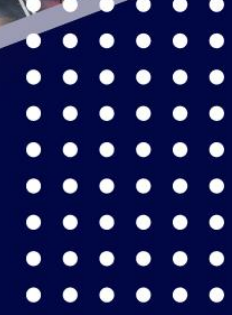


THE ASIASAFE ROAD SAFETY HANDBOOK

THE BEST PRACTICES IN TRAFFIC SAFETY
BETWEEN EUROPE – INDONESIA,
MALAYSIA AND VIETNAM



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ASIASAFE PROJECT
2024

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DISCLAIMER:

This handbook on Road Traffic Safety, titled "The ASIAsafe Road Safety Handbook: The Best Practices in Traffic Safety between Europe – Indonesia, Malaysia, and Vietnam," is a collaborative effort involving nine universities across Asia and Europe. It represents over three years of intensive research, discussions, and consultations with relevant agencies in participating countries.

The six Asian universities involved are the Malaysia University of Science and Technology, Universiti Malaya (Malaysia), Universitas Gadjah Mada, Universitas Muhammadiyah (Indonesia), and Nguyen Tat Thanh University, University of Transport and Communications (Vietnam). The three European universities are Linköping University (Sweden), University of Porto (Portugal), and University of Rome "Tor Vergata" (Italy).

While every effort has been made to ensure the accuracy and relevance of the information provided in this handbook, it is essential to acknowledge that each country has its own unique conditions and circumstances concerning road traffic safety. Therefore, the content of this handbook should be adopted and adapted according to the specific situations and needs of individual countries.

Readers are advised to exercise caution and discretion in implementing the recommendations and strategies outlined in this handbook, considering the local context and consulting with relevant authorities and experts as needed. The authors and contributing institutions do not accept any responsibility for the consequences of actions taken based on the information provided in this handbook.

Furthermore, this handbook is intended for informational purposes only and should not be construed as legal, professional, or medical advice. Readers are encouraged to seek professional guidance and legal counsel where appropriate.

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Our heartfelt thanks go to the road safety stakeholders in the six participating countries Sweden, Portugal, Italy, Malaysia, Indonesia and Vietnam. Your invaluable contributions, expertise, and dedication to road safety have significantly enriched the content and relevance of this handbook.

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While every effort has been made to ensure accuracy, we recognize the unique road safety challenges faced by each country. Readers are encouraged to adapt the handbook's recommendations to their specific contexts and seek local expertise when implementing them.

We are truly grateful for the collective dedication and contributions of all involved parties, which have made this handbook a valuable resource for promoting road safety worldwide.

With sincere appreciation,
The Asiasafe Project Members

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Preface of the ASIAsafe Project Coordinator



Around the world, traffic accidents result in over 1.3 million fatalities and 50 million injuries a year. It is now the world's number-one cause of death for children and young people worldwide. In Southeast Asia, traffic accidents are the main cause of fatalities and serious injuries. It is a significant socioeconomic problem.

Road safety concerns all of us, whether we are drivers, passengers, cyclists, pedestrians, motorcyclists, or public transport users. Individuals, friends, families, and societies are all severely affected by road collisions. This needs to be given serious attention and awareness by all of us.

When we started to discuss and implement this important project, ASIAsafe, with partners in the EU (Italy, Portugal, and Sweden) and Asia (Indonesia, Malaysia, and Vietnam), we began to recognise the importance of sharing best practises and know-how between project partners. We cannot do all this alone.

It is now time for change to improve road safety in partner countries and achieve the global vision of a 50 percent reduction of road casualties by 2030, according to the United Nations Global Plan for the Decade.

Therefore, this ASIAsafe handbook shares best practises in the EU and ASIA to be taken to achieve our vision of reducing road fatalities towards the UN plan and Vision Zero. This is a vision that we and our partners are determined to achieve through the development of new modern master curricula in traffic safety at partner universities and the sharing of best practises between partner countries.

This handbook can be read by ordinary people, the public, and the media, as well as by professionals from academia, government agencies, civil society, industry, NGOs, etc. The beneficiaries of this handbook will be all of us: our families, our children, our beloved ones, policymakers, and society.

In this regard, I would like to thank all project partners, stakeholders, and everybody who gave us their views on developing this important document.

Together, we save lives!

*Dr. Ghazwan Al-Haji, Associate Professor
Linköping University, Sweden
ASIAsafe Project Coordinator*

Preface of the ASIAsafe Project Regional Coordinator



This handbook is the culmination of the collaborative work of nine universities on the topic of Road Traffic Safety. It took more than three years of research and discussions, not only with the participating universities but also with relevant agencies in the countries where the universities reside.

Six Asian universities participating include Malaysia University of Science and Technology and Universiti Malaya from Malaysia, Universitas Gadjah Mada and Universitas Muhammadiyah from Indonesia, and Nguyen Tat Thanh University and University of Transport and Communications from Vietnam. Additionally, three European universities involved are Linköping University from Sweden, the University of Porto from Portugal, and the University of Rome "Tor Vergata" from Italy.

It is envisioned that this handbook will provide an excellent guide on how to improve traffic safety, specifically in reducing traffic accident cases and fatalities, particularly in the three Asian countries mentioned where road traffic accidents and fatalities are high compared to their European counterparts. Benchmarking has been done to emulate their good practises and their drive towards zero road traffic accident fatalities.

Each country will have its own unique conditions and circumstances. Therefore, they will have to adopt and adapt the content of the handbook according to their situations. We are grateful for the grant provided by the European Commission under the Erasmus+ ASIAsafe project, which made it possible to carry out the research and collaborative work in producing this handbook.

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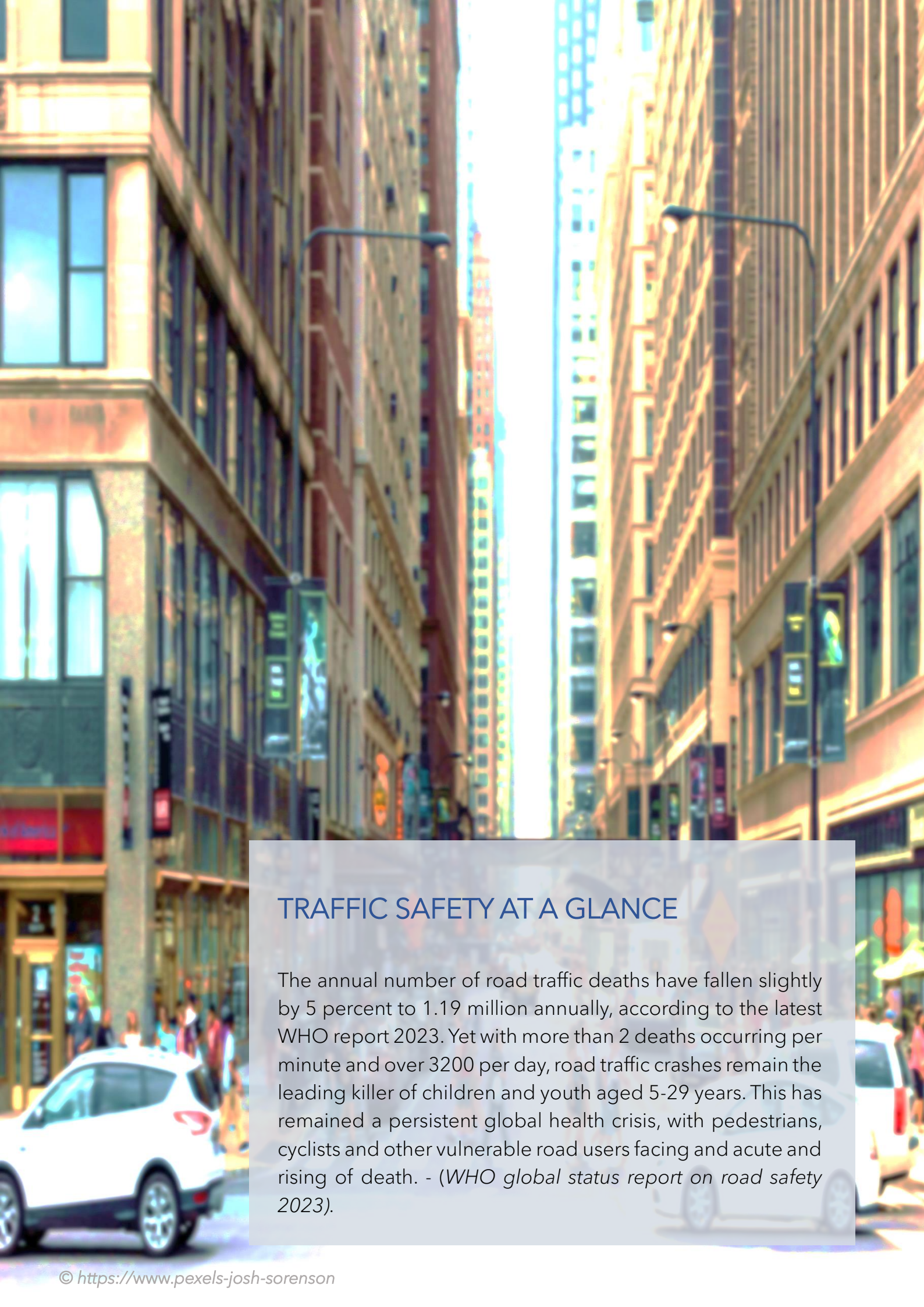
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TRAFFIC SAFETY AT A GLANCE

The annual number of road traffic deaths have fallen slightly by 5 percent to 1.19 million annually, according to the latest WHO report 2023. Yet with more than 2 deaths occurring per minute and over 3200 per day, road traffic crashes remain the leading killer of children and youth aged 5-29 years. This has remained a persistent global health crisis, with pedestrians, cyclists and other vulnerable road users facing and acute and rising of death. - *(WHO global status report on road safety 2023)*.

PART 1.0

ASIASAFE PROJECT OVERVIEW

Today, the transportation industry is a fast-growing field of study and has the potential to drive the nation's economy as it penetrates various industries. Transportation can offer sustainable approaches to resolving modern-day challenges faced by society and industries, as well as promise many job opportunities locally and internationally. One of the concerns in transportation is traffic safety. Traffic safety in the broadest sense aims to adopt all plans, programs, traffic regulations, and preventive measures to reduce or prevent the occurrence of traffic accidents to ensure human safety and property and to preserve homeland security and its human and economic elements.

In the effort of producing the required human resources required by the traffic safety field, the European Commission co-founded the Master Program as part of the Erasmus+ Programme–Capacity Building Projects in Higher Education (CBHE). The ASIASAFE Project–Modernization, Development, and Capacity Building of Master Curriculum in Traffic Safety in Asian Universities–focuses



on road traffic safety as well as the world's developing health, social, and economic problems. The ASIASAFE Project endeavours to create a sophisticated and contemporary master curriculum, encompassing both diploma and full master programmes, in the field of road traffic safety.

This objective is to be achieved through collaborative initiatives between three European partner universities hailing from Italy (IT), Portugal (PT), and Sweden (SE), and six Asian partner universities from Indonesia (ID), Malaysia (MY), and Vietnam (VN). Asia Safe Project Consortium Partner Details: Sweden: Linköping University, Portugal: University of Porto, Italy: University of Rome Tor Vergata, Indonesia: University of Gadjah Mada and Universitas Muhammadiyah Yogyakarta, Malaysia: University of Malaya and Malaysia University of Science & Technology, Vietnam: Nguyen Tat Thanh University and the University of Transport and Communications. The curriculum is to be developed in accordance with EU traffic safety standards and best practises, as well as national accreditation standards.

The educational programmes will be reinforced by novel methodologies for instruction and the acquisition of knowledge. The enhanced courses aim to cater to

the needs of both students and professionals by providing comprehensive training. The objective is to cultivate a fresh cohort of engineers and managers in Indonesia, Malaysia, and Vietnam who possess exceptional theoretical and practical competencies in traffic safety, encompassing design, operation, planning, and management. The project will share EU best practises and innovative experiences to support the development of new or existing courses, capacity building, and knowledge building in traffic safety at the partner universities. The developed curricula will be based on market analysis needs and job demands for graduate engineers. It will be tailored to the problems, needs, and local traffic characteristics in ID-MY-VN.

Within this overall aim, the following specific objectives shall be achieved, which correspond to the knowledge triangle (education, research, and business):

- Increasing awareness of the traffic accidents problem in society in ID-MY-VN.
- To define clearly the knowledge and skills required for the master curricula in traffic safety according to EU standards and tailored to problems and priorities in partner countries.
- A market study among industry and public authorities in ID-MY-VN will be carried out as early as the beginning of the project (the first 3 months) to know the scientific and professional career and job demands in the field of traffic safety.
- Different information and communication technologies (ICT) will be incorporated into the new curricula for teaching and learning.
- All EU-ASIA partners will develop and share together teaching materials on traffic safety, which will be available over Open Courseware (a web-sharing platform) for teachers, students, and trainees. This includes an electronic/wiki library. This will provide more access to higher education for students and professionals who live in more remote towns in the country.
- Mini video lectures (15–45 minutes) will be recorded in streaming format and be available on the Project web-based platform for each developed course.
- A webinar meeting will be organised between partners every 2 months, for working groups, or with invited speakers or attendees from the university and stakeholders.
- New pedagogical approaches, e.g., problem-based learning (PBL), will be tested and applied in the new curricula. Capacity building and training/re-training the trainers/trainees (teachers/administrative staff/professionals).

- Establishing a web-based EU-Asia (ID-MY-VN) Traffic Safety Network between universities-authorities business for benchmarking, exchange of experiences, accidents data, challenges, solutions, and recommendations.
- Establishing interactive Web-based EU-ASIA (ID-MY-VN) databases for road traffic accident data and analysis, which can be used for teaching (and also research), is based on the identified quantitative and qualitative performance indicators.
- Developing a Handbook of EU-ASIA (ID-MY-VN) Standards and Best Practices in Traffic Safety includes national policy recommendations and an action plan.
- A modern lab in road safety will be established at the ID-MY-VN partner universities equipped with advanced hardware, software, and ICT tools.
- The EU-ASIA International Conference on Traffic Safety will be organised at the end of the project.
- Summer schools in traffic safety will be organised in partner countries in summer 2023. EU teachers and U students will attend the summer school at ID-MY-VN.
- Teachers, staff, and students' mobility and training between EU and ID-MY-VN are encouraging the establishment of traffic safety NGOs in ID-MY-VN as a spin-off of the project.
- Memorandum of Understanding (MoUs) will be signed between partners for continuous collaboration after the project ends.

Therefore, offering these important curricula (a master programme or diploma for students and specialised courses for professionals) in traffic safety in ID-MY-VN will significantly increase the popularity of this topic and ultimately benefit the whole society in the country and the South Asia region as well.

1.1 The ASIAsafe Road Safety Handbook

The ASIAsafe Road Safety Handbook is a handbook of EU-Asia road safety standards and best practises in traffic safety aimed at sharing knowledge and experiences between countries and supporting and guiding future actions towards road safety. Road accidents are a significant issue in the European Union and Asian nations, leading to considerable loss of life, physical harm, and financial repercussions. The implementation of traffic safety protocols and optimum methodologies can effectively reduce the frequency and intensity of vehicular accidents. The primary objective of the Handbook is to provide a comprehensive guide for the implementation of efficient traffic safety regulations and optimal methodologies in the European Union and Asian nations.

The handbook provides a set of guidelines for the development of national policies that aim to enhance road safety while also considering the distinctive characteristics of each individual country. The proposed measures encompass a range of initiatives, including but not limited to the enhancement of road infrastructure, the provision of driver education and training, the elevation of car safety standards, and the promotion of technological advancements to enhance traffic safety.

In addition, the Handbook comprises a set of guidelines that entail a course of action with precise measures to proficiently execute the proposed suggestions. The proposed action plan will consider the existing resources, regulations, and policies of each country and provide a well-defined strategy for the effective execution of the recommended measures. The Handbook was developed through a collaborative effort involving significant stakeholders, including governmental bodies, non-governmental organizations, and industry associations.

The establishment of the Handbook of EU-ASIA standards and best practises in traffic safety is imperative to enhancing the partnership between the European Union and Asian nations. Enhanced road safety and diminished economic losses due to traffic accidents can be achieved in both regions through the exchange of traffic safety knowledge and expertise.

1.2 Importance of Road Safety on a Global Scale

The Global Goals, officially termed the Sustainable Development Goals (SDGs), were universally endorsed by the United Nations in 2015. Their primary purpose is to galvanise collective efforts to eradicate poverty, safeguard the environment, and guarantee universal peace and prosperity by the year 2030. 17 SDGs were established to embody an interconnected approach. Road safety is a major concern for the United Nations, and it is recognised globally through the Sustainable

Development Goals (SDGs) of the United Nations 2030 Agenda. Two of these goals have set targets related to road safety:



SDG3 (Good Health and Well-Being), Target 3.6 calls for a reduction by half of the number of global deaths and injuries from road traffic crashes.



SDG 11 (Sustainable Cities and Communities), Target 11.2 calls for the provision of access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, including women, children, persons with disabilities, and older persons.

Nevertheless, road safety embraces more than these two SDGs, extending beyond individual safety. As mentioned by the United Nations, an effectively safe road system that meets the transportation needs of everyone can enhance access to education (SDG targets 4.2 and 4.3), healthcare (target 3.8), and food (target 2.1) in a fair manner (target 9.1). Moreover, such a system facilitates nationwide connectivity, fostering economic, social, and environmental ties between urban, peri-urban, and rural areas (target 11.a).

The World Health Organization (WHO) is a specialised agency of the United Nations tasked with the responsibility of advancing global health and wellness. The WHO, founded in 1948, collaborates with various governmental and non-governmental entities to facilitate and bolster endeavours aimed at enhancing health outcomes and tackling health predicaments, encompassing those pertaining to road safety.

The World Health Organization has expressed concern regarding road safety, as road traffic injuries pose a substantial public health issue that impacts individuals in all nations across the globe. As per the WHO, more than 1.35 million individuals lose their lives annually due to road traffic collisions, while tens of millions experience injuries or disabilities. Road traffic accidents constitute a significant contributor to mortality and morbidity, particularly among individuals aged between 5 and 29 years. Road traffic injuries impose a significant burden, particularly in low- and middle-income nations, where they account for 93 percent of worldwide road traffic fatalities, despite possessing only 60 percent of the world's registered vehicles. Low- and middle-income countries in Africa, the Middle East, and Southeast Asia exhibit the highest per capita incidence of road traffic fatalities.

The economic ramifications of road traffic accidents are noteworthy, as the expenses associated with road traffic injuries have been estimated to reach up to 3 percent of

the gross domestic product (GDP) in certain nations. The aforementioned comprises expenses related to medical treatment, recovery, decreased work output, and harm to property. In response to this worldwide issue, the WHO has created an array of instruments and materials to assist nations in enhancing road safety. These include the "Five Pillars of Road Safety."

