

A photograph of a modern highway bridge at night. The bridge features a series of tall, illuminated pillars and a curved, glowing overpass structure. Light trails from moving vehicles are visible on the bridge deck. The background shows a dark landscape with some trees and distant lights under a twilight sky.

Beautiful ROADS of Europe

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‘Beautiful Roads of Europe’ is the name of this book.
Here, the word ‘beautiful’ encompasses many things:
aesthetic enjoyment, fantastic architecture, technical mastery,
workmanship, road safety, and expanded trade.

Have a pleasant journey on the
beautiful roads of Europe!



Photo: PRSMA

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Roads of Europe – Benefits and challenges

Roads have been the lifeblood of our society since ancient times, whether for travel, trade, exploration, or conquest. The Silk Road from China to Europe, which is over 6,000 km long, has existed for more than 2,000 years. It is the best example of a road system that allows nations to engage in cross-cultural communication and international trade.

Roads are still the backbone of our society and play a major role in today's economy, helping us to satisfy our mobility needs.

From cradle to grave, every human being uses roads: first on the footpath as a toddler in a pushchair and as a pedestrian, then later on the road itself as a cyclist, a motorcyclist, a motorist, or a passenger in buses or trams. Roads are the most popular means of transportation for people travelling from place to place.

Today in Europe, roads represent 77 % of inland freight transport and 85 % of passenger transport by private vehicle or public transport. Road transport also plays a major role in Europe's economy and society, contributing 11.5 % to its GDP and providing a substantial proportion of its fiscal income.



The history of European roads

The reasons for constructing roads have always been pragmatic and dictated by functional needs. It is therefore natural that most of the world's oldest roads are to be found near the cities of the most powerful and largest empires the world has seen. For example, at its peak, the Roman empire had about 90,000 km of highways with stone surfaces. If one were to include dirt and gravel roads, this figure would

rise to around 250,000–300,000 km of roads. In 1936, the famous French historian Albert Grenier wrote: 'of all the works of the Romans in the world, the most important, brilliant, and greatest of these was the understanding of the importance of roads and the creation of an extensive network of roads for the empire.' Many have heard various sayings about Rome and its roads; however, not everyone knows that the oldest European roads were not constructed in Rome, but in Crete, a Mediterranean island. These roads, which were covered with fine-grained limestone slabs, were built in 2600–2000 BC. The oldest road in Europe that is still in use today was constructed in Crete around 1700 BC. It is about 50 km in length and links Knossos to the city of Gortyna and the southern coast of the island. During the Minoan period, but also during the later years of Ancient Greece, great emphasis was placed on road construction, especially urban roads, which led to the creation of functional road design. From this period on, the design of urban roads was no longer a random line on a map or an afterthought; roads were instead meticulously designed and customised to meet the needs of the city within the framework of an organised road network. This period is also notable for cities that were planned with squares and other public spaces and a more uniform road infrastructure.



Photo: D. Andriulis

The **Conference of European Directors of Roads (CEDR)** is a forum for the discussion and promotion of improvements to the road system and its infrastructure, both of which are an integral part of a sustainable transport system in Europe.

Its members represent their respective national road authorities or equivalent bodies; they are the key players when it comes to the implementation of directives, standards, or recommendations. CEDR members are in a unique position to address the full range of road transport and road infrastructure issues. The purpose of cooperation at European level is to facilitate the exchange of experience and information and to analyse and discuss all road-related issues, especially infrastructure, construction and maintenance management, traffic and transport, financing, legal and economic problems, safety, environment, and research.

Despite the economic crisis, transport volumes are growing. Moreover, politicians and road users all want a triple-A infrastructure. CEDR's vision states that the conference wants to play the role of a reliable, active stakeholder in the European context. CEDR will therefore promote the road sector by contributing to innovation and change and showing that the benefits of the road sector are often underestimated, especially in terms of the huge contribution roads make to the well-being and wealth of European society.

Another challenge: consolidation

The expansion and smooth operation of infrastructure is an essential precondition for the powerful synergy of European roads and close economic and social cooperation. One does not have to be an expert to appreciate the positive impact that an expanded infrastructure has on a country on the continental and world stage. If a country interests us, we begin by trying to find out how to get there, always noting the roads that can help us reach our destination quickly and easily. A modern society needs a modern network of roads. Such a network is necessary for smooth development, which is why it is important to invest in the maintenance and expansion of roads. Today, all European countries are striving to make their road networks as effective as possible and to successfully integrate these networks into the common network of European roads.

On the economy and economics
Whenever there is a discussion about the construction or maintenance of one road or another, two concepts are of the utmost importance: the economy and economics. These help us determine both the costs and the benefits.
Everyone agrees that transport infrastructure impacts on production processes, trade systems, and the property market. Economic development and the development of transport infrastructure are closely linked. In fact, the British professor Martin Christopher believes that at present, producers are not competing with one another with products, but with supply chains.
The improvement of the road infrastructure brings economic benefits, which depend on the specific project in question. Ideally speaking, however, the primary benefit of an investment is an economic development that is worth the time and effort. The economics of expenditure on road maintenance, the economics of reducing automobile accidents, and the operating costs of transport vehicles are of great importance. What's more, as time passes, the economics of environmental damage are considered more and more important.
Investment in road infrastructure has a positive effect on the creation of jobs and wage growth. Investment in road infrastructure has a positive effect on the creation of jobs and wage growth.



Photo: M. Kambiz

The following **general developments** are currently affecting European society and its mobility:

- Europe's population is still growing and is concentrating in urban areas, leading to more local congestion and pollution. The population is also ageing and diversifying, leading to different demand for transport modes. In these circumstances, individual transport by car is no longer the only viable option.
- Transport demand has become less fixed on a given mode; instead, travellers look for the best solution for a given journey.
- The awareness of environmental constraints, the importance of road safety, and the need to reduce energy consumption have become mainstream thinking.
- The financial difficulties of many countries mean that less (public) funds are available for infrastructure. Even less funds are available for roads, which are often still the most reliable mode for meeting society's mobility demands.

Having considered these developments, CEDR members identified six challenges facing their national road administrations:

Safety: in all CEDR countries, safety is and remains a high priority. Although many of these countries have made good progress in reducing fatalities and injuries, this reduction is not sufficient, nor is it taking place fast enough.

Environment: although much progress has already been made in reducing the pollution emitted by individual vehicles, there is still a lot of work to be done. Noise generated by transport is still a big issue, as is air pollution, especially in densely populated areas.

The development of electric vehicles and the use of recycled or new, less environmentally burdensome materials and processes offer opportunities for reducing greenhouse gases.

Climate change: greater fluctuations in temperature and levels of water, moisture, and snow require extra research, engineering, and construction skills.

Energy: energy prices have doubled over the past ten years and are expected to continue increasing. Constructing and maintaining roads in an energy-efficient manner are major challenges. Energy efficiency is extremely important. It is a matter not only of rising costs, but also of scarce resources.



CEDR Governing Board members in Panathinaikon Stadium, Athens, in 2012

Front row (from left): M. Sabato (Italy), F. Barry (Ireland), D. Makris (Greece), S. Skrinaskas (Lithuania), J. Riimaa (Estonia), J. Kunz (Germany), L. Erixon (Sweden), J. H. Dronkers (Netherlands), C. Mallouppa (Cyprus), M. Egger (CEDR). Second row (from left): A. Moreno (Portugal), H. Haraldsson (Iceland), G. Dalton (United Kingdom), P.-E. Winberg (Sweden), T. Roelants (Belgium, Flanders), S. Granati (Italy), F. Cazottes (France), D. de Smet (Belgium, Wallonia), G. Ficko (Slovenia), S. Meister (Switzerland), R. Dieterle (Switzerland). Third row (from left): A. Janušauskas (Lithuania), B. Leben (Slovenia), Z. Völgyesi (Hungary), J. Al (Netherlands), I. Pāže (Latvia), M. Dambergis (Latvia), S. Grima (Malta), P. Jacobsen (Denmark), T. M. Gustavsen (Norway), R. Tapio (Finland), N. Risley (CEDR)

Multimodality: roads must be considered part of an existing multi-modal transport system. In order to improve the system further, we must take advantage of new or better physical opportunities, facilitate movement between the different modes for the greater convenience of travellers, and provide road users with information on other (sometimes perhaps more convenient) modes of transport.

Financing: the reduced availability of public funds for the construction and maintenance of the road infrastructure is the new reality in most European countries. Providing better roads for less money is possible only in the short-term. In the medium- and long-term, it is an impossible challenge because the roads will continue to deteriorate and the backlog in maintenance will build up.

The **purpose of this book** is to present the most beautiful accomplishments in road construction from the 28 member countries of CEDR. From north to south, from east to west, this extraordinary infrastructure shows us the genius of planners, engineers, and contractors that allows us to satisfy Europe's mobility needs.

This book is dedicated to you, the citizens of Europe, who made these accomplishments possible through your desire and support for safe, efficient, and well-maintained road networks in your respective countries.

Let us not forget that roads contribute to social integration by reducing the geographical handicap of peripheral economies and by bringing European citizens closer together. Long-term economic growth is closely linked to infrastructure choices and to the capacity to ensure viable, fair, and sustainable mobility.

Nearly all industries need to be located in places where they are accessible to their suppliers, customers, and employees. Roads are therefore an undeniable source of socio-economic welfare and will continue to play a dominant role in the transportation of goods and people well into the twenty-first century and beyond.

Michel Egger
CEDR Secretary-General
2003–2013





Austria

The mountainous relief and geographical location of the central European country of Austria have a great impact on its system of roads. Only 32 % of Austria is lower than 500 m above sea level.

The total length of the road network in Austria is 107,115 km. It comprises motorways and expressways, federal roads, and municipal roads. Under the supervision of the Federal Ministry of Transport, Innovation and Technology, the Austrian motorway and expressway network is planned, built, and maintained by ASFiNAG, which is a 100 % state-owned company. Road construction and the maintenance of federal roads and municipal roads are the responsibility of the nine Austrian federal states and the municipalities respectively.

Due to the fact that Austria is an Alpine state, the number of bridges and tunnels is high in comparison with other countries. There are 5,192 bridges and 150 tunnels and galleries in operation on the motorway and expressway network.



Country facts

Area	83,879 km ²
Inhabitants	8,421,000
Road network	107,115 km
Passenger cars per 1,000 inhabitants	537 (2011)

Road network

Motorways and expressways	2,178 km	2 %
Federal roads	33,878 km	32 %
Municipal roads	71,059 km	66 %

With 0.2 m of road per inhabitant, Austria has one of the highest lengths of motorway per person in Europe. Motorways are financed exclusively through tolls collected from customers. Cars have to display toll stickers, while HGVs and buses pay a distance-related toll. All revenues are invested directly in the operation and construction of the road network and, consequently, in increasing road safety.

The Tauern Motorway is the main axis joining the southern and northern part of Austria. It is about 194 km long, with 24 km of road taken up by 14 tunnels. This is a photo of an exit from a road tunnel on the A10 (Tauern Motorway) near Werfen. There are a total of 150 tunnels and galleries on Austria's roads.

As one of the main routes across the Alps, the Brenner Motorway (A13 in Austria, A22 in Italy) passes over the Europabrücke (Europe bridge), which spans the Wipp Valley near Innsbruck.



Photo: ASFiNAG

Photo: ASFiNAG





The St. Georg Bridge across the Danube River was finished in 2010. It is 356 m long. Traismauer, S33 Expressway. There are a total of 5,192 bridges on Austrian roads.



Modern technology ensures a safe road surface on the A1 Motorway near Amstetten, northern Austria.



The A1 Motorway was the first highway built in Austria. Austria has one of the highest lengths of motorway per person in Europe. Seewalchen, A1 Motorway.

Austria's geological relief has a huge impact on its road system: just 32 % of the country is lower than 500 m above sea level. Stainach am Brenner A13 Motorway.



Belgium

Within Belgium, responsibility for motorways and regional roads is borne by the regions, which is why the road network is managed by the regional authorities in Flanders, Brussels, and Wallonia.



Flanders

Flanders spreads across the northern half of Belgium. It is one of the three Belgian federal regions and accounts for 45 % of the country's territory and almost 60 % of the population. The Flemish population is mainly Dutch-speaking. The major cities of Flanders are Brussels, Antwerp, Ghent, Louvain, and Bruges.

In Flanders, the Agency for Roads and Traffic is responsible for organising smooth and safe road traffic, providing information to and ensuring communication with road users, and setting the standards for road design, while maintaining and optimising the road infrastructure. At local level, the municipalities are in charge of their own roads.

Flanders' central location, at the heart of western Europe, continues to be an asset. The region is among the world's best when it comes to the density of road, rail, and inland waterway networks. Its modern infrastructure allows for fast connections with the European hinterland. As such, logistics continues to

be an important pillar of the Flemish economy. The combination of goods flows and passenger travel in a densely populated area such as Flanders requires a specific approach to safety and environmental protection.

Region facts

Area	13,521 km ²
Inhabitants	6,162,000
Road network	6,900 km
Number of bridges and viaducts	3,486 (2011)
Passenger cars per 1,000 inhabitants	495 (2011)

Road network

Regional roads	5,400 km
Motorways	1,500 km
Cycle tracks	6,700 km



More information:
www.wegenenverkeer.be



This intersection on the Brusselsesteenweg (N2) in Herent was redeveloped in 2012. Due to the wide cycle paths and narrower lanes, this reconstructed road is safer for both cyclists and motorised traffic.

