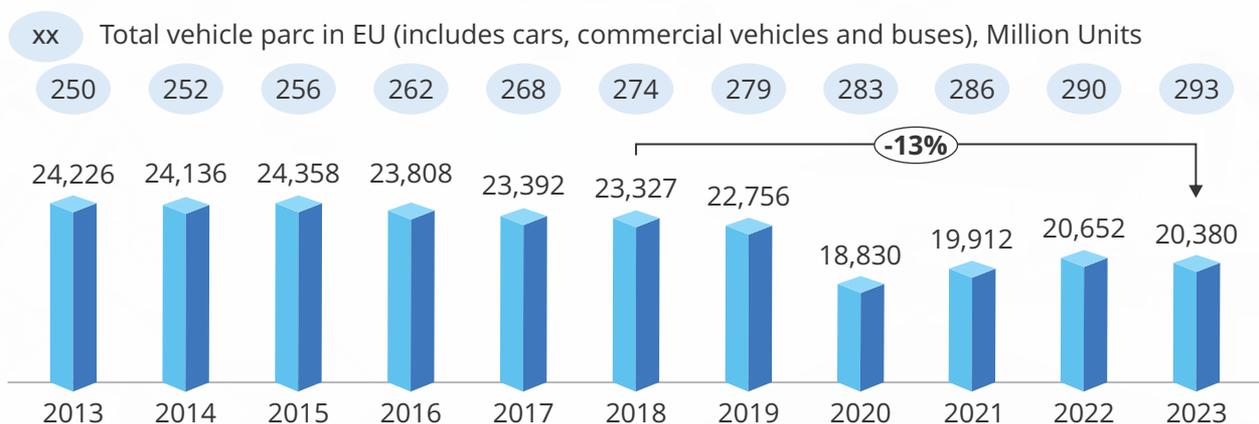
Figure 1: Road accident fatalities (number of deaths), EU, 2013-2023[4] , Total vehicle parc in EU[5]

1. *National Library of Medicine – The Future of Road Safety: Challenges and Opportunities*
2. *Eurostat - Road Safety Statistics in the EU*
3. *World Health Organization – Despite notable progress, road safety remains urgent global issue*
4. *Eurostat – Road safety statistics in the EU*
5. *ACEA – EU vehicle fleet: Size and segment distribution*
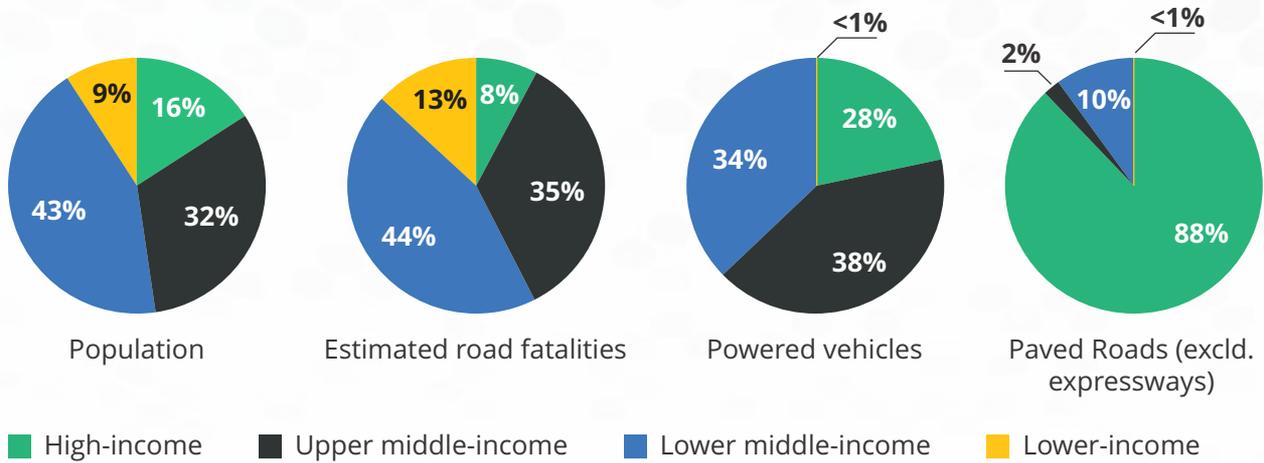
Figure 2: Share of global population, road traffic deaths, paved inter-urban roads
(excluding expressways), and registered motor vehicles, by country income level, 2021

In the last two decades, global road safety policy has increasingly converged around the Safe System approach. This approach frames road safety as a system design challenge rather than a user compliance issue, recognizing that people will make mistakes and that these errors should not result in fatal or serious injuries. It places shared responsibility on policymakers, road authorities, vehicle manufacturers, and emergency services to design and operate a transport system that is forgiving of human error. The approach integrates safer road infrastructure, safer vehicles, appropriate speed management, and effective post-crash care. By focusing on reducing the severity of crashes rather than eliminating all crashes, the Safe System Approach supports sustained, system-wide improvements in road safety outcomes.


Figure 3: Principles of Safe System Approach

Jurisdictions adopting system-level interventions for safer road design, speed management, vehicle crashworthiness, and rapid post-crash care have been more successful in decoupling mobility growth from fatalities. Yet progress remains fragile: even in high-income countries, fatality reductions have slowed in recent years, while globally, road deaths have not declined meaningfully.

3.2 Road Safety Policy Evolution in India

India's road safety policy journey has been shaped by rapid motorization, urbanization, and exponential growth in road infrastructure, often outpacing the development of supporting safety systems. Road safety efforts in India evolved through largely disconnected, agency led interventions, with a stronger emphasis on post-incident control than on system wide risk reduction. While regulatory changes were introduced over time, they were insufficient to arrest the growth in road traffic injuries, leaving India among the highest absolute number of road fatalities globally. India recorded approximately 1.8 lakh road deaths in 2024, accounting for nearly 11-12% of global road fatalities, despite having a significantly lower vehicle penetration than many high-income countries[6]. Preliminary MoRTH data indicates that road fatalities in 2025 will be around 1.6-1.7 Lakhs, reflecting a modest reduction compared to recent years, though the overall level remains high and underscores the need for sustained, system-wide safety interventions.
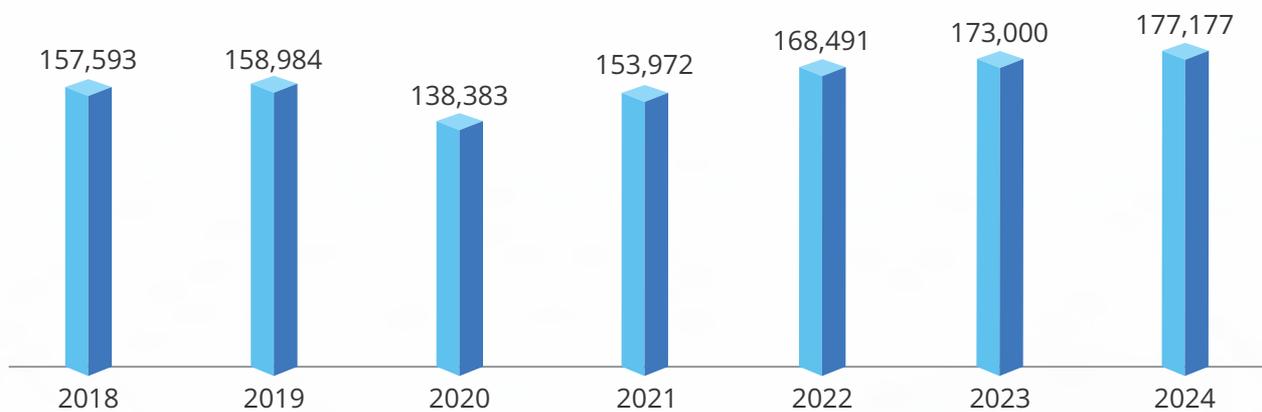
Figure 4: Road fatalities in India (number of deaths), 2018 to 2024

