МИНИСТЕРСТВО ТРАНСПОРТА
РОССИЙСКОЙ ФЕДЕРАЦИИ

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ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО
ОБРАЗОВАНИЯ
«РОССИЙСКИЙ УНИВЕРСИТЕТ ТРАНСПОРТА
(МИИТ)»

Институт экономики и финансов

Кафедра «Лингвистика»

Л.А. Чернышова, Н.А. Заломова

Cross-Cultural Communication
in Transport Industry

Учебно-методическое пособие

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Учебно-методическое пособие
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направления «Лингвистика»

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Учебно-методическое пособие предлагает комплексное рассмотрение различных аспектов современного транспорта с позиции межкультурной коммуникации. Англоязычный языковой материал разбит на разделы. Пособие содержит ряд практических заданий, способствующих развитию межкультурной компетенции. Адресовано студентам транспортных вузов, а также широкому кругу лиц, интересующихся проблемами транспорта и межкультурной коммуникации.

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UNIT 1. ROLE OF TRANSPORT IN SOCIETY

Transportation is the activity of moving people or things from one place to another, or the system used for doing this (https://www.macmillandictionary.com/).

Text 1

Efficient transport is a critical component of economic development, globally and nationally. Transport availability affects global development patterns and can be a boost or a barrier to economic growth within individual nations. Transportation investments link factors of production together in a web of relationships between producers and consumers to create a more efficient division of production, leverage geographical comparative advantage, and provide the means to expand economies of scale and scope. Transport’s contribution to economic development includes the following:

Network effects – linking more locations exponentially increases the value and effectiveness of transport:
Performance improvements – reducing cost and time for existing passenger and freight movements increase transport’s contribution to economic growth.

Reliability – improves time performance and reduces loss and damage, thus reducing economic drag.

Market size-access to wider markets adds to economies of scale in production, distribution, and consumption, thereby increasing economic growth.

Productivity – transport increases productivity gained from access to a larger and more diverse base of inputs such as raw materials, parts, energy, and labor, and broader markets for more diverse outputs.

Text 2

Transport makes raw materials available to manufacturers or producers, since it makes it possible to carry raw materials from places where they are available, to places where they can be processed and assembled into finished goods.

Transport makes possible movement of goods from one place to another with great ease and speed.
It enhances standard of living: easy means of transport facilitates large-scale production at low costs. It gives consumers the choice to make use of different quantities of goods at different prices. So it raises the standard of living of the people.

It helps during emergencies and natural calamities.

Transport helps in creation of employment: It provides employment opportunity to individuals as drivers, conductors, pilots, cabin crew, captain of the ship, etc. who are directly engaged in transport business. It also provides employment to people indirectly in the industries producing various means of transport and other transport equipment.

Transport helps in labour mobility.

It helps in bringing nations together. Since transport facilitates movement of people from one country to another, it helps in exchange of cultures, views and practices between the people of different countries. This brings about greater understanding among people and awareness about different countries. Thus, it helps to promote a feeling of international brotherhood.
Text 3

While many of the social and economic impacts of transportation are positive, there are also significant societal challenges:

Cost differences. Locations that have low levels of accessibility tend to have higher costs for many goods. This can play at several geographical scales, from the national to the local. For landlocked countries most of the goods have to be imported through an intermediate country, often over long distances. The resulting higher transport costs inhibit the competitiveness of such locations and limits opportunities.

Congestion. With the increased use of transport systems, it has become common for parts of the network to be used above design capacity. Congestion is the outcome of such a situation with its associated costs, delays and waste of energy.

Accidents. The use of transport modes and infrastructure is never entirely safe. Due to human errors and various forms of physical failures (mechanical or infrastructural) injuries, damages and even death occur. Accidents tend to be proportional to the intensity of use of transport infrastructures which means with more traffic the higher the probability for an accident to occur. The respective level of safety
depends on the mode of transport and the speed at which an accident occurs. No mode is completely safe but the road remains the riskiest mode for transportation, accounting for 90% of all transport accidents on average. At the global level, about 1.25 million people died in road accidents in 2013, in addition to 50 million injuries. Although the number of deaths due to car accidents is declining in developed countries, in developing economies, death rates are usually at least twice as high as those of developed countries and account for close to 90% of all deaths. China has the world largest number of fatalities, 250,000 in 2013, a situation mainly due to a sharp growth in vehicle ownership in recent years, a lack of driver education and

**Environmental Transportation Challenges**

The mobility provided by transport activities has a wide range of environmental consequences. A society becomes more aware of environmental concerns and has less tolerance for its negative impacts:

- **Air quality.** Atmospheric emissions from pollutants produced transportation, especially by the internal combustion engine, are associated with air pollution and global climate change. In urban regions, about
50% of all air pollution emanates from automobile traffic.

**Noise.** A major irritant, noise can impact on human health and most often human welfare. Noise can be manifested in three levels depending on emissions intensity; psychological disturbances (perturbations, displeasure), functional disturbances (sleep disorders, loss of work productivity, speech interference) or physiological disturbances (health issues such as fatigue, and hearing damage). Noise and vibration associated with trains, trucks, and planes in the vicinity of airports are major irritants and have commonly been associated with lower land values since it makes those location less desirable.

**Water quality.** Accidental and nominal runoff of pollutants from transport such as oil spills, are sources of contamination for both surface water and groundwater. In addition, paved surfaces are more prone to floods with intense rainfall.

**Land take.** Transport is a large consumer of space when all of its supporting infrastructure and equipment are considered. This space is subject to competition between other activities and reflects societal values. The most common way for a society to mitigate the environmental externalities of
transportation is to impose regulations related to standards, level of emissions and operating conditions (Jean-Paul Rodrigue, 2017).

**Exercise 1. Answer the questions**

1. What is the role of transport in economic and social life of a country?

2. What challenges does the transport system face? Are they identical for different countries? Give your reasons.

3. What transportation mode is riskiest one? Why?

4. Is the death rate in car accidents higher in developed countries or in developing economies? Give your reasons.

5. What are the global environmental transportation challenges?

6. What are countries doing to mitigate the negative impact of transport on environment?
Exercise 2. Decide whether the following statements are true (T) or false (F):

1. Efficient transport is a critical component of national economic development.
2. Productivity – improves time performance and reduces loss and damage, thus reducing economic drag.
3. Transport enhances standard of living.
4. Transport helps in creation of unemployment.
5. Transport helps in labour mobility.
6. Russia had the largest number of fatalities in car accidents in 2013
7. In urban regions, about 60% of all air pollution emanates from automobile traffic.

Exercise 3 Match the verbs to the nouns

1. to affect a/ standard of living
2. to leverage b/ nations together
3. to improve c/ loss and damage,
4. to impact on d/ employment
5. to link e/ regulations
6. to enhance  f/ global development
7. to provide  g/ time performance
8. to mitigate  h/ human health
9. to impose  i/ locations
10. to bring  j/ geographical advantages
11. to reduce  k/ the environmental externalities
12. to challenge  l/ global environmental transportation

Exercise 4. Complete the sentences with appropriate words or phrases from the box.

Landlocked, Mobility, meets, mobility gaps, emergencies, raw materials, accidents, impact

1. Transport helps during ..... and natural calamities
2. Transport makes ..... available to manufacturers or producers
3. ......is one of the most important characteristics of economic or social activities.
4. It ...... the basic need of going from one location to the other, a need shared by passengers, freight.
5. The higher the income, the higher the mobility, which may give rise to substantial ...... between different population groups.
6. For ..... countries most of the goods have to be imported through an intermediate country.
7. The road is the riskiest transportation model, accounting for 90% of all transport ....
8. A major irritant, noise can ..... on human health

Exercise 5. In pairs discuss the role of transport in economic and social life of your country

Text A

Public Transportation Provides Critical Support During Emergencies and Disasters

In major evacuations of urban areas, only public transportation has the capacity to move millions of people quickly and to give critical support to first responders by delivering emergency equipment and transporting emergency response personnel. The 9/11 response illustrates public transit's vital role during times of emergency. Natural or Man-Made Disasters, Earthquake Response Public transportation is an important back-up alternative for moving people quickly during a disaster or emergency. During the 1989 Loma Prieta earthquake in San Francisco, the Bay Bridge was closed for a month. BART carried 75 percent of trans-bay commuters—up from 35 percent before the bridge closed—helping avert a major economic disruption. Transit systems in hurricane-prone states provide critical evacuation during hurricanes and flooding. In August 2005, the
Southwest Ohio Regional Transit Authority helped evacuate residents from homes, schools and businesses upon detection of a chemical leak from a rail tanker. Across the nation, buses are used as heated or air-conditioned shelters and treatment centers for emergency workers at the sites of fires or hazardous materials incidents. When Americans face natural or man-made disasters, America’s public transportation systems provide comfort, safety, security and rescue.

https://www.apta.com/resources/reportsandpublications/Documents/twenty_first_century/
UNIT 2. LAND TRANSPORTATION

Transport modes are the means by which people and freight achieve mobility. They fall into one of three basic types, depending on over what surface they travel – land (road, rail), water (shipping), and air. Each mode is characterized by a set of technical, operational and commercial characteristics.

Road Transportation

Bullock-carts, lorries, trucks, buses, cars, coaches, etc., are the means of road transport.

Road infrastructures are large consumers of space with the lowest level of physical constraints among transportation modes. However, physiographical...
constraints are significant in road construction with substantial additional costs to overcome features such as rivers or rugged terrain. While historically road transportation was developed to support non-motorized forms of transportation, it is motorization that has shaped the most its development since the beginning of the 20th century. Road transportation has an average operational flexibility as vehicles can serve several purposes but are rarely able to move outside roads.

Road transport systems have relatively high maintenance costs, both for the vehicles and infrastructures. Freight and passenger vehicles still share the roads. The growth of freight traffic is increasing road congestion and in many cities concerns are being raised about the presence of trucks. Already, restrictions are in place on truck dimensions and weights in certain parts of cities, and there are growing pressures to limiting truck access to non-daylight hours. Certain highways exclude truck traffic – the parkways in the US for example. These are examples of what is likely to become a growing trend;
the need to separate truck from passenger vehicle traffic.

Advantages of Road Transport

1. Less capital outlay:

Road transport required much less capital investment as compared to other modes of transport such as railways and air transport. The cost of constructing, operating and maintaining roads is cheaper than that of the railways.

2. Door to Door service

3. Service in rural areas

4. Flexible service

5. Suitable for short distance

6. Lesser risk of damage in transit as the intermediate loading and handling is avoided

7. Rapid Speed:

8. Disadvantages:

1. Not suitable for bulky goods and heavy machinery.
2. Uneconomical for long distance
3. Breakdowns and delays in transportation.
4. Different rates are charged by different operators
5. Pollution of the environment.

**Rail Transportation**

Rail transport is the conveyance of passengers and goods by means of wheeled vehicles specially designed to run along railways or railroads. It is a rapid, energy-efficient, but capital-intensive means of
mechanized land transport. Rail is by far the land transportation mode offering the highest capacity. Containerization has improved the flexibility of rail transportation by linking it with road and maritime modes. It is part of the logistics chain that facilitates international trade and economic growth in most countries. Gauges, however, vary around the world, often challenging the integration of rail systems.

Most rail systems improved passenger and freight services. Where both segments are maintained the railways give priority to passengers, since rail persists as the dominant mode for inter-city transport in India, China and much of the developing world. In Europe the national rail systems and various levels of government have prioritized passenger service as a means of checking the growth of the automobile. Significant investments have occurred in improving the comfort of trains and in passenger rail stations, but most notable have been the upgrading of track and equipment in order to achieve higher operational speeds. Freight transport has tended to lose out because of the emphasis on passengers since such systems were optimized for passenger flows. Because
of their lower operational speeds, freight trains are frequently excluded from day-time slots, when passenger trains are most in demand. This incompatibility is a factor in the loss of freight business by most rail systems still trying to operate both freight and passenger operations. It is in North America where the separation between freight and passenger rail business is the most extensive. The private railway companies could not compete against the automobile and airline industry for passenger traffic, and consequently withdrew from the passenger business in the 1970s. They were left to operate a freight only system, which has generally been successful, especially with the introduction of intermodality. The passenger business has been taken over by public agencies, AMTRAK in the US, and VIA Rail in Canada. Both are struggling to survive. A major problem is that they have to lease trackage from the freight railways, and thus slower freight trains have priority.

In light of more recent technological developments, rail transportation also includes monorails and Maglev. Rail transport is considered one of the safest
forms of travel. Nonetheless, there are various possibilities for accidents and breakdowns to occur.

**Advantages of Rail Transport**

1. Suitable for bulky and heavy goods
2. The safest mode of transport
3. Large capacity:
4. Public Welfare
5. It can provide long distance travel throughout the day and night with unbroken services.
6. Though initial investment is large, in the long run the operating expenses will be very low in railways and it will prove a cheaper mode of transport.
7. It requires less time than motor transport for carrying goods over long distance with greater speed
8. Its capacity can be increased depending on the situations.

**Disadvantages**

1. Large investment of capital. The cost of construction, maintenance and overhead expenses
are very high as compared to other modes of transport.
2. Lack of flexibility
3. Lack of Door to Door service

**Exercise 1. Answer the questions**

1. What are the advantages of road and rail transport
2. What are the disadvantages of road transport?
3. Why are railways considered to be the safest mode of transport?
4. In what countries does rail persist as the dominant mode for inter-city transport?
5. What are the growing trends in road transportation in the USA and some European countries?
6. How do gauges vary around the world?
7. Where is the separation between freight and passenger rail business the most extensive?
8 Why has rail freight transport tended to lose out in many European countries?

