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**“Англійська мова за професійним спрямуванням”**

**для студентів ОС “Бакалавр” спеціальності 274 “Автомобільний  
транспорт”**

*навчально-методичний посібник*



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## UNIT 1

### MEANS OF TRANSPORTATION

#### *Ex. 1. Read and translate the text*

**Transport or transportation** is the movement of humans, animals and goods from one location to another. In other words the action of transportation is defined as a particular movement of an organism or thing from a point A to the Point B. Modes of Transport include air, land (rail and road), water, cable, pipeline and space.

**Road Transport** People travelling on the road are either pedestrians, cyclists or they are using a certain type of vehicle, such as automobiles, bicycles, buses, vans or trucks.

**Rail transport** This includes all transport over rails. This can be either for passenger or goods transport, and with different modes of transport, such as trains, metro and trams.

**Water Transport** or Ship transport is watercraft carrying people (passengers) or goods (cargo).

**Air Transport** includes all transport through the air. In an urban or regional context this air transport includes local air traffic such as small airplanes or helicopters

**Public Transport** is passenger transport which is publicly available. This can furthermore be distinguished in collective and individual transport.

Along the history, people have had the necessity and the curiosity of moving and changing from some places to others, and in this sense means of transport have played an important role. Nowadays there is a great variety of means of transport and all of them have advantages and disadvantages. When we have to choose a mean of transport we usually take into account distance, speed, comfort and cost, but let's focus the discussion on transport in our cities and the question is What do you think is better: to use public or private transport?

Cars provide autonomy and they are seen as being more convenient and reliable. They also provide access to more destinations than public transport. Besides, in another way, cars are seen to confer prestige and other socially desirable attributes. But on the contrary cars are expensive to support. Owning a car means spending a lot of money in garage, an insurance, fuel and tax. In addition, the main problem is that cars pollute very much and this is a problem which affects us all, car owners and non-car owners. In opposite of this, we can

find very modern very modern public transport as the tube, the tram, High Speed Train which are more ecological; they use less energy and make easier the traffic trough the cities, among other advantages. Besides, in modern cities, bicycles are being introduced as a public transport because the are more efficient than some public transports in some conditions, as speed, flexibility and energy saving. Is public transport really cheaper and more efficient? Is it promoted enough by governments? We should think about this, because it seems a contradiction.

### MEANS OF TRANSPORTATION VOCABULARY LIST

1. Ferry	14. Race car	27. Camper
2. Car	15. Subway	28. Catamaran
3. Bike	16. Boat	29. Train
4. Truck	17. Scooter	30. Tow truck
5. propeller plane	18. Skateboard	31. Cruiser
6. Jeep	19. Rocket	32. Delivery truck
7. Motorcycle	20. Submarine	33. Glider
8. Golf cart	21. Taxi	34. Garbage Truck
9. Helicopter	22. Bullet train	35. Kayak
10. Hot air balloon	23. Van	36. Yacht
11. Canoe	24. Zeppelin	37. Snowmobile
12. Train	25. Ambulance	38. Sailboat
13. Plane	26. Tank	39. ship

## VERBS TO TALK ABOUT TRANSPORT

catch	I have to catch a bus and I am late
Drive	I am going to drive my car to the service stations
Ride	She is riding her new motorcycle
Get on	I have to get on this bus, I can't wait any longer
Get off	We will be getting off the train at the next stop
Get in	We need to get in the taxi right now
Get out	Let's get out of the car

### *Ex. 1. Answer the following questions*

1. Do you know how to drive a car?
2. Do you know how to ride a motorcycle / Bicycle?
3. Do you remember your first bicycle? can you describe it?
4. Have you ever gotten a ticket / fine?
5. How old were you when you learned how to ride a bicycle?
6. Do you have a driver's license? How do you get it?
7. Do you have a car?
8. How often do you use public transportation?
9. Have you ever had an accident? Have you ever been in an accident?

### *Ex.2. Read each one of the sentences and try to guess the mean of transportation that the sentence refers to.*

1. This means of transportation is used to go to space: \_\_\_\_\_
2. Two examples of two-wheeled vehicles are \_\_\_\_\_ and \_\_\_\_\_
3. This means of transport is capable of going underwater: \_\_\_\_\_
4. This means of transport is used exclusively to transport injured people: \_\_\_\_\_
5. This is used to move damaged vehicles: \_\_\_\_\_

6. This is used to collect municipal solid waste: \_\_\_\_\_
7. This is used for winter travel and recreation: \_\_\_\_\_
8. It is moved by pushing with one foot while the other remains on the board: \_\_\_\_\_
9. An automobile built or modified for racing: \_\_\_\_\_
10. Vehicles specialized to deliver different types of goods: \_\_\_\_\_
11. A small vehicle created to carry golfers: \_\_\_\_\_
12. Vehicle that provides both transport and sleeping accommodation: \_\_\_\_\_
13. Vehicle for hire with a driver: \_\_\_\_\_
14. Armored fighting vehicle designed for frontline combat: \_\_\_\_\_
15. This aircraft is capable of moving vertically and horizontally: \_\_\_\_\_

**Ex. 3. Read the dialogue**

**Situation:** Tom is talking to Mary about his trip plan for a week.

<b>Tom:</b>	I'm going to Liberia next week.
<b>Mary:</b>	How are you traveling?
<b>Tom:</b>	By plane. It's more expensive, but it's the fastest way to get there. Liberia has a modern international airport.
<b>Mary:</b>	That's interesting. Why do you want to go there?
<b>Tom:</b>	Because Liberia has everything: nice weather, warm people and the most beautiful beaches are very near, around the Papagayo Gulf. You can go to the beaches by bus or you can rent a car.
<b>Mary:</b>	Where did you get that information?
<b>Tom:</b>	On the Internet.
<b>Mary:</b>	I'm sure you'll have a great time.
<b>Tom:</b>	I know I will.

**Ex. 4 Use these questions for short talks.**

1. Have you ever gotten a speeding ticket?
2. Do you always wear a seatbelt when you get in a car?
3. What do you think about carpooling to work?
4. What's your opinion about services like UBER?
5. Is parking a problem in your city?
6. Have you ever flown to another country?
7. What transportation problems are there in your country?
8. What will the transportation of the future be like?
9. What form of transport is worst for the environment?

## UNIT 2

### TRANSPOTATON SYSTEM

**Ex. 1. Read and translate the text**

An appropriate point of departure for any discussion of transportation systems is a set of definitions. What is a transportation system? What are the various types of transportation systems? And how do they interact with their environment? After responding to these questions, this essay will briefly examine the role, effects, and control of transportation systems in the economic, social, and physical systems.

The textbook definition of a transportation system or *mode* is a system for moving persons or goods consisting of three components:

(a) The *vehicle* (equipment) is what moves objects or *traffic* (people, goods). The vehicle consists of a container and some type of motive power, either onboard or elsewhere.

(b) The *guideway* is what the vehicles move along. The guideway consists of links and nodes that together form a network. A sequence of links is called a



route. A terminal is a node where traffic is transferred from one vehicle to another.

(c) The *operations plan* is the set of procedures by which traffic and vehicles are moved over the guideway, including schedules or timetables, crew assignments, and control systems.

Transportation systems, either existing or envisaged for the future, can be classified according to these components and their relations to the larger economic, social, and physical systems in which they occur. Guideways often reside on or within Earth's surface and are therefore described as surface or ground transportation systems. Examples are highways and railways. Some systems, however, have their guideways in the air or on the water. In this case, their principal facilities are ports, either airports or harbors. Of course, a canal is also a guideway consisting of water held in a channel.

Each transportation system operates within a larger economic, social, and physical environment, as noted above. Accordingly, each system generates certain external effects, or externalities, on its environment. Among these are emissions, noise, and damage to property and persons, both those using the system and those adjacent to it. Emissions, largely from vehicles, degrade the air, water, and soil through their exhaust and spills of hazardous materials. Noise from vehicle operations impact society within hearing distance. Passengers and bystanders are injured or killed when crashes occur, and accidents also damage or destroy goods and property.

Despite their positive effects, transportation systems also can, and often do, have large negative effects on the economic and social systems they serve. One of the most pervasive effects is that of traffic congestion in all levels and types of transportation services. Congestion of transportation systems occurs when the demand or use of the system brought forth at the given generalized cost (time, money, risks, etc.) is excessive compared with the system's capacity or the supply of services available. Congestion is effectively the wasted time and expense of using an inadequately supplied transportation service. However, congestion also serves to bring the system's use into balance with its available capacity.

***Exercise 2. Translate these sentences into Ukrainian paying attention to the active vocabulary of the text.***

1. Transport development depends upon development and allocation of productive abilities of the state. 2. Transportation policy provides state instructions with shipments. 3. Ukraine has the purpose to become an integral part of European transportation system as it is used as a transportation country to ship goods. 4. Reasonable planning will reduce the transportation costs. 5.

Satellite technology allows to establish communication across a wide geographic area such as region or even the world. 6. Last week we signed the contract for car shipment. 7. Electronic Data Interchange is defined as intercompany computer-to-computer exchange of business documents in standard formats to facilitate high-volume transactions. 8. To study transport logistics one must have a basic understanding of supply management. 9. Aircraft of Ukraine is not competitive in the foreign market of airlines because of inefficient training of personnel. 10. Transport development depends upon development and allocation of productive abilities of the state.

***Exercise 3. Translate these sentences into English.***

1. Україна має широко розвинуту транспортну систему. 2. Автомобільні перевезення є найважливішими в Україні. 3. Українська транспортна система є складовою частиною європейської транспортної системи. 4. Транспорт привносить у наше життя великі соціальні та екологічні проблеми. 5. Україна має добре розвинений громадський транспорт. 6. Комп'ютерні системи залучаються до контролювання транспорту на автошляхах. 7. Тисячі людей слідкують за розвитком автомобільного транспорту. 8. Ефективна транспортна система дуже важлива для України через її територію та виробничі потужності.

