REPUBLIC OF UZBEKISTAN MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION
NAMANGAN INSTITUTE OF ENGINEERING AND CONSTRUCTION

DEPARTMENT OF " VEHICLE ENGINEERING"

DESIGN OF HIGHWAYS

by science

EDUCATIONAL AND METHODICAL COMPLEX

Field of knowledge:	300000 - Production and technical field
Education area:	310000 - Engineering work
Direction of Education:	5620400 - Organization of road traffic

Namangan

REPUBLIC OF UZBEKISTAN

MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION

NAMANGAN INSTITUTE OF ENGINEERING AND CONSTRUCTION

REGISTERED:

№_____

2022 «___» _____

“I CONFIRM”

Vice-rector for educational work

_____ Q.Inoyatov

“___” _____2022

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DESIGN OF HIGHWAYS

Educational and methodological complex of the discipline design of highways 5620400-the organization of road traffic is designed for students of the educational direction.

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Educational-methodical complex of the scientific-methodical Council of the Institute of Engineering and construction of Namangan _____ 2022-the meeting of the year (meeting statement No._) was considered and recommended for use. (number_____)

CONTENTS

TRAINING MATERIALS

1 Introduction. content, subject and methodology of the science of highway design

The content of the discipline" design of highways " includes the elements of highways, the forces of direct movement of the car and the resistance acting on it, the forces of movement and impact of cars on curved sections, ensuring visibility on roads, the laws of movement of traffic flows, the influence of natural factors on the road, removal of water from the road,, roadbed sludge, road sludge in arid areas, road design in mountainous areas, Road sludge in serjar areas, road design in karst process areas, bridge crossing areas sludge, Highway sludge, urban street and Road sludge. The process of designing highways is the subject of science.

When studying the discipline" design of highways", quantitative techniques are used. The purpose of the study is to form students ' motorway design skills. The elements of highways, the forces of direct movement of the car and the resistance acting on it, the forces of movement and impact of cars on curved sections, ensuring visibility on roads, the laws of movement of traffic flows, the influence of natural factors on the road, water removal from the road, the design of small bridges and pipes, the Basic Rules for, the tasks of science are to lay roads in arid regions, muddle roads in mountainous areas, muddle roads in harsh areas, muddle roads in karst process areas, muddle bridge crossings, muddle highways, reveal the essence of urban street and Road muddling. At present, in the automobile traisport, which Meets World requirements and standards, the topics are reflected in the logical sequence in terms of continuity and continuity in terms of designing the roads of the Republic of Uzbekistan in general foydrlan, which provides international transit and efficient transportation of goods and passengers throughout the year. An in-depth study of the discipline" design of highways " plays an important role in solving the problems of related fields.

To master the discipline" design of highways“, the student is required to have knowledge and skills in the curriculum, such as" engineering Geodesy“," hydraulics, hydrology and hydrometry“," Engineering Geology and grunts mechanics“," road building materials“," drawing geometry and engineering graphics".

2 Elements of highways.

Plan:

1. Elements of the highway in plan.
2. Elements of the highway in longitudinal cross section.
3. Elements of the highway in transverse cross section.

Base words and phrases: plan, straight and curved, domer, bisector, commuting part, road Share, road collar, burn, working character, Project line

Highways are made up of the following basic elements:
- elements of the highway plan ;
- longitudinal cross section elements of the highway;
- cross-sectional elements of the highway;

Elements of the track plan. The geometric position of the road axis in place is called its track. A graphical representation of the projection of a track onto a horizontal plane at a reduced scale is called a track plan. The elements of the track plan will consist of straight and curved lines.

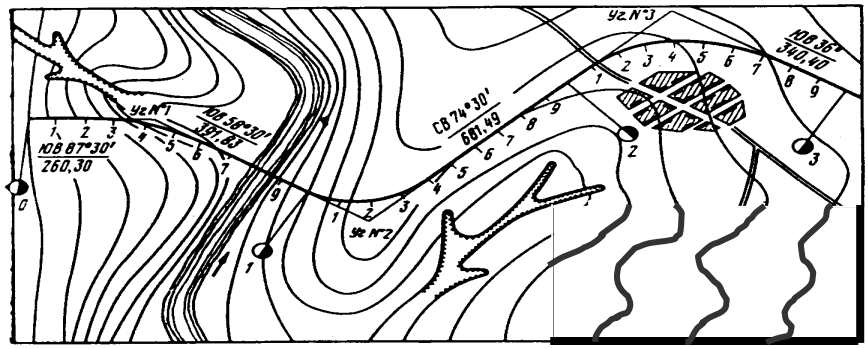


Figure 1. Transfer of the road axle line (track) in plan

Each change in the direction of the track is determined by the angle of rotation, this angle is measured between the continuation of the direction of the track and its new direction. The elements of the horizontal curve include α-angle of rotation, R - radius of curvature,T-tangent, B-bisector, D-domer and E-curves.

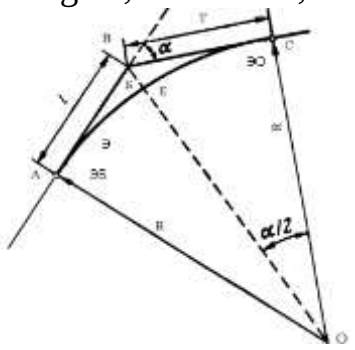


Figure 2. Turning angle elements:

α-angle; V is the apex of the angle; A is the starting point of the circle curve(EB); S is the completion point of the curve (EO); R is the radius of the curve,T is the tangent, B is the bisector, E is the curvature .

The stretch coefficient of the track. The lengthening of the track at the expense of turning angles is characterized by a development coefficient or extension coefficient, which is equal to the ratio of a straight line connecting the initial and final points of the actual length of the track, which is then called the "airway".

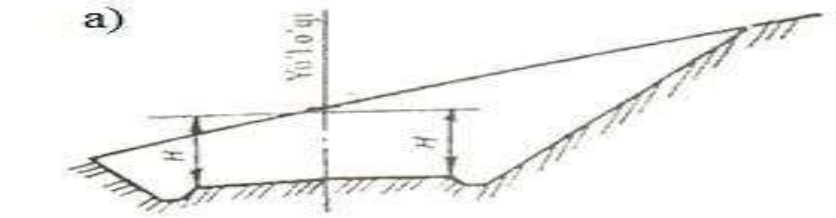
$$K_{уз} = \frac{L_{mp}}{L_x}$$

Path longitudinal profile controls. Spread on the plane of the drawing, the projection of the indicated path axis on the vertical plane is called the longitudinal profile of the path.

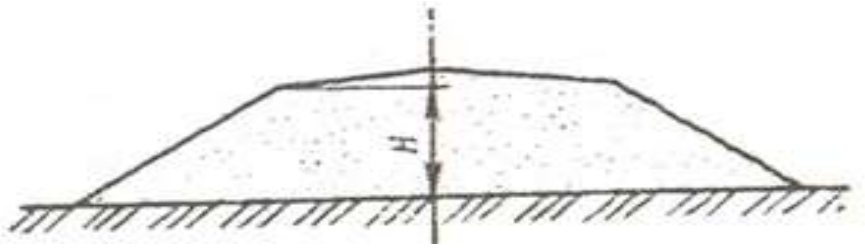
Areas where the road surface remains relatively low to the surface of the earth as a result of the grunt shearing are called carvings, and the road sections where the road passes over a gurunt with artificial spills higher than the surface of the earth are called lifts.

The difference between the signs of the surface of the earth along the line of the road axis and the signs of the road Bank, which determine the height or depth of the carvings of the road lift, is called the working mark.

Road race working sign



a) in the scroll



b) on the lift

Determining the position of the road surface in relation to the ground surface in a longitudinal profile is called designing a longitudinal profile or conducting a project line.

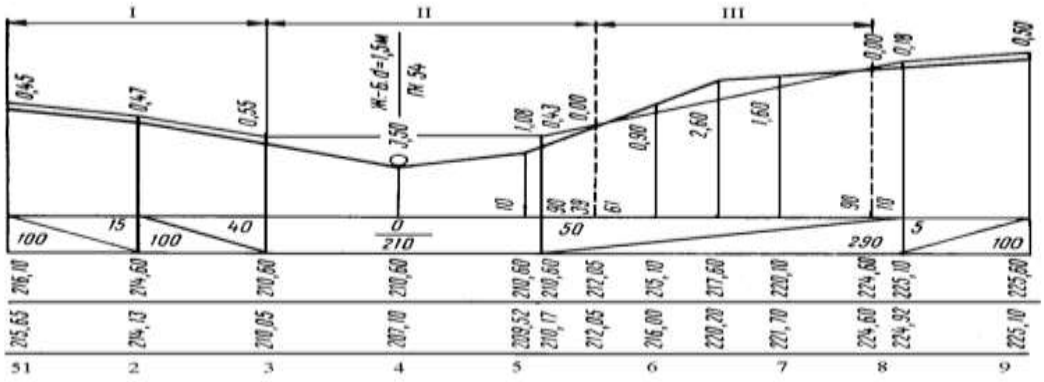


Figure 3. Longitudinal cut . I-Road in the signs "Zero"; II – in the lift; III – in the engraving.

Cross-sectional elements of the road. The image of the intersection of the path with the vertical plane at an extended scale is called a transverse cross section**.**

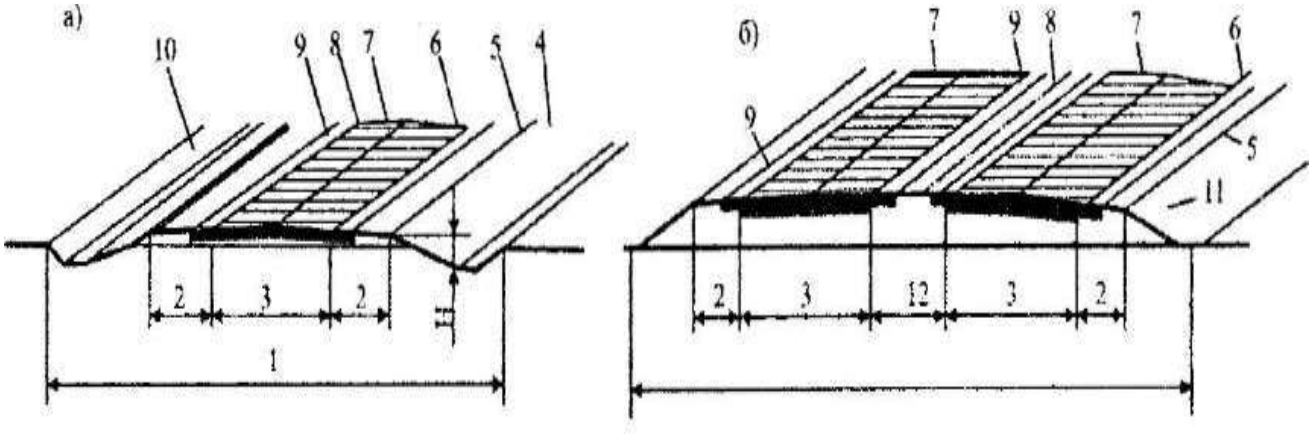


Figure 4. Elements of the road transverse profile

a-one-lane section Road; b-two - lane section and separating polo - sali Road; 1 - Road Share; 2 - road collar; 3 - lane section; 4-inner slope of the side ditch; 5 - embankment; 6 - edge of the lane section; 7 - axis of the lane section; 8 - road axis; 9-chetki polosa; 10 - outer slope of the side ditch; 11 - slope of the slope of the

The Strip allocated for the transfer of the road, in which auxiliary structures are built, and seedlings are allocated for the transfer, is called the region allocated for the road.

