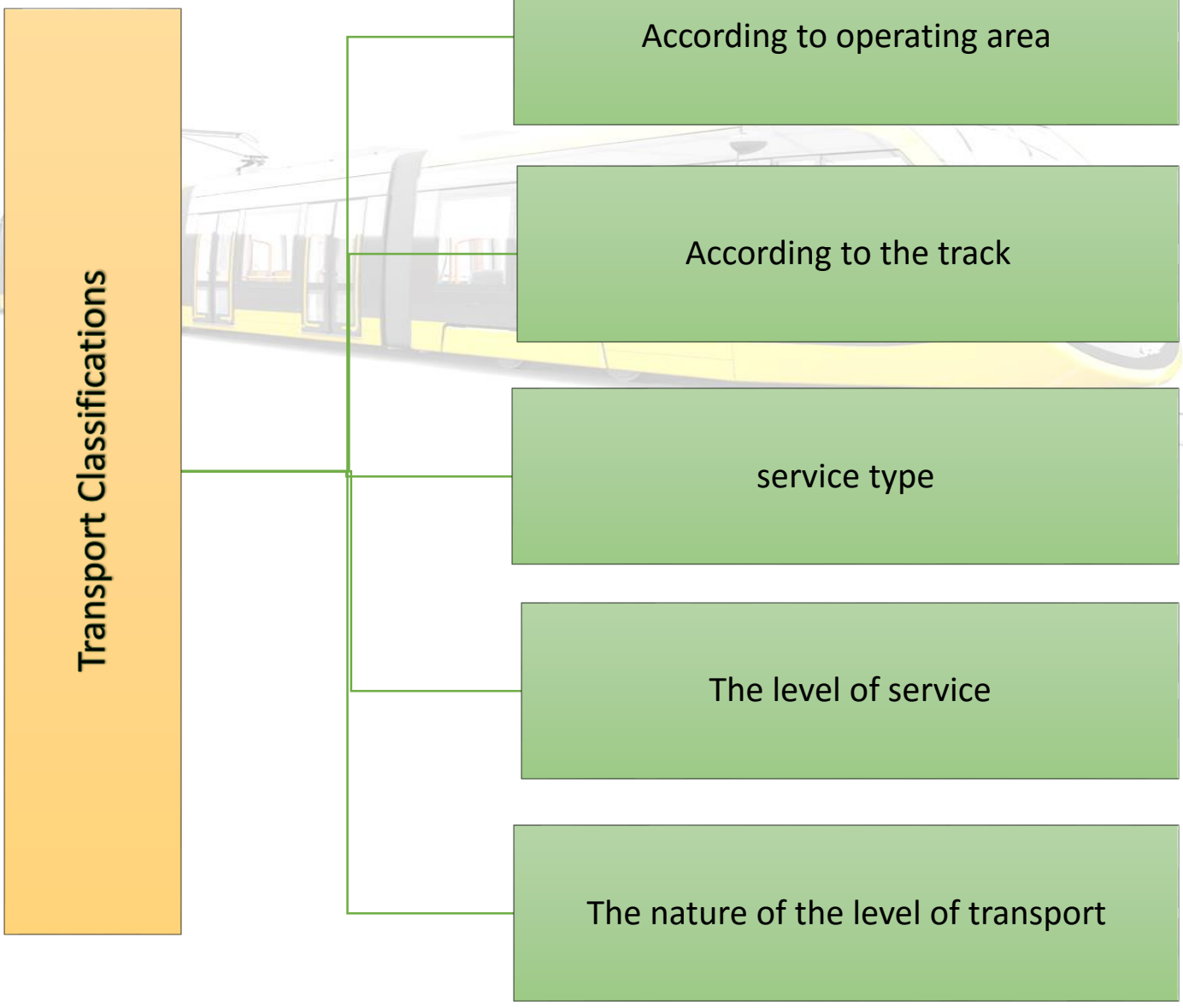
Definition of transportation

It is a means of moving from one place to another has been used by human transport since ancient times as the means of transport over time from the transfer of animals and then the carts of animals to access modern means of transport such as trains, planes, missiles and submarines.

The movement of people is an important factor in the economic and social development of society.



Transport Classification

First: Classification according to the field of operation:

- Internal transport: It is within the scope of the state.
- (International) transit transport between States (outside the scope of one State).
- Urban transport is the transport within the city limits.

Second Classification according to the track:

It includes three types
- Water transport (river and marine)
- Road transport (roads, railway, subway lines, buses, vehicles)
- Air and common transport (Planes, airports, water jets).

