AZERBAIJAN ROAD CRASH DATA REVIEW AND REPORTING

STATUS AND RECOMMENDATIONS

MARCH 2025

CAREC
Central Asia Regional Economic Cooperation Program

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Note:
In this publication, "$" refers to United States dollars.

Cover photos (left to right): Local citizens travels in a motorbike to Sheki, Azerbaijan, the Government of Azerbaijan has received a loan from the Asian Development Bank for the Road Network Development Program Project 1. Part of the proceeds of this loan will go to the rehabilitation and reconstruction of rural roads located in Gazakh regions.

Cover design by Josef Ilumin.

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Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ADB	Asian Development Bank
AIS	Abbreviated Injury Scale
CADaS	Common Crash Data Set
CARE	Community Database on Road Accidents
CAREC	Central Asia Regional Economic Cooperation
ETSC	European Transport Safety Commission
GIS	geographic information system
GRSF	Global Road Safety Facility
ITF	International Transport Forum
MAIS	Maximum Abbreviated Injury Scale
MOH	Ministry of Health
MOIA	Ministry of Internal Affairs
SPI	safety performance indicator
STBA	Statistisches Bundesamt
WHO	World Health Organization

1 Introduction

This report presents an overview of the current road crash data management situation in Azerbaijan, offering strategic recommendations for improvement based on the best globally recognized practices. The report is prepared as part of the consultancy "Enhancing Road Safety for Central Asia Regional Economic Cooperation Member Countries (Phase 2) - IC7 Road Crash Data Review and Reporting," funded by the **Asian Development Bank** (ADB).

The consultancy aims to assess road crash data management practices for **10 countries** of the **Central Asia Regional Economic Cooperation (CAREC)**[1] and develop guidance and tools to improve road crash data management and move toward greater harmonization of crash data across the region.

The consultancy is part of efforts from ADB and other international stakeholders[2] to develop the **Asia Pacific Road Safety Observatory**, the regional forum on road safety data, policies, and practices to ensure the protection of human life on the roads across Asia and the Pacific.

Reliable safety and traffic data are essential to assess the full nature of the road safety problem, measure the real economic costs associated with road crashes, and design the most cost-effective road safety interventions. As well, the establishment of road safety observatories (e.g., at national and/or regional level) helps to strategically deal with high quality road crash data.

A road safety observatory can be seen as a formal network of government representatives sharing and exchanging road safety data and experience to reduce traffic injuries across the country or within a region. Moreover, an observatory can provide reliable and comparable data on road crashes, in-depth analysis, and information on road safety practices and policies. An observatory typically provides **evidence base on road safety**, composed, for instance, of statistical reports, country and/or region profiles, thematic analysis, and key performance indicators. An observatory can also help to:

- measure progress toward reducing deaths and serious injuries on national roads,
- identify and quantify road safety problems,
- develop and evaluate the effectiveness of a road safety measure, and
- facilitate the exchange of experience between regions or countries.

[1] Afghanistan, Azerbaijan, the People's Republic of China, Georgia, Kazakhstan, the Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan. https://www.carecprogram.org/. ADB placed its regular assistance to Afghanistan on hold effective 15 August 2021.

[2] World Bank Group, Fédération Internationale de l'Automobile , International Transport Forum, United Nations (UN) Economic and Social Commission for Asia and the Pacific, WHO, Global Road Safety Facility (GRSF).

Since a road safety observatory strongly depends on safety and traffic data, a prerequisite is thus to design and implement of a reliable **road crash data management system**, which is the strategic objective of this consultancy.

To assess road crash data management practices, and to recommend improvements in view of **country-wide systems for road crash data management**, strategic guidelines issued by **World Health Organization** (WHO), by **World Bank**[3] and by **European Commission** (EC), such as the **Community database on road accidents** (CARE),[4] have been considered.

Accordingly, within this report, recommendations for the improvement of the current road crash data collection process are provided, and main data sources and collection procedures are assessed and considered to define a specific and tailored **road crash data management framework for Azerbaijan**.

[3] Martensen H., G. Duchamp, V. Feypell, V. I. Raffo, F. A. Burlacu, B. Turner, and M. Paala. 2021. *Guidelines for Conducting Road Safety Data Reviews.* World Bank.

[4] CARE database.

2 Reference Standards

The importance of road safety data and information and of data-driven approaches to road safety improvement is widely recognized at international level.

According to the European Transport Safety Commission (ETSC 2001), the emphasis of a road safety information system has shifted from a single focus on road crash data recording to the collection of data and information required to support different levels of the road safety management system, as visualized in the pyramid in Figure 1.

Figure 1: Essential Elements of a Road Safety Information System

Source: Wegman, 2001.

According to World Bank Guidelines for conducting road safety data reviews (footnote 3),

> *Road safety data are not just about crash data (or outcome data – the observed crashes and injuries), but also about the safety performance of the road traffic system, and about interventions to improve road safety. These data are best used when combined with other information, such as traffic volumes and distances traveled, or split between different transport modalities. For an evidence-based approach to the management of road safety, these data can be used by policy makers, traffic engineers, police, the health sector, the research community, insurance companies, prosecutors, vehicle manufacturers, and others.*

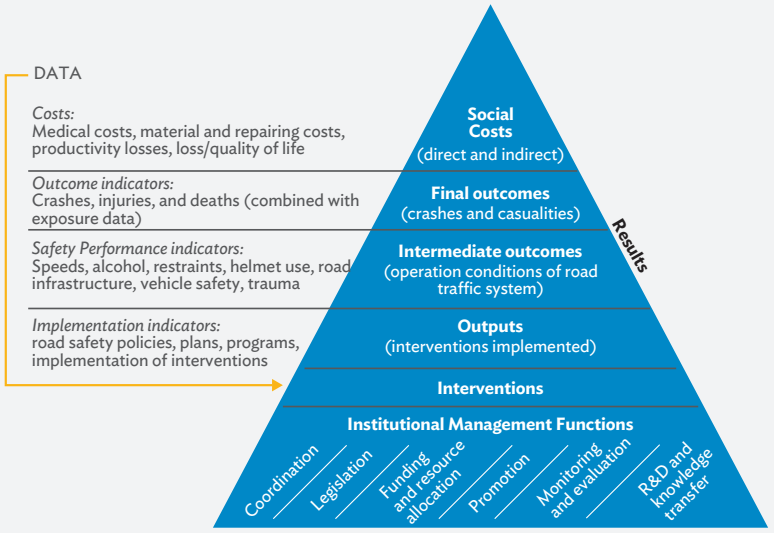
The rationale is that data at all levels of the pyramid is necessary to describe and understand the process leading to crashes. This knowledge then serves as the basis for evidence-based road safety management. The road safety information framework according to this philosophy is visualized in Figure 2.

The pyramid has four levels. At the bottom level, road safety interventions can be found (policy, programs, and initiatives). If implemented effectively, and at scale, improved government road safety policy delivery should result in certain changes in road traffic (the next level). For example: a lower percentage of drivers and passengers traveling without wearing a helmet or seatbelt, a higher proportion of vehicles obeying speed limits, a shorter time interval that medically qualified personnel need to reach a crash location, etc. These are known as safety performance indicators (SPI). These are parameters that have a causal relationship with crashes and casualties/victims. They are not used instead of crash and injury data, but in addition to them. The purpose is to be able to assess the effectiveness (and risk-reduction effectiveness) of specific programs and to understand better the impact of policy interventions.

The next level contains the features of crashes and victims; possibly related to exposure quantities to calculate road safety risks. These contain the (national) crash registration data, that, nearly everywhere in the world, is based on the police crash data. This data is then processed into national road crash statistics.

The top level of the pyramid contains data that express the social cost of crashes. This concerns the damage that society judges to be negative (hospitalization cost, loss of earnings etc.), and to be prevented.

Figure 2: Outcomes of Road Safety Management



Source: WHO, 2010

When data at all four levels are available and actively used, the process leading to crashes can be described, analyzed, understood, and serve as a basis for a rational road safety management system to lower the social costs.

A road crash data collection system is usually characterized by three main elements: (i) a data collection process (i.e., a set of operations or phases carried out for the purpose of data collection), (ii) the data collection techniques and tools, and (iii) the actors who carry out the operations foreseen within the process.

The ultimate purpose of road crash data should be to support the process of improving road safety. As such, a safety-oriented data collection system should:

- make the data accessible to road safety managers, in particular road management bodies and territorial administrative bodies,
- provide relevant information, in particular to:
  - locate road crashes on the road network,
  - understanding crash patterns and contributory factors,
  - understand the outcomes of crashes,
- provide complete and reliable information in a timely manner, and
- allow linkage between different data sources (e.g., police, health services, insurance, etc.).

A road crash data management framework should be organized according to some basic topics to which some standards are connected to ensure reliability and completeness of information:

- Road crash data collection.
- Storage, processing, and use of road crash data.
- Other road safety data.

Road crash data collection is the basic function to be ensured since it provides information about the final outcomes' indicators (crashes, injuries, deaths). The collection of crash data concerns mainly the police bodies attending the scenes of crashes with victims. However, other actors can provide important complementary data. Health services (mainly hospitals) can provide data used for statistics on road traffic casualties and victims follow up. Insurance companies can complement police data with information about history of vehicles and drivers, as well as road crashes without victims.

