Transport and Road Network

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Annotation: *This article discusses the basic requirements for transport infrastructure, transport and road network.*

Key words: *street, trackless, cars, bicycles, motorcycles, scooters, sidewalks, bike paths, rail transport paths, green spaces.*

The transport network should create the ability to move in the shortest directions between destinations, have sufficient density, and its outline should be simple, without complex intersection nodes.

In the modern city, the following types of public passenger transport are common: tram, bus, taxi, metro.

Urban passenger transport is classified by type of use; by location relative to the streets; by the nature of the track devices : individual (street, trackless, cars, bicycles, motorcycles, scooters);) public (street, trackless, car parking, taxis). street transport includes: fixed-route taxis, buses.

The street and road network of the city is formed as an integral system, interconnected with the network of transport highways of the settlement area. The structure of the network is determined by the general planning structure and size of the city, the relative position of its parts.

The grid of streets is the planning basis of the city plan. The streets provide communication and communications within the city, and networks of engineering communications are laid under them.

Rectangular street network - these are mutually intersecting streets at right angles. It is typical for flat relief conditions, and some elongation of the links along the perimeter of the rectangle is eliminated by including diagonal directions in the grid of streets.

The radial-ring network easily connects all parts of the city with the center, however, with insufficiently developed ring highways, radial directions overload the central part of the city, where the diameters of the main streets intersect.

The free street network has a picturesque style linked to the natural features of the city. It is used, as a rule, in small towns, satellite towns and certain areas of large cities with their dissected layout.

In direct connection with the road network, the organization of transport and pedestrian traffic in the city is also decided, which is one of the most important conditions for ensuring the normal

functioning of the city, convenient interconnections between its individual parts, taking into account the time spent on movement within 30-45 minutes of walking distance public transport stops.

A street is a part of the territory of a populated place, intended for the passage of all types of urban traffic, the diversion of surface water, the laying of underground networks, the placement of green spaces and ground equipment.

The boundaries of the street along its width are red lines.

Within the streets are located: the roadway; sidewalks; - bike paths; rail transport paths; green spaces (to isolate pedestrians from the roadway, for dividing lanes); ground equipment devices: ground lighting masts; supports of electric transport networks; transport stop signs; traffic regulation signs . The main difference between streets and roads is the absence of buildings on the territory of the directly served road. Roads are laid, as a rule, along undeveloped sections of urban areas and are intended for the passage at high speeds of large homogeneous traffic flows passing in transit with respect to intersected terrain.

The main criteria for assessing the transport infrastructure are the speed of movement and the time spent on movement.

Basic requirements for transport infrastructure: rational distribution of traffic volumes; combination of speed of movement with comfort; the ability to develop in accordance with the development of all elements of the city; the possibility of choosing the type of communication depending on the range of movement, the nature of the connections and the functional organization of the territory; intensification of intracity communications while reducing the time spent on movement.

The principle of separation of transport and pedestrian traffic, expressed in the classification of city streets, is the basis for the planning structure of the city, its individual parts.

Streets and roads according to their purpose are divided into: high-speed roads; main streets; local traffic streets; streets and roads of industrial and warehouse areas; park roads; pedestrian roads; main streets; embankments.

Expressways are routed outside the residential area. Dividing green stripes are provided along them, and interchanges for intersecting traffic are designed in different conditions. High-speed roads should exclude oncoming or intersecting traffic flows and be sufficiently isolated from each other.

Highways of transit intercity communication are routed around the city.

The main streets of citywide and district significance are the main routes of mass passenger transport, they are laid at intervals of 800 100 мbetween each other, transport stops should be at a distance of 300 400 мfrom the home and place of work.

Streets of local traffic are intended for direct connection with individual buildings and structures of the microdistrict. The network of these streets should not be dense and should not exclude the possibility of through traffic flows.

Local roads do not have a direct connection with the development, pedestrian traffic is excluded on them. They are intended for access to landfills, quarries and other objects of local importance.