The intersection Antwerp-North is a traffic junction on the ring road around Antwerp. The shape of the Antwerp-North node is a half turbine hub.



Photo: Agentschap Wegen en Verkeer



Photo: Agentschap Wegen en Verkeer

This three-armed bridge over the expressway near Loppem was finished at the end of 2012. The main arm is just under 900 m long and 6m above the traffic on the expressway, making trips to and from Loppem a lot safer for cyclists and pedestrians.

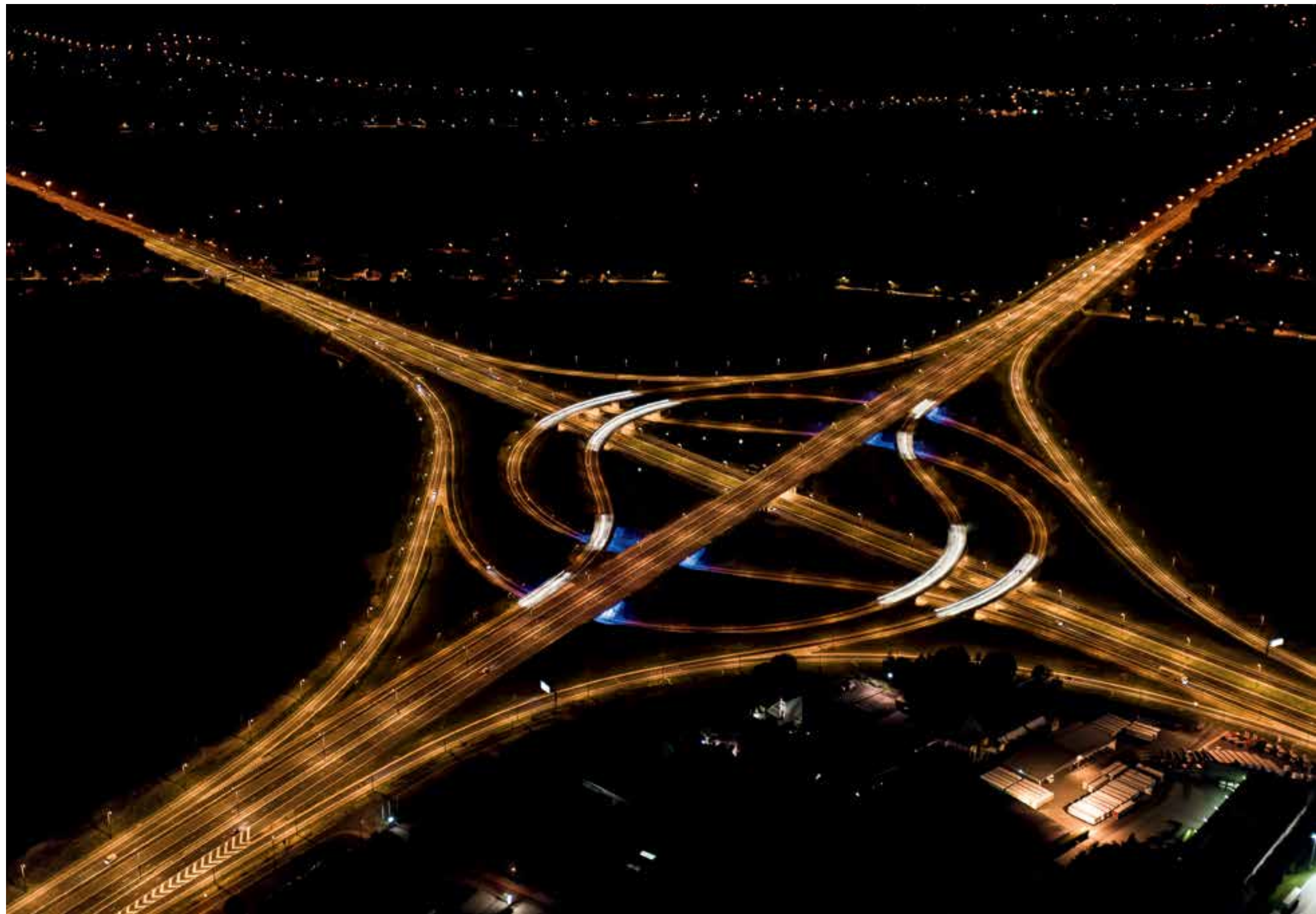
Photo: Agentschap Wegen en Verkeer



Photo: Agentschap Wegen en Verkeer

This cyclists' bridge over the E19 near Machelen was built in 2009. It is the longest cycle bridge in Flanders. The bridge has a span of 200 m and is the starting point of a newly constructed cycle path that makes a loop around Brussels Airport. Building this bridge was part of the Diabolo project, which enabled access to Brussels Airport from the north.

This cloverleaf is an interchange between the A2/E314 and the A13/E313 in Lummen near Hasselt. The interchange dates from the early 1970s. Recently, it was transformed into a turbine hub to improve traffic safety and traffic flow.



Wallonia

Wallonia spreads across the southern half of Belgium. It is one of the three Belgian federal regions and accounts for 55 % of the country's territory and a third of the population. The official languages are French and, in the far eastern cantons, German. The capital of Wallonia is Namur, and its largest metropolitan area is Liège, while its most populous municipality proper is Charleroi.

Located at the heart of western Europe, Wallonia offers an impressive transport network and high quality communication infrastructures for all modes: road, rail, air, and inland waterways. Thanks to these advantages, the vast majority of the European economic market is directly and easily accessible. In consequence, transport and logistics is one of the key sectors of the Walloon economy.

In Wallonia, the road network is managed by three actors: the *Société de Financement Complémentaire des infrastructures* (Sofico, a public company) for highways

Region facts

Area	16,844 km²
Inhabitants	3,546,000
Road network	80,826 km
Number of bridges and viaducts	3,373 (2012)
Passenger cars per 1,000 inhabitants	470 (2011)

Road network

Motorways	869 km	1.1 %
Regional roads	7,587 km	9.4 %
Local roads	72,370 km	89.5 %

and strategic regional roads (600 km), the General Directorate for Roads and Buildings for all other regional roads, and municipalities for local roads.

The General Directorate for Roads and Buildings is at the centre of this system. It fully manages its own network, it acts as the general contractor for the Sofico, and it provides technical and financial support to municipalities.

The activities of all these road managers focus on maintenance, modernisation, and operation of the network with objectives that centre on mobility, road safety, and environmental protection.

Wallonia employs intelligent transport systems with advanced detection and route guidance to ensure smoother and safer mobility. E25-E40 link, view of the quadrilateral of Kinkempois. This 635-metre-long motorway tunnel is a technological feat. It runs beneath the railway quadrilateral of Kinkempois without interrupting the movement of trains.

N95, view of Bayard Rock near Dinant. Originally, a small peak stood on this spot. However, some rock was removed by the soldiers of Louis XIV when they invaded Dinant in 1675 in order to facilitate the construction of a road next to the Meuse River. This road was later extended to allow for car traffic.



Photo: SPW

Photo: SPW



A3 Motorway, aerial view of the double roundabout of Crisnée. This motorway links Brussels and Liège, and is one of the main east–west axes of the country. It was built around 1970 in record time.



A602 Motorway, view of the tunnel under Cointe. This is a double tunnel: one is 1,639 m long and the other 1,511 m long.



A4 Motorway, view around Lavaux-Sainte-Anne. Successful landscaping adds value to the road and makes the journey more pleasant.



Cyprus

The Republic of Cyprus is the third largest island in the Mediterranean Sea. Surrounded by water, it has a unique geomorphology, and with its remote location depends entirely on its ports and airports for its links to the European Union, while managing and running a modern road network in the country.

There are several modern motorways in Cyprus. A series of motorways runs east along the coast from Paphos to Ayia Napa, with two motorways running inland to Nicosia; one from Limassol and one from Larnaca.

The national road network, including the trans-European road network (TEN-T) of Cyprus, is managed and maintained by the Public Works Department (PWD). The rest of the roads are managed by district offices, municipalities, and the Forestry Department (mostly unpaved forest routes). Traffic on the road network is managed by the Cyprus Police in cooperation with PWD, which also uses an Urban Traffic Control (UTC)/SCOOT programme to manage urban traffic.

Cyprus is divided into six districts, with the road network in the southern part of the island divided into five districts: Nicosia, Limassol, Larnaca, Paphos, and


More information:
www.mcw.gov.cy/pwd



Country facts

Area	9,300 km ²
Inhabitants	840,000
Road network	13,261 km
Number of bridges	350 (2013)
Passenger cars per 1,000 inhabitants	575 (2012)

Road network

Highways/motorways	257 km	2 %
District offices	2,780 km	21 %
Municipalities	4,560 km	34 %
Public Works Department roads	2,455 km	19 %
Forestry Department roads	3,209 km	24 %

Famagusta, where the Public Works Department also has offices.

Average traffic on the country's motorways ranges from 12,000 to 65,000 vehicles per day. The busiest section of the national road network is the entrance to the capital city, Nicosia, which sees around 65,000 vehicles per day in both directions. Urban traffic varies, but big arteries in the cities carry traffic ranging from 30,000 to 45,000 vehicles per day.



The A6 from Limassol, the country's biggest harbour city, to the city of Paphos, the mythological birthplace of the Greek goddess Aphrodite.

Limassol–Paphos Motorway (A6), tunnel near Paramali, a village on the southern coast.



On a country road through
Diarizos Valley. Nikoklia-Agios
Nicolaos. Hasamboulia Rock.



Photo: PWD

Cyprus is one of only
four EU nations where
vehicles drive on the
left-hand side of the
road. Limassol-Paphos.
Motorway, entry to
Paphos International
Airport.



Photo: PWD



The A1 links Nicosia, the capital,
and Limassol. Ayios Athanasios
Grade Separated Junction.

Photo: PWD



Denmark

All new roads, have to be planned right down to the smallest detail—including the signs, road surfaces, and lighting—so that road users don't notice them at all. Every road has to be easy and safe to use.

The Danish Road Directorate is responsible for the national road network, which comprises motorways, a number of main roads, and many of the country's bridges—a total of about 4,000 km—which is the same as the distance from Copenhagen to Rome and back.

Even though the national road network covers only about 5 % of the country's 75,000 km of public roads, almost half of Denmark's traffic uses the national road network.

To ensure a cohesive and well-designed infrastructure, the Danish Road Directorate cooperates with a large number of authorities, in particular the Danish road sector and local authorities.

The directorate looks 10 to 15 years ahead in order to take the future traffic needs of Denmark into consideration. Its ambitions are to create solutions and avoid unnecessary environmental impacts, while ena-

Country facts

Area	43,094 km²
Inhabitants	5,543,000 (2012)
Road network	76,574 km (2010)
Passenger cars per 1,000 inhabitants	390 (2010)

Road network (2010)

Motorways	4,130 km	5.5 %
Dual carriageways	379 km	0.5 %
Other roads	72,065 km	94.0 %

bling private vehicles and public transport to work together. In order to do this, it gathers and processes data on traffic, safety, and the environment.

The Danish Road Directorate's most important function is to ensure that the country's infrastructure develops in harmony with future social requirements. This concerns both private and public transport, as well as the environment. The directorate and its partners work consistently to innovate and optimise both the methods and materials used and the way residents in areas affected by roadworks and construction are accommodated.



More information:
www.vejdirektoratet.dk



The motorway section at Vejle, a town most known for its forested hills, fjord, harbour, and iconic windmill.

Langlandsbroen (Langeland's Bridge), connecting Langeland with Sio in the South Funen Archipelago, celebrated its 50th birthday in 2012.





Photo: Vejdirektoratet

The rail bridge crosses the Funen Motorway at Odense, the third largest city in Denmark.



Photo: Vejdirektoratet

'Hesteskobroen' (the Horseshoe Bridge), a cycleway and footpath, crosses Ringway 3 west of Copenhagen and connects two major recreational areas, Vestvolden and Vestskoven.



Photo: Vejdirektoratet

Sporup Church in Hammel, built in the sixteenth century. Route 26.



Estonia



Estonia is often seen as a pathway to Scandinavia, to other Baltic states, and to Russia. Over 11 million passengers a year use the Via Baltica ferry lines between Helsinki and Tallinn and Stockholm and Tallinn. Estonia has 16,469 km of state roads: 1,607 km of main roads, 2,403 km of basic roads, 12,449 km of secondary roads, 23,504 km of local roads, and 18,000 km

Country facts

Area	45,226 km ²
Inhabitants	1,340,000
Road network	58,487 km
Number of bridges and viaducts	1,208 (2013)
Passenger cars per 1,000 inhabitants	470 (2010)

of private and forest roads and streets. The Estonian Road Administration in all counties is responsible for the construction and maintenance of state roads funded by the state budget. All roadworks (100 %) are put out to tender and performed by the private sector.

Estonia has a Scandinavian climate with approximately 4–5 months of winter conditions on the

Road network (2012)

National roads	16,443 km	28 %
Local roads	23,647 km	40 %
Private roads	18,398 km	32 %

roads. When the thickness of the sea ice allows it, Estonia has six ice roads with an approximate length of 70 km. Heavy snowfall in winter is a challenge for road maintenance services.