Third: Classification by quality of service

It includes two types:
-Specialized: to transport passengers only or goods only.
-Common: to transport passengers and goods together, or air and land transport together.

Fourthly Classification by level of service

It includes two types:
-Speed (Normal and Fast).
-Regularity of service (permanent, on request).

Fifth Classification according to the nature of the means of transport

It includes two types:
(Public transport and private transport) , a classification that specialists in the field of urban transportation planning in general, because the means of public and private transport are considered to be a significant factor in the transport process in general and in urban transport, namely transport within cities in particular.

Factors influencing the choice of means of transport

-The speed of transport
-Cost resulting from use
-The security tools provide the means of transportation
-Combined cargo services
-The amount of energy used, such as gasoline or diesel and others
- Flexibility to move.
-The market location that serves and operates the means of transportation.

Public Transport

Public transport is a term used for all transport systems used for public transport, which are usually paid. Public transport includes train and bus services, but also for airlines, ferries and taxis.

We often talk in many of our councils about the congestion in the streets and the congestion of cars in the streets and intersections and traffic signals and even in some of the main roads.
As the days pass, we see that congestion is steadily increasing and beyond reasonable limits in many ways.

I mean some of the major cities in Sudan like Khartoum and many other cities.

Perhaps the reasons for this great accumulation and there is no room to limit them, but almost to mention the reader's mind to understand what we mean in this regard, we say:
Growing population growth and increasing numbers of expatriates and residents.
Migration of people from villages to major cities in search of livelihood.
Review the ministries, government departments and main branches of many companies and institutions located in major cities.
There are other reasons such as coming for tourism, industry or treatment ..... etc.

Current transportation problems

-Traffic Safety: Most types of high-speed motor transport suffer
Of traffic problems, but motorists in particular suffer from depression Safety level.
-Falling Fuel Reserves: Petroleum and all other fuels derived from oil are generally available Energy sources warn energy experts that the world's stock of moderate oil Taking consumption rapidly.
-Environmental problems: Cars are the main cause of traffic congestion in cities Smoke from the exhaust of these vehicles also causes pollution of the atmosphere.
-Improvements in transportation: mainly require "improvement in: city services – services Trains between cities.
-Transport capacity.

Buses Cars

The first buses were horse-drawn. In the early 1800s these vehicles became known as public buses. In Britain, horse-drawn bus services began in the 1820s.
Travel by bus was not comfortable at first because of the rough roads and tires that buses used. But since the beginning of the 20th century, buses have become more comfortable because of good roads and the use of air-filled tires. In the 1950s, bus services in the industrial countries began to decline, because many people bought private cars. However, inter-city buses are currently transporting more passengers. Bus companies sometimes seek to reduce bus fare so that public transport becomes more popular.

Buses are one of the most important modes of mass transport. Many people are transported to and from their workplaces. Buses are used as a means of public transportation, especially in developing countries. They are inexpensive, save time and effort, and reduce congestion caused using private vehicles.

The bus is a means of transport for passengers. The buses are designed in different sizes depending on the number of passengers to be carried. Some buses have a few seats that can accommodate only 8 passengers, while other buses accommodate many passengers up to 70 passengers.

Some buses with interconnected joints have two sections connected to a flexible cover.
Most buses run with diesel or gasoline.

Taxi Cars

It is a public means of transport for the transport of an individual or a small group of individuals.
The passenger rents the taxi to deliver it to a specific destination chosen by the passenger. Unlike in other modes of transport such as buses where the bus passenger commits a certain route and from which the passenger descends at the nearest point to his destination.

You can hire a taxi when you come across one on the street as soon as you throw your hand at the driver. On the other hand, some taxis (owned by taxi-phone companies) move only based on a telephone call to a taxi asking for a specific time, place and direction. You can also take a taxi from the cars waiting in the taxi stand, although taxi stops are not common, but they may be found in some busy business districts. A Yellow Taxi sign may mean that the taxi is available for rent if it is lit. If it is dark, it means that the taxi is already taking one of the passengers, and it is not worth pointing out to him to stop. In congested cities, the taxi may take an extra passenger off the road if it means the same destination as the original passenger.

Taxi is determined by a fare-meter. The taxi counter is programmed for calculating the taxi mainly based on the kilometers traveled, considering the time used in the journey even during the stop of the vehicle (such as stopping traffic signals).

History of rail transport

The history of rail transport is almost 500 years old, and the invention of a horse, steam, rail and rails was usually of wood or stone in some cases). It was used to transport coal from the mine to the river or the sea, where it could be transported from there by ships and large boats, with a wheel running flattened on the rail. Then the use of steel in the rail began in 1760, followed by a system of plateways where the flange of the rail became part of the rail itself. Railway transport benefited modern systems for the first time in England in 1820. By introducing the steam locomotive, and was the first mechanization of land transport, which became for 100 years is considered to dominate the land transport.