The part of the road along which the car moves is called the commuting part. On the roads of category I, a strip is designed, which is separated between the parts of the shuttle. A road collar will be located on the side in the commuting area.On the roadside and dividing bands along the commuting section edge reinforcement tapes are laid, which increase the strength of the edge of the coating.

Slope slope of the road stem. In order to make it possible to roll out the flanks of small couplings, from cars in case of an accident, 1:5 or 1:6 clipping is suitable for the maximum. Copulating with Cor heaps of such yonbagir reduces colish and increases traffic safety. The coefficients of the yonbagir laying in the construction of the kura race are accepted in the current construction procedure: I...In Category III, the height is 1:4 with the kupi for couplings found up to 3 m, and in kolgan categories 1:3 for couplings found up to 2 m in height. It is allowed to build sidewalks at an altitude of 1:1.5 in fairly high couches, as well as on fertile lands in couches to be built from grottoes transported from the grottoes located in the uzok, or in couturiers to be built where there is no access from.

Transverse profiles of the last STEM in the riser

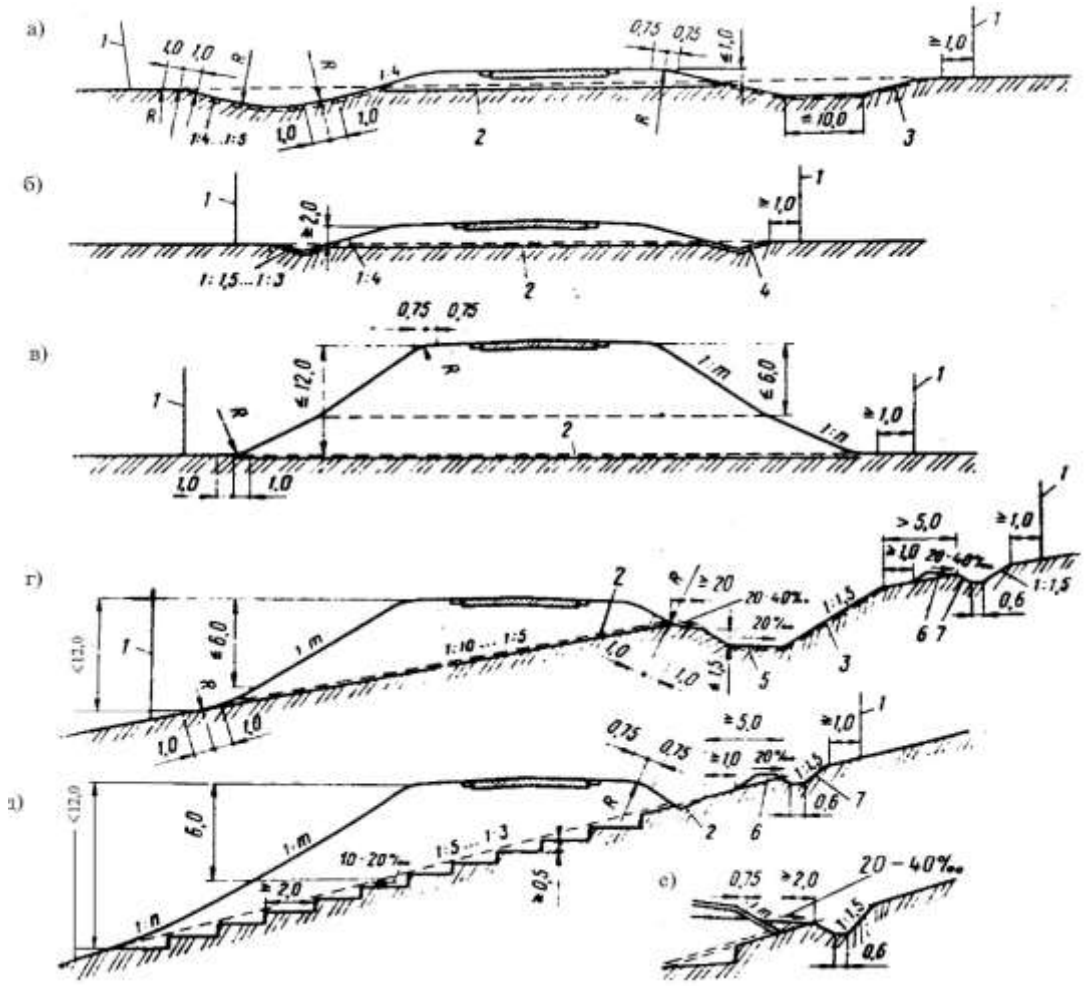
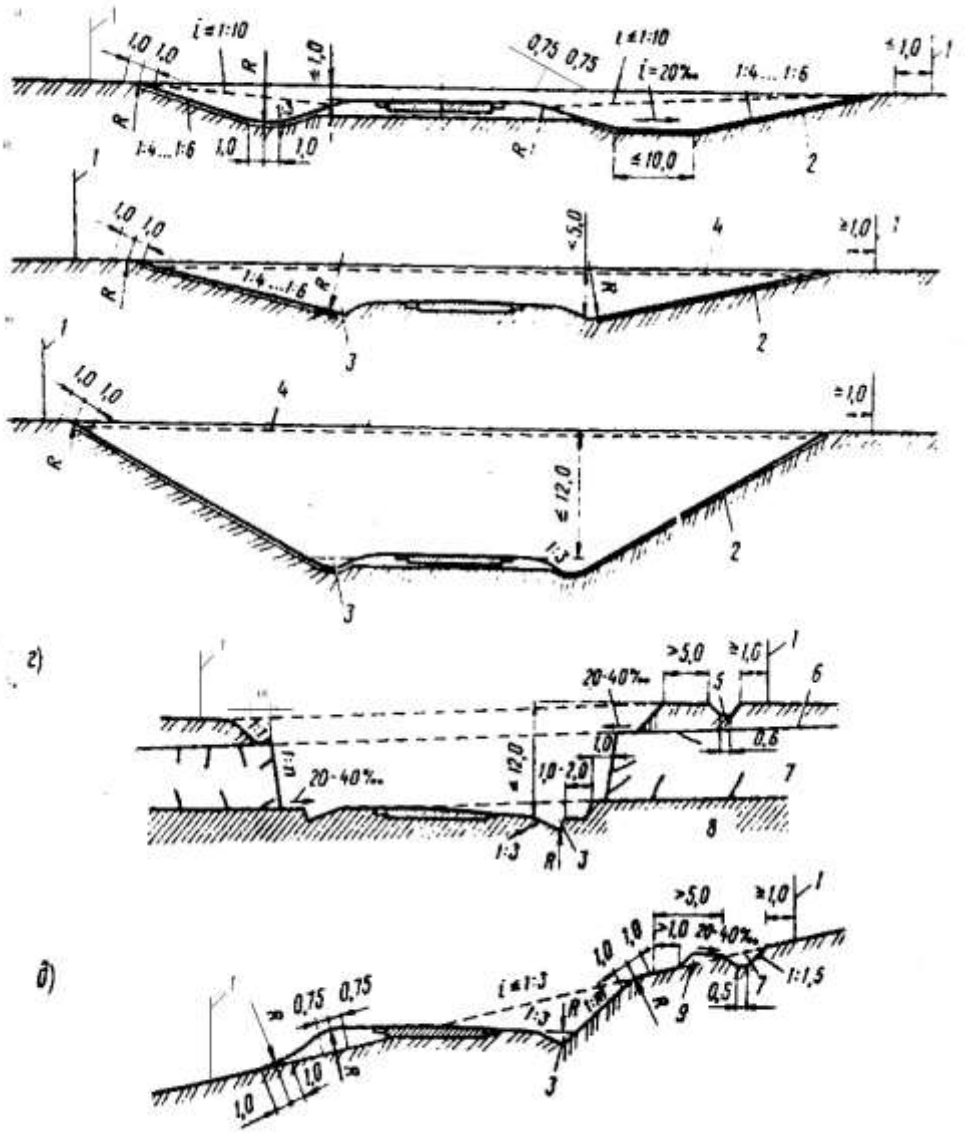


Figure 5. a-height 1m.cuvette with less than-reserve transverse profile; b-height



2 m.transverse profile up to; v - height 12 m.cross profile; slope of the mountain slope in g - ADR transverse profile with a reserve from 1:1.5 to 1: 3; D - slope of the mountain bagri steep slope from 1:5 to 1:3; e - slope of the upper slope of the Non - mountain ditch adjacent to the grunt; border of the place allocated for the 1st Road; removable layer of triangular ditch 0.3 m; 5 - reserve, the size of which is attached to the required micdor of the grunt; 6 - a grunt shed with a height of at most 0.6 m; 7-a mountain FIR with a depth of calculated, but at least 0.6 m.

Dimensions of geometric elements of highways

Dimensions of road elements	Avtomagistral	Quick way	Typical road type
	Category		

	Ia	Ib	II	III	IV	V
Total number of motion bands	4 and more	4 and more	2	2	2	1
Movement band width, m	3,75	3,75	3,75	3,5	3,0	4,5
Road collar width, m	3,75	3,75	3,75	2,5	2,0	1,75
The width of the edge band on the roadside, m	0,75	0,75	0,75	0,5	0,5	-
Width of the reinforced part of the road collar, m	2,5	2,5	2,0	1,5	1,0	-
The minimum width of the central dividing strip when obstacles are not installed along the road axis, m	6,0	5,0	-	-	-	-
The minimum width of the central dividing strip when installing fences along the road axis, m	2 m + to'siq kengligi		-	-	-	-
Width of the safety strip at the edge of the dividing strip, m	1,0		-	-	-	-
Width of the road stem, m	28,5 va undan ortiq	27,5 va undan ortiq	15,0	12,0	10,0	8,0

Questions for supervision

1. What is included in the elements of highways?
2. State the elements of the transverse cross section of the highway.
3. What is said to be a transverse cut?
4. The slope slope of the road stem is chosen Kandy?
5. Outline the cross-section of the road stem in the engraving.
6. Draw a transverse cross section of the road stem on the lift and show.
7. State the elements of the highway in the plan.
8. State the elements of the curve.
9. State the elements of the highway in the longitudinal profile.
10. Describe the working character, the red line.