Until the mid-2010s, India's road safety approach remained largely compliance-led, with primary emphasis on traffic policing, penalties, and basic vehicle regulations. Institutional responsibilities were dispersed across central ministries, state transport departments, police authorities, and urban local bodies, with limited coordination or outcome accountability. While seatbelt and helmet mandates were in place, enforcement varied widely across states. During this period, over-speeding emerged as the single largest cause of road fatalities, accounting for nearly 1.24 lakh deaths in 2024, while non-wearing

---

6   *MoRTH – Road Accidents in India*

of helmets and seatbelts together contributed to about 39% of road deaths (over 69,000 fatalities), underscoring persistent gaps in enforcement effectiveness and behavioral compliance.[7]

India's road safety framework has begun to move toward greater structure and coherence. Legislative updates, including amendments to the Motor Vehicles Act, introduced higher penalties, strengthened licensing and vehicle compliance provisions, and improved clarity on institutional responsibilities.[8] In parallel, national initiatives such as black-spot identification[9], road safety audits, strengthened vehicle safety standards, and enhanced emergency response systems have contributed to a broader policy toolkit. While these measures signal progress in policy design, national fatality rates remain high, and outcomes continue to vary widely across states. Despite sustained efforts to strengthen legislation and institutional frameworks, India's road safety outcomes indicate that considerable work remains to translate regulatory intent into consistent on-ground improvements and safer road user outcomes nationwide.

7   Times of India, Press Release, Article
8   MoRTH – The Motor Vehicles (Amendment) Act, 2019
9   MoRTH – Road Safety, Engineering interventions and Black Spot Rectification

4.1 Road Safety Frameworks Across The World

Over the last two decades, global road safety thinking has increasingly converged around a shared set of principles that move beyond enforcement and user compliance. These standards recognize that road crashes are not random events, but predictable and preventable outcomes of system design. At their core, internationally accepted road safety frameworks emphasize shared responsibility across system designers, safe infrastructure and vehicles, and tolerance for inevitable human error, with the objective of preventing serious injury and death rather than eliminating all crashes. Globally, road safety outcomes have improved markedly in the European region, while accident and fatality rates have continued to rise across many developing economies.
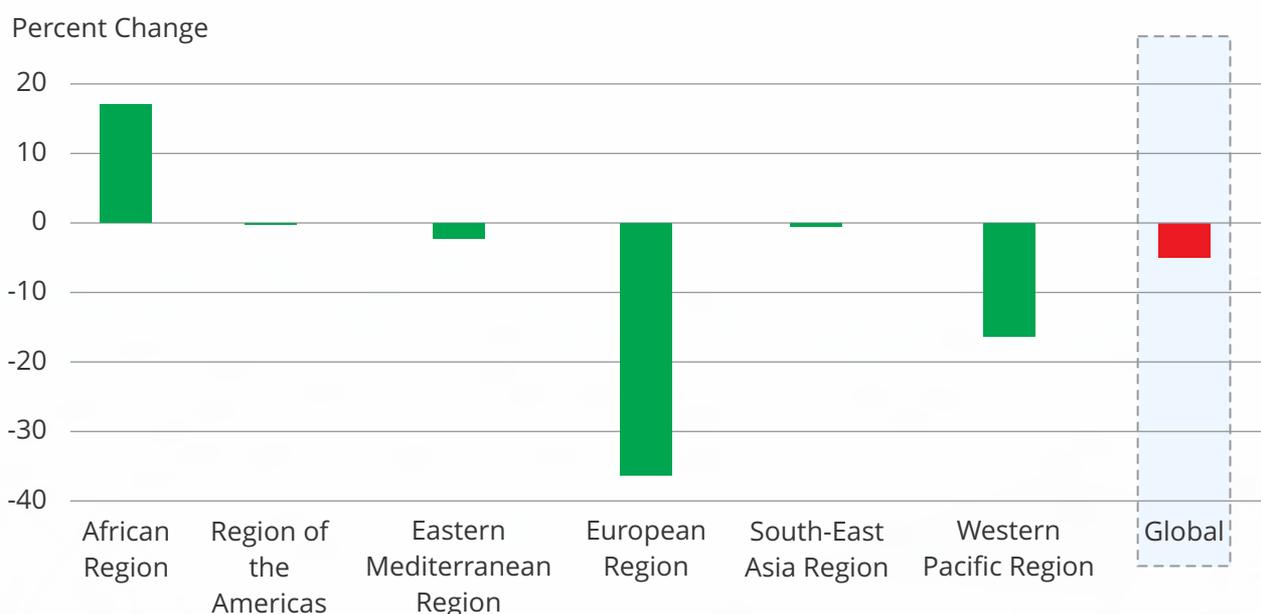
Percent Change

Figure 5: Percentage change in estimated road fatalities, by WHO region, 2010-2021[10]

Europe: System Responsibility and Vision Zero Thinking

European road safety standards have played a significant role in shaping global thinking, particularly through the widespread adoption of Vision Zero aligned principles[11]. These principles place primary responsibility on policymakers, road authorities, and vehicle manufacturers to design systems that prevent fatal outcomes, even when road users make mistakes. Key elements

---

10 *World Health Organization - Global Status Report on Road Safety*
11 *Vision Zero Network – Website*

include forgiving road infrastructure, safe speeds aligned with road function, strong vehicle safety requirements, and the integration of road safety principles into education and training systems. Over time, this philosophy has shifted the policy focus from blame attribution to injury prevention, influencing infrastructure design standards, urban speed management, vehicle safety norms, and structured safety education across the region.

Figure 6: European Road Safety Awards, 2025

Americas: Safe System Adoption with Localized Implementation

In the Americas, particularly in North America and parts of Latin America, road safety standards have increasingly aligned with Safe System principles. The emphasis has been on integrating safer road design, protection of vulnerable road users, evidence-based speed management, and structured road safety education within broader mobility and urban planning frameworks. The country has actively pursued to improve various layers in the safe system approach i.e. Behavioral interventions, Roadway countermeasures, Laws policies and enforcement, vehicle safety features and performance and emergency medical care[12]. Several cities across the region have adopted system-oriented safety strategies that prioritize infrastructure redesign and speed reduction over enforcement alone, reflecting growing acceptance that system design plays a decisive role in safety outcomes.