9 What countries maintain both segments of rail transportation?

**Exercise 2. Decide whether the following statements are true (T) or false (F):**

1. The cost of constructing, operating and maintaining roads is cheaper than that of the railways.
2. Road transportation has high operational flexibility.
3. Road transport is suitable for bulky goods and heavy machinery.
4. Rail persists as the dominant mode for inter-city transport in India.
5. In Europe the national rail systems have prioritized freight service.
6. Rail transport is considered one of the safest forms of travel.
7. Initial investment in rail transport is large and operating expenses are very high too.

8. Containerization has improved the reliability of rail transportation

Exercise 3. Complete the sentences with appropriate words or phrases from the box.

fuel-efficient, bulk commodities, shippers, Containerization, boost, well-run, competitive pressure, environmentally friendly, emissions

Rail transport is generally more ..... than road transport; Next to water transport, rail transport is the most energy efficient means of moving large volumes of goods and passengers. Railways are ideal to transport high volumes of ..... or passengers. Since efficiently run railways can provide an inexpensive means of transporting high volumes of freight and passengers, low transport costs improve the competitive positions of ..... and entire economies. ..... of goods has expanded transport network effectiveness
by reducing costs and friction between transport modes.

The cost advantages of efficient well-run rail transport can ..... competitiveness among manufacturers and shippers in domestic and global markets and exert competitive pressure on road transport prices. Similarly, efficient ..... passenger transport can increase labor mobility—expanding the labor pool and economic development outward from urban centers.

Modern and well run railways often offer significant environmental, land-use, and capital investment benefits - they are usually more energy efficient than road transport and much more ..... because they have lower emissions per traffic unit than nearly any other mode. Many of the world’s railways are electrified, which can reduce ..... associated with rail transport, depending on the energy source used to generate the electricity.
**Exercise 3 Match the verbs to the nouns**

1. to develop                     a/ priority
2. to exclude                      b/ mobility
3. to consume                    c/ passenger and freight services
4. to offer                         d/ passengers and goods
5. to achieve                      e/ truck traffic
6. to convey                        f/ the highest capacity
7. to give                             g/ road transportation
8. to improve                      h/ space
9. to expand                        i/ the automobile and airline industry
10. to compete against         j/ transport network effectiveness

**Exercise 5. Skim the article on page 140 and find the principal characteristics of the British road transport systems**
Exercise 6. Skim Text A and compare the principal characteristics of the British and US rail transport systems

Passenger Train Service

In the USA trains account for less than 1% of travel; in sharp contrasts with the UK where its over 10%. Second to only the car, in America flying is by far the most popular choice for intercity travel; whereas in Britain (in spite of its cost) it's the train. However, in Britain the train service is a political hot potato:

- In the early 1990s (apart from London Transport) it was privatised by the Conservative Government.

- In 2003, following the collapse of Railtrack, the rail network (the rail tracks and stations) part of the service was taken back into public ownership by the Labour Government.
Current, Labour policy, for when they return to power, is to renationalise the rail service; most probably by not renewing the train operators franchises as they expire.

When nationalised, it was great. I used it quite frequently because I could travel from Bristol to London and return on a daytrip with the fare costing no more than a takeaway meal; but those days are long since gone.

Since privatisation the fares have sky rocketed, with private companies and their shareholders creaming off the profits rather than re-investing in the service.

When it was privatised, the rail service was split into two components:

- The rail network, as one company, to maintain the tracks and stations, and

- The trains, which were divided into competing franchises (currently 23); with the idea being that
healthy competition would drive down prices and improve efficiency.

These days, because of the high rail fares, I only use the rail service when absolutely necessary; albeit I will still use it in preference to coach (even though the coach is cheaper), simply because train is quicker. From Bristol to London the journey time (and ‘return’ fare), using different modes of transport is:-

- Coach, two and a half hours and costs about £10 ($15) return.
- Air, 2 hours, and costs about £53 ($65).
- Train, only 90 minutes, but costs £70 ($100) for a return ticket.

The only good news from my viewpoint is that, although the train services are privately run under franchise, at least the rail tracks themselves are now back under government ownership.

Following the collapse of Railtrack in 2001, Network Rail (Government Department) was created to manage
the rail network. Consequently since Network Rail took over there’s been significant investment in the maintenance and expansion of the railway network infrastructure. As with all Government Departments, they're non-profit making, so any income they earn is re-invested in the network rather than going to shareholders.

The great thing about the train service in the UK is that, with high speed trains, and because the rail network is so comprehensive, you can get from just about any part of Britain to anywhere else in the country relatively quickly.

Ghost Trains in Britain
Where a small section of track has gone into disuse due to a lack of passenger demand a private train Operator will often run one train on that line at least once a week; as a means to keep the line open, rather than it being decommissioned.

Such services are known as Ghost Trains.
Although ‘Ghost Trains’ are run at the Company’s expense, it protects the line by preventing government closure and decommissioning; and it leaves options open for the Train Operator to reinvigorate the service in the event of future renewed demand.

How the UK Train Service Compares With the USA

What amazes me, when I compare the rail network and passenger train services across the whole of America and Britain, is the startling fact that the number of passenger journeys in Britain is phenomenally greater. Startling, when you consider how much smaller the UK is to the USA; albeit within London and New York themselves, their respective underground train services are comparable.

### Railway Passenger Journeys and Distance Per Year

<table>
<thead>
<tr>
<th></th>
<th>USA</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Journeys</td>
<td>30.8 million</td>
<td>1.69 billion</td>
</tr>
<tr>
<td>Passenger Miles</td>
<td>6.4 billion</td>
<td>40 billion</td>
</tr>
</tbody>
</table>
In the USA there’s 233,000 miles of railroad track; compared to 21,000 miles in the UK; no surprise considering how much smaller Britain is. I’m not sure how many passenger trains or stations there are in America; but in Britain there’s over 4,000 trains serving 2,552 passenger stations.

The other interesting fact I came across is that American trains may not be as fast as in Europe, typically 200mph; but then neither is Britain’s. Since the introduction of the ‘InterCity 125’ in the 1970s British trains have been running at 125mph. Currently, the fastest train service in Britain is the Eurostar which links London to Paris and beyond, and runs at 186mph; total journey time from London to Paris being 2 hours and 20 minutes.

[https://wanderwisdom.com/transportation/uk-](https://wanderwisdom.com/transportation/uk-)
UNIT 3. MARITIME AND AIR TRANSPORTATION

Maritime transportation

Maritime transportation is the most effective mode to move large quantities of cargo over long distances. Main maritime routes are composed of oceans, coasts, seas, lakes, rivers and channels. However, due to the location of economic activities maritime circulation
takes place on specific parts of the maritime space, particularly over the North Atlantic and the North Pacific. The construction of channels, locks and dredging are attempts to facilitate maritime circulation by reducing discontinuity. Maritime transportation has high terminal costs, since port infrastructures are among the most expensive to build, maintain and improve. High inventory costs also characterize maritime transportation. In the maritime sector passenger services have become separated from freight operations. The exception being ferry services where the use of RORO ships on high frequency services adapt to the needs of both market segments. Deep sea passenger travel is now dominated by cruise shipping which has no freight-handling capabilities, and bulk and general cargo ships rarely have an interest or the ability to transport passengers. More than any other mode, maritime transportation is linked to heavy industries, such as steel and petrochemical facilities adjacent to port sites.
**Merits of Maritime Transport:**

1. Of the various modes of transport, it is only the sea transport, that offers the highest carrying capacity. A ship can even carry several aeroplanes.
2. It plays a crucial role in the international trade of any country.
3. No investment is required for waterways maintenance.
4. The operating cost, in case of sea transport, is also less when compared with the other modes of transport.
5. There is no problem of traffic congestion in the mid-sea. This avoids delay.
6. Accident during the voyage is a rare occurrence. Loss of goods due to accident, therefore, is also avoided.

**Drawbacks**

1. It is the slowest mode of transport.
2. It is very much affected by weather and climatic conditions.
3. Lack of stable political conditions in many countries also come as a barrier
4. Sea transport doesn’t offer any scope for extension. All other modes of transport can be extended to newer areas.

**Air transportation**

Air routes are practically unlimited, but they are denser over the North Atlantic, inside North America and Europe and over the North Pacific. Air transport constraints are multidimensional and include the site (a commercial plane needs about 3,300 meters of
runway for landing and take-off), the climate, fog and aerial currents. Air activities are linked to certain sectors, notably finance and tourism, which lean on the long distance mobility of people.

Yet even here a divergence is being noted. The growth of all-freight airlines and the freight-only planes operated by some of the major carriers, such as Singapore Airlines, are heralding a trend. The interests of the shippers, including the timing of the shipments and the destinations, are sometimes better served than in passenger aircraft. The divergence between passengers and freight is also being accentuated by the growing importance of charter and "low-cost" carriers. Their interest in freight is very limited, especially when their business is oriented towards tourism, since tourist destinations tend to be lean freight generating locations.

Advantages

1. It provides a regular, convenient, efficient and quick service.
2. Perishable goods like fruits, vegetables, egg, meat, etc., can be transported quickly.
3. It does not require huge investment for construction and maintenance of track like railways.
4. It provides comfortable services for passengers and safety for their goods.
5. It can be used to move goods to areas, which are inaccessible to other means of transport.
6. It is very much helpful for flood or landslide and war rises to the occasion to save human life from danger.

**Disadvantages**

1. It is one of the most expensive modes
2. It has size and weight limitations.
3. Unfavourable weather may disturb the air service.
4. The construction and maintenance of aerodromes involve a huge capital expenditure.
Exercise 1. Answer the questions

1. Where does maritime circulation primarily take place? Why?
2. What is done to facilitate maritime circulation?
3. What are the advantages of maritime transportation?
4. Why does maritime transportation have high terminal costs?
5. What ships are adopted to the needs of both passenger and freight market segments?
6. What are Air transport constraints?
7. What business sectors are Air activities linked to?
8. What are the advantages of Air transportation?
9. What are the drawbacks of Air and maritime transport?
Exercise 2. Decide whether the following statements are true (T) or false (F):

1. Maritime transportation is the most effective mode to move small quantities of cargo over long distances.
2. Air transport is the mode where freight and passengers are least integrated.
3. Maritime circulation takes place on specific parts of the maritime space.
4. In the maritime sector passenger services are integrated with freight operations.
5. Air routes are practically unlimited.
6. There are no constraints for air transport.
7. Sea transport offers a large scope for extension.
8. Charter and "low-cost" carriers business is falling.
9. The divergence between passengers and freight is accentuated by the growing importance of charter and "low-cost" carriers.
Exercise 3. Match the verbs to the nouns

1. to move a/ service
2. to facilitate b/ a trend
3. to maintain c/ investment
4. to play d/ delay
5. to avoid e/ investment
6. to herald f/ maritime circulation
7. to operate g/ perishable goods
8. to provide h/ large quantities of cargo
9. to require i/ infrastructure
10. to transport j/ freight-only planes

Exercise 4. Complete the extract with appropriate words or phrases from the box

Accessibility, destination, door-to-door, modal competition, vans, integrated transportation systems, complement
PROS and CONS of different modes of transport.

Each transportation mode has key operational and commercial advantages and properties. However, contemporary demand is influenced by ……… that require maximum flexibility in the respective use of each mode. As a result, ……… exists at various degrees and takes several dimensions. Modes can compete or……… one another in terms of cost, speed, ………, frequency, safety, comfort, etc. When deciding which method of transport to use, you need to weigh up the advantages and disadvantages of each. Depending on the distance, ………, volume and type of goods you deliver, if you want to transport goods directly from ………, you can choose between different types of road transport, such as bikes, cars, ……… or trucks or use alternatives such as rail, air, sea.

Exercise 5. Match the words and phrases to their explanations:

1. Transportation
2. Network effects
3. Transport modes
4. Rail transport
5. Main maritime routes
6. Intermodal transportation
7. Each transportation mode
8. Air transport
9. Maritime transportation
10. Gauges
11. The growth of freight traffic
12. Maritime transportation

a) vary around the world, often challenging the integration of rail systems.

b) linking more locations exponentially increases the value and effectiveness of transport

c) the activity of moving people or things from one place to another

d) are composed of oceans, coasts, seas, lakes, rivers and channels.

e) is linked to heavy industries, such as steel and petrochemical facilities adjacent to port sites.
f) has high terminal costs
g) concerns a variety of modes used in combination so that the respective advantages of each mode are better exploited
h) the conveyance of passengers and goods by means of wheeled vehicles specially designed to run along railways or railroads
i) has key operational and commercial advantages and properties
j) the mode where freight and passengers are most integrated
k) the means by which people and freight achieve mobility.
l) is increasing road congestion

Read the article and speak on public transportation in the USA

Public Transportation: Benefits for the 21st Century
Public transportation offers a variety of modes of travel, such as: Road vehicles: bus, trolleybus, vanpool, paratransit service. Rail and other fixed guideways: heavy rail, light rail, commuter rail, automated guideway transit, inclined plane, cable car, monorail, aerial tramway. Water: passenger-only and vehicle ferries, water taxis Many transit systems operate more than one mode of service.

Approximately 1,500 agencies provide bus service, 80 provide rail service, 5,960 provide paratransit services and 120 provide services on other modes.