1.3 Five Pillar of Road Safety

The Five Pillars of road safety were established by the World Health Organization (WHO) as part of the "World Report on Road Traffic Injury Prevention," published in 2004. This seminal report provided a thorough analysis of the global road traffic injury epidemic and offered strategic recommendations for its mitigation. Since its inception, the Five Pillars framework has been widely embraced by nations and organizations worldwide, serving as a guiding principle for the development and implementation of road safety initiatives. By encompassing (i) Road Safety Management, (ii) Safer Roads and Mobility, (iii) Safer Vehicles, (iv) Safer Road Users, and (v) Post-Crash response, this comprehensive framework endorsed by the WHO presents a unified approach to understanding and addressing road safety challenges, thereby facilitating coordinated efforts in this critical area.



Figure 1. Five Pillars of Road Safety.
(Data Source: World Health Organization (WHO), 2004)

First Pillar: Road Safety Management

The first pillar of road safety is road safety management, which refers to the organisation and coordination of road safety policies, strategies, and activities. Effective road safety management requires strong leadership, political will, and a

multi-sectoral approach that involves different stakeholders, such as government agencies, civil society organizations, private sector companies, and the media. Road safety management also involves setting clear road safety targets, monitoring and evaluating road safety performance, and using data and research to inform road safety policies and strategies. The first pillar of road safety is road safety management, which refers to the organisation and coordination of road safety policies, strategies, and activities. Effective road safety management requires strong leadership, political will, and a multi-sectoral approach that involves different stakeholders, such as government agencies, civil society organizations, private sector companies, and the media. Road safety management also involves setting clear road safety targets, monitoring and evaluating road safety performance, and using data and research to inform road safety policies and strategies.

Second Pillar: Safer Roads and Mobility

The second pillar of road safety is to make mobility networks and roads safer by lowering the likelihood of crashes and injuries for all drivers. This can be accomplished in a variety of ways, including separating different vehicle types (such as cars, bicycles, and pedestrians), lowering speed limits and installing traffic calming tools (such as speed bumps and roundabouts), improving road surfaces and markings (such as reflective materials and clearly marked pedestrian crossings), and ensuring safe and practical public transportation options (such as buses and trains). Furthermore, special precautions should be taken to ensure that the elderly and young people, who are more vulnerable on the road, can safely travel to work and school.

Third Pillar: Safer Vehicles

Safer vehicles are the third pillar of road safety, which comprises making certain that all vehicles meet specified safety requirements and are furnished with equipment that reduces the probability of being involved in an accident or suffering an injury. This can include measures like requiring all vehicles to have child safety seats and seat belts for adults, developing standards for automobile safety, such as mandating the installation of airbags, anti-lock brakes, and electronic stability control, and implementing procedures for routine vehicle safety inspections and maintenance. There should be both financial incentives and regulatory constraints in place to encourage people to drive newer and safer vehicles. Safer vehicles are the third pillar of road safety, which comprises making certain that all vehicles meet specified safety requirements and are furnished with equipment that reduces the probability of being involved in an accident or suffering an injury. This can include measures like requiring

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Fourth Pillar: Safer Road Users

The fourth pillar of road safety is the promotion of safe behaviours and attitudes among all road users, including pedestrians, cyclists, motorcyclists, and vehicle drivers. This may include measures such as providing education and training programmes on traffic safety to all road users, particularly vulnerable groups such as infants and the elderly; enforcing traffic laws and regulations, such as speed limits, seatbelt use, and alcohol limits for drivers; increasing cyclists' and motorcyclists' use of protective equipment, such as headwear; and raising awareness of the risks and consequences of hazardous road behaviours, such as driving under the influence of alcohol or other substances, distracted driving, and speeding.

Fifth Pillar: Post-Crash Response

The fifth pillar of road safety is post-crash reaction, which involves ensuring that emergency services, healthcare providers, and other support systems are in place to offer quick and effective care to accident victims. This can include measures such as developing and implementing national and local emergency response plans for road traffic collisions. ensuring that emergency services are sufficiently prepared and trained to respond to road traffic incidents, including the provision of first aid, transportation, and medical care. Rehabilitation and support services for accident victims and their families include physical and mental health care, legal and financial assistance, and emotional and social support.

1.4 Summary

The ASIASAFE Road Safety Handbook, in conclusion, offers an invaluable tool for raising road safety awareness in Asian and European countries alike. This handbook seeks to limit the financial impact of traffic accidents, save lives, and address the urgent problem of road accidents by highlighting the significance of a comprehensive approach.



PART 2.0 TRAFFIC SAFETY IN EUROPE

Traffic safety in Europe is a complex issue that encompasses various aspects, including road infrastructure, vehicle safety, driver behavior, and regulatory policies. European nations have implemented significant measures aimed at improving traffic safety, resulting in a considerable decrease in both road fatalities and injuries. The following is a comprehensive analysis of the traffic safety situation in the European partner countries of the ASIAsAFE Project.

2.1 Sweden

Sweden, a Nordic country situated in Northern Europe, is renowned for its enchanting landscapes, innovative spirit, and high quality of life. Sweden is a model for progressive governance and sustainable living due to its long history and commitment to social welfare. Sweden's road transport system is a vital component of the country's economy and daily life. It facilitates the movement of goods and people throughout Sweden, as well as serving as a key link to international trade routes. A total of 573,134 kilometres makes up the network of roads and highways in Sweden. This is equivalent to 55.03 metres for each of the 10.42 million people in the population. The road network is divided into urban roads at 30 percent, rural roads at 69 percent, and motorways at 1 percent. The number of registered motor vehicles is 6.5 million, with a motorization rate of 63 percent per population. The distribution of vehicles is cars (77 percent), goods vehicles (11 percent), and motorcycles (5 percent). 75,000 km of private roads receive state subsidies, and a very large number of private roads are without state subsidies, mostly forest motor roads. However, it is also crucial to remember that Sweden has a relatively low population density, with only 23 people per square kilometre. In this situation, travelling disproportionately far distances is typically required to access the country's more distant regions.

Most passenger transport within Sweden takes place by road. Road transport accounts for just over 90 percent of the total volume of travel. According to TRAFSA, the Swedish Transport Policy Analysis, Swedes' travel in 2021 decreased by 14 percent compared to 2019 due to the Corona pandemic. Just under 37 billion kilometres were travelled to or from the workplace, school, and in the service, and just under 33 billion kilometres for leisure purposes.

2.1.1 Road Crash Statistics

Since the late 1970s, Sweden has steadily and systematically reduced the numbers and severity of road accidents by implementing coordinated multi-sector pro-active, remedial, and preventive solutions. There is a need to tackle many fields of action simultaneously (road design, traffic engineering, traffic safety management, Intelligent Transport Systems (ITS), education, campaigns, behaviour, health service, legislation, traffic police enforcement, etc.) for all types of road users and ages. Sweden is one of many countries with decades of advanced experience in road safety.

Table 1 presents the traffic accident data spanning from 2010 to 2021 in Sweden. In 2021, 210 people died in road traffic accidents, compared to 204 people the year before. The number of road fatalities reached a peak in 1965 and 1966, at 1,313 road deaths each year. Of those who died in 2021, 58 percent were protected road users, i.e., travelled in a car, truck, or bus. The largest group of road users were private motorists, where nearly 3 out of 4 fatalities were the driver of the car. The number of people killed in trucks increased slightly, from 16 in 2020 to 18 in 2021. Of all fatalities in 2021, 42 percent were unprotected road users, with motorcyclists and pedestrians being the largest road user groups with 27 and 26 fatalities, respectively. The number of cyclists who died was 24, compared to 18 the year before.

Table 1. Traffic accidents statistics in Sweden.

	2010	2015	2019	2020	2021
Population	9,381,729	9,849,349	10,267,922	10,368,969	10,467,097
Registered Vehicle	5,495,473	5,669,063	5,870,783	6,044,067	6,116,750
Number of total road injury accidents	15,329	14,849	14,667	14,449	14,256
Number of total deaths in road accidents	266	324	221	204	210
Number of deaths per 10,000 vehicles	0.5	0.4	0.3	0.24	0.23
Number of deaths per 100,000 population	2.8	2.6	2.2	2.15	2.1

Data Source: *Strada (Swedish Traffic Accident Data Acquisition, 2022)*

Traffic crashes represent a high cost for society, estimated in 2017 at around EUR 13.4 billion (2.6 percent of GDP). The cost of road crashes was first evaluated in 1990 by the ASEK Group based on a willingness-to-pay approach to assess the unit cost of a fatality, a hospitalised person, a slightly injured person, and a property damage-only crash. Since then, these unit costs have been regularly re-evaluated, considering the evolution of GDP and the Consumer Price Index (CPI). These costs are calculated using ASEK 7.0 and based on the official statistics for 2017, using police-reported accidents (not corrected for under-reporting). the official statistics for 2017, using police-reported accidents (not corrected for under-reporting).

2.1.2 Road Crash Causes and Priorities

An approach to assessing risk in road traffic involves comparing the number of fatalities per specific type of road user and age group to the corresponding population figures. This comparison is illustrated in figures 2 and 3. The number of deaths per inhabitant has decreased in all age groups over time. The differences between age groups are large. Nearly half of those 65 and older killed are unprotected road users, mostly cyclists and pedestrians. For children and young adults who die, cars dominate. Motorbikes and mopeds kill mostly 25- to 64-year-olds.

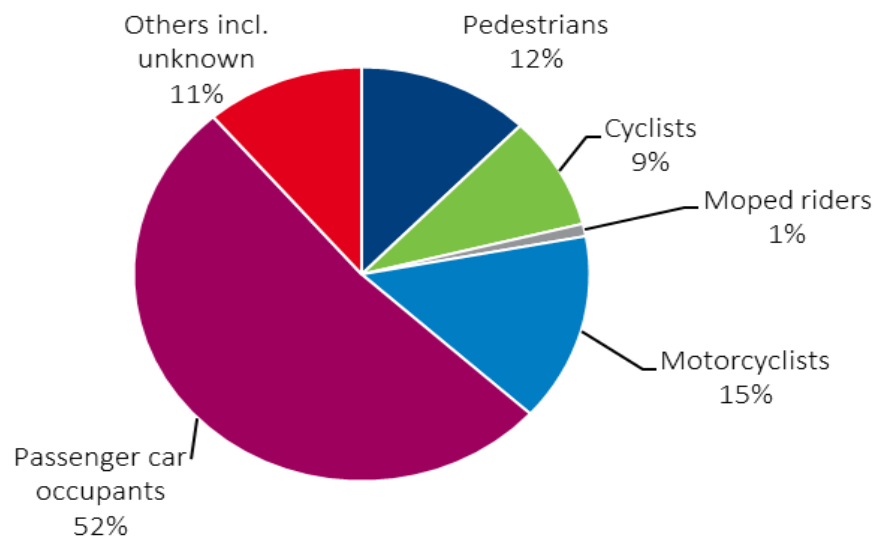


Figure 2. Road fatalities in Sweden by user category, 2020.
(Data Source: *International Transport Forum, 2021*)

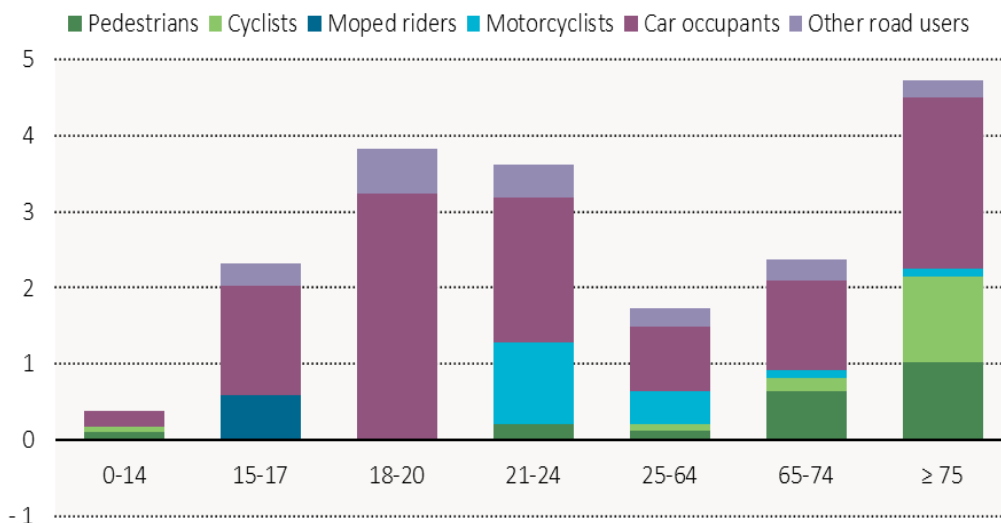


Figure 3. Road fatality rate in Sweden by user category and age group, 2020. Rate per 100,000 population in the same age group.
(Data Source: *International Transport Forum, 2021*)

The International Transport Forum's 2021 road safety report lists the top causes of accidents in Sweden.

- (i) **Speed:** Road crashes are often caused by speeding. Long-term road infrastructure must match speed limits. Swedish Transport Administration began a major speed limit review in 2016 and 2017 to meet road safety standards.
- (ii) **Drink-driving:** Like most IRTAD countries, Sweden has many road crashes caused by drunk driving. Alcohol or drug-related crashes killed 53 people (28 percent of road fatalities) in 2020, up from 53 (23 percent) in 2019. If the driver, rider, pedestrian, or cyclist has a Blood Alcohol Concentration (BAC) above 0.2 g/l, Sweden considers the crash alcohol related. Quick and accurate breath tests are also crucial for future drink driving prevention.
- (iii) **Mobile phone use while driving:** The Swedish Road Traffic Ordinance requires drivers to focus.
- (iv) **Seat belt and helmet use:** Sweden has required front seat belts since 1975 and rear seat belts since 1986. Seat belt use has increased over time.
- (v) **Sweden has many wildlife accidents but few deaths:** In 2021, wildlife accidents killed 4 people—2 protected road users and 2 motorcyclists. Deer (77 percent), wild boar (8 percent), and moose (8 percent) caused the most wildlife accidents in 2021.

2.1.3 Stakeholder

Responsibility for road safety in Sweden lies with several agencies. Transportstyrelsen, the Swedish Transport Agency, has overall responsibility for drawing up regulations and ensuring that authorities, companies, organizations, and citizens comply. Trafikverket, the Swedish Transport Administration, is responsible for the long-term planning of the transport system for all types of traffic and building, operating, and maintaining public roads and railways. This centralised approach to road transport management has been effective in ensuring that roads are kept in good condition and that adequate resources are allocated for regular maintenance. The Swedish Transport Administration is also responsible for administering the theoretical and practical driving tests needed to obtain a driving licence for both professional and private drivers.

The National Cooperation Group for Road Safety (Gruppen för Nationell Samverkan inom trafiksäkerhetsområdet or GNS) in Sweden is tasked with addressing traffic safety issues, inquiries, and initiatives in pursuit of Vision Zero. GNS includes

representatives of the government, polis authority, Sweden's counties, car manufacture, industry, the Swedish Transport Agency, the Swedish Transport Administration, research institutes, media, NGOs, etc. GNS is an arena for exchanging knowledge and coordinating activities within road safety between essential players to realise Vision Zero.

2.2 Italy

Italy is situated in south-central Europe, and it has a population of approximately 59 million people. The geography of Italy encompasses a comprehensive depiction of the various physical geographical components present within the country. Italy, a nation whose territorial boundaries closely align with the corresponding geographical region, is situated in the southern part of Europe. It encompasses the elongated Italian Peninsula, which is traversed by the Apennines Mountain range, as well as the southern portion of the Alps, the expansive Po Valley plain, and several islands such as Sicily and Sardinia. In terms of vehicle ownership, there are around 53 million registered motorised vehicles. As of 2020, the country's freeway network spans 6,978 km, the national road network spans 28,307 km, and the provincial and regional network spans 132,626 km.

2.2.1 Road Crash Statistics

The trend of road statistics in Italy is illustrated in *table 2*. In 2021, 2,875 people died in road accidents in Italy; 204,728 were injured, and 151,875 were road accidents. Road accidents represent a considerable cost in terms of human lives and the national economy.

According to the Ministry of Infrastructure and Sustainable Mobility estimates for 2020, the total cost of traffic crashes resulting in death or injury was estimated at around EUR 11.6 billion (0.7 percent of GDP). This value is based on the social cost assessed by the Ministry in 2010, using the human capital approach and without taking inflation into account.

Table 2. Trend of road statistics in Italy.

	2010	2015	2019	2020	2021
Population	60,626,442	60,665,551	59,641,488	59,236,213	59,030,133
Registered Vehicle	49,209,701	49,488,493	52,401,299	52,750,339	53,114,479
Number of total road accidents with victims	212,997	174,539	172,183	118,298	151,875
Number of total deaths in road accidents	4,114	3,428	3,173	2,395	2,875
Number of deaths per 10,000 vehicles	0.84	0.69	0.61	0.45	0.54
Number of deaths per 100,000 population	6.74	5.65	5.32	4.00	4.87

(Data source: RSR 2021; ISTAT report 2021)

2.2.2 Road Crash Causes and Priorities

In 2011, the European Union set an ambitious goal of halving the number of road deaths between 2010 and 2020. As shown in Figure 4, in Italy, a significant reduction in the number of road deaths was observed from 2010 to 2013, but little improvement was observed in subsequent years. In 2020, following the impact of the COVID-19 pandemic, there was an exceptional decrease in road accidents and injuries involved.

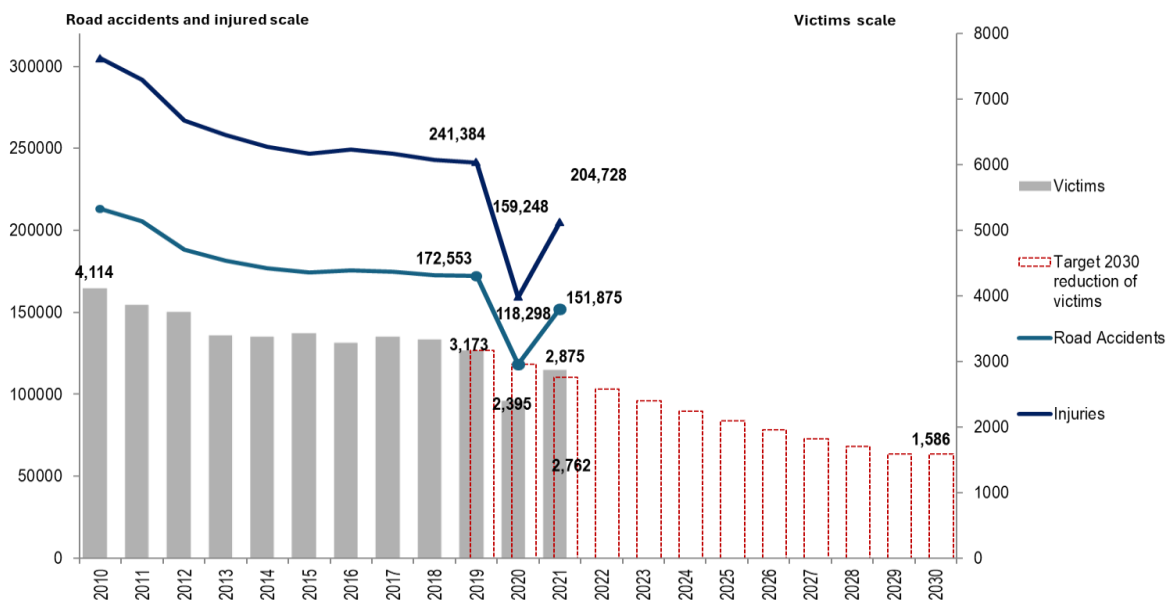


Figure 4. Road accidents resulting in death or injury, killed and injured. Years 2010-2021.