Vehicle Safety Features and Performance

Roadway counter measures

Emergency Medical Care

Behavioral Interventions

Laws, Policies, Enforcement
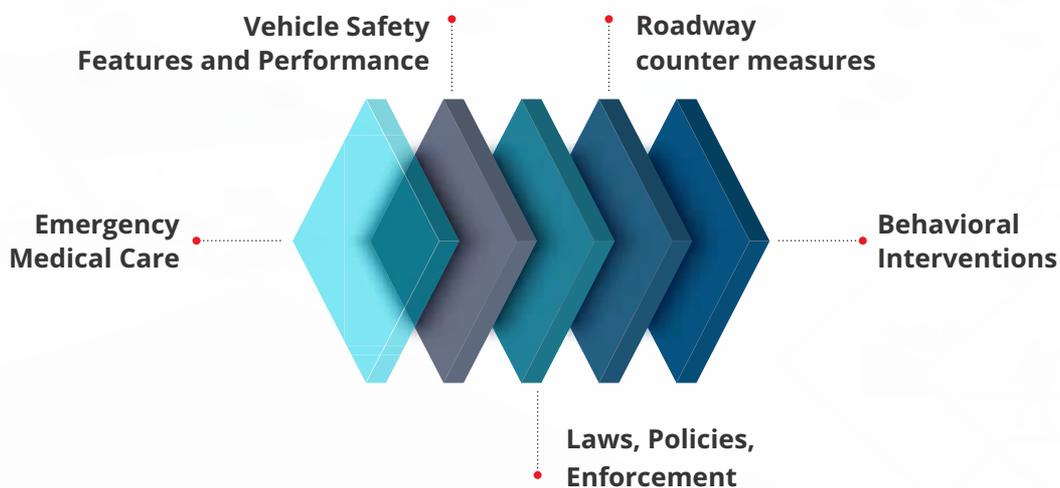
Figure 7: Layers of Safe System Approach

---

12 *US Department of Transportation - National Roadway Safety Strategy*

Figure 8: Road Safety Infrastructur Improvement Initiatives in Africa[13]

Africa: Global Frameworks Guiding Emerging Standards

In many African countries, road safety standards are still evolving, shaped largely by international frameworks rather than regionally developed models. The emphasis has been on adopting globally recognized principles, such as safe speeds, safer road infrastructure, and improved post-crash care, within the constraints of limited institutional capacity. International organizations, including the World Health Organization, have played a key role in promoting system-based approaches that move away from enforcement only strategies toward holistic safety planning, particularly for high-risk road users such as pedestrians and motorcyclists.

Asia-Pacific: Blending Global Standards with Rapid Motorization Contexts

Across the Asia-Pacific region, road safety standards increasingly reflect the best global practices while responding to unique challenges of rapid urbanization, mixed traffic conditions, and high two-wheeler usage. Many countries have begun aligning with Safe System concepts by improving infrastructure design standards, introducing safer vehicle requirements, and strengthening post-crash response systems. The focus has been on adapting global principles to local operating conditions.

Figure 9: Asia Pacific Road Safety Conference, Manila, 2025[14]

4.2 International Road Safety Governance Models

Global evidence shows that differences in road safety outcomes are not only driven by income levels but more importantly how countries organize, govern, and hold themselves accountable for road safety. High-performing countries typically follow a

---

13 *African Cities taking on road safety – The City Fix*
14 *Press Release – Asia Pacific Road Safety Conference*

ADVANCING ROAD SAFETY THROUGH SYSTEMIC POLICY REFORM

common governance model built around clear institutional leadership, formal coordination mechanisms, and outcome-based accountability. In contrast, many countries with weaker road safety outcomes lack these governance foundations. Fewer than one-third of countries have mechanisms to systematically review performance of used vehicles highlighting the gaps existing in the governance frameworks.

Sweden: Centralized Leadership and Vision Zero Accountability

Sweden is a global benchmark following the adoption of Vision Zero. Road safety governance is led by a strong central authority with clear responsibility for outcomes, supported by coordination across transport agencies, municipalities, police, and vehicle regulators. Accountability is explicitly placed on system designers rather than road users. Since the late 1990s, Sweden has significantly reduced road fatalities, achieving one of the lowest fatality rates globally (20 deaths per million inhabitants in 2024[15]).

Figure 10: Global Ministerial Conference on Road Safety, Stockholm, 2020

Japan: Integrated National Local Coordination

Japan's road safety governance is characterized by close coordination between national ministries, police authorities, and local governments under multi-year national road safety plans. These plans set clear quantitative targets and assign responsibilities across infrastructure, enforcement, vehicle safety, post-crash care, and early-stage education, with road safety concepts integrated into primary schooling to shape behavior from a young age. As a result of consistent execution, strong urban design standards, and high compliance levels, Japan has significantly reduced road fatalities since the early 1990s, reaching around 2,500 deaths in 2024[16].

Figure 11: Japan's Road Safety Primary Education Initiatives

---

15 *Press Release – Asia Pacific Road Safety Conference*
16   *The Asahi Shimbun – Press Release*

Australia: Federal Coordination with Shared Accountability

Australia operates within a federal structure but maintains strong national coordination through the National Road Safety Strategy, jointly agreed upon by federal and state governments. Clear performance targets, shared funding mechanisms, and regular public reporting help align incentives across jurisdictions. The Safe System approach underpins governance, ensuring consistency across infrastructure, speed management, vehicles, and trauma care. This coordinated model has enabled Australia to achieve long-term fatality reductions, despite geographic diversity and extensive rural road networks.

Figure 12: Australian Government Road Safety Awareness Campaign

Global experience shows that strong road safety governance defined by clear leadership, coordination, and measurable targets correlates with sustained fatality reductions, while weak accountability frameworks are associated with persistently high death rates.

4.3 Role of Data, Technology, and Enforcement

Globally, effective road safety policy implementation increasingly depends on the integration of robust data systems, technology-enabled enforcement, and vehicle safety regulations. Reliable crash and injury data allows policymakers to identify high-risk corridors and dominant risk factors such as speeding, and alcohol impairment. This evidence base supports targeted interventions and prioritization of safer infrastructure investments. In parallel, progressive vehicle safety regulations have reduced injury severity, reinforcing policy effectiveness beyond traditional enforcement. Countries with stronger data enforcement linkages have generally achieved more consistent reductions in fatalities than those relying on ad hoc or manual approaches.