About the tram

The first electric trams appeared in Europe and the United States during the 1880s. In the 1990s, German engineer Rudolf Diesel invented the engine that he later named. Over time, diesel engines replaced steam engines in many ships and most trains. Of all the inventions of the 19th century, it was the engine that operated with oil that brought the most changes in the world of transportation.

It is a public transport and is like a light train but often operates within the city and its path is superficial. It is lighter and slower than the metro.

It is a means of transport across railways extending along the roadways next to the cars, and sometimes can be found on distant tracks on cars. The tram usually operates on electric power and is considered one of the most common means of transport in some countries, formerly called electric railways.

The tram may also operate between towns and villages close to one another and may sometimes be used as a means of transporting goods. Trams are usually lighter and shorter than high-speed trains, but the degree of difference between different modes of transport by rail is almost unclear. But most of today's tram cars operate on electric power, and few of them operate on diesel fuel, especially in rural towns. Trams have been used in the past but by using horses and mules to tow them. The first appearance of this vehicle was at the Chicago International Exposition in 1883, and the process of organizing it is based on the completion of fixed stations (stops) along the railway lines.

Advantages of trams over buses in towns

The advantages below mean they are attractive to car drivers – they will switch

-faster than traffic – green wave traffic light pre-emption means they are not delayed by traffic even though they share the same road space is no segregation – cannot be applied to buses

-they run every 6 minutes

-being much longer can carry 350 – 450 passengers so people are not pushed together, and car drivers are more likely to use them

-being of heavy railway origin the cars can have multiple large doors meaning boarding and egress is only 10 – 20 secs

-short boarding times mean trams pause in the traffic so when they restart there is at least a 20 second traffic free space in front – buses must fight to re-join the traffic

-off-tram ticketing means boarding times are short

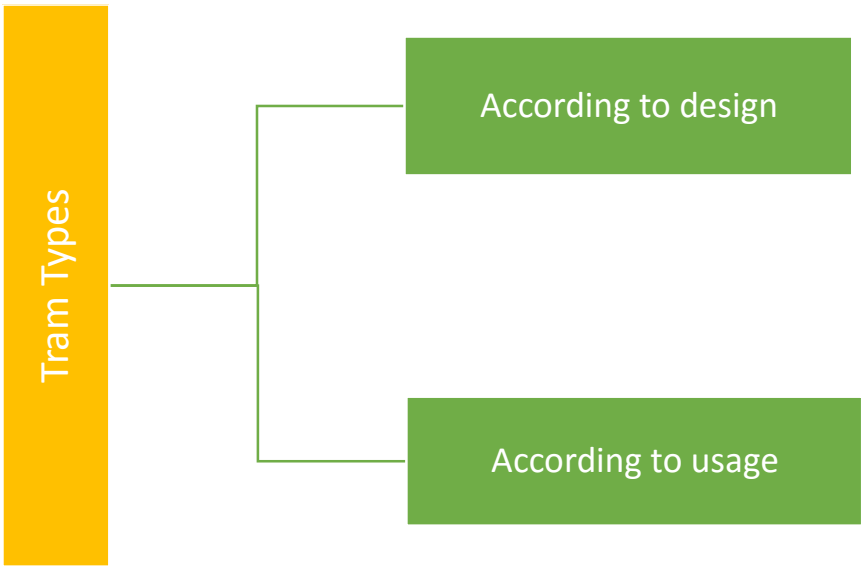
-once built trams cannot simply be withdrawn as an economy measure – the loan must be repaid – this encourages people to invest in shops and business due to transport certainty

-in tram cities 35% of journeys are made by tram compared to 5% in Bath by bus, so tram profits are proportionally larger and can be used to subsidies unprofitable local and rural bus routes – this in turn attracts more drivers

-trams are highly reliable having only 3 moving parts in the power unit, whereas a diesel engine has over 2,000 parts requiring constant maintenance and being less reliable

-the foregoing makes trams very attractive to car drivers – in Croydon trams, 20% of users were ex car users – so this frees up road space for feeder buses, rural buses, taxis, tradesmen and those who still want to drive in.

Trams Types



According to design

Single-ended

The tram which has the operator's position at the end is just one tram.

Double-ended

The tram has two operating sites, one on each side of the tram. This approach makes the tram more versatile but becomes more weighty and complex.

Low floor

The modern design of the tram allows passengers to enter more easily and quickly or get out of the tram. Disabled users with wheelchairs can use this tram more easily because only a small platform is needed to serve them.