Absolute values

(Data source: ISTAT report 2021).

The lockdown period enacted by government decrees to contain the spread of infections resulted in an almost total blockage of mobility and circulation from March to late May, and subsequently also in the winter months, to contrast the second pandemic wave, significantly affecting the trend of road accidents. The pandemic situation and the measures taken to contain it continued to influence the trend of road accidents and mobility in 2021. Compared to 2020, accidents and injuries decrease in January and February and increase substantially in March–June 2021, returning to levels very close to the pre-pandemic period in the second half of the year.

The number of road traffic deaths decreased by 41.8 percent over the decade spanning from 2010 to 2020, but decreased only by 22.9 percent from 2010 to 2019, excluding the exceptional decrease in 2020 due to the pandemic. While progress has been made in improving road safety, there is still much work to be done to achieve the EU's ambitious goal for 2030.

In 2021, 2,875 people died in road accidents in Italy (+20.0 percent compared to the previous year), 204,728 were injured (+28.6 percent), and 151,875 is the road accident number (+28.4 percent). All values increased in comparison to 2020 but are still decreasing with reference to 2019 (victims: -9.4 percent, injured: -15.2 percent, and road accidents: -11.8 percent). The peaks in the distribution of the victims are in the age groups 45–59 years and 20–24 years for men and 70–84 years and 20–24 years for women. The age groups for which there is the largest increase in the number of fatalities (Figure 5), compared to 2020, are the 15–19 (+41.7 percent) and 25–29 age groups (+34.9 percent), followed by the 40–49 age group (+31.5 percent).

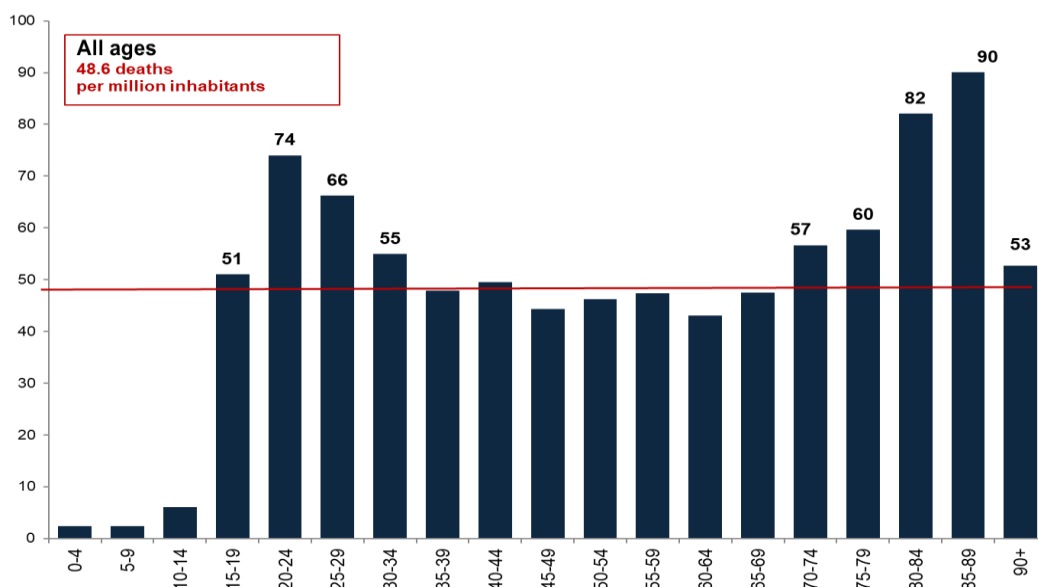


Figure 5: Road mortality rate by age class. Year 2021, per million inhabitants
(Data source: ISTAT report 2021).

Continuing to be a negative note is the high proportion of children aged from 0 to 14 killed in traffic accidents (by the 30th day): there are 28 children in 2021, of which 23 are aged from 5 to 14 (18 in 2019 and as many as 29 in 2020). Considering road user type (Figure 6), the number of fatalities increased for all road users in comparison with 2020, except for truck occupants, while there was a decrease compared to 2019. There are 169 fatalities for heavy goods vehicle users (+44.4 percent and +23.4 percent compared to 2020 and 2019), 695 for motorcyclists (+18.6 percent; -0.4 percent), 471 for pedestrians (+55.2 percent and -11.8 percent), 1,192 for occupants of passenger cars (+17.1 percent; -15.5 percent), and 67 for moped drivers (+13.6 percent; -23.9 percent). Finally, for electric bicycles and electric scooters, 229 fatalities were recorded (+30.1 percent compared to 2020 and -9.5 percent compared to 2019).

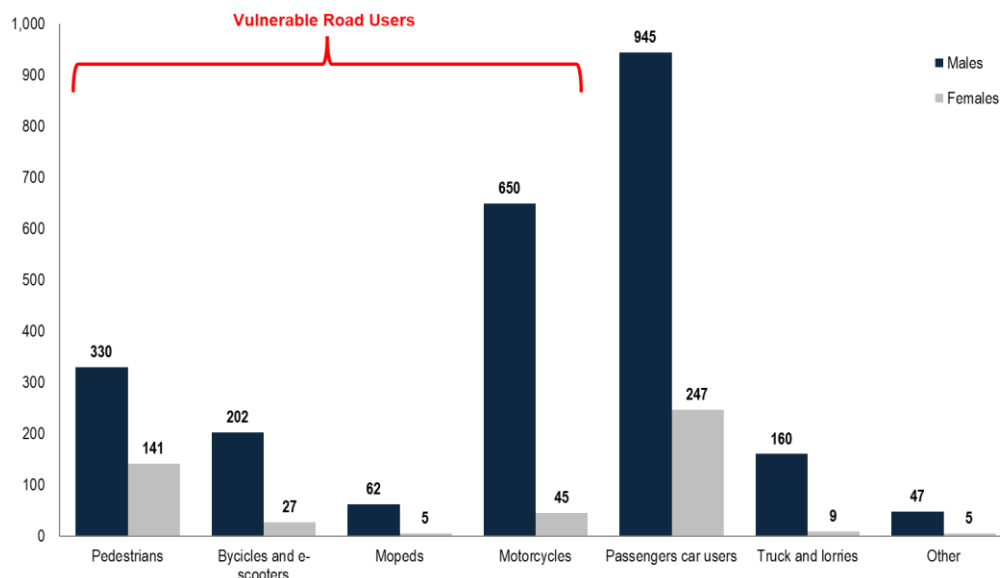
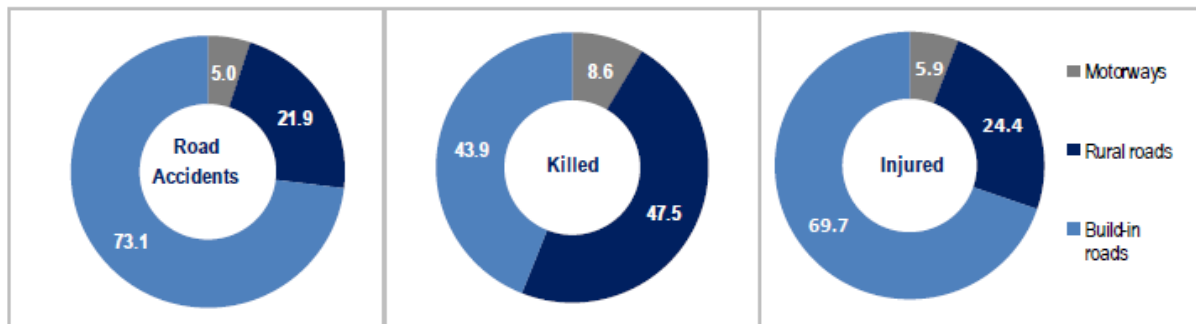


Figure 6: Killed in road accidents by gender and road user type. Year 2021
(Data source: *ISTAT report 2021*).

Taking into account road categories, road accidents, fatalities, and injuries increased in all of them but remained below pre-pandemic levels. The most significant percentage changes (Figure 7), compared with the previous year, are recorded on motorways, where the number of victims rose by 26.2 percent (-20.6 in comparison with 2019), followed by rural roads (+19.8 percent and -10.9 percent compared with 2020 and 2019) and built-up area roads (+19.1 percent and -5.0 percent).



(a) Included rural or not built up roads called: Statali, Regionali and Provinciali, Comunali out of urban area.

Figure 7. Road accidents resulting in death or injury. Killed and injured by road type (a). Year 2021, percentage value

(Data source: ISTAT report 2021)

In conclusion, the long-term trend for road deaths in Italy is encouraging. Between 2000 and 2021, the number of annual road fatalities decreased by approximately 55 percent. Considering fatalities by road user groups, the data show that passenger car occupants continue to be the group most affected by road crashes. The long-term trend shows traffic in Italy has become safer for all road user groups, even if, in terms of percentages of the total, pedestrians, cyclists, and motorcyclists registered a small increase. Inappropriate speed is one of the main causes of road crashes. According to the Italian National Institute of Statistics (ISTAT), speeding was the cause of almost 10 percent of road crashes in the last few years, and it remains the most frequent and sanctioned misconduct both inside and outside built-up areas.

Driving under the influence of alcohol is another major cause of road crashes in Italy. Drink-driving crashes are defined in police reports as crashes in which a driver has a Blood Alcohol Concentration (BAC) above the legal limit. The current limit in Italy, which came into force in 2002, is 0.5 g/l. Since July 2010, there has been a zero-tolerance policy in place for young, novice, and professional drivers, with a BAC limit of 0.0 g/l. Driving with a BAC higher than 0.8 g/l can result in imprisonment and a licence suspension.

2.2.3 Stakeholder

The responsibility for road safety in Italy lies with the *Ministry of Infrastructure and Sustainable Mobility* through its Directorate for Road Safety. The main responsibilities of the directorate are:

- adoption and implementation of the national road safety plan and related operational programmes and technical regulation of road infrastructure;
- implementation of the provisions of the Highway Code and any proposals for its revision in the areas of competence;

- development of technical regulations for road traffic, including testing activities of new vehicles and control systems;
- approval of signalling devices for regulation and control of road traffic;
- relations with local, national, and international authorities in liaison with the offices of direct collaboration of the Minister in matters of competence;
- development of intervention programmes for the safety of road mobility and the protection of road users;
- institutional communication activities for prevention and information on road safety and activities related to 'road safety education';
- supervision of the market for vehicles and related safety devices in accordance with European legislation in the sector;
- management of the operations centre of the Coordination Centre for Road Safety Information (CCISS) and national and international projects on information mobility;
- preparation of regulatory proposals and technical discipline of the sector.

A national structure was created for consultation with stakeholders. On January 1, 2019, the *National Agency for Road Safety (ANSFISA)* was established to oversee and improve infrastructure safety.

ANSFISA is responsible for promoting safety and supervising rail, road, and highway infrastructure and fixed installations. It aims to implement a modern concept of safety, articulated in terms of proactive and evolutionary actions, in order to ensure the improvement of the quality of land transport infrastructure and, therefore, smoother and more direct mobility for all citizens on the national territory.

ANSFISA aims at increasing the involvement of infrastructure managers and transport companies, which, as responsible parties for safety, have the task of defining effective *Safety Management Systems (SMS)* and providing for, among other things, how to plan and implement maintenance and risk control activities.

The agency verifies the condition of rail infrastructure and vehicles in the field through random inspections. It also organises system audits to check the performance of managers and operators regarding the effectiveness of actions put in place to protect safety.

National and local road authorities are also responsible for improving road infrastructure, and police forces are responsible for enforcing traffic laws. Finally, the *National Institute of Statistics (ISTAT)* is responsible for collecting road safety statistics

on injury crashes at the national level. All police forces must send a standard crash form to ISTAT for each injury crash. ISTAT checks data consistency quantitatively and qualitatively, reviews any deficiencies, and proceeds with data correction. The statistical survey is conducted in cooperation with the Italian Automobile Club (ACI).

Besides, the increase in road safety is one of the pillars of the sustainable mobility system that the Italian government decided to implement over the next ten years, in line with international and European guidelines. The “National Road Safety Plan 2030” drawn up by the Ministry of Infrastructure and Sustainable Mobility represents a serious and articulated proposal, both in terms of content and in terms of the timing of the actions, to achieve a profound transformation of the way of dealing with this problem using the Safe System approach developed by the United Nations and other international organisations active on the subject. The implementation of the plan will follow a plan divided into three phases:

- a first phase, four years dedicated to the launch of the plan and the implementation of systematic interventions;
- a second three-year consolidation phase;
- a third phase of maximum implementation regime.

At the end of each phase, an interim evaluation of the plan will be carried out (the first is scheduled for 2024) to guarantee an adequate time horizon for planning and implementing the interventions.

In order to ensure effective and efficient management and implementation of the plan, reference will be made to the principles of clear definition of responsibilities, formalisation and simplification of implementation procedures, and centrality of monitoring and evaluation of the financed interventions. The responsibilities regarding the management and implementation of the plan are mainly associated with the following subjects: Ministry of Infrastructure and Sustainable Mobility; General Directorate for Road Safety and Road Transport; Regions and Autonomous Provinces and Beneficiary Bodies; Regional Monitoring Centres; and other individuals and entities.

2.3 Portugal

Portugal is situated in the southwestern region of Europe, on the Iberian Peninsula, and is a member of the European Union. With a population of approximately 10 million people, Portugal has made significant investments in road infrastructure over

the past century, particularly in the development of freeways. As of 2021, the country's freeway network spans 3,065 km, which accounts for about 21 percent of the national road network (excluding the municipal network) (source: PORDATA). In terms of vehicle ownership, there are 682.6 registered motorised vehicles per 100,000 people in Portugal as of 2019.

Unfortunately, road accidents remain a major issue in Portugal. In 2021, 561 fatalities and 2,161 serious injuries were recorded, with the former resulting in 5.4 fatalities per 100,000 inhabitants. In the same year, the social and economic cost of road accidents with victims totalled 4.4 billion euros, corresponding to 2.1 percent of that year's GDP.

2.3.1 Road Crash Statistics

In 2011, the European Union set an ambitious goal of halving the number of road deaths between 2010 and 2020 (*Table 3*). Portugal made significant progress in reducing road deaths from 2010 to 2013, but progress slowed over the next six years. However, the pandemic year of 2020 had a notable impact on the overall outcome, as road deaths decreased by 21 percent compared to 2019. Over the decade spanning from 2010 to 2020, the number of recorded serious road traffic injuries in Portugal decreased by 29 percent. While progress has been made in improving road safety, there is still much work to be done to achieve the EU's ambitious goal for 2030.

Table 3. Trend of road statistics in Portugal.

	2010	2015	2019	2020	2021
<i>Population</i>	10,573,100	10,358,076	10,286,263	10,333,765	10,361,831
<i>Registered Vehicle</i>	6,182,051	6,083,694	7,027,599	7,021,112	7,090,889
<i>Number of total road accidents with victims</i>	35,426	31,953	35,704	26,501	29,217
<i>Number of total deaths in road accidents</i>	937	593	688	536	561
<i>Number of deaths per 10,000 vehicles</i>	1.5	1.0	1.0	0.8	0.8
<i>Number of deaths per 100,000 population</i>	8.9	5.7	6.7	5.2	5.4

Data source: INE; PORDATA; ANSR, 2021

2.3.2 Road Crash Fatalities and Injuries Snapshot

Since 2010, Portugal has experienced a considerable reduction in the number of deaths (from 2010 to 2021, a reduction of 40 percent can be observed), as shown in Figure 8. When considering the population, this reduction stayed the same (39 percent reduction in the number of fatalities per 100,000 inhabitants). Note, however, that the years 2020 and 2021 correspond to the pandemic period of COVID-19. The reduction trend of fatalities is in contrast with the increase in the number of registered vehicles (from 2010 to 2021) of 14.7 percent.

As can be seen in Figure 9, in 2021, the highest percentage of deaths (died within 30 days of a crash) is related to cars (either passenger or driver), followed by motorcyclists. It is worth noting that for both road users and pedestrians, the percentage of fatalities has increased during the analysed period in contrast with the pedestrian percentage of deaths. Nevertheless, the pedestrian mortality rate in Portugal (13.9 fatalities per million inhabitants) is higher than the EU 28 average, which is 10.4, being especially severe for pedestrians aged 65 or more. On the other hand, the increased percentage of motorcyclist fatalities may be a consequence of the increase in this kind of transport mode (from 2006 to 2021, there was a 69 percent increase in the number of registered motorcycles), eventually related to the recent use of this mode for commercial deliveries.