Through the development and deployment of 21st century technologies, today’s riders are finding that public transportation is a far cry from the transit systems of yesteryear. Buses and trains are easy to get on and off with stops announced to riders. New information technologies alert passengers by e-mail or cell phone when the next bus or train is coming. People plan their trips on transit agency web sites. Some commuter buses and trains now have Wi-Fi capabilities—becoming rolling Internet cafes.
Public transportation helps everyone — commuters, families, students, senior citizens, persons with disabilities — live the American dream, as they seek to fulfill their personal and career goals, meet their daily needs and maintain a high level of transportation independence. Now, more than ever, it is evident that vital, strong public transportation systems are needed in this country. Approximately 1,500 agencies provide bus service, 80 provide rail service, 5,960 provide paratransit services and 120 provide services

https://www.apta.com/resources/
UNIT 4. MULTIMODAL vs INTERMODAL TRANSPORTATION

The major difference between Multimodal and Intermodal is the number of contracts the shipper has with various service providers. The differentiation between multimodal and intermodal lies in the contract/bill of lading and transport carrier responsibility/liability of the movement.

*Intermodal* is defined as the movement of cargo from origin to destination by several modes of transport where each of these modes has a different transport carrier responsible, each with its own independent
contract. Multiple carriers during a single journey. Each leg of the shipment is be handled by a separate transport carrier. The Shipper will have several contracts, one with each transport carrier to handle their specific leg of the shipment.

Multimodal is defined as the movement of cargo from origin to destination by several modes of transport where each of these modes have a different transport carrier responsible, However under a single contract or bill of lading. Single carrier during a single journey. The same transport carrier is responsible for moving the shipment in all legs, in all modes. In simple terms, Multimodal is using various modes of transport but with one transport bill of lading.

According to DHL, "The advantage of both Intermodal and Multimodal Transport is given by the most efficient combination of multiple transport modes, optimizing lead times, reducing inventory costs and keeping the level of freight costs under control. This combination results in increased
environmental sustainability, reducing the transportation carbon footprint".

Advantages of Multimodal transportation:

1. Shipment tracking efficiency able to monitor with one transport carrier from door to door delivery;
2. access to remote parts of the world with responsibility and liability of the movement with one transport carrier;
3. efficiency in delivery time;
4. minimization of logistics coordination expenses of a shipper
5. provides faster transit of goods:
6. Use of international experience, in transportation as well as in the field of bureaucracy and commerce;

Advantages of Intermodal transportation:

1. Shippers can choose carriers to take advantage of lower rates for each transport leg;
2. gain flexibility and specialized handing of loading and unloading goods at different ports;
3. choosing environmentally friendly carriers;
4. increased security of the products being transported;
5. Shippers have more access to equipment and can better control capacity and selection of transit schedules.
6. The inherent advantages of Multimodal transport system will help to reduce the cost of exports and improve their competitive position with pricing in the international market segment.

Regardless of your choice with Intermodal or Multimodal, Shippers require a transportation management system (TMS) to ensure door to door tracking visibility, ability to perform routing scenarios to determine the best overall total shipping cost with the best overall routing transit time. The transportation management system must have capabilities for coordination with / and between transport carriers and
suppliers, along with freight rate / contract management. http://logisticsportal.org

**Exercise 1. Complete the extract with appropriate words or phrases from the box**

| Multi-modal, single, competitive position, rates, private, globalization, cargo, responsibility, efficiency, freight forwarding, carrier, mode of transport, transport system |

…… is the transport operation where despiect the use of several modes, a single provider (and a single contract) assumes the entire ….. since the cargo origin until its destiny. Compared to ….., multimodal transportation involves carrying of goods from one point to another with the help of multiple transportation modes. One ….. operates the system that involves more than one ….. All modes of transport including air, sea, road and rail are covered under one bill and are under the ownership or control of the
operator. This type of ..... is planned and coordinated as a single operation which reduces the loss of time and money and also minimizes the risk of damage to the cargo at trans-shipment points.

Multimodal transport system helps improve trading ..... , transforming the relation between international carriers and trading partners. Due to ..... , companies require nothing less than international door-to-door transportation. They require these services under a ..... liability system which not only leads to better control but also results in low delivery costs.

Multi-modal transport system is considered a game changer as it is quite effective in solving a major part of ..... mobility issues. By combining state and ..... transportation modes into one transport system, the best ..... and transit time can be capitalized. The inherent advantages of Multimodal transport system will help to reduce the cost of exports and improve their ..... with pricing in the international market segment.
UNIT 5. HIGH-SPEED RAIL (HSR)

Text 1 High-speed Rail: Definition, Principles, Advantages

The EU directive defined HSR as “specially built high-speed lines equipped for speeds generally equal to or greater than 250 km/h, or specially upgraded high speed lines equipped for speeds of the order of 200 km/h, or - specially upgraded high-speed lines which have special features as a result of topographical, relief or town planning constraints, on which the speed must be adapted to each case”.

High speed rail is not only a technical subject, but encompasses a complex reality involving various technical aspects such as infrastructure, rolling stock
and operations and crosssector issues such as financial, commercial, managerial and training aspects.

The high speed rail system combines these various elements using highly sophisticated technology.

1. Infrastructure

a) The infrastructure of the trans-European High Speed system shall be that on the trans-European transport network:
   • those built specially for High Speed travel,
   • those specially upgraded for High Speed travel.
They may include connecting lines, in particular junctions of new lines upgraded for High Speed with town centre stations located on them, on which speeds must take account of local conditions.

b) High Speed lines shall comprise:
   • Specially built High Speed lines equipped for speeds generally equal to or greater than 250 km/h,
   • Specially upgraded High Speed lines equipped for speeds of the order of 200 km/h,
• Specially upgraded High Speed lines which have special features as a result of topographical, relief or town-planning constraints, on which the speed must be adapted to each case.

2. Rolling stock

The High Speed advanced-technology trains shall be designed in such a way as to guarantee safe, uninterrupted travel:

• at a speed of at least 250 km/h on lines specially built for High Speed, while enabling speeds of over 300 km/h to be reached in appropriate circumstances,
• at a speed of the order of 200 km/h on existing lines which have been or are specially upgraded,
• at the highest possible speed on other lines.

3. Compatibility of infrastructure and rolling stock

High Speed train services presuppose excellent compatibility between the characteristics of the infrastructure and those of the rolling stock. Performance levels, safety, quality of service and cost depend upon that compatibility.
High Speed principles

They are two important principles for any high speed rail system:

1 - High Speed Railway is not element but systems. They are in fact very complex system, comprised by state of the art of all following components: Infrastructure, Station emplacement, Rolling Stock, Operation rules, Signalling systems, Marketing, Maintenance systems, Financing, Management, Legal aspects

Considerable advantages of high-speed trains are:
• high capacity
• environmental respect
• high safety

The performance that supports high speed for customers are:
• Commercial speed - travel with a high level of speed
• Total time of travel - benefit a short travel time from door to door
• Frequency - profit of a high level of available transports, that what signifies short total travel time (in
general, the half of the frequency is included in the total time of travel)

- **Reliability** - profit of a reliable system of transport, which works independent in nearly each case of weather
- **Accessibility** - you can enter a train spontaneous without long check in times, which supports you high level of flexibility
- **Price**
- **Comfort** - there is a higher level of comfort (in terms of space, accelerations, noise, light, etc.) than in the plane, bus, or an average car
- **Safety** - High speed trains are the safeties transport medium
- "**Freedom**" - during your trip, you can go everywhere and every time you want, else in the restaurant, to the lavatory, or only for promenade, seatbelts are nor necessaries, electronic devices aren’t limited, etc.

**HSR advantages for Society**

- Offers high capacity of transport - Up to 400,000 passengers per day - Reduce traffic congestion
Text 2. The Development of HSR

1964 The Birth of Shinkansen

Japan was the first to develop a commercial high-speed rail train and is a leading nation in HSR railway technology worldwide. Built in 1964, Japan’s Tokyo-to-Osaka high-speed rail line was the first, and is still the busiest, high-speed rail line in the world. The line is usually referred to as the Tokaido Shinkansen. Tokaido is the name of the Tokyo-Osaka corridor and Shinkansen means “new trunk line” (referring to its status as the world’s first).

This line was built to provide capacity to the new transport system necessary for the impressively rapid
growth of the Japanese economy. The Tokaido Shinkansen was designed to operate at 210 km/h (later increased), broad loading gauge, electric motor units powered at 25 kV ac, Automatic Train Control (ATC), Centralised Traffic Control (CTC) and other modern improvements.

High Speed Rail (HSR) was born.

After the big success of the Shinkansen operation, technical progress in several European countries, particularly France, Germany, Italy and UK, developed new technologies and innovations aimed to establish the basis for the "passenger railway of the future".

France kicked off the HSR race in Europe when it launched the Paris-to-Lyon TGV (Train à Grand Vitesse) HSR train line in 1983. The European HSR was born, but in contrast to the Shinkansen concept, the new European HSR was fully compatible with existing railways and this largely conditioned the further development of the system in the Old Continent.
The project was motivated by the need to increase capacity on congested sections of their existing network. It involved developing a completely new alignment that shortened the existing track length from 520 to 120 km (323 to 74 miles). New, lighter train sets that needed less expensive infrastructure were developed for the system. As in Japan this first (for France) HSR project was very successful in many respects total traffic on the corridor almost doubled from 12.5 to 22.9 million passengers between 1980 and 1992. It reduced travel times between Paris and Lyon to two hours from four hours.

The European HSR was born, but in contrast to the Shinkansen concept, the new European HSR was fully compatible with existing railways and this largely conditioned the further development of the system in the Old Continent.

Once again, after the big success of the TGV, each European country looked for the new generation of competitive long and medium distance passenger rail services, in some cases by developing its new technology and in others by importing.
Joining the group of countries offering high speed rail services in Europe were Italy and Germany in 1988, Spain in 1992, Belgium in 1997, the United Kingdom in 2003 and the Netherlands in 2009.

**Developing a System-Wide Network in Europe**

The HSR network in Europe has its core in the cities of Brussels and Lille. The three-pronged network in France has been a central link in the bid to build up a European high-speed rail network. Lille is connected to London to the west and Paris in the south, while Brussels is connected to Amsterdam in the north and Cologne to the east.

Though France, Italy, Spain and Germany have the most extensive high-speed rail networks, they are not the only countries pursuing HSR development in Europe. Several countries, namely Sweden, Norway, Poland, Finland, Turkey, and the United Kingdom, are all at various stages of either building HSR lines or upgrading their existing lines to speeds 100-155 miles per hour.

http://www.uic.org/High-Speed-History
HSR in Asia

In the meantime, some similar cases appeared in other countries and regions, such as China in 2003 (even if the big development came later, in 2008), South Korea in 2004, Taiwan Railway High Speed Corporation in 2007 and Turkey in 2009.


A new dimension and a new perspective for HSR started in China on 1 August 2008. The 120 km high speed line between Beijing to Tianjin represents just the first step in a huge development to transform the way of travelling for the most populated country in the world. Since 2008, China has implemented almost 20,000 kilometres of new high speed lines and thanks to an enormous fleet of more than 1 200 train sets, carries 800 million passengers per year (2014 and
growing), more than the half of the total high speed traffic in the world.

And following the example led by China, new high speed systems are under development around the world.

*Exercise 1. Answer the questions:*
1. What railways can be defined as HSR?
2. What elements does a high speed rail system involve?
3. What kind of infrastructure is needed for the trans-European High Speed system?
4. What rolling stock is required for high speed rail system?
5. What are two important principles for any high speed rail system?
6. What are High Speed advantages?
7. What country was the first to develop a commercial high-speed rail train?
8. What country launched the TGV HSR train line in 1983?
9. What is the main difference between the Shinkansen concept and the new European HSR?
10. What European countries have the most extensive high-speed rail Networks?
11. What Asian countries have achieved remarkable progress in building up their high-speed rail?

**Exercise 2. Decide whether the following statements are true (T) or false (F):**

1. HSR is defined as “specially built high-speed lines equipped for speeds generally equal to or greater than 150 km/h, or specially upgraded high speedlines equipped for speeds of the order of 200 km/h,

2. The high speed rail system combines various elements using highly unilateral technology

3. High Speed lines shall comprise: specially built High Speed lines equipped for speeds generally equal to or greater than 350 km/h,
4. The High Speed advanced-technology trains shall be designed in such a way as to guarantee safe, uninterrupted travel.

5. The performance that supports high speed for customers are: commercial speed, total time of travel, frequency, reliability, accessibility, price, comfort, safety and "freedom".

6. The Birth of Shinkansen Japan was in 1954.

7. The China high speed rail program was launched in 2005.


9. The HSR network in Europe has its core in the cities of Brussels and Lille.

10. Joining the group of countries offering high speed rail services in Europe were Italy and Germany in 1989.
Exercise 3. Match the beginning of the sentences (1-10) to their endings (a-j):

1. HSR advantages for Society
2. Safety
3. The three-pronged network in France
4. HSR project
5. Reliability
6. The project was motivated by
7. Accessibility
8. Though France, Italy, Spain and Germany have the most extensive high-speed rail networks,
9. After the big success of the Shinkansen operation
10. In contrast to the Shinkansen concept, 
    a/ profit of a reliable system of transport
    b/ you can enter a train spontaneous without long check in times, which supports you high level of flexibility
    c/ they are not the only countries pursing HSR development in Europe
d/ the new European HSR was fully compatible with existing railways and this largely conditioned its further development.

e/ has been a central link in the bid to build up a European high-speed rail network.

f/ technical progress in France, Germany, Italy and UK, developed new technologies and innovations aimed to establish the basis for the "passenger railway of the future".

g/ the need to increase capacity on congested sections of the existing network.

h/ reduced travel times between Paris and Lyon to two hours from four hours.

i/ high speed trains are the safest transport medium

j/ offers high capacity of transport, respects the environment, helps economic development, promotes logical territory structure and helps contain urban sprawl.
Exercise 4. Complete the extract with appropriate words or phrases from the box

Density, high-speed lines, third-generation, delays, LGV standards, destinations, signalling systems, impetus, existing rail lines, dedicated, runs, network, certified,

Construction on first German ..... began shortly after that of the French TGVs. Legal battles caused significant ..... , so that the InterCityExpress (ICE) trains were deployed ten years after the TGV network was established. The ICE ..... is more tightly integrated with pre-existing lines and trains as a result of the different settlement structure in Germany, with a population more numerous by a third than that of France, on a territory smaller by a third, resulting in more than twice the population ..... of France. ICE trains reached ..... in Austria and Switzerland soon after they entered service, taking advantage of the same voltage used in these countries. Starting in 2000, multisystem third-generation ICE trains entered the
Netherlands and Belgium. The third generation of the ICE reached a speed of 363 km/h (226 mph) during trial ….. , and is certified for 330 km/h (205 mph) in regular service.