## UNIT 3

### PUBLIC TRANSPORT

***Ex. 1. Read and translate the text***

Public transport (also known as public transportation, public transit, or mass transit) is a system of transport, in contrast to private transport, for passengers by group travel systems available for use by the general public, typically managed on a schedule, operated on established routes, and that charge a posted fee for each trip. Examples of public transport include city buses, trolleybuses, trams (or light rail) and passenger trains, rapid transit (metro/subway/underground, etc.) and ferries. Public transport between cities is dominated by airlines, coaches, and intercity rail. High-speed rail networks are being developed in many parts of the world.

Most public transport systems run along fixed routes with set embarkation/disembarkation points to a prearranged timetable, with the most frequent services running to a headway (e.g.: "every 15 minutes" as opposed to being scheduled for any specific time of the day). However, most public transport trips include other modes of travel, such as passengers walking or catching bus services to access train stations. Share taxis offer on-demand services in many parts of the world, which may compete with fixed public transport lines, or complement them, by bringing passengers to interchanges. Paratransit is sometimes used in areas of low demand and for people who need a door-to-door service.

Urban public transit differs distinctly among Asia, North America, and Europe. In Asia, profit-driven, privately-owned and publicly traded mass transit and real estate conglomerates predominantly operate public transit systems. In North America, municipal transit authorities most commonly run mass transit operations. In Europe, both state-owned and private companies predominantly operate mass transit systems. Public transport services can be profit-driven by use of pay-by-the-distance fares or funded by government subsidies in which flat rate fares are charged to each passenger. Services can be fully profitable through high usership numbers and high farebox recovery ratios, or can be regulated and possibly subsidised from local or national tax revenue. Fully subsidised, free of charge services operate in some towns and cities.

For geographical, historical and economic reasons, differences exist internationally regarding use and extent of public transport. While countries in the Old World tend to have extensive and frequent systems serving their old and dense cities, many cities of the New World have more sprawl and much less comprehensive public transport. The International Association of Public Transport (UITP) is the international network for public transport authorities and operators, policy decision-makers, scientific institutes and the public transport supply and service industry. It has 3,400 members from 92 countries from all over the globe.

***Exercise 2. Complete the sentence.***

1. Public transport \_\_\_\_\_
2. Passenger transport \_\_\_\_\_
3. Public transport modes include \_\_\_\_\_
4. Most public transport runs to a scheduled timetable \_\_\_\_\_
5. Public transport services \_\_\_\_\_

***Exercise 3. Translate these sentences into Ukrainian paying attention to the active vocabulary of the text.***

1. Intermodal passenger transport, also called mixed-mode commuting, involves using two or more modes of transportation in a journey. 2. The goal of mixed-mode commuting is often to combine the strengths (and

offset the weaknesses) of various transportation options. 3. A major goal of modern intermodal passenger transport is to reduce dependence on the automobile as the major mode of ground transportation and increase use of public transport. 4. Mixed-mode commuting often centres on one type of rapid transit, usually rail, to which low-speed options (i.e. bus, tram, or bicycle) are appended at the beginning or end of the journey. 5. Trains offer quick transit into an urban area, where passengers can disembark and access a similar array of options to complete the trip. 6. Most modes of transportation have always been intermodal; for example, to get to the airport people have always needed drive or be driven (e.g. take a taxi) or to take public transport (if available), and to get to an inter-regional railway station people have needed take local transport such as a bus, tram, or urban rail. 7. Today world automobiles are engineered and built in such a manner that they are able to withstand heavy loads for long periods of operation. 8. The passenger's safety and comfort must be considered as much as the car's reliable performance and ability to travel on the highways. 9. The automobile must have great power for riding, have dependable clutch and brakes, have good riding qualities, good lights, dependable starting and ignition systems, low fuel consumption, as well as long service life

***Exercise 4. Translate these sentences into English.***

1. Пасажирське сполучення між окремими населеними пунктами постійно розвивається. 2. Зміцнення транспортних та економічних зв'язків між сусідніми населеними пунктами призвело до виникнення більш великих суспільних об'єднань. 3. Для сучасної України значення транспорту велике, тому що саме транспорт з'єднує різні регіони у єдину країну. 4. В цьому сенсі транспорт є одним з відомих країностворюючих факторів. 5. Транспорт -- комплекс, який здійснює перевезення людей та вантажів. 6. Автомобільний пасажирський транспорт є складовою частиною єдиної транспортної системи країни, та її успішне функціонування в більшості залежить від координації роботи з іншими видами транспорту.

***Exercise 5. Answer the following questions on the text:***

1. What do you know about public transportation system?
2. How often do you use route-taxi?
3. What is the level of public transport in Lutsk?
4. Is automobile transport more important than railroad one?
5. Do you like travelling by coaches?
6. What are zero-fare (free) services?

7. What are public transport services?

**Ex. 6 Use these questions for short talks.**

1. What are the pros and cons of using public transport?
2. Do you have a smartphone app to call a taxi, such as Uber?
3. How do you get to school/University/work?
4. Is traffic a serious problem in your city? What do you usually do when you are stuck in a traffic jam?
5. What skills do you need to practise to pass the driving test in your country?
6. Did you pass your test first time? What do you find most difficult about driving?
7. Do you think your city has good public transportation?
8. Do you think a motorcycle rider should be required to wear a helmet?
9. Have you ever missed your last train or bus home?

## UNIT 4

### WHAT IS AN AUTOMOBILE?

**Ex. 1. Read and translate the text**

Automobile is a self-propelled vehicle, used primarily on public roads but adaptable to other surfaces. Automobiles changed the world during the 20<sup>th</sup> century. From the growth of suburbs to the development of road and highway systems, the so-called horseless carriage has forever altered the modern landscape. The manufacture, sale and servicing of automobiles have become key elements of industrial economies. But along with greater mobility and job creation, the automobile has brought noise and air pollution, and automobile accidents rank among the leading causes of death and injury throughout the world. But for better or worse, the 1900s can be called the Age of the Automobile, and cars will no doubt continue to shape our culture and economy well into the 21<sup>st</sup> century.

Automobiles are classified by size, style, number of doors and intended

use. The typical automobile, also called a car, auto, motorcar, and passenger car, has four wheels and can carry up to six people, including a driver. Larger vehicles designed to carry more passengers are called vans, minivans, omnibuses or buses. Those used to carry cargo are called pickups or trucks, depending on their size and design. Minivans are van-style vehicles built on a passenger car frame that can usually carry up to eight passengers. Sport-utility vehicles, also known as SUVs, are more rugged than passenger cars and are designed for driving in mud or snow.

The automobile is built around an engine. Various systems supply the engine with fuel, cool it during operation, lubricate its moving parts, and remove exhaust gases it creates. The engine produces mechanical power that is transmitted to the automobile's wheels through a drivetrain, which includes a transmission, one or more drive shafts, a differential gear and axles. Suspension systems, which include springs and shock absorbers, cushion the ride and help protect the vehicle from being damaged by bumps, heavy loads and other stresses.

***Ex. 3. Answer the following questions***

1. Where are automobiles primarily used?
2. How did automobiles change the world during the 20
3. What key elements of industrial economies have become significant?
4. What kinds of disadvantages have appeared with the development of automobiles?
5. How do we call the 1900s concerning the evolving of automobile indus-
6. What is the classification of automobiles?
7. How many people can an automobile carry up?
8. How are vehicles designed to carry more than 6 passengers called?
9. What is the purpose of SUVs?
10. What is the main part of an automobile?
11. Why do we need to use various systems of engine?

**Ex. 4. Decide if the following sentences are true (T) or false (F)**

1. The 1900s can be called the Age of the Automobile.
2. The typical automobile can carry up to eight people, including a driver.
3. Automobiles changed the world during the 18<sup>th</sup> century.
4. So-called horseless carriage has forever altered the modern landscape.
5. The automobile has never brought noise and air pollution.
6. The engine produces electrical power that is transmitted to the automobile's wheels through a drivetrain.
7. Suspension systems help protecting the vehicle from being damaged by bumps.
8. The price, colour and size of automobiles have become key elements of industrial economies.
9. Larger vehicles designed to carry more passengers are called vans, minivans, omnibuses or buses.
10. Minivans are SUVs vehicles built on a passenger car frame that can usually carry up to ten passengers.

**Ex. 5. Translate the following sentences into English**

1. У середині автомобіля знаходиться двигун.
2. Ця система двигуна охолоджує його під час руху.
3. Мінівени здатні перевозити до восьми пасажирів.
4. Кінець 19-го сторіччя може називатися епохою автомобіля.
5. Двигун виробляє механічну енергію, яка передається на колеса автомобіля.
6. Спортивне легкове авто має більш жорстку конструкцію, ніж пасажирське авто.

7. Амортизатори допомагають захистити авто від пошкоджень на нерівних дорогах.
8. Звичайний автомобіль може перевозити до шести пасажирів, разом з водієм.
9. Кожен автомобіль має систему, яка видаляє відпрацьовані гази, які він створює.
10. У 1891 році Рене Панар та Еміль Левассор створили перший «безкінний» екіпаж з силовим агрегатом, яким був двигун.
11. Більшість сучасних автомобілів мають чотири колеса, рідинне або повітряне охолодження двигуна та сам двигун.
12. Розмір, стиль, кількість дверей та призначення для користування є ключовими моментами під час купівлі автомобіля.

***Ex. 6. Prepare reports using Internet or other sources (catalogues, magazines, books, etc.) about the latest news, achievements in the field concerning the topic of the unit***

## UNIT 5

### CLASIFICATION OF AUTOMOBILES

There are several bases of classification of automobiles, hence they can be categorized as follows.