Movement of the car in the right direction and the forces of resistance acting on it

Plan:

1. Vehicle impact resistance forces
2. Wheel resistance power
3. Air resistance force to the movement of the car
4. Dynamic factor.

Base words and phrases: forces of resistance, dynamic factor, coefficient of nobility, force of resistance to the wheel, force of inertia.

The actual order of the car's movement on the road is determined by three factors: the characteristics of the car's use (1), the conditions that provide the possibility of walking at an acceptable speed (2) and the individual characteristics of drivers when choosing a comfortable speed for themselves, based on road conditions (3). This usually does not take full advantage of the dynamic capabilities in terms of the design of the car.

The moving car is generally affected by the following resistance forces. The traction force generated by the engine on the car's leading wheels is used to overcome the forces that resist movement. The vehicle moving with acceleration on the rise is generally affected by the following carshilik forces: wheel wheel resistance (wheel friction) force Pf, force of resistance to movement on the rise Ri, air resistance Rw, inertia forces of the rotating masses of the car's mechanisms, which are formed when the speed of movement changes Pj. The Resistance Forces and havonnng resistance will always affect the moving car. It is possible that the forces of resistance to movement and inertia in the lift will be absolutely absent depending on the mode of movement of the car, or will have a negative hint at the letter, helping with movement.

Wheel resistance occurs due to the expenditure of energy on deformation of tires. In cement-concrete and asphalt-concrete coatings, the main factor determining the resistance to castings is tire compression. In uncharacteristic coatings (on paths with agile stone, gravel, stone laying), this is added to the fact that the wheels walk over unevenness in the coating. On soils with a soft surface, resistance is characteristic due to the forces spent on the deformation of the tires and the soil when the trace of the wheels is formed. When driving on roads with a rigid coating, the resistance to the wheel will be correctly proportional to the pressure on the road:

$$P_f = \sum G_i f_i,$$

here-the load that falls on the road from individual wheels, N; - the coefficient of resistance to the wheel.

Wheel resistance strength on deformable grunted surfaces:

$$P_f = \xi G_i \sqrt{H/D},$$

where ξ is a variable coefficient from 0.75 to 1, depending on the condition of the soil; N is the depth of the trail, which is typical after the wheel has passed; D is the diameter of the wheel. The resistance to the wheel depends on several factors. The resistance to the wheel depends on the plane of the coupling, speed and elasticity of the tires. However, when driving at speeds below 50 km/h, the resistance to the wheel increases so slowly that the coefficient of resistance to the wheel can be considered practically unchanged:

Wheel resistance coefficient

Coating	f value
Cement-concrete and asphalt-concrete	0,01-0,02
Coatings made of Flint or gravel treated with organic binders	0,02-0,025
Not treated with binding agents	0,03-0,04
replicas made of Flint or gravel	0,04-0,05
Stone laid paths, dry and shibbed grunts	0,03-0,06
extremely wet wet wet wetland grunt, crumbly Sands	0,05-0,30 more

When there is speed (60 < < 150 km/h) on flat, solid-top roads at speeds close to calculated speeds, the coefficient of wheel resistance can be expressed as follows:

Fv =f0(1+4,5*10-5 v2)

here-the coefficient of resistance to the wheel at speeds up to 60 km/h.

Air resistance force to the movement of the car

The total carriageway of air to the movement of the car (N) is represented by the aerodynamics formula:

$$P_{\omega} = \frac{c\rho\omega\vartheta^2}{3{,}6^2} = \frac{c\rho\omega\vartheta^2}{13}$$

where the resistance coefficient of S-mukhit (in air - dimensionless size, which depends on the shape of the moving body, as well as on the smoothness of the surface of the body); - density of air, it is equal to 0.125 N s2/m4 in the sea SATX; - the face of the projection of the car on a steep plane to its direction of movement, (face of the opposite)

Air resistance coefficient

car	K_x,$N*s^2/m^4$	ω,m^2
Cargo car	0,6-0,7	3-7
Wagon type body bus	0,25-0,50	4.5-7,0
Light car	0,15-0,30	1,4-2,6
racing car	0,10-0,15	1,0-1.5

When calculating the traction of a car, the coefficient of resistance of the air, which is found by the multiplication experiment, is replaced by Kx.

The pesh surface of the car is calculated by approximate formulas:

for modern passenger cars =0.8 V*N; for buses and Van body trucks = 0.9 V*N (where V, N is the gabarite width and height of cars).

The strength of the car's resistance to the slope. I-resistance to movement when climbing a sloping hill becomes typical as a result of additional energy expenditure on the elevation of the car. Work is spent on overcoming the force of gravity F =GH in order for the car to shift on a lifting plot with a length of L and a

height of N. The resistance to movement on the rise can be expressed as follows for the unit of road, without taking into account the difference between the actual length of the sloping section of the road and its horizontal projection (not very economical for longitudinal slopes allowed on highways:

$$P_j = F/L = GH/L = G * i$$

Resistance of the inertia forces of the car. Thus, the coefficient of resistance to movement on the rise, consisting of the ratio of Rj to the weight of the car, is equal to the kiymati of the longitudinal slope, expressed in decimal places.

The resistance of the inertia forces generated when the speed of the car changes the forward motion is made up of the sum of the inertia moments of the rotating parts of the car with the inertia forces.

Inertia force of forward motion when the mass of the car is m=G / g and speed (m / s:

$$P_j = m\frac{d\vartheta}{dt} = \frac{G}{g}\frac{d\vartheta}{dt} = G * j$$

here $d\vartheta$ /dt - acceleration of the car; $j = \frac{1}{g}\frac{d\vartheta}{dt}$ relative acceleration.

The equation of motion of a car. When the car moves, the traction force is used to push the resistance to movement. The condition of equality of external and internal forces (car motion equation) is expressed as follows:

$$P_p = P_f \pm P_i + P_\omega \pm P_j$$

where Pf is the resistance to the wheel;Pi is the resistance to the movement on the hill climb;–the resistance of air to movement; Pj is the resistance of the inertia force.

Dynamic factor. Depending on the ratio of the resistance, the car will move, accelerate or brake with an invariable speed. By transferring the air resistance, which is dependent on the speed of movement, to the right of the equation and placing the values of the resistances, we characterize:

$$P_p - P_\omega = G_f \pm G_i \pm G_j$$

Academic E.A. Chudakov proposed to characterize the traction or dynamic qualities of a car by a dynamic factor, that is, the ratio of the turnover between full traction on the leading wheels and air resistance to the weight of the car:

$$D = \frac{P_p - P_\omega}{G} = f \pm i \pm j$$

The dynamic factor describes the reserve of the force of gravity, which gives birth to the unit of weight of a car moving with speed. These backup road resistances can overcome f ± i and the acceleration of the car can be spent on J.

According to the amount of dynamic factor, the longitudinal slopes of highways are normalized.

Conclusions on the 3rd topic

1. The movement of cars on the roads depends on the operating characteristics of the car, the individual characteristics of the driver and road conditions.

2. The car in motion is influenced by the force of resistance of air, the force of inertia, the force of resistance to the slope, and the forces of resistance to the wheel.
3.The dynamic factor describes the reserve of traction force per unit weight of the car.
4. The coefficient of wheel resistance depends on the plane of the coupling, the speed of the car and the elasticity of the tires.

Questions for supervision

1. Valve the car's motion equation.
2. What resistance forces affect the car?
3. What factors does the resistance to the wheel depend on?
4. How is the resistance of the inertia forces of a car determined?
5. How is the force of air resistance to the movement of a car determined?
6. How is the slope resistance force of a car determined?
7 . How is the dynamic factor determined?

4- Traffic laws of traffic flows

Plan:

1. Modes of movement of cars.
2. Descriptions of modes of movement of cars.
3. The bandwidth of the highway**.**

Base words and phrases: *modes of movement of cars, free flow, partial link flow, connected flow, dense or felt flow.*

There are several specific flows of traffic flows, depending on the degree to which cars occupy roads. Free flow - (ease of movement level A). Partial bond flow - (degree of ease of movement B) bound flow - (degree of ease of movement C). Dense or felt flow - (degree of ease of movement G).

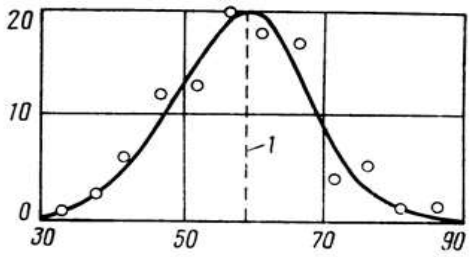
In the general case of free flow, the following manifestations are observed. Single cars moving on the roads at a distance that does not affect the conditions of mutual movement from each other. Walking on the road will not be exhausting for drivers and passengers.

In a partially connected stream, in general, the following manifestations are observed. Consisting of a movement stream of groups of several cars, these cars differ in the dynamic qualities of uzaro and walk at a close distance from each other. Usually the reason for this is that a car walking much slower ahead will catch those coming on the go. Their drivers are forced to walk slowly, they take a break from the wait for the moment when they laugh to take off orcali to the side band and continue to move in single-car mode until they reach the group going ahead. The average speed of the flow decreases, the car steering becomes more complicated. If it turns out that moving at the same speed at a close distance in relation to each other is prescribed to a group of guides who go to the same place, this corresponds to the movement of the organizational column.

In general, the following manifestations are observed in the connected stream. A large group will consist of the flow of movement of cars. All cars interact with each other, and after overtaking a single car or a group of cars, the speed of the car will again be tied to the speed of the car going in front of it. The greater the intensity of movement, the greater the overtakes are practically increased with such great difficulty and risk, the higher attention is required from the guides.

In a dense or collected stream, in general, the following precipitation is observed. Cars walk after each other. Kuvib utish can practically not be found. The speed of movement drops sharply. in places where conditions worsen, congestion can occur.

Distribution curve of movement speeds in the traffic flow



Speed, km / h

Density of traffic flow. The density of the traffic flow, that is, the number of cars corresponding to a road 1 km long, which is the same in terms of traffic qualities, serves as a description of the current traffic flows:

$$g = N / \vartheta$$

here, N - the speed of movement, avt/hour; in the form of - the speed of movement, km/h.

The bandwidth of the motion strip. The typical transfer cabiliate of the traffic strip characterizes the greatest speed of movement in the kisman-connected mode of the traffic flow, in which the speed is slightly reduced compared to the speed of single cars.

Depending on the speed of movement on the road, the number of crossbreeds for cars and their modes of movement changes. When laying roads, it is envisaged that the intensity will be less in one strip of the commuter Kismi, so much greater comfort will be created for off-road users.

Load factor of the motion strip

The fact that motion bands are loaded with cars is characterized by the load factor z, which is equal to the ratio of the intensity of movement of the xakikiy to the usual practical transfer cobilicity of the motion tape of the Nf.