The experience of Zambia highlights how harnessing fatality data through capacity building can strengthen road safety outcomes[17]. By investing in training for police, health, and transport officials, Zambia improved the collection, quality, and analysis of road traffic fatality data. This enhanced evidence base enabled authorities to better identify high-risk behaviors and locations, and to focus enforcement and awareness efforts on priority issues such as speeding and alcohol impairment. The alignment of improved data capacity with targeted enforcement contributed to a measurable reduction in road traffic fatalities, demonstrating the value of data-led policy execution even in resource-constrained contexts.
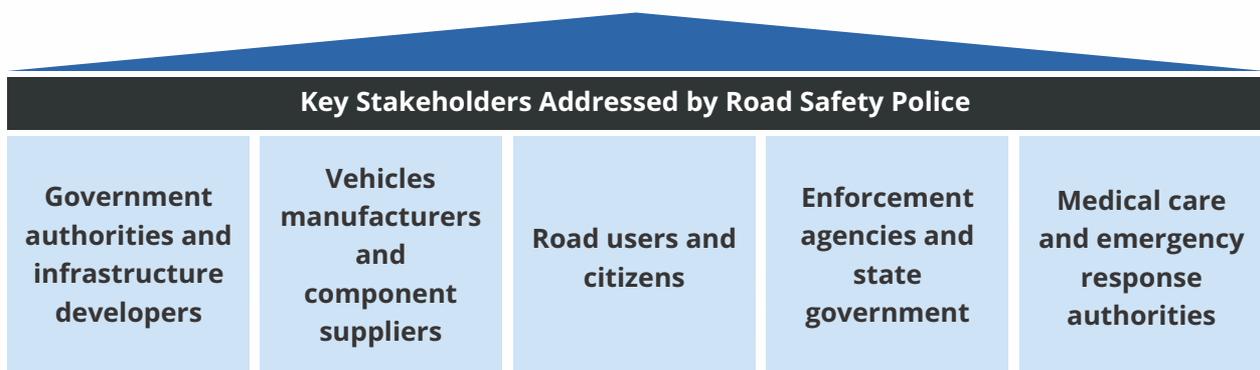
---

17   *World Health Organization – Global status report on road safety, 2023*

5 India's Current Road Safety Policy Landscape

India's road safety legislative and regulatory framework comprises central laws, subordinate rules, and technical standards that govern driver behavior, vehicle safety, enforcement, and post-crash response, with recent amendments aiming to strengthen deterrence, accountability, and system-wide safety outcomes.

5.1 Legislative and Regulatory Framework

India's regulatory and legislative framework for road safety is designed to define responsibilities and accountability across four key stakeholder groups: government authorities and infrastructure developers, vehicle manufacturers, enforcement agencies, emergency response and medical care authorities, and road users. Recent reforms have sought to clarify responsibilities and strengthen deterrence across infrastructure development, vehicle manufacturing, and road user conduct.

Key Stakeholders Addressed by Road Safety Police				
Government authorities and infrastructure developers	Vehicles manufacturers and component suppliers	Road users and citizens	Enforcement agencies and state government	Medical care and emergency response authorities

Figure 13: Key Stakeholders Addressed by Road Safety Policy

Government Authorities and Infrastructure Developers

Regulations governing road infrastructure place explicit safety obligations on road-owning and executing agencies. Under the Motor Vehicles (Amendment) Act, 2019, authorities are required to identify and rectify accident black spots and undertake corrective measures within defined timelines. Complementing this, the IRC and MoRTH road design standards mandate road safety audits at design, construction, and operation stages, particularly for national highways[18]. Guidelines on access control, signage, road markings, crash barriers, and pedestrian facilities seek to reduce design-related risks, while contractors are increasingly held accountable for construction-stage safety compliance.

---

18   *Press Information Bureau*

Vehicle Manufacturers (OEMs) and Component Suppliers

Vehicle safety regulation in India has expanded significantly through mandatory compliance with Central Motor Vehicle Rules (CMVR) and associated Automotive Industry Standards (AIS)[19]. These include norms on crashworthiness, frontal and side impact protection, braking systems (ABS), airbags, seatbelt reminders, and lighting standards. The regulatory framework also enables vehicle recall provisions for safety-related defects, increasing manufacturer accountability beyond the point of sale. In recent years, consumer-facing safety assessment mechanisms such as Bharat NCAP have further reinforced regulatory intent by introducing transparent, standardized crash testing and star-based safety ratings for passenger vehicles sold in the Indian market. By publicly disclosing vehicle safety performance across parameters such as adult and child occupant protection and safety assist technologies, Bharat NCAP empowers consumers to make informed choices and creates market-based incentives for manufacturers to improve safety performance. This shift from compliance-driven regulation to outcome-oriented transparency has encouraged OEMs to prioritize safety across vehicle platforms. In parallel, several leading OEMs have increased investment in road safety focused CSR initiatives, including school level education programs and driver training interventions, to reinforce safer driving behavior beyond regulatory compliance.

Road Users and Citizens

For citizens, legislation focuses on licensing standards, behavioral compliance, and deterrence. The Motor Vehicles (Amendment) Act strengthened penalties for key risk behaviors such as over-speeding, drink-driving, helmet and seatbelt non-compliance, mobile phone use while driving, and dangerous driving. Provisions supporting electronic enforcement, automated challans, and digital licensing systems aim to reduce subjectivity in enforcement and improve compliance consistency across states. In parallel, road safety education is being progressively introduced through school curricula and awareness programs, with the objective of shaping safe road behavior from an early age and reinforcing it across different life stages. Together, these measures seek to influence road user behavior while improving enforcement efficiency.

Enforcement Agencies and State Governments

State governments and enforcement agencies are central to operationalizing the legislative framework. Regulations empower states to deploy speed cameras, red-light violation detection systems, and electronic enforcement platforms, and to standardize driver licensing and vehicle registration processes through digital systems. States are also responsible for implementing post-crash response guidelines, including emergency medical response coordination. While the central framework provides legislative direction, state-level capacity and prioritization continue to shape on-ground outcomes, resulting in variation across jurisdictions.
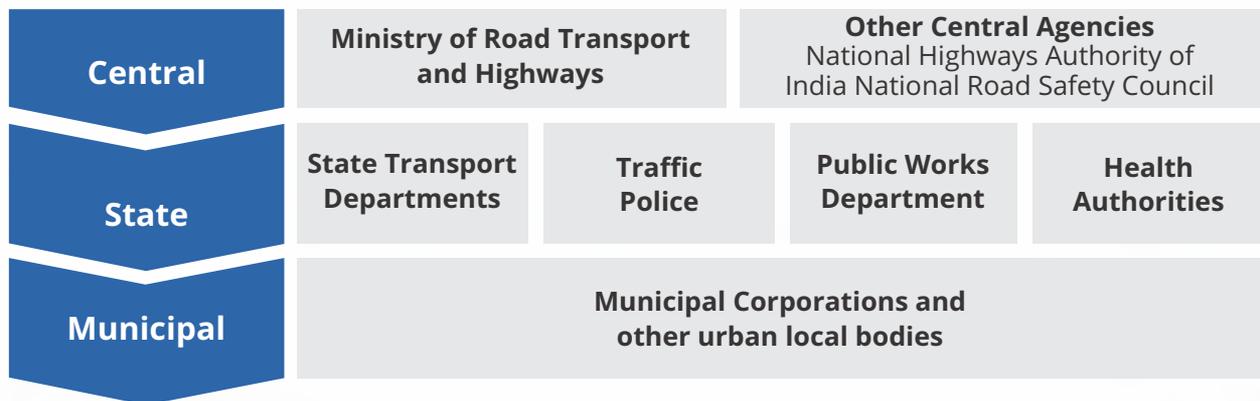

Medical Care and Emergency Response Authorities

Medical care and emergency response authorities play a critical role in determining post-crash outcomes. Regulations and national guidelines assign responsibility to health departments, emergency medical services, and trauma care facilities for timely evacuation, treatment, and rehabilitation of crash victims. Initiatives such as standardized ambulance response protocols, integration with emergency helpline systems, and designation of trauma care centers along major corridors aim to reduce fatalities arising from delayed or inadequate care. However, capacity, coverage, and coordination across emergency services and hospitals vary significantly across regions, influencing survival rates and highlighting the importance of stronger integration between transport, police, and health systems.