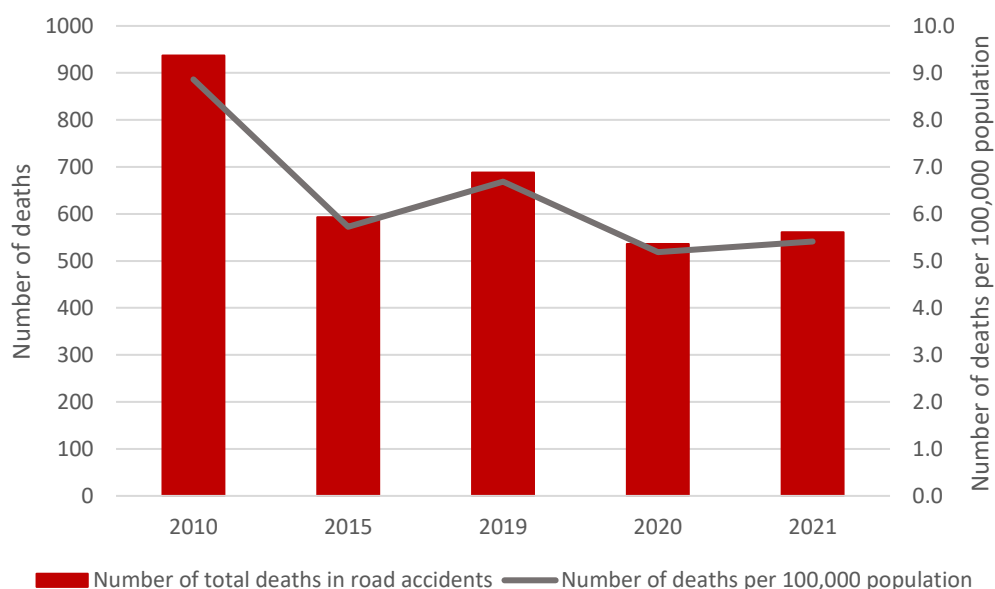


Figure 8. Number of deaths in road accidents in PT 2010-2021
(Data source: ANSR, 2021)

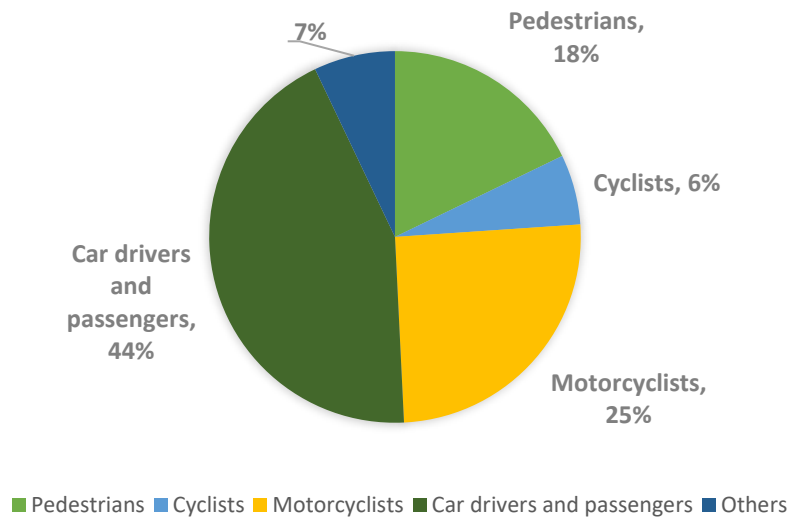


Figure 9. **percentage of deaths in road accidents by road user in 2021**
 (Data source: ANSR, 2021)

In a recent report published by ANSR focused on the problem of driving under the influence of alcohol, it was found that between 2016 and 2018, 6.1 percent of the crashes were related to driving under the influence of alcohol, resulting in 20.9 percent of the total number of fatalities and 14.6 percent of the total number of serious injuries. According to the National Statistical Institute (INE), during the period 2010–2019, less than 4.5 percent of drivers tested by the police had a blood alcohol concentration (BAC) above the 0.5 g/l legal limit, noting that since 2010, the trend has shown a decreasing tendency. Higher percentages of offenders were detected on moped riders (10.7 percent) and bicyclists (5.4 percent), and lower on bus and heavy goods vehicle (HGV) drivers (0.9 percent).

Regarding the consequences of speeding on road safety, unfortunately, there is no information on speed compliance on Portuguese roads. However, a study was conducted considering a planned systematic measure in 2004 by LNEC and in 2008 by Prevenção Rodoviária Portuguesa (<https://observatorio.prp.pt>). Overall, it can be concluded that speed measurements are needed to ascertain the current dimension of the speeding problem and which road categories are more dangerous.

Nevertheless, a report by ETSC (2019) comparing different countries shows that Portugal is the one where speeding in urban areas is most prevalent (more than 80 percent). Regarding rural areas, the aforementioned report indicates that Portugal and Spain have the highest percentage of cars and vans exceeding the speed limit on non-motorway rural roads. In motorways, where the speed limit in Portugal is 120 km/h, Portugal stands out negatively from the other countries, with rather higher

percentages of speeding cars (64 percent), whereas in the other countries this percentage is around 35 percent.

2.3.3 Stakeholder

The road safety management institutional framework in Portugal comprises the *National Road Safety Authority (ANSR)*, the *Institute for Mobility and Transport (IMT)*, and the *Mobility and Transport Authority (AMT)*. Additionally, the municipalities are responsible for the management of all roads in urban areas, including infrastructure and operation, which corresponds to approximately 85 percent of the total Portuguese road network. Municipalities also have a key role in the implementation of basic education policy, civil protection, and transport policies related to micromobility and in ensuring that safety is embedded in their definition and implementation, namely as concerns the adaptation of urban and infrastructure design and maintenance and in laying out and enforcing traffic rules and control. Besides urban areas, three road infrastructure concessionaires also play a major role in road safety management: *Infraestruturas de Portugal (IP)*, BRISA, and ASCENDI (the former being state-owned companies and the latter being private companies).

National Road Safety Authority ANSR

The ANSR is a central service of the direct administration of the state, with administrative autonomy. Its mission is to support the implementation of the government's road safety policy through planning and coordinating activities at the national mainland level, as well as providing support for the enforcement of traffic-related laws. ANSR has no decentralised structures allowing direct interaction with citizens. Therefore, within the framework of the administrative traffic violation process, interaction is ensured by the National Republican Guard and the Public Security Police. ANSR is the entity that carries out the planning, strategic coordination, and support to the government within road safety public policy, focusing on the formulation and implementation supervision of measures to raise awareness, prevent, monitor, and deter risk-increasing behaviour, in addition to providing, on a consultative basis and with a road safety perspective, support to entities with competence in the areas of road infrastructure and vehicle specifications.

Institute for Mobility and Transport (IMT)

The Institute for Mobility and Transport (IMT) is a public institute integrated into the indirect administration of the state, endowed with administrative and financial autonomy and its own assets. IMT is a central entity with jurisdiction over the entire

Mainland National Territory. The IMT pursues the attributions of the Ministries of Internal Administration, Infrastructures and Housing, the Environment and Energy Transition, and the Sea, under the supervision and guidance of the Minister for Infrastructures and Housing. IMT's mission includes supporting the government in the implementation and evaluation of policies for mobility, land transport, and road infrastructure sectors; in the preparation of legal and regulatory diplomas; and in the preparation and launch of pre-contractual procedures in the land transport sector.

Mobility and Transport Authority (AMT)

Mobility and Transport Authority (AMT) is a legal person governed by public law with the nature of an independent administrative entity endowed with administrative, financial, and management autonomy, as well as its own assets. The AMT's mission is to regulate and supervise the sector of mobility and land, river and rail transports, and their infrastructures, as well as economic activity in the commercial ports and maritime transport sector, as well as services of general economic interest and activities based on networks, through its powers of regulation, supervision, inspection, and sanction, with powers to protect the rights and interests of consumers and to promote and defend competition in the private, public, cooperative, and social sectors, under the terms of these statutes and other legal instruments.



PART 3.0

TRAFFIC SAFETY IN ASIA

Traffic safety in Asia is a multifaceted matter that exhibits significant variation throughout the continent due to disparities in infrastructure, regulations, cultural norms, economic growth, and population density. Some Asian countries have made notable progress in enhancing road safety, whereas others still encounter challenges in this regard. The following is a comprehensive analysis of the traffic safety situation in the Asian partner countries for the ASIASAFE Project.

3.1 Indonesia

Indonesia is the world's largest archipelago country, located between two continents and two oceans, i.e., between the Asian and Australian Continents, as well as the Indian and Pacific Oceans. As an archipelagic country, Indonesia consists of 17,001 islands interconnected by straits and seas (BPS, 2023). Indonesia has 37 provinces that cover a total land area of 1,892,410.09 square kilometres. The five largest islands are Sumatera, Java, Kalimantan (Borneo), Sulawesi, and Papua. As of 2021, the population of Indonesia was 272.7 million, making it the 4th most populous country in the world after China, India, and the USA. With hundreds of native languages, Indonesia has a diverse cultural background. However, there is a common language, Bahasa Indonesia, which helps to foster a strong national identity.

Indonesia has the most extensive road network in Southeast Asian (ASEAN) countries, with a total of 549,161 kilometres of roads as of 2022 (BPS, 2023). The main roads connecting major cities are generally in good condition and serve as the primary arterial network. However, some provincial and regency/district roads are in fair and poor condition, limiting accessibility between regions, particularly during the rainy season. This situation illustrates that the presence of a vast road network will have significant implications for the financing of road asset management. Accordingly, although Indonesia is currently facing challenges related to traffic safety, the primary emphasis on addressing safety issues is centred on preserving the functional road condition. Despite the national agreement on its significance,

3.1.1 Road Crash Statistics

According to statistics, the number of traffic accidents in Indonesia reached 103,645 cases, for a total of 25,266 deaths in 2021 (Indonesian Police Transport Corps, 2022). The majority of fatalities resulting from road accidents in Indonesia involve motorcyclists, followed by users of trucks, buses, cars, and un-motorized vehicles such as pedestrians and cyclists. In recent years, the government has been implementing various initiatives aimed at improving road safety, including increased enforcement of traffic rules and regulations. Despite these efforts, road safety remains a major concern for the country. *Table 4* presents an overview of the traffic accident statistics in Indonesia from 2010 to 2021.

Table 4. Trend of road statistics in Indonesia.

	2010	2015	2019	2020	2021
Population (million) ^a	238.5	255.6	266.9	270.2	272.7
Registered Vehicle ^s	76,907,127	122,006,799	133,617,012	136,137,735	141,996,832
Number of total road accidents ^b	66,488	96,233	116,411	100,028	103,645
Number of total deaths in road accidents ^b	19,873	24,275	25,671	23,529	25,266
Number of deaths per 10,000 vehicles ^b	2.58	1.99	1.92	1.73	1.78
Number of deaths per 100,000 population ^b	8.33	9.50	9.62	8.71	9.27

Data source: a. Based on (BPS-Statistics Indonesia, 2012, 2016, 2021, 2023)

b. Based on (Indonesian Police Transport Corps, 2022)

3.1.2 Road Crash Causes and Priorities

The increasing number of road accidents in Indonesia has become a significant concern since the declaration of the *Decade of Action (DoA)* for road safety in 2010. It can be observed that the number of road accidents in Indonesia has experienced an upward trend from 66,488 in 2010 to 116,411 in 2019, followed by a subsequent decline to 100,028 in 2020. Despite experiencing a decline in 2020, the number of accidents will increase again in 2021. The decreased number of accidents in 2020 was caused by decreasing traffic during the COVID-19 pandemic due to the mobility limitation policy of the government.

In 2021, the number of deaths in road traffic accidents in Indonesia was approximately 25.27 thousand, indicating an increase compared to the previous year (see Figure 10). During 2010–2021, the highest number of fatalities was reached in 2017, with over 30 thousand people killed in traffic accidents. The fatality rate per 100,000 population was 8.33 in 2010 and increased to 9.27 in 2021.

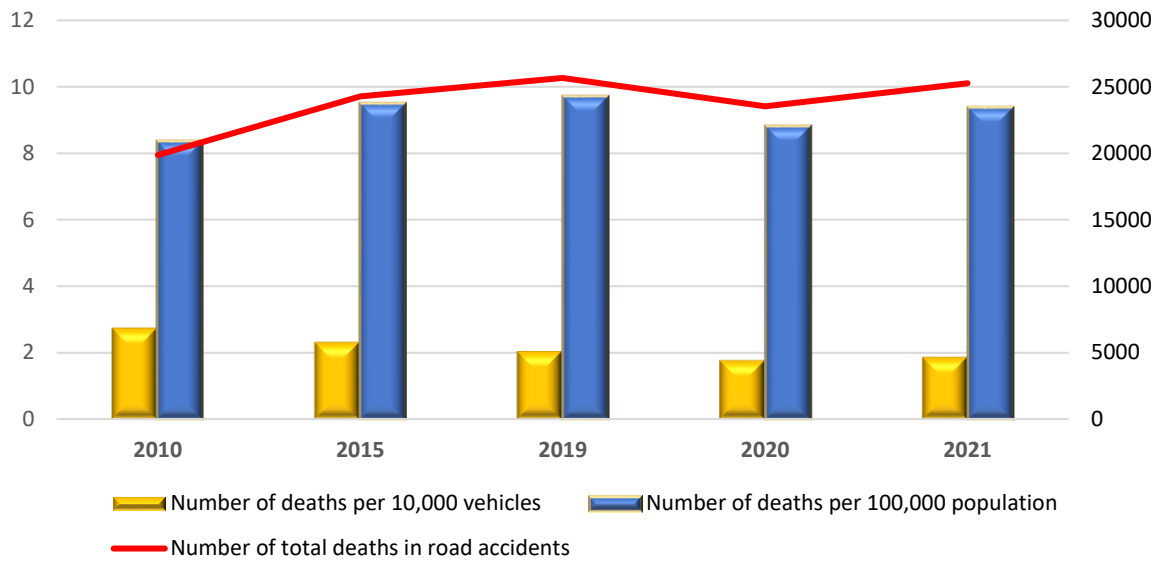


Figure 10: Number of deaths in road accident in Indonesia 2010-2021. (Data source: Indonesian Police Transport Corps, 2022).

Motorcycles have been identified as the primary mode of transportation involved in road accidents, accounting for 73 percent of all fatalities resulting from such incidents in Indonesia in 2021 (see Figure 11). This number was followed by freight vehicles, which constituted 12 percent of the total fatalities. This is mostly caused by Overdimension and Overloading (ODOL). Overdimension refers to a situation in which the dimensions of the vehicle carrier are out of compliance with production standards and regulatory requirements, while overload refers to a situation in which the vehicle is carrying a load that exceeds the allowed load limit. The control of ODOL in freight vehicles has become a significant concern for the government. Despite the implementation of law enforcement and weight stations by the government, the issue persists.

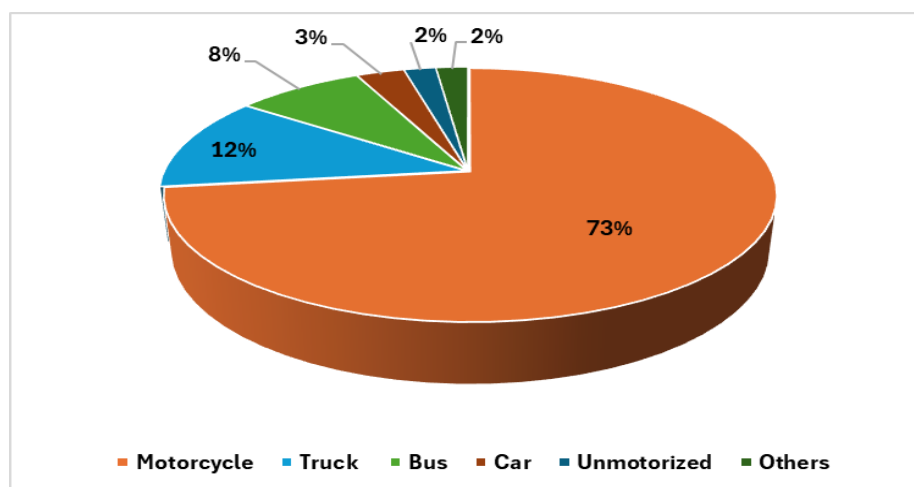


Figure 11. Vehicle involving in road accidents in Indonesia year 2021 (Data source: Indonesian Police Transport Corps, 2022)

3.1.3 Stakeholder

In Indonesia, authority over road networks is shared between two ministries: the Ministry of Transportation and the Ministry of Public Works and Housing. The Ministry of Public Works and Housing is in charge of infrastructure management functions such as road construction, preservation, and development, while the Ministry of Transportation is in charge of traffic management. In terms of road safety, the Indonesian government mandates several government agencies based on the 5 pillars of safety as stated in the Indonesia *National Road Safety Master Plan (RUNK)* 2011–2035 (Presiden Republic Indonesia, 2022).

Ministry of National Development Planning of the Republic of Indonesia (BAPPENAS)

The Ministry of National Development Planning serves as the lead agency for the road safety programme in Indonesia and has become the coordinator for Pillar 1: Road Safety Management. In order to guarantee the efficacy and sustainability of the development and planning of a road safety strategy at the national level, BAPPENAS is responsible for promoting cooperation between stakeholders and the formation of sectoral partnerships. It involves establishing goals for achieving road safety and conducting evaluations to make sure that the implementation of road safety has been done properly and efficiently.

Ministry of Public Works and Housing of Indonesia (PUPR)

The Ministry of Public Works and Housing is the coordinator for Pillar 2: Safer Roads. By making improvements at the planning, design, construction, and operational stages of roads, PUPR is responsible for providing a safe road infrastructure. Accordingly, safer road infrastructure, i.e., forgiving, self-explaining, and self-regulating roads, could be achieved to reduce and accommodate errors committed by road users.

Ministry of Transportation of Indonesia (KEMENHUB)

The Ministry of Transportation is the coordinator for Pillar 3: Safer Vehicles. The ministry is responsible for ensuring that every vehicle used on the road meets a high safety standard to reduce the number of accidents and fatalities caused by inefficient vehicle systems.

Indonesian National Police (POLRI) and Ministry of Education, Culture, Research, and Technology (KEMENDIKBUDRISTEK)

The National Police and Ministry of Education, Culture, Research, and Technology are the coordinators for Pillar 4: Safer Road Users. They are responsible for improving the behaviour of road users by developing comprehensive programs, including law enforcement and education. The Kemendikbudristek focuses on education, while the National Police focuses on law enforcement. In addition, the police is the agency responsible for developing the accident database in Indonesia.

Indonesian National Police

The National Police is the coordinator for Pillar 4: Safer Road Users. The police are responsible for improving the behaviour of road users by developing comprehensive programs, including law enforcement and education.

Ministry of Health of Indonesia (KEMENKES)

The Ministry of Health of Indonesia is the coordinator for Pillar 5: Post-Crash Response. The Ministry is responsible for enhancing both the victim handling and emergency response system capacities of the relevant stakeholders in order to improve post-accident emergency response management.

Non-Government Organizations (NGOs)

Besides the government, there are non-government organisations (NGOs) that are involved in assisting the government to achieve traffic safety. The NGOs include the Indonesia Road Safety Partnership (IRSP), the AHM Safety Riding and Training Centre, Transportologi, Psikologi Transportasi, Kamselindo (the Indonesian Security and Safety Association), and Masyarakat Transportasi Indonesia (MTI).

Academia and Research Center

In Indonesia, there is no dedicated or centralised national research centre for traffic safety. However, some universities are concerned with traffic safety, which includes teaching, training programs, research, and development activities. There are universities that concern themselves with traffic safety, such as Universitas Gadjah Mada (UGM), Universitas Muhammadiyah Yogyakarta (UMY), Indonesian Land Transport Polytechnic (PTDI STTD), Road Transport Safety Polytechnic (PKTJ), Land Transport Polytechnic in Bali (Poltrada Bali), and Trisakti Transport and Logistics Institute (ITL Trisakti).

Universitas Gadjah Mada (UGM) has a Center of Excellence (CoE): Green and Smart Transport System, a research community concerned with transportation safety. In addition, the Faculty of Engineering UGM (FT-UGM) offers a master's programme in Transport System and Engineering (MSTT-UGM), in which traffic safety is one of the specializations, and a doctoral programme in civil engineering, in which a number of students conduct doctoral research in the field of traffic safety. FT-UGM possesses quite comprehensive expertise in the field of traffic safety, with lecturers from across departments and faculties, including civil engineering, mechanical and industrial engineering, economics, psychology, etc.