Italy pioneered the use of the Pendolino tilting train technology. Italian government constructor Treno Alta Velocita has been adding to the high speed network in Italy, with some lines standards. Also, many high-speed services, including TGV and ICE utilize ….. in addition to those designed for high speed rail. For that reason, and due to differing national standards, trains that cross national boundaries need to have special characteristics, such as the ability to handle different power supplies and ….. . This means that not all TGVs are the same, and there are loading gauge and signalling considerations.

The construction of the Channel Tunnel, completed in 1994, provided the ….. for the first cross-border high speed rail line. In 1993, the LGV Nord, which connects Paris to the Belgian border and the Channel
Tunnel via Lille was opened. Initial travel times through the tunnel from London to Paris and Brussels were about 3 hours. In 1997, a ….. high-speed line to Brussels, HSL 1 was opened. In 2007, High Speed 1, the Channel Tunnel Rail Link to London was completed after a partial opening in 2003. All three lines were built to the French ….. , including electrification at 25 kV.

Passenger trains built to specific safety standards are operated by Eurostar through the Channel Tunnel. Direct trains now travel from London St. Pancras to Paris in 2h 15, and to Brussels in lh 51.
UNIT 6. RAIL TRACK

Text 1. Track

The track is a fundamental part of the railway infrastructure and represents the primary distinction between this form of land transportation and all others in that it provides a fixed guidance system. The track is the steering base for the train and has evolved from an ancient design of vehicle guidance with origins dating, some historians have suggested, from the Sumerian culture of 2000 BC. The modern railway version is based on the steel wheel running on a steel
Other forms of guided vehicle technology exist; rubber-tyred trains, magnetic levitation and guided busways, for example.

The usual track form consists of the two steel rails, secured on sleepers (or crossties, shortened to ties, in the US) so as to keep the rails at the correct distance apart (the gauge) and capable of supporting the weight of trains. There are various types of sleepers and methods of securing the rails to them. Sleepers are normally spaced at 650 mm (25 ins) to 760 mm (30 ins) intervals, depending on the particular railway's standard requirements.

https://ru.scribd.com/
Typically, railway infrastructure includes fixed physical facilities including the following principal components.

Basic railway infrastructure includes the sub-grade, sub-ballast, ballast, sleepers (also known as crossties), rail, and track fastenings that secure the rail in position relative to the sleepers and to each other. These systems, the foundation for railway infrastructure, should be designed for the proposed purpose of the
railway. Railways intended to carry heavy loads will require a solid sub-grade without underlying problems such as soft marshy soils, for example, and a substantial sub-ballast cross section of hard angular rock, typically granite. The ballast section must also be hard angular rock; the rock depth must be sufficient to distribute load stresses throughout the sub-ballast and the rock size must be sufficient to permit rapid water drainage into drainage structures built adjacent to the shoulders of the top ballast section. (World Bank).

Text 2. Ballast

Ballast is provided to give support, load transfer and drainage to the track and thereby keep water away from the rails and sleepers. Ballast must support the weight of the track and the considerable cyclic loading of passing trains.

Ballast (usually crushed stone), as it is known, is another important part of railroad infrastructure. Although it may just look like plain ole gravel this stone plays a vital role in acting as a support base for the railroad ties and rails as well as allowing for
proper drainage of water away from the rails (which is why the stone is always sloped downward and away from track). You may be wondering how such a term came to define the stone which supports the railroad track structure. Interestingly, it has its roots dating back to early times when stone was used as ballasting for sailing ships. In today's railroad industry the use of ballast, its application, and purpose has changed little since it was first employed and will likely always remain an important component as a part of the track structure.

Track ballast forms the trackbed upon which railway sleepers (UK) or railroad ties (US) are laid. It is packed between, below, and around the ties. It is used to facilitate drainage of water, to bear the load from the railroad ties, and also to keep down vegetation that might interfere with the track structure. This also serves to hold the track in place as the trains roll by. It is typically made of crushed stone, although ballast has sometimes consisted of other, less suitable materials. The term "ballast" comes from a nautical term for the stones used to stabilize a ship.
Material properties. A good ballast should be strong, hard-wearing, stable, drainable, easy to clean, workable, resistant to deformation, easily available, and reasonably cheap to purchase.

http://www.railway-technical.com/infrastructure/

Text 3. The Railroad Ties

Railroad ties, also known as crossties or sleepers are the primary lateral support for the rails themselves, anchoring the track and giving it a solid, sound base upon which trains can pass over. Over the years crosstie technology has improved to the point that today, the common hardwood tie which has been properly treated with creosote can last at least 30-40 years before being replaced. While the basic design and function of the tie has not changed much in more than a century of use, today's technologies have allowed other materials to be utilized notably concrete and even plastics/composites that generally enhance its livelihood. In any event, while railroads have employed these new ties in some instances, especially concrete on heavily used main lines, wood remains the
preferred choice due to its cost and generally-good life expectancy.

Traditionally, sleepers (known as ties in the US) are wooden. They can be softwood or hardwood. Most in the UK are softwood, although London Underground uses a hardwood called Jarrah wood. Sleepers are normally impregnated with preservative and, under good conditions, will last up to 25 years. They are easy to cut and drill and used to be cheap and plentiful. Nowadays, they are becoming more expensive and other types of materials have appeared, notably concrete and steel.

Concrete is the most popular of the new types (left). Concrete sleepers are much heavier than wooden ones, so they resist movement better. They work well under most conditions but there are some railways which have found that they do not perform well under the
loads of heavy haul freight trains. They offer less flexibility and are alleged to crack more easily under heavy loads with stiff ballast. They also have the disadvantage that they cannot be cut to size for turnouts and special trackwork. A concrete sleeper can weighs up to 320 kg (700 lbs) compared with a wooden sleeper which weighs about 100 kg or 225 lbs. The spacing of concrete sleepers is about 25% greater than wooden sleepers.

https://www.american-rails.com/

**Text 4. Rails**

As individual components of railroad infrastructure go railroad track, or rails, is the single most important part. While the ballast and ties also play a very important role within the track structure, without the rails, of course, trains could not operate. Throughout the decades and centuries railroad track technology has gradually improved with the most important advancement coming in the development of "T"-rail in the mid-19th century. Today, virtually all main lines with speeds above 25 mph use welded or continuous welded rail (CWR) as it is much easier to maintain
than the older "stick" or jointed rail that required being bolted together.

Rail classification (weight)

Rail is graded by weight over a standard length. Heavier rail can support greater axle loads and higher train speeds without sustaining damage than lighter rail, but at a greater cost. The standard form of rail used around the world is the "flat bottom" rail. It has a wide base or "foot" and narrower top or "head". The UK introduced a type of rail which was not used elsewhere - apart from a few UK designed railways.

Flat bottom rails can also be "spiked" directly to the sleepers.
Normally, the rail rests on a cast steel plate which is screwed or bolted to the sleeper. The rail is attached to the plate by a system of clips or clamps, depending on the design.

Older track is jointed. In the UK, about 35% of track is still jointed, although this is continuously falling as new rail is installed. Rails were normally laid in standard lengths bolted together by what are called fishplates in the UK or splices in the US. The joints allowed sufficient space for expansion as they were provided at 60 foot intervals in the UK and 39 foot in the US, allowing them to be carried in a standard 40 ft flat wagon. The joints were always staggered in the US whereas the UK placed them side by side.

Nowadays, rail is welded into long lengths, which can be up to several hundred metres long. Expansion is minimised by installing and securing the rails in tension. Provided the tension is adjusted to the correct level, equivalent to a suitable rail temperature level, expansion joints are not normally needed. Special joints to allow rail adjustment are provided at suitable locations.
Adjustment switches are also provided to protect turnouts and at locations where a change in the rail design or size occurs. Rail tends to creep in the main direction of travel so "rail anchors" ("anti-creepers" in the US) are installed at intervals along the track. They are fitted under the rail against a base plate to act as a stop against movement.

**Rail Welding**

Modern trackwork uses long welded rail lengths to provide a better ride, reduce wear, reduce damage to trains and eliminate the noise associated with rail joints. Rail welding is a complex art (or science) depending on how you feel about it. There are two main types of welding used for rails: Thermit welding and Flash Butt welding.

Continuous welded rail

Most modern railways use continuous welded rail (CWR), sometimes referred to as ribbon rails. In this form of track, the rails are welded together by utilising flash butt welding to form one continuous rail that may be several kilometres long, or thermite welding to
repair or splice together existing CWR segments. Because there are few joints, this form of track is very strong, gives a smooth ride, and needs less maintenance; trains can travel on it at higher speeds and with less friction. Welded rails are more expensive to lay than jointed tracks, but have much lower maintenance costs. The first welded track was used in Germany in 1924 and the US in 1930 and has become common on main lines since the 1950s.

**Gauge**

The standard track gauge - the distance between the two rails - is 4 ft. 8½ in or 1435 mm. but many other gauges, wider and narrower than this, are in use around the world. Gauge is often intentionally widened slightly on curved track.

**Exercise 1. Answer the questions**

1/ What part of the railway infrastructure represents the primary distinction between this form of land transportation and all others?
2/ What does the track consist of?
3/ What does basic railway infrastructure include?
4/ What does a sub-structure ensure?
5/ What three elements does a sub-structure consist of?
6/ What does ballast provide?
7/ What is the role of railroad ties?
8/ Why are adjustment switches provided?
9/ What is used to get continuous welded rail?
10/ What are the advantages and disadvantages of welded rails?
11/ What is the gauge?

**Exercise 2. Decide whether the following statements are true (T) or false (F):**

1. Efficient transport is a critical component of national economic development.
2. Productivity – improves time performance and reduces loss and damage, thus reducing economic drag.
3. Transport enhances standard of living.
4. Transport helps in creation of unemployment.
5. Transport helps in labour mobility.
6. Russia had the largest number of fatalities in car accidents in 2013
7. In urban regions, about 60% of all air pollution emanates from automobile traffic.

*Exercise 3 Match the words and phrases to their explanations:*

1. Concrete sleepers  a/ is provided to give support, load transfer and drainage to the track
2. wide base of the rail  b/ the distance between the two rails
3. gauge  c/ consists the formation, the sub-ballast and the ballast
4. the sub-structure  d/ allowed sufficient space for expansion
5. the narrow rail top  e/ "foot"
6. the rail  f/ are the primary lateral support for the rails
7. the track  g/ allowed sufficient space for expansion
8. crossties or sleepers  h/ "head".

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9. modern railway version i/ is based on the steel wheel running on a steel rail
10. the joints j/ is graded by weight over a standard length
11. The joints k/ a fundamental part of the railway infrastructure
12. ballast l/ are much heavier than wooden ones

Exercise 4. Complete the sentences with appropriate words or phrases from the box.

fundamental part, fastenings, Sleepers, loading, mineral ballast, permanent way, transportation, heavier loads, beams, ties, gauge, fastener, lateral displacement

Rail Tracks or Permanent Way means the physical elements of the railway line itself: generally the pairs of rails typically laid on ..... ("crossties"or just "ties", in North America) embedded in ballast, intended to carry the ordinary trains of a railway. It is described as permanent way because in the earlier days of railway construction, contractors often laid a temporary track
to transport spoil and materials about the site; when this work was substantially completed, the temporary track was taken up and the ..... installed.

The track is a ..... of the railway infrastructure and represents the primary distinction between this form of land ..... and all others in that it provides a fixed guidance system. The modern railway version is based on hardened steel wheels running on a pair of hardened steel rails as the base. Steel rails can carry ..... than any other material. The traditional form of Permanent Way consists of:

a/ two parallel iron or steel rails, a fixed distance apart, on which the wheels of trains run;

b/ transverse ..... called sleepers, set at a close spacing, that maintain the specified spacing of the rails and that distribute the concentrated ..... of train wheels;

c/ ..... to hold the rails and sleepers together;

d/ a layer of ..... placed under and around the sleepers, to further distribute the train loading, and to resist ..... Parallel steel rails forming tracks together with railroad switches (or points) guide trains without the need for steering. Rails are laid upon sleepers (.....)
embedded in ballast to form the railroad track. Railroad ties spread the load from the rails over the ground and serve to hold the rails a fixed distance apart called the ….. , always measured between the inner faces of the rails. The rail is fastened to the ties with rail spikes, lag screws or clips such as Pandrol clips. The type of f ….. depends partly on the type of sleeper, with spikes being used on wooden sleepers, and clips being used more on concrete sleepers.

*Exercise 5. Skim the texts and find British and US synonymic terms*

**UNIT 7. ROLLING STOCK**

Rolling stock (UK) – A generic term for all types of railway vehicle other than locos, which are usually referred to separately

Rolling stock (US) – Any on-track wheeled equipment Railway rolling stock comes in a variety of forms.
The sole purpose of locomotives is to pull or push trains; they carry no passengers or freight. Locomotives are distinguished by the prime mover or energy source used to propel them. Modern locomotives are either electric or diesel-electric.