Ultra low floor

Recent technical improvement that most of the systems of engines located in the roof and ground are very close. Because these trams have an entry height of only 18 cm (similar to the height of the pier), they can be used very easily by users with wheelchairs or strollers. On the other hand, their integration into the city lines is more difficult because this type of tram requires a unique floor.

Articulated

The trams have articulated joints and a walking platform that connects adjacent passenger vehicles. It is very popular all over the world, with some trams having up to 5 or six passenger cabins that are connected in this way....

Double Decker

The tram has two floors, and is mostly used in Great Britain, Australia, Hong Kong and Alexandria.

Tram-train

Trams that meet all technical requirements (power, wheel type, safety, etc.) that can operate on both city tram lines and regular gauge rail tracks. They are mostly used on longer lines linking more than one urban area separated by a regular railway track.

According to Usage

Passenger tram

Transportation of passengers from one station to another.

Cargo trams

Since the nineteenth century goods have been transported on rail vehicles in the streets, often near the sidewalks and steelworks, for example Tram Wymouth Harbor in Weymouth, Dorset.

Restaurant trams

A number of systems have introduced tram restaurants, especially as a tourist location. This is a modern trend specifically. The systems that have or have had Tram restaurants include Adelaide in Australia, Brussels in Belgium, Milan, Rome and Turin in Italy,
Moscow, Russia and Switzerland.

Mobile Library Service trams

It is used as a mobile library to display various books. Munich tram No. 24, which was handed over as a mobile library in 1928, was restored.

Advertising trams

Many systems have a tram carrying passenger advertising around the area.

Tourist Trams

Many systems have retained historical tramways that often operate on parts of the system for tourists and tram lovers.

Trams Cars Capacity

Why trams have a much higher capacity than buses or cars?

3 times the number of cars at left can be replaced by this tram (Heidelberg) and car drivers will voluntarily switch to trams due to the much higher quality of service. This means the tram and rural or feeder buses now also get a free run into town. Tram stops are only 10-20 secs in the road so when the tram restarts it has clear space ahead. Buses must pull over due to the much longer boarding times (no large multiple doors and no off-bus ticketing) so when they re-enter there is 2 mins of traffic in front of them. Buses are great for rural to town services and tram feeder routes (trams help their economics).

Table 1.1 Capacity of urban transport modes

Mode	Maximum capacity (people/hour)	Average speed (Km/hour)	Stop distance (km)
Bus on road	9000	16	0.2
Bus on busway	20000	56	0.8
Tram rail transit	40000	26	0.5
Metro	60000	32	1.5
Car on road	1000	19	-
Car on freeway	3000	72	-

The above table is accurate for the type of roads, but is optimistic for buses and trams, however it does show that trams are much more effective than buses.

The roads have a maximum carrying capacity of about 1,000 persons per hour. From the information below we can see that buses can be 2.5 times more effective as car, but trams are 12 times as effective as cars, and about 5 times as effective as buses.

Therefore, trams can afford to operate at a 6 – 8-minute schedule throughout the day whereas trams have an inherently longer service interval and are more expensive per passenger kilometer.

Tramway Operation

There are two main types of tram, the classic tram built in the early 20th century with the tram system that works in mixed traffic, and the newer type that is often associated with the tram system has its own right on the road. Tram systems are often called having their own right in the light rail route, but this is always incredible. Although these two systems differ in their operation, their equipment is the same.

trams Routes

Road patterns vary greatly between tram systems in the world, leading to different network topologies.

Trams Track

The tram track can have different rail profiles to accommodate different operating environments. Concrete can be embedded in the street operation process, or use a standard ballast track with rail links on high speed sections.

Tram stop

Tram stations may be similar to bus stops in design and use, particularly in the street-run provinces, where in some cases the other vehicles are legally required to stop tramways. Some stations may be similar to railway platforms, especially in the right sections of the private road, where the tram ascends the standard rail platform, instead of using steps at the entrance or tram on low floors.

Power supply

Electric tram uses different devices to collect energy from air lines. The most common device today is the pantograph, while some ancient systems use trolley columns or arch collectors. Earth-level energy supplies have become a new innovation. Another new technique uses superconductors. When an insulator in the track key cuts off the tram for a short distance along the line, the tram can use the energy stored in a large capacitor to push the tram before the gap in the energy feed. An outdated power supply system is the current channel collection.

Tram and light rail transport systems around the world

The tram in a interval of growth, with about 800 tram systems operating around the world, 10 or so new systems are opened every year, a lot being gradually extended.