Traffic flow situation

Comfort level of movement	Intensity of movement in the tape	Current state	Driving conditions of cars	Load coefficient z	The speed of the flow in relation to the speed of the yaka car	Working conditions of the driver
A	360	Free	No reciprocal barriers	0,2 less than	0,9-1,0	Light
B	900	partially bound	Dressing group of cars smudges, often smudges	0,2-0,45	0,7-0,9	Normal
V	1200	Tied	The group of cars will increase. Intervals are maintained between them. Plucking conditions are complicated	0,45-0,70	0,55-0,7	Tied
G	1600	the rush	Typical turbidity of cars flows, the speed is significantly reduced. tire-employment dressing in areas where the conditions are complicated can	0,7-1,0	0,4-0,55	the rush

			be blurred.			

Conclusions on the 4th topic

1. There are several modes of traffic flows, depending on the degree of reservation of roads with cars.

2. The movement of car flows along the road is a kind of unstable process in which the mutual arrangement and speeds of cars change in a random way.

3. It is characterized by distribution and cumulative curves of speeds and modes of Transport flows.

4. The less intensity is found in one strip of the commuting section when laying roads, the greater comfort is created for off-road users.

Questions for supervision

1. What do you mean by traffic flow?
2. State the modes of Transport flow.
3. Explain the free flow.
4. Explain the partial link current.
5. Explain the connected current.
6. Explain the dense or seemingly stream.
7 explain the distribution curvature of Transport flows.
8. Explain the cumulative curvature of Transport flows.
9. What expression is determined by the density of the traffic flow?
10. What factors do the bandwidth of the motion strip depend on?

5. Influence of natural factors on the road

Plan:

1. The influence of natural factors on highways.
2. Sources of road stem hydration.
3. Division of the Republic of Uzbekistan into road and climatic regions.
4. Requirements for determining the height mark of the road share embankment.
5. Insulating sheets.

Base words and phrases: *natural factors, road-climatic regions, classification of relief,moisture-heat order.*

The influence of natural factors on highways. The service life of the highway depends on the influence of a large number of natural Geophysical factors on it, from which climatic and hydrological conditions, as well as the relief of the place and the geological structure of the soil, are affected. The main types of relief are: plains, hills, mountains. Plains are dry lands with a weak relief; the relative heights of the individual points in these change relatively little. As the surface is generally flat, in some of its places there may be elevations or depressions (Hills,

plateaus, streams, etc.). Hills-raised areas, the height of which does not exceed 200 m from the skirt Sathi, they smoothly move to the plane.
Mountains-there will be quite high rises, and the skirt will rise from Sathi in a sharp image. Mountainous elevations pass to each other, forming mountain ranges.

Complexity category	Name of relief	Description of the relief
1	Plane	Extensive water separators, river valleys plains with slope slope
2	Low hilly	Separate low hills and plateaus, areas divided by sloping water separators, sparse ravines and streams
3	Too low-high	Sertepa with split relief, narrow curve-a place where there are bugri water separators and many cliffs. The lower parts of the foothills and mountain slopes. A place with a lot of hills.
4	Adrli	There are mountain slopes and slopes with a strong relief, narrow gorges and valleys of mountain rivers,slopes and streams of water are very steep
5	Mountain	The ridges, located one after another, are steep, strongly dissected by mountain slopes, have steep cliffs curved - Bugri mountain gorges.

Grunt conditions. When choosing a Track Direction, it is necessary to take into account the grunt conditions. The structure of the road race will depend on the conditions of the grunt; it is necessary to presume the requirements for the removal of water from the road. Uncomfortable grunts-an attempt is made to bypass the scattered, salty-pressed lands and swampy plots.

Climatic conditions. Climatic conditions greatly affect the conditions of use of roads. This includes the amplitude of the Harat and the rate of change of the Harat, the maximum and minimum of the Harat, the amount of precipitation-sochin and evaporation, the direction and speed of the wind, the thickness of the snow, the depth of freezing. Climatic conditions often limit the duration of the construction season or require the use of special methods of performing work, which makes road work costly and complicated.

Hydrological and hydrogeological conditions. Hydrological and hydrogeological conditions are characterized by the amount of precipitation-sochin falling, the conditions of leakage and evaporation of water, the thickness of the snow cover and the intensity of spring melting, the depth of laying of sizot waters and the characteristics of their modes, the modes of rivers and ditches. All these conditions must be taken into account when slicing water removal and when choosing a road stem construction**.**

Water-heat order of the road stem

The amount of moisture in the road race will not be constant throughout the year and will change at certain time intervals according to the water balance equation:

$$W= (A+V+S)-(D+E+F),$$

where A is the amount of precipitation that falls on the road race-sochin; V is the distribution of water that flows from the site adjacent to the road; C is the water that flows from the sizot water Sathi along the capillaries, as well as through the veiled and vapor - permeable displacement of moisture; D is the water that flows from the road

Change in road share humidity in the cycle of the year: I - the accumulation of moisture as a result of the leakage of rainwater in the fall. II-winter freezing of the road stem and redistribution of moisture. III-melting of road-stem ice and super-wetting of the grunt in spring. IV-summer drying of the road race.

The water regime is highly dependent on local climatic conditions, since the influence of factors entering the water balance equation is manifested differently in different climatic zones.

The division of the territory of the Republic of Uzbekistan into road and climatic regions is shown in the table below:

Road-climate region	**Geographical location of districts in the road-climatic region and their brief description.**
1	2
I	Covers the districts of Ustyurt, North Kyzylkum, Buqatogh-Etimtogh, Sultanwaystogh, South Kyzylkum, Kuljuktogh-Tomditogh, Jingildi, Gazli. Desert with a dry climate, desert steppe includes common Barhan sands that give geographical regions varying degrees of mobility and visibility.
II	The border of Navoi city along the right and left banks of the Zarafshan river covers the geographical region, where strong and excess saline soils spread from Altai to Altai.
III	Covers Chirchik, Akhangaron, Angren, Zamin, Forish, Chotkol, Karadarya, South and West Alai, Turkistan, Nurota, Sanzar, Khatirchi, Samarkand, lower Kashkadarya, Guzar, Kitab, Shahrisabz, Surkhandarya districts geographically flat, mountainous regions without sufficient moisture.
IV	The remaining districts include rationally moistened lands as a result of irrigation and washing in a geographical region with a dry climate.

The road share accepts all the pressure that vehicles are given through the roadbed. Its resistance to pressure changes strongly when the humidity of the grunt changes. Therefore, the elevation of the road share Coast at the required height from sources of humidification will not be the same in different road - climatic regions. Depending on the region of the road climate, the minimum elevation of the coating surface is as follows:

Working layer soil	**The path depends on the climatic region kholda, the least elevation of the coating surface, m**			
	I	II	III	IV

Fine sand, light large loam, light loam	0,5/0,3	0,6/0,4	0,4/0,2	0,9/0,7
Dusty sand, dusty sandy	0,8/0,5	1,0/0,6	0,7/0,4	1,2/0,8
Light and heavy loam, glina (clay)	1,1/0,8	1,3/1,0	1,0/0,7	1,5/1,2
Heavy dusty sandy loam, light and heavy dusty loam	1,2/0,8	1,4/1,0	1,1/0,7	1,6/1,2

Insulating sheets. When it is not possible to raise the road share embankment to the indicated height, it is possible to build insulating sheaths at the top of the road stem that will suspend the displacement of moisture inside the road share in order to maintain the water regime in the same way.

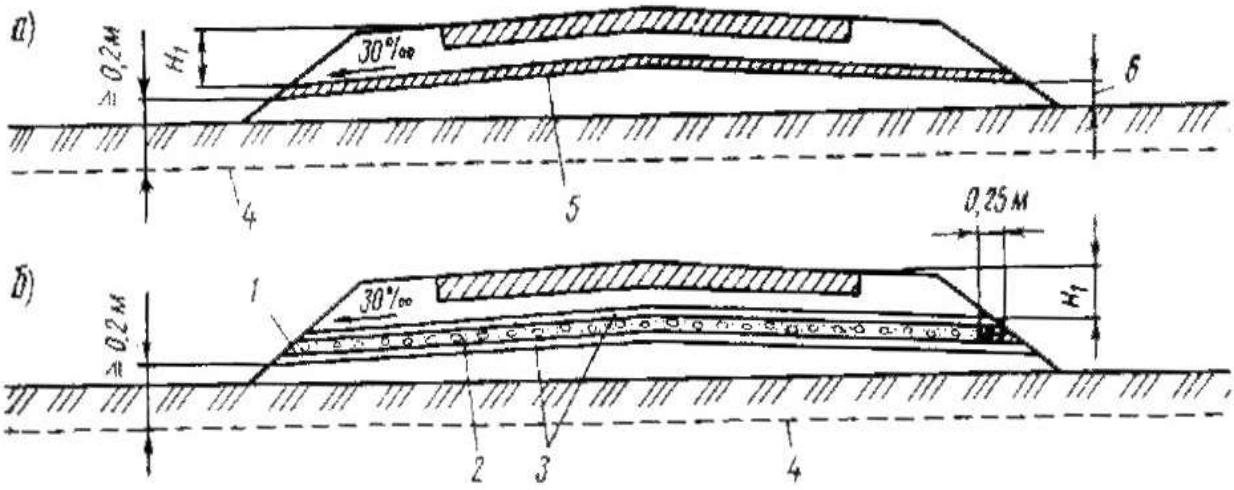


Figure 7. Insulating sheets.1-Flint; 2-large grain Layer; 3 - Clay anti - pressing layer; 4 - sizot waters satxi; 5-grunt layer treated with organic binding materials or a layer of waterproof synthetic materials; 6-surface waters rising from satxi, at least 0.2 m.

Conclusions on the 5th topic:

1. When designing the road race of highways, it is necessary to know the features of the relief, as well as the classification of its main elements.
2. When choosing the direction of the track, it is necessary to take into account the grunt, climate, as well as hydrological conditions.
3. It is necessary to take into account that the amount of moisture in the road race varies according to the water balance equation at certain time intervals due to non-constant throughout the year.
4. The rise of the road share coast should not be less than the minimum values given according to SHNK2.05.02-07.
5. When it is not possible to raise the road stake embankment to the indicated height, it is necessary to build insulating sheaths.

Questions for supervision

1. Is the impact of Kandy natural factors on highways ?

2. Name the main types of relief.
3. Do you know the Kandy categories of relief when designing roads?
4. What is included in the Grunt conditions ?
5. What is included in climatic conditions ?
6. What is included in the hydrological and hydrogeological conditions?
7. State the sources of road stem hydration.
8. Explain by writing down the water balance equation of the road race.
9. How many road and climate regions is the territory of the Republic of Uzbekistan divided into?
10.Are insulating sheets designed in a niche?

6- Sludge small water structures.

Plan:

1.The order of operation of the pipes.
2.Determination of pipe otvertsyas.
3.Muddling small bridges.