5.2 Institutional Roles and Inter-Agency Coordination

India's road safety governance involves multiple institutions operating across central, state, and local levels, each with distinct but interlinked responsibilities. At the central level, Ministry of Road Transport and Highways (MoRTH) is responsible for national legislation, vehicle safety standards, highway design guidelines, and overarching policy direction. Other central agencies contribute through standards-setting, enforcement support, public health, and emergency response frameworks. At the state level, transport departments, traffic police, public works departments, and health authorities are responsible for implementation, enforcement, and post-crash care, while urban local bodies manage road safety aspects within municipal limits.

Central	Ministry of Road Transport and Highways		Other Central Agencies National Highways Authority of India National Road Safety Council	
State	State Transport Departments	Traffic Police	Public Works Department	Health Authorities
Municipal	Municipal Corporations and other urban local bodies			

Figure 14: Natinal Road Safety Council, India's road safety governance layers

While this multi-tiered structure enables broad coverage, it also creates coordination challenges. Responsibilities related to road design, enforcement, emergency response, and data collection are often distributed across multiple agencies without a single authority accountable for outcomes. For example, road-owning agencies may control infrastructure design, traffic police handle enforcement, and health departments manage trauma care, yet coordination mechanisms across these functions are limited. This fragmentation can lead to gaps in execution, such as delayed black-spot rectification, inconsistent enforcement practices, or weak linkage between crash data and corrective action.

At the local level, capacity constrains further complicated coordination. Urban local bodies and district administrations often lack dedicated road safety units or technical expertise,

despite being closest to on-ground risk factors. While state road safety councils and committees exist in many jurisdictions, their effectiveness varies widely due to irregular meetings, limited authority, or weak data integration. Overall, India's institutional landscape reflects clearer role definition and growing coordination mechanisms, though further strengthening of horizontal and vertical alignment can help translate policy intent into more consistent road safety outcomes.

5.3 Key National Road Safety Initiatives and Programs

The Government of India has launched several national initiatives aimed at reducing road accidents and fatalities by addressing key risk factors across infrastructure, enforcement, vehicle safety, and post-crash response. These initiatives are designed to support states and local authorities with frameworks, standards, and targeted interventions, while improving consistency in implementation.

Road Accident Black Spot Identification and Rectification Program

Accident black spots concentrate multiple risk factors such as poor geometry, limited visibility, access conflicts, and high speeds, causing a disproportionate number of crashes and fatalities on the road network. In 2024, a total of 111 black spots were identified, recording 1,132 accidents, including 483 fatalities and 649 non-fatal crashes [20]. Black spot rectification initiative focuses on the systematic identification of accident black spots on national highways using multi-year crash data, including frequency, severity, and causal patterns of accidents. Once identified, these locations are subjected to detailed site investigations to diagnose underlying risk factors such as road geometry, visibility constraints, signage gaps, access conflicts, or traffic mixing. Based on these assessments, targeted corrective measures ranging from geometric improvements and access control to enhanced signage, markings, lighting, and speed management are implemented. These targeted interventions by the government are a significant step towards improving road safety. Mumbai witnessed a 40% reduction in road fatalities in 2024 while road crashes reduced from 292 in 2023 to 173 in 2024 [21]. The objective is to move beyond reactive fixes and adopt a data-led, engineering-driven approach to reduce fatalities and serious injuries at locations that contribute disproportionately to overall road accidents.
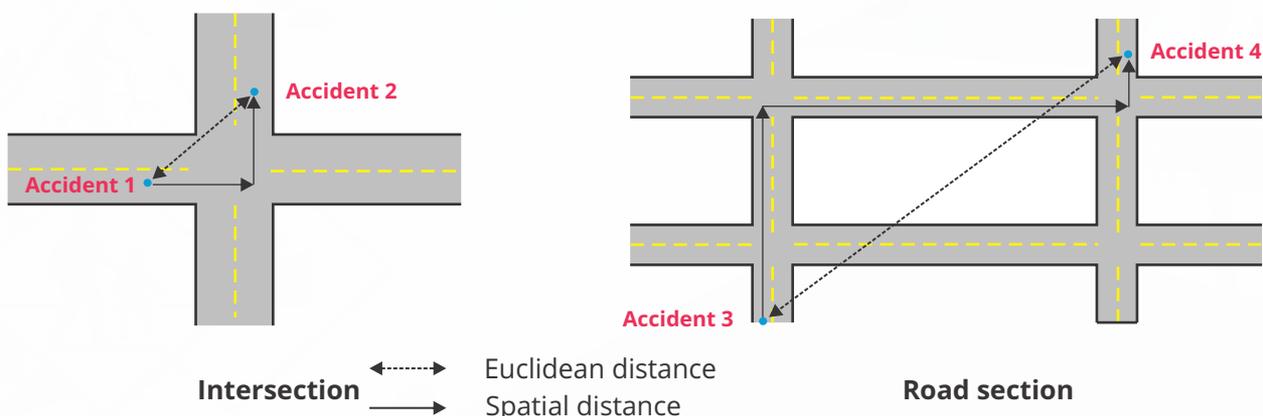

Figure 15: Black spot illustrative

20   Press Release – NDTV
21   Press Release – The Times of India

ELV Recycling and Road Safety

The Government of India has initiated measures to formalize end-of-life vehicle (ELV) recycling as part of a broader automotive circular economy framework. Policies promoting voluntary vehicle scrappage, authorized recycling facilities, and formal deregistration processes aim to systematically remove old, unsafe, and poorly maintained vehicles from the road network. By accelerating fleet renewal, these initiatives reduce exposure to vehicles lacking modern safety features or are affected by structural and mechanical degradation. In parallel, regulated recycling helps curb the reuse of substandard or counterfeit components by promoting traceable and quality-assured parts recovery. Together, these measures support improved vehicle condition, higher safety compliance, and a gradual shift toward safer, more reliable vehicles on Indian roads.

Mandatory Road Safety Audits

Road safety audits have been institutionalized at the planning, design, construction, and operation stages of road projects. The aim is to proactively identify safety risks and embed corrective measures into road infrastructure before accidents occur, rather than relying solely on post-crash interventions.

Technology Enabled Enforcement and e-Challan Systems

The rollout of electronic enforcement platforms, including e-challan systems and automated speed and red-light violation detection, seeks to improve consistency, transparency, and deterrence in traffic law enforcement. These systems aim to reduce dependence on manual enforcement and improve compliance with traffic rules.

Strengthening Vehicle Safety Standards

Progressive introduction of mandatory vehicle safety features and alignment of national standards with global benchmarks aim to improve crashworthiness and reduce injury severity. This initiative seeks to ensure that vehicle safety becomes a baseline requirement rather than an optional feature, contributing to safer outcomes across the vehicle fleet.

Overall, these initiatives reflect a growing and structured government focus on road safety, though further strengthening of implementation, coordination, and state-level execution will be essential to achieve sustained reductions in fatalities.