Some of these systems date back to the late nineteenth or early twentieth century. However, many old systems were closed during the mid-20th century due to these perceived defects as road inflexibility and maintenance expenses. This was particularly the case in North America, Australian, British, French and other Western European cities. However, some of the traditional tram systems have survived and still function much when they were built more than a century ago.

In the last 20 years their numbers have been increased by modern tram or light railway systems in cities that have abandoned this form of transport. There were also some new tram systems in cities that they had not had before.

tram station

The train & tram stations were Landmark in the characteristic of the large cities developed and the construction reflects the nature including the urban site.
These buildings reflected the spirit and essence of the city because it is to a certain extent a mirror of the city in size and construction reflects many of the characteristics of the existence and urban life of the city and artistic trends.

In the middle of the 19th century, the shape became very important, with the invention of new techniques. The train & tram stations gave a new and distinctive feature, using iron, glass and curved surfaces. The stations became an architectural monument and a gateway to the city.

With the help of the line engineer Georges Lipper Paul (1821) Crown street station the first station in the world.

As a result of the technical development in this period and with the changes that took place in the trains and their transformation from the work on steam energy to electricity at the end of the nineteenth century, and with the entry of trains under the level of land and the existence of large areas wide, all have a significant impact on the form of the design of train stations in America and Europe. Thus, the train became part of the building affecting its shape and composition. In addition to the formal and functional influences resulting from the developments, new requirements have emerged in the stations, which led to the presence of new commercial and service elements, which led to the expansion of the building's size and functions.

The station

It is the port or place where the departed people pass through the tram and ship and disperse their cargo of goods and luggage.
The station may be empty of any building for passengers and goods which are called stop stations or position.
Stations are either adjacent to the lines or placed at the end of a line.

The station usually consists of merging the terminal with the goods when needed and is separated from each other by allocating several railways for passengers and others for goods
If the railway is used for both uses, a special warehouse for the goods is allocated, which separates the passenger building and the cargo building.

Station names

Related to the nature and purpose of the area.

Entrances or access routes to the station:

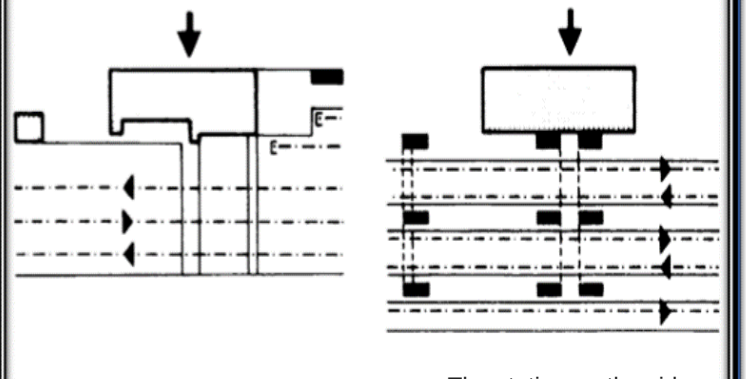
Persons with disabilities must enter the station through the slopes or elevators that reach the sidewalks and provide them with easy movement between the various activities of the station, including tickets, shops, services, etc. In addition to the importance of voice advertising where it must reach the various sections of the station to be heard by all those passengers.

Forms of stations

There are several forms of the train station, where stations are placed at intersections with roads, unless the intersection at several levels is at a higher level or often lower than the level of the road then the level of the station or railway lines is different for the main entrance of the station, The same level of entry is rare in the suburbs or when the station is at the end of the line.

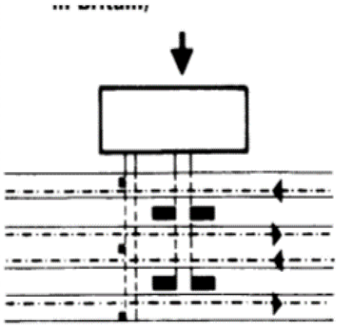
Station end of line:

It is the terminal indicating the end of the railway at a given point, with access to all sidewalks without the need for an intersection with the railway lines.
This station may be an intermediate point in the train line when the train line runs in different directions and may be in conflict.