*Based on purpose*

1. Passenger vehicle
2. Goods vehicle

*Based on capacity*

1. Heavy motor vehicle (HMV)
2. Medium motor vehicle (MMV)
3. Light motor vehicle (LMV)



*Based on fuel used*

1. Petrol engine vehicles
2. *Diesel engine vehicle*
3. Gas vehicle
4. *Solar vehicle*
5. Hydrogen engine vehicle
6. Electric powered vehicle
7. *Steam engine vehicles*
8. Hybrid vehicles
9. Hybrid electric vehicle (HEV)

*Based on transmission*

1. Automatic transmission vehicle
2. Manual (or conventional) transmission vehicle
3. Semi-automatic transmission vehicle

*Based on number of wheels*

1. Two-wheeler
2. Three-wheeler
3. Four-wheeler
4. Six-wheeler and more

*Based on driving side*

1. Left handed drive automobile
2. Right handed drive automobile

*Based on drive availability*

1. Four-wheel drive
2. All wheel drive

### **Components of an engine**

Engine is one of the most important parts of an automobile. It is the source of power to the vehicle which is used to propel it. It is very important to understand *different parts of an engine*.

Parts on an engine can be classified into two parts.

1. Stationary or structure forming components
2. Moving or mechanism forming components

Mechanism forming components

- Piston
- Piston rings
- Gudgeon pin
- Connecting rod
- Crank
- Crankshaft
- Camshaft
- Valves
- Valve operating mechanism timing gears
- Chain and sprocket

- Belt and pulley
- Flywheel

#### Structural components

- Cylinder block
- Cylinder head
- Gaskets
- Cylinder liner
- Crankcase
- Inlet and outlet manifold
- Oil pan
- Resonator
- Muffler (or silencer)
- Vibration damper
- Bearing
- Fasteners
- Turbocharger

### **Resistance to the motion of an automobile**

While moving a vehicle has to overcome several types of resistances offered to it. Broadly the resistance can be classified into following categories.

- 1 Aerodynamic drag
- 2 Gradient resistance
- 3 Rolling resistance
- 4 Inertia

### **Clutch**

Clutch is a machine member which connects two rotating shafts, so that driven shaft can be stopped at the will of operator without stopping driving shaft. A clutch has to provide interruptible connection between two shafts. Clutches are used in automobiles and often used while changing gears or using brakes. In a modern automobile clutch is situated just between engine and gear box.

#### *Types of clutch*

- Single plate clutch
- Multi plate clutch
- Centrifugal clutch
- Semi centrifugal clutch
- Cone clutch

#### *Clutch operating mechanisms*

1. Mechanically operated clutch
2. Hydraulically operated clutch

### **Overdrive**

Overdrive is a mechanical component which provides faster output speed for slower input speed.

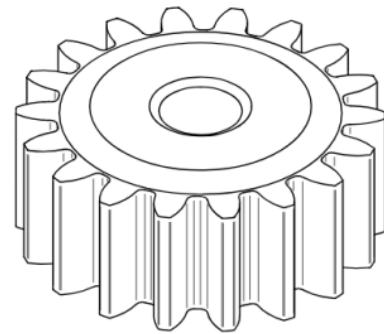
### **Fluid coupling**

A fluid coupling is used to transmit motion between two shafts with the help of acceleration and deacceleration of working fluid. It works similar to the clutch.

### **Freewheel**

It is a special type of clutch which disengages driven shaft from the driving shaft when the speed of driven shaft becomes more than driving shaft.

### **Gears**



Gears are another important part of an automobile.

These are used to adjust speed and torque of the wheels. Since high torque is required for starting a vehicle and high speed is required for running it.

For a given power engine speed and torque are always inversely proportional.

### **Types of transmissions**

Several kinds of transmissions can be employed in a vehicle. Transmissions can be classified as follows.

#### *Manual transmission*

1. Sliding mesh gearbox
2. Constant mesh gearbox
3. Synchronous gearbox
4. Synchronous gearbox with overdrive

#### *Semi-automatic transmission*

1. Electric controlled with overdrive
2. Electric controlled without overdrive
3. Fluid torque drive

#### *Automatic drive*

1. Hydraulic drive
2. Torque converter drive

### **Braking system**

Brakes are used to stop or slow down the vehicle. When brakes are applied it creates a force against the motion of tires which ultimately stops the vehicle. Requirements of an efficient braking system. There are some requirements of a good braking system. It should ensure following things.

- It must operate on least effort
- It produces less heat during operation
- It should not slip
- It must have strong braking force
- It must act suddenly during emergency
- The vehicle must stop at a smallest distance

Types of brakes

Following are the main types of the brakes used.

*On the basis of purpose served*

1. Main brake
2. Parking brake

*On the basis of location*

1. Wheel mounted
2. Transmission mounted

*On the basis of driver's ergonomics*

1. Hand brake
2. Foot brake

*On the basis of actuating*

1. Mechanical brake
2. Hydraulic brake
3. Air brake
4. Electric brake

*On the basis of construction*

1. Disc brake
2. Drum brake

*On the basis of application of brake efforts*

1. Manual brake
2. Power brake
3. Power assisted

*On the basis of action of brake shoes*

1. External expanding brake
2. Internal expanding brake

### **Brake lining**

Brake lining is a high friction material which is used to stop the moving vehicle by providing friction resistance to the motion of vehicle.

#### **Properties of brake lining**

For high performance brake lining should have following properties

- Low heat swell
- Low water swell
- Low wear rate
- High coefficient of hot and normal friction
- High strength and physical properties

## Brake lining material

Brake linings are generally made from asbestos, rubber, metallic plates, resin, minerals and coefficient of friction modifiers.

### **Loads on the frame**

Frame of an automobile bears several types of loads. These loads are dependent of terrain and driving conditions.

1. Flexural (or bending) load

Factors responsible for flexural load

- Dead weight of vehicle
- Weight of passengers
- Engine torque
- Braking torque
- Road camber
- Cornering force
- Side wind

2. Torsional load (or twisting moment)

Following things are employed to curb torsional load

- Torque resisting members
- Cross members
- A radius rod
- Benz frame type torque members

3. Impact load

### **Steering system**



A steering system provides directional stability to a vehicle. It also helps in move the vehicle in a particular direction.

Types of steering systems

There are different types of steering systems. On the basis of gearing arrangement steering systems can be classified into following types.

1. Worm and nut steering gear
2. Cam and lever steering gear
3. Worm and roller steering gear

4. Worm and sector steering gear
5. Rack and pinion steering gear

### **Differential assembly**

A differential assembly is a special kind of gear arrangement which allows outer tire to move with a greater speed than inner tires while turning.

Types of differentials

1. Double reduction type
2. Power lock or non-slip
3. Conventional

### **4. Suspension system**



A good *suspension system* is the luxury and necessity of a modern vehicle. It prevents and mitigates sudden jerks to the vehicle from the uneven road surface. A suspension system consists spring and damper elements for its working.

Types of suspension systems

- Leaf spring
- Coil spring
- Torsion bars
- Air suspension
- Automatic level control

### ***Ex. 1. Answer the following questions***

1. What does automobile engineering deal with?
2. What is the purpose of automobiles?
3. What is the principle for working of all types of vehicles?
4. What is necessary to get the transmission motion in the vehicles?
5. What kind of engine is the most popular?
6. What types of vehicles do you know?
7. How are automobiles classified?
8. Give examples of automobiles with three wheels.
9. What is the difference between diesel vehicle and electric vehicle?
10. How is vehicle with a steam engine called?
11. Give examples of automobiles according to their body.
12. What are vehicles for special purpose?

**Ex. 2. Put the words in the correct order**

- 1) have, many, they, how, got, trucks and buses?
- 2) types, are, the, automobiles, different, vehicles, of?
- 3) types, of, different, are, fuels, burnt, the, inside, cylinder?
- 4) used, cars, for, are, of, transportation, passengers?
- 5) knowledge, should, engineer, have, the, of, engineering, automobile?
- 6) what, fuel, is, kind, the, of, popular, most?
- 7) motorcycles, scooters, popular, are, and, teenagers, among?
- 8) combustion, of, the, automobiles, most, are, internal, vehicles, engines?

**Ex. 3. Translate the following sentences into English**

1. Усередині циліндра спалюються різні види палива. 2. Автомобілі спеціального призначення існують в кожній країні. 3. Джон вважає, що дизельне паливо більш дешево, ніж бензин. 4. Автобуси застосовуються для перевезення пасажирів. 5. Автомобілі класифікуються на основі різних принципів. 6. Декілька днів тому Мері купила автомобіль із відкидним дахом. 7. Вантажівки для перевезення важкого вантажу є дуже популярними в нашій країні. 8. Кожен інженер-механік повинен мати знання із автомобільної інженерії. 9. Сьогодні у світі налічується більше десятка тисяч транспортних засобів. 10. Більшість транспортних засобів використовує двигун внутрішнього згорання. 11. Автомобіль – це вид транспортного засобу для здійснення різних перевезень. 12. Автотранспортні засоби – це транспортні засоби, які рухаються на колесах по дорогах за допомогою власного двигуна.

**Ex. 4. Prepare reports using Internet or other sources (catalogues, magazines, books, etc.) about the latest news, achievements in the field concerning the topic of the unit**

## UNIT 6

### HOW AN ENGINE WORKS

***Ex. 1. Read and translate the text***

Since the same process occurs in each cylinder, we will have a look at one cylinder to see how the four stroke process works.

The four strokes are Intake, Compression, Power and Exhaust. The piston travels down on the Intake stroke, up on the Compression stroke, down on the Power stroke and up on the Exhaust stroke.

*Intake.* As the piston starts down on the Intake stroke, the intake valve opens and the fuel-air mixture is drawn into the cylinder. When the piston reaches the bottom of the intake stroke, the intake valve closes, trapping the air-fuel mixture in the cylinder.

*Compression.* The piston moves up and compresses the trapped fuel-air mixture that was brought in by the intake stroke. The amount that the mixture is compressed is determined by the compression ratio of the engine. The compression ratio on the average engine is in the range of 8:1 to 10:1. This means that when the piston reaches the top of the cylinder, the air-fuel mixture is squeezed to about one tenth of its original volume.

*Power.* The spark plug fires, igniting the compressed air-fuel mixture which produces a powerful expansion of the vapor. The combustion process pushes the piston down the cylinder with great force turning the crankshaft to provide the power to propel the vehicle. Each piston fires at a different time, determined by the engine firing order. By the time the crankshaft completes two revolutions, each cylinder in the engine will have gone through one power stroke.