The Estonian state road network is very dense: 379 km per 1,000 km². It has 951 bridges and viaducts on state roads with a total length of 22,590 m, and 357 bridges on local roads with a total length of 5,522 m. In 2012, the annual average daily traffic was 4,208 vehicles per day on main roads, 1,297 vehicles per day on basic roads, and approximately 270 vehicles per day on secondary roads. The highest average daily traffic in the past three years was measured near Tallinn on the Via Baltica route towards Latvia, with 31,410 vehicles per day being measured in 2012.


More information:
<http://www.mnt.ee/en>



The E263 links the Estonian capital, Tallinn, and Tartu, often called the country's cultural centre. The 280-kilometre-long road ends at Luhama.

Estonia is often seen as a pathway to Scandinavia, to other Baltic states, and to Russia. The E20 links six countries. The Estonian section takes drivers to Narva, which is right on the Russian border, and into Russia.



Photo: ERA

An ice road from the mainland to Vormsi Island. When the thickness of the sea ice allows it, Estonia has six ice roads with an approximate length of 70 km.



Photo: ERA

In 1896, a 3.5-kilometre-long dam was built from Saaremaa Island to Muhu Island. Having crossed the strait dam, the journey continues to the lovely island of Muhu.

Joesuu Bridge over the Emajõgi River. The name Emajõgi means 'Mother River' in Estonian.



Photo: ERA



Finland

Roads are hugely significant in Finland, a Scandinavian country that has a large surface area but is sparsely populated.

Road passenger transport accounts for 97 % of all passenger transport, and road freight transport for 68 % of all freight transport. In terms of the competitiveness of industry and commerce, functional logistics and especially the functionality of the internal transportation system are vital.

The Finnish road network comprises highways, municipal streets, and private roads. The entire network extends for some 450,000 km, of which about 340,000 km are private and forest roads, 79,000 km are public highways, and 29,000 km are streets.



Country facts

Area	338,200 km²
Inhabitants	5,421,000 (2011)
Road network	79,363 km (2011)
Number of bridges	14,625 (2011)
Passenger cars per 1,000 inhabitants	551 (2011)

Road network (in 2011)

Class I main roads	8,600 km	11 %
Class II main roads	4,729 km	6 %
Regional roads	13,574 km	17 %
Connecting roads	51,258 km	66 %



More information:
www.fta.fi



The northern lights (Aurora Borealis) in northern Finland are most often seen from late September to late March.

Reflections of the midnight sun. Jätkäkynttilä Bridge with its eternal flame over the Kemijoki River in Rovaniemi, Lapland.

Photo: J. Danilova





Photo: J. Dausukas

Roads for all.

Winter lasts between four and seven months in Finland, which means that drivers have to take greater care on the roads during this long period.

Roads are hugely important in Finland, particularly in sparsely populated rural areas.



Photo: L. Lennqvist



Photo: L. Lennqvist



France

The French national road network is the responsibility of the Department of Transport Infrastructure at the Ministry of Ecology, Sustainable Development, and Energy. It stretches over more than 21,100 km. It accounts for 2 % of the two million kilometres of roads within the country but carries 34 % of total road traffic. Of these 21,100 km of roads, 8,300 km are managed by private operators through concession

contracts that cover the financing, building, operation, and maintenance of the motorway network. As a consequence, the state remains the owner of these infrastructures, which are returned to the state at the end of the concession contract. The rest of the national road network is made up of 3,000 km of motorways and 9,800 km of urban expressways and interurban roads. These roads are directly operated, maintained,



Country facts

Area	552,000 km²
Inhabitants	63,300,000
Road network	1,050,117 km (2010)
Passenger cars per 1,000 inhabitants	496

Road network (2012)

National roads (motorways: 11,392 km)	21,146 km	2 %
Local roads	377,769 km	36 %
Municipal roads	651,202 km	62 %



More information:
<http://www.developpement-durable.gouv.fr/>

and upgraded by 9,000 state employees in charge of the daily operation of the roads.

The national road network is essential for facilitating accessibility and is characterised by the wide variety of natural environments it passes through, a fact that is reflected in the road structures designed and built to be compatible with the surrounding environment.

Since the creation of the road network more than 60 years ago, scientific and high-tech expertise from both the private and public sectors have been used in order to find the best technical solutions for building and upgrading the network. This expertise, along with road safety for both users and workers, environmental integration, and optimal traffic management, are at the heart of the policy implemented by the Department of Transport Infrastructure.



The Millau Viaduct is often described as a work of both engineering prowess and architectural grace, and has become a tourist attraction in its own right. It is part of the A75 Motorway crossing the Tarn Valley in the south of France. This road structure, the construction of which ended in 2004, set four world records at the time of its commissioning: the world's highest pier (245 m), spire (343 m) and road deck (270 m) and the world's longest cable-stayed deck (2,460 m).



Photo: © Laurent Mignaux/METL-MEDE



Photo: Arnaud Bouissou/METL-MEDE



Photo: Laurent Mignaux/METL-MEDE

View of the A75 Motorway. Construction of this 335-kilometre-long motorway began in the 1960s. It is an important link in the French road network, opening up the Massif Central region and creating a new transit route from northern Europe and Paris on the one hand and Spain and the western Mediterranean on the other.

Roundabout in Rochefort (department of Charentes-Maritimes). The integration of road infrastructures into the environment and the landscape is a major priority in their development.

View of the Normandy Bridge. This cable-stayed bridge crosses over the Seine River estuary linking Le Havre and Honfleur. It is 2,140 m long and can resist winds of up to 300 km/h.

The D46 crossing the marsh near Carbonnière Tower in Camargue. This photo was taken from the tower, erected in the thirteenth century to serve as a toll-gate for the salt trade. Since 2007, there has been a pathway that allows visitors to discover the life of the marsh.



Photo: Arnaud Bouissou/METL-MEDE



Germany

Germany is well known for its highly developed traffic system and smart infrastructure.

The road network comprises motorways (*Autobahnen*), national roads (*Bundesstrassen*), state roads (*Landstrassen*), district roads (*Kreisstrassen*), and municipal roads (*Gemeindestrassen*).

The motorways and national roads belong to the federal government, which supports the road maintenance authority in accordance with the Federal Highway Act. However, they are managed by the federal states. Moreover, according to the Federal Highway Act, state roads, district roads, municipal roads, and other public field roads and forest roads are the responsibility of the road maintenance authorities of the federal states, districts, and cities or municipalities.

The motorways, national roads, state roads, and district roads form a network of higher classified roads measuring 230,782 km. In addition to these roads, there are 395,400 km of municipal roads. The area of paved roads comprises only 1.2 % of Germany's total area.

Germany is divided into 16 federal states (*Bundeslaender*), which manage road maintenance. There are administrative bodies for motorways and higher classified roads in every state. These bodies are also

Country facts

Area	357,121 km ²
Inhabitants	81,844,000
Highway network	230,782 km
Number of bridges	38,782 (2011)
Passenger cars per 1,000 inhabitants	524

Highway network (2011)

Autobahns	12,819 km	5.6 %
National roads	39,710 km	17.2 %
State roads	86,598 km	37.5 %
District roads	91,655 km	39.7 %

responsible for their respective highway maintenance offices (*Autobahnmeistereien*) and for administrative authorities of the other roads (*Strassenmeistereien*). The federal states are in charge of the planning, construction, and maintenance of motorways, national roads, and state roads. The Federal Ministry of Transport, Building and Urban Development is responsible for the right of legal technical supervision for the federal trunk road network (*Bundesfernstrassen - Autobahnen, Bundesstrassen*).

The A4 crosses Germany from west to east. The western segment is 156 km long, while the part in the east is 429 km long.

Road in the state of Mecklenburg-Western Pomerania, which is home to three of Germany's 14 national parks and several hundred nature conservation areas.



Photo: J. Darius



More information:
www.bmvbs.de
www.bast.de



Photo: BMWBS



Germany's highly-developed road system contributes much to the country's economic strength. Junction near Metzingen, B312.



Most sections of Germany's motorways are modern, containing up to four lanes and an emergency lane.

Germany's motorway network had 12,819 km of roads in 2011, making it one of longest highway systems in the world. The motorways, national roads, state roads, and district roads form a network of higher classified roads that is 230,782 km long.



Greece

Greece, officially the Hellenic Republic, is a Mediterranean country in south-eastern Europe. Athens is the nation's capital and largest city. Its metropolitan area also includes the municipality of Piraeus. Greece is located at the crossroads of Europe, Asia, and Africa and has land borders with Albania, the Republic of Macedonia, and Bulgaria to the north, and Turkey to the north-east.

Transport in Greece has undergone significant change over the past few decades, greatly modernising the country's infrastructure. Although ferry transport between islands remains the prominent method of transport between the nation's islands, improvements to the road infrastructure, rail, urban transport, and airports have all led to a vast improvement in transportation. These upgrades have played a key role in supporting Greece's economy, which in the past decade has come to rely heavily on the construction industry.

The expected results of the 2007–2013 Road Programme of the Ministry are the following: about 750 km of new motorways on the trans-European road network (TERN), about 3,000 km of upgraded national and regional roads, about 250 km of upgraded main roads on the biggest islands of the country, and more than 30 hazardous locations (known as 'black spots') on the existing road network improved.



More information:
www.ggde.gr



Country facts

Area	131,957 km ²
Inhabitants	10,815,000
Road network	117,533 km
Bridges and viaducts	~75 km
Passenger cars per 1,000 inhabitants	528 (2011)

Road network (2012)

Comprehensive trans-European road network	~4,500 km
Roads connecting the capitals of the prefectures of the country	~6,000 km
Regional roads	~30,000 km
Municipal and rural roads	~67,000 km

In Greece, there are 10.92 km of road network per 1,000 inhabitants. The density of the road network is 890.67 km per 1,000 km².

In the region of Athens along the Attiki Odos Motorway, the volume of traffic is 250,491 vehicles per day (2011); there are 100,000 to 200,000 vehicles per day in the urban tissue (along Kifissos Highway), while on other motorways there are 5,000 to 15,500 vehicles per day.

Since the 1980s, Greece's road network has been significantly modernised.

The Attiki Odos Motorway offers three traffic lanes in each direction, one emergency lane, 32 multi-level interchanges and hundreds of overpasses and underpasses. The Attiki Odos Motorway consists of two parts: a section leading to the Elefsina-Athens Airport and a section called the Hymettus Beltway in the west.



Photo: Ministry of Infrastructure, Transport and Networks

Photo: Ministry of Infrastructure, Transport and Networks



Photo: Ministry of Infrastructure, Transport and Networks

The Rio-Antirion Bridge is located at the intersection of two major roads: the Patras–Athens–Thessaloniki Road (PATHE), and the Kalamata–Patras–Igumenitsa Coastal Road.

The PATHE Motorway, with a total length of 774 km, is the most important road axis in the country, as it crosses its most developed areas and main cities, including Thessaloniki, Larisa, Athens, and Patra. On the right: Kakia Skala.



Photo: Ministry of Infrastructure, Transport and Networks



Photo: Ministry of Infrastructure, Transport and Networks

The PATHE Motorway connects 6 regions, 6 airports, 11 prefectures, 9 ports, 14 important cities, 80 tourist areas, 360 townships, and 22 industrial zones.

H

Hungary

Hungary has 19 counties and 7 statistical regions (formed by grouping the counties and the capital city). The density of roads is 340 km per 1,000 km². The structure of the road network is central-radial, with Budapest as the starting point of all motorways and important trunk roads. The Hungarian road network includes public and private roads. Public roads are comprised of state roads and municipal roads. The total length of state roads and municipal roads is 31,806 km and 167,939 km respectively. About 75 % of the total road transport uses the state road network. A total of 8,340 km of the state roads belong to the principal road network, of which 2,254 km are E-roads (being a part of the European road network). The motorway network is 1,345 km long, with an additional 489 km of the junction branches, totalling 1,834 km. A total of 27 % of the length of state roads is in urban areas, thus playing an important role in city and regional transport. There are 7,436 bridges and 1,787 railway intersections.

Different categories of state roads are managed by different companies. State roads excluding motorways are managed by the Hungarian State Road Company and financed from the budget through a contract with the Hungarian Transport Administration.

Country facts

Area	93,030 km ²
Inhabitants	9,942,000
State road network	31,806 km
Passenger cars per 1,000 inhabitants	301 (2012)

State road network

Motorways	1,345 km	4.2 %
Junctions	489 km	1.5 %
Trunk roads	6,631 km	20.8 %
Secondary roads	23,341 km	73.5 %

The Hungarian motorway network is managed by five different companies of which one (the State Motorway Management Company) is state-owned and the other four are concession companies. The operation and maintenance of the state motorways is carried out by the State Motorway Management Company on the basis of a yearly contract with the Hungarian Transport Administration.

Due to Hungary's geographical location, the country is traversed by important international road corridors such as the IV and V TEN-T pan-European road corridors.

The Mária Valéria Danube Bridge in Esztergom, built in 1895, was rebuilt 57 years after it was destroyed in World War II.

Due to Hungary's geographic location, the country is traversed by important international road corridors. The 1,872-metre-long Kőröshegy Viaduct on the M7 Highway is Hungary's longest bridge. The bridge has 17 spans. Its highest pier is almost 80 m high.