Streets and roads of industrial and storage areas are arranged for the transport of passengers and goods to enterprises and warehouses. Their roadway must ensure the movement of all types of urban transport of the city. Park roads are intended for walking and connections with remote places in the park or in the forest park. Here, occasional traffic of cars is possible and lanes for cyclists are necessarily arranged. Pedestrian roads are intended for pedestrian communication

between residential areas and microdistricts and places of application of labor, recreation, and community centers. The main streets are intended for the organization of traffic between individual urban areas; they link highways and provide direct access to the transport's final destination. Traffic along the main streets is regulated by traffic lights and other types of signals, parking lots, turns, entrances and exits are controlled. The network of main streets forms the backbone of the city's transportation system. Buildings are being developed along the red lines, the first floors of which are mainly occupied by institutions and enterprises of cultural, community and commercial purposes. These streets are being improved and landscaped. On holidays, traffic is excluded along the main streets, they are provided for processions to the central square, parades. It is also where festivities and festive celebrations take place. Often in large cities in the redistribution of the main streets, traffic is completely excluded and only pedestrian flows are allowed, and traffic is transferred to parallel duplicate streets.

The main streets are sometimes referred to as the so-called shopping streets, connecting the population with objects of trade, food and consumer services. It is desirable to free these streets from intensive city traffic. They must also have parallel-duplicate transport links for the delivery of goods to trade enterprises and sufficient parking areas.

In areas with a hot climate, on shopping streets within pedestrian traffic, it is advisable to arrange an overlap to protect from the sun, place ponds and fountains that improve the microclimate. Embankments are streets near a reservoir where heavy traffic is excluded. The embankment is being landscaped and widely planted with greenery, while greenery is located in the middle of the embankment or along the coast. The longitudinal slopes of the carriageway of all streets are determined by the safety of traffic and the need for precipitation runoff. The largest slope for citywide and regional highways is 5-6%, and for express roads - 4%. The longitudinal slope of the sidewalks should not exceed - 8%, with a steeper terrain, steps are arranged on the sidewalk with a slope of 1: 3, the number of which should fit in one march.

The street consists of a carriageway, a sidewalk and a landscaping strip, while the carriageway is located in the middle of the street. The width of the carriageway is determined based on the intensity of traffic and the composition of the traffic flow, as well as taking into account its category. In a mixed flow, each type of transport that differs in speed is provided with a separate lane of the carriageway. The higher the speed of traffic, the further the lane is located from the sidewalk. The width of one lane is accepted: 3.5 - 3,75 мfor citywide highways and 3,5 м. for districts. When designing highways with heavy traffic (1000 or more vehicles per hour), a transit carriageway and local roads isolated from it on both sides are allocated. The dividing lanes between the main carriageway and the passages of local traffic are assumed to have a width of 6 м, between the carriageways of oncoming traffic - 3 м.

The transport hub of the city consists of a complex of lines, structures and devices for all types of external and intracity transport. All operational, the work of all types of transport in the city is built on the principles of interconnectedness. The outline of the entire complex of the city's transport network depends on two main factors: the general planning structure of the city and the requirements of the transport itself, which determine its normal operation.

The problem of transport service of a modern city, especially a large or large one, is very complex. The rapid growth of our cities has caused an urgent need for the development of all types of external and intracity transport that can cope with the sharply increased passenger and freight traffic necessary for the normal life of the city. At present, the solution of the master plan of a large or large city is impossible without solving, first of all, the problem of transport services for the city.

It is possible to correctly solve the transport problem of the city only with a comprehensive consideration of the general structure of the city and all modes of transport, both external and

intracity, in their mutual connection, taking into account the role played by individual modes of transport.

The movement of vehicles and pedestrians at intersections can be organized: at the same level without regulation or with the implementation of self-regulating traffic on the square with a continuous flow of traffic along the ring; on the same level with traffic control by traffic lights or traffic controllers; at different levels, combined in the form of continuous traffic along the ring, regulation of individual secondary directions and the passage of the main traffic flows at different levels.