Electric locomotives draw power from an overhead wire or third rail, and use electric motors to turn the wheels. The prime-mover is a transformer on the locomotive that converts the overhead electricity to
the type of electricity needed in electric traction motors that turn the wheels.

Instead of a transformer, diesel-electric locomotives use a diesel engine to drive an alternator and generate electricity that powers traction motors that turn the wheels. Some diesel locomotives use a hydraulic torque converter rather than electric motors - these are referred to as diesel-hydraulic locomotives. Older generation steam locomotives, powered by coal, oil, or wood, are now used onl

*Exercise 1. Decide whether the following statements are true (T) or false (F):*

1. Rolling stock (UK) is a generic term for all types of railway vehicle
2. Rolling stock (US) is any on-track wheeled equipment
3. The sole purpose of locomotives is to pull or push trains; they carry passengers and freight
4. Modern locomotives are all diesel-electric.
5. Electric locomotives draw power from an overhead wire or third rail.

6. The prime-mover is a transformer on the locomotive that converts the overhead electricity to the type of electricity needed in electric traction motors that turn the wheels.

7. Diesel-electric locomotives use a diesel engine to drive an alternator and generate electricity that powers traction motors that turn the wheels.

8. Diesel locomotives don’t use hydraulic torque converters.

9. Steam locomotives, powered by coal, oil, or wood, are not used now.

10. Hydraulic torque converters rather than electric motors are used in diesel-hydraulic locomotives.
Exercise 2 Match the words and phrases to their explanations:

1. Rolling stock (US)
2. Rolling stock (UK)
3. locomotives
4. prime mover
5. Electric locomotives
6. diesel-electric locomotives
7. transformer
8. diesel-hydraulic locomotives
9. Locomotives
10. steam locomotives
11. a diesel engine
12. Modern locomotives

a) pull or push trains; they carry no passengers or freight.
b) draw power from an overhead wire or third rail
c) use a hydraulic torque converter rather than electric motors
d) Any on-track wheeled equipment
e) is used to drive an alternator and generate electricity that powers traction motors that turn the wheels.
f) are now used only in tourist operations or for occasional work on smaller railways or in museums.
g) converts the overhead electricity to the type of electricity needed in electric traction motors that turn the wheels
h) all types of railway vehicle other than locos, which are usually referred to separately
i) are distinguished by the prime mover or energy source used to propel them.
j) is energy source used to propel a locomotive
k) are either electric or diesel-electric
l) use diesel engines to drive alternators to power traction motors that turn the wheels.
Commuter Rail provides passenger service between central cities and their suburbs. Commuter rail trains typically operate only on work days and during commute hours. Most riders make trips of less than 50 miles for work, school, or errands. These trains typically run on the same railroad tracks as freight trains and often share some stations with Amtrak intercity trains.
Text 2. Multiple-Unit Trains

“Multiple-unit” passenger rolling stock is an important category, with two basic types — electric multiple-units, called EMUs and diesel multiple-units, called DMUs. The MU equipment has no locomotive; multiple cars can be connected and operated from a single location. Some multiple-unit cars have powered axles; the cars that do not are called ‘trailer’ cars. Typically, the first car has a driver’s station and accommodates passengers. Multiple unit (MU) equipment is popular for many reasons.

MU trains can respond to changes in demand levels because cars can be added to or dropped from a train.

MU trains can be driven from either end so two person crews can quickly prepare for return trip, making MUs popular for commuter services.

MU trains offer more passenger space per track length, since they operate without a locomotive.

MUs distributes traction power throughout the train, thus achieving higher power-to-weight ratios and greater acceleration rates.
The MUs’ flexibility and design characteristics are also ideal for high-speed train services because higher power levels are needed to overcome aerodynamic drag.

Some TGV and ICE trains are considered push-pull trains with power cars at each end, some with as much as 16,300 horsepower (12,200 kW). For example, the EuroStar train service has a configuration (1 power set, 18 trailer cars, 1 power set) with a total of 24,400 kW (32,600 hp) that can carry 794 passengers in bi-level coach configurations.

Text 3. Light Rail
Light Rail passenger service refers to the number of riders that the train can carry, not the weight. Light rail trains provide passenger service within a city and its suburbs. They operate on their own tracks—they don't share tracks with commuter rail, Amtrak, or freight trains—but sometimes share right-of-way with automobiles. They also run at frequent intervals and typically run not only in commute hours but also during the day, weekends, and evenings.

Text 4. LONG DISTANCE PASSENGER RAIL SERVICE
Long-distance trains travel between many cities and/or regions of a country, and sometimes cross several countries. They often have a dining car or restaurant car to allow passengers to have a meal during the course of their journey. Trains traveling overnight may also have sleeping cars.

Text 5. PASSENGER CARS

Passenger cars for carrying and serving the traveling public include coaches, parlor, observation, sleeping, dining, kitchen, lunch-counter, buffet, café and club cars. Trains made up of cars providing many combinations of these accommodations afford the comforts and conveniences of the best city hotels. There are also numerous types of cars for moving baggage, mail and merchandise in passenger trains, including refrigerator cars for transporting perishable products. Among the more recently developed types of passenger-carrying cars are the dome cars, which widen the scope of vision of the traveler, and two-level coaches, which, provide full-length seating in the upper level and space for dressing rooms, lounges and hand baggage below. Two-level cars to increase
seating capacity long have been used in suburban passenger service.

*(Car Builders Cyclopedia of American Practice)*

Traditionally the passenger car can be split into a number of distinct types.

The most basic division is between cars which do carry passengers and "head end" equipment. The latter are run as part of passenger trains, but do not themselves carry passengers. Traditionally they were put between the locomotive and the passenger-carrying cars in the consist, hence the name.

**Coach**
The coach is the most basic type of passenger car, also sometimes referred to as 'chair cars'.

Two main variants exist: 'Open', with a centre corridor; the car's interior is often filled with row upon row of seats like that in a passenger airliner, other arrangements of the 'open' type are also found, including seats around tables, seats facing windows (often found on mass transit trains since there is increase standing room for rush hours), as well as variations of all three. Seating arrangement is typically [2+2]. The seating arrangements and density, as well as the absence or presence of other facilities depends on the intended use - from mass transit systems to long distance luxury trains.

The other variant is the 'closed' or 'Compartment car', in which a side corridor connects individual compartments along the body of the train, each with two rows of seats facing each other.
In both arrangements carry-on baggage is stowed on a shelf above the passenger seating area. The opening into the cars is usually located at both ends of the carriage, often into a small hallway - which in railway parlance is termed a vestibule.

In India normal carriages often have double height seating, with benches (berths), so that people can sit above one another (not unlike a bunk bed), in other countries true double decker carriages are becoming more common.

The seats in most coaches until the middle of the 20th century, were usually bench seats; the backs of these seats could be adjusted, often with one hand, to face in
either direction so the car would not have to be turned for a return trip. The conductor would simply walk down the aisle in the car, reversing the seat backs to prepare for the return trip. This arrangement is still used in some modern trains.

**Dining car**

A dining car (or diner) is used to serve meals to the passengers. Its interior is split with a portion of the interior partitioned off for a galley, which is off-limits to passengers. A narrow hallway is left between the galley and one side wall of the car for passengers to use. The remainder of the interior is laid out with
tables and chairs to look like a long, narrow restaurant dining room. There is special personnel to perform waitstaff and kitchen duties.

**Sleeping car**

Often called "sleepers" or "Pullman cars" (after the main American operator), these cars provide sleeping arrangements for passengers travelling at night. Early models were divided into sections, where coach seating converted at night into semi-private berths. More modern interiors are normally partitioned into separate bedroom compartments for passengers. The beds are designed in such a way that they either roll or fold out of the way or convert into seats for daytime
use. Compartments vary in size; some are only large enough for a bed, while others resemble efficiency apartments including bathrooms

**Lounge**

Lounge cars carry a bar and public seating. They usually have benches or large swivelling chairs along the sides of the car. Some lounge cars include small pianos and are staffed by contracted musicians to entertain the passengers.
These cars are often pulled in addition to the dining car, and on very long trains in addition to one or more snack or cafe cars.

Lounge cars are an important part of the appeal of passenger trains when compared to aircraft, buses and cars; there is more space to move around, socialize, eat and drink, and a good view.

**Observation Car**

The observation car almost always operated as the last car in a passenger train. Its interior could include features of a coach, lounge, diner, or sleeper. The
main spotting feature was at the tail end of the car -
the walls of the car usually were curved together to
form a large U shape, and larger windows were
installed all around the end of the car. Before these
cars were built with steel walls, the observation end of
heavyweight cars resembled a roofed porch area;
larger windows were installed at the observation end
on these cars as well. At this end of the car, there was
almost always a lounge where passengers could enjoy
the view as they watch the track rapidly recede into
the distance.

Dome Car
A dome car can include features of a lounge car, dining car and an observation. A portion of the car, usually in the center of the car, is split between two levels, with stairs leading both up and down from the train's regular passenger car floor level. The lower level of the dome usually consisted of a small lounge area, while the upper portion was usually coach or lounge seating within a "bubble" of glass on the car's roof. Passengers in the upper portion of the dome were able to see in all directions from a vantage point above the train's roofline. On some dome cars, the lower portion was built as a galley, where car attendants used dumbwaiters to transfer items between the galley and a dining area in the dome portion of the car.

Some dome cars were built with the dome extending the entire length of the car, while others had only a small observation bubble. There were also combination dome-observation cars built which were meant to be the last car on the train, with both rear observation and the dome up top.
Double-decker or Bi-level

The **bilevel car** (North American English) or **double decker** (British English) increases the passenger or freight capacity of a train without lengthening a train.

Some passenger car manufacturers began building double decker passenger train cars for use in areas that are more heavily populated or to carry more passengers over a long distance while using fewer cars (such as Amtrak's Superliner cars). Cars used on long-distance passenger trains could combine features of any of the basic car types, while cars used in local
commuter service are often strictly coach types on both levels.

Double decker coaches were tried in the UK (SR Class 4DD) but the experiment was unsuccessful because the restricted British loading gauge resulted in cramped conditions.

**Head-end equipment**

**Baggage car (US) and Brake van (UK)**

Although passengers generally were not allowed access to the baggage car, they were included in a great number of passenger trains as regular equipment.
The baggage car is a car that was normally placed between the train's motive power and the remainder of the passenger train. The car's interior is normally wide open and is used to carry passengers' checked baggage. Baggage cars were also sometimes commissioned by freight companies to haul less-than-carload (LCL) shipments along passenger routes. Some baggage cars included restroom facilities for the train crew, so many baggage cars had doors to access them just like any other passenger car. Baggage cars could be designed to look like the rest of a passenger train's cars, or they could be repurposed box cars equipped with high-speed trucks and passenger train steam and air connections.

**Prisoner car**

In some countries, convicts are transported from court to prison or from prison to another by railway. In such transportation a specific type of coach, prisoner car, is used. It contains several cell compartments with minimal interior and commodities, and a separate guard compartment. Usually the windows are of nontransparent opaque glass to prevent prisoners from
seeing outside and determine where they are, and windows usually also have bars to prevent escapes. Unlike other passenger cars, prisoner cars do not have doors at the ends of the wagon.

**Railway post office**

![Railway post office interior](image.jpg)

Railway post office (US) and Travelling post office (UK). The interior of an RPO on display at the National Railroad Museum in Green Bay, Wisconsin.

Like baggage cars, railway post office (RPO) cars or travelling post offices (TPOs) were not accessible to paying passengers. These cars' interiors were designed
with sorting facilities that were often seen and used in conventional post offices around the world. The RPO is where mail was sorted while the train was en route. Because these cars carried mail, which often included valuables or quantities of cash and checks, the RPO staff (who were employed by the postal service and not the railroad) were the only train crews allowed to carry guns. The RPO cars were normally placed in a passenger train between the train's motive power and baggage cars, further inhibiting their access by passengers.

**Specialized types**

**Troop sleeper**

A "troop sleeper" was a railroad passenger car which had been constructed to serve as something of a mobile barracks (essentially, a sleeping car) for transporting troops over distances sufficient to require overnight accommodations. This method allowed part of the trip to be made overnight, reducing the amount of transit time required and increasing travel efficiency. Troop kitchens, rolling galleys, also joined the consists in order to provide meal service en route.
(the troops took their meals in their seats or bunks). Troop hospital cars, also based on the troop sleeper carbody, transported wounded servicemen and typically travelled in solid strings on special trains averaging fifteen cars each.

**Hospital car**

A variety of hospital trains operate around the world, employing specialist carriages equipped as hospital wards, treatment rooms, and full-scale operating theatres.
In some countries, convicts are transported from court to prison or from prison to another by railway. In such transportation a specific type of coach, prisoner car, is used. It contains several cell compartments with minimal interior and commodities, and a separate guard compartment. Usually the windows are of nontransparent opaque glass to prevent prisoners from seeing outside and determine where they are, and windows usually also have bars to prevent escapes. Unlike other passenger
**Exercise 1. Answer the questions:**

1. What does Commuter Rail provide?
2. What characteristics of the MUs’ are ideal for high-speed train services?
3. What types of passenger cars are there?
4. What are the main variants of the coach seating arrangements?
5. What is dome car intended for?
6. What are the advantages of the double decker?
7. Where does the observation car operate?

**Exercise 2. Decide whether the following statements are true (T) or false (F):**

1. MU trains operate without a locomotive.
2. Trailer’ cars have powered axles
3. Commuter rail trains typically operate only on work days and during commute hours.
4. Some TGV and ICE trains are considered push-pull trains with power cars at each end.
5. The National Railroad Passenger Corporation, doing business as Amtrak, is not a government-owned corporation.