*Exhaust.* With the piston at the bottom of the cylinder, the exhaust valve opens to allow the burned exhaust gas to be expelled to the exhaust system. Since the cylinder contains so much pressure, when the valve opens, the gas is expelled with a violent force (that is why a vehicle without a muffler sounds so loud.) The piston travels up to the top of the cylinder pushing all the exhaust out before closing the exhaust valve in preparation for starting the four stroke process over again.

***Ex. 2. Answer the following questions***

1. What does the four stroke process consist of?
2. In what case does the intake valve open?
3. When is the air-fuel mixture trapping in the cylinder?
4. What is the amount of the compressed mixture determined by?
5. In what case is the air-fuel mixture squeezed to about one tenth of its original volume?



6. What is the role of the spark plug?
7. Why does a vehicle without a muffler sound so loud?
8. What is each piston's firing time determined by?
9. Is it an easy process to keep engines working well?
10. What is the reason of gas expelling with a violent force?

**Ex. 3. Match the part of the car with its function**

steering wheel	holds brake fluid
exhaust manifold	provides the power
radiator	stores electricity
fuel tank	ensures that the rear wheels turn at a different speed to each other when a car corners
brake line	produces electricity
silencer/muffler	sends an electric current to the spark plugs
battery	carries waste gases to the exhaust pipe
clutch	makes the car go faster when it is pressed
differential	used by the driver to turn the car
engine	holds fuel
brake cylinder	cools water from the engine
accelerator	connects the brake cylinder to the brakes
distributor	reduces the exhaust noise
alternator	disconnects the engine from the gearbox while the gears are changed

**Ex. 4. Translate the following sentences into English**

1. Двотактні двигуни при роботі виділяють більше диму.
2. Двотактний двигун важить менше ніж чотиритактний.
3. При пуску холодного двигуна необхідна багата горюча суміш.
4. Чотиритактні двигуни мають складнішу конструкцію і коштують дорожче.
5. У двотактному двигуні одного оберту колінчастого валу вистачає для завершення робочого циклу.

6. В автомобілях двигун захищений під капотом, а у мотоциклів зовнішній вигляд, дизайн двигуна має важливе значення.

7. Перший чотиритактний двигун, придатний до практичного використання, створив німецький інженер Ніколаус Отто у 1876 році.

8. Робочі цикли більшості автомобільних двигунів здійснюються за чотири такти, тому ці двигуни називаються чотиритактними.

***Ex. 5. Prepare reports using Internet or other sources (catalogues, magazines, books, etc.) about the latest news, achievements in the field concerning the topic of the unit***

## UNIT 7

### TRAFFIC REGULATIONS FOR DRIVING ON THE AUTOBAHN

***Ex. 1. Read and translate the text***

The German freeway system, the Autobahn, links most of the country's major cities. The Autobahn is the pinnacle of the German driving experience. Virtually all of the world's serious drivers have heard of it. Some of the fastest and busiest highways in Europe connect Frankfurt to Munich. The Autobahn looks like a typical freeway. The stories of speed anarchy are only half correct – many sections of Autobahn have speed limits.

The world's first motorway was built in Berlin between 1913 and 1921. Italy built several expressways in the 1920s and Germany followed with its first "auto-only roads" opening in 1929 between Düsseldorf and Opladen and in 1932.

The general rule for design is to provide for unimpeded, high-speed traffic flow.

To help maintain safe grades, the Autobahn system has extensive tunnels and bridges. So-called "valley bridges" are often over 500 meters high and sometimes over 1 kilometer long. The Autobahn system now has over 70 tunnels, both through mountains as well as in urban areas. As a result of the tunnel disasters elsewhere in Europe during the past decade, extra emphasis has been placed on tunnel safety. All Autobahn tunnels have extensive safety systems including 24-hour monitoring, motorist information radio and signs, frequent refuge rooms

with emergency telephones and firefighting equipment, emergency lighting and exits, and smoke ventilation systems.

To safely facilitate heavy, high-speed traffic, special laws apply when driving on the Autobahn. Bicycles, mopeds and pedestrians are specifically prohibited from using the

Autobahn, the same as any other vehicles with a maximum speed rating of less than 60 km/h. Passing on the right is also strictly prohibited. Slower vehicles must move to the right to allow faster traffic to pass, and drivers should stay in the right lane except to pass. You are, however, allowed to pass on the right in heavy traffic when vehicles have started queuing, but only at a low speed.

Traffic entering the Autobahn must yield to traffic already on the Autobahn.

On Autobahn sections with three travel lanes, trucks over 3.5 tonnes and any vehicle with a trailer are prohibited from using the far left lane.

During traffic jams, motorists in the left lane are required to move as far to the left as possible. And those in the adjacent center or right lane must move as far to the right in their lane as possible, thus creating a gap between the lanes for emergency vehicles to pass through.

If you have a breakdown or accident, you must move to the shoulder if possible and place a warning triangle 200 meters behind the scene. You must report the incident to the authorities using the nearest emergency phone

It is illegal to run out of fuel on the Autobahn. Technically, there is no law specifically against this, but it is illegal to stop unnecessarily on the Autobahn and this law is also applied to people who run out of fuel as such an occurrence is deemed to be preventable.

There are no tolls for passenger vehicles to use the Autobahn. However, trucks must pay a per-kilometer fee which is collected electronically.

In addition to the official laws, most drivers adhere to the following customs: motorists at the rear of a traffic jam usually switch on their hazard blinkers to warn approaching traffic of the slowdown.

***Ex. 2. Answer the following questions***

What is the Autobahn in Germany?

2. When was the Autobahn constructed?

3. Is there anything like the Autobahn in Ukraine?
4. Why do special laws apply when driving on the Autobahn?
5. Should there be an autobahn in Ukraine?
6. Are bicycles, mopeds and pedestrians prohibited from using the Autobahn?
  
7. Would the Autobahn system work in Ukraine?

***Ex.3. Decide if the following sentences are true (T) or false (F)***

1. The German freeway system, the Autobahn, doesn't link most of the country's major cities.
  
2. Some of the fastest and busiest highways in Europe connect Berlin to Munich.
  
3. The Autobahn doesn't look like a typical freeway. 4. The stories of speed anarchy are correct.

***Ex. 4. Translate the following sentences into English***

1. Обмеження швидкості регулюється відповідно до погодних умов. 2. Будівництво автобану – дуже складний і відповідальний процес. 3. Однією з особливостей автобанів є пробки поблизу великих міст. 4. Додаткові будівельні роботи були зроблені щодо безпеки тунелю. 5. Більшість водіїв дотримуються правил дорожнього руху.
  
6. Дорожній затор («пробка») може статися через аварію або ремонтні роботи.
  
7. Деякі з найшвидших магістралей у Європі з'єднують Франкфурт з Мюнхеном.
  
8. Зупинятися на автобані незаконно і це також стосується людей, у яких закінчилось паливо.
  
9. У Німеччині користування автобанами для легкового транспорту безкоштовне.
  
10. Протипожежне обладнання, аварійне освітлення та виходи, системи вентиляції диму є частиною системи безпеки автобану.
  
11. Загальне правило проектування автобану – забезпечити безперешкодний, високошвидкісний трафік.

12. На німецьких автобанах є безліч обладнаних автостоянок: з лісопарками, автозаправними станціями, готелями та кафе.

## UNIT 8

### DIFFERENT TYPES OF VEHICLES

#### *1. Read and translate the text*

Automobile engineering is the one of the stream of mechanical engineering. It deals with various types of automobiles, their mechanism of transmission systems and its applications. Automobiles are the different types of vehicles used for transportation of passengers, goods, etc.

Basically all types of vehicles work on the principle of internal combustion processes or some times the engines are called as internal combustion engines. Different types of fuels are burnt inside the cylinder at higher temperature to get the transmission motion in the vehicles. Most of the automobiles are internal combustion engines vehicles only. Therefore, every mechanical and automobile engineer should have the knowledge of automobile engineering, its mechanisms and its various applications.

Automobile can also be defined as a vehicle which can move by itself. For example cars, jeeps, buses, trucks, scooters, etc.

Automobiles or vehicles can be classified on different bases as given below. On the basis of load:

- heavy transport vehicle or heavy motor vehicle (trucks, buses, etc.); - light transport vehicle (pick-ups, station wagons, etc.);
- light motor vehicle (cars, jeeps, etc.).

On the basis of wheels:

- two wheeler vehicle (scooter, motorcycle, scooty, etc.);
- three wheeler vehicle (auto rickshaw, three wheeler scooter, etc.);

- four wheeler vehicle (car, jeep, trucks, buses, etc.);
- six wheeler vehicle (big trucks with two gear axles each having four wheels).

On the basis of fuel used:

- petrol vehicle (motorcycle, scooter, cars, etc.); - diesel vehicle (trucks, buses, etc.);
- electric vehicle (battery drive );
- steam vehicle (an engine which uses steam);
- gas vehicle.

On the basis of body:

- sedan with two doors;
- sedan with four doors;
- station wagon;
- convertible (e.g. jeep, etc.);
- van;
- special purpose vehicle (ambulance, milk van, etc.).

***Ex. 2. Answer the following questions***

1. What does automobile engineering deal with?
2. What is the purpose of automobiles?
3. What is the principle for working of all types of vehicles?
4. What is necessary to get the transmission motion in the vehicles?
5. What kind of engine is the most popular?
6. What types of vehicles do you know?
7. How are automobiles classified?
8. Give examples of automobiles with three wheels.
9. What is the difference between diesel vehicle and electric vehicle?
10. How is vehicle with a steam engine called?
11. Give examples of automobiles according to their body.
12. What are vehicles for special purpose?