A reliable road crash data collection can be ensured when:

- A common nationwide notification system is in place, ensuring that police bodies and emergency services are rapidly informed about the crash. The use of a central emergency number is usually a good practice.
- Police bodies and emergency services have sufficient resources to attend all scenes of road crash with victims.
- A unique and comprehensive road crash registration system is in place, allowing for collection of at least a minimum set of crash attributes and variables, preferably by using IT devices rather than paper-based forms.
- Procedures for almost immediately storing the road crash data into a jurisdiction-wide (e.g., provincial, national) database exist and allow for an easy retrieval of data. This feature should be made via a centralized information system (e.g., road crash data management system).
- The persons in charge of road crash data collection and storage are adequately trained about the importance of road crash data and about the practices to be followed.

All these aspects can greatly influence the amount and quality of data collected and can lead to important underreporting of data.

When it comes to the specific road crash attributes and variables to be collected, it is important to ensure that data are complete, of good quality, and collected uniformly throughout the country.

World Bank Guidelines for conducting road safety data reviews recommend to:

- Attend at least every crash scene resulting in serious or fatal injuries.
- When possible, record causation and aggravation factors such as speeding, driving under the influence, seatbelt use, and other violations.
- Report the severity of the victims' injuries since the initial data collection at the scene and update the initial assessment based on medical records.
- Ensure the road crash fatality count includes the victims who die in hospital.
- Record a minimum set of information on eventual road crashes not investigated by police (e.g., those without victims).

The **minimum set of crash attributes and variables** should include information about the location, the road infrastructure, road users, and vehicles involved as well as variables characterizing the maneuvers and the consequences of the crash. For instance, the World Bank Guidelines for conducting road safety data reviews refer to a set of 28 road crash attributes derived from the Common Accident Data Set (CADaS) of the European Commission (Table 1).

Table 1: Minimum Set of Crash Attributes

Crash	Traffic unit	Person
Crash ID		Person ID
Date	Traffic unit type (e.g., pedestrian, cyclist, passenger car)	Date of birth
Time	Special function vehicle	Gender
Weather conditions	Registration year	Road user type (pedestrian, driver, passenger)
Lighting conditions (daylight, dark, with/without lighting, dusk/dawn)	Country of registration (e.g., foreign, national)	Injury severity (slight, more than 24 hours in hospital, fatal)
Crash type (e.g., with pedestrian, single, two vehicles turning, two vehicles no turning)	Vehicle maneuver (e.g., turning, overtaking, etc.)	Alcohol test (not tested, not applicable, positive, negative, unknown)
Location: X coordinate (latitude) and Y coordinate (longitude)		Drug use
Road type (e.g., motorway, expressway, national road, local road)		Safety equipment
Section type (e.g., bridge, tunnel, bend, gradient, straight)		Nationality (national, foreigner – possibly by relevant country grouping)
Junction type (not at junction, crossroad, roundabout)		Injury severity assessed on the basis of the Maximum Abbreviated Injury Scale (MAIS)
Speed limit		
Surface conditions (dry, snow/ice, wet, slippery)		
Crash severity		

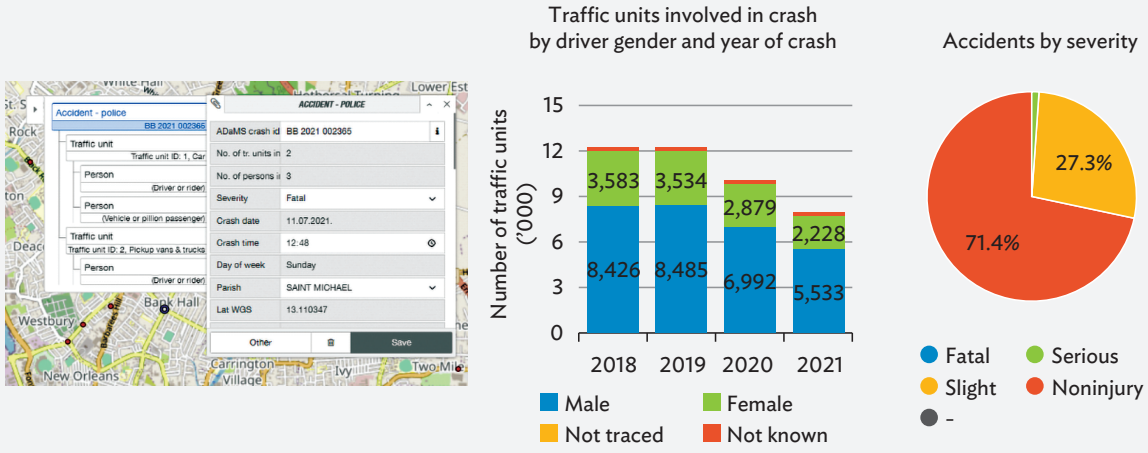
Source: World Bank Guidelines for conducting road safety data reviews.

The international standards give specific attention to the crash location due to its importance for identifying road safety interventions. Knowing the location of road crashes on geographic information system (GIS) helps identify high-risk sites and road sections and, consequently, select road safety interventions.

Storage, processing, and use of road crash data into a national database is also important to ensure that a reliable process is established a national level, involving all the stakeholders having a role in road safety. The following aspects should be considered to ensure that data are properly stored and can be used for road safety analysis:

- The data should be recorded in a common system (directly from the crash scene or from office by transferring paper-based forms into the database).
- The data should be regularly transferred to a central data repository where all crash data are consolidated (national road crash database).
- The national database and the common system should be accessible both by actors in-charge of data collection (e.g., police, health services) and by actors in-charge of selecting road safety interventions or developing road safety policies. This is important for data-driven decision-making.
- The database should feed into analysis tools. The data per se are useless if they cannot be analyzed and used to inform decision-makers. A road crash data management system should be in place allowing for a number of analyses: querying of data (by combining different crash variables), mapping the data, assessing the single crash data, obtaining graphics and reports, etc. (Figure 3).

Figure 3: Screenshot of ADaMS – Accident Data Management System



Source: FRED Engineering.

Other road safety data should be included in the process and, when possible, embedded in a road crash data management system. Main additional data (possibly to be added into a road crash data management system) refer to:

- **Risk exposure data**, usually measured in terms of number of crashes or victims by population, number of vehicles, road length, distance traveled, etc. The specific measurements of risk exposure depend on the availability of specific mobility data in the country (for instance, data on traffic volumes may not always be available). In some cases, using surrogate measures to compensate missing information is also possible.

- **Safety performance indicators** (SPIs) causally linked to road safety. SPIs can be linked to conditions of road infrastructure, vehicle used, road user behavior, post-crash care. The selection of SPIs to be considered (and when possible, added to a road crash data management system) depends on country road safety policies and on the main risks of crashes. Some examples are:
  - **Road infrastructure**. level of risk related to road attributes (e.g., iRAP star rating).[5]
  - **Road users**. percentage of vehicles' occupants wearing a seatbelt, percentage of motorcycles' riders wearing a helmet, percentage of drivers using mobile phone while driving, etc.
  - **Vehicles**. percentage of vehicles equipped with active safety features such as the Anti-lock Braking System (ABS) or the Electronic Stability Control (ESC).

It is to note that other road safety data can be difficult to collect on a regular basis. When available in a country they can lack a full national coverage or in some cases are outdated. These data should thus be treated carefully and coherently with the road crash data available to avoid misleading interpretations of road crash contributory factors. That said, these data can be valuable for deeper road safety considerations, especially for planning purposes.

Table 2 synthesizes the reference standards described above, that will be considered when assessing the existing road crash data framework of Azerbaijan.

Table 2: Synthesis of Reference Standards for a Road Crash Data Framework

Topic	#	Reference Standard
Road crash data collection	A.1	Common/unique crash notification system
	A.2	Road crash and injury definitions compliant with international standards.
	A.3	All road crash scenes with victims attended by police and emergency services
	A.4	Unique and comprehensive road crash registration system
	A.5	Collected road crash attributes and variables allows for data analysis
	A.6	System allowing for precise location of road crashes on map
Storage, processing and use of road crash data	B.1	Data registered by all actors in a common information system
	B.2	Data regularly transferred to a national road crash database
	B.3	Data accessible by all actors involved in data collection and analysis
	B.4	Road crash data management system available including analysis tools
Other road safety data	C.1	Risk exposure data included in data collection and storage (minimum data: population, traffic volumes)
	C.2	SPIs included in data collection and storage (minimum data: road risk assessment, use of mobile phone while driving, use of seatbelts, use of helmets, driving over speed limit)
Data analysis	D.1	Comprehensive analysis of road crash data and other road safety data oriented to planning and decision-making