6. "Head end" cars are run as part of passenger trains and carry passengers.

7. Light rail trains provide passenger service within a city and its suburbs.

8. Passengers generally are allowed access to the baggage car.

9. Lounge cars carry a bar and public seating.

10. Commuter rail trains typically operate on work days, week ends and at night.

Exercise 3. Complete the extract with appropriate words or phrases from the box.

Failure, tilting schemes, trucks, curves, articulated, consist, wheels
cars have a number of advantages. They save on the total number of …… and …… reducing costs and maintenance expenses. Further, movement between cars is safer and easier than with traditional designs. Finally, it is possible to implement ……… such as the Talgo design which allow the train to lean into……. The chief disadvantage is that ……… of a single car disables the entire set, since individual cars cannot be readily switched in and out of the ………

**Exercise 4. Match the words and phrases to their explanations:**

1. Commuter rail trains
2. Light rail trains
3. trailer’ cars
4. The coach
5. Long-distance trains
6. Open type car
7. Lounge cars
8. Compartment car
9. A dome car
10. Prisoner car
11. Sleepers or Pullman cars
a) has a centre corridor; the car's interior is often filled with rows of seats like that in a passenger airliner
b) operate on their own tracks—they don't share tracks with commuter rail
c) has a side corridor which connects individual compartments
d) ‘trailer’ cars do not have powered axles
e) an important part of the appeal of passenger trains when compared to aircraft, buses and cars; there is more space to move around, socialize, eat and drink, and a good view.
f) travel between many cities and/or regions of a country, and sometimes cross several countries.
g) provide sleeping arrangements for passengers travelling at night.
h) the most basic type of passenger car, also sometimes referred to as 'chair cars'.
i) typically run on the same railroad tracks as freight
trains and often share some stations with intercity
trains.

j) Convicts are transported from court to prison or
from prison to another by railway in……..

kl) can include features of a lounge car, dining car and
an observation

**Exercise 5. Skim the texts and find British and US
synonymic terms**
UNIT 9. FREIGHT ROLLING STOCK

Text 1

The history of railroad cars moving lading (another term for freight) can be traced back to the earliest days of the industry using simple flatcar designs. As the years progressed equipment became larger, heavier, and more sophisticated to handle larger ever-larger loads and/or specific cargo. Today, a wide range of cars can be found in service replacing the ubiquitous boxcar, which railroads had always typically used to haul most types of non-liquid and aggregate freight throughout much of the 20th century.

Text 2. TYPES OF FREIGHT CARS

Freight wagons (UK) / Freight Cars (US)

Railway freight wagons come in a variety of designs aimed at accomplishing specific freight tasks most efficiently.
Box Wagons / Boxcars (US)

Railroad boxcars are perhaps not only the best-recognized pieces of equipment ever put into service but also one of the most identifiable symbols of the industry itself. It has a history tracing back to the earliest years when railroads realized that some freight and lading needed at least a little protection from the outside elements and Mother Nature. However, after the turn of the 20th century the car truly became an industry icon and remained so through the 1960s, used to haul about any and every type of non-bulk traffic moved by train. Over time railroads realized, largely through complaints by shippers, that more specialized cars were needed to haul unique types of freight. This
issue led to the development of the well car, autorack, refrigerator car, and several other specific designs. Boxcars, however, still have their place in today's industry especially in carrying bulky items such as autoparts.

Box Wagons /Boxcars (USA) are commonly used for many commodities such as auto-parts, canned goods, bags of cement, and even loose grains. Some box wagons offer interior loading restraints (equipped boxes), a range of door types and sizes, insulation, refrigeration, and temperature control so goods will not overheat or freeze, and a range of grades-high-grade wagons are used to ship food or other products that must avoid contamination by other commodities.
The history of this car can be traced back to the earliest years of the industry. For many years the gondola remained basically the same in design and character. However, in the 20th century several specialized types entered service such as a side-dump version for bulk materials, one which could carry large sheets of steel, and the most popular in today's industry the "Bathtub" gondola for use in hauling coal. In any event, this car appears very likely to remain an important tool within the industry for many years to come.
Open top wagon /Gondola car have open tops but no bottom hoppers for unloading. Most gondolas are unloaded by a crane or bucket but some have drop floors; often they are unloaded using a rotary dumping device (see photo at left). High-sided gondolas are used for aggregates, coal, and other relatively low-density materials, including cement in 10-ton bags. Low-sided gondola cars are used for heavier materials such as steel slabs, steel structural members, machinery, and other materials that can tolerate exposure to the weather. The wagons feature high loading capacity, light tare weight, reliable, long lifetime and easy maintenance.
Hopper Wagons / Hopper Cars (US)

‘Open-top’ Hoppers can be loaded in many different ways and carry commodities that will not be damaged by exposure to weather such as aggregates, coal, and mineral ores. The name derives from the ‘hoppers’ at the bottom of the wagons that are opened to discharge contents easily and quickly.

Covered Hoppers haul commodities such as grains, cement, sand, fertilizers, flour and sugar, or chemical or powdery materials that may be damaged by exposure to the elements. Some covered hopper
wagons are ‘unload-assist’ and have vibrating sides or air injection systems to aid unloading. Covered hopper wagons are often categorized by size (cubic meters/feet) and larger wagons are used for lighter density commodities such as flour or grains; smaller wagons are used for high-density products such as cement and sand.

**Flat Wagons / Flatcar (US)**

Flat Wagons (Flatcar, Flat car (US)) carry machinery, logs, plywood, containers, and road transport trailers. Many flat wagons include special features to extend their utility—for example, an automobile rack converts it to an automobile carrier; stakes added to the sides can contain pipes and lengths of raw timber; bulkheads can be added to transport logs, or lumber.
Trucks, tanks, turbines, and other commodities are carried on flat wagons or modified flat wagons.

**Tank Wagons / Tank Cars (US)**

Tank Wagons / Tank Cars (US) carry liquids such as oil or oil products, chemicals, or consumables such as seed oils, milk, beer, or water. Some tank wagons carry gases in their liquid forms, such as liquefied petroleum gas or LPG, or pressurized fluids in a liquid/gaseous state, such as liquefied natural gas (LNG). Tank wagons are often specialized for the type of commodity they carry, for example, chemicals, oils, and oil products use a special tank lining, and milk or
beer may be carried in a stainless steel tank. In many countries, tank wagons transporting hazardous materials are required to have safety features, such as shelf couplers that prevent wagons from detaching during a train derailment, or reinforced end shields that prevent couplers from puncturing the tank during derailment. In addition, pressurized tank wagons have pressure relief valves and special venting systems.

The Refrigerator Wagon / The Refrigerator Car, Reefers (US)
A refrigerated wagon also called a refrigerated van (Br) is a railway goods wagon with cooling equipment. In the USA it is also commonly referred to by its shortened name as "reefer". The car was a revolutionary design that allowed for the widespread shipment of perishable food products such as dairy, meat, and vegetables. The earliest such cars date back to the mid-19th century, naturally using ice as a means of cooling. These basic freight wagons types have many variations; many railways collaborate with shippers and tailor freight wagons to specific needs.
Well Cars/Double-Stack Cars

Double-stack rail transport is a form of intermodal freight transport where railroad cars carry two layers of intermodal containers.

The "well" is a depressed section which sits close to the rails between the wheel trucks of the car, allowing a container to be carried lower than on a traditional flatcar. This makes it possible to carry a stack of two containers per unit on railway lines (double-stack rail transport) wherever the loading gauge assures sufficient clearance. Advantages to using well cars include increased stability due to the lower center of gravity of the load,
lower tare weight, and in the case of articulated units, reduced slack action.
Double-stack cars are most common in North America where intermodal traffic is heavy and electrification is less widespread; thus overhead clearances are typically more manageable.

The Cattle Car/Stock Car

The cattle car (although they hauled all types of livestock) once a common staple of freight trains the USA. Today, livestock traffic is virtually non-existent
and the stock car, like the caboose, has become an obsolete piece of equipment

The Classic Caboose (USA): An American Legend

Perhaps no other symbol of American railroading has defined the industry as the simple caboose. An endearing piece of equipment, even to the general public, the car was an all too common sight that many folks anticipated watching pass as the end of the train went by. First reportedly developed just a few decades after the Baltimore & Ohio Railroad was chartered the caboose became a vital part of a freight train for over a
century with several different types and versions of the car developed during that time mostly in regards to how a particular railroad designed their particular type for everyday use. While still in limited use today the beloved caboose has mostly went extinct as it rapidly disappeared beginning in the 1980s.

**Exercise 1. Answer the questions:**

1. What are Box Wagons commonly used for?
2. What commodities are carried in ‘Open-top’ Hopper Wagons?
3. What do Flat Wagons carry?
4. What kind of freight car design are gondolas?
5. What is the primary purpose of well cars?
6. What car is considered the symbol of American railroading?
7. What car was used for hauling livestock?
8. What cars are used for shipment of perishable food products such as dairy, meat, and vegetables?
9. What versatile piece of rolling stock has long been used to handle liquid or liquefied products?
Exercise 2. Decide whether the following statements are true (T) or false (F):

1. ‘Open-top’ Hopper Wagons can be loaded in many different ways and carry commodities that will not be damaged by exposure to weather such as aggregates, coal, and mineral ores.

2. Railroad boxcars truly became an industry icon and remained so through the 1950s, used to haul about any and every type of non-bulk traffic moved by train.

3. Tank wagons are often specialized for the type of commodity they carry, for example, chemicals, oils, and oil products may be carried in a stainless steel tank.

4. While the well car has been embraced by railroads for its efficiency it is actually little more than a flat car.

5. Before the advent of efficient highways and trucks, railroads were able to derive considerable profit from hauling livestock thanks to its high priority status and time sensitive nature.
6. Tank car use has increased over the years diversified to also include food-based products and ethanol.

7. While still in limited use today the caboose has mostly went extinct as it rapidly disappeared beginning in the 1970s.

8. The modern open-top hopper cars haul everything from coal to aggregates, such as ballasting (the crushed rock used under the railroad tracks that acts as support and cushioning), and feature a number of different drop-bottom designs to empty their cargo.

9. The history of railroad cars moving lading (freight) can be traced back to the earliest days of the industry using simple boxcar designs.

10. The least popular in today's industry is the "Bathtub" gondola for use in hauling coal.

**Exercise 3. Complete the extract with appropriate words or phrases from the box.**

| boxcar (4), hopper(3), tank , rolling stock, customer, car fleet, flatcar |
The railroads own and maintain their own …….. The characteristics of these cars have changed considerably to suit…… requirements; for example, the conventional…… has been deemphasized but has seen resurgence in the past few years. Today’s…… is highly specialized and is designed to meet the needs of the individual shipper. Following is a list of eight generalized car types: ……… (plain): Standardized roofed freight car with sliding doors on the side used for general commodities. ……… (equipped): Specially modified…… used for specialized merchandise, such as automobile parts. ……… car: A freight car with the floor sloping to one or more hinged doors used for discharging bulk materials. Covered ………: A ……… car with a roof designed to transport bulk commodities that need protection from the elements. ………: A freight car with no top or sides used primarily for TOFC service machinery and building materials. The …….. car has long been used to handle liquid or liquefied products.
Exercise 4. Match the words and phrases to their explanations:

1. box wagons
2. high-sided gondolas
3. covered hopper wagons
4. open-top hopper wagons
5. low-sided gondola
6. flat wagons
7. the caboose
8. the cattle car
9. well cars (double-stack cars)
10. refrigerator cars (reefers)
11. tank wagons
12. hoppers

a) are commonly used for many commodities such as auto-parts, canned goods, bags of cement, and even loose grains
b) carry liquids such as oil or oil products, chemicals, or consumables such as seed oils, milk, beer, or water
c) carry commodities that will not be damaged by exposure to weather such as aggregates, coal, and mineral ores
d) are used for heavier materials such as steel slabs, steel structural members, machinery, and other materials that can tolerate exposure to the weather
e) carry machinery, logs, plywood, containers, and road transport trailers
f) feature some type of angled or sloped chutes or hatches, which use the force of gravity to quickly unload their cargo and never requiring being tilted or turned upside-down in any way
g) allowed for the widespread shipment of perishable food products such as dairy, meat, and vegetables
h) are used for aggregates, coal, and other relatively low-density materials, including cement in bags
i) hauled all types of livestock, was once a common staple of freight trains
j) haul commodities such as grains, cement, sand, fertilizers, flour and sugar, or chemical or powdery
materials that may be damaged by exposure to the elements

k) the sight that many folks anticipated watching pass as the end of the train went by

l) their primary purpose is to haul international containers in loads of one or two (typically two if railroad tunnel and bridge clearances will allow) from port to market and vice-versa
UK Transport System and How It Compares With the USA

Car is without a doubt the main mode of passenger transport in both America and Britain, but that is where the similarity ends.

It’s impossible to make an exact comparison because official statistics in both countries are compiled differently. For example, although car is by far the most popular mode of transport, for some reason the UK government statistics lump both cars and taxis together in the same figure;

In Britain these days buses tend to be used more for short journeys, and trains for the longer journeys. Although there was a time when trains and trams used to be as popular as buses for local urban travel. A Branch Line being a railway line that branches off from the main (artery) rail network to provide a
network of local stations linking local communities. In the cities and towns there used to be railway stations every few miles. This was popular because it was convenient to just hop on and off of local trains to nip to the shopping centre or a neighbouring town. Following the closure of these lines, many have since been converted to cycle tracks.