3.2 Malaysia

Malaysia is a Southeast Asian country that is situated in two distinct regions. The Peninsular Malaysia region is bordered by Thailand, while East Malaysia shares borders with Indonesia and Brunei. As of 2021, the population of Malaysia was estimated to be around 33.6 million people.

The country has a highly advanced system of road transportation infrastructure that serves to interconnect various geographical areas. This infrastructure comprises federal and state roads, highways, and motorways. Federal roads are maintained by the federal government, while state roads are maintained by state governments. The highways and motorways in Malaysia are subject to tolls that are calculated based on the type of vehicle and the distance covered. Despite the existence of a well-maintained road network, Malaysia continues to face road safety issues. Every year, the country experiences a significant number of road accidents, which are mainly caused by reckless driving, speeding, and a lack of adherence to traffic rules and regulations. According to statistics, the majority of fatalities resulting from road accidents in Malaysia involve motorcyclists, followed by car drivers and passengers. Pedestrians and cyclists also account for a significant percentage of road accident fatalities. In recent years, the government has been implementing various initiatives aimed at improving road safety, including increased enforcement of traffic rules and regulations and the implementation of stricter penalties for traffic offenses. Despite these efforts, road safety remains a major concern for the country.

3.2.1 Road Crash Statistics

The escalating number of road accidents in Malaysia has become a significant cause for concern, persistently rising over the course of the last ten years. Based on the data presented, it can be observed that the number of road accidents in Malaysia experienced an upward trend from 414,421 in 2010 to 567,516 in 2019, followed by

a subsequent decline to 370,286 in 2021. Despite experiencing a decline in the current year of 2021, the incidence of accidents remains notably elevated in comparison to the figures recorded in 2010. The escalation in the number of registered vehicles in the country may be a contributing factor to the surge in road accidents. Between 2010 and 2021, there was a notable rise in the number of registered vehicles in Malaysia, from 20,188,565 to 33,570,214. This trend suggests an increase in vehicular traffic, which could potentially be linked to the escalation of road accidents. *Table 5* presents an overview of the traffic accident statistics in Malaysia from 2010 to 2021.

Table 5. Trend of road statistics in Malaysia.

	2010	2015	2019	2020	2021
<i>Population^a</i>	28,588,600	31,186,100	32,523,000	32,584,000	33,573,874
<i>Registered Vehicle^a</i>	20,188,565	26,301,952	31,214,772	32,378,174	33,570,214
<i>Number of total road accidents^b</i>	414,421	489,606	567,516	418,520	370,286
<i>Number of total deaths in road accidents^b</i>	6,872	6,706	6,167	4,643	4,539
<i>Number of deaths per 10,000 vehicles^b</i>	3.40	2.55	1.98	1.43	1.35
<i>Number of deaths per 100,000 population^b</i>	24.038	21.503	18.962	14.222	13.519

Data source: a. DOSM-Department of Statistic Malaysia, 2022

b. RMP-Royal Malaysia Police, Statistics 2022

3.2.2 Road Crash Fatalities and Injuries Snapshot

A significant issue of concern pertains to the quantity of fatalities arising from vehicular collisions on roadways. While the aggregate quantity of fatalities has exhibited a modest decline over the course of time, from 6,872 in 2010 to 4,539 in 2021, the incidence of fatalities per 100,000 individuals has demonstrated a relatively stable pattern. The mortality rate per 100,000 individuals was 24,038 in 2010 and decreased to 13,519 in 2021. Moreover, the data indicates a consistent decline in the fatality rate per 10,000 vehicles. The mortality rate per 10,000 vehicles decreased from 3.4 in 2010 to 1.35 in 2021. The potential cause of this phenomenon could be attributed to heightened awareness initiatives and more stringent implementation of traffic regulations. The data presented indicates that road safety continues to be a noteworthy issue in Malaysia.

As illustrated in Figure 12, the number of fatalities caused by vehicular accidents in Malaysia for the year 2021 was recorded at 4,539. The data suggests that specific demographics exhibit a higher susceptibility to vehicular collisions than others.

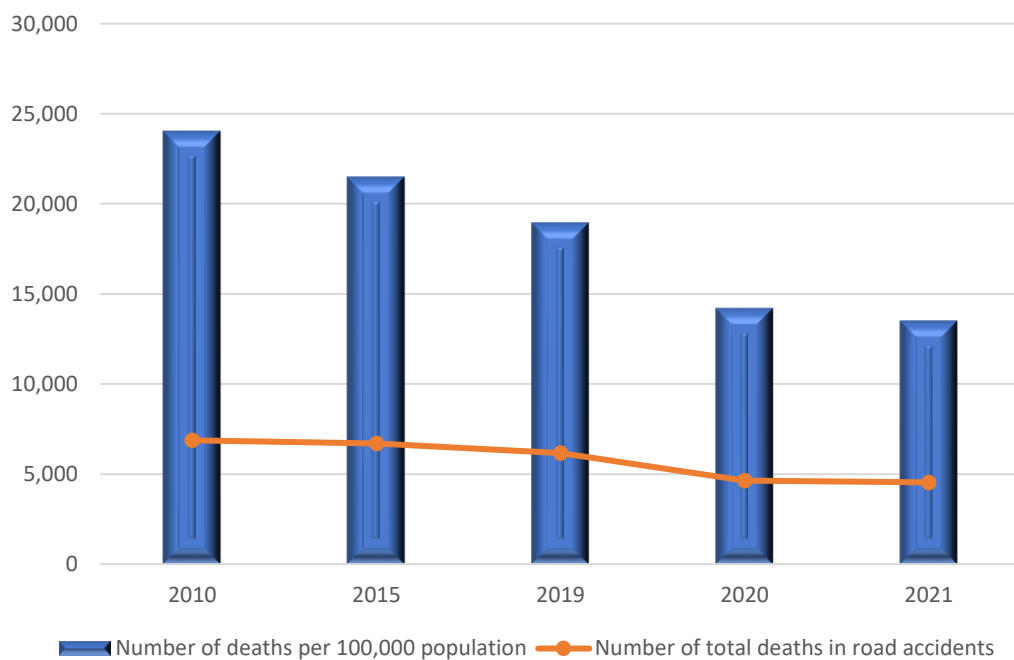


Figure 12: Number of deaths in road accident in Malaysia 2010-2021
(Data source: Royal Malaysia Police, Statistics 2022).

Motorcyclists represent a highly vulnerable demographic, as shown in Figure 13, comprising 68.56 percent of all fatalities resulting from road accidents in Malaysia during the year 2021. The aforementioned underscores the necessity of implementing measures to enhance motorcycle safety, such as more stringent implementation of traffic regulations and better infrastructure to safeguard motorcyclists while on the road.

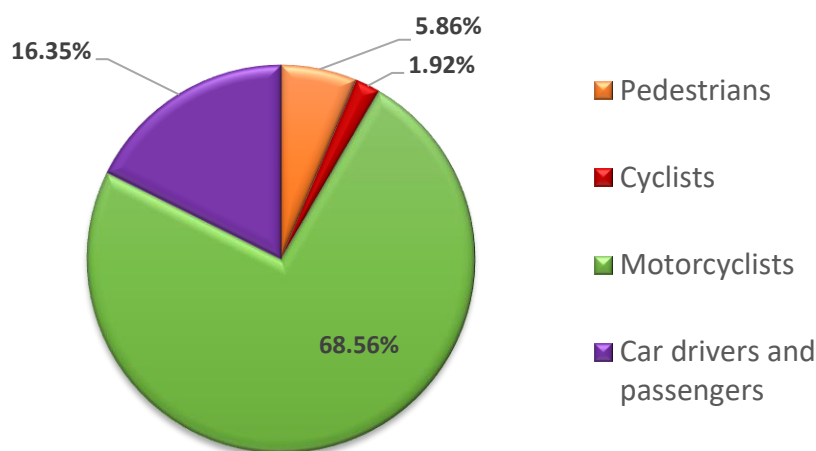


Figure 13: Vulnerable demographic in Malaysia for the year 2021
(Data source: Royal Malaysia Police, Statistics 2022).

Pedestrians, as a vulnerable demographic, constituted 5.86 percent of the total fatalities arising from road accidents in the year 2021. The aforementioned underscores the necessity for enhanced pedestrian infrastructure, encompassing walkways, crosswalks, and traffic signals that are conducive to pedestrian safety and convenience. Cyclists were identified as a susceptible demographic, comprising 1.92 percent of the total fatalities arising from vehicular incidents in 2021. In line with the safety of pedestrians, the implementation of enhanced cycling infrastructure, such as exclusive cycle lanes, may contribute to the mitigation of fatalities associated with cyclists. In the year 2021, fatalities resulting from road accidents were analysed, and it was determined that car drivers and passengers collectively constituted 16.35 percent of the total number of deaths.

3.2.3 Stakeholder

Ministry of Transport (MOT)

The Ministry of Transport (MOT) in Malaysia currently serves as the road safety administrator in the country. The ministry is responsible for overseeing and implementing various policies and initiatives aimed at improving road safety, such as the implementation of road safety campaigns and the introduction of stricter penalties for traffic offenses. Additionally, the ministry works closely with various agencies and organisations to develop and implement road safety strategies and programmes aimed at reducing the number of road accidents and fatalities in the country.

Malaysia Road Safety Department (JKJR)

The Malaysia Road Safety Department (JKJR) is a department under the Ministry of Transport that is responsible for overseeing and implementing road safety initiatives and programmes in Malaysia. JKJR's mission is to reduce the number of road accidents and fatalities in the country through various activities, such as road safety campaigns, education and training programs, and the implementation of laws and regulations related to road safety. JKJR also manages the National Road Safety Plan, which is a comprehensive plan aimed at improving road safety in the country.

Malaysian Institute of Road Safety Research (MIROS)

The Malaysian Institute of Road Safety Research (MIROS) was founded in 2007 by the Ministry of Transport Malaysia. Road safety study and development at the institute aims to reduce road accidents and fatalities. MIROS's main focus is road safety study and development, including accident investigation and analysis, vehicle safety standards, road infrastructure design, and technology development. The institute offers road safety technical assistance and advice to government agencies, private

groups, and individuals. Road safety teaching and training programs, including school and university curricula, are also offered by MIROS. The institute works with local and international organisations to support road safety research and development.

Royal Malaysia Police (PDRM)

The Royal Malaysia Police (PDRM) ensures road safety in Malaysia. PDRM enforces traffic laws and investigates traffic accidents as the national law enforcement body. Road safety and mishap prevention are PDRM priorities. These efforts include regular roadblocks and checkpoints to catch drunk drivers and drugged drivers, as well as campaigns to promote safe driving practises like wearing seatbelts, obeying speed limits, and avoiding distractions. Traffic management and law enforcement are handled by the PDRM's Traffic Investigation and Enforcement Department (JSPT). Road crashes, traffic flow, and road user safety are the JSPT's responsibilities. The PDRM is a key partner in Malaysia's road safety efforts.

Road Transport Department (JPJ)

The Malaysian Road Transport Department, better known as JPJ, was established on April 1, 1946, with the aim of coordinating all aspects of transportation across the country. In connection with the establishment of this department, various related acts were enacted, such as the Road Transport Ordinance of 1958 and the Road Transport Act of 1987. JPJ is the government agency under the Malaysian Ministry of Transport (MOT) and is responsible for enforcing laws and regulations related to road transport. This includes issuing driver's licenses, registering vehicles, and administering motor vehicle safety standards in a systematic, reliable, and innovative manner.

3.3 Vietnam

Vietnam, with an area of 331,212 km², is a country located at the easternmost tip of the Indochinese peninsula in Southeast Asia, with a land border of 4,639 km, bordering Laos, Cambodia, China, the East Sea, and the Gulf of Thailand, with a coastline of 3,260 km. It shares a maritime border with Thailand across the Gulf of Thailand and with China, the Philippines, Indonesia, Brunei, and Malaysia across the South China Sea. As of 2022, the population of Vietnam is estimated at about 99,330 million people.

Domestic traffic routes, mainly roads, railways, and air routes, are in the north-south direction. The road system includes national highways, provincial roads, district roads, etc. With a total length of about 222,000 km, most national and provincial roads are paved and concreted; a minority of district roads are still dirt roads.

The main road system in Vietnam includes National Highways, connecting regions and provinces, as well as going to international border gates with China, Laos, and Cambodia. The total length of the above roads is 14,790.46 km, while all national highways in Vietnam are said to have a total length of about 17,300 km, with nearly 85 percent paved with asphalt concrete. In addition to national highways, there are provincial roads (ring roads, trunk roads, etc.) connecting districts in the province and district roads (main roads, boulevards, etc.) connecting communes in the district. Provincial roads have a total length of about 27,700 km, with more than 50 percent paved with asphalt.

Vietnam's expressways system, a network of roads extending from north to south, belongs to the road transport system in Vietnam. started construction from the end of 1998 to the present. Currently, according to calculations, the entire Vietnam expressways system (excluding the road sections that have not been accurately determined) has a total length of more than 2000 km. The North-South Expressway (CT.01) has been built in many sections, and many other major expressways are still under construction.

In general, Expressways in Vietnam are built with 4-6 lanes, including 2-3 lanes in each direction, and all link to national highways and other Expressways where the Expressways pass. The speed of expressways in Vietnam is designed to be a maximum of 80-120 km/h (minimum 60 km/h).

3.3.1 Road Crash Statistics

In Vietnam, motorbikes and scooters are still the main means of transportation for people. In 2018, there were about 55 million motorbikes in circulation nationwide, with an average of 1.8 people per vehicle. Particularly in two big cities, Ho Chi Minh City and Hanoi, the total number of registered cars accounts for about one-third of the number of vehicles circulating in Vietnam, meeting 90 percent of people's travel needs.

According to statistics, the majority of road accident deaths in Vietnam involve motorcyclists, followed by car drivers and passengers. Pedestrians and cyclists also account for an outside proportion of road accident deaths. In recent years, the government has taken various initiatives to improve road safety, including strengthening enforcement of traffic rules and regulations and implementing tougher penalties for traffic violations. Despite these efforts, road safety remains a major concern for the country. *Table 6* presents an overview of the traffic accident statistics in Vietnam from 2005 to 2020.

Table 6. Trend of road statistics in Vietnam.

	2005	2010	2015	2019	2020
<i>Population</i>	82,392,000	87,967,651	92,677,076	96,462,106	97,338,579
<i>Registered Vehicle</i>	17,532,296	34,652,252	50,682,934	67,265,126	77,896,976
<i>Number of total road accidents</i>		14,442	21,589	17,621	14,510
<i>Number of total deaths in road accidents</i>	11,534	11,406	8,671	7,624	6,700
<i>Number of deaths per 10,000 vehicles</i>	6.58	3.29	1.71	1.13	0.86
<i>Number of deaths per 100,000 population</i>	14.00	12.97	9.36	7.90	6.88

Data Source: The Office of the Vietnam National Traffic Safety Committee, Statistics 2021.

3.3.2 Road Crash Causes and Priorities

According to the General Statistics Office, in 2022, there were 11,448 traffic accidents nationwide, killing 6,364 people. On average, 17 people die in traffic accidents every day. According to a report at the meeting to review the work in 2022 and implement the 2023 plan of the Ministry of Transport on January 13, 2023, during the entire year of 2022, there were 11,457 traffic accidents, killing 6,397 people and injuring 7,804 people. Compared to 2019, the number of traffic accidents decreased by 6,216 cases (down 35.2 percent), 1,246 people died (down 16.3 percent), and 5,841 people were injured (down 42.81 percent). However, compared to 2021, there was a decrease of 38 cases (down 0.33 percent), a decrease of 214 people injured (down 2.67 percent), but an increase of 598 deaths (up 10.31 percent). According to the Ministry of Transport, along with the recovery and socio-economic development, the travel and transport needs of people and businesses increased very much compared to the same period in 2021, accompanied by a sense of compliance. The traffic law is not good for a part of the people, and traffic accidents in 2022 compared to 2019 (before the COVID-19 epidemic) decreased by all three criteria, but compared to 2021 (the time of implementing social distancing), both the number of accidents and the number of deaths increased.

Notably, a large number of car owners and drivers lack a sense of law observance for profit, so oversized and overloaded vehicles still exist, especially on roads in localities with construction material mines, cement factories, and industrial parks, which have a high potential for traffic accidents, increasing damage and reducing the life of work. The situation of illegal vehicles' itinerary and illegal terminals has not been thoroughly handled, causing frustration in public opinion. In 2022, the Ministry of Transport shall closely coordinate with ministries, branches, and localities to step up

inspection, examination, and handling of violations of the law on traffic order and safety, formulating and promulgating many documents, dispatches, and plans to synchronously deploy groups of solutions to ensure traffic safety. Including: formulation and completion of legal regulations; improving traffic safety conditions for infrastructure; promoting the propaganda, dissemination, and education of the law on ensuring traffic safety; building traffic culture; improving traffic safety conditions for vehicles and vehicle drivers.

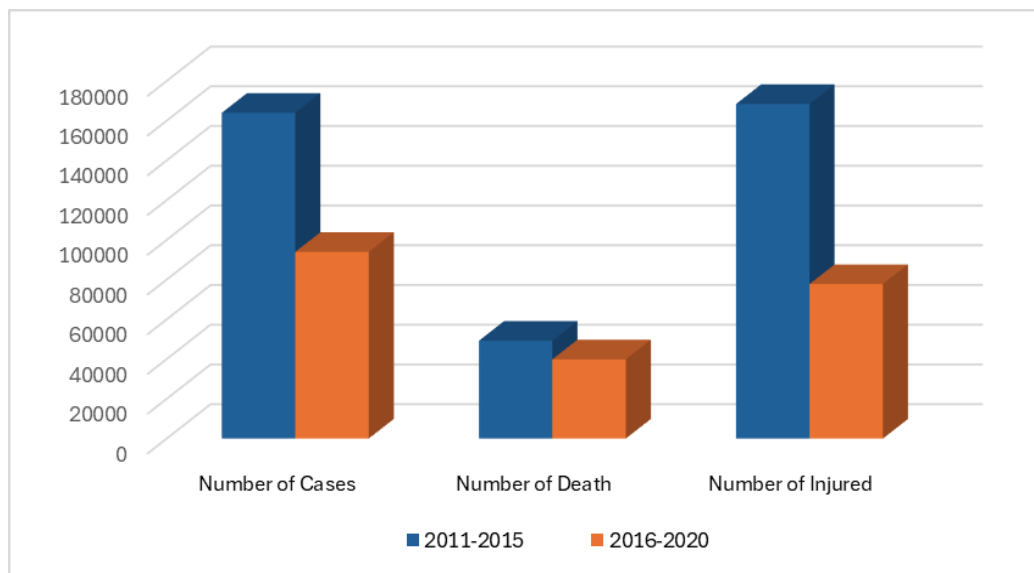


Figure 14: **Number of traffic accidents and deaths in Vietnam 2016-2020**
 (Data source: *Traffic Police Department, 2021*)

As illustrated in Figure 14, the number of deaths from vehicle accidents in Vietnam during the period 2016–2020 was recorded at 39,873 (average 7,975 per year). The data show that specific causes represent a higher likelihood of vehicle crashes than others. Motorcyclists represent a very vulnerable demographic, accounting for 63.48 percent of the total number of road accidents in Vietnam between 2015 and 2020, as can be seen in Figure 15. The foregoing highlights the need to implement measures to enhance motorcycle safety, such as stricter implementation of traffic regulations and better infrastructure to protect motorcyclists on the road.