Source: FRED Engineering

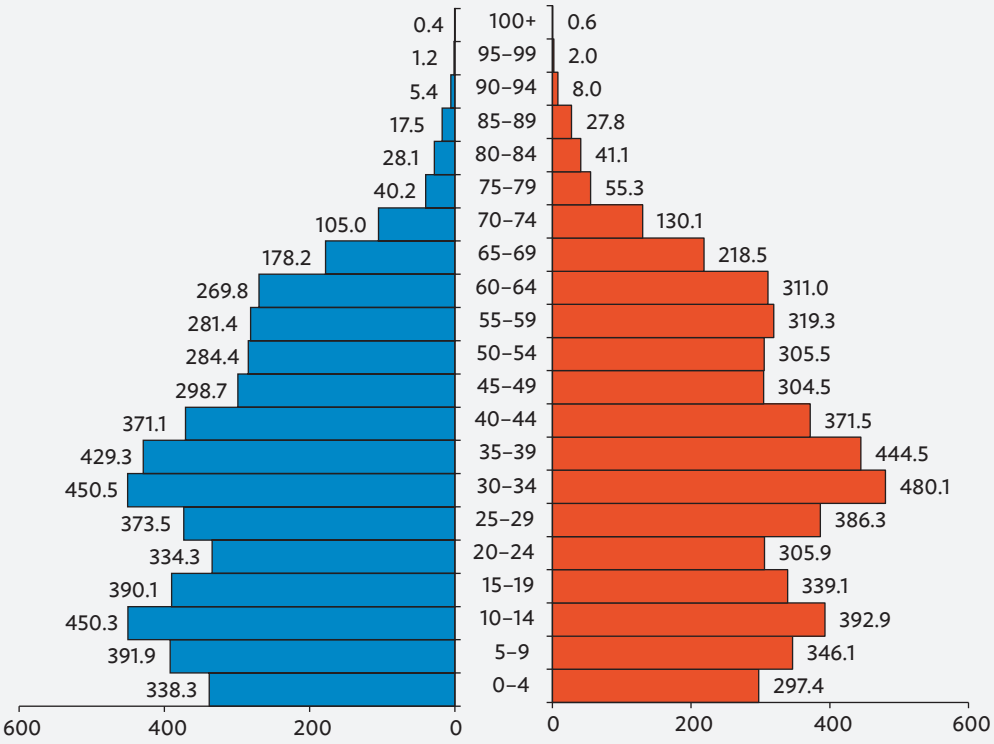
[5] The International Road Assessment Programme (iRAP) is a registered charity dedicated to saving lives by eliminating high risk roads throughout the world. iRAP Star Ratings are used for road safety inspections and road safety impact assessments. They provide a measure of the risk to which vehicle occupants, motorcyclists, cyclists and pedestrians are exposed. Risk is rated on a scale of 1 to 5; 1-Star roads have the highest risk and 5-Star roads the lowest risk.

3 Background

Azerbaijan, situated in the Transcaucasian region between Eastern Europe and Western Asia, is a country with diverse geographical features and a rich cultural history. Its economy, primarily based on the energy and natural resources sector, has seen significant development in recent years due to investments in the oil and gas sector.

The population of Azerbaijan comprises approximately 10 million inhabitants, with an average age of around 30–35 years (Figure 4). The country has a relatively equal gender distribution, with a slight male predominance. Azerbaijan is a multicultural and multilingual society, with Azerbaijani as the official language and Russian commonly used for business and administrative purposes.

Figure 4: Age Distribution by Gender in Azerbaijan (2023)



Source: The State Statistical Committee of the Republic of Azerbaijan

Azerbaijan's road infrastructure (Figure 5) is undergoing significant improvements through investments in the transportation sector. However, some rural areas may have less developed road infrastructure and may require further investment to ensure adequate access to services and safety levels.

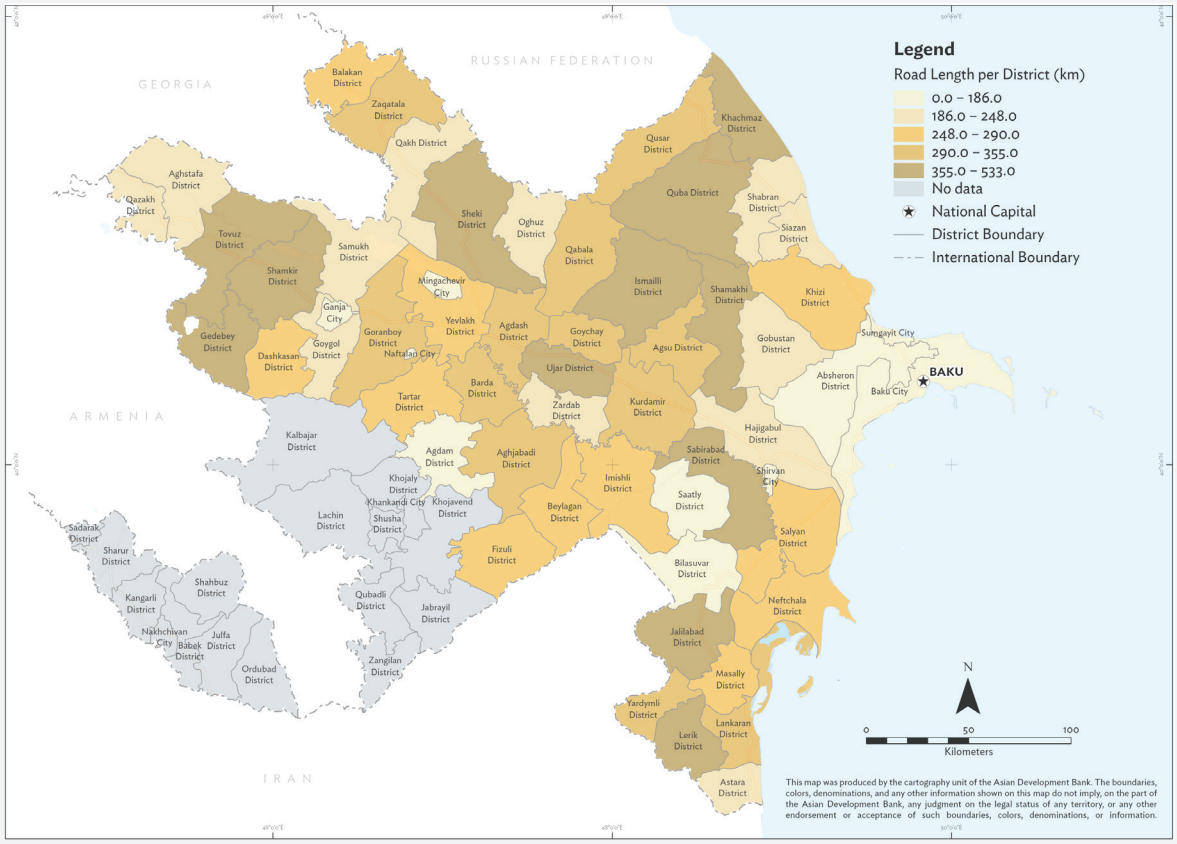
According to data provided by the World Bank Group, there are about 20,000 kilometers (km) of roads in the country serving domestic cargo traffic and giving access to international major highways.

Highways, whose length is about 19,145 km, are structured, in terms of surface type, as follows:

- Concrete – 79 km
- Asphalt Concrete – 12,501.7 km
- Black Surface – 943.4 km
- Gravel – 5,544.9 km
- Earth – 76.6 km

According to data provided by the Asian Development Bank, around 60% of the local roads of the country's network is reported to be in poor condition.

Figure 5: Length of Roads by District (2022)



Source: Asian Development Bank.

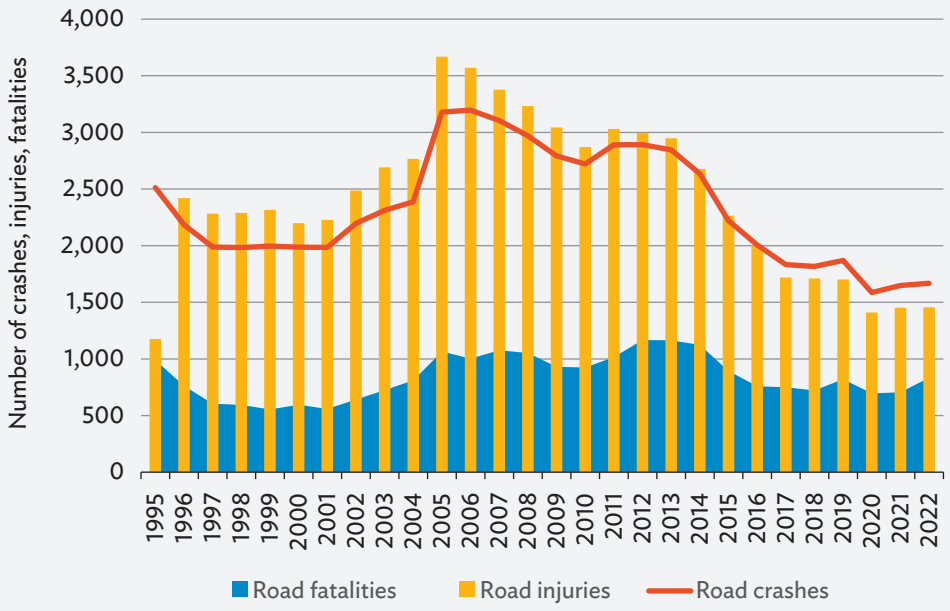
Road crashes

From 1995 to 2022, 23,544 fatal crashes and 67,988 crashes with severe injuries were recorded in Azerbaijan. Figure 6 shows the trends of crash data during this period.