Photo: Hungarian Transport Administration

Photo: Hungarian Transport Administration



Photo: Hungarian Transport Administration

The M8 Motorway's Pentele Danube Bridge, which is 1,642 m long, holds a world record among basket handle bridges. The bridge was finished on 13 March 2007. It is interesting to note that the lamps on the bridge are standing at the same angle as the cables.



Photo: Hungarian Transport Administration

The Hegyesd two-span stone bridge over Eger Stream, Hungary, was built in the eighteenth century. The wooden box contains a statue of St. John of Nepomuk, who watches over the bridge.



Photo: Hungarian Transport Administration

Hungary has many tourist destinations, including low mountains in the north-west and lakes, rivers, and the Great Plain in the east. M7 Motorway, south of Lake Balaton, Hungary.



Iceland

Iceland is a country of extreme contrasts. It is a place where fire and ice co-exist, and where dark winters are offset by the summer's midnight sun. A country where insular existence has spurred a rich and vibrant culture; where the vast, unspoiled nature lies at the doorstep of a highly modern urban community. A place where a peaceful and progressive population lives in harmony with the often violent forces of nature. The place where, geologically, Europe literally meets America.

According to the Road Act of 2007, Iceland's road system is divided into national roads, municipal roads, public paths, and private roads. National and municipal roads make up a coherent and continuous road system that connects the country's urban and rural areas. Most of Iceland's roads in the interior run along mountains between glaciers and are impassable in the winter for all normal traffic except specially built jeeps equipped for driving on snow.

Of the 12,898 km of roads in Iceland, 5,252 km are asphalt roads and 7,646 km are gravel roads. There are 10 road tunnels ranging from 30 m to 11,000 m, in all 43.4 km long.

Iceland is an island, and because of this, its road system is not directly connected to other European roads, except through the Norröna ferry that sails



Country facts

Area	103,000 km ²
Inhabitants:	322,000
Road network	12,898 km (2012)
Number of bridges	1,194 (2012)
Passenger cars per 1,000 inhabitants	653 (2012)

Road network (in 2012)

Primary roads	4,425 km	34.3 %
Primary highland roads	505 km	3.9 %
Secondary roads	2,956 km	22.9 %
Highland roads	1,921 km	14.9 %
Local access roads	3,091 km	24.0 %

from Denmark via the Faroe Islands to eastern Iceland. The main road in Iceland is the Ring Road around the island.

The road network is almost 13,000 km long, which means that there is a lot of road per capita. This makes it different from networks in most other European countries. Winter service is provided on about 5,000 km of the network. Conditions differ greatly, depending on whether the road is in the north or the south of the country.



Urban landscape. Nesbraut (49) Miklabraut, a primary road in Reykjavik in summer. Traffic around the capital is markedly higher than in the rest of the country.

Iceland is famous for its amazing landscapes. The Ring Road (1) in the east, Harekstadaleid.



More information:
www.vegagerdin.is

Clear air in the autumn. Vatnaleid (56), a primary road on the Snaefellesnes Peninsula.



Photo: ICERA

Don't forget to fill up. Öskjuleid (F88), a highland road in the north.



Photo: D. Andrius



Photo: ICERA

For centuries, the Icelandic horse was the only means of transport in Iceland. It carried people and goods over mountains, through powerful rivers, over rugged lava fields, and even over glaciers. Today, horseback riding is a popular sport and hobby. Horses on the move: Audkuluvegur (726), a secondary road in the north in summer.



Ireland

Situated to the north-west of continental Europe, the landscape of Ireland consists of relatively low coastal mountains surrounding the central plain. The oceanic climate is mild and very changeable, and the country avoids the extremes of temperature that occur in many of its continental neighbours.

The road network in Ireland is comprised of two broad categories of road: national roads, for which overall responsibility rests with the National Roads Authority, and regional and local roads for which the individual local authorities, county, city, and town councils, have direct responsibility.

Until very recent times, Ireland had a very limited network of motorways and other high-speed roads. The first short section of motorway only opened in 1983, and even by 2001, the total length of motorway amounted to 125 km.

Between 2000 and 2010 the total length of motorway and non-motorway expressway increased to 1,224 km, connecting the capital, Dublin, with all of the other principal cities on the island, and transforming the travel experience of road users on the busiest and most important routes.

Ireland relies heavily on its road network for the transportation of goods and freight. In 2009, within



Country facts

Area	70,273 km ²
Inhabitants:	4,581,000 (2011)
Road network	93,749 km
Number of bridges on national roads	2,996
Passenger cars per 1,000 inhabitants	432 (2011)

Road network (2012)

National roads	5,413 km	5 %
National primary roads (of which 900 km are motorways)	2,697 km	
National secondary roads	2,716 km	
Non-national roads	88,336 km	95 %
Regional roads	13,010 km	
County roads	75,326 km	

Ireland, 99 % of all goods were transported by road. The Irish road network reflects the low population density of the country and the dispersed character of rural settlement. Consequently, with approximately 21 km of public road per thousand inhabitants, Ireland has a much greater length of road per head of population than most of its European neighbours.

The River Suir Bridge (N25 Waterford Bypass route) has a total length of 450 m and a main span of 230 m, which is the longest road bridge span in Ireland.

In 2009, within Ireland, 99 % of all goods were transported by road. The M8 Motorway links Dublin and Cork, Ireland's second city. The section in the picture lies near Cashel in County Tipperary.





Photo: NRA

The Newport Road junction with the M7 Motorway near Limerick City.

The N59 National Secondary Road runs along the south side of Killary Harbour in County Galway on the west coast of Ireland.

The R319 Regional Road and Keem Bay on Achill Island, which lies off the coast of County Mayo on the west coast. This island retains some striking natural beauty.



Photo: NRA



Photo: NRA



Italy

The Italian road network has particular features that are linked to the specific terrain of the country, which is long, narrow, crossed by two mountain ranges (the Alps and the Apennines), and has high viaducts and bridges.

Compared to other transport infrastructures, the road network is widespread and connects all parts of the country, including important economic centres and rural or isolated areas. Italy is also actively involved in developing roads and motorways that are in line with the European Priority Corridors that pass through the country's territory.

The Italian road network extends over 189,570 km (urban roads excluded) and classifies its roads, according to the relevance of the connections each road provides.

Italian motorways, which are part of the national long-distance network, are designed in accordance with high safety standards in order to manage huge levels of traffic.

The world's first real motorway, the Milano-Laghi Motorway, was built in Italy in the 1920s and was designed by Piero Puricelli.

Italian state roads connect main traffic areas (ports, airports, freight terminals, and state boundaries)



Country facts

Area	301,336 km² (2012)
Inhabitants	60,483,000 (2012)
Road network	189,570 km (2011)
Number of bridges and viaducts	1,840 (2013)*
Passenger cars per 1,000 inhabitants	610 (2011)

* about 25,000 km on the road network managed by Anas

Road network

Free motorways	938 km	0.5 %
Motorway junctions	372 km	0.2 %
Interchanges and at-grade roads	4,145 km	2.2 %
State roads	19,227 km	10.2 %
Roads to be classified	230 km	0.1 %
Toll motorways	5,763 km	3.0 %
Regional and district roads	158,895 km	83.8 %

to major urban areas. Some of them were built over ancient routes that once connected the main cities of the Roman Empire to Rome such as State Road 4, known as the Via Salaria, which provided direct access to the Adriatic Sea. Some structures built by the Romans are still in use today, for example, the Forulus, a tunnel built by Emperor Vespasiano on the Via Flaminia through the gorges of the Umbria-Marche Apennines, is still open to traffic, though a modern tunnel has been built nearby in recent years.

Anas SpA is a joint-stock company that has been tasked by the Italian government with directly managing the Italian state road network and the free motorway network (interchanges and access roads included, over a total length of approximately 25,000 km). Toll motorways (5,763 km) are currently managed by Italy through 24 concessionaires. The management of regional and district roads is entrusted to local authorities by the state.

The Colosseum in Rome and the lights of a passing car.

National Road 163 connects the tourist towns of the Amalfi Coast. The route runs along the sea, mainly in the province of Salerno.



More information:
www.stradeanas.it



Photo: ANAS

Photo: ANAS



The A3 Salerno-Reggio Calabria Motorway links extended areas of southern Italy (namely Campania, Basilicata and Calabria Regions) to the north of the peninsula and to Europe.

Photo: ANAS



The GRA Motorway, or Grande Raccordo Anulare ('Great Ring Road'), is a toll-free, ring-shaped, orbital motorway, 68 km in circumference, that encircles Rome. Its acronym also comes from the name of one of its main designers and supporters, Eugenio Gra.

Photo: ANAS



Photo: ANAS

National road 647, or Fondo Valle del Biferno, is one of the main roads of the Molise region in central Italy. The viaducts Molise 1 and Molise 2 are very beautiful, running for several kilometres along the Biferno River and Liscione Lake.



Latvia



Latvia is situated at the heart of the Baltic and is located in north-eastern Europe on the east coast of the Baltic Sea. It consists of fertile lowland plains and moderate hills, with most of its territory less than 100 m above sea level. It has an extensive network of rivers, thousands of lakes, and hundreds of kilometres of undeveloped seashore lined with pine forests, dunes, and continuous white sand beaches.

The Ministry of Transport has delegated the management of the state road network and the administration of state road financing to SJSC Latvian State Roads. Latvian State Roads tenders out all physical works in open tenders to other companies. Road design, road construction, and supervision of road construction works are all tendered out to private companies. Road maintenance is also tendered out in open tenders,

Country facts (2011)

Area	64,589 km ²
Inhabitants	2,042,000
Road network	72,444 km
Number of bridges	938
Passenger cars per 1,000 inhabitants	296

Roads and streets (2011)

State roads	20,119 km	28 %
Municipal roads and streets	38,683 km	53 %
Forest roads	10,142 km	14 %
Private roads	3,500 km	5 %

Road laboratory experts perform quality tests on the E22 in Ķegums.



however, all contracts so far have been won by another state-owned company called Latvian Road Maintainer.

The primary tasks of Latvian State Roads are to register and manage state roads; to prepare the strategy for state road network preservation and development; to administer state road financing; to organise public procurement in the road sector; to organise and control road network design, construction, repairs, and maintenance; to prepare legal acts and control their implementation; to co-ordinate traffic safety organisation on roads; and to supervise the construction, maintenance, and protection of municipal, company, and private roads.

The average road network density is 1.122 km per 1 km². The average daily traffic intensity for Latvian state roads is 4,644 vehicles per day.



More information:
www.lvceli.lv

The longest stone masonry bridge in Europe crosses the Venta River in Kuldīga, Latvia. The total length of all the bridges in Latvia is 30,247 m.





A newly completed 20-kilometre bypass to the north of Riga is Latvia's biggest road-building project since the country regained its independence in September 1991. Known as the Saulkrasti Bypass, it is part of the Via Baltica, which is a key 670-kilometre road linking the capital cities of Poland and Estonia.

Photo: LVCEU

A Catholic priest blesses the completed Karsava–Vilaka route at the Latvian–Russian border.



Photo: LVCEU



Photo: LVCEU

Low-volume gravel roads are beautiful in winter. Because of improvements in the Latvian road network, there are fewer roads each year that have gravel surfaces.



Lithuania

The oldest road in Lithuania was built in the fourth century. It was covered with pine logs and led to a sacred ritual site. Lithuania was famous for its 'külgrinda', stone roads that were used for defensive purposes and were hidden under water in lakes, rivers, and swamps. From the thirteenth to the eighteenth century, during the times of the Grand Duchy of Lithuania, the road network was one of the most expansive in Europe. The long-standing traditions of making roads laid the foundations for today's road network in Lithuania.

Lithuania is a transit country located in the geographical centre of Europe. The country is traversed by two international transport corridors, running east-west and also north-south, along with six European highways. Together with other modes of transport, the extensive road network works as a multi-level logistics centre on the eastern border of the European Union.

As the transport infrastructure of the newer member states of the EU is still underdeveloped in comparison with the older member states, there is still much to do in terms of road management in Lithuania. The implementation of projects such as bypasses for cities and TEN-T network feeder roads, along with the paving of gravel roads, the installation of IT technology, and engineering road safety measures usually exceed 12 % of a project's internal rate of return.

Country facts

Area	65,300 km²
Inhabitants	2,988,000 (2012)
Road network*	82,895 km (2012)
Number of bridges**	1,499 (2012)
Passenger cars per 1,000 inhabitants	603 (2012)
* state and local roads	
** state roads only	

State road network

Main roads	1,746 km	8.2 %
National roads	4,929 km	23.2 %
Regional roads	14,567 km	68.6 %
Total	21,242 km	100 %

The main source of financing for the road sector comes from the Road Maintenance and Development Programme, which is financed primarily through the country's fuel tax and vignettes for heavy vehicles on main roads. Most road maintenance is done by state companies, while construction and renovation is done by private contractors.

The natural beauty of Lithuania's rolling landscape represents difficult conditions for road construction and maintenance. Each year, there are 40 to 100 cycles of freezing and thawing. The toughest seasons for maintenance are winter and spring.

The team of the Lithuanian Road Administration and family of road engineers work hard so you can travel safely and enjoy the beauty of our roads, nature, and cultural heritage.