The amount of water flowing from a small body of water into the structure can be determined by the calculations studied in the hydrology course, when performing these calculations, it is inevitable that there will be various hypotheses (conditions) and errors. It is very difficult to take into account the absorption of rain and melt snow waters into the soil. Therefore, water consumption and hajmi in small basins are calculated by flow standards, that is, for all water bodies, metreological factors of flow in certain geographical areas are assessed uniformly. To check the Oim norms, the calculated beliefs are compared to the observed values. Usually, there are not many such values at which the current is transmitted, making it difficult to assess whether they will be amplified by the _ata current again.

They generally believe that the flow costs and consumption will increase at the expense of jala and melt snow water. On this basis, it is possible to draw up regional (by Regions) flow standards for the value of water consumption found on the passage tracks of streams on the site, as well as the results of monitoring precipitation-sochins and snow melting at meteostans (these provide an opportunity to assess _ata and severe Jales and the intensity of melting snow).
In the absence of data to establish regional norms, general (in the country) flow norms are used. In all types of engineering projects, the norms of leakage of melt snow waters are adopted. In the design organizations of different departments, the calculation of the flow of the jala is carried out by different norms.

The waters of the Jala flow into the structures almost according to the triangular hydrograph. The greatest consumption determined by the Formula is observed for a very short time.

The calculation is based on the general formula for the flow of jala waters

$$Q_j = 16{,}7 a_{xis} F \alpha \varphi ,$$

here, the calculated intensity of the emotion, the probability of increasing this is similar to the increase in the duration of the scale, the sought - after consumption is most likely, mm/min; F – the area of the water body, km2, _ata_are determined in the horizontal ones by; - the flow coefficient depends on the type of grunt on the surface of the water body;

In a strong Jala, water does not penetrate into the grunt, this can be obtained by taking into account the actual conditions for the formation of the jala stream, the flow coefficient of which is equal to 1.

Thus, after placing the relation (9.6) to (9.1), the calculated formula of the flow consumption of the takes the following view:

$$Q_j = 16{,}7 a_{soat} K_t \varphi F$$

while the formula for full flow consumption (K_t=5,24 va □=1 da)

$$Q_{to} = 87{,}5 a_{soat} F$$

The volume of the flow of the rain is determined by the reduction coefficient with the flow layer hj, as well as the watershed area in the form of a multiple of F. In this case, it is taken as a form=1 (See above):

Calculation of holes of small bridges and determining the height of the structures

The calculation of the holes of small bridges should usually be carried out using the formula according to the free-flow scheme, this formula is easily brought to the following view:

$$b = \frac{Q_s}{1{,}35 H^{3/2}}$$

7- Basic Rules for choosing a Track Direction

Plan:

1. Ensuring ease and safety of movement when designing the track.
2. Environmental protection when choosing a Track Direction.
3. Ensuring the spatial fluency of the track.
4. To ensure that it harmonizes with the surrounding landscape when passing the road.

Base words and phrases: track, landscape, harmony with the environment, spatial line.

The requirements of highways in relation to the elements of the plan and longitudinal profile were from the chic, coming from the condition of moving the movement on separate, separated approach elements. And in khakikat, each path

will consist of the addition of plots that differ in plan and longitudinal profile. When changing longitudinal slopes in short sections, cars do not resort to the characteristic of speed corresponding to the calculation by dynamic characteristics. There are places where speed on land is limited according to traffic rules. It is not allowed to be plots that cause the need to reduce the speed on the safety of movement. Without taking into account the features of the perception of the conditions of movement of the guides on the road, the correct solution will not be solved by the mutual rational addition of the adjacent sections of the road.

The above-considered methods of substantiating the requirements for elements of highways in the plan and profile apply to the most difficult parts of the road and provide for the strained mode of control of the car in the event of a complex situation. The complex situation includes the full use of brake force, the minimum duration of the drive reaction and the hacksaw. Tracking the speed of the khakikai movement of cars on the roads shows that the kuplik khaydovists make a quiet mode of movement with smaller speeds than the speeds captured in the fall with the calculation. On roads whose technical standards are not satisfied with the necessary conditions of movement according to the imagination of the khaydovists make adjustments to the solutions of guyo projectors, entering the opposite movement band when passing through small radial curves to increase the turning radius, or sitting at small speeds on curves to reduce the centrifugal forces that are generated. With this, they bring the trajectory of the car to the kiyats of the transverse force coefficient, which is convenient for them, and the speeds at which longitudinal and transverse accelerations grow. In order for the road to meet the requirements of comfortable movement, its elements should not make it difficult to control the car, and the direction of the track should be absolutely obvious to drivers.

The driver is grateful to see the conditions of movement mainly through his eyes. As additional sources of information, when passing curvatures or passing through uneven sections of the road, the accelerations given to its organism are served. In the process of movement, khaydovchi's nigoxi jumps from one object on the road and next to the road to the second object, and guyo separates the base points of the spatial corridor, where it is clearly visible that he is driving a car (fig. Such a base for throwing a gaze is the nooks and crannies of the carriageway and the edge of the lane, tree rows parallel to the road, the longitudinal seam of the concrete coplama and the hokazos are served.

When the speed of movement is small, the driver has the opportunity to browse the place adjacent to the road. When moving with gradually increasing speed, the driver is forced to underestimate the increasingly increasing number of base points at a constant time interval. At the same time, every person has a limited opportunity to notice, notice, make and evaluate this or that event.

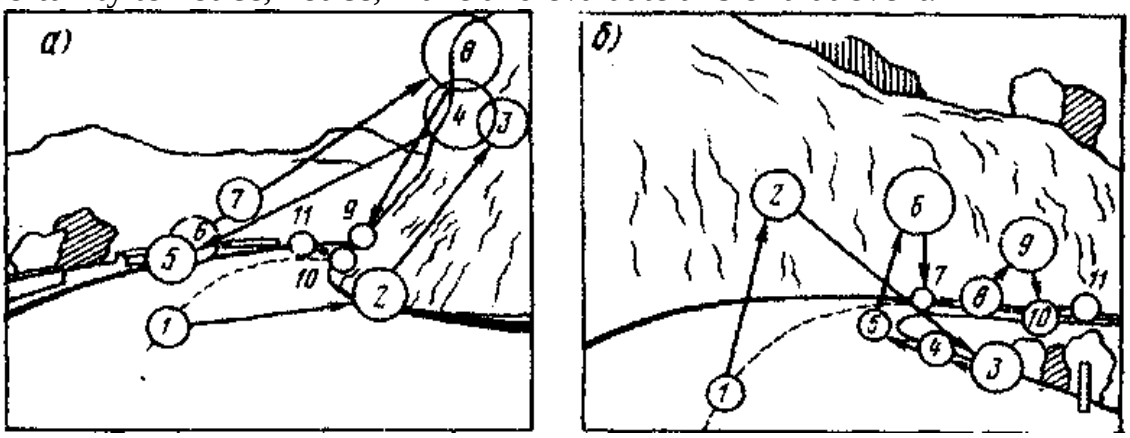


Figure 8. Moving heidovchi's gaze in otitsh from the curve of the plan on the mountain roads /V.P.Varlashkin's experiments include: a-Convex, curved line; b - concave curve; the names of the points indicate the sequential accumulation of a guide's gaze; the diameters of the circles correspond to the relative duration of the yaydoichi's gaze to one side.

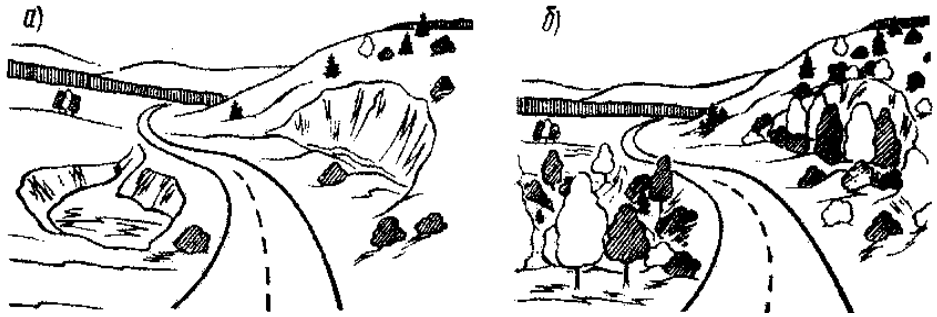
When the intensity of the movement is low, it is necessary to take into account when driving a car, if the factors are reduced, the drivers change and adjust the information that falls on their faces at the expense of involuntary decrease in speed, but on the contrary, in a place of the same style(desert, forest of the same sex), the The change in the conditions of passage from different sections of the road is reflected in the state of Darhal nerve-ruhiyat, and the hayajonla shi of the khaydovites increases.

Such a sudden increase in imagination is repeated several times when crossing the road, where the elements of the track change often and sharply. However, the increase in imagination will go to the accumulation and reduce the property of drivers to quickly pay attention to changes in conditions, which will be the reason for making a mistake that will lead to road workers. From this, it follows that when trassing, it should be borne in mind that the elements of the road connect in such a way with each other and with the elements of the surrounding landscape (landscape), in which optimal excitation of the guides is ensured. The road should not be the one that puts drivers to sleep. In particular, one of the

reasons for which the attention of haidovists is waning is the long sections of the road, it is necessary that this length does not exceed 1.5-4 km in places of the open plain.

Requirements for environmental protection when choosing a Track Direction or other project solutions. When choosing a Track Direction, environmental protection requirements must be taken into account. Road construction makes great changes to the ecological balance of the nature of the territory in which it is being conducted and to the economic life. The allocation of land for road construction and the violation of land boundaries can disrupt the crop rotation system and cause significant damage to agriculture. Sometimes in the construction of intensively moving car highways, a toll comes to the planning of kayta lands located on either side of the road in order to eliminate the need for agricultural machinery to cross the road. Cross-country roads are dangerous because of the low level of cross-country terrain that the wind blows from low-class roads, which reduces the comfort in the lands located near the dusty road.

When gasoline is added, the anti-aging compounds are burned, harmful to health compounds are released, which precipitate in the lane next to the road and can accumulate in the soil and fall into the food industry of agricultural products. The track should go around places that refer to nature reserves, monuments of nature and culture. As far as possible, paths along rivers, lakes and other water sources should be carried out away from water sources. Thoughtless Earth excavations in road construction can ruin the natural beauty of landscapes in uncomfortable places with grunt quarries and reserves. This score can also occur when laying a track in half-up and half - carvings, bare slopes on the slopes of the mountain during the construction of a road race (Figure 9, a). It is bad to look with construction when it is impossible to avoid work incoming CA Y should be hidden by planting a plant.



9 - picture. Different ways to plant large bare slopes and dug quarries.

Cutting slopes and overloading them with lifts can lead to the activation of land migration processes. When passing paths along a mountain slope, road ditches can block flowing surface waters and dry out growing plants on the low side of the slope.

At the point of crossing the marshlands, the risers condense peat, stopping the seepage of seepage waters, strengthening the swamp.