- After a significant reduction between 1995 and 1997, the number of road crashes followed a linear trend until 2001, the year from which they began to increase until reaching a maximum value in 2006 (3,197 road crashes registered). Thereafter, there was a slight decline until 2010; road crashes then maintained in a constant trend until 2013, after which they began to decrease until they reached their lowest value in 2020 (1,587 road crashes registered).
- The number of injuries, after a sharp increase between 1995 and 1996, also maintained a constant trend until 2001; after that, the numbers increased until reaching a maximum value in 2005 (3,668 road injuries registered). After a gradual decrease until 2010, there was a constant trend until 2013; between 2013 and 2022 the number of road injuries decreased with the lowest value recorded in 2020 (1,410 road injuries recorded).
- The number of fatalities is similar to the previous ones up to 2005; from here to 2014 they show a rather irregular pattern characterized by a peak reached in 2012 (1,168 road fatalities registered). In the following 10 years road fatalities decreased, with a minimum value reached in 2020 (696 road fatalities registered).

The lowest values were recorded in 2020; however, it must be considered that this year was characterized by the COVID-19 pandemic, which severely restricted the vehicle movement and thus, probably, the risk of exposure to road crashes. Between 2020 and 2022, the number of road crashes started to increase again, which highlights the need to address road safety issues with greater commitment.

Figure 6: Trend of Crashes, Injuries, and Fatalities from 1995 to 2022



Source: The State Statistical Committee of the Republic of Azerbaijan.

Each year from 1995 to 2022, an average of 2,336 road crashes, 841 fatalities, 2,428 road injuries have been recorded (Table 3).

Table 3: Road Crashes in Azerbaijan (1995-2022)

Year	Number of Crashes	Number of Fatalities	Number of Injuries
1995	2,513	990	1,177
1996	2,185	763	2,420
1997	1,988	605	2,283
1998	1,984	594	2,290
1999	1,996	554	2,316
2000	1,987	596	2,199
2001	1,985	559	2,228
2002	2,196	642	2,486
2003	2,311	724	2,691
2004	2,388	811	2,766
2005	3,179	1,065	3,668
2006	3,197	1,003	3,570
2007	3,104	1,077	3,377
2008	2,970	1,052	3,232
2009	2,792	930	3,044
2010	2,721	925	2,871
2011	2,890	1,016	3,031
2012	2,892	1,168	2,997
2013	2,846	1,164	2,948
2014	2,635	1,124	2,676
2015	2,220	894	2,265
2016	2,006	759	2,003
2017	1,833	750	1,719
2018	1,817	722	1,711
2019	1,870	821	1,702
2020	1,587	696	1,410
2021	1,649	706	1,452
2022	1,668	834	1,456
Average	*2,336*	*841*	*2,428*
Total	**65,409**	**23,544**	**67,988**

Source: The Statistical Committee of the Republic of Azerbaijan.

Table 4 schematically shows the trend in the number of road crashes. Particularly significant is the increase in the number of fatalities in the last 2 years (almost 20%).

Table 4: Trend in Number of Crashes

From 1995 up to 2010	From 2010 up to 2020	From 2020 up to 2022
Number of crashes increased by **8,3%**	Number of crashes decreased by **41,7%**	Number of crashes increased by **5,1%**
Number of fatalities decreased by **6,6%**	Number of fatalities decreased by **24,8%**	Number of fatalities decreased by **19,8%**
Number of injuries increased by **143,9%**	Number of injuries decreased by **50,9%**	Number of injuries decreased by **3,3%**

Elaboration from Statistical Committee of Republic of Azerbaijan.

Legislative Framework, State Policy, and National Strategies

The main laws and related codes dealing with road safety, approved by presidential decrees, are as follows:

- **Law of the Azerbaijan Republic "On Road Traffic,"** issued on 3 July 1998, defines the legal basis of actions required for the organization of safe and convenient movement of vehicles and pedestrians on roads and prevention of road crashes.
- **Law "On Road Transport,"** issued on 1 April 2008, establishes legal, organizational, and economic basis of public conveyances and freight transport by road in the territory of Azerbaijan Republic.
- **Law "On Transport,"** issued on June 1, 1999, establishes the legal, economic, and organizational basis of transportation operation.
- **Law "On Police,"** issued on 28 October 1999, aims to protect life, health, rights and freedom of people, legal interests, and property of the state from illegal crimes.
- **Law "On Highways,"** issued on 22 December 1999, extended to all highways in the Republic of Azerbaijan, regardless of owner, users and value, this law establishes general basis (legally, technically, economically and organizationally) for the development of highways.
- **Law "On Compulsory Insurances,"** issued on 24 June 2011, establishes the general bases of the implementation of the types of compulsory insurance, as well as the rules and conditions of their implementation in the Republic of Azerbaijan.
- **Administrative Offences Code of the Republic of Azerbaijan,** dated 29 December 2015, establishes administrative responsibilities and provides for the imposition of penalties against those persons who commit administrative violations.
- **The State Program on Road Safety for 2019-2023** and its action plan, approved in December 2018, stipulate that by the end of 2023, the following targets are expected to be achieved compared to the 2013-2017 period:
  - 30% reduction in the number of road fatalities,
  - 30% reduction in the number of people whose health was seriously or slightly injured in road crashes,

  - 30% reduction in the total number of road crashes,
  - 50% reduction in child fatalities in road crashes.
- **Decree on improvement of management in the road transport sector,** dated 11 October 2021, aims to improve the management, regulation, and control mechanisms of road transport.

Azerbaijan has also adhered to a set of international agreements and conventions (Table 5).

Table 5: International Agreements and Conventions to Which Azerbaijan has Adhered to

Road Safety Conventions	Accession Date
European Agreement concerning the Work of Crews of Vehicles Engaged in International Road Transport (AETR), 01/07/1970	16 August 1996
Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), 30/09/1957	28 September 2000
Agreement on Global Technical Regulations for Wheeled Vehicles, Equipment and Parts, 25/06/1998	15 April 2002
Agreement on Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be fitted and/or used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approval Granted on the Basis of these United Nations Regulations, 20/03/1958	15 April 2002
Convention on Road Traffic, 08/11/1968	03 July 2002
Convention on Road Signs and Signals, 08/11/1968	22 February 2011

Source: Increasing Road Safety in Azerbaijan, European Union-funded project.

4 Assessment of the Existing Road Crash Data Management Framework

The coordination of road safety in Azerbaijan is carried out by the Transport Coordination Council. The minister of Digital Development and Transport serves as the chair of the council.

Enforcement to ensure traffic safety on the roads is carried out by officers of the Department of the State Traffic Police of the Ministry of Internal Affairs (MOIA). Controls for road safety on highways throughout the country are carried out by officers of the relevant executive authority at stationary and other posts with the support of vehicles equipped with special tools.

Figure 7 shows all the actors involved in road crash and road safety data management in Azerbaijan.

Figure 7: Actors Involved in Road Crash Data Management Process in Azerbaijan

Source: FRED Engineering. Consultations conducted with local stakeholders

The agencies involved include the State Agency of Azerbaijan Automobile Roads, which is also a part of the Transport Coordination Council and plays an important role in crash data management.

To get information about the current procedures for collecting, managing, and analyzing road crash data in Azerbaijan, consultations have been conducted with the following stakeholders (Table 6).

Table 6: Stakeholders Consulted

Stakeholder Agency	Meeting Focus
Traffic Organization and Safety Department, State Agency of Azerbaijan Automobile Roads	Crash data collection procedures
	Crash data analysis and statistics
	Approach to road safety topics
	Familiarity and use of SPI (safety performance indicators)
	Definition of road safety policies
Traffic Police Department, Ministry of Internal Affairs	Organization of the police department
	Registration of road crash data
	Storage and accessibility of road safety data
	Use of road safety information
	Suggestions for improving the registration of crash data and the use of road safety information.
Institute of Traumatology and Orthopaedics, Ministry of Health	Treatment of road crash victims
	Definitions of road crashes
	Assessment of injury severity, use of scaling techniques
	Communication between Traffic Police and Medical Facilities
	Preparation of statistical reports on road crash trends

Source: FRED Engineering. Consultations conducted with local stakeholders.

The procedures currently in use in Azerbaijan for data collection and management are described in the following sections.

4.1 Road Crash Data Collection

A.1 – Is a common/unique crash notification system in place?

Currently, there is not a single notification system in Azerbaijan. In case of a road crash, the victim or witnesses can report information about the crash to the following numbers:

- “102” (number of the MOIA).
- “902” (hotline of the Main State Traffic Police Department).
- “103” (number of medical services).
- “112” (general number managed by the Ministry of Emergency Situations).

Box 1: Emergency Number - Best Practice Example

Several countries use a unique emergency number to manage all emergency calls flow, which are then transferred to the body in charge of managing the specific emergency (e.g. police, fire brigade, health emergency).

In Saudi Arabia, for instance, the police are notified about the occurrence of a road crash through a call to a unique emergency number: 911. Moreover, the Government of Saudi Arabia has set a specific performance indicator concerning the dispatch time of an emergency from notification to 911.

Source: World Health Organization.