***Ex. 3. Put the words in the correct order***

- 1) have, many, they, how, got, trucks and buses?
- 2) types, are, the, automobiles, different, vehicles, of?
- 3) types, of, different, are, fuels, burnt, the, inside, cylinder?
- 4) used, cars, for, are, of, transportation, passengers?
- 5) knowledge, should, engineer, have, the, of, engineering, automobile?
- 6) what, fuel, is, kind, the, of, popular, most?
- 7) motorcycles, scooters, popular, are, and, teenagers, among?
- 8) combustion, of, the, automobiles, most, are, internal, vehicles, engines?

***Ex. 4. Translate the following sentences into English***

1. Усередині циліндра спалюються різні види палива.
2. Автомобілі спеціального призначення існують в кожній країні.
3. Джон вважає, що дизельне паливо більш дешево, ніж бензин.
4. Автобуси застосовуються для перевезення пасажирів.
5. Автомобілі класифікуються на основі різних принципів.
6. Декілька днів тому Мері купила автомобіль із відкидним дахом.
7. Вантажівки для перевезення важкого вантажу є дуже популярними в нашій країні.
8. Кожен інженер-механік повинен мати знання із автомобільної інженерії.
9. Сьогодні у світі налічується більше десятка тисяч транспортних засобів.
10. Більшість транспортних засобів використовує двигун внутрішнього згорання.
11. Автомобіль – це вид транспортного засобу для здійснення різних перевезень.
12. Автотранспортні засоби – це транспортні засоби, які рухаються на колесах по дорогах за допомогою власного двигуна.

***Ex. 5. Prepare reports using Internet or other sources (catalogues, magazines, books, etc.) about the latest news, achievements in the field concerning the topic of the unit***

**UNIT 9**

**AUTOMOTIVE INDUSTRY IN UKRAINE**

***Ex. 1. Read and translate the text***

Ukraine has become an attractive platform for manufacturers of automotive components. Acceptable wages and proximity to carmakers in Europe are good arguments for investors. In fact, there are about 20 companies that have been already working in the world of automotive industry in our country. Moreover, during the next few years it would be possible to see a few plants of international manufacturing.

Basically Ukrainian workers rely on the production of the simplest products – car covers, wiring and the like. However, Ukraine is responsible for more complex components either. For example, electronics, engine components, systems, climate control and heating are of great popularity. The major part of the enterprises owned by foreigners are mostly Chinese

and Japanese ones. But there are also local companies that have managed to establish contacts with European car factories.

International companies that have started the production of automotive components in Ukraine, rarely go beyond the Carpathian region. Their favourite locations are Lviv and Ivano-Frankivsk.

In general the geography of production is concentrated due to the desire to be closer to our customers in Europe. Although there are some companies that have chosen the place for the construction of the plant based on the economic characteristics – some plants have been built in the area, where the beginning of the 2000s was considered to be so-called free economic zones.

Ukraine is a favourite place for on-board cabling manufacturers for cars. Among manufacturers of automotive cables for cars and Ukrainian companies there is an enterprise “Production Association “Karpaty”. The company belongs to the state. Moreover, it is the part of the national holding company structure in charge of the defense industry – “UkrOboronProm”. The Ukrainian defense industry is operated on such concerns as Volkswagen and Daimler, that are supplied with the Carpathian cables.

Another Ukrainian producer, released on the European market is Mukachevo plant “Tochprilad”. In addition to automotive wiring this company produces speakers which are established by international car manufacturers. For example, the acoustics, which is produced in Mukachevo, can be found on vehicles such as the Land Rover and BMW.

In a small town Vinogradov in Zakarpattia there is the factory of German Automotive Systems. This company produces electronic seat heating system for the prestigious brands of cars. Among the Ukrainian enterprise customers there are: BMW, Porsche, Mercedes and Ferrari.



***Ex. 2. Guess the word from the text due to the certain description. Make up your own sentences using the guessed words***

1. A place where an industrial or manufacturing process takes place (5 letters).
2. A person who does a specified type of work (6 letters).
3. The brand of high-quality sport and racing cars, named after Italian designer (7 letters).
4. A system of wires providing electric circuits for a device or building (6 letters).
5. A thing used for transporting people or goods, especially on land, such as a car, lorry or cart (7 letters).
6. A machine designed to convert one form of energy into mechanical energy (6 letters).
7. The synonym for “plant” (7 letters).
8. Its capital is Kyiv (7 letters).
9. An insulated wire used for transmitting electricity or telecommunication signals (5 letters).
10. Equipment installed in a car or other vehicle to provide in-car entertainment and information for the vehicle occupants (8 letters).

***Ex. 3. Translate the following sentences into English***

1. Серед корпоративних клієтів є заводи Мерседес та Феррарі.
2. Україна співпрацює із Німеччиною та Японією.
3. Компанія “Карпати” належить державі.
4. Автомобіль VW оснащений кабелями, виробленими в Карпатах.
5. Компанія виробляє підігрівну систему для сидінь для автівок відомих марок.
6. Через декілька років можна буде побачити нові заводи з міжнародного виробництва.
7. Місцевим компаніям вдалося встановити взаємовідносини з Європейськими автомобільними заводами.
8. Виробники автомобілів з інших країн вкладають гроші у розвиток автомобільної промисловості України.

9. Її чоловік працює на заводі в Мукачеві, який виробляє системи клімат контролю.

10. Для іспиту студентці потрібно було знати інформацію про компоненти двигуна.

***Ex. 4. Prepare reports using Internet or other sources (catalogues, magazines, books, etc.) about the latest news, achievements in the field concerning the topic of the unit.***

## UNIT 10

### WHAT IS A GPS TRACKER?

***Ex. 1. Read and translate the text***

In recent years, the evolution of technology in fleet management systems has made the processes a lot easier. With innovation, reputable experts now provide real-time monitoring of the fleet vehicles through various technologies. Among all these, GPS real-time tracking of fleet vehicles remains the best management tool used today. Both managers and owners heavily use this technology to monitor the movement of the fleet and offer the necessary guidance. However, not all users clearly understand much about this technology. In this article, we will focus on highlighting important insights that every GPS user should know. Let's get started.

Global positioning system or GPS takes advantage of satellite technology to map any location on earth using latitude and longitude. The technology is accurate in regard to time since it uses the Universal Time Coordinated or UTC. When used to track vehicles, real-time data from all the vehicles can be integrated into one system. This allows the managers and the owners to see the location of each vehicle from one dashboard as well as their movement.

GPS is the constellation of 24 satellites that orbit around the earth and make it possible for us to pinpoint our exact geographic location. However, its location accuracy ranges anywhere from 10 to 100 meters (for most equipment). The most accurate is the military-approved equipment that pinpoints to within one meter. GPS equipment was much expensive some years ago but now it is widely used in science and has become so affordable that almost anyone can own a GPS, and many do in their smartphones, tablet, and many gadgets.

The police department, firefighters, large courier businesses and military personnel use GPS tracking and it is quite invaluable for them. A lot of these use the AVL (Automatic Vehicle Locator) systems that include a network of vehicles – all equipped with a GPS receiver, a mobile radio receiver, a GPS antenna, and a GPS modem. This network connects with a PC (that has a base radio) as well as a GPS receiver and interface. These systems are highly accurate and can be used to boost the efficiency of a company's dispatching process through effective communication and tracking.

The GPS tracking device installed in each vehicle uses power from the battery to send a signal with coordinates to the base. The global positioning system data has to travel to the satellite in space before it is transmitted to the base and back using the same route.

Even though the information is sent in code form, certain software is integrated into the system at the base to simplify the code through the extraction of the important data. However, the code logs are still available if the managers want to do further analysis. Some systems will show color-coded dots representing vehicles against a route map while others may have different display formats.

The operation of a GPS is based on a simple mathematical principle called trilateration. Trilateration falls in two categories; 2D trilateration and 3D trilateration. To make a simple calculation, the GPS receiver must have two things. First, the location of the place which is to be traced by at least three satellites above the place. Second, the distance between the place and each of those space vehicles. These radio waves travel in the speed of light, making it quick to get located easily.

GPS have different uses. From a commercial point of view, GPS equipment is generally used to record and track the position of vehicles as they make their journeys. Some systems store the data within the GPS tracking system itself, which is called passive tracking, while others send the information to a centralized database via a modem within a GPS tracking system, which is known as active tracking (2-Way GPS).

- **Passive Tracking**

A passive GPS tracking system monitors and saves data based on the specific type of events. For instance, it may log data where the GPS-enabled vehicle has traveled in the past 12 or 24 hours. This data is usually stored in the internal memory or on a memory card. It can be downloaded to a computer at a later date for analysis. The data can also be requested for wireless download at specific points during the journey.

- **Active Tracking**

Active tracking, also known as real-time tracking, automatically sends the data to a centralized tracking portal or system in real-time as it takes place. For commercial purposes such as fleet tracking or monitoring of people, this system

is a much better option and preferred over passive tracking as it provides highly exact locations.

### **Benefits of Real-Time GPS Tracking**

Just as the name suggests, this is real-time tracking that sends the coordinates to the base without stopping. Fleet managers feel like they are on the road with all the vehicles. It is now common that they can control the movement of delivery vehicles, especially those trying to maneuver through the cities. Another benefit is that they will know when the vehicles make suspicious stops and can contact the driver to understand the situation. If the vehicle is carjacked or breaks down, the managers will know something is wrong.

### **Using GPS with GSM**

Well, things are even easier because owners and managers can still know the location of the vehicles even when the owners and managers are out of the office. They get this information through their mobile phones by receiving a text at a certain interval. This works pretty simply; the GPS module is integrated with the GSM module. When the GPS receiver gets the coordinates, then the GSM module will forward the coordinates to connected people's phones via a text message. This way, they will stay updated even when they are on the move.

### **Other Uses**

- Track assets such as hardware, machinery, or packages
- Coordinate fleets of vehicles
- Tracking children or loved ones
- Used in aviation to track flights and provide pilots and passengers real-time aircraft position
- Used by boat captains to navigate through waters to reach their accurate destinations.
- Used in surveying to map and measure various measures on the surface of earth and underwater
- Used by banks to schedule and determine the local and international funds transfer
- Used in smartphones to provide users with accurate location tracking.
- Used in social activities such as hiking, skydiving, cross-country cycling, geotagging photographs, etc.
- Securing expensive assets by attaching a small GPS device to them

### **Understanding Some Terminologies Related to GPS Technology**

#### **• A-GPS**

A-GPS stands for Assisted-Global Positioning System, which refers to a combination of both GPS satellite and wireless or cellular networks.