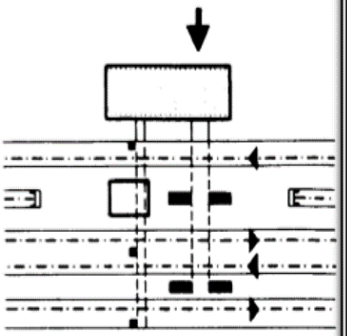


1. The station on the side of the railway is connected to the Sidewalk by bridge way for passengers to descend.

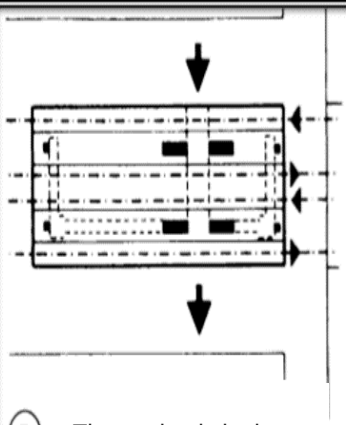
2. The station on the side of the railway is connected to the sidewalk through a tunnel under the railway for the boarding of passengers



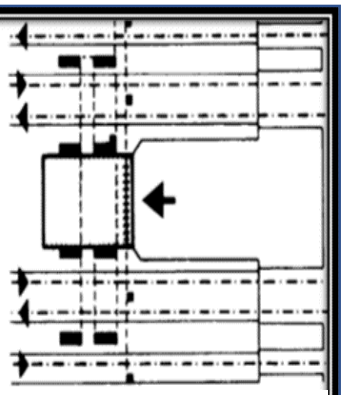
3. The station on the side of the track is connected to a hallway below the lines and escalators to the sidewalk.



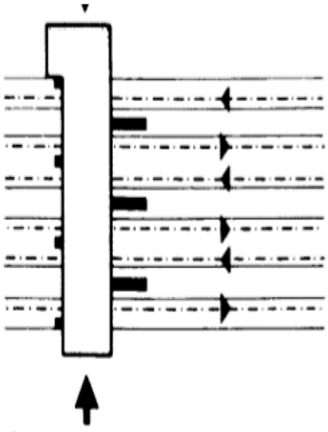
4. The station on the side of the railway is connected to a hall in the middle of the lines and on either side of it the sidewalk.



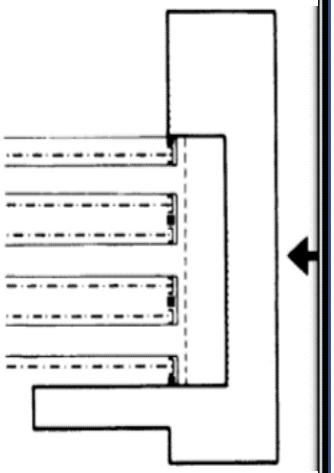
5. The station is in the middle down the railway lines and the stairs are on both sides of the sidewalk.



6. The station is in the middle of the highest railway lines and bridges on both sides of the sidewalk.



7. The station is at the top of the railway lines and escalators to reach.



8. The station is at the end of the line and the starting point.

Stations platforms

The platforms are part of the traffic route within the station and extends alongside the railways within the railway station building, through which passengers can travel to and from the trams as well as the berths for the transport of goods and all related to the movement of freight to and from the tram cars.

The platforms traffic

It is designed and placed in such a way as to ensure that the station contains a set of basic elements, for example, easy for passengers to and from the tram cars. These berths are connected to each other by foot, pedestrian bridges or intersections. In addition to the activities of passengers waiting and ticketing may be located on the platforms or in the case of large stations in the public buildings of the station, in addition to securing the transport services of goods and passengers may be in the stations sections for the maintenance of locomotives and rail in addition to private warehouses.

The width of the platforms varies from 6 meters if it is to carry passenger luggage and only 4 meters for passengers. The berths can be rails or high on the floor of the carriages. The last type is preferred when the number of passengers is large. Passenger This time is reduced in high berths to 1.1 seconds per passenger.

Passengers arrive on platforms through public walkways or walkways connected to the terminal's passenger services area. When parking areas and service areas are at different vertical levels, they must be connected either by ramps, lifts or stairs. The 32-inch moving ladder can move 500 people the 48-inch clock drives 8,000 people per hour at 15 feet per second.

Type of platforms

Bay platforms

The platforms that connect the building to the railway are a major part of the terminal building and are placed at the end of the lines ie the end or the dead side of the lines.

Through platforms

The platforms of each intermediate tram between the two lines are placed on the sides of the lines where passengers can climb or get off the tram.

Island platforms

The isolated platforms are in the form of an intermediate island between the lines and can not be reached through pedestrian bridges, tunnels or intersections.

Safety factor in platforms

Usually, several measures are taken to protect passengers and alert them to the need not to approach the mobile. The simplest way is to set certain limits on platforms that passengers should not exceed. These limits may be either colored barriers or lines painted on the pavement. Lines are prominent at night, so they can be observed or protected from rolling.
The edges of the platforms must also be specially designed to prevent the sliding of carts, wheelbarrows, strollers and wheelchairs away or to the tram track.
The distance of protection or the limit that should not be exceeded is commensurate with the speed specified for the train. In some countries, the speed of the tram is limited to 200 km / h.