The absence of a common notification system is a possible source of under-reporting, as some crashes might not be reported to the Traffic Police. In general, a unique notification system reduces the time for reporting and thus the likelihood of serious injuries becoming disabling or fatal. Intervening promptly at the crash scene is also beneficial for crash data collection, as the scene is likely to be less affected by external factors that could "pollute" the scene.

A.2 – Are road crash and injury definitions compliant with international standards?

Every country should have a clear definition of a road crash based on the crash location, the road user types involved, the nature of the injuries sustained by the casualties and the damage sustained by vehicles.

Road crash injury severity also needs to be defined. Ideally, the definitions should be based on injury scaling techniques, such as the Abbreviated Injury Scale (AIS). When these techniques are not carried out, the following definitions for road traffic injuries can be considered:

- Fatal – death due to injuries sustained during the crash; the date and time of death is within 30 days of the crash occurrence.
- Serious – hospitalized for more than 24 hours.
- Minor – any crash involving on-site firs aid services or treatment of the patient at a medical facility and disposal within 24 hours.
- No injury – no visible injuries sustained.

In Azerbaijan, definitions for road crashes are provided by the Road Traffic Law approved on 3 July 1998. According to this law, a road traffic crash is defined as:

> *An event involving a vehicle whose movement on a road, a street, a square or a railway crossing causes death or injuries to people, hits animals or fixed obstacles, or causes damage to vehicles, roads, or constructions.*

A road traffic fatality means:

> *Any death occurring at the scene of a road crash or within 7 days of the crash.*

A distinction is made between minor and serious injuries.

A minor injury means:

> *Any injury, contusion or trauma with light functional complications and anatomical changes.*

A serious injury means:

> *Any injury, contusion or trauma leading to obvious functional complications and anatomical changes.*

These definitions thus differ from best international practices since:

- They consider a fatality due to a crash if it occurs within 7 days instead of 30 days.
- The definitions used to describe injuries in the crash databases are not based on international standards (e.g., AIS scale).
- They do not establish a time limitation before or after which an injury can be considered minor or serious.

A.3 – Are all road crash scenes with victims attended by police and emergency services?

Traffic police officers have sufficient resources to intervene at any crash scene, regardless of location and weather conditions. When a crash is reported, a patrol car is immediately dispatched to the scene. Traffic Police is required to record a variety of information, including:

- Personal details of the victim(s), such as ID, age, gender, etc.
- Crash-related aspects, such as the date, time, type, and cause of the crash, etc.
- Type and characteristics of the vehicles involved.

Other features like contributing factors and use of protective equipment are assessed by investigative units of the MOIA.

Medical facilities also always rush to the crash scene. Usually, the head of the medical team decides to which facility the victim should be transported. The attempt is to admit the victim within the so-called golden hour, i.e., the period immediately following a traumatic injury where there is the highest probability that timely medical intervention and surgical treatment will prevent the victim's death.

A.4 – Is there a unique and comprehensive road crash registration system?

Traffic police uses a paper-based form to collect data on road crashes (Annex 1). It includes a section showing a schematic representation of the crash (i.e., crash diagram), which allows an effective reconstruction of the crash dynamics. After being filled, the forms are sent to the head of the Traffic Police Department of the MOIA who assesses their correctness, completeness, and requirements. After that, they are entered into a dedicated database.

According to consultations with the Traffic Police Department:

- Local police make monthly visits to hospitals and medical facilities to update information collected on road crashes (e.g., to verify if a seriously injured person has died while at the hospital).
- Crash data are linked to other databases, such as those of hospitals, to enrich the information collected on road crashes. Police officers do not station in hospitals to observe victims' progress.

Classification of crashes into different categories allows for accurate planning of possible preventive measures. The State Statistical Commission of Azerbaijan defines the crash categories listed below:

1. Collision between vehicle and pedestrian.
2. Single-vehicle collision.
3. Collision between vehicles:
    - Of which rear-end collisions.
    - Of which collisions due to crossing or turning.
    - Of which head-on collisions.

However, standard crash configurations are currently not defined in Azerbaijan.

Statistics for the listed categories are available at the website: https://www.stat.gov.az/.

This list is not exhaustive. For example, information about crashes between vehicles and specific categories of users (cyclists, motorcyclists, etc.) is missing; in addition, clear definitions of the meaning of the listed categories are not provided by the Azerbaijani legislation.

Box 2: Crash Data Management - Best Practice Example

In France, the national database of road crashes is managed by the Interministerial Observatory for Road Safety (ONISR).

The data are collected by the various police forces operating in the different areas (urban, suburban, motorway). The information collected is based on the common BAAC form (Bulletin d'Analyse des Accidents Corporels). The BAAC form is filled in digitally.

ONISR is responsible for validating the data, checking their consistency, and for publishing and disseminating the road crash information.

Source: International Transport Forum.

Table 7 shows the road crash variables collected at crash scenes in Azerbaijan and compares them with the European Union Standards. The Common Crash Data Set (CADaS) is used for this comparison (this table shows both the full CADaS variables and the simplified ones). The current framework shows several shortcomings due to the absence of a road crash tracking system based on the use of GPS coordinates.

Table 7: Road Crash Variables Collected in Azerbaijan Compared to CADaS

Variable	CADaS	MINI-CADaS	Republic of Azerbaijan
CRASH			
Crash ID	✓	✓	✓
Crash date	✓	✓	✓
Crash time	✓	✓	✓
Nomenclature of Territorial Units for Statistics	✓	✓	
Local Administrative Units	✓		
Weather conditions	✓	✓	
Light conditions	✓	✓	
Traffic crash type / category	✓	✓	✓
Cause	✓	✓	✓
ROAD			
Latitude	✓	✓	
Longitude	✓	✓	
Road name	✓	✓	✓
Road kilometer	✓		✓
Functional class – 1st road	✓	✓	
Functional class – 2nd road	✓	✓	
Annual Average Daily Traffic (AADT) – 1st road	✓		
Annual Average Daily Traffic (AADT) – 2nd road	✓		
Speed limit – 1st road	✓	✓	
Speed limit – 2nd road	✓	✓	
Motorway	✓	✓	
Urban area	✓	✓	
Junction	✓	✓	
Rel.to junction/interchange	✓		
Junction in control	✓		
Surface conditions	✓	✓	✓
Obstacles	✓	✓	
Carriageway type	✓	✓	✓
Number of lanes	✓	✓	
Emergency lane	✓		
Markings	✓		
Tunnel	✓		
Bridge	✓		
Work zone related	✓	✓	
Road curve	✓		
Road segment grade	✓		

continued on next page

Table 7 *continued*

Variable	CADaS	MINI-CADaS	Republic of Azerbaijan
TRAFFIC UNIT			
Traffic unit ID	✓	✓	
Traffic unit type	✓	✓	
Vehicle special function	✓		
Trailer	✓	✓	
Engine power	✓		
Active safety equipment	✓		
Vehicle drive	✓		
MAKE	✓		
Model	✓		✓
Registration year	✓	✓	
Traffic unit maneuver	✓	✓	
First point of impact	✓		
First object hit in	✓		
First object hit off	✓		
Insurance	✓		
Hit & Run	✓	✓	
Registration country	✓	✓	
PERSON			
Person ID	✓	✓	✓
Year of birth	✓	✓	✓
Gender	✓	✓	✓
Nationality	✓	✓	
Injury severity as reported	✓	✓	
Road user type	✓	✓	
Alcotest	✓		
Alcotest sample type	✓	✓	
Alcotest result	✓	✓	
Drug test	✓		
Driving license issue date	✓	✓	✓
Driving license validity	✓		
Safety equipment	✓	✓	
Seating position in/on vehicle	✓	✓	
Distracted by device	✓		
Psychophysical / physical impairment or condition	✓		
Trip/Journey purpose	✓		
Maximum Abbreviated Injury Scale /MAIS)	✓		

CADaS= Common Crash Data Set

Source: Mobility and Transport Department, European Commission.

As medical facilities have their own database, there is no unique and comprehensive road crash registration system.

Currently, work is being done in Azerbaijan to develop a common registration system to enable automatic data sharing among different stakeholders.

A.5 – Does the collected road crash attributes and variables allow for data analysis?

Crash data are summarized and analyzed at the Main State Traffic Police Department of the MOIA and submitted to the Administration of the President of the Republic of Azerbaijan, the Cabinet of the Ministers, and the State Statistics Committee, online and in a paper form, monthly, quarterly, and annually.

Analyses on road crash data, whose results are shown through statistical indicators, are conducted by:

- Type of area (motorways, inside/outside built-up areas).
- Day and month when the crash occurred.
- Light conditions.
- Road conditions.
- Type of crash (single vehicle crashes, crashes between vehicle, etc.).
- Age groups.
- Trends on fatalities/injuries.

Based on these analyses, crashes are associated with specific features of the road to evaluate, at those sites with high crash risk, the most appropriate countermeasures; if data are incomplete, additional investigations are conducted by the Traffic Police Department to reach a final solution. The analysis made by Traffic Police includes crash reconstruction.

Medical facilities prepare statistical reports concerning the trends in the number of crash injuries and fatalities. However, no internationally recognized standard (such as the AIS) is used for estimating the severity of injuries.

In Azerbaijan, there is no single database for recording crash data, so the exchange of data between different stakeholders is not done automatically, which limits the accuracy and the completeness of the analyses performed.