1. Simple intersections with very little traffic in the intersecting directions. More intervals between passing cars of the same street make it possible to safely cross this direction for vehicles and pedestrians following the crossed street. Such intersections are arranged on residential and other streets of local importance, traffic on them is not regulated.
2. Self-regulating intersections with low traffic intensity, which makes it possible to replace the intersection of traffic flows with their rebuilding with the organization of unregulated traffic. These intersections can be arranged at the intersections of highways of regional significance, and in small and medium-sized cities and citywide significance.
3. Signalized intersections with significant traffic volume, for the safe passage of which the regulation of traffic and pedestrians is used.

According to the conditions for passing traffic in directions, intersections can be located on two-way or one-way streets.

According to foreign data, it is recommended to take the length of construction sites on squares with circular continuous movement at the same level as 40- 60 м. The project of the intersection of the main streets should solve the main task of organizing the passage of the maximum current and future traffic flows and pedestrians in all directions with the least delays and the greatest traffic safety. To solve this problem, you need:

- to examine the current and determine the prospective dimensions of traffic and pedestrian traffic at the intersection with the provision of conditions of convenience and safety;
- calculate the capacity of the intersecting streets and the intersection, checking its compliance with the prospective traffic sizes;
- determine the number of tapes for traffic and pedestrians at the intersection and approaches to it and set the required width of carriageways and sidewalks;
- make cross profiles of streets at the approaches to the intersection;
- design a plan of the intersection with the provision of the necessary turning radius of transport, compliance with the length of the rebuilding sections, drawing the contours of the guide islands, safety islands, roadways, green spaces, sidewalks, pedestrian crossings and red lines;
- outline the placement of public transport stops;
- to develop a project for the vertical layout of the intersection and approaches to it in red horizontals with the provision of surface runoff of storm water and the placement of water intake wells of the drainage network.

At simple intersections of residential streets with very little traffic, traffic can pass without regulation. The right of priority is given to cars moving on a street of a higher category. At the intersections of streets of the same value, the following order of movement by type of vehicle is observed : non-rail mechanical and all mopeds; others (non-mechanical). When turning left, the

driver of any non-rail vehicle must give way to all those moving from the opposite direction straight and to the right.

With two-way traffic at the intersection of two streets, the passage of vehicles without mutual intersections is possible in all directions only in four working periods: straight along one of the streets, two left turns from the same street, straight along the crossing street, two left turns from the crossing street. As a result, there are 32 conflict points at the intersection at 16 intersections, 8 merges and 8 branches.

A further reduction in the number of intersection points can be achieved by one-way street planning . In this case, however, there are serious inconveniences in organizing traffic along a winding road with large overruns along secondary streets located perpendicular to the main streets.

The main advantages of squares with ring self-regulating traffic: the possibility of transport passing without regulation with a changing ratio of flows in directions; convenient passage of passenger transport routes and convenient conditions for turning vehicles in the opposite direction. The main condition for a good layout of a square with a ring traffic is the intersection of the streets flowing into it at a right or close to it angle on a calm terrain.

Junctions in the form of a T -shaped intersection with self-regulating traffic are used for small amounts of traffic along the main and adjoining streets. This usually takes place when residential streets adjoin highways of district significance or to main streets of citywide significance.

In places where the streets branch into two directions, U-shaped intersections are designed. It is advisable to take the width of the carriageway of each street after a branching less than the width of the carriageway at the confluence. With small traffic flows at the fork, self-regulating traffic can be applied. To do this, a triangular guiding island is arranged at the fork, around which traffic flows are passed counterclockwise .

When designing schemes for organizing traffic at intersections, the main difficulties are caused by the passage of flows turning left. Bypassing guide islands can be replaced by a detour around individual buildings, structures, squares, parking lots or small neighborhoods.