#### **• External GPS Antenna**

An external GPS antenna is the most important and essential piece of hardware that is used to grab radio signals from GPS satellites. It is designed to be

independent of the monitoring device but it allows GPS hardware to capture GPS signals.

- **Fleet Management**

It is a process of managing and overseeing various mobile assets and vehicles of an organization in order to improve routing, customer service, tracking, driver safety, and overall efficiency. This allows companies to safeguard their equipment, track their employees and their routes more effectively. This reduces the costs as well that are associated with fuel consumption.

- **Geotagging**

Geotagging is a common terminology that most, if not all, are aware of. It is a process of linking forms of digital media such as videos, photographs, web pages, and RSS feeds with geographical data that includes latitude and longitude positions obtained through GPS tracking.

- **RFI**

RFID or Radio Frequency Identification is a term of technology used to utilize radio frequency tags that are connected or linked to objects. It transfers information or data to a receiver.

***Ex. 1. Complete the sentences.***

1. GPS real-time tracking of fleet vehicles\_\_\_\_\_.
2. \_\_\_\_\_ takes advantage of satellite technology to map any location on earth using latitude and longitude.
3. GPS equipment was much expensive \_\_\_\_\_.
4. \_\_\_\_\_ automatically sends the data to a centralized tracking portal or system in real-time as it takes place.
5. If the vehicle is carjacked or breaks down,\_\_\_\_\_.
6. An external GPS antenna is \_\_\_\_\_.
7. \_\_\_\_\_ is a process of linking forms of digital media such as videos, photographs, web pages, and RSS feeds with geographical data that includes latitude and longitude positions obtained through GPS tracking.
8. \_\_\_\_\_ because owners and managers can still know the location of the vehicles even when the owners and managers are out of the office.

***Ex. 2. Prepare reports using Internet or other sources (catalogues, magazines, books, etc.) about the latest news, achievements in the field concerning the topic of the unit***

***Ex. 3. Practice connected reading. Translate into Ukrainian.***

Transport document, world of documentary business, subject to many changes, different forms, bill of lading, inland waterway transport, air waybill, consignment notes, negotiable transport documents, endorsing the document, security in the goods, carriage of goods, shipment origin, routing instructions, commodity class and rate, liable to normal loss like through evaporation, changes or additions to ensure, clause specifies the details, substitute or exchange.

## UNIT 11

### TRANSPORT DOCUMENT: CERTIFICATES FOR SHIPMENTS OF SPECIFIC GOODS

***Ex. 1. Read and translate the text***

Additional certificates are needed for different purposes. **ATA CARNET/Temporary shipment certificate.** An ATA Carnet, a. k. a., "Merchandise Passport," is a document that facilitates the temporary importation of products into foreign countries by eliminating tariffs and value-added taxes (VAT) or the posting of a security deposit normally required at the time of importation.

**Certificate of Analysis:** A certificate of analysis can be required for seeds, grain, health foods, dietary supplements, fruits and vegetables, and pharmaceutical products.

**Certificate of Free Sale.** Certificate of free sale may be issued for biologics, food, drugs, medical devices and veterinary medicine. More information is available from the Food and Drug Administration. Health authorities in some states as well as some trade associations also issue Certificates of Free Sale.

**Dangerous Goods Certificate.** Exports submitted for handling by air carriers and air freight forwarders classified as dangerous goods need to be accompanied by the Shipper's Declaration for Dangerous Goods required by the International

Air Transport Association (IATA). The exporter is responsible for accuracy of the form and ensuring that requirements related to packaging, marking, and other required information by IATA have been met.

For shipment of dangerous goods it is critical to identify goods by proper name, comply with packaging and labeling requirements, which vary depending upon the type of product shipper and the country shipped to. More information on labeling/regulations is available from the International Air Transportation Association or Department of Transportation - HAZMAT websites.

For ocean exports, hazardous material regulations are contained in the International Maritime Dangerous Goods regulations.

**Fisheries Certificate.** The National Marine Fisheries Service conducts inspections and analyses of fishery commodities for export.

**Fumigation Certificate.** The Fumigation Certificate provides evidence of the fumigation of exported goods (especially agricultural products, used clothing, etc.). This form assists in the quarantine clearance of any goods of plant or animal origin. The seller is typically required to fumigate the commodity at his or her expense a maximum of 15 days prior to loading.

**Halal Certificate.** Required by most countries in the Middle East, this certificate states that the fresh or frozen meat or poultry products were slaughtered in accordance with Islamic law. Certification by an appropriate chamber and legalization by the consulate of the destination country is usually required.

**Health Certificate.** For shipment of live animals and animal products (processed foodstuffs, poultry, meat, fish, seafood, dairy products, and eggs and egg products). Note: some countries require that health certificates be notarized or certified by a chamber and legalized by a consulate. Health certificates are issued by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS).

**Ingredients Certificate.** A certificate of ingredients may be requested for food products with labels that are inadequate or incomplete. The certificate may be issued by the manufacturer and must give a description of the product, contents, and percentage of each ingredient; chemical data; microbiological standards; storage instructions; shelf life; and date of manufacture. If animal fats are used, the certificate must state the type of fat used and that the product contains no pork, artificial pork flavor, or pork fat. All foodstuffs are subject to analysis by Ministry of Health laboratories to establish their fitness for use.

**Inspection Certificate.** Weight and Quality certificates should be provided in accordance with governing USDA/GIPSA regulations for loading at port and loading at source/mill site as appropriate. A certificate of origin certified by the local chamber of commerce at the load port and a phytosanitary certificate issued by APHIS/USDA and fumigation certificate are to be provided to the buyer. Costs of all inspection, as well as certificates/documents at the load port, are usually the responsibility of the seller. Independent inspection certificates may be required in some instances.

**Pre-Shipment Inspections.** The governments of a number of countries have contracted with international inspection companies to verify the quantity, quality, and price of shipments imported into their countries. The purpose of such inspections is to ensure that the price charged by the exporter reflects the true value of the goods, to prevent substandard goods from entering the country, and to deflect attempts to avoid payment of customs duties. Requirements for pre-shipment inspection are normally spelled out in letter-of-credit or other documentary requirements. Some countries require pre-shipment inspection certificates for shipments of used merchandise.

**Insurance Certificate.** Insurance certificates are used to assure the consignee that insurance will cover the loss of or damage to the cargo during transit. These can be obtained from your freight forwarder or publishing house. Note: an airway bill can serve as an insurance certificate for a shipment by air. Some countries may require certification or notification.

**Phytosanitary Certificate.** All shipments of fresh fruits and vegetables, seeds, nuts, flour, rice, grains, lumber, plants, and plant materials require a federal phytosanitary certificate. The certificate must verify that the product is free from specified epidemics and/or agricultural diseases. Additional information and forms are available from Animal and Plant Health Inspection Service (APHIS).

**Radiation Certificate.** Some countries including Saudi Arabia may require this certificate for some plant and animal imports. The certificate states that the products are not contaminated by radioactivity.

**Other (Product-Specific) Certificates.** Shaving brushes and articles made of raw hair must be accompanied by a recognized official certificate showing the consignment to be free from anthrax germs. Used clothing requires a disinfection certificate. Grain requires a fumigation certificate, and grain and seeds require a certificate of weight. Many countries in the Middle East require special certificates for imports of animal fodder additives, livestock, pets, and horses.



**Weight Certificate.** A certificate of weight is a document issued by customs, certifying gross weight of the exported goods.

***Ex.2. Practice connected reading. Translate into Ukrainian.***

Transport document, world of documentary business, subject to many changes, different forms, bill of lading, inland waterway transport, air waybill, consignment notes, negotiable transport documents, endorsing the document, security in the goods, carriage of goods, shipment origin, routing instructions, commodity class and rate, liable to normal loss like through evaporation, changes or additions to ensure, clause specifies the details, substitute or exchange.

***Ex. 3. Complete the sentence.***

1. Certificate of free sale \_\_\_\_\_
2. A certificate of weight \_\_\_\_\_
3. Health certificates \_\_\_\_\_
4. A certificate of ingredients \_\_\_\_\_
5. Radiation Certificate \_\_\_\_\_

***Ex. 4. Translate these sentences into Ukrainian paying attention to the active vocabulary of the text.***

1 .Transport using more than one mode is described as intermodal. Transportation that carries around many people and can be used by the public is known as Mass Transportation. 2. ATA CARNET/Temporary shipment certificate is customs document that enables a motor vehicle to be driven across international borders at no cost. 3. It is international customs document that make customs procedures easier for temporary importation of assorted types of merchandise. 4. The major task of functioning of the Logistic Department is elaboration and creation of an optimum chain of movement of each concrete cargo under the scheme "from door to door" by the various types of transport (water, railway, motor), maintenance of movement of cargo with all necessary accompanying documents, the operative control and cargo tracing at all stages of transportation. 5. There are thousands of ingredients used to make foods. 6. The Food and Drug Administration (FDA) maintains a list of over 3000 ingredients in its data base "Everything Added to Food in the Ukraine", many of which we use at home every day (e.g., sugar, baking soda, salt, vanilla, yeast, spices and colors). 7. Some consumers have concerns about additives because they may see the long, unfamiliar names and think of them as complex chemical

compounds. 8. In fact, every food we eat - whether a just-picked strawberry or a homemade cookie - is made up of chemical compounds that determine flavor, color, texture and nutrient value. 9. All food additives are carefully regulated by federal authorities and various international organizations to ensure that foods are safe to eat and are accurately labeled. 10. The purpose of this brochure is to provide helpful background information about food and color additives: what they are, why they are used in foods and how they are regulated for safe use.