A.6 – Does the system allow for precise location of road crashes on map?

According to the World Bank Group's assessment on the crash data collection methodology, the current procedures are not GIS-oriented, which does not allow for accurate location of crashes.

The use of mobile devices such as smartphones or tablets should be implemented as it would allow the location of the crash to be easily indicated on the map. The use of geographic coordinates to report crashes is also recommended by international best practices.

4.2 Storage, Processing, and Use of Road Crash Data

B.1 – Are the data by all actors registered in a common information system?

In Azerbaijan, the traffic police use a paper-based data collection form; then the data are uploaded to a central crash database at the General Department of State Traffic Police, that is accessible only by the MOIA. General crash data is shared only with the Statistical Committee and, in some cases, with the Ministry of Digital Development and Transportation.

MOIA crash database is also linked to vehicle registers to enrich the information collected at crash scenes. Medical facilities record data on crash injuries and fatalities in their own database. However, there is no link with the MoIA database, so there is no automatic communication between the two agencies.

B.2 – Are data regularly transferred to a national road crash database?

Although all traffic police data are regularly recorded in the central crash database at the General Department of Traffic Police, this cannot be considered a proper national database on road crashes as only the MOIA has direct access to the crash database.

Box 3: Crash Data Flow - Best Practice Example

In Germany, the road crash national database management body is the Federal Statistics Office (STBA). The data source is constituted by the data collected by police.

STBA is also responsible for verifying the data quality, consolidating the data and for publishing and disseminating road crash information.

The police officers survey road crashes and fill in a standard form at the Regional Statistical Office (Lander). In turn, the regional statistical offices are responsible for sending the data to the Federal Statistical Office.

Source: European Road Safety Observatory.

Moreover, no additional road safety data (e.g., exposure data, SPIs) are recorded in the database.

However, it should be noted that according to the State Program on Road Safety in the Republic of Azerbaijan, the creation of a single electronic analytical database related to road safety has been assigned to the Ministry of Digital Development and Transport, and work is being done in this field.

B.3 – Are data accessible by all actors involved in data collection and analysis?

Currently, only the MOIA has direct access to the crash database. General crash data is shared only with the State Statistics Committee and in some cases with the State Road Transport Service.

The General Department of State Traffic Police is responsible for the preparation of the monthly road safety reports.

The State Statistical Committee is responsible for publishing general road safety data, which is available online at: www.stat.gov.az/source/transport. Medical facilities prepare statistical reports on the basis of the information collected on trends in the number of fatalities and injuries. Currently, these outputs are not matched with those produced by the traffic police.

B.4 – Is a road crash data management system available including analysis tools?

The current crash data management system has several limitations. In particular, it does not provide for the use of mapping tools to visualize crashes, which does not allow for the proper identification of high-risk crash sites. Furthermore, the quality of crash location data being collected is not supportive of reliable crash mapping.

In addition, lack of knowledge on the use of modern web-tools such as PowerBI does not allow easy processing of crash data.

Currently, work is being done in Azerbaijan to develop an electronic interactive map for the presentation and analysis of crash data.

4.3 Other Road Safety Data

C.1 – Are risk exposure data included in data collection and storage?

Risk exposure data are not systematically collected in the database.

C.2 – Are SPIs included in data collection and storage?

As in the previous case, safety performance indicators are not systematically collected in the database. However, the State Agency of Azerbaijan Automobile Roads is aware of the importance of these indicators. According to this stakeholder, data concerning the number of crashes, and the exact location of crashes sites collected by the traffic police units and injury trends collected by the medical facilities could be used to determine the SPIs.

4.4 Data Analysis

D.1 – Are data on road crashes and other road safety data systematically analyzed for planning and decision-making?

Based on crash data, the locations of high-risk sites are constantly investigated by the State Traffic Police Department. More specifically, investigations on road features are carried out so that they can be associated with crash events and thus identify the most appropriate countermeasures.

Road safety data analyses enables:

- The organization of road safety policy. There is not a single institution responsible for this policy, each institution is responsible for its own area.
- The implementation of the rules and the control of road users' behavior; this task is carried out by the employees of the General State Traffic Police Department.
- Road infrastructure protection, which is supervised by the Department of Highway Protection under the State Agency of Azerbaijan Highways.

Authorities responsible for road safety policy ensure the safety of road users during crashes, interventions and repairs providing the area with road signs, choosing optimal routes, etc.

5 Recommendations to Improve Road Crash Data Management

Evidence-based approaches, supported by road crash data and other road safety data, are the pillars of the most effective road safety policies. The availability of good quality road safety data allows to accurately identify problems and assess the effectiveness of potential road safety measures.

The current framework in Azerbaijan suffers several lacks such as:

- Road safety definitions compatible with international standards regarding road crashes are missing.
- The forms used by the traffic police to collect road crash data are still paper-based, which, among other things, does not allow the GPS coordinates to be recorded. These forms also do not report some details that would be important for the crash analyses, such as the light and weather conditions under which the crash occurred, road features (speed limits, average daily traffic, number of lanes, etc.), aspects related to the vehicles involved (insurance, year of registration, country of registration, etc.) and aspects related to the persons involved (physical/psychophysical conditions, alcohol or drugs use, use of mobile devices, etc.).
- There is not a unique database for road crash data collection and storage.
- Only road crash data are recorded in the database; information about risk exposure data and SPIs is missing.

Improving the process of road crash data collection is a key factor in road safety management. To this aim, some measures should be adopted:

- In accordance with international standards, provide **clear definitions** on road crashes.
- Road crash data **collection forms** should be updated and enriched with details about crashes that would allow more in-depth analyses to be conducted. The forms, which are currently filled out on paper, should move to an **electronic version** so that the **GPS coordinates** of the crash location can be recorded. The forms should also include procedures to identify crash contributing factors (for instance using a Haddon Matrix as described in chapter 5.1, section A.5).
- Organize **regular training activities** for traffic police officers so that crash data collection is done uniformly throughout the country.
- More coordination between the different units involved in road crash management (traffic police, medical services, emergency teams) would be needed to avoid the under-reporting of crash data. This implies the adoption of a **common data collection form** and a **single database** for the collection and storage of crash data. Data should be managed by a web-based **road crash data management system** that provides follow-up for injured persons, integration of data from different sources, and analysis of road crash data. Access to this system should be given to all the stakeholders having a role in road safety to share road crash information and thus optimize road safety analyses. **Risk exposure data** and **safety**

performance indicators should also be added to the database to enrich de data collected and thus apply effective **road safety policies**.

- The whole process and system should be considered as an initial phase for the development of a **National Road Safety Observatory** and for data source to the **Asia Pacific Road Safety Observatory.**

Based on the reference standards described in chapter 2, the recommended procedure for collecting and managing road crash data is given in the following paragraphs.

5.1 Road Crash Data collection

A.1 – Common / unique crash notification system

According to international best practices, it is necessary to provide a unique phone number for contacting emergency services. The existing hotline 112 should be in line with this requirement.

A.2 – Road crash and injury definitions compliant with international standards

The definitions currently used in Azerbaijan for crash fatalities and injuries are not in line with the international standards.

It is recommended to review the current national standards according to definitions shown in Table 8. Since AIS system is currently not in place in Azerbaijan, a gradual approach is recommended to distinguish between serious and minor injuries.

Table 8: Definitions of Crash Fatalities and Injuries

Category	Internationally agreed definition
Fatalities	People who die immediately or within 30 days as a result of a road crash.
Serious injuries	People with a Maximum Abbreviated Injury Scale (MAIS) equal or higher than three. If MAIS is not available: people hospitalized for more than 24 hours.
Minor injuries	People with a Maximum Abbreviated Injury Scale (MAIS) lower than three. If MAIS is not available: people given first aid at scene or treated in a medical facility as outpatient or discharged from hospital within 24 hours.

Source: Mobility and Transport Department, European Commission.

A.3 – All road crash scenes with victims attended by police and emergency services

Currently, all road crashes are followed up by the traffic police and, in case of fatalities or severe injuries, by health services. To improve the current situation and avoid under-reporting of crash data, it is recommended to:

- Ensure that those actors involved in crash data collection always share information about the occurrence and outcome of crashes. This implies, for example, that if a victim, after a crash, goes directly to the hospital, the traffic police are aware of it.
- Ensure that data collection procedures are commonly adopted regardless of the location of the crash.

A.4 – Unique and comprehensive road crash registration system

To improve crash data collection procedure in Azerbaijan, it is recommended that information on road crashes be collected in a single national database (Figure 8).