In the case of high-speed lines, two types of measures are taken to protect people on platforms in transit stations.

Determining certain speed limits should not be exceeded.
Reconstruction of the station Certain lines that do not pass the platforms are allocated.

Curvature

The platforms must be straight or slightly curved so that the guard can see the entire trams as it prepares to close the doors.
Bends with large bending points have blind spots that create a protection problem. In this case, mirrors and observation glasses should be used.

Railways

Railways can be classified by width of the distance between the two bars measured at a depth of 14 mm from the highest penis to the following patterns:

Railways:

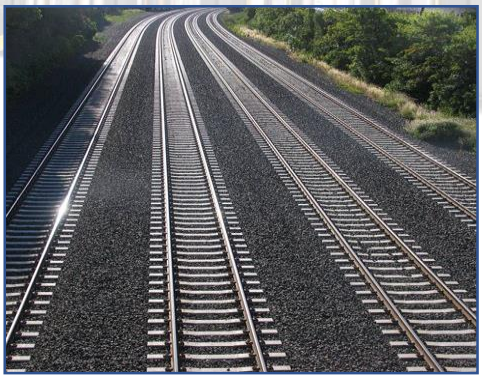
(1435 mm), which was used by Stevenson (4 feet and 8.5 inches) and today accounts for 84% of the total length of lines in the world.

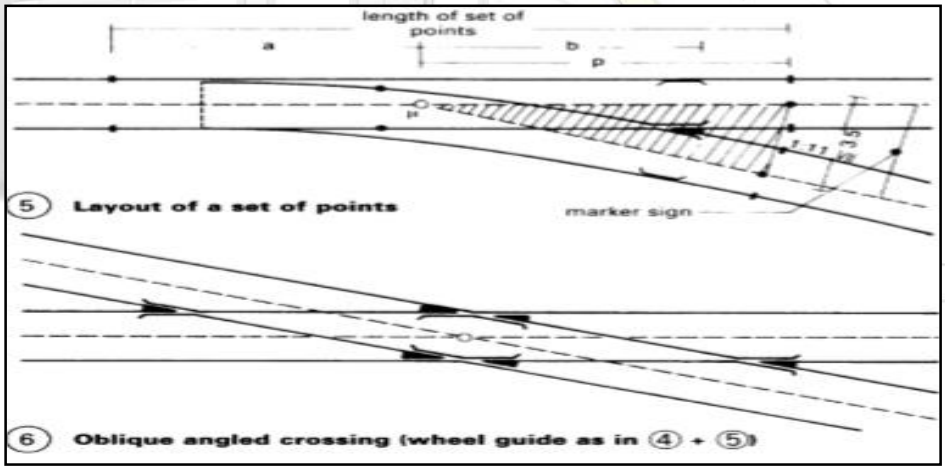
Railroad:

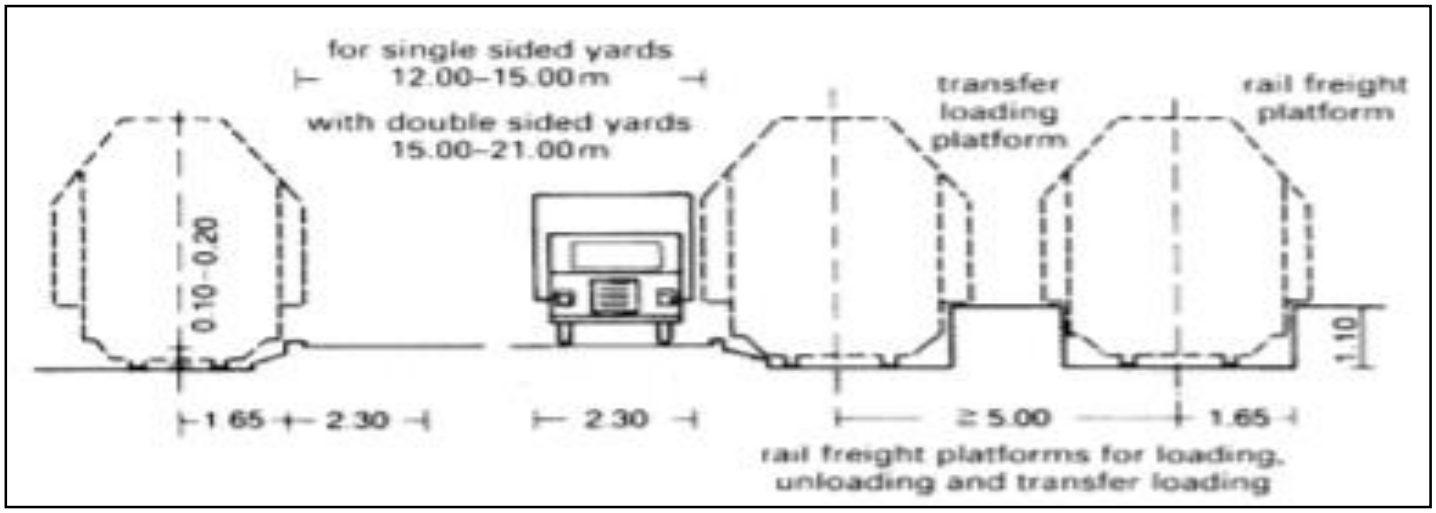
Its width is 1521 mm, as in the Russian Federation, or 1676 mm as in Spain, Argentina, Portugal, India and Ceylon, or 1696 mm, as in Australia and Brazil.