Pedestrians and cyclists, as a vulnerable demographic, accounted for 6.28 percent of all road accidents between 2015 and 2020. The foregoing highlights the need to strengthen pedestrian infrastructure, including footpaths, crosswalks, and traffic signals that are conducive to pedestrian safety and convenience, and, to ensure pedestrian safety, the deployment of enhanced bicycle infrastructure, such as dedicated bike lanes. For the period 2015–2020, road accident cases were analysed, and it was determined that cars accounted for 30.24 percent of the total number of accidents.

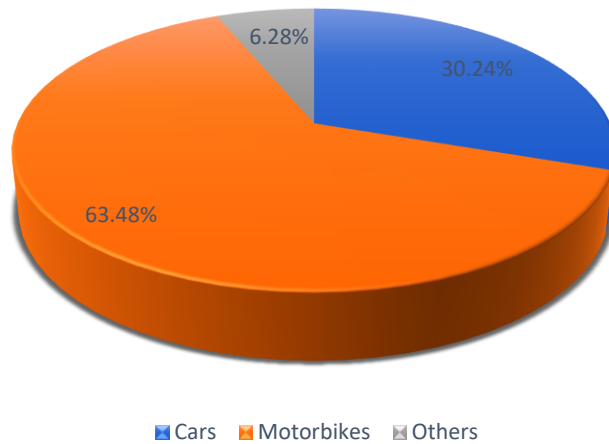


Figure 15: **Vehicles causing traffic accidents in Vietnam 2016-2020**
 (Data source: *Traffic Police Department, 2021*).

3.3.3 Stakeholder

National Traffic Safety Committee

The *National Traffic Safety Committee* is an inter-sectoral coordination organisation with the function of helping the Prime Minister of Vietnam direct ministries, sectors, and localities to implement national strategies and projects on ensuring traffic order and safety and deploy interdisciplinary solutions to ensure traffic order and safety within Vietnam. The Ministry of Transport is the standing agency of the National Traffic Safety Committee, responsible for ensuring the operating conditions of the Commission and using functional agencies and units under the Ministry to perform the operation duties of the National Traffic Safety Committee. The Ministry of Transport of Vietnam is an agency of the Government of Vietnam, performing the function of state management of transportation by road, railway, inland waterway, maritime, and aviation nationwide and state management of public services in accordance with the law. As the standing agency of the National Traffic Safety Committee, the Department is responsible for overseeing and implementing various policies and initiatives aimed at improving road safety, such as conducting safety campaigns on roads and introducing stricter penalties for traffic violations. In addition, the Department works closely with various agencies and organisations to develop and implement road safety strategies and programmes to reduce the number of road accidents and deaths in the country. The National Traffic Safety Committee is an inter-sectoral coordination organisation with the function of helping the Prime Minister of Vietnam direct ministries, sectors, and localities to implement national strategies and projects on ensuring traffic order and safety and deploy interdisciplinary solutions to ensure traffic order and safety within Vietnam. The Ministry of Transport is the standing agency of the National Traffic Safety Committee, responsible for ensuring the operating conditions of the Commission and using

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Department for Roads of Vietnam (DRVN)

The Department for Roads of Vietnam (DRVN) is an organisation directly under the Ministry of Transport, performing the function of advising and assisting the Minister of Transport in state management and law enforcement of the law on road transport nationwide and organising the implementation of public services on road transport according to the provisions of the law. Traffic Police Department (C08) is an agency under the Ministry of Public Security of Vietnam, which has the function of state management on the protection of road traffic order and safety; organise the implementation and uniformly manage, command, direct, guide, and inspect the traffic police force in the implementation of guidelines, plans, and measures to protect road traffic order and safety; coordinate with forces in the prevention and fight against crimes and violations of social order and safety on road traffic routes in accordance with law and the Minister of Public Security.

Organizing traffic law propaganda; organising, directing, and conducting the work of ensuring road traffic order and safety; and registering and issuing licence plates for all types of road motor vehicles:

- Organizing traffic law propaganda; organising, directing, and conducting the work of ensuring road traffic order and safety; and registering and issuing licence plates for all types of road motor vehicles
- Training, issuance, and renewal of road motor vehicle driver's licences
- Organize, command, and control traffic in urban centres and important traffic hubs.
- When there is an unexpected situation, it is allowed to divide the stream and route and regulate the stopping and stopping points temporarily.

- Patrol, control, and manage administrative violations of road and inland waterway traffic order and safety.
- Organization of investigation and settlement of traffic accidents; assume the prime responsibility for, and coordinate with transport authorities in, analyzing, determining the causes and conditions of traffic accidents, and proposing preventive measures.
- Cooperate with functional agencies in inspecting safety equipment for waterway and rail transport when there are signs of unsafety.



PART 4.0 BEST PRACTICES IN EUROPE

The European Union has made enormous progress in improving road safety. Although there remains much to do, important mitigation measures were set and implemented. This section shows the best practices of the three European partners of ASIAsAFE

4.1 SWEDEN

Sweden is among the best countries in the world regarding traffic safety. The overall positive decline of fatalities and accidents in Sweden can be partly explained by gradual improvements in infrastructure, the safety of the vehicle fleet, an increased focus on injury prevention, and reduced speeds. The safety performance indicators for vehicles and national roads are improving, and road design has long embraced more excellent safety. Sweden is one of many countries with decades of advanced experience in traffic safety, and this to a large extent is based on the development of modern 5Es applications and technologies (education, enforcement, engineering, emergency, and evaluation) in the traffic system. Much of this existing knowledge can also be transferred to and implemented in other countries.

Pillar 1 Road Safety Management

One notable feature of Swedish road transport policy is the ambitious national goal known as "Vision Zero," which was passed by the Swedish Parliament in 1997. This goal aims to achieve no deaths or serious injuries due to road traffic accidents in Sweden, with a long-term vision of absolute safety for all road users. The purpose of the management by objectives model is to apply a long-term, systematic approach to road safety work.

The Road Safety Strategy 2021-2030 in Sweden: The action plan includes 111 measures designed to increase road traffic safety. The actual indicators are followed up and analysed every year. The analysis of road safety performance is presented at annual conferences attended by various stakeholders. For instance, the Swedish government presented a national strategy for cycling in April 2017 that is intended to function as a platform for future safety work. Five areas of action were highlighted: greater priority for cyclists in social planning; focus on different groups of cyclists; promotion of a more functional and user-friendly infrastructure; and promotion of a safer environment for cyclists.

The National Traffic Accidents Database (STRADA): The Swedish Transport Agency collects accident data from the police and hospitals into the STRADA integrated database. The numbers of injuries and fatalities are published in the official statistics, broken down by age group, gender, and road user group. The statistics also describe the circumstances surrounding the accidents, the counties in which they occurred, the month, day of the week, and time of day they occurred, plus the road type, road conditions, and other circumstances.

Pillar 2 Safer Roads and Mobility

2+1 Roads: In 1998, the first 2+1 median barrier road in Sweden was implemented. The idea was to adapt the existing two-lane standard cross-section with a 13-meter paved width at stated speed limits of 90 and 110 kph without expansion. 2+1 roads proved to increase mobility and safety. The number of head-on collisions was eliminated. A centre guardrail is being increasingly set up along the side of the road to prevent head-on collisions or single collisions, thereby making roads of standard width considerably safer.

Safe roadside shoulders: trees, boulders, rigid posts, etc. can be fatal for anyone who should happen to drive off the road. Such fixed obstacles along roads should be removed or protected with cushions.

Preventing road users from experiencing uncertainty in traffic: Expectancy or consistency relates to a driver's readiness to respond to situations, events, and information in predictable and successful ways. This includes the separation of traffic lanes for pedestrians, cyclists, cars, and heavy vehicles according to homogeneous speed, directions, and mass of vehicles.

Road Safety Audit (RSA) and Road Safety Inspection (RSI) are formal safety performance examinations of existing and/or future roads, regularly applied in Sweden. These examinations qualitatively estimate and report on potential road safety issues and identify opportunities for safety improvements for all road users.



Pillar 3 Safer Vehicle

The introduction of advanced driver assistance systems has been rapid in Sweden. In 2019, the share of new cars in Sweden with auto-brake at low speeds was 85 percent, lane departure warning systems at 63 percent, and auto-brake for vulnerable road users at 74 percent.

Anti-lock Braking Systems (ABS) development as standard equipment on motorcycles has moved quickly. The percentage of motorcycles by traffic volume fitted with ABS increased from 9 percent in 2007 to 55 percent in 2017.

The New Car Assessment Program (NCAP) provides European consumers with information regarding the safety of passenger vehicles imported and operated on the roads. The programme awards 'star ratings' based on the performance of the vehicles in a variety of crash tests, including front, side, and pole impacts and impacts with pedestrians or cyclists.

Volvo and Scania Braking system: If the truck driver does not respond to the warning system, the braking system will be automatically activated. The vehicle brakes gradually at first, but as the truck gets closer to the hazard, the system will bring the vehicle to a sudden stop.

Pillar 4 Safer Road User

Speed limits on national roads are regularly reviewed. The aim is to adjust the speed limit to the safety standard of the road.

Permanent speed surveillance cameras so that motorists are aware of speed violations.

Traffic calming measures (TCMs) in the city and finding the best choice of vertical or horizontal TCMs according to their impacts on speed, traffic volume, emissions, costs, etc.

School zone safety includes speed-reducing measures (TCMs), safe crossings for children who walk or use the bike, safe dropping-areas with a safe/access distance from the school, improved walk and bicycle routes to and around the school, available and accessible bicycle parking, zones with 20 speed limit signs and "Children Playing" or markings on the surface, improved lighting, enhanced knowledge for children and parents, and inspired more people to walk, bike, and go to school, etc.

Pillar 5 Post Crash Response

Emergency response time is vital in Sweden. Emergency response time and medical services help prevent traffic crashes, which play a significant role in overall survival rates, according to national statistics. This can be supported by the call system (112), which provides an automated message to emergency services following a road crash, which includes the precise crash location. The in-vehicle call is generated either manually by the vehicle occupants by pushing a button, via mobile, or automatically via the activation of in-vehicle sensors after a crash. The emergency and rescue services find the optimal and shortest route to reach the hospital after the accident.

4.2 ITALY

As introduced in April 2022, the Ministry of Infrastructure and Sustainable Mobility published the Road Safety Strategy Plan (RSSP) 2030. The Safe System approach is the basis of the new strategy, which has five pillars: road safety management, safer roads, safer vehicles, safer road users, and post-crash assistance.

The plan sets a generic target of halving road fatalities by 2030 from a 2019 baseline level. The generic target will also include the reduction of serious injuries. The final target is to eliminate road fatalities by 2050, in line with the European Union's Vision Zero approach.

In addition, the plan sets specific targets for cyclists, pedestrians, users of motorised two-wheelers, children, and people over 65. For each category, the main risk factors and some specific guidelines have been identified, and based on these action strategies organised on two levels, they have been defined as a general strategic line able to affect the whole system, grouped according to the five pillars of road safety defined by the UN and specific strategic lines addressed to the categories at greatest risk.

Pillar 1 Road Safety Management

The strategic lines included in this pillar cover three main aspects: (i) digitization and data collection, (ii) coordination, and (iii) research.

Digitization and Data Collection

To effectively support road safety management, it is necessary to initiate a process of digitization of accident data and road transport data. Relevant actions for improving the current process are:

- digitization of the accident and injury data collection process, understood as computerization of the data and partial automation of the collection and submission process.
- linkage with other national databases (hospital discharge records, emergency room data, insurance companies, and insurance service concessionaires) to improve knowledge of the phenomenon of serious injuries, the quality of the data collected, and to be able to assess the extent of under-reporting phenomena.
- monitoring of risk exposure (in terms of mileage) and detection of Key Performance Indicators (KPIs) defined by the European Commission on: speed, seat belt use, protective systems, alcohol, distraction, vehicle safety, infrastructure safety, emergency, and rescue.
- completion of the network of regional monitoring centres and homogenization of their functions on a national scale.
- dissemination of road safety data through the creation of a National Road Safety Observatory.

Coordination

Inter-ministerial coordination should be fostered because of the principle of integrated approach and sharing of Safe System responsibilities. Priority action will be:

- The Ministry of Infrastructure and Sustainable Mobility set up the Committee to oversee and coordinate road safety activities. The Committee's job is to plan road safety initiatives, figure out the most important things that need to be done, and check that the RSSP's actions led to the desired outcomes.

Research

In Italy, there is no single structure of reference and no specific national research strategy on road safety that addresses it to the country's needs. Relevant actions to this end will be:

- establishment of a National Road Safety Research Centre aimed at identifying underlying problems and developing short- and long-term solutions. The Centre's research will need to support policymakers so that they can define strategies and standards for improving road safety.

- specific research on risk factors and risk perception, as well as, in a broader sense, accident prediction indexes, with regard to various types of road mobility and age groups.



Pillar 2 Safer Roads and Mobility

The priority objective of this strategy is to improve the safety of existing and planned road infrastructure, consistent with Safe System principles.

Actions included in this strategic line concern:

- criteria and procedures for managing the safety of road infrastructure must be applied to the whole road network. These include road safety audits of projects, safety inspections of existing infrastructure, safety classification of the road network, and setting priorities for interventions.
- updating road design and operation criteria to take into account the human factor (e.g., constraints) and human behaviour (e.g., risk-taking);
- adoption or activation of planned road infrastructure maintenance systems to avoid conditions of reduced road functionality and risk to users;
- monitoring and funding of experiments, pilot studies, and interventions geared toward making road infrastructure functional for higher levels of vehicle automation.

Pillar 3 Safer Vehicle

This strategic line aims at the dissemination of safe vehicles in the circulating fleet. Actions included in this strategic line concern:

- campaigns to raise awareness of the purchase of vehicles with increased safety equipment;
- tax and insurance incentive programmes for the dissemination of vehicles with additional safety equipment over the basic models;
- Legislative and vehicle enforcement actions to support the transposition and effective implementation of Regulation 2019/2144 of the European Parliament and of the Council. This regulation requires, as of 2022, new advanced safety systems, such as intelligent speed adaptation, alcohol-lock readiness, and automatic emergency braking, for new registered motor vehicles.

Pillar 4 Safer Road User

This strategic line aims to make road users aware of the risks associated with behaviour and the limitations that exist in the system and to make appropriate choices aimed at reducing the risk to themselves.

Actions included in this strategic line concern:

- planning the awareness and education campaigns that accompany any regulatory changes or additions regarding road safety and coordinating with the police to disseminate related enforcement campaigns to amplify the positive effects;
- implementation of effective and scientifically validated awareness and education models targeting all age groups;
- increased controls for all police forces with respect to the main risk factors such as speed, alcohol, drugs, cell phone use, and failure to use protective systems;
- to foster a road safety culture;
- establishment of programmes to train professional figures with expertise in road, vehicle, and user safety;
- improvement of the process of establishing psycho-physical fitness to drive;
- introducing permanent traffic education and sustainable mobility education activities in schools;

- supporting the action of the Police Forces, through the introduction of new regulations or the modification of existing ones, giving priority to aspects aimed at the prevention of fatal and seriously injured accidents.

Pillar 5 Post Crash Response

The objective of this strategic line is to optimise the coordination of the different phases of the post-accident to ensure greater effectiveness and timeliness of the rescue system.

Actions included in this strategic line are:

- application of the eCall system throughout Italy, with supporting actions, in order to extend it to all vehicles on the road;
- strengthening cooperation between the rescue and emergency services involved in the trauma survivability chain;
- training of medical and non-medical personnel and improvement of rescue equipment;
- identification of areas of the territory where incident response times are high and the initiation of programmes to reduce response times to and from these areas;
- institutionalisation of a service to provide better trauma and post-traumatic care, building on the good practises already present in the country;
- liaison and coordination with association stakeholders in road safety from both the legal, psychological, and social perspectives, as well as health and rehabilitation.

4.3 PORTUGAL

In 2011, the European Union set an ambitious goal of halving the number of road deaths between 2010 and 2020. While the collective EU road death reduction target for 2020 was not met, all countries made improvements, and Portugal achieved a decrease above the EU average of 37 percent (ETSC 2021). Recently, the EU has set two new targets for 2030, again to halve road deaths and also to halve serious injuries.

In Portugal, the National Authority for Road Safety (ANSR) is developing a road safety strategy for the coming period of 2021-2030 named Vision Zero 2030 (<https://visaozero2030.pt>). The later plan is named the National Strategic Road Safety

Plan (PENSE 2020) and includes five strategic objectives in line with the UN's Plan for the Decade of Action: to improve road safety management, make users safer, make infrastructure safer, promote greater vehicle safety, and improve assistance and support to victims. In Portugal, the five pillars have been implemented to varying degrees of success.



Pillar 1 Road Safety Management

Regarding road safety management, the strategy included initiatives such as improving data collection and analysis, making available road safety information, and promoting inter-agency coordination. Additionally, the improvement of legislation, enforcement, and sanctions, as well as the system for allocating financial resources for road safety, were set as operational measures to achieve the strategic objectives of PENSE 2020.

Portugal has also established a Road Safety Observatory to monitor road safety data and trends. Portugal has adopted the MAIS3+ classification for serious injuries as recommended by the EC; however, improvements are needed to ensure the accuracy and stability of the database before assuming this classification on the annual reports published by the ANSR. Also, since 2020, information concerning enforcement has been published in the annual reports, including data about offence rates and types, speeding, driving and alcohol influence, driving licence scoring, and so on. In consequence of the Sustainable Urban Mobility Plans (SUMP) developments by municipalities, which may include road safety diagnosis and planning, a new set of challenges and requests regarding crash and casualty data

availability, as well as the integration and harmonisation of municipal interventions, are emerging.

Nevertheless, there is a need to gather new safety and exposure data related to walking and cycling. The data related to walking should be collected at a national level and disaggregated by local administrative units. The data related to cycling should be collected at the municipal level, and it is preferable to harmonise it at the intermunicipal community level as a minimum.

According to the European Transport Safety Council, Portugal needs to strengthen its institutional framework and enhance the efficiency of its enforcement and judicial systems to better manage road safety.

Pillar 2 Safer Roads and Mobility

Portugal has made significant progress in improving its road infrastructure, particularly with regards to highways and motorways. The country has also implemented measures such as traffic calming, roundabouts, and safer pedestrian crossings to improve road safety in urban areas. A guide for road safety plans for municipalities was published; however, the urban plans are not mandatory for the municipalities. Nevertheless, Sustainable Urban Mobility Plans (SUMPs) are currently developed in Portugal at the municipal level, aiming at the achievement of mobility-related objectives, including a road safety diagnosis. Therefore, it is expected to contribute to road safety interventions by municipalities. In addition, specific policy documents were prepared, for example, laying out the National Strategy for Active Cycling Mobility 2020-2030, with the goal of promoting individual travel in active modes as a safe, accessible, and attractive experience for all.