If traffic flows in both intersecting directions reach large sizes (about 1000-2000 cars per hour), then they are allowed to pass in direct directions with the installation of four sectoral islands and the organization of traffic control at the mouths of incoming streets. Cross-ring traffic has significant advantages, especially in urban areas, because. provides convenient safe passage of significant traffic and pedestrian flows, as well as public transport routes, convenient turnaround of vehicles in the opposite direction and the ability to consistently increase capacity as traffic grows. The main disadvantage is traffic delays at traffic lights.

Transport hubs with intersections at different levels are complex and expensive structures worth several million sums or more. Therefore, when designing intersections at different levels, it is necessary to develop an economic justification for the need for their construction with an analysis of other less expensive measures to ensure the required throughput.

The arrangement of intersections of city highways at different levels makes it possible to increase the throughput of transport hubs, increase the speed and safety of traffic, eliminate or significantly reduce traffic and pedestrian delays at intersections and squares, reduce changes in economic costs caused by delays and a decrease in the speed of transport.

The construction of intersections at different levels is provided for in the development of master plans for cities on high-speed roads, main streets with continuous traffic; at the entrances to the city at the points of intersection with extra-urban roads of category I and II ; at transport hubs, when traffic on intersecting highways in each direction exceeds 2,000 vehicles per hour.

Depending on the outline in terms of intersection at different levels, there can be the following most characteristic types: ring, clover, loop, diamond-shaped and combined.

Squares with ring traffic with intersections at different levels can be used on main streets of citywide significance, when traffic flows on them exceed the capacity of cross-ring traffic at one level. Depending on the category of intersecting highways and the size of traffic flows, ring areas are designed on them with a successively increasing throughput with the following traffic organization.

1. Self-regulating ring traffic with a tunnel under the square or a flyover above the square is designed at the intersection of highways of continuous citywide traffic with secondary directions.
2. Cross-ring traffic with a tunnel under the square or a flyover above the square is designed at the intersection of continuous traffic highways and high-speed roads with regulated traffic highways.
3. The layout of the area in three levels with a tunnel, overpass and self-regulating ring traffic is designed at the intersections of city highways of continuous traffic between themselves or with high-speed roads.
4. An improved ring with five overpasses is designed in exceptional cases on extra-urban roads.

Squares with ring traffic have significant advantages, especially when used in urban areas. They provide a convenient organization of turning movement.

The intersection of the type and leaf of clover is solved in two levels with four right-turn and left-turn exits, reminiscent of clover places in their pattern. Separation of levels is achieved by one of three methods: by raising one of the passages to a flyover or embankment, by deepening one of the passages into a recess, or by partially raising one and deepening the other direction.

In addition to standard solutions, complex and combined intersections are designed at different levels by combining elements of different types of intersections, mainly such as clover leaves, left-turn isolated ramps, loops and rebuilding sections.

According to their purpose, city squares are divided into main squares, residential squares in front of public buildings, shopping, station and transport squares.

Retail space is located near department stores and markets. On these areas, convenient movement of large masses of pedestrians should be ensured and parking spaces for cars and trucks should be provided. The movement of transit transport, although it is envisaged to bypass the square, however, its stops should be as close as possible to it, and unimpeded access for freight transport and the economic part of the commercial building should be provided. An isolated area is allocated on the square for loading the store with goods and temporary storage of containers.

Station squares are organized at railway, sea, river and automobile stations, at airports. Station squares serve as a kind of "gate" for entering the city.

They require complex interchanges for traffic and pedestrians without crossing them, as well as delimitation of parking lots for cars, trolleybuses, trams and buses.

Transport areas are the intersections of urban transport routes, where the regulation and distribution of traffic flows takes place. The dimensions of these squares are determined by the intensity of traffic and the number of streets crossing the square.

LITERATURE:

1. Cherepanov V.A. Transport in urban planning. - M.: Stroyizdat, 2011.
2. Stepanov V.K., Velikovsky L.B., Tarutin A.S. Fundamentals of urban planning . - M.: Higher school, 2016.
3. SHNK 2.07.01 - 03 Urban planning. Planning of development and development of territories of urban and rural settlements. - T .: Goskomarchitektstroy of the Republic of Uzbekistan, 2003.