6 Comparative Assessment: India vs Global Benchmarks

6.1 Accident Characteristics and Causal Differences

In India, several high-fatality road accidents have been characterized by systemic compliance and enforcement failures, often compounded by infrastructure deficiencies and post-construction modifications. Common patterns include over-speeding on undivided highways, unsafe road geometry, poor roadside protection, vehicle overloading, and unauthorized body modifications, particularly in buses and goods vehicles[22]. In many cases, fatalities are amplified by secondary factors such as fires, delayed evacuation, and inadequate emergency response. These accidents reflect gaps not only in driver behavior but also in road design consistency, enforcement predictability, and post-sale vehicle compliance.

By contrast, major road accidents in developed regions such as the European Union and the United States typically occur within otherwise compliant systems and are more often linked to isolated system failures or extreme scenarios. These may include adverse weather conditions, and rare mechanical failures[23]. Importantly, while such incidents can still result in casualties, the overall severity is often mitigated by forgiving road infrastructure, strict vehicle safety standards, predictable enforcement, and rapid emergency response. As a result, even when crashes occur, fatality ratios tend to be lower and confined to fewer occupants.

The underlying distinction lies in the maturity of the safety ecosystem. In India, accidents often result from multiple simultaneous failures, including infrastructure design gaps, uneven enforcement, vehicle non-compliance and poor maintenance, and limitations in emergency care, leading to disproportionately high fatality outcomes. In contrast, developed countries operate within safety systems designed to anticipate human error and contain its consequences, ensuring that individual failures are less likely to cascade into mass-casualty events. This comparison highlights that improving road safety outcomes in India will require not only stronger compliance and enforcement, but also sustained attention to vehicle condition, system-level design, accountability, and execution consistency.

---

22   *Times of India – Press Release*

23 *CBS News – Press Release*

6.2 Policy Frameworks and Strategic Alignment

Globally, leading road safety jurisdictions design policy around long-term, outcome-oriented national strategies aligned with the Safe System approach. These frameworks typically include clearly defined fatality and serious injury reduction targets, multi-year time horizons, dedicated funding, and formal review mechanisms. According to global road safety assessments, most high-income countries operate with fully funded national road safety strategies, often targeting 40–50% reductions in fatalities over a decade, supported by interim milestones and institutional accountability[24]. This policy architecture ensures continuity, alignment across agencies, and sustained political focus.

India's policy intent has progressively aligned with these global principles. National targets articulated under the UN Decade of Action, strengthened legislation, and expanding programs on infrastructure safety, vehicle standards, and enforcement reflect a clear strategic direction. However, compared to global leaders, India's policy framework remains less uniform in translation across states, with variations in target-setting, funding commitment, and monitoring mechanisms. While the overarching policy direction is consistent with global best practice, the strategic framework is still evolving toward tighter institutional ownership and outcome accountability at sub-national levels.

6.3 Implementation Effectiveness and Safety Outcomes

In high-performing road safety systems, implementation is characterized by predictable enforcement, data led targeting, and continuous monitoring of outcomes. Automated enforcement, integrated crash databases, and consistent penalties have enabled several regions like EU to achieve fatality rates of 45 deaths per million population[25], with sustained downward trends over time. Between 2010 and 2021, the European region reduced road deaths by over 36%, demonstrating the impact of coordinated implementation aligned with policy design [26].

India's implementation outcomes remain significantly behind these benchmarks. The country accounts for approximately 11% of global road deaths, with a fatality rate of around 156 deaths per million population in 2019, more than double that of many high-income regions[27]. Enforcement and compliance remain uneven across states, with over speeding contributing to nearly 70% of fatalities, and vulnerable road users accounting for a large share of deaths[28]. While digital enforcement, higher penalties, and infrastructure programs have expanded, their impact on national outcomes has been limited by variability in enforcement intensity, data integration, and follow-through.

24 World Health Organization – Decade of Action for Road Safety, 2021-2030
25 European Parliament – Road Death Statistics in the EU
26 World Health Organization – Global Status Report on Road Safety 2023
27 Data For India – Road Accident Deaths
28 BBC News – Press Release - Speeding led to 70% of India road crash deaths

India's road safety outcomes reflect a combination of rapid motorization, complex traffic conditions, and uneven implementation of safety interventions across regions. While policy intent and program coverage have expanded over time, persistent gaps in execution and coordination continue to limit impact. These challenges can be systematically examined across the five key dimensions of road safety, Engineering, Enforcement, Education, Emergency care, and Evaluation. These 5Es together shape both risk and resilience within the road transport system.
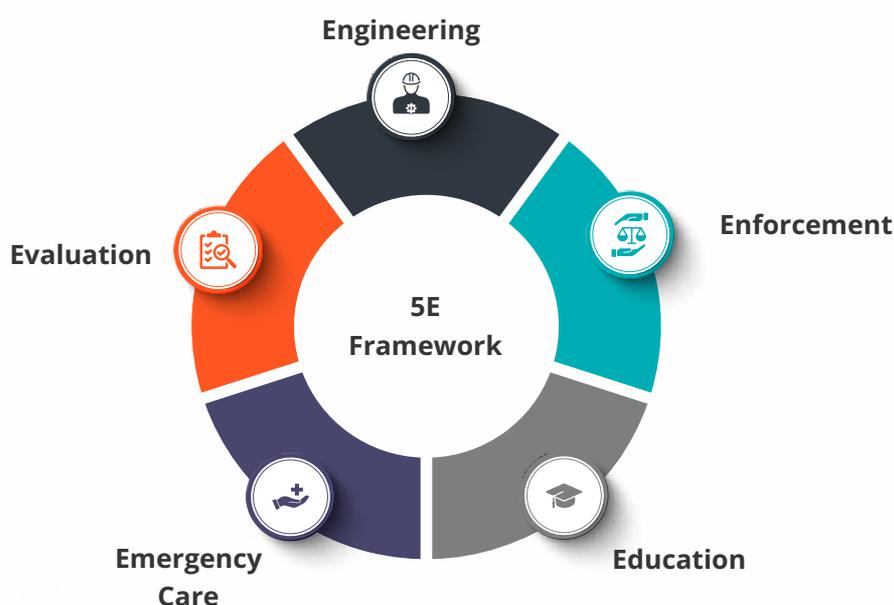
Figure 16: 5E Road Safety Framework

7.1 Gaps across the 5Es of Road Safety

Across India's road safety landscape, gaps are visible across all five dimensions of the safety framework, often reinforcing one another and limiting the effectiveness of individual interventions. While initiatives exist under each pillar, their depth, consistency, and integration vary widely across geographies and road types. Engineering measures are not uniformly applied across the existing road network, enforcement outcomes differ significantly by jurisdiction, education and awareness efforts remain fragmented, emergency response capabilities are uneven, and both data collection and the effective use of data remain limited, constraining evidence-based decision making. Together, these cross-cutting gaps highlight the need for a more balanced and coordinated strengthening of all five elements to achieve sustained improvements in road safety outcomes.