However, according to the European Commission, Portugal needs to improve its road infrastructure in terms of maintenance and safety, as well as enhance accessibility for pedestrians and cyclists.

In this regard, speed management in urban areas is set as a future intervention through 30 km/h Zone and Home-Zone area-wide infrastructure interventions, including the implementation of the Portuguese design guidelines for Home Zones and the execution of urban renewal plans according to the Portuguese design guidelines for 30 km/h Zones. In the same line, speed management on rural roads is foreseen in the road safety strategy for 2030, involving five components: changing the perceived severity of slight speeding offenses; fostering general deterrence of speeding by increased stationary manual speed enforcement; enlarging the coverage of automatic speed enforcement; matching speed limits to safe speed criteria on municipal undivided interurban links; and developing road user speeding information campaigns.

Pillar 3 Safer Vehicle

Under PENSE 2020, two operational measures were set to promote the maximisation of the safety of the new vehicle fleet and the used vehicle fleet. In the past, Portugal has successfully implemented safety regulations such as mandatory seatbelt and helmet use for motorcyclists. According to the ANSR report for 2021, there were no reported infractions regarding helmet use. However, 1.9 percent of the infractions were due to car passengers not wearing seat belts. The country has also adopted the European Union's vehicle safety standards and implemented measures such as mandatory periodic inspections of vehicles. In the 2021 ANSR report, 5.0 percent of the infractions were due to the absence of periodical inspection.

Pillar 4 Safer Road User

In this pillar, the strategy included education and training promotion, the development of specific programmes to promote safe behaviour, the improvement of vulnerable road user protection, and the effectiveness of communication campaigns. To address these issues, Portugal has implemented measures such as speed limit enforcement, campaigns promoting safe road behavior, and education and awareness programmes for drivers, cyclists, and pedestrians. The country has also increased penalties for traffic offences and implemented random breath testing for alcohol and drug use. Despite good efforts, future improvements are needed, especially regarding speeding, alcohol, drugs, distraction, and fatigue. Regarding speeding, two actions are foreseen under road user behaviour: changing the perceived severity of slight speeding offences and developing road user speeding information campaigns.

According to the European Transport Safety Council, Portugal needs to strengthen its education and awareness campaigns for vulnerable road users, such as children and the elderly. This is particularly relevant considering that the Portuguese population is ageing over time.

Pillar 5 Post Crash Response

Portugal has made significant progress in improving its emergency medical services and trauma care for crash victims. The country has also established a national network of trauma centres to provide specialised care for seriously injured patients. Also, following the PENSE 2020 guidelines other actions to promote the optimisation of assistance, treatment and rehabilitation of victims of road accidents were established such as preparation of the first aid teaching textbooks and material, and promote the

training of the school population in first aid and basic life support; improving the knowledge of novice drivers on basic first aid notions, by strengthening the content of training and assessment programs; updating and making available, in digital format, the Safety Data Sheets Manual and promote training actions for its use by the Fire Brigade officers; preparing a programme for upgrading the emergency service system.

However, according to the European Transport Safety Council, Portugal needs to improve its crash investigation and data collection systems to better identify the causes of road crashes and prevent future incidents.

Overall, while Portugal has made progress in implementing the 5 pillars of road safety established by the WHO, there is still room for improvement in all areas. Continued efforts and investment are needed to ensure that road safety remains a priority and that progress is made in reducing the number of road deaths and injuries.

For the next road safety plan, the following operational level intervention areas were selected: distraction; alcohol; drugs; post-crash care; fatigue; speeding, car occupants and motorcyclists, in rural roads; and speeding, pedestrians, motorcycles and cyclists in urban areas.



PART 5.0 BEST PRACTICES IN ASIA

ASIA countries aim to improve traffic safety, embracing the five pillars of WHO. In this section, the three Asia partner countries show how they tackle each.

5.1 INDONESIA

In Indonesia, the administration of the Five Pillars of Road Safety requires collaboration among several government agencies, non-governmental organizations (NGOs), and other stakeholders. The Ministry of Transportation (is the main agency in charge of road safety management. The Directorate General of Land Transportation of the ministry is responsible for managing road safety rules, regulations, and enforcement.

Pillar 1 Road Safety Management

The Ministry of Transportation (is the main agency in charge of road safety management) is responsible to encourage coordination among stakeholders and the establishment of sectoral partnerships to guarantee the effectiveness and sustainability of road safety strategy planning and development at the national level, including determining achievement targets for road safety and performing evaluations to ensure that road safety management is carried out effectively and efficiently. Among the main programmes implemented and activities under this strategy were:

- Harmonization and Coordination of Road Safety: Establish a forum or coordinating agency; provide work procedures and governance forums or coordinating agency; agency for safety programs; establish Working Groups on Accident Response; set priorities and ensure the effectiveness and sustainability of safety programs;
- Emergency Vehicle Traffic Protocol: prepare guidelines for emergency vehicle traffic arrangements; conduct simulation and socialisation of the operating protocol;
- Road Safety Research: Institutionalizing the governance of research; undertaking research on accident causes; undertaking research that suits the needs of road safety;
- Injury Surveillance and Integrated Information System: collect accident data and develop data structures (data on causes of accidents, data on accident victims, surveillance data); consolidate accident data from various parties, develop a safety management information system, disseminate the annual report on accidents, and provide easy public access to data;

- Road Safety Fund: Operate a road safety funding agency and ensure the availability of funds for road safety;
- Safety Partnership: Prepare guidelines for partnership arrangements with the business sector and communities; and undertake road safety partnership initiatives;
- Public Transport Safety Management System: operation of safer public transport; and safety of public transport crew;
- Improvement of Road Safety Regulations: review and issue new traffic regulations that accommodate safety aspects; disseminate new traffic regulations.



Pillar 2 Safer Roads and Mobility

The Ministry of Public Works and Housing is responsible to provide safe road infrastructures by performing improvements in the planning, design, construction, and road operation stages so that the road infrastructures provided are able to reduce and accommodate road users' errors. Among the programmes and activities that have been identified under safer roads and mobility were:

- Safer Road Lane: providing road improvement management that pertains to safety appropriateness; implementing the closure of potholes; carrying out repairs pertaining to puddles; implementing the handling of slippery roads; and carrying out road shoulder repairs;
- Planning and Execution on Safer Roads at Road Works (including Road Furniture's): providing management on the planning of safe roads; providing

management on the implementation of safe road works; implementing safer road planning, from the planning stage through detailed design; implementing safer road principles at road works; implementing road safety inspections; implementing inventory and investigation of accident-prone locations; improving accident-prone locations; undertaking speed management, including traffic calming; supporting acts of emergencies as caused by traffic accidents and disasters;

- Improvement of the Worthiness of Operational Standards of Safer Roads: providing operational worthiness standards of safer roads, providing management guidelines for the implementation of safer roads, and applying operational management of safe roads;
- Safer Road Environment: involving governance in the control and arrangement of the road environment in relation to safety; controlling roadside space function; controlling activities at the roadside; and providing pedestrian facilities, including protection for pedestrians with fencing.

Pillar 3 Safer Vehicle

The Ministry of Industry responsible to ensure that every vehicle used on the road has a high safety standard, so that it will be able to minimise the number of accidents caused by inaccurate vehicle systems. In addition, the vehicle should be able to protect its user and people involved in an accident from worse conditions if they become accident victims. The main programmes implemented and activities under this strategy were:

- Compliance in Operating Vehicles: undertake compliance inspections in the operations of motor vehicles; undertake compliance inspections; install safety equipment (safety belt, helmet, tools of child protection, air bag);
- Providing and improving the Periodic Test and Type Test Procedures: improve procedures and manuals for periodic tests and type tests; develop a techno-based testing system; evaluate periodic testing and type testing systems (HR, administration, infrastructure, data collection in the information system, implementation of an accreditation system); undertake inspection of vehicles on the road;
- Vehicle Speed Restrictions: set speed limits; establish procedures for handling speed violations; provide technologies for law enforcement; set a fine system;
- Overloading Handling: involve (participation of) the community in the movement of Say No to Overloading; undertake good governance in the handling of overloading; improve the function of the weighbridge;

implement an Intelligent Transportation System (ITS) in the field of freight transport;

- Elimination of vehicles (scrapping);
- Safety standards for public transport vehicles;
- Improvement of the type test procedures for imported motor vehicles that have been modified and are not new;
- Development of research and design of motor vehicles

Pillar 4 Safer Road User

The Ministry of Transportation is responsible for road safety education campaigns, and the Indonesian National Police (Polri) is responsible for the enforcement of traffic laws. Together, they are responsible for improving the behaviour of road users by developing comprehensive programmes, such as:

- Driver Condition Inspection: set a health standard for drivers (age restrictions; high-risk disease or birth defect; need for assistive devices; unhealthy behaviours; senility; etc.); Implement a standard examination of the driver's health when obtaining a driving licence (SIM); Implement periodic medical examinations; Implement patrols over behaviours that endanger safety; set limitations on the rights to drive in relation to the driver's conditions factor;
- Improvement of facilities and infrastructure for the SIM test system: improve the quality of SIM test materials; improve the quality and quantity of SIM test instructors; provide educational facilities for the driver; and apply electronic SIM;
- Improvement of SIM test procedures: establish SIM hierarchy; apply the demerit point system;
- Technical Guidance for Driving Schools: Implement accreditation for driving schools; Set standards of technical coaching for driving school; Provide training for the Human Resources (SDM) department of driving schools; Guarantee the operation of driving schools;
- Handling of 5 main risk factors plus: enforcing the law against motorcycle riders that make helmet use violations; enforcing the law against violators of safety belt usage; enforcing the law against speed limit offenders; enforcing the law against offenders of drunk driving; enforcing the law against violators in the use of safety devices intended for vulnerable road users; enforcing the law against mobile phone usage offenders;

- use of electronic law enforcement;
- Formal and informal education on road safety;
- Safety Campaign: Five major risk factors plus (helmet, safety belt, speeding, drunkenness, use of a cell phone, vulnerable road users); safer behaviour on the road.

Pillar 5 Post Crash Response

Ministry of Health and the Ministry of Transportation are responsible for improving post-incident emergency response management by improving the capabilities of the concerned stakeholders, both in terms of the emergency response system and victim handling, including long-term rehabilitation for accident victims. In their implementation, the five pillars carry out their authorities based on a mutually inclusive principle or the integration of road safety pillars interaction with an added value. Among the main programmes implemented and activities under this strategy were:

- Integrated Emergency Services System: providing an integrated emergency post (Public Safety Centre); providing competent medical personnel; establishing Standard Operating Procedure (SOP) for emergency accident protocol; providing trained civil manpower for P3K (accident first aid); undertaking trials on accident emergency circumstances;
- (One Access Code Emergency Communication System (emergency number): establishing one access code; and ensuring one access code becomes part of the protocol for handling accidents that people can memorize;
- Guarantee or insurance for accident victims that are treated in a referral hospital: developing a tiered referral system from primary to tertiary health facilities; establishing rules regarding guarantee or insurance for victims handled in hospitals; ensuring the guarantee or insurance scheme can be accepted and implemented by all parties (insurers, hospitals, and the riders who take to the streets);
- Third-party insurance;
- Allocation of part of the insurance premium for the Road Safety Fund;
- Post-accident rehabilitation program;
- Research in the handling of accident victims.

5.2 MALAYSIA

In 2006, the Ministry of Transport (MOT) introduced an official document named the Malaysia Road Safety Plan (MRSP) as an effort to address road safety issues in Malaysia. There have been three editions of MRSPs that have been developed and put into implementation, which are MRSP 2006–2010, MRSP 2014–2020, and MRSP 2022–2030.

Pillar 1 Road Safety Management

The MRSP was designed to achieve a set of outcomes through a holistic approach and the effective implementation of a comprehensive set of strategies. One of the strategies was to reduce the vehicle speed. Among the main programmes implemented under this strategy were:

- integrated ops for traffic offence enforcement;
- re-evaluation of speed limits for types of roads and vehicles;
- implementation of speed control techniques (traffic easing);
- re-evaluation and improvement of laws concerning road safety, and
- training programmes for enforcement officers.



Pillar 2 Safer Roads and Mobility

Among the programmes and activities that have been identified under safer roads and mobility were:

- Malaysia Road Assessment Programme (MyRAP): The programme aims to address the highest-risk roads around the country by collaborating and partnering with national and state agencies. Those improvements focused on a 'quick fix' to upgrade the star rating of the roads;
- Road Safety Audit (RSA) and Inspection: The main objectives of RSA assessment and inspection are (i) to identify safety deficiencies in the road design and (ii) to recommend safety treatment;
- Improvement on the road design: The improvement on the road design shall follow the guidelines, such as road alignment, road cross section, roadside safety, intersection design, visual aids, facilities for motorcycles and pedestrians, and public transport facilities.

Pillar 3 Safer Vehicle

Improvement and compliance with safety standards for vehicle components are important aspects of ensuring the crashworthiness of new vehicles and the roadworthiness of existing vehicles. Other indicators under this strategy include the following:

- percentage (percent) of summonses issued relating to vehicle modifications that have not been approved by the Road Transport Department (JPJ);
- application or compliance with United Nations Regulation (UNR) under the Vehicle Type Approval (VTA) procedure;
- percentages (percent) of initial and periodic inspection approvals at PUSPAKOM, and
- numbers of enforcements for the standards related to automotive replacement components.

Pillar 4 Safer Road User

Safer Road User is focused mostly on educating, enforcement, and awareness programs, which include the following:

- Reviewed on Road Safety Education (RSE) & Programmes: RSE has been implemented in schools since 2007 as part of the intervention programme by

the Road Safety Department of Malaysia (JKJR). The effort was supported by Ministry of Education as part of long-term proactive action plan to increase awareness on road safety among primary and secondary students;

- Automated Awareness Safety System (AwAS): Automated Awareness Safety System (AwAS) was identified as one of the significant programmes in the Malaysia Road Safety Plan 2006-2010, carried out in order to reduce road traffic deaths in this country. The AwAS implementation has been muted since 2005 and the programme officially started in 23 September 2012. Currently the AwAS cameras are able to detect the violation of speeding and red light running. Among the indicators under this strategy were:
 - i. the percentage of summons issued related to mobile phone and seatbelt uses;
 - ii. number of awareness coverage related to drivers and passengers on social media;
 - iii. number of employers who conducted road safety programmes for car drivers and passengers;
 - iv. percentage of vehicle models with ASEAN NCAP rating of 4 stars and above;
 - v. Perception of Being Caught (POBC) Index among car drivers and passengers;
 - vi. percentage of seatbelt used, and;
 - vii. percentage of child restraint system (CRS) used.

Pillar 5 Post Crash Response

This final strategy emphasised on the aspect of improving the process of emergency assistance following a road crash and the use of communication systems/digital tools/high tech applications to reduce fatality rates. Effective from 2016, the Ministry of Health Malaysia (MOH) has been collaborating with the Fire Department for the use of Emergency Medical Rescue Services (EMRS) to manage emergency cases based on priority.

Among the main indicators under this strategy were:

- the average response time for medical emergency;
- establishing specialist hospitals classified as trauma centres, and;
- increasing the number of ambulances for pre-hospital treatment.

5.3 VIETNAM

In December 2020, the Prime Minister approved the National Strategy to ensure road traffic order and safety in the 2021-2030 period, with a vision for 2045. The overarching objective of the strategy is to reduce the number of road traffic deaths and injuries by 5-10 percent annually in a sustainable manner. The strategy sets out the task of proactively applying and developing the achievements of the Fourth Industrial Revolution to synchronously implement 5 pillars of road traffic safety, including:

Pillar 1: Road Safety Management

- The system of legal documents on traffic order and safety and the organisation of the traffic safety management apparatus from the central to local levels have been completed and operated effectively and efficiently.
- The traffic safety database is built and completed according to modern technology with synchronous connections, meeting the requirements of traffic safety management and research. All five pillars of road traffic safety are applied to advanced science and technology, especially the achievements of the Fourth Industrial Revolution.

Pillar 2: Safer Roads and Mobility

- Timely eradication of black spots and potential points of traffic accidents on the road system; to ensure that 100 percent of road routes newly built, upgraded, renovated, and operated are inspected and appraised for traffic safety according to regulations; to restore order to road safety corridors and prevent re-encroachment on all national highways; and to ensure that large construction works when directly connected to urban roads, national highways, and provincial roads do not cause traffic jams and accidents.
- 100 percent of national highways and provincial roads (grade III or higher) are newly built, and 75 percent of the national highway network's length in operation achieves a traffic safety level of 3 stars or more according to the standards of the National Highway Traffic Safety Assessment Program. global road safety prices.
- Newly built, upgraded, and renovated road routes are considered to build dedicated lanes for motorcycles and bicycles and ensure safety for vulnerable traffic participants.

- 100 percent of the provincial road system and 50-80 percent of the district road system are built and fully installed with work and equipment to ensure traffic safety. Completing an accessible transportation system for the disabled and elderly on main roads in urban areas of grade I or higher
- Mobilize investment resources, build rest stops to serve the essential needs of drivers, passengers, and vehicles along highways, national highways, and provincial roads, and ensure that drivers do not exceed 4 hours of stopping according to regulations.
- 100 percent of highways, routes, and sections of national highways have deployed and installed intelligent traffic management and administration systems (capable of detecting violations, collecting tolls, etc.). non-stop electronic, flexible electronic road signs); to form integrated centres for smart urban traffic management and administration in cities directly under the central government and local authorities in need.
- reducing traffic jams on key national highways and major traffic hubs in Hanoi, Ho Chi Minh City, and big cities, avoiding prolonged traffic jams lasting over 30 minutes.
- 100 percent of the school gate area located on national highways, provincial roads, and urban main roads is organised traffic to ensure safety and prevent traffic jams.



Pillar 3: Safer Vehicle

- Eliminate 100 percent of motor vehicles that have expired, and self-made three- and four-wheeled vehicles are not allowed to participate in traffic; implement periodic emission control for motorbikes and mopeds with gasoline engines participating in traffic.
- 100 percent of car owners use electronic toll collection accounts to make multi-purpose payments for road traffic services and pay fines for violations.

Pillar 4: Safer Road User

- 100 percent of road users are educated and disseminated knowledge and laws on traffic order, safety, and safe traffic skills.
- The system of training, testing, and licencing of drivers meets standards equivalent to those of developed countries in the world, comprehensively integrated according to the 1968 Convention on Road Traffic.

Pillar 5: Rescue and medical emergency traffic accident

- 100 percent of highways and national highways are fully equipped with a system of emergency stations or in service areas of medical facilities capable of giving first aid to traffic accident victims, ensuring accessibility. traffic accident victims in the fastest time since receiving the emergency request information.
- All provinces and centrally run cities have 115 medical emergency centers, ensuring the ability to reach traffic accident victims in the fastest time since receiving emergency request information.
- All general hospitals at district level and above in the whole country shall have the capacity to provide first aid and approach traffic accident victims in the fastest time since receiving emergency request information.