For some time now, intelligent transport systems have been used on Lithuanian roads in order to better manage transport flows, inform road users, and improve traffic safety. In 2013, the Lithuanian Road Administration was awarded for its special achievements in implementing a geographic information system.

Early morning on Lithuania's main highway A1 (Vilnius-Kaunas-Klaipėda).



Photo: J. Dimauskas



Photo: A. Kostrov



Photo: D. Andziulis

The wooden Dubingiai Bridge, which stretches across Asveja Lake, the longest lake in Lithuania, was built in 1934. It is 76.4 m long, 6 m wide, and supported by oak poles. The bridge, renovated in 2009, can be used by drivers and visitors to the regional park.



Photo: J. Damauskas

Every year, winter road conditions are a challenge for Lithuanian drivers. Wonderful landscapes open up upon leaving the main highways.



Photo: D. Andziulis

The tradition of Lithuanian cross-crafting is included on UNESCO's World Heritage List. This rich sacral heritage is an inseparable part of Lithuania's roads and landscape.



Photo: PROMO EVENTS

The traditional 1,000-kilometre rally near Palanga, Lithuania's biggest resort town. A section of a state road adapted for car racing.



Luxembourg

Luxembourg is one of the smallest countries in Europe and one of the founders of the European Union. Its modern economy has made it one of the most prosperous countries in the world. The city of Luxembourg is the centre of this economy and is home to 114 banks and over 100,000 inhabitants.

Luxembourg can be divided into two geographical regions: the Oesling, with its rural area, and Gutland, with the most important economic centres of the countries and the biggest cities.

Luxembourg's road network is maintained by the Administration for Bridges and Roads. Working with foreign partners, the administration is installing traffic control and traffic information systems on Luxembourg's highways. The CITA project seeks to introduce:

- the real time collection of information about transport flows and weather conditions
- video surveillance
- the provision of information to road users via VMS screens.

Luxembourg's highway system is used by many inhabitants of neighbouring countries. Luxembourg is located in the centre of Europe, halfway between the big cities of Belgium and the Netherlands and the regions of southern France. A number of drivers from



Country facts

Area	2,586 km²
Inhabitants	525,000 (2012)
Road network	2,875 km
Number of bridges	1,169
Passenger cars per 1,000 inhabitants	820.8

Road network

Motorways	147 km	5 %
Trunk roads	837 km	29 %
Regional roads	1,891 km	66 %

neighbouring countries use the opportunity to buy petrol in Luxembourg, because it is cheaper here than in their home countries.

The number of cross-border workers who use the country's road network every working day is very high (nearly 150,000 people in 2009, about 50 % of whom were French, 26 % Belgian, and 24 % German).

In summer, the road system is overcrowded, especially the A6 and A3. There is also a lack of truck stops. Currently there is a new project for creating a modern road infrastructure, the goal of which is to increase the volume of transport in an efficient and effective manner.

Adolphe Bridge is an arch bridge in Luxembourg City that was opened in 1903. The bridge has twin parallel 84.65-metre arches in the centre, surrounded by eight smaller arches of 5.40 m each. The total length of the structure is 153 m. It carries four lanes of road traffic.

Guyed Bridge over the Alzette Valley near Luxembourg City (A1). The bridge is 260 m long, and its central pylon is 105 m high. Using the viaduct, traffic goes through the Howald Tunnel which is about 470 m long.



Photo: Administration des ponts et chaussées



Photo: Administration des ponts et chaussées



Photo: Administration des ponts et chaussées

Thionville A3 highway: truck congestion at the service area of Berchem is a daily occurrence because fuel prices in Luxembourg are lower than in neighbouring countries.

This viaduct allows the N4 Highway to pass over the bypass of the city of Luxembourg (E25/A6). Its size allows for future expansion to three lanes on both sides. The arch-like structures on top that support this impressive viaduct are made of steel pipes with two sets of steel hangers.

Wildlife crossings allow animals to cross the road safely. Overpasses on the A7 Motorway.



Photo: Administration des ponts et chaussées



Malta

Malta is the southernmost country of the European Union. Measuring 364 km², it consists of three main islands: Malta, Gozo, and Comino. The official languages are Maltese and English. Malta has a long and rich history and joined the European Union in 2004. Since 2008, Malta's currency has been the euro.

The Maltese road network includes approximately 262 km of arterial and distributor roads. These roads fall under the responsibility of the Maltese Road Administration, namely the Roads and Infrastructure Directorate within Transport Malta. There are five tunnels on this network, the longest one measuring 450 m. Being a hilly island, the network also includes several bridge structures that have low to moderate spans.


More information:
www.transport.gov.mt/



Country facts

Area	364 km ²
Inhabitants	420,000
Road network (excluding residential roads)	2,148 km
Passenger cars per 1,000 inhabitants	564 (2011)

Road network

Arterial roads	135 km	6.3 %
Distributor roads	127 km	5.9 %
Rural roads	674 km	31.4 %
Urban roads	1,212 km	56.4 %

Traffic drives on the left, the official road user guide is the Highway Code, and car ownership is quite high given the very small size of the islands. This presents major challenges to the Road Administration and Traffic Management Team in terms of maintaining a level of operational efficiency. Notwithstanding a 50 % decrease in fatal accidents in 2012, our target is to continue upgrading the network with the sole aim of reducing fatal accidents to zero.

The Roads and Infrastructure Directorate strives to ensure that all levels in the organisation have the right tools to achieve the service expected by our customers, but this also requires continuous improvement.



Photo: Transport Malta

Mellieha Bypass (Ta'Pennellu) re-opened in 2012.

The previous page: a ring road around Valletta. It is flanked on one side by majestic fortresses built in the sixteenth century to protect the city from enemy attacks. This road today plays an important role in the traffic circulation around the capital city.

Below: Tas-Saqqajja, Rabat. Mdina, the historic capital of Malta, is a small, scenic city, surrounded by the bastions. Mdina, also known as the 'Silent City', has restrictions on access and vehicle transit.

Photo: Transport Malta

Photo: Transport Malta





Photo: Transport Malta

The Maltese Islands consist of three islands: Malta, the main island, Gozo, Malta's sister island, and Comino, the smallest of the three. This road connects Victoria, the capital city of Gozo, and the port of Mgarr.

Photo: Transport Malta



Photo: Transport Malta

This junction connects the Council of Europe Road with Garibaldi Road in the south of Malta and is very close to the airport in Luqa.



Marfa road is the only road leading to the port of Cirkewwa, from which the ferry service to Gozo operates. It is located at the northernmost point of Malta and is situated in a beautiful landscape.



Netherlands

The Dutch mobility policy serves two goals: reliable journey times and better accessibility. Since the Netherlands' economy relies heavily on transport and distribution, the main economic centres must be readily accessible. With a keen eye on safety, the Netherlands is regularly among the top three countries for traffic safety. As a densely populated country, the Netherlands has a long history of dynamic traffic and demand management, including ITS, for its road infrastructure.

Founded in 1798, Rijkswaterstaat can look back on a rich tradition of designing waterways, railways, and motorways that are an exemplary mix of sustainability, functional quality, and aesthetic appeal.

In recent decades, Rijkswaterstaat has collaborated with stakeholders on route designs for a number of motorways, in which the design of the motorway is coordinated with the characteristics of the surrounding area. In the development of these designs, Rijkswaterstaat is supported by a State Advisor for Urban Development and Infrastructure who safeguards the aesthetic aspects of the route design.

Two issues dominate the development of the country's infrastructure. One is the battle against water, as a major part of the Netherlands is below sea level.



Country facts

Area	41,543 km²
Inhabitants	16,788,000
Road network *	139,295 km* (2012)
Number of bridges and viaducts **	3,545 (2012)
Passenger cars per 1,000 inhabitants	468 (2012)
* of these, 3,042 km are motorways, managed by Rijkswaterstaat	
** on state roads managed by Rijkswaterstaat	

Road network

Public roads	139,295 km	100 %
National roads	5,120 km	3.7 %
Provincial roads	7,802 km	5.6 %
Local and other roads	126,373 km	90.7 %

The other particular feature in the planning of new motorways in the Netherlands is how to combine infrastructure requirements with spatial planning. The effective integration of motoring connections into an urban context requires innovative designs that take account of noise pollution standards, particulate emissions, and traffic circulation among other things. The designers pay close attention to the integration of motorways into the surrounding urban landscape and come up with truly innovative solutions.

A futuristic structure along the A2 Motorway near the city of Utrecht. This noise barrier, which lines one of the Netherlands' most important traffic arteries, also houses a car showroom.

The A2 Motorway was recently widened and given a new look in the process. One striking feature is the design of the recreational underpass for boats and cyclists near the Linge River in the vicinity of Beesd.



More information:
www.rijkswaterstaat.nl/en





Photo: Joop van Houdt

One of the most remarkable motorways in the country is the A7, which leads across the Afsluitdijk, connecting the provinces of Noord-Holland and Friesland. This 32-kilometre-long dike forms a barrier between Lake IJssel and the Wadden Sea, creating one of the largest freshwater basins in Europe.

The construction of the high-speed rail connection between Amsterdam and Paris and the lowering of the A16 Motorway created the opportunity to lay out a park across these two infrastructure connections in order to reconnect two city districts.

A50 Woeste Hoeve wildlife crossing. The Netherlands' first wildlife overpass allows big game to freely cross the A50 Motorway, creating a large ecological structure in the region.



Photo: MPO



Photo: Jeroen Murch



Norway

Transport in Norway is greatly impacted by Norway's low population density, narrow shape, and long coastline. The Norwegian public road network consists of national, county, and municipal roads. The roads are financed by public funding and toll revenues.

Our surroundings are important for our quality of life. This applies equally to people living in urban areas and to those who live in natural environments or in cultural landscapes. The design of streets and roads has an impact on us, whether we travel by car, by bicycle or on foot.

Norway's topography is unique. Mountains, valleys, rivers, and islands make bridges an integral part of country's infrastructure.

They are in fact a prerequisite for freedom of movement and accessibility. There are a total of 18,200 bridges in use.

Due to topographical barriers such as mountains, fjords, and straits, tunnels and bridges are essential to the national road network. Norway's 1,043 road tunnels have a total length of approx. 974 km.

Subsea tunnels have become alternatives to bridges and ferries along the coast. The 30 subsea tunnels in Norway replace ferry connections between the main-

Country facts

Area	323,782 km²
Inhabitants	5,051,000 (2013)
Road network	93,214 km (2012)
Number of bridges	18,200
Passenger cars per 1,000 inhabitants	490 (2012)

Road network

National roads	10,500 km	11.3 %
County roads	44,000 km	47.3 %
Municipal roads	38,515 km	41.4 %

land and island communities. The subsea tunnels are generally long, having steep gradients and low traffic volumes. The world's deepest subsea road tunnel, the Eiksund Tunnel, is 287 m below sea level.

In 1988 the NPRA established the Beautiful Roads Award. The Director General's motto for the award is an inspiration to follow: 'Beautiful roads produce a good environment. We will build roads that we can be proud of.'

The NPRA has ambitious goals for road traffic safety and has many traffic safety campaigns.



Gamle bybru bridge in Trondheim was constructed in conjunction with the reconstruction of Trondheim after the great fire of 1681.

Sognefjellet: for centuries, this road has connected Norway's east and west; it is northern Europe's highest mountain pass.



More information:
www.vegvesen.no

Photo: Knut Opdeide

Photo: Geir Skjåk



Photo: Olav Handeland

The caverns of the Lærdal Tunnel (24,5 km long) are lit with yellow and blue light in order to create the pleasant illusion of a sunrise.

Some roads are not designed for reaching a destination as quickly as possible. Trollstigen is one of 18 National Tourist Routes that are perfect for exploring breath-taking landscapes.



Photo: Ellingsen

With a span of 70 m, the Tynset Bridge is the second longest timber bridge in the world. About 400 m³ of laminated timber was used to build the arches.



Photo: Johan Bruun



Poland

Poland lies at the heart of Europe. Road users cross the whole country when travelling from the north to the south and from the east to the west of Europe. The road network managed by GDDKiA, the Polish national road administration, plays a significant role in the transit of goods for the European market.

Poland has around 19,000 km of national roads and over 380,000 km of public roads. Motorways constitute the backbone of the infrastructure in Poland. The basic network consists of the A1 Motorway (north-south) with the A2 and A4 (east-west) Motorways. They are complemented by the A6, A8, and A18 Motorways, as well as expressways.

GDDKiA manages national roads, including motorways and expressways. Although these roads account for only approximately 5 % of the total length of the road network in Poland, they carry almost 60 % of all traffic. The 16 divisions of GDDKiA are responsible for managing these roads. The area of operation of each division is identical to that of individual voivodeships. The GDDKiA headquarters in Warsaw sets priorities, coordinates the investment process, and manages maintenance and traffic on national roads.

Over the past four years, more than 60 billion PLN (€15 billion) has been invested in road construction. From



More information:
<http://www.gddkia.gov.pl/>



Photo: P. Wagner



Country facts

Area	312,685 km ²
Inhabitants	38,623,000
Road network	399,000 km
Number of bridges	30,000
Passenger cars per 1,000 inhabitants	469

Road network

National roads	19,000 km	5 %
Public roads	380,000 km	95 %

2008 to 2012 under the National Road Construction Programme, GDDKiA constructed about 2,404 km of new roads (motorways, expressways, cities bypasses). In addition to the National Road Construction Programme, GDDKiA reconstructed or repaired approximately 3,721 km of existing roads. Poland currently has 1,384.5 km of motorways and 1,116 km of expressways, totalling 2,500 km of trunk roads.