When the road axles pass near the inhabited points and especially when the streets are used, the car traffic comes as sources of air pollution, noise and vibration by the exhaust gases of the engines, affecting the health and shivering ability of the population.

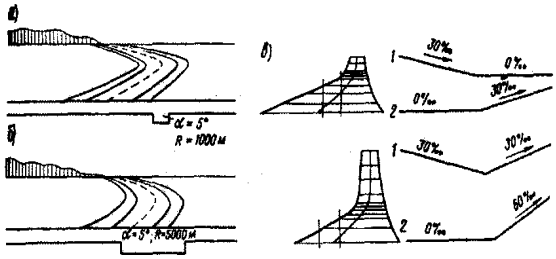
The Sanitary of permissible noise limits the height in residential quarters up to 50-60 dBA, in resorts up to 40-50 dBA.

Traffic noise in most cases-depends on the intensity, composition and speed of movement, the type of tires, the plane of the road surface. On average, the road share from the edge will be equal to the noise height (dBA) melody at a distance of 7.5 from the axis of the nearby traffic lane:

$$L = 50 + 8.8\lg N$$

where N is the intensity of movement, avt / hour.

Ensuring the spatial fluency of the track. When determining the elements of the road, it should be borne in mind that the drivers see the road plot located in front of them in a remote damaged area, under a small viewing angle. The short curve between the long straight lines seems to be a sharp bend of the track; the slightly sloping straight-line kisms of the track seem to be steep climbs located after below the long deer.



10- picture. Ensuring the spatial fluidity of the track.

Based on the analysis of the visibility fluency of the constructed roads, recommendations were developed on the placement of track elements.

1. The number of fractures in the plan and profile should be as uniform as possible. In the plan, short curves should not be placed between long straight lines, which will seem to the driver a sharp fracture of the road from the uzok and will lead to a decrease in speed.

The small angular turns of the Yule ing are moderated by the introduction of a large radial curve no smaller than those of the same:

Angle of rotation, grad	1	2	3	4	5	6	7-8
Radius of the curve, m	30000	20000	10000	6000	5000	3000	2500

3. The length of the right places should be limited.

4. Short straight lines should not be inserted between the curves directed to one side.

5. To achieve the best fluidity of the track, it is necessary to perform vertical and horizontal curves in such a way that they overlap as much as possible.

In order to ensure visibility at a long distance on the road, it is necessary to avoid the addition of "kissing" dressing elements in a longitudinal

profile, as a result of which the further route of the road for the driver remains unknown.

Harmonizing the path with the surrounding landscape. The alignment of the road with the landscape should be based on the compatibility of the road elements with the elements of the landscape and the holding of the track, taking into account the connecting cones of these elements. If the path is carried out over the boundaries of landscape elements or the natural direction of the landscape, for example, a stream of water flowing in the valley, is carried out buyly, it is well connected with the landscape. In this case it is found in what landscape and to the elements that characterize it, karab muljal take zapyp. The length of the correct sections on the roads should not exceed 3.5-5 km on the roads of the 1st category. The permissible length of straight sections also depends on the surrounding area.

Conclusions on the 7th topic:

1. When designing the track, it is necessary to ensure ease and safety of movement.
2. Environmental Protection is important when choosing a Track Direction.
1. In ensuring the spatial fluency of the track, it is necessary to adhere to the Basic Rules.
2. When passing the road, it is necessary to harmonize with the surrounding landscape and take into account the landscape.

Questions for supervision:

1. How was it achieved to ensure ease and safety of movement when designing the track?
2. What is paid attention to when choosing a Track Direction in Environmental Protection?
3. What are the Basic Rules for ensuring the spatial fluency of the track?
4. how is the norm of traffic noise determined?

8- SUBJECT. DESIGN A LONGITUDINAL PROFILE. PRINCIPLES OF CONDUCTING A PROJECT LINE.

PLAN:

1. Control and control signs when conducting a project line.
2. longitudinal profile design sequence.
3. longitudinal slope and vertical curves.

Base words and phrases: *cutting and erasing method of conducting a project line,vertical curves, control and control points.*

Transfer of the project line. Determining the position of the road surface in relation to the ground surface in a longitudinal profile is called designing a longitudinal profile or conducting a project line.

When conducting a project line, it is necessary to ensure the following.

The fluidity of the longitudinal profile, the permissible longitudinal slope, the calculated visibility distance, the removal of water from the roadbed, the non-arrayability of the project line, the passage of roads through the height marks indicated when passing through the control points, these are the signs of the height at the beginning and end of the track adjacent to the existing road.

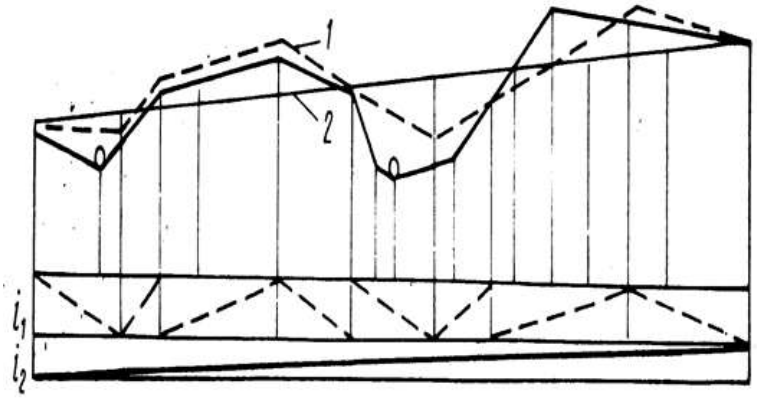


Figure 11. Methods of conducting a project line. 1-on the cutting line; 2-on the cutting line.

Longitudinal profile design sequence. Conducting a project line on the longitudinal profile of the track begins with determining the control elevation points and determining the required elevation of the road surface on different sections depending on the grunt and hydrological conditions. When conducting a project line according to the cutting method, it is necessary to strive for the overlap of adjacent lifting and carving volumes, and not to exceed the minimum marks required by local grunt and hydrological conditions by more than 20-30 cm.

The main indicators of the longitudinal profile.

When setting longitudinal profile elements to ensure safe movement, the following should be taken as the main indicators:

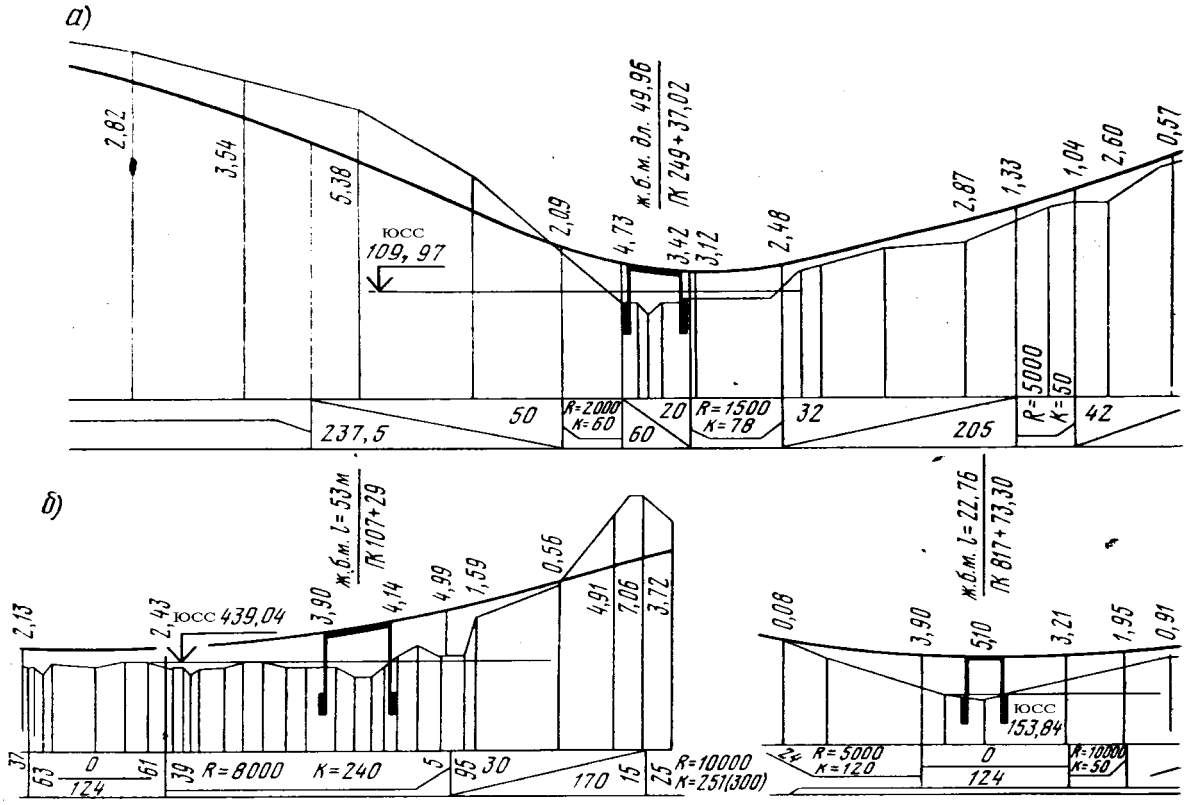
- radii of curves in a longitudinal profile:
- 70000 m in bubble;
- 8000 m in the swamp;
- the length of the curves in the longitudinal profile:
- 300 m by ship in the bubble;
- 100 m by ship in the swamp.

Control and control points. Control points include places of intersection with cars and railways, height points above the pipe and bridge.