PART 6.0

THE COMMON CHALLENGES IN ASIA

Due to the multiple actors involved in traffic safety, Asia countries face many challenges in achieving safety goals. This section shows an analysis of the most relevant challenges identified to be prioritized.

6.1 Vulnerable Motorcyclists

Motorcycles serve as a primary mode of transportation in Indonesia, Malaysia, and Vietnam, providing mobility in bustling urban centres and remote rural regions alike. However, the prevalence of vulnerable motorcyclists within these nations underscores the urgent need for targeted safety interventions.

In these countries, many motorcyclists lack access to proper safety gear, compounding their vulnerability on the roads. Economic constraints, coupled with a dearth of awareness, lead to the widespread neglect of critical protective equipment like helmets, gloves, and padded clothing. Consequently, even minor collisions can result in life-altering injuries or fatalities.

Furthermore, the informal and often chaotic traffic environments in these countries contribute to a higher likelihood of accidents. Reckless driving habits, non-compliance with traffic rules, and a lack of standardised training exacerbate the risks faced by motorcyclists. The absence of comprehensive road safety education and inadequate enforcement of regulations perpetuate this hazardous scenario.



6.2 Recklessness on the Roads



In the dynamic traffic landscapes of Indonesia, Malaysia, and Vietnam, the pervasive issue of reckless driving habits and non-compliance with traffic rules casts a shadow over road safety. The intertwining factors of cultural norms, economic realities, and inadequate enforcement mechanisms contribute to a perilous environment for all road users.

Recklessness on the roads takes various forms, from speeding and aggressive driving to ignoring traffic signals and overtaking in dangerous situations. This behaviour not only endangers the driver but also poses a significant risk to pedestrians, cyclists, and other motorists. Furthermore, the lack of adherence to traffic rules creates an atmosphere of uncertainty where unexpected actions become the norm, leading to higher accident rates. Human error stands as a fundamental contributor to road accidents. Whether it be distracted driving, impaired judgment, or fatigue, these lapses in attentiveness and decision-making can have catastrophic consequences.

The challenge of enforcing traffic regulations is particularly pronounced in these countries. Inconsistent law enforcement and lenient penalties for violations undermine the authority of traffic laws, fostering a culture of non-compliance. Additionally, the intersection of informal traffic practises and formal regulations blurs the lines of acceptable behavior, further contributing to the prevalence of reckless driving.

6.3 Road Infrastructure Deficiencies

Across the diverse terrains of Indonesia, Malaysia, and Vietnam, the inadequacies of road infrastructure cast a shadow on road safety, posing significant challenges for all road users. The intricate interplay between urban expansion, rural connectivity, and infrastructure development creates a complex landscape where deficiencies in road design, signage, and pedestrian facilities amplify the risks of accidents.

One pressing concern lies in the design of roads themselves. Poorly planned roads with narrow lanes, inadequate shoulders, and insufficient separation between different modes of transport contribute to congestion and heightened accident rates. In rural areas, the presence of sharp turns, a lack of proper lighting, and the absence of safe pedestrian crossings compound the dangers faced by road users.

Signage also emerges as a critical aspect of road safety. Inadequate or inconsistent signage confounds drivers, impeding their ability to navigate effectively and anticipate potential hazards. This deficiency is particularly pronounced at intersections, where clear and visible signage is essential for minimising the risk of collisions.

6.4 Lax Vehicle Safety Standards and Enforcement

In the bustling automotive landscapes of Indonesia, Malaysia, and Vietnam, the prevailing laxity in vehicle safety standards and enforcement poses a formidable challenge to road safety. The widespread adoption of motor vehicles, often coupled with affordability concerns, has led to a situation where inadequate safety features and inconsistent enforcement practises contribute to heightened accident risks.

One significant issue lies in the deficiency of essential safety features in many vehicles. Airbags, antilock braking systems (ABS), electronic stability control (ESC), and advanced driver assistance systems (ADAS) are often absent, leaving occupants and pedestrians vulnerable in the event of an accident. The affordability factor often drives consumers towards budget-friendly vehicles that lack these crucial safety mechanisms.

Compounding the issue is the inconsistency in enforcement of existing vehicle safety regulations. A lack of standardised assessment protocols and rigorous inspections allows vehicles with subpar safety features to enter the roadways, perpetuating an environment where occupants are at greater risk. The variance in enforcement practises further erodes public trust in the safety of the vehicles on the road.

The prevalence of ageing fleets, coupled with the absence of stringent safety regulations, creates an environment where road users are exposed to heightened risks and vulnerabilities.

One pressing concern is the ageing fleet of vehicles that populate the roadways. Many vehicles in these countries fall short of modern safety standards, lacking essential features that are now considered fundamental for occupant and pedestrian protection. As these vehicles age, their mechanical reliability and safety systems deteriorate, magnifying the risk of accidents and escalating the severity of their outcomes.

Moreover, the absence of rigorous safety regulations exacerbates the situation. Inconsistent enforcement practices and the lack of standardized testing protocols allow vehicles with subpar safety mechanisms to continue operating on the road, perpetuating an unsafe environment for all road users.



6.5 Lack of Awareness and Education

The absence of comprehensive road safety knowledge among road users, coupled with limited educational initiatives, creates a significant gap that hinders the quest for safer journeys.

A dearth of awareness about road safety rules and best practises among pedestrians, cyclists, and drivers underscores the gravity of the issue. Many road users remain uninformed about fundamental concepts such as proper road crossing, signaling, and sharing the road with others. This lack of awareness not only endangers

individuals but also contributes to an atmosphere of uncertainty and unpredictability on the roads.

Furthermore, the absence of comprehensive road safety education exacerbates the problem. Limited access to road safety curriculum in schools and a lack of targeted awareness campaigns deprive individuals of the knowledge needed to make informed decisions while navigating traffic. This educational gap perpetuates poor road user behaviour and diminishes the potential for creating a culture of road safety.

The diverse geography, coupled with varying levels of infrastructure development, presents a complex challenge that demands a strategic overhaul of post-crash protocols to ensure timely assistance for accident victims.

6.6 Post-Crash Response Inefficiencies

One significant hurdle lies in the accessibility of emergency services, particularly in remote or challenging terrain. The absence of well-maintained roads, coupled with limited transportation infrastructure, impedes the swift arrival of medical assistance to accident scenes. This delay can significantly exacerbate the severity of injuries and diminish the chances of successful interventions.

Moreover, the lack of public awareness about post-crash actions further complicates the situation. In the critical moments following an accident, individuals may not possess the knowledge or understanding of how to provide aid, contact emergency services, or secure the scene to prevent further harm. This dearth of awareness can lead to delays in accessing essential medical care and support.

Traffic congestion in major urban centres poses another obstacle to rapid post-crash response. The slow movement of vehicles and the difficulty of manoeuvring through congested streets can hinder the progress of emergency vehicles, causing precious time to be lost in critical situations.



PART 7.0 ASIASAFE RECOMMEDATION TO POLICYMAKERS IN ASIA

The ASIAsafe partners are deeply committed to promoting and advancing road safety through comprehensive recommendations aimed at reducing traffic accidents and enhancing overall road safety. A summary of the multifaceted strategies proposed is described.

7.1 Road Safety Management

In terms of road safety management, recommendations include enhancing organisational coordination, shared responsibility and communication among relevant universities, public authorities, industry, private sector and NGOs in the country for effective road safety management. Implementing a synchronised approach to road safety initiatives, designating a lead authority for decision-making, and developing a uniform body responsible for targeted road safety objectives as Traffic Safety Council, efficient resource allocation, and effective interventions. Additionally, it is crucial to clearly define roles and responsibilities for different solution groups, aligning them with the respective strategy as the National Traffic Safety Action Plan 2020-2030, with clear quantitative targets, according to SDGs global targets to cut the number of traffic deaths into half by 2030. Further, it is important to deploy relevant traffic legislations and to establish a robust legal foundation for implementation. Furthermore, an appropriate national database for road traffic accidents collection, consistent with international norms, is recommended to enable accurate understating of the problems and comparisons with other countries. The project suggests promoting increased share of public transportation in the traffic in the country, encouraging a shift from the use of motorcycles to public transport for the sake of safety, noise, costs and environmental considerations.

7.2 Safer Roads and Mobility

In the domain of safer roads and mobility, the focus is on strengthening road design standards, enforcing stringent Road Safety Assessment and Inspection, Road Safety Audits (RSAs) for road projects, and increasing funding for road maintenance and repairs to ensure safer road conditions. Recommendations include implementing advanced technologies, such as ultra-high-performance concrete, to enhance road durability, accelerating road resurfacing works, and conducting regular inspections to prolong road lifespan. Furthermore, it involves promptly addressing hazardous black spots and reinstating order within road safety corridors. Additionally, it includes instituting a thorough road safety rating program for both national highways and provincial roads, contemplating Traffic Calming Measures (TCMs) within urban locales, designating lanes exclusively for particular road users like motorcyclists, and erecting rest stops along highways and roads to accommodate the requirements of drivers, passengers, and vehicles. The deployment of Intelligent Transport Systems

(ITS) applications such as traffic management and administration systems on highways and integrated centres for smart urban traffic management are also recommended to alleviate traffic congestion in key areas. Furthermore, prioritising safety and reducing congestion around school gate areas located on various types of roads is advised. Lastly, setting up a separated motorbike lane, with no mix of other traffic is highly recommended. This corresponds to homogenous speed and mass in traffic.

7.3 Safer Vehicles

To ensure safer vehicles, recommendations include gradually enforcing safety standards and prerequisites for older vehicles and local manufacture vehicles through mandatory inspections and certifications every 1-2 years. Encouragement is given for the adoption of advanced safety technologies in vehicle designs to improve crashworthiness, along with emphasising compliance with safety requirements set by the respective transport department through inspections and certifications. Stricter regulations against the unauthorised creation or modification of vehicles or motorbikes (e.g. capacity or speed) that do not meet safety standards are also advocated. Implementing a national comprehensive road safety rating programme for vehicles (active and passive safety) is recommended.



7.4 Safer Road Users

Addressing Safer Road Users, recommendations stress the implementation of stricter education, campaigns (traditional and within social media), and enforcement of road user behavior, particularly against specific risky behaviors such as speeding

or non-using of appropriate helmets or seatbelts, through legal measures and multi-sectoral collaboration. Integrating comprehensive road safety education, including first aid training, into relevant curricula is suggested, along with raising awareness about the importance of providing prompt first aid assistance at accident scenes. Furthermore, strengthening the training, testing, and licencing system for drivers to align with international standards is highlighted.

7.5 Post-Crash Response

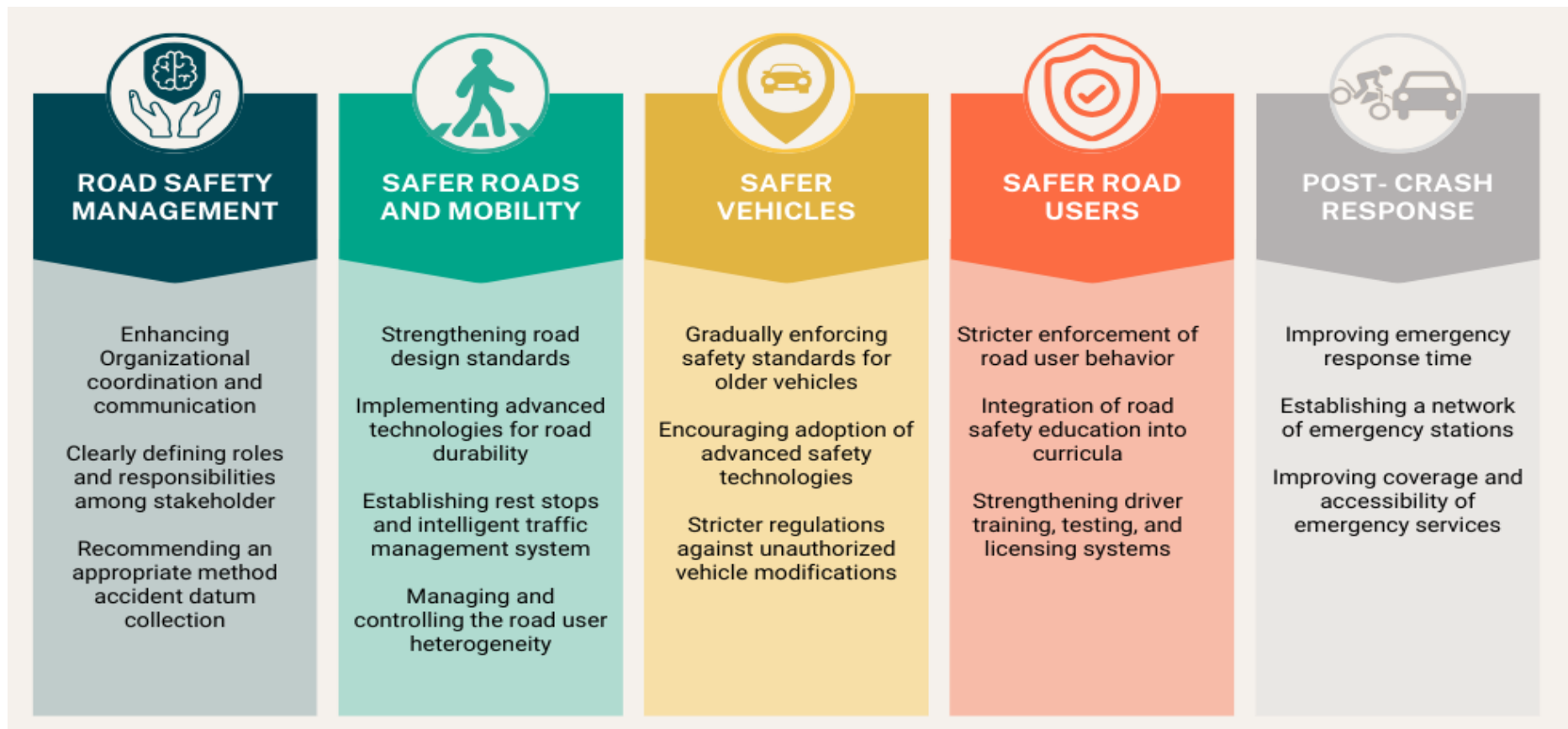
When it comes to post-crash response, there are several recommendations. Firstly, improving emergency response time is crucial. This can be achieved through various initiatives in which enhancing accident site clearance efficiency is essential. Involving multiple agencies and implementing advanced technologies can significantly contribute to this improvement. Also, creating a well-established network of emergency stations that cover key routes is vital. This network can ensure swift responses in critical situations. Additionally, equipping medical facilities in service areas to provide immediate first aid to traffic accident victims is essential. Hospitals should possess the necessary resources and expertise to administer prompt first aid to accident victims, aligning with national traffic safety objectives. Finally, improving coverage and accessibility of emergency services in rural areas is crucial to meeting overall traffic safety objectives at a national level. The care of the victims and their families is recommended, including proper mental well-being care.

7.6 Summary

To ensure effective implementation of road safety plans, collaboration among government entities, commercial sectors, NGOs, and local organisations is emphasised. Yet, to be efficient and reliable, sufficient funding and resources need to be ensured for the successful implementation of road safety plans. Furthermore, regularly evaluating and updating road safety plans to adapt to changing conditions and challenges are desirable mostly considering the dynamic of the mobility and the new trend such as the growing phenomenon of distraction by mobile device and the constant evolution of new forms of personal mobility (for example electric scooters). Finally, the Vision Zero approach needs to be embraced not only for the authorities directly responsible for the road safety but also by the policy makers and by the society at large. To do so, recommendations to continuously undertake road safety campaigns and engage the public through community-based programs are highlighted. Figure 16 shows some of the recommendations mentioned for each of the five pillars.



ASIASAFE GOLDEN RECOMMENDATION



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“The ASIASAFE Road Safety handbook is a valuable review and collection of data and information on road accidents, traffic characteristics, driver’s behavior, vehicles, and infrastructures conditions, through an examination of different Asian and European countries profiles. The project strength mainly consists in the cooperation among countries and knowledge and best practices sharing. This model contributes, surely, to improve the knowhow of the experts and engineers and allows to correctly address the policies. I hope that the Countries involved will continue to inspire each other with information and models sharing to reach the common target of killed reductions on the roads.”

**Dr. Silvia Bruzzone – Istat - Italian National Institute of Statistics - Head for Road Accidents Statistics
Directorate for Social Statistics and Welfare**

“The improvement of road safety carries out by way of the diffusion of safety culture; ASIASAFE project represents an important initiative toward this direction, representing a useful tool to supply solutions to manage road risk.”

**Eng. Alberto Andreoni – National Agency for the Safety of Railways and Road
and Motorway Infrastructures, Italy**

Exchange of bests practices is the most efficient tool to a global progress and leveling of different countries in many different areas of knowledge and development. Road Safety is no exception, and the many international conferences worldwide prove the global commitment to the UN goal of reducing by 50% the number of road fatal victims and serious injuries by the end of the decade, the first step towards the more ambitious, but realist, goal of ZERO victims in 2050. ASIASAFE Project is an example of this international cooperation at the University and teaching level, between three European countries (Sweden, Italy and Portugal) and Asia (Malaysia, Indonesia and Vietnam). I can only wish the best of success for this program and encourage the promoters and participants.

**Prof. Rui Ribeiro
University Professor and Head of ANSR, Portuguese Road Safety Agency**

Taking the initiative to produce the handbook on road safety was a pivotal step towards fostering safer communities and saving lives. This comprehensive resource not only highlights road safety challenges but also offers best practices, practical solutions, and preventive measures. Thanks to this initiative, we are equipped with invaluable knowledge to address road safety issues holistically, making our roads safer for everyone.

**Norfaizah Mohamad Khaidir, Head, Road Traffic & Infrastructure (RTI) Unit,
Malaysian Institute of Road Safety Research (MIROS)**

The Ministry of Transportation of the Republic of Indonesia always strives to provide education on safe transportation and reduce the number of accidents due to transportation activities. This handbook from Erasmus+ is a practical tool and is expected to help in providing information and education to those who need it as a safer traffic guidance tool. Hopefully this Guidebook can be adapted and be useful in improving traffic safety in each region. We really appreciate and support this program for the advancement of traffic transportation safety.

**Acting Head of Agency of Human Resources Development on Transportation,
Ministry of Transportation of the Republic of Indonesia**

“The best practices of European countries with developed transport systems such as Sweden, Italy and Portugal and of Asian countries with similar road traffic characteristics such as Malaysia and Indonesia are valuable documents for Vietnam to learn and apply in practice. I do hope that ASIASAFE project scientists will continue to cooperate to train human resources and solve specific problems to improve road traffic safety in the future”.

**Dr. Tran Huu Minh
Chief of Office of the Vietnam National Traffic Safety Committee**



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