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ROAD SAFETY IN UKRAINE AND EUROPE IN 2025–2026

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Introduction Road safety remains one of the most important social and transportation problems in the modern world. Every year, millions of people are injured or killed in traffic accidents. Although many European countries have significantly improved their road infrastructure and traffic safety systems during the last decades, road accidents continue to cause enormous human and economic losses. The problem is especially serious in Ukraine, where the level of road fatalities remains much higher than in most European countries.

According to European statistics, around 19,800 people were killed on EU roads in 2024, while approximately 100,000 people suffer serious injuries every year. Despite the fact that EU roads are considered among the safest in the world, the European Union continues introducing new safety measures and technologies in order to achieve its long-term “Vision Zero” strategy, whose goal is to reduce road deaths to zero by 2050.

In Ukraine, the situation is even more alarming. In 2025, 3,249 people died in traffic accidents, which exceeded the number of civilians killed by Russian attacks during the same period. Since 1991, approximately 190,000 people have lost their lives on Ukrainian roads. Every year, about 30,000 people are injured in road accidents

across the country. These statistics demonstrate that road safety is not only a transportation issue, but also a major social, economic, and public health problem.

Modern road safety research shows that traffic accidents are caused not only by human mistakes, but also by poor infrastructure, ineffective urban planning, excessive speed, lack of safe pedestrian zones, and insufficient cycling infrastructure. For this reason, many countries are moving from traditional "Safety-I" approaches, which focus only on preventing failures, toward the newer "Safety-II" concept, which studies how successful and safe traffic interactions can be encouraged and expanded.

The Current State of Road Safety in Ukraine Ukraine continues to face serious road safety challenges. Compared to European countries, the level of traffic fatalities per million inhabitants remains extremely high. In many EU countries, road safety indicators improved significantly after large investments in infrastructure modernization, strict traffic law enforcement, and safer urban design. For example, Norway had only 17 traffic deaths per million inhabitants in 2020, while the EU average was around 42.

Ukraine, however, still records around 100 deaths per million inhabitants annually, which means the country lags approximately twenty years behind European standards. Several major factors contribute to this situation. One of the most serious problems is outdated road infrastructure. Many Ukrainian roads were designed decades ago and no longer correspond to modern traffic demands. Dangerous intersections, wide high-speed urban roads, lack of pedestrian islands, absence of bicycle lanes, poor lighting, and insufficient traffic calming measures all increase accident risks.

Another problem is driver behavior. Speeding, distracted driving, fatigue, dangerous overtaking, alcohol consumption, and improper lane changes remain among the leading causes of crashes. At the same time, pedestrians and cyclists often become victims because Ukrainian cities still prioritize cars over safer and more balanced urban mobility.

Research from Lviv demonstrates that infrastructure improvements can significantly reduce

accident rates. For example, after introducing dedicated public transport lanes, bicycle lanes, and pedestrian safety islands on Viacheslav Chornovil Avenue in 2019, the number of severe and fatal accidents decreased from nine to three within one year. This example clearly proves that safer street design can save lives.

Vulnerable Road Users One of the most important modern road safety topics concerns vulnerable road users, including pedestrians, cyclists, and motorcyclists. These groups face much greater risks during traffic accidents because they are not protected by vehicle structures.

Studies from Europe and Australia demonstrate that pedestrian and cyclist fatalities have increased in recent years despite general road safety improvements. Similar tendencies can also be observed in Ukraine. In Lviv, for example, approximately 63% of fatal traffic accidents involve collisions with pedestrians. Many Ukrainian streets remain unsafe for vulnerable users because they lack:

- protected bicycle lanes;
- safe pedestrian crossings;
- adequate street lighting;
- sidewalks;
- speed reduction infrastructure.As a result, pedestrians, cyclists, and vehicles are forced to share the same road space, increasing the probability of conflicts and accidents.

Improving safety for vulnerable users benefits everyone, not only pedestrians or cyclists. Safer streets create calmer traffic conditions, reduce unpredictable situations, improve visibility, and

make cities more comfortable for residents. In addition, safer urban spaces support local businesses, encourage walking and cycling, and improve public health.

The Importance of Road Infrastructure Modern road safety experts increasingly agree that infrastructure design strongly influences human behavior. Roads can either encourage dangerous driving or naturally force drivers to move more carefully.

One of the most promising modern approaches is the concept of the “road diet.” This method

involves reducing the number of traffic lanes or narrowing them in order to improve safety and redistribute road space more efficiently. Road diets are especially useful in urban areas where:

- accidents frequently occur during lane changes or left turns;
- roads contain more lanes than necessary;
- pedestrian crossings are unsafe;
- bicycle infrastructure is absent;
- excessive vehicle speeds create danger.

Research shows that converting four-lane roads into three-lane roads can reduce accidents by
20–50%. Narrower streets also reduce speeding, sudden braking, and aggressive driving behavior.