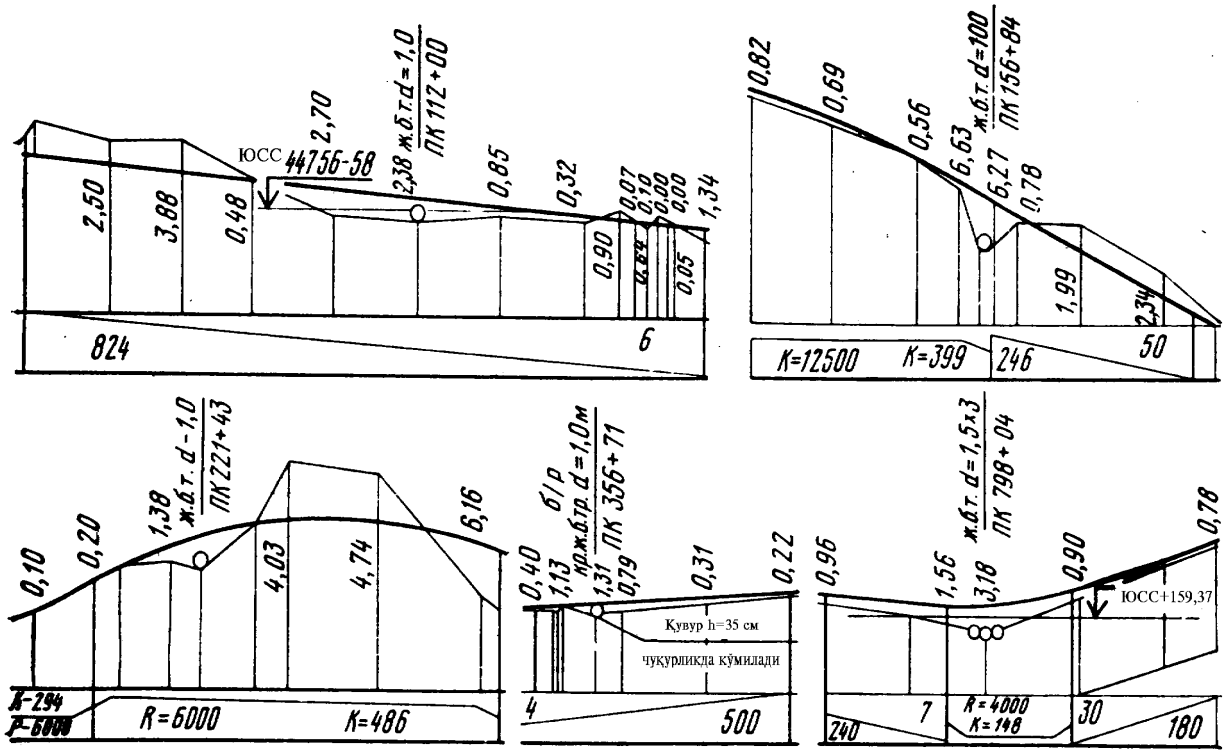
Control points. The beginning and end of the track to the control points, taking into account the peculiarities of the road passing in complex climatic conditions, are largely determined by the smallest sign of the road share Coast.

Vertical curves. When the algebraic difference of slopes in broken areas of the longitudinal profile project line is 5‰ or more on Type I and II roads, 10‰ or more on Category III roads, 20‰ or more on Category IV - V roads, curves should be

designed.



12- picture. Control points on bridges



13- picture. Control points on pipes

The table below shows the norms for conducting a project line in a longitudinal profile

Estimated speed, km / h	Largest longitudinal inclines,	The smallest fear distance, m		The smallest radii of curvature, m		
				in the longitudinal cut		
				the bubble	botiq	
		To stop	opposite car		in the main place	in mountainous areas
150	30	300	-	30000	8000	4000
120	40	250	450	15000	5000	2500
100	50	200	350	10000	3000	1500
80	60	150	250	5000	2000	1000
60	70	85	170	2500	1500	600
50	80	75	130	1500	1200	400
40	90	55	110	1000	1000	300
30	100	45	90	600	600	200

Conclusions on the 8th topic:

1. When conducting a project line, it is necessary to ensure the fluidity of the longitudinal profile, sufficient visibility and regulatory values of longitudinal slopes.
2. Based on the relief structures, it is necessary to select the method of conducting the project line, and then design the longitudinal profile.
3. Before conducting the project line, it is necessary to set Control and control points.
4. When the algebraic difference of slopes in broken areas of the longitudinal profile project line is 5‰ or more on Type I and II roads, 10‰ or more on Category III roads, 20‰ or more on Category IV - V roads, vertical curves should be designed**.**

Questions for supervision:

1. What is included in the road longitudinal profile elements?
2. What is said to be engraving?
3. What is said to be an ascendant?
4. What is said to be a working character?
5. How many different ways do you know to run a project line?
6. Explain control and control points?
7. When are vertical curves designed?

10- Subject. Design of motorway intersections

Plan:

1. Intersection of highways in one

2. Dressing dividing points at the intersection in one.
3. Channeled action intersections.
4. Ring-shaped intersections.

Base words and phrases: *chorraxes, danger points, alfalfa leaf, channeled, semi-channeled, intersections of different levels.*

Intersection of highways in one SATX. The plot of the intersection of highways with each other or railways in one SATX is the most loaded in relation to the rest of the sections, the amount of movement at this intersection is equal to the sum of the amount of movement of the intersecting roads. The conditions of movement for cars in the quarter are complex in relation to the right plot, and there are many additional obstacles for cars, since the movement of cars coming directly becomes difficult at the expense of cars turning left. It will be advisable to place the intersection of roads in one SATX in places where visibility is provided as well as possible, on the right side of the road, in places of reduced longitudinal weirdness.

Safe points. In the quarter on one SATX, 32 dangerous points occur on the trajectory of the car's movement. Of these, 16 were from the intersection of the movement of the flow of cars, 8 were from the addition, 8 were from the separation of the movement. At these points, the probability that YTX will occur is very high.

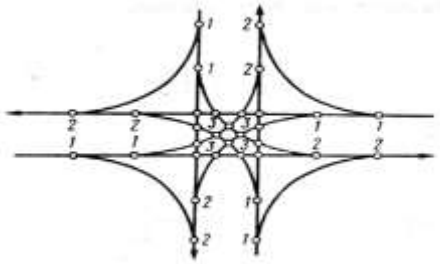
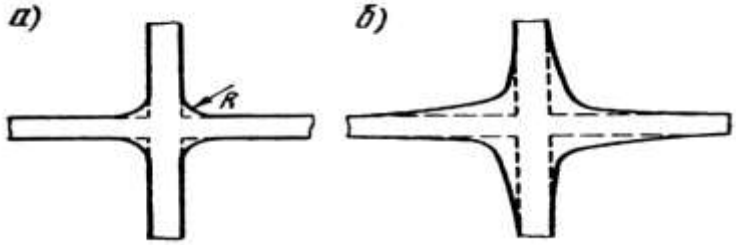


Figure 14. Dangerous points that occur in the attic on one SATX. 1 - dangerous points arising from the separation of the flow of movement of Cars, 2 - Dangerous points arising from the addition of the flow of movement of Cars, 3- dangerous points arising from the intersection of the flow of movement of cars.

Road of curves at intersections in one SATX. The ability to conduct the simplest intersections at one level depends on the radii of the curves adjacent to the tracks. The radii of curves along the inner edge of the commuting section are accepted for Category IV and V roads up to 15 M and 25 m on Type I and II roads.

Scheme of the simplest intersections at one level



15- picture. a-typical intersections; b is a symmetrical intersection with increased bandwidth.

Requirements for the intersection of highways in one SATX. In one SATX, it is allowed to cross category II roads with Category IV and V roads, as well as Category III, IV and V roads, in which the future total speed of movement at intersections should not exceed 8000 quoted units/milk. Compliance of the angles of intersection with the best conditions of visibility (burial at an angle of at least 60-750);

- providing preferential driving conditions for traffic flows with the highest intensity;

-to move the intersection points of the traffic flows as far apart as possible by building the Islanders separating the flows in the intersection area;

- separation of the part of the intersection area that is not used by the flow of cars into reserve zones;

- construction of additional straps when the share of left-turn cars is large;

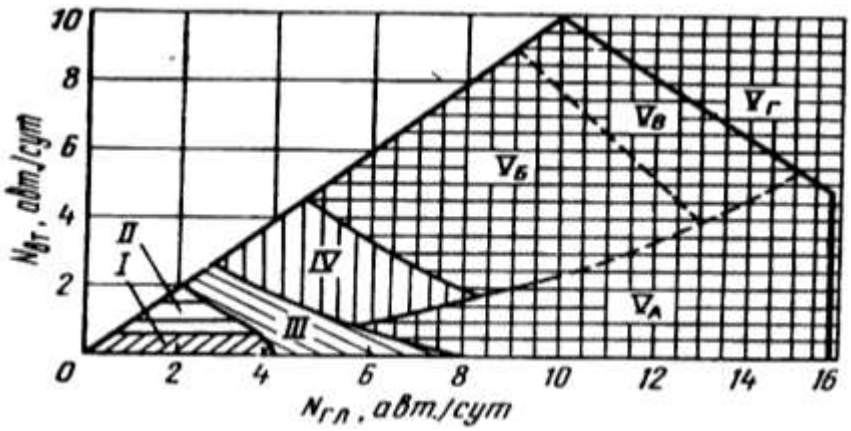


Figure 16. Intersections of different levels. Ngl, Nm-intensity of movement on the main and second category roads; I-simple unclosed intersections; II-partially channeled intersections with guide Islands on the second level road; III - channeled intersections with guide islets on the main and second category roads and crossings on the main road-fast lanes; IV - ring-shaped intersections; and-wedge intersections providing the best traffic conditions on the; VB-shell intersections as the first stage of step construction, and then they are designed and rebuilt in different satxs; Vr - intersections in different SATX.

Channeled action intersections. The most effective of the measures to improve the conditions of movement at an intersection in one SATX is a channeled movement. In the Channeled movement, each direction of movement is separated into independent bands in the movement part**.**

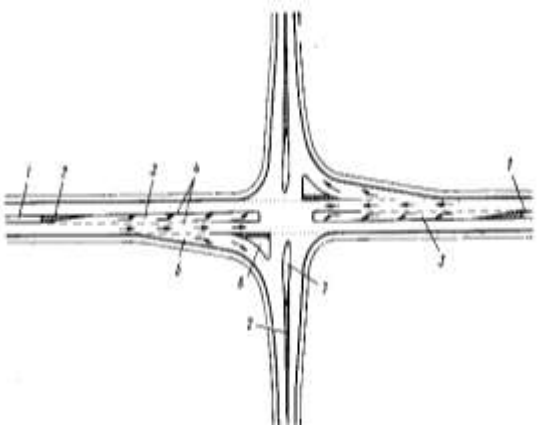


Figure 17. Intersection and confluence of channeled action Tracks 1 - separation Strip; 2 - islets drawn with paint on the coating; 3 - additional strip of the commuting section for cars waiting for a Left Turn; 4 - mark lines on the commuting Section; 5 - right turn lane on the main road; 6 - triangular islets; 7 - drop-shaped islets.

Ring-shaped quarters. One of the safest types of cross - section in one SATX is a folk cross-section. The radius of the central islet of peopletalk is obtained large, since all the maniacs of cars are included in the flow and occur when moving out of it. The dimensions of the bag arise from the requirements for providing a given speed.

18- picture. houses

The advantage and disadvantage of the ring-shaped attic. The movement of cars along the ring in one direction allows you to accurately organize the movement and organize it. However, annular intersections occupy a large area, in which the speed of movement decreases much more than the speed on the roads of arrival, due to the fact that the regrouping of cars occurs continuously.

The speed of movement calculated by the commuting part of the annular intersection depends on the diameter of the central islet.

Therefore, most often the average diameter of the central islet (25-60 m) is chosen. In such an islet, the trajectories of movement intersect at an acute angle; small (15 m) diameter Islanders are also common, which force drivers to reduce the speed of movement around the islet to its safe value.