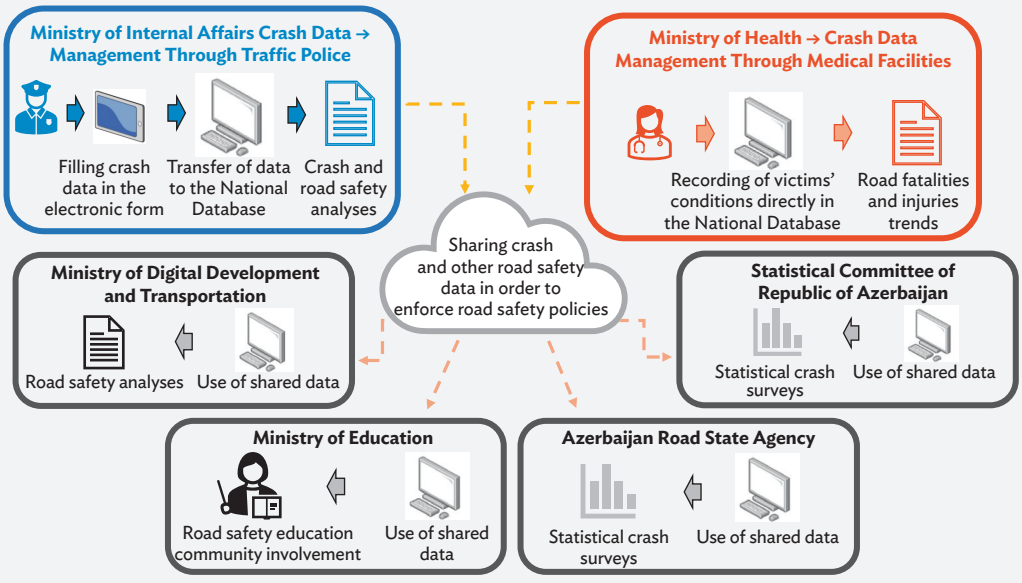
This framework is based on the use of a **web-based crash data collection, management and analysis system** that enables automatic and standardized collection, storage, and analysis of crash information. The exchange of information should be secured via appropriate cybersecurity mechanisms to ensure confidentiality, integrity, authentication and non-repudiation of hardware, software, and data.

Currently, in Azerbaijan, there is a lack of coordination between the different agencies responsible for collecting crash data. Therefore, it is recommended to provide health services with access to the system allowing to record victim's data; this would make it possible to merge data collected by the traffic police with data collected by the health services and thus update the status of victims directly in the national crash database.

Hospitals should ensure that crash victims are tracked up to 30 days after the crash and send the updated information to the database, so that the severity of injuries of people involved in crashes is updated almost automatically.

It is also recommended that access to the information system be extended to other actors involved in crash data management such as the State Statistical Committee and the Ministry of Digital Development and Transportation so that they can use the data for analytical and statistical purposes.

Figure 8: Recommended Road Crash Data Management Framework for Azerbaijan



Source: FRED Engineering

A.5 – Collect road crash attributes and variables allowing for data analysis

Currently, some statistical analysis can be performed using data collected by the traffic police. However, they do not provide a complete understanding of the factors contributing to road crashes.

A comprehensive and reliable crash data collection process should allow for:

- The collection of a sufficient set of crash data elements necessary for analysis.
- The use of a single, standardized format for data collection by all entities involved in crash data management.
- The establishment of reliable and agreed links between stakeholders involved in crash data collection (traffic police, health services).

A. Traffic Police

It is recommended that traffic police make use of the minimum set of standardized data elements of the Common Accident Data Set (CADaS) recommended by the European Commission.

These elements are divided into four basic categories:

- Crash-related variables.
- Road-related variables.
- Traffic Unit-related variables.
- Person-related variables.

The recommended data collection form for Azerbaijan should initially conform to a minimum data set that is consistent with both the current data collection form and CADaS. Further improvements and updates may be possible in the future.

Table 9 shows the road crash attributes included in the updated version of the data collection form and those that are recommended to be added.

The recommended form should include some important information that allows not only to perform road crash statistics but also to identify crash contributing factors, thus supporting the selection of reactive and preventive interventions. In addition to the attributes listed in Table 9, the following aspects should be considered:

- Crash configuration, which allows the type of crash to be described in terms of parties involved, type of collision, vehicle / pedestrian maneuver immediately before the crash and hit and run crash.
- Crash diagrams, which allow visualization of the configuration after the crash, including the position of vehicles, description of the road environment, any tracks on the road, etc.
- Description of crash contributing factors using the Haddon Matrix (see below for specific example).

The possibility of major crash reconstruction should also be considered for future developments, after the data collection process is adopted in a standardized manner throughout the country. Crash reconstruction should involve the training of dedicated teams (with possibly different skills) in in-depth investigation techniques.

Table 9: Recommended Data Set for Police Forces Compared with Current Data Set

Attributes	Notes
Police Department	
Report/Crash ID	
Officer name	
Report date	
Crash-related variables	
Date	
Time	
Region	
City	
Street	
Road name or code	
GPS coordinates	
Crash and impact type	Specific variables to describe a specific crash type, while more than one type can be applicable in the same crash. In such crashes (e.g., collision between two vehicles, one of which finally hits a pedestrian) more than one variable can be selected; each one describing the respective crash type.
Crash severity	
Weather conditions	
Light conditions	
Road-related variables	
Functional class – 1st road	
Functional class – 2nd road (if intersection)	
Carriageway type	
Number of lanes	
Surface conditions and status	
Street lighting	
Road type	
Speed limit – 1st road	
Speed limit – 2nd road (if intersection)	
Type of intersection	
Type of intersection management	
Work zone related	
Urban area	

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Table 9 *continued*

Attributes	Notes
Traffic-unit related variables	
Traffic Unit ID	
Vehicle class	
Vehicle brand	
Vehicle model	
Manufacturing year	
Registration year	
Vehicle type	
Vehicle special function	
Vehicle maneuver	
Vehicle runaway	
N° passengers allowed	
N° passengers on board	
Vehicle load allowed	
Overloading	
Person attributes	
Name	
Person ID	
Traffic unit linked to the person	
Date of birth	
Gender	
Nationality	
Road user type	
Seating position in/on vehicle	
Pedestrian maneuver (if pedestrian)	
Driving license data	
Injury severity at the time of crash	
Hospital transfer to	
Time of death	Informed by hospital
Days of stay in hospital	Informed by hospital
Alcohol use	
Drug use	
Safety equipment use	
Communication devices use	

Source: Mobility and Transport Department, European Commission.

To identify the factors contributing to the occurrence of the crashes, it is recommended to use the Haddon Matrix (or similar procedure), which allows the human, vehicle, and infrastructure factors to be divided into three-time phases: pre-crash, crash, and post-crash (Table 10).

Based on the factors contributing to the occurrence of each crash in each phase, solutions to the problem can be determined.

Some solutions may be specific to a particular crash site and can be implemented immediately such as road signs, markings, removal of obstructions to vision, and basic enforcement activities. Other solutions, such as making two-wheelers more stable or safer, require more data for research and development and may take more time, effort, and resources for implementation.

Table 10: Haddon Matrix

PHASES		FACTORS		
		HUMAN	VEHICLE	INFRASTRACTURE
PRE-CRASH	Crash prevention	- Information - Attitudes - Impairment - Police enforcement	- Roadworthiness - Working lights - Good brakes - Handling - Speed control	- Road design and layout - Speed limits - Pedestrian facilities
CRASH	Injury prevention during the crash	- Use of safety systems	- Crash worthiness - Crash protective design - Occupant restraints - Other safety devices	- Crash protective roadside objects
POST-CRASH	Life sustaining	- First aid skill - Access to medics	- Ease of access - Fire risk	- Rescue facilities - Congestion

Source: 1st Highway Safety Manual – American Association of State Highway Transportation Officials (AASHTO).

B. Health Services

The collection form used by the health services should make it possible to combine hospital information with that collected by the traffic police. The proposed module is based on the MAIS3+ standard.

Table 11 shows the attributes and variables recommended for the treatment of injured persons. It is planned to collect most of the data at the hospital facility.

C. Insurance Companies

Like for health agencies, the data collection form proposed for insurance companies should allow the cross-referencing of information with that collected by traffic police. The objective in this case is to complement the traffic police data with information about vehicles and persons involved in crashes, as well as to collect a minimum set of data for crashes without victims.

Table 11: Recommended Data Set for Health Services

HEALTH SERVICE DATA FORM			
Hospital name			
P0 - Name	Open text	**P2 - Birth date**	DD/MM/YYYY
P1 - Person ID	Two-digit code	**P3 - Gender**	
P5 - Crash date	DD/MM/YYYY	1	Male
P6 - Crash time	hh:mm	2	Female
P7 - Admission date	DD/MM/YYYY	3	Unknown
P8 - Admission time	hh:mm	**P4 - Nationality**	Open text

P9 - Type of injury		P10 - Injury severity	
1	Injury to the spine	1	Fatally injured
2	Head injury	2	Seriously injured
3	Leg fracture	3	Slightly injured
4	Multiple fracture	**P11 - First responders**	
5	Minor injury other than previous	1	Red cross
6	Other	2	Civil defense
99	Unknown	3	Police
P12 - Exit date	DD/MM/YYYY	4	Doctor
P13 - Exit time	hh:mm	5	Nurse
		6	Other

Source: Mobility and Transport Department, European Commission

Table 12 shows the recommended attributes and variables for insurance companies. The form can be filled in by extracting data from existing information systems, when available.

A.6 – System allowing for precise location of road crashes on map

The current data procedures adopted by the traffic police do not allow to accurately locate road crashes. Therefore, it is recommended that the geographic coordinates of crashes be included in the future data collection module of the traffic police.

To increase the accuracy of road crash location, it is also recommended to collect data at the crash scene using mobile devices.