***Ex. 5. Translate these sentences into English.***

1. Ключові слова та поняття: атестація виробництва, біобезпека, ветеринарний сертифікат, генетично модифіковані організми (ГМО), заява про відповідність, знак відповідності, знак сертифікації, ідентифікація харчової продукції, інспекційний контроль, карантинний сертифікат. 2. Сертифікати «продовольча безпека, продовольча сировина, продукти тривалого зберігання, роздрібна торгівля, санітарно-гігієнічний висновок, система управління безпечністю харчових продуктів, токсичність, фіто-санітарний контроль, харчова продукція, швидкопсувні продукти» -- виписуються у спеціальній державній інспекції. 3. У сучасному світі така інтегральна категорія, як безпека, стає синонімом безпеки не тільки безпосередньо споживача харчових продуктів, а й економічної безпеки держави та перспективи виживання людства в цілому. 4. У разі необхідності (природні катастрофи, здійснення спеціальних програм економічного та соціального розвитку) розвинені країни світу організовують гуманітарну продовольчу допомогу іншим країнам для постачання населенню достатньої кількості продуктів харчування. 5. Рационально розглядати систему продовольчої безпеки з двох позицій - економічної та соціальної.

***Ex. 6. Answer the following questions on the text:***

1. When do we need additional certificates?
2. What is a certificate?
3. Can you name any certificate?
4. What is a health certificate?
5. Do we always need a radiation certificate?
6. What is Weight Certificate?

7. Do we need Health Certificate for carrying vehicles?

***Ex. 7. Translate the following sentences into Ukrainian paying attention to the Subjective Infinitive Construction ( Complex Subject)***

1. Industrial electronics is said to be a comparative newcomer to industrial plants.
2. Electronic equipments have been proved to save millions of man and machine hours.
3. Electronic equipments have been proved to do jobs better and more economically than other devices.
4. Electronic equipments are likely to find an ever growing application.
5. The future is expected to bring a great many of new applications for machine-building industry.
6. Experiments with special constructions of special track vehicles are reported to have been carried out.
7. The application of electronics in everyday life and industry has proved to increase enormously in the last few years.
8. Electronics is believed to begin when the valve was invented.
9. Electronics equipment is known to have already been applied at the beginning of the century.

## UNIT 12

### TRANSPORT DOCUMENT: BILL OF LADING

Transport documents are one of the most problematic in the world of documentary business. They are numerous and changeable over time, so it is hard to set some ground rules for examining them. Transport field is changing rapidly and transport documents take different forms and are subject to many changes. Transport documents usually are: bill of lading, waybill, road, rail or inland waterway transport documents.

Transport documents can be divided into waybills (consignment notes) and negotiable transport documents. Bill of lading is an example of the negotiable transport document as it gives title to the goods and the goods will be handed over to the named person or company in the transport document (consignee). The consignee is actual owner of the goods. Negotiable transport documents can be transferred to a new holder or the ownership over the goods can be transferred. The transferring is done by endorsing the document. Waybills do not provide access to the goods, but they state the consignee. In the case of non negotiable transport documents, the issuing bank does not have security in the goods.

**The bill of lading** is the most important document that is used in transporting goods. The legal definition of a bill of lading is a contract for the carriage of goods and a document of title to them. It provides any and all information that the carrier will need to transport the items. It contains the shipment origin and the contract terms for the transportation and is required by a carrier before the shipment is taken.

**The bill of lading** should include the name and address of the consignor and consignee, and often it will have the routing instructions for the carrier. It will contain a description of the goods to be transported, the quantity for each of the commodities, and the commodity class and rate.

**The bill of lading** will contain the terms of contact for the movement of goods by a common carrier. This is the contract between the shipper and the carrier to transport the goods on the bill of lading to the consignee, i.e. the buyer.

**The bill of lading** contract has nine terms:

1. Common Carrier Liability – the carrier is liable for loss and damage of the goods being transported, except if the goods were improperly packed by the shipper or if the goods themselves would be liable to normal loss like through evaporation. The carrier is not liable for acts of God, public enemy or public authority.

1. Delay in Transit – the carrier cannot be held liable if the loss or damage is due to a delay in the transportation of the goods.
2. Freight Not Accepted – if the goods are not accepted within the time allocated, the carrier can store the goods at a cost to the owner.
3. Extraordinary Value – the carrier is not liable and does not have to carry items of extraordinary value that are not on the rated in the published classifications or tariffs unless a special agreement with the shipper has been negotiated.
4. Explosives – the carrier has to be given full written disclosure when they are shipping dangerous material, otherwise they are not liable for any losses.
5. Recourse – the carrier cannot make additional charges to the shipper after making a delivery.
6. Substitute Bill of Lading – if the bill of lading is a substitute or exchange for another bill of lading then the current bill of lading has to include all the clauses from previous documents.
7. Alterations – the carrier must note any changes or additions to ensure that they can be enforceable.

8. Claims – this clause specifies the details on how to file a claim against the shipper and the time period after delivery in which the claim will be accepted.

***Ex. 1. Complete the sentence.***

1. Transport documents \_\_\_\_\_
2. Transport documents can be divided \_\_\_\_\_
3. Negotiable transport documents \_\_\_\_\_
4. Bill of lading \_\_\_\_\_
5. Common Carrier Liability \_\_\_\_\_

***Ex. 2. Translate these sentences into Ukrainian paying attention to the active vocabulary of the text.***

1. The main economic drivers for transportation costs are: distance that directly contributes to labour, fuel and maintenance expenses; transportation manager to consolidate small loads into larger loads; a combination of weight and volume since transportation cost for any movement; storability referring to how product case dimensions fit into transportation equipment; handling equipment necessary for loading and unloading trucks; lane volume and balance influence transportation cost. 2. Performance of a transportation service demands well-organized documentation. 3. Its primary purpose is to protect the interest of all parties involved in a transaction. 4. The basic documents are the bill of lading, the freight bill and shipment manifest. 5. The bill of lading is the document used in purchasing transport services. 6. It helps to register products and quantities shipped. 7. This receipt serves as a basis for a claim in the case of damage or loss. 8. A carrier is obliged to follow the instructions in this document. 9. The freight bill represents a carrier's method of charging for transportation services performed. 10. Shipment manifest goes through individual stops or consignees when multiple shipments are placed on a single vehicle.

***Ex. 3. Translate these sentences into English***

1. Коносамент (Bill of Lading) – це документ, що видається перевізником або його агентом відправнику вантажу як посвідчення прийняття вантажу для перевезення. 2. В коносаменті містяться дані про транспортний засіб, його власника, тоннаж, назву пункту завантаження й розвантаження, суму оплати, кількість виданих екземплярів. 3. Товарно-транспортна накладна (ТТН) – основний документ, своєрідний паспорт перевозки вантажу,

документ, що підтверджує договірні зобов'язання між власником вантажу, його представником і перевізником. 4. Накладна використовується для обліку матеріальних засобів та підтвердження факту перевезення товару. 5. В умовах, коли в одному автомобілі перевозяться товари для різних одержувачів, товарно-транспортна накладна виписується кожному одержувачу вантажу.

***Ex. 4. Answer the following questions on the text:***

1. What are the main transport documents?
2. What is the bill of lading?
3. Do you know any specific documents for transporting of explosives?
4. Can you name any transport documents?
5. Do you have to secure your goods?
6. Is the carrier obliged to follow the instructions in the documents?
7. Performance of a transportation service demands well-organized documentation, does not it?

***Ex. 5. Translate the following sentences into Ukrainian paying attention to the Predicate in the Present, Past, Future Perfect Passive Voice.***

1. Today plastics have been used to replace metals for certain applications. 2. A further progress has been made in microwave systems. 3. More than half a century chemists have been using this method for producing synthetic rubber. 4. New equipment had been installed in our shop when the designer returned to the plant. 5. By 8 o'clock all the experiments will have been conducted. 6. The radar has been used for automatic control of automobiles. 7. By the middle of the 19th century about 60 metal elements had been discovered. 8. By the end of the year a large variety of traffic safety devices will have been produced. 9. The majority of valves have already been replaced with tiny transistors. 10. Of great attention has been paid to have materials whose properties can be changed and controlled.

## VOCABULARY

“just-in-time” manufacturing – виробництво за принципом “дуже вчасно”

acceptable wages – сприйнятлива заробітня плата

Accidents аварійність

acoustics– акустика

adhere to– дотримуватися

adjacent - прилеглий, суміжний

air pollution – забруднення повітря

alter – змінювати

alteration – зміна, переробка, перебудова

ambulance – авто швидкої допомоги

annual sales – щорічні продажі

anthrax – сибірська виразка

application – застосування

authority -- повноваження, адміністрація

autobahn - автострада

automotive industry – автомобільна промисловість

axle – вісь

axle – вісь, вал

banning – заборона

beyond– поза, за межами

bicycle path – велосипедна доріжка

bill of lading – коносамент-документ, який є підтвердженням отримання вантажу і обв’язком доставити його за призначенням

blockage– блокування

bump – глухий удар, зіткнення

car cover – авто чохол

car frame – шасі  
carrier – перевізник, транспортер, транспортний засіб  
cargo – вантаж  
certificate – посвідчення, свідоцтво, сертифікат, дозвіл  
claim – претензія, заява, скарга  
combustion – горіння, згоряння  
competition – конкуренція  
comprehensive – всеосяжний, широкий  
consignee – одержувач вантажу  
consigner -- вантажовідправник  
consume – споживати, витратити  
consumer confidence – споживча довіра, очікування  
conventional – звичайний  
convertible – автомобіль з відкидним дахом  
current – нинішній, сучасний  
cushion – обладнувати подушкою  
cylinder – циліндр, валик, барабан  
deal with – мати справу з  
defense industry – військова індустрія  
desire – (палке) бажання  
domestic market – вітчизняний ринок  
emissions – викиди  
drive shaft – вал трансмісії  
drivetrain – трансмісія  
efficient – ефективний, раціональний  
emergency vehicle – спецмашина (поліцейська, пожежна)  
emphasis (pl- ses) – наголос, акцент  
encourage – заохочувати  
enemy – ворог, противник, недруг  
engine – двигун  
enterprise customers – корпоративні клієнти  
exhaust – вихлопні гази (двигуна)  
expressway – швидкісна автомагістраль з розв'язками різних рівнях  
facilitate – полегшувати, сприяти  
ferry – пором  
fodder -- корм, фураж