1. **Engineering:** Road infrastructure safety remains uneven across much of the network, especially on state highways, urban streets, and rural roads. Although design standards and safety audits are in place, their application is inconsistent, and improvements to existing high-risk corridors often progress slowly. Mixed traffic conditions, limited facilities for pedestrians and cyclists, and inadequate speed management continue to increase risk for vulnerable road users[29].

Figure 17: Unprotected concrete blocks at the toll plaza

2. **Enforcement:** Enforcement outcomes vary widely across states and cities. While penalties have been strengthened and digital tools introduced, compliance remains uneven, particularly for speeding and drink-driving. Manual enforcement still dominates in many locations, limiting consistency and predictability, and reducing the deterrent effect intended by regulation.

3. **Education:** Road safety education and behavior change efforts remain fragmented and largely campaign driven. Driver training quality is uneven, and sustained programs targeting children, young drivers, and commercial vehicle operators are limited. As a result, awareness initiatives do not consistently translate into safer on-road behavior.

4. **Emergency Care:** With one crash happening every 68 seconds and a death every 3 minutes it is imperative to have a robust emergency care system to prevent fatalities [30]. However, post-crash response capabilities differ significantly by geography. Although ambulance networks and trauma care facilities have expanded, gaps persist in response times, coverage, and coordination, particularly outside major urban centers. These variations continue to affect survival rates and injury outcomes following crashes.

5. **Evaluation:** Accident data is collected at a national level, but challenges remain around data quality, under-reporting, and integration across police, transport, and health systems. Limited use of data for prioritization, performance tracking, and course correction constrains evidence-based decision-making and continuous improvement.

Taken together, these gaps across the five Es indicate that India's road safety challenge is not confined to any single pillar, but reflects the need for more balanced, consistent, and integrated strengthening across all dimensions of the safety system.

---

29 BBC News – Press Release - Speeding led to 70% of India road crash deaths

30 Citizen Consumer and Civic Action Group – From Road Crash to Emergency Care

7.2 Institutional and Execution Enablers Affecting the 5Es

The effectiveness of road safety interventions across the five Es is strongly influenced by a set of institutional and execution enablers that determine how policies are translated into action. Governance arrangements, capacity at state and local levels, funding certainty, and data-driven monitoring play a critical role in shaping consistency and scale of implementation. Where these enablers are weak, even well-designed interventions struggle to deliver outcomes; where they are strengthened, the same measures can achieve sustained improvements in road safety performance.

1. **Governance and Accountability Mechanisms:** Road safety responsibilities are distributed across multiple institutions at central, state, and local levels, with limited outcome ownership. In the absence of a clearly empowered lead agency with accountability for results, coordination across engineering, enforcement, education, emergency care, and evaluation functions remain uneven.

2. **State-Level Capacity and Execution Capability:** Performance across the 5Es varies significantly across states, reflecting differences in administrative capacity, technical expertise, and prioritization. States with stronger institutional capability tend to implement road safety audits, enforcement technologies, and emergency response systems more consistently, while others face delays and partial adoption.

3. **Funding and Implementation Certainty:** While policy frameworks and guidelines exist, dedicated and predictable funding for road safety interventions, particularly for retrofitting infrastructure, expanding enforcement technology, and strengthening data system remains constrained. This affects the depth and pace of implementation across all five Es.

4. **Monitoring, Feedback, and Course Correction:** Limited integration of data across police, transport, and health systems constrains the ability to track performance across the 5Es and adjust interventions in real time. Weak feedback loops reduce the effectiveness of evaluation and slow continuous improvement.

8 Role of Industry and Multi-Stakeholder Collaboration

Road safety outcomes are shaped not only by public policy, but also by the extent to which industry and civil society contribute capabilities, innovation, and execution support. Globally, sustained improvements in road safety have been achieved where governments, industry, and non-government actors operate within clearly defined roles and coordinated frameworks.

8.1 Private Sector and Research Institution's Role in Safer Mobility

The private sector including OEMs, research and advisory bodies have played a central role globally in improving road safety by advancing vehicle safety technologies, supporting regulatory evolution, and adapting solutions to local conditions. In many high-performing jurisdictions, close coordination between governments and manufacturers has enabled faster translation of safety research into mandatory standards.

In the European Union, collaboration between regulators, vehicle manufacturers, and safety research bodies has led to progressive strengthening of vehicle safety requirements, including mandatory advanced driver assistance systems. OEM-led innovations such as the three-point seatbelt, electronic stability control, and pedestrian protection systems have been associated with significant reductions in fatal and serious injuries. For example, widespread adoption of electronic stability control is estimated to have reduced single-vehicle fatal crashes by up to 40% [31], while improvements in vehicle crashworthiness have contributed to a more than 60% decline in road fatalities in the European region since the early 1990s, despite increased vehicle ownership and travel demand [32].

Similarly, in Japan, sustained collaboration between government agencies and vehicle manufacturers supported the early adoption of crashworthiness standards and active safety technologies. These efforts, combined with consistent enforcement and urban design measures, contributed to a significant reduction in road fatalities since the 1990s, demonstrating how industry capability can reinforce national road safety objectives.

In India, the automotive industry has played an increasingly important role in advancing the road safety agenda, complementing regulatory action with technology, advocacy, and on-ground initiatives. OEMs have progressively improved vehicle safety through wider adoption of airbags, ABS, structural reinforcements, and active safety features, often ahead of consumer demand. Industry-led platforms, including initiatives coordinated by SIAM, have supported road safety awareness, policy dialogue, and research-based inputs to regulators.

---

31 *Science Direct – Effects of electronic stability control on accidents: A review of empirical evidence*
32 *National Library of Medicine – Factors related to Fatal injury in Frontal Crashes Involving European Cars*

These examples underscore that the automotive industry's contribution extends beyond regulatory compliance; through research, testing, localization of safety technologies, and data sharing, industry participation can help strengthen the overall road safety ecosystem in India.

Figure 18: SIAMs road safety initiatives

8.2 Public–Private Partnerships and Civil Society

Public–private partnerships (PPPs) have proven effective globally in addressing implementation gaps and capacity constraints in road safety, particularly where public systems face scale, technology, or resource limitations. In Australia, national and state governments partnered with private technology providers to deploy automated speed and red-light enforcement systems. These collaborations enabled consistent enforcement across jurisdictions and contributed to sustained reductions in speed-related fatalities under a Safe System oriented approach.

In Sweden, the implementation of Vision Zero has relied on close collaboration among road authorities, municipalities, research institutions, industry partners, and civil society organizations. This multi-stakeholder model supported systematic road redesign, urban speed management, and sustained public engagement, reinforcing Sweden's position among countries with the lowest road fatality rates globally.

In lower- and middle-income contexts, PPPs and civil society engagement have helped bridge institutional and capacity gaps. In Zambia, partnerships involving government agencies, development partners, and technical institutions focused on building capacity for crash data collection and analysis. Improved data quality enabled more targeted enforcement and awareness efforts, supporting better prioritization of high-risk behaviors and locations and demonstrating the value of multi-stakeholder collaboration even in resource-constrained settings.

These global experiences suggest that structured collaboration between government, industry, NGOs, and academia can play a meaningful role in strengthening road safety outcomes. Such partnerships can support technology deployment, data and research capacity, targeted behavior change initiatives, and local implementation support, complementing government-led programs and enabling more consistent, scalable, and evidence-based road safety interventions.