The common perception in Britain of American roads is that:

Gridlocks are common in major cities because of the problems caused by Intersections.

the different types of roads is confusing e.g. highways, interstate and freeways etc., and

We don’t get gridlocks in Britain because we use roundabouts in preference to intersections, although during the rush hour traffic jams aren’t uncommon; especially when there’s an accident.

Also in Britain roads are classified in simple terms:-

Motorways
A Roads,
B Roads

Motorways are financed, built and maintained by the British Government. An A Road (unless it’s classified as a Trunk Road) and B roads are financed, built and maintained by the appropriate Local Authority (local government). A Roads classified as Trunk Roads are the responsibility of the British Government, who uses the same technology on them as they do on motorways for managing traffic flow and safety.

In Britain it’s quite straightforward, the maximum speed limits are:

- 70mph on motorways, unless otherwise reduced by ‘variable speed signs’; often used to slow traffic down before it reaches an incident (accident) so long queues don't build up while the incident is being dealt with.

- 30mph in urban areas (unless it's a dual carriageway); although local councils (local government) can and do opt to reduce this to 20mph as part of their ‘traffic calming’ schemes, and
• 60mph on dual carriageways and all rural roads (including single track country lanes).

British Roads

Motorways

the Freeway in America is the nearest equivalent to a motorway in the Britain?

A motorway is a stretch of road, usually three lanes in each direction (plus a hard shoulder); on motorways:– Pedestrians, bicycles, and any vehicle which can't do 60 mph are prohibited.

It's illegal to stop, unless you breakdown,

Reversing or doing a U-turn are also illegal.

With Britain being much smaller than America there’s only 2,173 miles of Motorway in England. However, the entire motorway network is under constant surveillance from 1,750 live CCTV motorway traffic cameras, and other clever technology.

Constant surveillance of the motorway network helps to identify problems and take swift action e.g. by
using variable speed signs to control traffic flow, or to call out emergency services to deal with accidents. With the foresight to lay down optic fibre cables along all motorways in the 1980s, Smart Motorway Management (in operation since the 1990s) has proved effective in minimising delays and reducing travel time. If you do breakdown on the motorway, even if you don't phone for help yourself, you can be sure you’re plight will be picked up by one of the CCTV cameras and that a rescue vehicle will quickly come to your aid.

The motorway network connects all the major towns and cities together. Motorways run through the centre of cities; giving the driver the option to either carry straight on without stopping or slowing, or to take the slip road (junction) to the city centre. The exception being the M25 which is a glorified 117 mile long ring road encircling London.

*A Roads*
A Roads, which includes dual carriageways, are all the main roads regardless to whether they are within an urban area or in the countryside. If they are within an urban area and they're not a trunk road, then the maintenance is the responsibility of the Local Authority (local government); otherwise, it's the National Government who's responsible for their upkeep.

A Roads can be either one or two lanes in each direction; largely (but not always) dependant on density of traffic flow.

A dual carriageway, often a straight stretch of road between two roundabouts in a city, is an A road; usually two lanes of traffic in each direction. The main difference between a dual carriageway and other A roads is that pedestrians are discouraged from using it e.g. the dual carriageway is fenced off from any side roads and there's no paths (sidewalks). Although, unlike a motorway, it's not illegal to walk on or cross a dual carriageway; just very dangerous.
The main purposes of dual carriageways is to:

- Aid unimpeded fast flowing traffic through sections of an urban area; and

- As a ring road around the outskirts of cities and towns.

Consequently, unlike other urban roads (which are restricted to 30mph), the speed limit on dual carriageways is always 60mph.

**B Roads**

B Roads are all the minor roads within the city and town, and in the countryside.

They can be one lane in each direction, but in some older towns (especially places like Cornwall) and in the countryside B roads are often just a single lane for two-way traffic.

Single lane roads in the countryside have passing points at periodical intervals. So if you're on a single lane country road, and meet a car coming towards you, one or other of you will have to reverse to the nearest
passing point. Fortunately, as traffic volume is low on country roads this isn’t a major problem. Roundabouts are the norm in Europe but they’re not common in America; where instead the Intersection is normal.

https://wanderwisdom.com/transportation/uk-

Text 2. Public Road Transport

Buses

In Britain bus is the most common mode of public road transport in urban areas; albeit outside of London it can be rather expensive, and the service isn’t always as reliable as it could be.

Although generally, bus companies (as with most forms of public transport these days) are run by the ‘private sector’ they have to be licensed by the Local Authority before they can operate; thus avoiding a free for all. It also gives Local Authorities control in setting minimum standards of service, and provides
them with the means to co-ordinate the bus service with other modes of transport; as part of their ‘Integrated Transport’ policy.

As part of the ‘Integrated Transport’ system, to avoid the risk of getting stuck in traffic by driving into the city centre, you have the option of using the ‘Park and Ride’; large car parks on the outskirts of cities, from where you can catch a bus straight into the city or town centre.

In conjunction with 'Park and Ride', to aid the bus journey, most of the busy traffic routes in cities and large towns have 'bus only' lanes; which taxis, motorbikes and cyclists are also permitted to use.

Intercity Coaches in Britain vs America

Intercity coaches in America are used more widely than the train service, as supported by the stats which shows less than 1% of American passengers travel by rail.
Whereas in Britain, unlike America, intercity coaches are underused because of the popularity of the railway; in spite of the fact that the coach service is cheap, reliable, comfortable, and efficient.

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Text 3. HSR in Spain

The Alta Velocidad Espanola (AVE) high-speed rail system in Spain is currently under construction. High-speed trains have been running on the Madrid - Sevilla route since 1992. Should the aims of the ambitious AVE construction program be met, by 2020 Spain will have connected almost all provincial capitals to Madrid in less than 3 hours and Barcelona within 6 hours with high-speed trains. The Spanish and Portuguese high speed lines are being built to European standard or UIC track gauge of 1,435 mm and electrified with 25 kV at 50 Hertz from overhead wire. The first HSL from Madrid to Seville is equipped with LZB train control system, later lines with ETCS.

Elsewhere in Europe, the success of high speed services has been due in part to interoperability with
existing normal rail lines. Interoperability between the new AVE lines and the older Iberian gauge network presents additional challenges.

Both Talgo and CAF supply trains with interchangeable gauges and automatic gauge changer equipment which the trains pass without stopping. Some lines are being equipped with a third rail allowing trains with Iberian and UIC gauge to run on the same tracks. Other lines are equipped with sleepers for both Iberian and UIC gauge, where the track can be converted from Iberian to UIC gauge at a later time without changing the sleepers.

In the southwest, a new line between Karlsruhe and Basel is under construction to allow speeds of 250 km/h (155 mph), and a new line between Frankfurt and Mannheim for speeds of 300 km/h (186 mph) is in advanced planning stages. In the east, a 230 km (143 miles) long line between Nuremberg and Leipzig is under construction for speeds of up to 300 km/h (186 mph). Together with the fast lines from Berlin to Leipzig and from Nuremberg to Munich, which were built recently, it will allow travel times of just about 4
hours from Berlin in the north to Munich in the south, compared to nearly 8 hours for the same distance just a few years ago.

Text 4. HSR in Germany

Construction on first German high-speed lines began shortly after that of the French LGVs. Legal battles caused significant delays, so that the InterCityExpress (ICE) trains were deployed ten years after the TGV network was established. The ICE network is more tightly integrated with pre-existing lines and trains as a result of the different settlement structure in Germany, with a population more numerous by a third than that of France, on a territory smaller by a third, resulting in more than twice the population density of France. ICE trains reached destinations in Austria and Switzerland soon after they entered service, taking advantage of the same voltage used in these countries. Starting in 2000, multisystem third-generation ICE trains entered the Netherlands and Belgium. The third generation of the ICE reached a speed of 363 km/h (226 mph) during trial runs, and is certified for 330 km/h (205 mph) in regular service.
Admission of ICE trains onto French LGVs was applied for in 2001, and trial runs were completed in 2005. In June 2007, the LGV Est from Paris to the middle of the Lorraine region of France was opened. For the first time, high speed services over the Franco-German border were offered. SNCF operates the TGV service between Paris and Stuttgart via Strasbourg while ICE trains operate the Paris to Frankfurt route via Saarbrucken.

Text 5. HSR in Denmark

Large-scale bridge projects in Denmark have made fast rail links between Scandinavia and Germany a real possibility. The completed Great Belt Fixed Link and Qresund Bridge have made possible overland transportation between Germany and Sweden. A Fehmarn Belt bridge has been approved, and upon completion in 2018, will reduce rail travel between Hamburg and Copenhagen to 3.5 hours.

The main lines in Denmark allow 180 km/h at many places, for example most of the route Copenhagen-Arhus. Some parts will be upgraded to 200 km/h. Currently the fastest trains reach 180 km/h. A new
train, the 1C4 diesel train, can reach 200 km/h and has during 2007 been put into test operation with passengers in western Denmark. This project is delayed and it remains to be seen when they will run long-distance full-scale operation. During the winter 2007/2008 the German railways has started service with the 1CE-TD in Denmark, which are diesel trains capable of 200 km/h, but they run at maximum 180 km/h for now in Denmark.

It is not likely that any train will run above 200 km/h in Denmark for many years. Denmark is a small country having about 300 km between its two biggest cities Copenhagen and Aarhus. 200 km/h is enough to compete with air travel here. The mainlines are usually too curvy for higher speeds, which would be possible on short stretches only. New railway lines are not planned in Denmark, except for a new 60 km long line Copenhagen-Ringsted, which will allow at least 200 km/h when finished. The railway line towards the future Fehmarn Belt bridge was upgraded to 160 km/h in 2010, and possibly 200 km/h around year 2018, not faster than that, as the Copenhagen-Hamburg route is mostly too curvy and will be mixed with heavy freight
traffic and continue to rely on two single-track bridges; the Danish Storstrom Bridge and the German Fehmarn Sound Bridge.

The signalling system is unique for Denmark, and contains obsolete components, which must be replaced. Denmark has decided to replace the signalling system with a new one, the ERTMS, to be finished before 2020. That is a requirement for higher speed than 200 km/h.

Denmark uses diesel trains for long-distance passenger trains and plans to continue with that, even though delays with the custom-built IC4 might encourage a shift to electric trains. A key obstacle for the introduction of electric trains is the lack of an electric overhead supply on the Alborg-Arhus-Fredericia rail track. An additional obstacle to the introduction of high-speed rail in western Denmark is that two stretches of rail track between Kolding and the Danish-German border are single-track lines only.
Text 6. HSR in Finland

In Finland VR operates tilting Pendolino trains made by Alstom, reaching 220 km/h in regular operation between Helsinki and Lahti on a route spanning some 60 kilometers. This railway was opened in 2006. The trains stay at 200 km/h on a longer route between Helsinki and Tampere. Other parts of the Finnish railway network are limited to lower speed. The Pendolino network connects several major cities. A service between Helsinki and St. Petersburg Russia, utilizing Pendolinos opened in 2010. The service called "Allegro" runs 4 new Pendolino trains with a top speed of 220 km/h.

Finland uses its 1524 mm gauge, not standard gauge since they want to use the same trains for both high-speed railways and old enhanced railways.

Text 7. HSR in France

Europe was introduced to high speed rail when the LGV Sud-Est from Paris to Lyon opened in 1981 and TGV started passenger service. Since then, France has continued to build an extensive network, with lines
extending in every direction from Paris. France has the most developed high-speed network in Europe.

The TGV network gradually spread out to other cities, and into other countries such as Switzerland, Belgium, the Netherlands, Germany, and the UK. Due to the early adoption of high-speed rail and the central location of France in Western Europe, most other dedicated high-speed rail lines in Europe have been built to the same speed, voltage and signalling standards. The most obvious exception is the high-speed lines in Germany, which are built to existing German train line The Koralmbahn, the first entirely new railway line in the Second Austrian Republic is under construction since 2006. It includes a new 33 km tunnel connecting the cities of Klagenfurt and Graz. Primarily built for intermodal freight transport, it will also be used by passenger trains travelling up to 250 km/h. The travel time from Klagenfurt to Graz will be reduced from three hours to one hour.
Text 8. HSR in Belgium

Belgium's rail network is served by four types of high-speed trains: Thalys, Eurostar, ICE and TGV trains. All of them stop in Brussels South station, Belgium's largest train station. Thalys trains operate between Belgium, Germany (Koln), The Netherlands (Amsterdam) and France (Paris). Thalys trains are a variant of the French TGV. Since 2007 Eurostar connects Brussels to London St Pancras. Before that date trains connected to London Waterloo. The German ICE operates between Brussels, Liege and Frankfurt Hbf.

The HSL 1 is a Belgian high speed railway line which connects Brussels with the French border. 88 km long (71 km dedicated high-speed tracks, 17 km modernised lines), it began service on 14 December 1997. The line has appreciably shortened rail journeys, the journey from Paris to Brussels now taking 1:22. In combination with the LGV Nord, it has also impacted international journeys to France and London, ensuring high-speed through-running by Eurostar, TGV, Thalys PBA and Thalys PBKA trainsets.
The HSL 2 is a Belgian high-speed rail line between Brussels and Liege, 95 km long (61 km dedicated high-speed tracks between Leuven and Ans, 34 km modernized lines between Brussels and Leuven and between Ans and Liege) it began service on 15 December 2002. Its extension to the German border (the HSL 3) is now in use, the combined eastward high speed line greatly accelerates journeys between Brussels, Paris and Germany. HSL 2 is currently used by Thalys and ICE trains as well as fast internal InterCity services.

The HSL 3 is a Belgian high-speed railway line which connects Liege to the German border. 56 km long (42 km dedicated high-speed tracks, 14 km modernised lines), it began service on 13th december 2009. HSL 3 is used by international Thalys and ICE trains only, as opposed to HSL 2 which is also used for fast internal InterCity services.