freeway – швидкісна автострада з транспортними розв’язками  
hazard blinkers – вогні попередження про небезпеку назовні транспортного засобу, які швидко включаються та вимикаються  
freight companies – транспортні компанії  
fuel – паливо  
Fuel Cells – паливний елемент  
gear – механізм, привід  
GM – General Motors  
GPS – Global Positioning System,  
heavy transport vehicle – вантажівка для перевезення важкого вантажу  
highway – автомагістраль, автострада  
horseless carriage – екіпаж, що рухається сам  
injury – пошкодження  
impact – вплив  
injury – тілесне ушкодження, травма  
insist – наполягати  
insurance – страхування, страховий поліс  
internal combustion engine – двигун внутрішнього згорання  
joint ventures – сумісні підприємства  
lane – смуга руху  
liability -- відповідальність, повинність, необхідність (робити щось)  
light motor vehicle – легкове авто  
livestock – домашня худоба  
load – вантаж  
lubricate – змазувати, мастити (машину)  
lubricate – змащувати  
move about – рухатися, пересуватися  
mud – грязь, болото  
negotiable – оборотний документ  
nonrenewable – невідновлювальний  
occurrence – випадок, подія  
omnibus – приміський автобус  
on-board cabling – вбудований кабель  
overseas companies – зарубіжні компанії


























ownership – володіння, власність  
parking lot – стоянка  
passing on the right – обгін справа  
pedestrian – пішохід  
petrol – бензин  
pinnacle – вершина, кульмінаційний пункт  
prestigious – престижний  
propulsion – рух уперед, рушійна сила  
proximity – доступність  
queue – стояти в черзі  
refuge – острівцець безпеки (на вулиці або дорозі з інтенсивним рухом транспорту)  
released – випущений, допущений  
rely on – покладатися на  
run out of fuel – вичерпати паливо  
saturated – насичений  
sedan – седан (тип кузова)  
self-propelled – з автономним приводом  
shock absorber – амортизатор  
shoulder – виступ, узбіччя дороги  
slow down – уповільнювати  
slowdown – уповільнення  
smoke ventilation system – система вентиляції диму  
speakers – колонки  
sport-utility vehicle – спортивне легкове авто  
spring – пружина, ресора  
station wagon – універсал  
suburbs – передмістя  
suspension – підвіска  
swift – швидкий  
take stock – робити інвентаризацію  
telematics – телематика  
to contaminate – забруднювати, псувати  
to delay -- запізнюватися, затримуватися  
to enforce – примушувати, вимушувати  
to transfer – переносити, переміщати


























to verify – перевіряти, контролювати, підтверджувати  
to eliminate -- усувати, знищувати  
traffic jam – транспортний затор  
tube = underground – підземка  
unimpeded– безперешкодний  
urban area – міська територія  
valley bridge – міст через долину  
vehicle – транспортний засіб  
vehicles– автотранспорт  
virtually – фактично, власне кажучи  
virtually – фактично, практично, у дійсності  
warning triangle – попереджуючий про небезпеку трикутник  
waybill – транспортна накладна, дорожня накладна  
wealthy– багатий, заможний  
wiring– електропроводка, обмотка  
yield – поступатися

## **APPENDIX**

### **ROAD TRAFFIC SIGNS**

#### ***Warning Signs***

				
General danger	Curve left	Curve right	Double curve	Double curve
				
Accident hazard	Sliding danger	Winter sports along road	Soft shoulder	Rough road edge
				
Tree overhang	Soft shoulder for heavy vehicles	Steep upgrade	Steep downgrade	Falling rocks
				
Strong cross wind	Rough road	Beware of ice/snow	Slippery road	Loose gravel
				
Road works	Traffic signals	Quay/riverbank	Drawbridge	Pedestrians

				
Pedestrian crossing	Children	Wild animals crossing	Domestic animal crossing	Frog crossing
				
Congestion hazard	Bicycle crossing	Buses	Low-flying aircraft	Two-way traffic
				
Road narrows	Road narrows	Road narrows	Railway crossing ahead	Guarded railway crossing ahead
				
Railway crossing on crossroad	Railway crossing on crossroad	Railway crossing on crossroad	Railway crossing on crossroad	Unmarked intersection ahead
				
Priority	Railway crossing 240 meters ahead	Railway crossing 160 meters ahead	Railway crossing 80 meters ahead	Railway crossing





















 No passing	 No passing for vehicles over 3.5t	 Road closed	 Motor vehicles prohibited	 Vehicles over 3.5t prohibited
 Bicycles prohibited	 Mopeds prohibited	 Motorcycles and mopeds prohibited	 Multiple prohibition	 Horses prohibited
 Pedestrians prohibited	 Vertical clearance	 Horizontal clearance	 Length restriction	 Vehicles over 7.5t prohibited
 Weight limit	 Axle weight limit	 Minimum following distance	 Hazardous cargo prohibited	 Water polluting cargo prohibited
 No passing	 No passing	 No passing	 Emergency traffic restriction due to air pollution	 Traffic restriction zone for reduction of air pollution

				
End of no passing zone	End of no passing zone for vehicles over 3.5t	End of all restrictions	End of traffic restriction	Snow chains or tires required
				
Lane shift with width restriction	Lane shift with width restriction	Lane shift with width restriction	Lane shift with width restriction	Lane shift with width restriction
				
Do not enter	No U-turn	Turn left ahead	Turn right ahead	Turn either left or right
				
Straight ahead	Mandatory direction of travel	Mandatory direction of travel	Turn left	Turn right
				
Keep left	Keep right	Pedestrians only	Bus lane	Horses only
				
Pedestrian zone	End of pedestrian zone	Bus lane	End of bicycle path	Emergency way-side

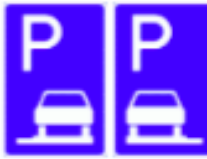








				
Tunnel	Autobahn en-	Expressway en-	End of Autobahn	End of expressway
				
Pedestrian and bicycle path	Split pedestrian and bicycle path	One way street	Traffic calming zone	End of traffic calming zone
 	 	 		
Bicycles only	Bicycle path; Mopeds also allowed	One way street Bicycles may travel in either directions	Shoulder lane ends	End of shoulder lane
				
Shoulder open to traffic	Advisory speed limit	Minimum speed limit	End of minimum speed limit	End of advisory speed limit
				
One way street	Speed limit zone	Maximum speed limit (km/h)	End of speed limit	End of speed limit zone
 				
Conditional speed limit	Minimum speed limit by lane	Minimum speed limit by lane	End of minimum speed limit by lane	End of minimum speed limit by lane







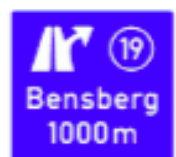
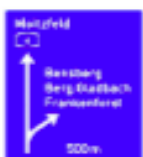









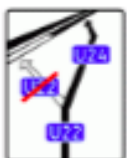
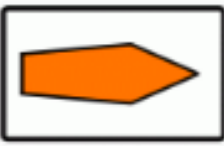



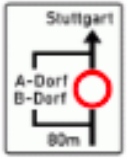
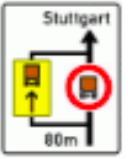








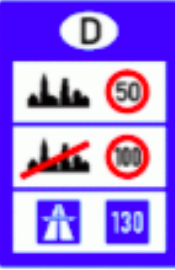

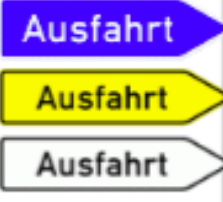









				
Priority road	End of priority road	Yield	Stop	Yield to oncoming traffic
				
Priority road turns left	Priority road turns left	Priority road turns left	Priority road turns right	Priority road turns right
				
Yield to Priority road	Yield to Priority road	Stop ahead	Yield and watch for bicycles	Yield to roundabout
				
Stop and yield to Priority road	Stop and yield to Priority road	Stop and yield to Priority road	Stop and yield to Priority road	Priority over oncoming traffic

				
No stopping	No parking	End of a no stopping area	Stopping is prohibited in either direction	Beginning of a no stopping area
				
End of a no parking area	Parking is prohibited in either direction	Beginning of a no parking area	Parking restriction zone	End of parking restriction zone
				
No stopping on shoulder	No parking on shoulder	Taxi stand	Directions to parking	
				
Parking	Parking garage	Indexed parking facility	End of a parking area	start of a parking area
				
Parking management zone	End of parking management zone	Park and ride	Hiker's parking	Parking on sidewalk permitted

				
Parking on sidewalk permitted	Parking on sidewalk permitted	Parking on sidewalk	Restricted parking	Restricted parking
				
Special parking	Special parking			

**Information and Guide Signs**

				
Advance direction sign	Advance direction sign	Consolidated direction sign	Autobahn entrance direction sign	Routing for designated vehicles
				
Routing for designated vehicles	Autobahn interchange initial approach sign	Autobahn interchange advance directional sign	Autobahn interchange number	Autobahn interchange countdown markers
				
Autobahn exit	Expressway exit	Expressway exit	Truck stop	Autobahn distance board
				
Numbered detour route	Provisional detour	Provisional detour	Alternate route	End of alternate

				
Detour route schematic	Routing schematic for designated	Complicated traffic route	Complicated traffic route	Bus or streetcar stop
				
Dead end street	Water protection area	Dead end street	Turn headlights on	Turn headlights off
				
Dead end street	School bus stop	National speed limit	Construction project information	Exit
				
Customs post	Toll road	Toll road	Streetlight does not stay on all	Parking hazard
				
Mobile lane closure board	Pedestrian underpass	Pedestrian bridge	Detour direction	End of detour
				
Entering urban	Leaving urban	Pedestrian crossing	Crossing guards	Lanes added to another roadway

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