Narrow Rail:

They are suitable for difficult terrain. With a width of 1176 mm in Japan and South Africa, 1050 mm in Syria, 1000 mm in Brazil and Argentina or 762 mm in India. Railways can be classified according to the towing capacity used to steam, diesel and electric lines.







Railways components

The rail is generally made up of two parallel bars of solid steel fixed by screws or metal screws vertically on a set of wooden slabs of concrete, called beams, which are parallel to each other, forming a kind of ladder, to maintain a single distance between the two iron bars and to secure Stability on the ground.

The rail is usually placed on a concrete base or on a bed of gravel pressed to the ground to avoid twisting the rail and to bear the weight of the train, and provides a degree of flexibility and good drainage. Over time, the railway will become more stable under the weight of the locomotives passing by.

Rails

These are steel elements that move the wheels of the trains, and are characterized by high flexibility and great hardness and include a number of species.

Symptoms

They are lateral elements on which the bars are based and provide a constant separation between the two iron bars and can be wooden, concrete, metal or mixed.

Gravel layer

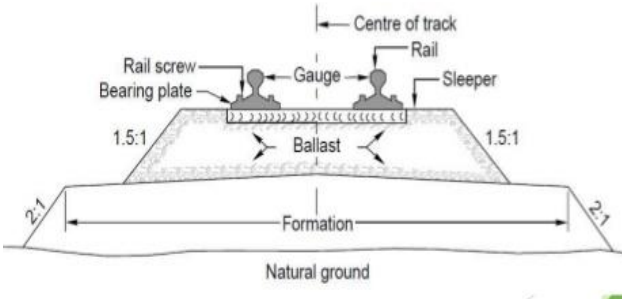
It is a layer of gravel resulting from the cracking of basalt rocks. It helps to give the iron line the regular position in the horizontal or vertical plane. The loads are distributed regularly to the lower section of the line and give it the required flexibility. It is also useful in the discharge of rain water from the components of the upper section.

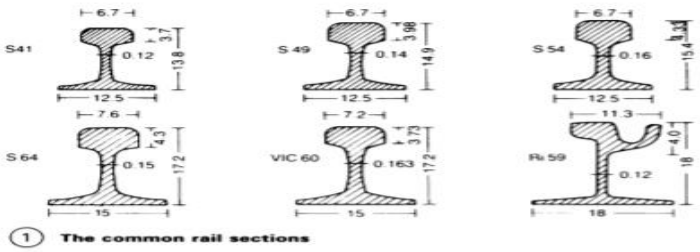
Keys

They are structural elements that allow for the transition from one line to another without any interruption in movement.

Installation tools

They are steel elements that fix iron rails over beams





① The common rail sections

Planning, design and environmental considerations for transport stations

It must be taken into consideration when planning and designing:

-Easy access to parking and other means of transportation (roads / rail / metro.)

-Early separation between passengers, baggage and depositors

-Shorten the distance the passengers walk from the departure lounge to the boarding gate and opposite for the Arrivals.

Organizing the transfer and handling of bags, sorting them and determining their

- routes.

-To take into account the presence of physically disabled individuals among the passengers, while taking care of their special needs

-The possibility of expanding the capacity of the station and modifying existing facilities (potential for future expansion)

-The station is constructed in an unconventional way and is in keeping with world development.

Environmental considerations:

- Considering changes in the level of noise on surrounding and surrounding areas.

The migration of a large number of residents from the vicinity of the location of the

- station.

- Infringement on the aesthetic aspects.

-Separation of residential communities.

-Impact on play, recreation and recreation areas.

-Influence on general behaviors due to noise.

-The significant impact of pollution in air and environment.