The construction of the highest-quality roads is a priority for GDDKiA. The road laboratories and field road laboratories guarantee this quality. When constructing roads, the influence on the environment is always taken into consideration. To ensure the maximum amount of protection for animals, special crossings like culverts or green bridges are built under or over the road. Additionally, protective fencing is mounted to keep animals away from road traffic.

Western roundabout of Poznań, S11 Expressway. The bypass provides faster access to Poznań's airport and also diverts most of the traffic away from Poznań's congested city centre. Poland's road network plays a significant role in the transit of goods for the European market.

Redzinski Bridge, spanning the Oder River in Wrocław on the A8 Motorway, is the longest cable-stayed bridge with one pylon in Poland.



Photo: W. Kluczewski



Photo: GDDKiA archives



Photo: GDDKiA archives



Photo: S. Zieliński

The A4 Motorway runs from west to east through southern Poland. It will be completely finished in 2014. Over the past five years, Poland has built 2,430 km of roads.

The S22 Expressway is a single-carriageway express road running from Elbląg to the border with Russia at Grzechotki-Mamonovo, where it connects to a Russian road that continues to Kaliningrad.

Viaduct in Milowka. The S69 Express Road connects Bielsko-Biala in Poland with Slovakia, where it connects with the Slovakian D3 Motorway.

The S3 Express Road was recently modified: a new dual carriageway (2x2 lanes) consisting of 2 bi-level Klucz and Pyrzyce nodes, two-level crossings, minor roads, culverts, a rain sewerage system, and other facilities.



Photo: Cezary Skorka



Portugal

Bathed by the Atlantic Ocean, Portugal is the westernmost country on the European continent, its mainland anchored to the Iberian Peninsula, which is a gateway to Europe.

Since the development of the transport system in the 1990s, roads have played an ever-increasing role as an instrument of cohesion, connecting people both inside the country and abroad. The current national road plan aims to build roads that connect main cities to ports, airports, and land border points. For this reason, the country embarked on a massive motorway construction programme at the end of the 1990s based primarily on a PPP model.

About 88 % of the main roads have been finished, most of them being motorways (with either traditional tollbooths or electronic toll collection) that are part of the TERN network (94 % completed).

In 2007, the Portuguese government decided to make a distinction between construction and regulation functions. As a result, a regulatory institute, the Institute for Mobility and Transports, was created. The tasks of this institute are to supervise the management of the road sector and to develop a closer connection with customers. The former body, Estradas de Portugal, became the main concessionaire. It is entirely owned by the state and responsible for con-



Country facts (2011)

Area	92,212 km ²
Inhabitants	10,562,000
National road network	13,924 km (2012)
Passenger cars per 1,000 inhabitants	443

National road network (2012)

Motorways	2,988 km	21 %
Other roads	10,936 km	79 %

structing, funding, and maintaining the national road network for 75 years.

In addition to this concession, a further 15 road concessions deal with the construction and operation of national roads in Portugal.

Portugal is known as a warm-hearted country. Its warm and unique people, fado music (a Portuguese sad and emotive song of mourning), superb cuisine, mild Mediterranean climate, and breathtaking landscapes and shoreline vistas, make Portugal the perfect place to visit. A modern road network makes this possible.



Abrantes–Vila do Rei, IP6, right in the heart of Portugal.

Near Montemor-o-Novo, EN4. This road crosses the south bank of Tagus to the border village of Caia near Badajoz.



Photo: EP – Estradas de Portugal, S.A.

Photo: EP – Estradas de Portugal, S.A.

Photo: EP - Estradas de Portugal, S.A

Ponte Internacional Guadiana crosses the Guadiana River connecting southern Spain and Portugal. Completed in 1991, it is a cable-stayed bridge with a deck of prestressed concrete. The bridge is open to vehicles only.



Photo: EP - Estradas de Portugal, S.A



Photo: EP - Estradas de Portugal, S.A

From a small village of Carregueiro to Castro Verde, EN2.

The famous Vasco da Gama Bridge in Lisbon. It is the longest bridge in Europe, with a total length of 17.2 km (the main bridge is 0.829 km long and there are 11.5 km of viaducts and 4.8 km of dedicated access road).



Romania

The transportation infrastructure of Romania, a country located where central and south-eastern Europe meet, consists mainly of highways and railways.

The road infrastructure has been influenced by the Carpathian Mountains, which are crossed by 10 railways and over 20 motorways, and by the southern location of Romania's capital city, Bucharest, where all the main traffic lines converge.

The Romanian public road network has a total length of 153,014 km. There are also 4,910 bridges located on the country road network with a total bridge length of 19,200 km. Through the National Company for Roads and Motorways (CNADNR), the Ministry of Transport and Infrastructure manages the country's national roads. County and communal roads are managed by the designated county or communal administrative bodies.

The national roads constitute the major road network of this country, carrying over 65 % of the total road traffic. Of the 14,683 km of national roads, only 543 km have the status of motorway. The need for the construction of new motorways is evident in this country. A total of 58.1 % of the national roads are classified as 'principal' (8,156 km), of which more than half (4,508 km) are classified as European (E) roads.



Country facts

Area	238,391 km²
Inhabitants	20,255,000 (2012)
Road network	153,014 km
Number of bridges	4,910
Passenger cars per 1,000 inhabitants	201 (2010)

Road network

National roads	14,683 km	10 %
County roads	26,967 km	18 %
Communal roads	31,166 km	20 %
Roads in the cities (streets)	80,198 km	52 %

Compared with the road networks of other European countries, the Romanian road network has experienced significant traffic growth, especially the growth in heavy traffic, since 1990. The Romanian Road Agency's top priorities are to improve the safety of the road system in order to ensure the safe and efficient movement of people and goods on the network, while effectively managing the risks associated with road transport operations.

Calafat-Vidin Bridge (also known as Danube Bridge 2) is a road and rail bridge between the cities of Calafat, Romania, and Vidin, Bulgaria.



Scenic county road 175B connecting the two northern Romanian towns of Pojorata and Rarau.



More information:
www.cnadnr.ro



Photo: DRUMURI PODURI

The A2 links Bucharest, the capital city, and Constanta, the oldest extant city in Romania.



Photo: DRUMURI PODURI

The Transalpina, or DN67C, located in the Parâng Mountains in the Southern Carpathians of Romania, is one of the roads of the Carpathian Mountains. The road has its highest point at the Urdele Pass, which is 2,145 m above sea level.



Photo: DRUMURI PODURI

Otopeni Overpass in southern Romania.



Photo: DRUMURI PODURI

The Transfagarasan, or national road 7C, is the second-highest paved road in Romania. Built as a strategic military route, the 90 km of twists and turns run north to south across the tallest sections of the Southern Carpathians.



Slovenia

The geographical and climatic variety and diversity of Slovenia bring many challenges to the builders and operators of public roads, especially in terms of maintenance, which has led to the participation of the Slovenian Roads Agency in the project 'The Road to Excellence 2010'.

More than 38,900 km of public roads, including 6,724 km of state roads, are managed by the Slovenian Roads Agency (5,955 km of regional and main roads) and the Motorway Company of the Republic of Slovenia (769 km of motorways and expressways). Management of 13,860 km of municipal roads and 18,500 km of public paths is divided among 211 municipalities. The density of the national road network is 1.93 km/km².

Slovenia is situated in central Europe, and its motorway network is an important link between northern and southern Europe and western and eastern Europe. Slovenia is the only country in Europe that combines the Alps, the Mediterranean, the Pannonian Plain, and the Karst. The changing landscape is constantly surprising, and there are three climatic influences that meet in the country.

Slovenia is among the most biologically diverse countries in the world. Over one-third of Slovenia's terri-

Country facts

Area	20,273 km²
Inhabitants	2,055,000 (2012)
Road network	6,724 km (2012)
Number of bridges and viaducts	2,317 (2011)
Passenger cars per 1,000 inhabitants	449 (2012)

Road network (2012)

Motorways	677	10.1 %
Expressways	92	1.4 %
Main roads	819	12.2 %
Regional roads	5,136	76.3 %

tory is protected and included in the Europe-wide Natura 2000 network, which protects biodiversity. Slovenia accounts for less than 0.004 % of the Earth's surface but is home to more than 1 % of all living creatures and 2 % of terrestrial creatures—a total of 24,000 animal species. Almost 60 % of its territory is covered by forest and it has almost 27,000 km of rivers, streams, and other watercourses. As a result, there are a number of bridges and viaducts across the road network.

The Črni kal Viaduct is the longest (1,065 m) and the biggest bridging structure in the Slovenian road network.

Bridge for cyclists on the way to Bled, a famous tourist resort.





Photo: M. Kambič

Puh's Bridge in Ptuj, the oldest Slovenian town built at an ancient crossroads. The bridge over the Drava River is 430 m long and 18.7 m wide.

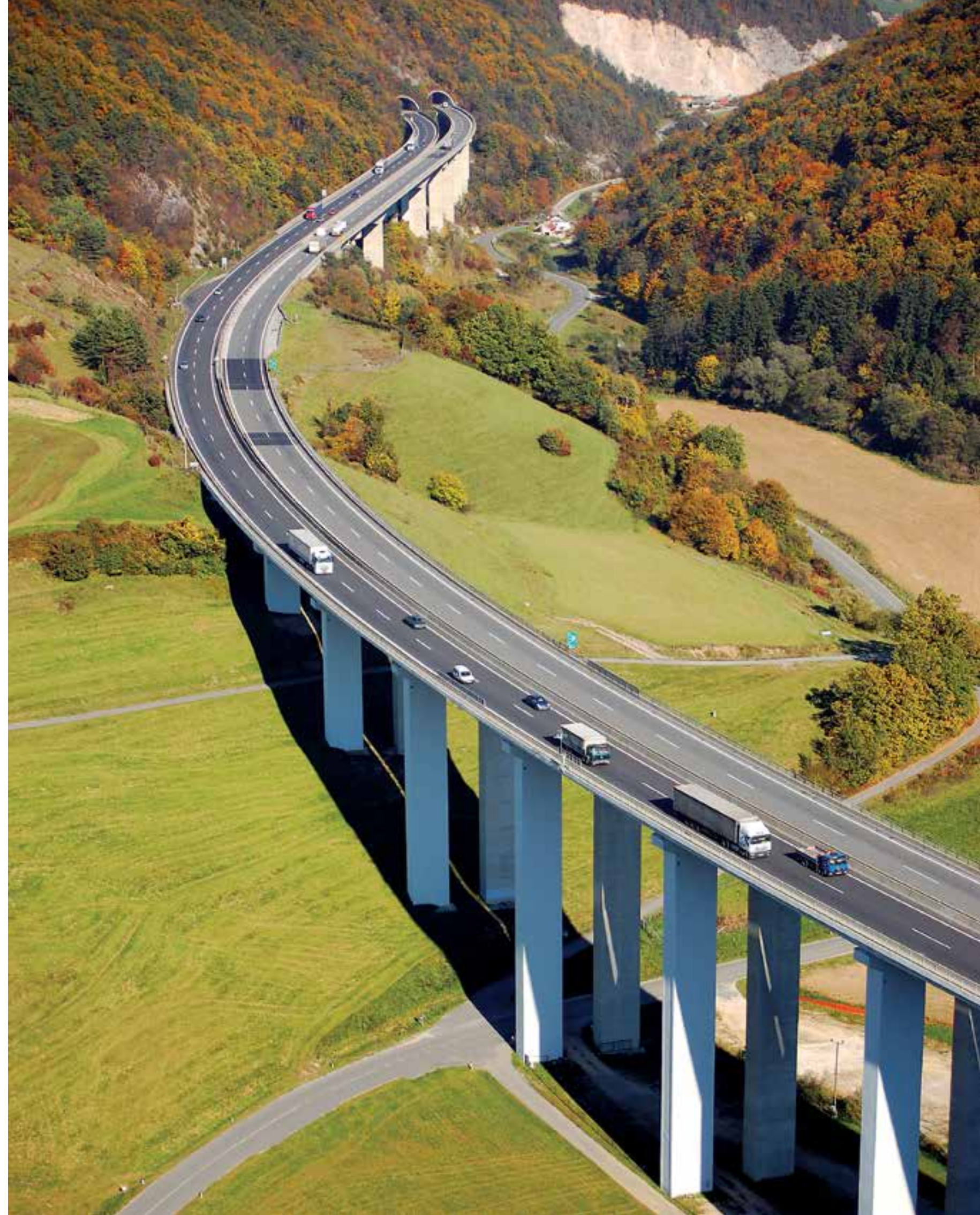


Photo: Arhiv Direktorja RS za ceste

Logar Valley, a magnificent Alpine glacial valley in Slovenia. A part of the Solčava region, tradition and nature have found harmony here, serving as a good example of sustainable development.

The A1 Motorway along the north-east-south-west axis is 245.3 km long and connects the biggest cities in Slovenia. It runs along Pan-European Corridor V (Lyon-Kiev).