Table 12: Recommended Data Set for Insurance Companies

INFORMATION COLLECTED FROM INSURANCE COMPANIES			
P0 - Name	Open text	**P2 - Birth date**	DD/MM/YYYY
P1 - Person ID	Two-digit code	**P3 - Gender**	
P4 - Nationality	Open text	1	Male
P5 - Crash date	DD/MM/YYYY	2	Female
P6 - Crash time	hh:mm	3	Unknown
V1 - Type of vehicle		V2 - Insurance details	
1	Motorcycle < 125 cc	1	Against others - Material
2	Motorcycle > 125 cc	2	Against others - Compulsory
3	Car	3	Comprehensive
4	4x4	4	All risk
5	Minibus	5	No insurance
6	Bus	**V3 - Registration year**	YYYY
7	Truck	**V4 - Registration country**	Open text
8	Pickup	**V5 - Vehicle make**	Open text
9	Tractor	**V6 - Vehicle model**	Open text
10	Trailer truck	**V7 - Manufacturing year**	YYYY
V8 - Chassis	Open text	**V9 - Engine power**	Open text
P7 - Driving license (if driver or rider)		**P8 - Injury severity**	
Number	Multi-digit code	1	Fatally injured
Category: private	Multi-digit code	2	Seriously injured
Category: public transportation	Multi-digit code	3	Slightly injured
Category: military	Multi-digit code	4	Injured (unknown level)
Category: international	Multi-digit code	5	Not injured
Category: foreign	Multi-digit code	99	Unknown
Issue date	DD/MM/YYYY	**P9 - Hospital for transfer (if any)**	
Expiry date	DD/MM/YYYY		

Source: Mobility and Transport Department, European Commission.

5.2 Storage, Processing, and Use of Road Crash Data

B.1 – Data by all actors registered in a common information system

The development of a crash data management system allows all actors involved in crash data management to store information in a single national crash database. The system should be accessible to the actors responsible for data collection (i.e., traffic police, health services) and to those authorized to use the data (i.e., Ministry of Digital Development and Transportation, State Statistical Committee).

The software must be structured to provide several functionalities that can be grouped into the following modules:

- **Data collection module**, which consists of two elements:
  - A mobile application to collect data at the crash scene; this application should allow the information to be sent automatically to a central server hosting the crash data management system, without the need to download the data from the computer. In case of temporary absence of internet connection, the application should be able to store the collected information and send it independently as soon as the connection is reestablished. This also gives the possibility to collect data on a mobile device without the need of internet access.
  - Web-based software for desktop data entry that is usually used when mobile devices are not available for data collection. This feature also offers the possibility to continue using paper data collection forms, as well as importing data extracted from other information systems already used by stakeholders.
- **Analysis module**, which produces graphs and tables automatically or as a result of ad hoc queries by the operator; this module should also make it possible to merge data collected by different actors. This function could also be implemented by linking the system with external data analysis tools such as MS PowerBI, etc.
- **Administration module**, which manages the roles assigned to different users and the national crash database in terms of data validation, downloading, backup, etc.

The system should be:

- **Web-based**, so that users can access the software via internet or intranet, without having to install it on local computers and devices.
- **GIS-based**, so that data can be visualized and analyzed through maps that can overlay different layers of information.

B.2 – Data regularly transferred to a national road crash database

To carry out updated and evidence-based road safety analyses, systematic archiving of data and their transfer to the national crash database is necessary. Therefore, the use of a management system that ensures the regularity of data transfer is recommended.

The adopted system should also include a mobile device application so that data collectors can use it directly at the crash scene. Before fully using mobile devices for data collection, an interim period can be provided during which paper forms can continue to be used. During this period, data should be transferred from paper to an information system.

B.3 – Data accessible by all actors involved in data collection and analysis

The use of a common web-based road crash data management system would facilitate data accessibility by all actors. The system should allow the setting of permissions according to the roles and functions of each actor.

B.4 – Road crash data management system including analysis tools

The implementation of an information system to manage the national crash database also allows the data to be used directly in that system. Based on data analysis, road safety interventions and policies can be planned.

A framework for analyzing road crash data based on international best practices is recommended. Reference can be made, for instance, to the annual United Kingdom road fatalities report (Department of Transport, 2017) and the CARE reports included in the European Road Safety Observatory (European Commission, 2018).

5.3 Other Road Safety Data

C.1 – Risk exposure data included in data collection and storage

Risk exposure data make it possible to explain road safety outcomes. The most relevant indicator is usually the annually traveled distance. Since data on this indicator are usually difficult to collect, approximations can be used, such as vehicle fleet size or road length.

Risk exposure data can be divided into three categories:

- Road users
- Vehicles
- Road infrastructures

Road users

It is recommended to include traffic and multimodal traffic information in the crash data management system, such as:

- **Vehicle distance traveled** (expressed in km) in total and by transport mode; the indicator should be "vehicle-kilometer," which is a unit of measure representing the movement of a vehicle over one kilometer.
- **Person distance traveled** (expressed in km) in total, by mode of transport and by user's age and gender; this indicator should be "passenger-kilometer," which is a unit of measure representing the movement of one passenger by road over one kilometer.

Vehicle

It is recommended that the road crash data management system include information on the vehicle fleet by size (number of vehicles) and by type.

Road infrastructure

To complete road safety analyses, data on road network characteristics such as the overall length of road infrastructure and the network hierarchy (i.e., subdivision of the network by road type) should be included.

C.2 – SPIs included in data collection and storage

Safety Performance Indicators (SPIs) allow to assess the risk to which road users are exposed, e.g., the average speed of the vehicles, the rate of use of protective devices (seat belts, helmets, child restraints, etc.), the rate of alcohol consumption while driving, etc. These data can be collected through field surveys.

It is recommended to include indicators shown in Table 13 in the Road Crash Data Management System.

Table 13: Recommended Indicators to be Included in the Road Crash Data Management System

Safety Performance Indicators (SPI)
Seatbelt use rate total and stratified by vehicle occupant
Helmet use rate total and stratified by vehicle occupant
Rate of driving under the influence of alcohol
Rate of driving under the influence of drugs
Rat of driving while using a mobile device
Rate of driving over speed limits
Driving time and rest periods for professional drivers
Risk levels associated to road infrastructures
Average response time to emergencies

Source: Mobility and Transport Department, European Commission.

5.4 Data Analysis

D.1 – Systematic analysis of road crash and road safety data for planning and decision-making

Currently, road crash data and other road safety data are not systematically analyzed by all the stakeholders involved in road safety.

The implementation of the new road crash data system and the subsequent creation of systematic data sharing among stakeholders would facilitate a systematic analysis of road crashes and other road safety data.

It is recommended to develop specific data analysis frameworks for each stakeholder, consistent with their activities and roles. Training activities should also be implemented to ensure that people working with data in the various agencies involved in road safety perform reliable and explanatory analyses.

Annex 1: Crash Form Used by Azerbaijan State Road Police

Republic of Azerbaijan

Annex to order no 326

27 September 1999

Form for "A" type of road crash

1. **General information**			
Type of paper			
Type of crash			
Month	Day	Day of the week	Time
No of Annex sheet			
2. **Location of the road crash in the settlement**			
Status of the settlement			
City, Region, Settlement			
Street, House No			

3. **Location of the road crash on the road**	
Road type	
Road name	
Km - m	
4. **Road condition**	
Surface type	
State of carriageway	
Lighting	
Elements of the road or street	
Road condition which caused the road crash	

5. **About guilty persons**	1.V	2.V	3.V
Driving license			
Age			
Gender male (1), female (2)			
Working years			
How long he/she has been driving before the crash			
Violated law			
6. **Info about vehicle**	1.V	2.V	3.V
Info about traffic			
Vehicle fault of the vehicle that caused the crash			

7. **Affiliation of the vehicle**
Name, surname, Fathers name of driver, pedestrian
No of driving license
Model, registration no, series no and registration certificate no
Division (area)
Working place (Ministry, enterprise)

First vehicle (Pedestrian)	**Second vehicle (Pedestrian)**	**Third vehicle (Pedestrian)**

8. **Information about injury and fatality**				
Fatalities and/or injuries	1st	2nd	3rd	4th
Fatalities (1) Injuries (2)				
Type of traffic element				
Gender male (1), female (2)				
Age (years)				
Row number of vehicles				
Safety belt, helmet				

1	**2**
Name, surname, Fathers name	Name, surname, Fathers name
Address	Address
Where was sent, type of casualty, which hospital was transferred	Where was sent, type of casualty, which hospital was transferred
3	**4**
Name, surname, Fathers name	Name, surname, Fathers name
Address	Address
Where was sent, type of casualty, which hospital was transferred	Where was sent, type of casualty, which hospital was transferred

9. **Additional information**

10. **Description of the scheme of the road crash**

11. **Taken measures**

The sheet is prepared by	
Date	No
Exit No	Chief
Enter no	Date

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Azerbaijan Road Crash Data Review and Reporting

Status and Recommendations

This report presents an overview of the current road crash data management situation in Azerbaijan offering strategic recommendations for improvement based on the best globally recognized practices. The report develops guidance and tools in an effort to improve road crash data management and move toward greater harmonization of crash data across the region.

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