The HSL 4 is a Belgian high-speed railway line which connects Brussels to the Dutch border. 87 km long (40 km dedicated high speed tracks, 57 km modernised lines). HSL 4 is used by Thalys trains since 13th
December 2009 and it will be used starting 2010 by fast internal InterCity and NS Hispeed trains. Between Brussels and Antwerp (47 km), trains travel at 160 km/h on the upgraded existing line (with the exception of a few segments where a speed limit of 120 km/h is imposed). At already opened. The Italian operator NTV plans to be the first open access high speed rail operator in Europe, by 2011, using AGV multiple units.

International links between Italy and France, Switzerland, Austria and Slovenia are underway. These links all incorporate extensive new tunnelling under the Alps. European Union funding has already been approved for the Lyon Turin Ferroviaire, which will connect the TGV and TAV networks, and for a link with Slovenia. In Slovenia, Pendolino-based trainsets are operated by Slovenian Railways as the InterCitySlovenija. Trains connect the capital Ljubljana with Maribor and also with Koper in summer months. One unit operated as EC Casanova on the line Ljubljana -Venice, but this service was discontinued in April, 2008.
Text 9. HSR in Netherlands

HSL-Zuid, connected to Antwerp with the HSL 4

HSL-Zuid is a 125 km high-speed line in the Netherlands. Using existing tracks from Amsterdam Centraal to Schiphol Airport, the dedicated high-speed line begins here and continues to Rotterdam Centraal and to the Belgian border. Here, it connects to the HSL 4, terminating at Antwerpen-Centraal. Den Haag Centraal (The Hague) and Breda are connected to the high-speed line by conventional railway lines. Services on the HSL-Zuid began on 7 September 2009. It is served by Thalys trains from Amsterdam to Brussels and Paris, and Fyra trains serving all HSL-Zuid stations between Amsterdam Centraal and Brussel-Zuid/Bruxelles-Midi.

Text 10. HSR in Sweden

Sweden today runs many trains at 200 km/h, including the X2 tilting trains, widebody and double-decker regional trains, and the Arlanda Airport Express X3. Since both the X2 and X3 are allowed to run at 205 in case of delay, they can technically be considered as

Parts of the network can be relatively easily upgraded to 250 km/h. This requires new signalling system, catenary, removal of level crossings and new trains. There are plans to upgrade specific railways to allow this speed. They have been delayed to after 2015. A number of upgrades from single to double track or new railway have been built since 1990. They have been built with curves capable for 250 km/h (some requiring tilting trains for that). However neither the signalling system, nor the trains allow more than 205 km/h before at least 2010. The Botniabanan will be ready and allowed for 250 km/h trains in 2010, but no such trains will run there for the first years, partly because the manufacturers have no experience of this in such cold climate. A research project ("Grona taget") aims to get experience of it, to make such trains available before 2015.
There are plans for a long completely new high-speed railway for 300-320 km/h, Stockholm-Linkoping-Jonkoping-Boras-Gothenburg, since the existing railways are relatively congested. An informal date suggestion by the Banverket is operation by year 2030. For two parts (Sodertalje-Linkoping and Molnlycke-Bollebygd) detailed planning is done, and they are expected to have construction start by around 2017 and be in operation by around 2025.

The first 12 high speed train sets are ordered from CAF company, Spain. Further sets are expected to be provided by EURQTEM, which is a joint enterprise between Korean ROTEM and Turkish TUVASAS.

**Text 11. HSR in The United Kingdom**

The United Kingdom's first dedicated high-speed line, High Speed 1 between London and the Channel Tunnel, opened 14 November 2007. There are no other high speed lines planned, however. Most proposals have been dubbed High Speed 2. Unlike in other countries, the strongest reasons for new high speed lines are to relieve congestion on the existing network.
The Eurostar trains, which run through the Channel Tunnel between the UK and both France and Belgium, are substantially different versions of the TGV trains, with support for two voltages, both pantograph and third-rail power collection, the ability to adapt to multiple platform heights, and to cope with no fewer than seven different signalling modes. Like the TGVs, Eurostar trains are articulated with bogies between the carriages, and most units have 18 carriages. A fully loaded train of 750 passengers is roughly equivalent to five Boeing 737s (the aircraft typically used by low-cost airlines). These trains operate at the highest scheduled speeds of any in the UK, using a high-speed line between the Channel Tunnel and St Pancras station in London (High Speed 1) which was fully opened in November 2007.

The remainder of Britain's railway network is considerably slower. Most inter-city traffic is restricted to a maximum speed of 200 km/h (125 mph) using routes largely established in the middle years of the nineteenth century. The main reason for this restriction is that, unlike several countries on the continent, Britain has never invested in building
specialised lines for intercity services, which therefore have to share even the main lines with freight and local passenger traffic. Any increase in line speed on the existing routes would require an expensive upgrade to in-cab signalling. Even so, the speed limit on some sections of the East Coast Main Line was raised to 140 mph during the upgrade and electrification of the route during the 1980s.

Several proposals for domestic British high speed lines have been put forward and the government is considering building a north-south line.

Text 12. The Next Generation of High-Speed Trains

Alstom AGV

Alstom's TGV enjoys the global distinction of being the most successful of all high-speed trains to date, in terms of both the numbers built and the revenue traffic carried, while its technology has also influenced the development of other vehicles, such as the Acela Express in the US. The 'Automotrice a Grande Vitesse' (AGV) is the company's latest offering to the
high-speed industry - a modular, next generation successor with an inherent multimarket capability that has led some to tip it as the first truly pan-European trainset.

Ten years and €100m of research lies behind the design, which reflects the growing trend towards the distributed traction seen in the Shinkansen trains, while retaining the characteristic articulation of its TGV antecedents. According to the company, the power system - quad voltage, permanent magnet motors, water- cooled IGBT traction converters and regenerative braking - provides for speeds of up to 360km/h, while consuming 15% less energy. The combination adds up to 20% greater passenger capacity and slashes maintenance costs by nearly a third. Siemens Velaro

While the TGV can lay claim to the lion's share of the commercial success to date, today Siemens' Velaro family of high-speed trains is arguably the best selling range on the market, and a worthy rival to Alstom's dominance.
Having successfully opened the markets of Spain, Russia and China, the Velaro design is another example of electric multiple unit (EMU) distributed power, and shares the industry-wide drive towards energy efficiency, increased safety and optimised passenger comfort. The latest generation Velaros represent the culmination of the company's research and development work, featuring major advances in aerodynamic profiling, energy management and noise reduction technology.

In October 2010, Eurostar announced its plans to purchase 10 new Velaro e3202s - at a cost of around €600m - to enter service in 2014. While this*would lead to the operator running some of the greenest trains around, and open up new routes to the Netherlands and Germany, it has caused a few ruffled feathers in France, not least because Eurostar itself is an affiliate of the state-owned SNCF. The idea of buying foreign trains did not go down well - no matter how environmentally friendly they may be.
**Bombardier Zefiro**

Nationalistic factors aside, the green card is proving an increasingly potent one, as the universal move amongst rolling-stock manufacturers to reduce impact helps bolster the growing perception amongst the travelling public of the sound eco-credentials of high-speed rail.

The Passengers Division President of Bombardier Transportation, Stephane Rambaud Measson recently made the point that success is now about more than just speed, it is about providing "cost-efficiency, coupled with high capacity capabilities, pleasing aesthetics, reliability, safety, durability and environmentally friendly transportation solutions" too. With an impressive record of sales, the company's Zefiro - described as a "game-changer" by Measson - looks to be achieving this.

A conventional, non-articulating design, comprising powered cars at either end and unpowered trailer cars, the Zefiro can be configured to a range of voltages to meet operator needs. A variant of the type 300 - the V300 - was recently selected by Italy's Trenitalia to
enter service in 2013, but it is in China that it has been making its greatest inroads, where the bulk of the company's 210 sales to date have been made - and China is a country that has taken the whole idea of high-speed travel to its collective heart.

**Chinese ambition**

China already claims the world's longest high-speed rail network at a combined length of over 7,500km, and massive ongoing investment will see this almost double by 2012. The China South Locomotive and Rolling Stock Corporation (CSR) has made no secret of its ambition to use this as a springboard to become the global number one manufacturer within five years.

"However, in China other manufacturers are emerging with ambitions of their own."

According to CSR's President Zheng Changhong, overseas business has only accounted for 10% of the company's total revenue; now they are aiming to double that, targeting new markets especially in the Middle East, South America and Africa. With the Chinese Government having pursued a rigorous policy
of technology transfer from overseas manufacturers and indigenous companies now holding a number of patents on redesigned elements of the foreign designs, many believe such Chinese ambition will ultimately be realised.

One thing is for sure, while Bell may well be right that the quest for faster, safer and more reliable trains has largely conspired to drive the next generation of high-speed trainsets along convergent lines of evolution, the manufacturers will be hoping that potential customers will still see sufficient differences. As Bombardier's Measson said, it has to be "about more than just speed."

**Text 13. World’s Best Metro Rail Systems**

Here are the world’s most popular international underground transit systems.

Moscow. The Moscow subway system caters to 3.2 billion riders travelling annually on 12 subway lines to 172 stations. The Moscow Metro covers approximately 290 km. On an average weekday, the subway itself carries about 8.2 million passengers.
Each subway line is identified by an alphanumeric index (usually consisting of just a number), a name, and a color. The voice announcement systems refer to lines by name, while in colloquial usage they are mostly referred to by color. While most of the Moscow trains run underground, some lines cross bridges overlooking the Moskva and the Yauza Rivers.

New York. The New York City Subway is a rapid transit system owned by the City of New York and leased to the New York City Transit Authority. The NYCTA is a subsidiary of Metropolitan Transportation Authority. From 28 stations, when it was founded in October, 1904, it has grown to 462 stations. The subway carries 4.9 million people daily. It is one of the most extensive public transportation systems in the world, with 369 km of rail route. The subway is also among the few rapid transit systems in the world to run 24 hours a day and 365 days a year.

London. The London Underground, usually referred to as the Tube, is Europe’s largest metro subway system and also the world’s oldest. Inaugurated in 1863,
today it has 268 stations and covers 405 km of rail tracks. It transports over 976 million people yearly. The Underground serves a large part of Greater London and neighboring areas of Essex, Hertfordshire and Buckinghamshire in England.

Paris. The Paris subway system is the second oldest in the world and transports roughly 1.5 million people daily at modest fares. The subway system runs over 214 km and stops at 380 stations. The network is so extensive that almost every building in Paris is within 500 meters of a subway station. Many of these stations are famous for their architecture, representing the Art Nouveau style.

Montreal. The Montreal Metro is a rubber-tired metro system, and the main form of public transportation in the city of Montreal, Quebec, Canada. Inaugurated in 1966, it is not too extensive — about 60 km, reaching 68 stations on four lines — but is a very modern system that was inspired by the Paris Metro. It caters to 835,000 people daily. The Metro is operated by the Societe de Transport de Montreal Madrid. The Madrid Metro is the second largest underground system in
Europe and the sixth largest in the world. The first line of the Madrid metro opened on October 17, 1919, under the direction of the Compania de Metro Alfonso XIII, with 8 stations and a 3.5-km track. This metro network now has 231 stations on 12 lines. It has 227 km of track and an additional 44 km of track is expected to be completed by the end of this year. The Madrid Metro is one of the densest metro networks in the world.

Tokyo. Tokyo Metro is one of two metro systems making up the Tokyo subway system, the other being Toei. In addition to underground subways, the Tokyo transit system consists of the Toden Arakawa light rail line and the Ueno Zoo Monorail. The Tokyo subway system carries approximately 2.8 billion people per year to 282 subway stations. Efforts are made to make the system accessible to non-Japanese speaking users. Many train stops are announced in both English and Japanese. Announcements also provide connecting line information. Ticketing machines can switch between English and Japanese user interfaces. Many stations’ railings often have Braille at their base meant for visually challenged commuters.
Seoul. The Seoul Metropolitan Subway is one of the most heavily used subway systems in the world {with more than 8 million daily trips. Seoul Metro is a public corporation which runs the Seoul Subway. During 1970-2006, it was called Seoul Metropolitan Subway Corporation. It is also one of the longest subway systems worldwide, running 287 km in length. The trains mostly run underground, but 30 per cent of the system is above ground.

Beijing. The Beijing Subway opened in 1969 and serves Beijing and the surrounding suburbs. Just before the 2008 Beijing Olympic games began, it was further developed at a cost $7.69 billion. The expansion project has taken the length of the subway station to about 480 km. With almost a dozen lines and 123 stations currently in operation and average passenger strength of 3.4 million per day, the Beijing Subway is the busiest in mainland China.

Hong Kong. The Hong Kong subway, also known as the Mass Transit Railway Corporation, was set up in 1979.
Despite its relatively small size (90 km), compared to other metro systems across the globe, the MTR transports an average of 2.46 million rides per day. The Hong Kong system is based on a British design. Recently, approval was granted for the merger of the MTR and the Kowloon-Canton Railway Corporation, to make the system more cost-effective and efficient.

Sao Paulo. The Sao Paulo Metro is the first underground transit system in Brazil and it began operations in 1974. It works alongside a larger company called the Companhia Paulista de Trens Metropolitanos (CPTM) and together they cover about 300 km of track and transport approximately 3.7 million people daily. Sao Paulo is one of the largest cities in the world, with a population of 19 million. Its metro system consists of four color-coded lines: Line 1-Blue, Line 2-Green, Line 3-Red and Line 5-Lilac. Line 4-Yellow is currently under construction and is due to start operating in late 2009. The metro system carries 3.2 million passengers a day.
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