Photo: S. Radovan



E

Spain

Spain is one of the largest countries in Europe and has an extensive network of roads, railways, air routes, and ports. The Spanish road network includes 16,204 km of motorways and dual carriageways, plus 149,703 km of single-carriageway roads. This represents an infrastructure of strategic importance across the country that secures the mobility needs of 90 % of all passenger demand and 85 % of freight demand, making it the most important element of the transport system. In addition, the effort and investment required to develop this road network has been a key factor in the economic stimulus and modernisation of Spanish society.

Certain aspects of Spain's geography affect the road transport network and its functionality in different ways. First of all, Spain is extremely hilly, as the average altitude is 660 m. Two large plateaus, surrounded by rugged mountain ranges and the low river valleys of



Country facts

Area	504,000 km²
Inhabitants	over 47,000,000
Road network	165,907 km
Passenger cars per 1,000 inhabitants	481 (2010)

Road network

National roads	25,835 km	16 %
Regional roads	71,853 km	43 %
Provincial roads	68,219 km	41 %

Ebro and Guadalquivir, present constant road engineering challenges. Numerous viaducts and tunnels are required to guarantee modern road designs and their environmental integration. Secondly, the population

is predominantly concentrated along the coasts and in a number of large metropolitan areas in the interior. In addition, tourism activity in these areas makes traffic demand highly seasonal. Finally, the Iberian Peninsula is located on the periphery of Europe, and is linked to the rest of the continent only through the mountain range of the Pyrenees.

From an administrative point of view, Spain is a highly decentralised country. For this reason, the 165,907 km of interurban roads are organised in three networks:

- National road network: 25,835 km owned and managed by the central government through the Dirección General de Carreteras (Road Directorate) of the Transport Ministry. The national road network covers 70 % of all motorways and dual-carriageway roads (11,364 km) and carries 52 % of all road traffic in Spain.
- Regional network: 71,853 km of roads aimed at intraregional traffic and managed by the regional governments.
- Provincial network: 68,219 km of roads owned and managed by the provincial councils.
- In addition, there are some 500,000 km of municipal roads that provide local and rural access.



The Spanish road system was initially radial, with six highways connecting Madrid to the Basque Country, Catalonia, Valencia, West Andalusia, Extremadura, and Galicia. It has increasingly become more complete and now has a mesh structure.

Link connecting the A-8 Highway ‘del Cantabrico’ and the AS-1 Regional Highway on the northern coast of Spain. In the Spanish road network, links are properly sized to facilitate the quick and secure connection between different roads.

More information:
www.fomento.es





Photo: FOMENTO



Photo: FOMENTO



Photo: FOMENTO

Spain is extremely hilly, which is why numerous viaducts and tunnels are required to guarantee modern road designs and their environmental integration. View of the highway A-3 and the high-speed railway over the reservoir of Contreras.

The Navia Viaduct on the A-8 is a bridge of great beauty. It has eleven spans, and the 905 m long cross beam is continuous over the entire viaduct. The two main spans are supported by mixed arches located in the median. The International Federation for Structural Concrete singled it out for a special mention in the 'Civil Engineering Structures' category of the federation's 2010 awards.

A cable-stayed bridge over the Lerez River in Pontevedra, Galicia. In Spain infrastructures built in urban environments tend to be highly aesthetic or even emblematic.

Spain possesses a highly developed highway system, with both toll roads and freeways. View of the A-67 Highway 'Cantabria-Meseta' heading towards the Cantabrian Mountains.



Photo: FOMENTO



Sweden

Sweden is a fairly large Scandinavian country with an extensive road network. The total length of state roads amounts to 98,500 km. The Swedish Transport Administration, Trafikverket, is responsible for the long-term planning of the transport system for road, rail, maritime shipping, and aviation. This is being done in close dialogue with regions and municipalities with the aim of developing an efficient and sustainable transport system from a perspective that encompasses all modes of transport.

Furthermore, Trafikverket has overall responsibility for building, operating, and maintaining state road and national railway networks ensuring that this infrastructure is effectively used and that it promotes safe and environmentally sound transport.

Trafikverket ensures transport for less inhabited regions by procuring national public service obligations in aviation, as well as maritime and bus and train services.

The overall goal for Sweden's transport policy is to safeguard the provision of socio-economically efficient and sustainable transport for all citizens, trade, and industry throughout Sweden.

Transportation has a significant impact on the environment. Trafikverket is working in various ways to limit this impact by influencing demands on vehicles,

Country facts

Area	449,964 km ²
Inhabitants:	9,540,000
Road network	214,600 km (2012)
Number of bridges and viaducts	15,800
Passenger cars per 1,000 inhabitants	464 (2011)

State road network (2012)

European highways	6,500 km	6.6 %
Other national roads	8,900 km	9.0 %
Primary county roads	11,000 km	11.2 %
Other county roads	72,100 km	73.2 %

participating in community planning, and fostering training in eco driving in order to reduce emission and noise.

The fragmentation of the landscape is a growing obstacle for biodiversity. Trafikverket works in various ways to ensure that the needs of natural and cultural heritage are taken into account when planning, building, and maintaining of roads and railways, including the management of cultural heritage bridges, road-sides rich in species and tree-lined avenues, and the creation of wildlife passages.

Åbromotet in Mölndal is one of the biggest road junctions in the western part of Sweden, with over 100,000 vehicles passing each day.

The Uddevallabron Bridge on the E6 Highway, was opened in May 2000. It is a cable-stayed bridge with a length of 1,712 m. The pylon is 149 m high.





Photo: Kerstin Ericsson

Road ferries are an important part of the Swedish road infrastructure due to the country's long coast, numerous islands, and big inland lakes. The 41 ferry lines with 65 ferries makes Trafikverket the biggest maritime shipping company in Sweden.

Kerstin Ericsson



Photo: Kerstin Ericsson

The management of roadsides rich in unique species is one of the ways Trafikverket works to ensure the needs of natural and cultural heritage. Country road in the province of Västergötland.

With a span of 1,210 m, the Högakusten Bridge has the longest span of all bridges in Sweden. It stretches over the Ångermanälven River. This area is famous for the annual land rise of almost 1 cm, which has been ongoing for 10,000 years.





Switzerland

Switzerland is a federal republic. It comprises 26 cantons and has four national languages. The Swiss Federal Roads Office (FEDRO) was established in 1998 as the Swiss federal authority responsible for road infrastructure and private road transport. Its principal objective is to secure the functionality of Switzerland's motorways and main roads. It works closely with cantonal, national, and international partners and formulates principles and prepares decisions for a sustainable federal road transport policy. It also draws up, supports, coordinates, and monitors suitable measures at both national and international level.

The Swiss road network comprises local, cantonal, and national roads (motorways). The entire network extends for some 71,500 km. Motorways are a major element in the Swiss transport system. Although in terms of length, motorways account for only around 2.5 % of the total Swiss road network, they account for around 40 % of the total distance covered by motor vehicles in Switzerland.

Switzerland's geographical location poses major challenges for road network managers and planners. Switzerland is a transit country situated in the heart of Europe and is traversed by some of the most important international road corridors. Its topography plays an important role in road planning and management.



Country facts

Area	41,285 km ²
Inhabitants:	8,014,000
Road network	71,464 km (2011)
Number of bridges and viaducts on roads (motorways only)	3,400 (2012)
Passenger cars per 1,000 inhabitants	529 (2011)

Road network (2011)

Motorways	1,799 km	2.5 %
Cantonal roads	18,027 km	25.2 %
Local roads	51,638 km	72.3 %

Switzerland's territory can be divided into two main parts: a low-lying area with a high population density, where available land is in short supply, and the Alps, where terrain is often inaccessible and climatic conditions difficult. Infrastructure and transport routes have to be designed to fit in with these very different landscapes. This is why the motorway network alone features around 3,000 engineering structures, including 228 tunnels, galleries, wildlife corridors, and noise abatement structures.

View of the Sunniberg Bridge in Klosters, a late work by the internationally renowned engineer Christian Menn. The bridge is 526 m long and has a curvature radius of around 500 m.



The Gotthard Pass is situated 2,100 m above sea level. Due to the enormous quantity of snow that falls here, it has to be closed during the winter. Before it can be reopened to traffic in the spring, the road has to be cleared by huge snow ploughs. The resulting snow walls can be more than 8 m high.



More information:
www.astra.admin.ch

Photo KEYSTONE



Aerial view of the southern Gotthard Pass road and the Tremola route, which was constructed between 1827 and 1832 and is Switzerland's longest historical road. The Gotthard Pass road connects the German- and Italian-speaking regions of Switzerland and forms the most direct connection between the north and the south of the Alps.

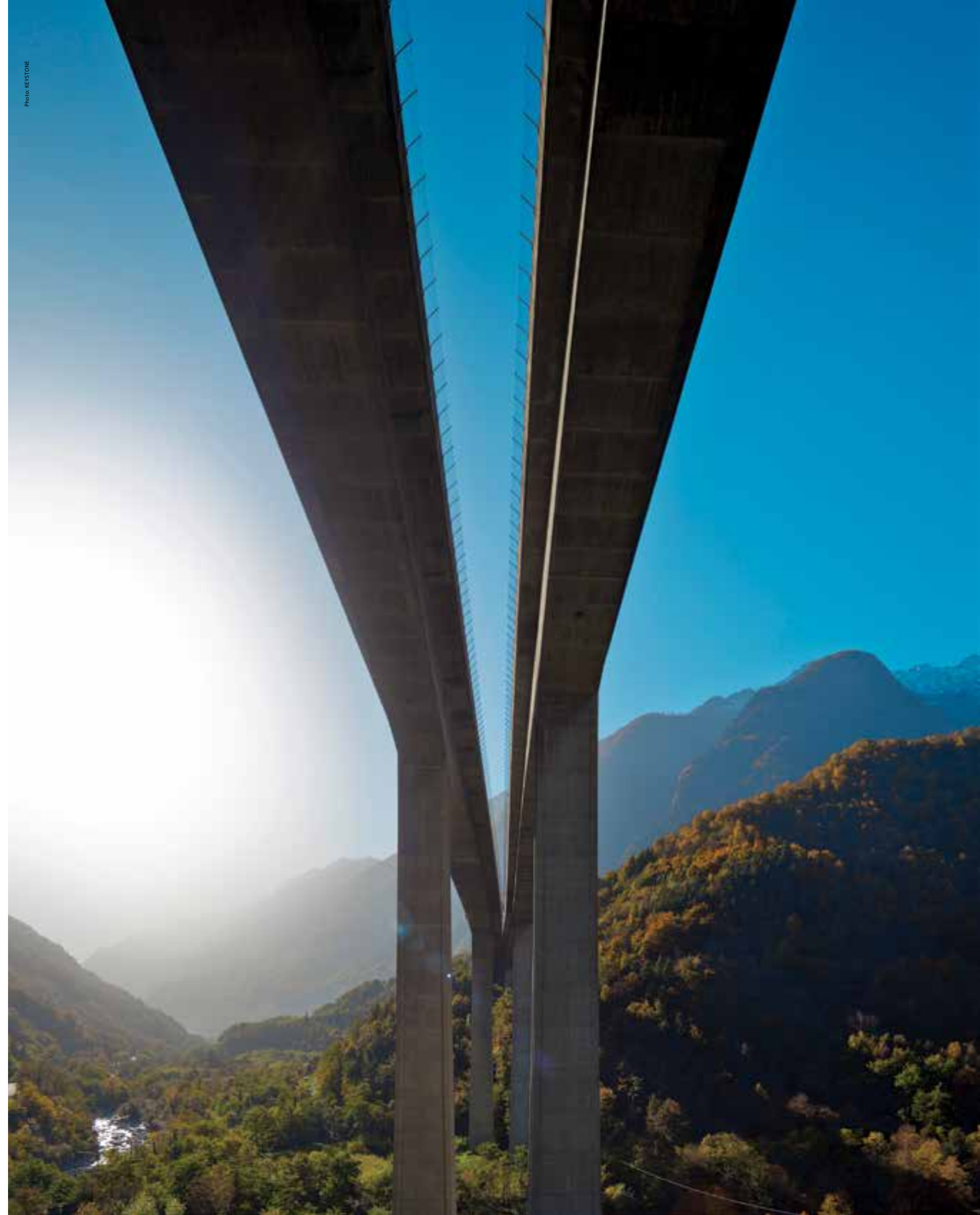
Photo KEYSTONE



Aerial view of the Schlund roundabout in Kriens-Horw (canton of Lucerne), in the heart of Switzerland. This roundabout was constructed as part of the upgrade of the A2 Motorway, and its unusual structure gives it the appearance of an octopus.

View of the Biaschina Viaduct on the A2 Motorway in Giornico, looking south. This viaduct was constructed between 1979 and 1983. Its height of 110 m above the valley floor makes it the second-highest bridge construction in Switzerland after Pont sur la Mentue.

Photo KEYSTONE





United Kingdom



The provision and maintenance of United Kingdom roads has been devolved from the central government. As a result, UK strategic roads are operated by separate administrations from its four respective countries: Highways Agency for England, Transport Scotland for Scotland, the Welsh Government for Wales, and Roads Service for Northern Ireland.

The total road length in the UK is estimated to be 420,000 km. Non-strategic minor roads make up 87 % of the total road length; of the strategic roads, motorways account for 0.9 % and 'A' roads represent 11.8 %. More than two-thirds of the UK's total road length lies in England.