In Ukraine, elements of road diet policies have already appeared. Since 2018, updated Ukrainian building standards reduced recommended lane widths from 3.5–3.75 meters to approximately 3 meters. Cities such as Lviv actively introduce traffic calming infrastructure, safety islands, bicycle lanes, and redesigned intersections.

Although some drivers criticize road diets because they fear additional traffic congestion, research demonstrates that adding more lanes often does not solve congestion problems. Instead, it creates “induced demand,” meaning that more drivers begin using the road until traffic jams return again. Experts argue that the real solution lies in:

- better public transportation;
- dedicated bus lanes;
- expanded cycling networks;
- reduced dependence on private cars;
- safer pedestrian infrastructure.

When public transport becomes faster and more reliable than private cars, many people naturally choose it instead of driving.

The Safety-II Approach Traditional road safety systems usually focus on identifying failures and preventing accidents. This approach is known as "Safety-I." However, modern researchers increasingly support the "Safety-II" concept.

Safety-II focuses not only on what goes wrong, but also on how road users successfully avoid accidents every day. Instead of studying only crashes and dangerous situations, researchers analyze safe interactions, adaptive behavior, and successful traffic management. For example:

- experienced drivers often anticipate hazards more effectively;
- cyclists who use hand signals reduce collision risks;
- pedestrians sometimes avoid accidents by adapting their behavior to traffic conditions.

The Safety-II model treats safety not as a simple "safe/unsafe" condition, but as a continuum of constantly changing human interactions. This approach helps researchers better understand driver adaptability, resilience, and risk compensation behavior.

Modern technologies such as artificial intelligence, vehicle sensors, traffic cameras, and big data analysis create new opportunities for applying Safety-II methods. By studying millions of everyday driving interactions, experts can identify patterns of optimal driving behavior and improve road safety systems.

Modern European Road Safety Policies The European Union continues introducing strict road safety policies and technologies. One of the most important goals is reducing road deaths by 50% before 2030 and achieving zero road deaths by 2050. Several major initiatives have already been introduced:

- EU-wide driving licence disqualifications for serious offences;
- stricter rules for new drivers;
- improved cross-border traffic law enforcement;
- mandatory life-saving technologies in vehicles.

Modern European vehicles must now include:

- intelligent speed assistance;
- emergency braking systems;

- lane-keeping systems;
- driver distraction warnings;
- reversing detection systems;
- tyre pressure monitoring;
- event data recorders.

Human error contributes to approximately 95% of all traffic accidents. Therefore, these technologies are expected to significantly reduce fatalities and injuries in the future. Ukraine can benefit greatly from adopting similar standards and technologies during future infrastructure reconstruction and integration with European transportation systems.

Conclusion Road safety remains one of the most urgent transportation and social challenges in Ukraine and worldwide. Every traffic accident represents not only statistics, but also human tragedy, economic loss, and long-term consequences for families and communities.

Although Ukraine has achieved some progress in reducing road fatalities during the last decades, the current situation still remains far worse than in most European countries. Unsafe infrastructure, excessive speed, dangerous driving behavior, lack of pedestrian protection, and insufficient urban planning continue to cause thousands of deaths every year. At the same time, international experience demonstrates that effective solutions already exist. Safer infrastructure, road diets, improved public transport, bicycle networks, intelligent vehicle technologies, and modern Safety-II approaches can dramatically reduce traffic risks.

The experience of European countries proves that road deaths are not unavoidable. With proper investment, political decisions, modern technologies, and responsible behavior from all road users, safer roads are achievable. Ukraine now has the opportunity not only to rebuild damaged infrastructure, but also to create safer, more modern, and more human-centered transportation

systems for the future.

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СЕКЦІЯ
ЗАХИСТ НАВКОЛИШНЬОГО СЕРЕДОВИЩА ТА РОЗВИТОК СУЧАСНИХ ЗЕЛЕНИХ ТЕХНОЛОГІЙ. СУЧАСНІ ТРЕНДИ РОЗВИТКУ МЕДИЦИНИ В УКРАЇНІ.

THEORETICAL FOUNDATIONS OF GREEN LOGISTICS AND ITS ENVIRONMENTAL IMPACT

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Logistics is a system that manages the movement, storage, and handling of goods throughout the entire supply chain. In modern conditions, it is not only an operational activity but also a strategic factor that directly influences business efficiency, competitiveness, and customer satisfaction. Over the past decades, logistics has evolved from simple transportation management to a complex system that integrates production, distribution, and information flows.

At the same time, the traditional approach to logistics focused mainly on minimizing costs and maximizing speed. Environmental consequences were often ignored because they were not directly included in company expenses. However, growing environmental problems, especially climate change, forced businesses and governments to reconsider this approach.

As a result, the concept of green logistics appeared. It can be defined as the management of logistics activities in a way that minimizes their negative impact on the environment. This includes reducing emissions, saving energy, optimizing resources, and decreasing waste. An important feature of green logistics is the balance between economic efficiency and environmental responsibility. Sustainable logistics is closely