9 Way Forward

9.1 Strengthening the 5Es

Global experience shows that meaningful improvements in road safety emerge when interventions across the five Es are deliberate, coordinated, and adapted to local risk profiles, rather than implemented in isolation.

1. **Engineering:** Countries such as Netherlands and Sweden prioritized systematic redesign of roads based on function, separating high-speed corridors from pedestrian and cyclist heavy environments[33]. The focus was on forgiving infrastructure, speed appropriate design, and network wide safety treatments rather than project by project fixes. For India, a similar shift toward corridor level and area wide safety planning can help address risks arising from mixed traffic and inconsistent road design.

2. **Enforcement:** In countries such as Australia and France, enforcement strategies evolved from sporadic policing to predictable, technology supported systems. Automated enforcement, combined with clear communication of rules and penalties, helped normalize compliance and reduce reliance on discretionary enforcement. India can benefit from further embedding predictability and visibility into enforcement practices, particularly for high-risk behaviors such as speeding.

3. **Education:** Japan and South Korea integrated road safety education into formal schooling, driver licensing, and community programs, ensuring that safety awareness is reinforced at multiple life stages[34]. These efforts complemented engineering and enforcement measures by shaping long-term attitudes toward risk. In India, Moving from campaign-led awareness to structured, age and user specific education programs can improve behavioral outcomes over time. Several government–industry initiatives such as SIAM's KVS road safety program have introduced structured awareness for school children. However, formalizing such efforts across education levels can embed safe road behavior as an intrinsic part of the education system.

4. **Emergency Care:** Countries such as United Kingdom focused on strengthening trauma care systems by improving coordination between emergency services, hospitals, and transport authorities. Standardized response protocols and regional trauma networks ensured more consistent post-crash care. Strengthening similar coordination and coverage especially beyond major urban centers can help reduce the severity of outcomes following crashes in India.

---

33 *ENO Centre for Transportation*
34 *Mainstreaming Road Safety Education for Children in South Korea*

5. **Evaluation:** In lower- and middle-income contexts, countries such as Zambia demonstrated that improving data quality and analytical capacity can materially strengthen road safety decision-making. Investments in training and systems enabled better identification of high-risk behaviors and locations, supporting more targeted interventions. For India, improving integration and use of crash data across agencies can enhance prioritization and policy refinement across all five Es.

9.2 Enablers for Sustained Road Safety Improvement

Experience from leading and emerging road safety systems indicates that technical measures across the 5Es are most effective when supported by strong enabling conditions. Countries that have achieved sustained progress have invested in clear governance structures, stable funding mechanisms, and coordinated delivery models that link national policy with local execution. A common feature across such systems is the presence of an empowered central institution responsible for setting direction, aligning stakeholders, and tracking outcomes.

Several jurisdictions have demonstrated the value of lead agencies that coordinate across transport authorities, police, health systems, urban bodies, and education departments, ensuring alignment and accountability across the safety ecosystem. In parallel, structured engagement with industry, civil society, and academic institutions has helped strengthen implementation capacity, deploy technology, and support behavior change initiatives, particularly at the last mile.

For India, strengthening these enabling conditions would benefit from the establishment of a unified national road safety body with a clear mandate to coordinate across ministries, state governments, enforcement agencies, health authorities, OEMs, and other ecosystem stakeholders. Such an institution could play a central role in setting national priorities, standardizing data collection and reporting, monitoring outcomes across states, and supporting capacity building at state and local levels. It could also serve as a platform for structured collaboration with industry and research institutions, enabling faster adoption of safety technologies, evidence-based policymaking, and consistent implementation. Aligning this governance mechanism closely with MoRTH and other key stakeholders would help translate policy intent into sustained, system-wide road safety impact.

9.3 Roadmap for reduction in road fatalities

The Government of India aims to reduce road fatalities and injuries by 50% by the year 2030, as per its commitment under the Stockholm Declaration[35]. A phased roadmap to achieve this reduction in road fatalities should combine early targeting with gradual system-wide scale-up. In the near term (2025–26), priority should be given to strengthening crash data quality and integration across police and health systems, accelerating identification and rectification of high-risk black spots, and expanding technology-enabled enforcement for speeding and drink-driving on the most dangerous corridors. Evidence from global road safety practice shows that targeted interventions in high-risk locations and behaviors deliver the fastest initial gains. In the medium term (2027–28), proven measures should be scaled nationally, including corridor-based engineering improvements, predictable automated enforcement, wider penetration of vehicle safety features, and structured road safety education embedded in schools and driver training. In the final phase (2029–30), the focus should shift to consolidation, strengthening post-crash care coordination, monitoring state-wise outcomes, and institutionalizing accountability mechanisms to sustain reductions. This approach ensures that all pillars of improving road safety are addressed and strengthened to significantly reduce road accidents in India by 2030.

---

35 *Press Information Bureau – Deaths Due to Road Accidents in India*

10 Conclusion

Road safety remains a complex and system-wide public policy challenge for India, shaped by the interaction of infrastructure design, vehicle safety, enforcement practices, road user behavior, emergency response, and institutional capability. Rapid motorization and expanding road networks have increased exposure to risk, particularly for vulnerable road users, underscoring the need to view road safety not as a series of isolated interventions but as an integrated safety system.

Over recent years, India has taken meaningful steps to strengthen its road safety framework through legislative reforms, national programs, and closer alignment with global safety principles. Comparative assessment with global benchmarks, however, indicates that sustained improvements are driven less by policy intent alone and more by consistent execution, predictable enforcement, system-level design, and long-term institutional accountability. The central challenge lies in translating intent into uniformly delivered outcomes across states, cities, and road types.

Achieving sustained improvements in road safety will require India to strengthen institutional leadership alongside technical interventions. The establishment of a unified national road safety agency, working in close coordination with central ministries, states, industry, and other stakeholders, can provide strategic direction, accountability, and continuity. By aligning policy, execution, data, and partnerships under a common institutional framework, India can move toward more consistent, system-wide road safety outcomes over the long term.

The five-E framework, engineering, enforcement, education, emergency care, and evaluation—provides a structured lens to understand where progress has been uneven and where targeted strengthening is required. Gaps across these pillars often reinforce one another, limiting impact when addressed in isolation. Strengthening road safety outcomes will therefore require a balanced approach that advances all five elements in parallel, supported by strong governance, adequate funding, and data-driven monitoring.

Looking ahead, global experience shows that road safety gains are achievable and cumulative when policy, execution, and collaboration move in step. By deepening coordination across levels of government, building state and local delivery capacity, and leveraging partnerships with industry, academia, and civil society, India can move from incremental improvements toward sustained reductions in fatalities and serious injuries. Embedding safety more deeply into the design and delivery of mobility systems will be critical to ensuring safer roads as the country's transport ecosystem continues to grow.

Table of Figures

SIAM

Society of Indian Automobile Manufacturers

Building the Nation, Responsibly.

Core 4-B, 5th Floor, India Habitat Centre
Lodhi Road, New Delhi– 110 003, India
Phone : +91-11-47103010 | Email: siam@siam.in

Website: www.siam.in