Photo: Aidan Taylor, Highways Agency

England

The Highways Agency is an executive agency of the Department for Transport and is responsible for operating, maintaining, and improving England's strategic road network. This network is around 6,900 km long; although it represents just 2 % of all roads in England by length, it carries a third of all traffic by mileage.

There are approximately 17,300 structures on England's strategic road network, which has an asset value of approximately £108 billion (€125 billion). The remainder of England's 300,000 km of roads are managed by local authorities.

The Highways Agency strategic roads network incorporates numerous routes that are part of the trans-European road network (TEN-T). Within the TEN-T network there are 30 priority axis routes of particular strategic importance.

England contains two of these priority axis routes. The first carries traffic from the ports of Felixstowe and Harwich in the east, and extends north and west to the Welsh and Scottish borders. The second axis connects the port of Liverpool in the west to the port of Hull in the east via the M57, M62, M60, and A63.



More information:
highways.gov.uk

Country facts

Area	130,373 km²
Inhabitants	63,200,000
Strategic road network	6,952 km (2012)
Number of structures	17,300
Passenger cars per 1,000 inhabitants	455 (2012)

Road network (2012)

Motorway (including A(M) roads)	2,954	42.5 %
All purpose trunk roads	3,998	57.5 %

A3 Hindhead Tunnel

There was much excitement among local people about A3 Hindhead Tunnel, with 6,000 people walking through the twin-bore structure just a few weeks before it opened in July 2011.

At nearly two kilometres in length, it is the UK's longest road tunnel of its type. It also removed a notorious crossroads 'bottleneck' that had slowed traffic between London and Portsmouth, on the south coast of England, for decades.

The modern tunnel boasts the latest technology and innovations, but Hindhead Tunnel's biggest legacy is to the tranquil Devil's Punch Bowl, an internationally prized beauty spot.

By March 2012 the old A3 had been removed and the heathland had been 'returned to nature', reuniting two sides of a Site of Special Scientific Interest for the first time in more than 180 years.



Photo: Aidan Taylor, Highways Agency



Photo: Aidan Taylor, Highways Agency

Scotland

The transport system in Scotland is generally well-developed. The trunk road network is the responsibility of Scottish Ministers, and comprises all motorways and some of the main A roads; local councils are responsible for non-trunk roads. It is the Scottish Government's view that the trunk road network should:

- provide the road user with a coherent and continuous system of routes which serve destinations of importance to industry, commerce, agriculture, and tourism;
- define nationally important routes which will be developed in line with strategic national transport demands;
- ensure that those roads which are of predominately local importance are managed locally.

The strategic road network in Scotland is 3,405 km in length, representing 6 % of the total Scottish road network, and has an asset value of £18 billion (€21 billion).

Transport Scotland is responsible for the safe and effective management and operation of this network,

Country facts

Area	78,700 km ²
Inhabitants	5,234,000
Strategic road network	55,700 km
Passenger cars per 1,000 inhabitants	432 (2011)

Road network (2012)

Trunk road network	3,530km	6 %
A roads (non-trunk)	7,467km	13 %
Minor roads (B, C and unclassified)	44,771km	81 %

ensuring that it is not only fit for purpose but also respects and fits with the rich and varied natural landscape of Scotland.

Since 2001–02, the management and maintenance of the Scottish trunk road network has been performed by four 'operating companies' (South West, North East, South East, and North West).

A82

The A82 takes motorists from the densely populated central belt of Scotland to the northern city of Inverness, the capital of the Highlands.

It stretches for 175 miles, from the heart of the major conurbation of Glasgow through some of the most scenic landscape in the UK, including the windswept beauty of the Rannoch Moor highland plateau and the dramatic towering hills of Glen Coe.

It is a landscape steeped in history and cultural significance with parts of the modern route following the same alignment as General Wade's military road, built circa 1726.

At Fort William, the road passes beneath the shadow of Ben Nevis, the UK's highest peak, and then traverses the length of the Great Glen alongside the deep waters of Loch Ness.


More information:
transportscotland.gov.uk/road



Photo: Transport Scotland



Photo: Angus Corby, Transport Scotland

Wales

The trunk road and motorway network is one of Wales’ most important assets with a value of more than £13 billion (€15 billion; depreciated replacement cost). While only representing approximately 5 % of the total road length in Wales, it carries around a third of all traffic.

The A55 in the north and M4 corridor in the south form part of the trans-European road network (TEN-T), linking Europe to Ireland via the ports of Holyhead and Fishguard.

Wales has more than 1,600 km of strategic road, including around 120 km of motorway. The network is managed and operated by the Welsh Government, which works closely with local authorities and other bodies.

Country facts

Area	20,779 km²
Inhabitants	3,060,000
Road network	34,399 (2012)
Number of bridges and viaducts on roads	1,200
Passenger cars per 1,000 inhabitants	431.2

Road network (2012)

Motorway	133	0.4 %
A trunk road	1,576	4.6 %
A roads (non-trunk)	2,749	8.0 %
B and C roads	12,818	37.3 %
Minor surfaced roads	17,124	49.7 %

More information:
wales.gov.uk

M4 Second Severn Crossing

Opening in 1996, the Severn Crossing is a 950-metre-high cable-stayed bridge that carries three lanes of traffic in each direction between Wales and England. At more than five kilometres in length, it spans the remarkable Severn Estuary, a river channel that boasts the world’s second-largest tidal range.

The £330 million engineering marvel was constructed to cope with extreme conditions, not least strong winds. The estuary itself is a Site of Special Scientific Interest and one of the UK’s most important wildlife habitats. The mudflats and saltmarshes are a haven for unique species, and during winter the area regularly supports about 85,000 waterfowl. The extensive saltmarsh beneath the bridge hosts more than 250 bird species.

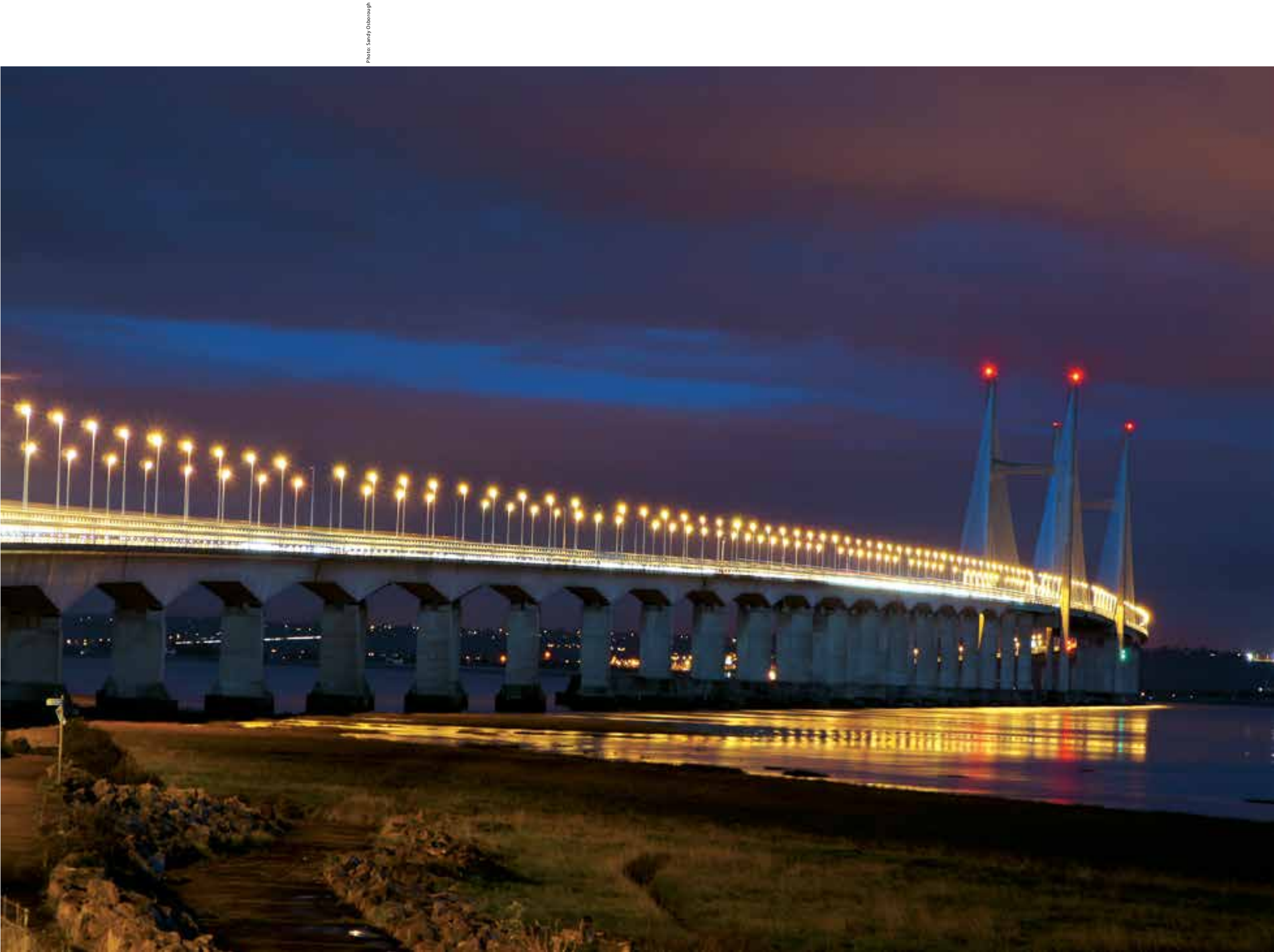


Photo: Sandy O'borough

Northern Ireland

Northern Ireland has an extensive network of around 25,000 km of public roads, developed and modernised over hundreds of years. The public road network is all surfaced.

There are 2,200 km of strategic roads, including 115 km of motorways, the first of which was constructed in 1962. The network is managed by a single road authority, Roads Service, which is part of the Department of Regional Development for Northern Ireland.

Northern Ireland has a well-developed network of primary, secondary, and local routes, providing good connectivity to the road network in the Republic of Ireland.

Like the rest of the United Kingdom, roads are classified as M, A, B, and C. However, the majority of the network is unclassified. The numbering system is separate from the system used in England, Scotland, and Wales.

In Northern Ireland, signposts show distances in miles, and speed limits are specified in miles per hour.

Region facts

Area	13,840 km ²
Inhabitants	1,811,000
Road network	25,246 km
Number of bridges on roads	5,800
Passenger cars per 1,000 inhabitants	486 (2011)

Road network

Motorways	115	0.5%
Roads	2,444	9.7 %
Other roads	22,688	89.8 %


More information:
drdni.gov.uk

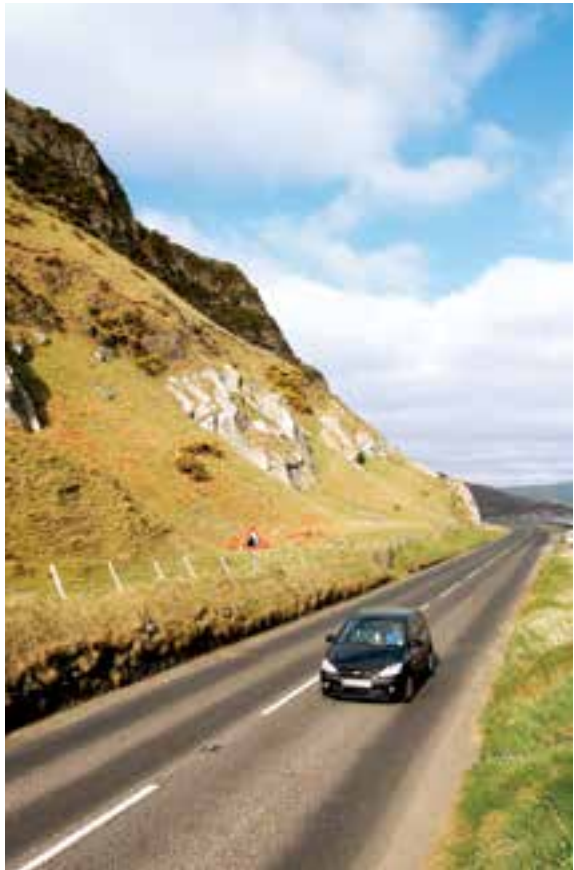


Photo: Roads Service Northern Ireland



Photo: Roads Service Northern Ireland

Antrim Coast Road

The A2 Antrim Coast Road is one of the UK's most scenic roads. It runs for 40 km along the north-eastern coastline of Northern Ireland, from Larne to Cushendall. The road was the vision of civil engineer William Bald, who blasted cliff faces—some more than 100 m high—so that rocks fell down to the foreshore to form the base of the new road.

The road was completed in 1842, opening up access to the Glens of Antrim. Today, it forms part of Northern Ireland's Causeway Coastal Route, which is most famous for providing access to one of Europe's most unique natural landmarks, the Giant's Causeway.

Photo: Highways Agency



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I would like to express my heartfelt thanks to CEDR and the employees of the respective national road authorities who helped in the making of this book.

Donaldas Andziulis



From north to south and from east to west, European countries are united by a common element: their roads. These roads allow us to fulfil our travel and transport needs. This book showcases Europe's beautiful roads in breathtaking photos, highlighting the genius of the engineers and builders who constructed them. It also includes some facts and figures about the road networks in each country.