Central islet diameter, m	≤ 15	30	≥ 60
Speed, km / h	20	25	30

Speed increase straps. The direct entry of cars into the quarters at high speed and at the same time the transition from crossing to the main road at low speed carries the risk of the occurrence of road personnel. In order for such points not to occur, additional tapes of the commuting part are designed to the sections adjacent to the intersection of roads, which are separated from the main commuting part by separation strips, sometimes separated by grunted separation bands. Additional straps allow cars turning from the main road to the adjacent road, without interfering with cars coming in the right direction, to reduce the speed in advance, and cars entering the highway, on the contrary, to get closer to the speed of cars driving on this road.

19-rasm. Speed boost bands

The length of the speed increase straps. The length of the speed increase straps L is determined from the condition that the speed of cars on the main road will decrease from 1 to 20 km/h during the turn:

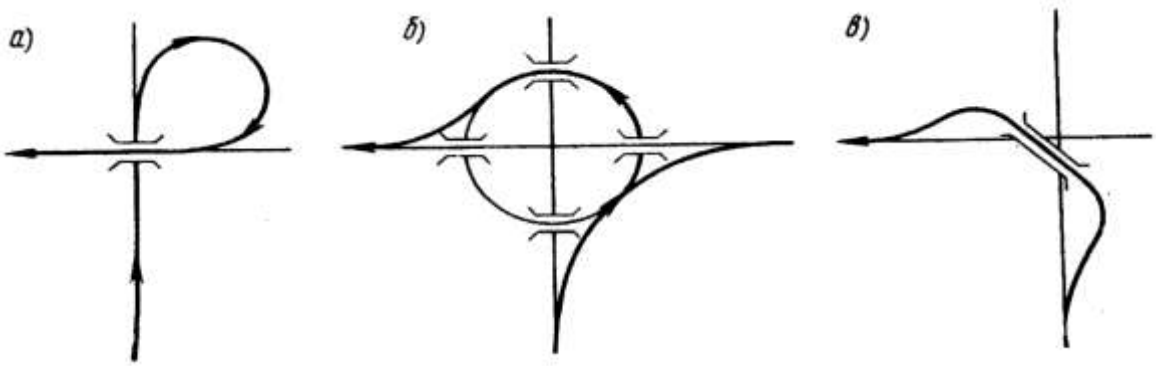
$$L = \frac{\vartheta_1^2 - \vartheta_2^2}{26a}$$

in this case, based on observations, the acceleration of the car is taken as 0.9-1.2 m/s2, equal to 1.75-2.5 m/s2 in deceleration. In practice, depending on the longitudinal slope of the road category and the place of intersection, the length of the working part of the speed increase bands is 30 - 230 m.

It is built at intersections of Type I roads with all categories of roads, on cross-and adjacent roads of Category I and II roads, as well as at intersections of Type II and III roads, and at intersections of Category III roads, in which the total intensity of movement in perspective should be more than 8,000 cited pieces/milk.

Advantages and disadvantages of intersections in different SATX. Building a overpass through one of the intersecting roads allows you to easily skip traffic flows through both roads in the right direction, without the halakits of turning cars, without reducing the speed; a more accurate Organization of the movement of intersecting traffic flows is provided than at intersections at one level; sharply increases the safety of movement, especially at left turns.

However, the intersection at different levels greatly increases the value of the construction work.



Forces acting on road beds. As cars pass, the voltages generated in the roadbed will fade as the depth increases. This makes it possible to design the roadway as multi-layered, in which materials of different strengths are used**.**

11- subject. Equipment of highways

Plan:

1. Road Traffic Service.
2. Road signs.
3. Road lines.
4. Reference devices.
5. Road barriers.
6. Highway lighting.

Road equipment includes technical means that organize movement on the road (obstacles, signs, linear signs, reference devices, lighting networks, traffic lights, automated traffic control systems) Greening, small architectural forms.

Road barriers are divided into two groups depending on the conditions of application.

The first group of obstacles includes porous structures (at least 0.75 m) high and wheel-returning (at least 0.6 m) high-brus parapets, which prevent vehicles from falling forced from dangerous sections of the road, bridges, overpasses, as well as collision of opposite-flow vehicles, hitting large obstacles and structures.

The barriers of the second group include grid-type structures, wire castings, etc.at a height of 0.8-1.5 m, which regulate pedestrian movement, prevent animals from entering the roadway section.

Fences belonging to the first group should be installed on the collars of the following parts of the I-IV category highways:

in elevations with slope slopes of 1:3 or more, according to the requirements presented in Table 11;

11-jadval

Parts of highways	**Longitudinal slope, ‰**	**The intensity of movement in perspective**	**The smallest height of the lift, m**

The rectilinear radius is at the curvature in the plan of more than 600m and the radius is at the inner side of the curvature in the plan of less than 600m, at the descent or after	40 gacha	2000 1000	3,0 4,0
Just like that	40 va undan ortiq	2000 1000	2,5 3,5
Curvature of the plan with a radius of less than 600m-on the outside, in the fall or after	40 gacha	2000 1000	2,5 3,5
Parts of highways	**Longitudinal slope, ‰**	**The intensity of movement in perspective**	**The smallest height of the lift, m**
Algebraic difference in longitudinal cross-section meeting slopes with 50‰ or more-in a concave curvature adjacent to	-	2000 1000	2,5 3,5
Curvature of the plan with a radius of less than 600m-on the outside, in the fall or after	40 va undan ortiq	2000 1000	2,0 3,0

Note:in agreement with the ground user, instead of installing road barriers, the slope is 1: 4 with a slope when the intensity is more than 2000 units/milk, and the speed of movement is Celtic.it is possible to build lifting slopes with a slope of 1:3 when the units/milk and less

in sections parallel to railway tracks, streams of water with a depth of 2 m or more, ravines and mountain gorges, the intensity of movement in perspective is at least 4000 Celts.when there is a grain/milk commute from the edge of the part to 25 m, and the intensity of movement in perspective is at least 4,000 Celts.when less than PCs/milk-at a distance of up to 15 m;

the intensity of movement in perspective is at least 4,000 Celts.pieces/milk, when passing through places with a slope (on the side of the slope) greater than 1:3;

in complex intersections and junctions of different levels;

when the direction of the road in the plan changes, there are places where there is not enough visibility-at;

when approaching sunhi structures, the lift is installed in road sections with a height of 3 m or more, and when the lift height is low, the intermediate device length of the sunhi structure is more than 10 m, at a distance of at least 18 m from the beginning and end of the structure on both sides.

It is necessary to provide for the protection of the supports of information and show signs, communications and lighting networks with barriers located at a distance of less than 4 m from the edge of the commuting part.

The first group of fences, depending on the rigidity of the structure, should be placed at a distance of 0.5 m and a maximum of 0.85 m from the road stake.

The following obstacles are recommended to be installed on the side of motorways:

On Type I and II roads, the curvature in the plan with a radius of less than 600 m is one-sided, absorbing the beating power with a column step of 1 m on the outside;

On Type I and II roads, from the inner side of the curvature in the plan with a radius of less than 600 m, in other places, one-sided metal fences of the pore type, absorbing the pounding power with a step of columns of 2 m;

On Type I and II roads, in other places of curvature in a plan with a radius of less than 600 m, one-sided, pore-type metal fences absorbing a stroke pile with a step of columns of 3 m;

On Type I and II roads, from the inner side of the curve in a plan with a radius of less than 600 m, metal fences of a single-sided pore type with a step of columns of 4 m, absorbing the force of impact;

On Type I and II roads, curves in a plan with a radius of less than 600 m are made of solid metal in other areas by the interior, in straight sections of Category III roads and curvatures in a plan with a radius of more than 600 m, with one-sided pore type barriers;

One-way fences of the metal planked pore type on reinforced concrete support on Type I and II roads, from the inner side of the plan curvature with a radius of less than 600 m and on Type III roads;

On Category IV roads, on the inner side of the curvature in the plan with a radius of less than 600 m, one-sided reinforced concrete fences of the pore type with a step of columns of 1.25 m;

Single-side reinforced concrete barriers of the pore type with column step 2.5 m in plan curvatures and straight sections with a radius of more than 600 m on Category III roads;

On Category III roads, on the inner side of the curvature in the plan with a radius of less than 600 m, and on Type IV roads, one-sided Truss barriers of the pore type;

in the road sections of the I - IV category of mountainous areas - Tu-sixes of the parapet type.

In the dividing bands of category I roads, the first group of barriers must be installed taking into account the conditions specified in Table 15.

The first group of fences is along the axis of the dividing strip; in places with dangerous holes - along the axis of the dividing strip, the line must be placed at a distance of at least 1 from the edge of the section.

15-jadval

Movement bands in both directions	**Dangerous holes in the dividing strip**	**Dividing band width, m, when the intensity of movement in perspective, at least**	
		3-4	**5-6**
4	not	30000	40000
	yes	20000	30000
6	not	40000	60000
	yes	30000	50000

Double-sided metal fences when the dividing strip width is more than 3 m; reinforced concrete fences of the parapet type when the width is 3 m or less, including special surface fences with a surface are recommended to install-di.

In the installation of road barriers, the intensity of the calculated movement for the 5th anniversary in perspective is acceptable .

It is not allowed to use Truss barriers on class I and II motorways.

Fences of the Parapet type are not allowed to be built in the form of separate blocks.In very difficult conditions of mountainous areas, it is necessary to install barriers of the parapet type, the length of which is not more than 10 m between the fragments, and 50 m in kami, when the technical aspect is duly based.

When the metal road barriers that absorb the beating power are adjacent to the bridge barriers, it should be borne in mind that the step of the road barrier pillars should be gradually brought up to 1 m. In this case, the length of the parts with the same step of the columns should be equal to 8 m.

It is carried out in a ratio of at least 10:1 when it is necessary to change the line of obstacles in the plan.

The second group of fences is necessary to install in the following cases:

On the dividing strip opposite the bus stops, which is the sidewalk (including the ground under and above) of the category I road, along the entire length of the station and outside it at a distance of at least 20 m to both sides;

at a distance of at least 0.3 m from the front surface of the border stone (bordyur) (in the form of a grid-type structure;

in the presence of supports on the dividing strip axis, supports of the overpass and lighting network, console and frame supports of information-indicating road signs, wire nets along the dividing strip axis are at a distance of at least 1 m from the edge of the commuting part and fences of the grid type at a distance of at least 0.5 m.

Warning poles with a height of 0.75-0.8 m should be equipped with guidance devices in the blind niche, when the installation of sunhi lighting and first group barriers is not required in dangerous parts of category I motorways, as well as Type II-IV roads.

Warning posts on the collars of Type II-IV roads are installed in the following cases:

at the limit of curvatures of longitudinal cross-section and arrival to them (three warning columns from each side) at distances indicated in Table 12 when the height of the lift is not less than 2 m, and the intensity of movement is at least 2000 units/Day;

12-jadval

Radius of curvature in longitudinal section, m	**Distance between columns, m**			
	At the limit of curvature	**When entering curvature**		
		from the beginning until the first	**from the first up to the second**	**from the latter until the third**
100	5	8	17	34
200	7	12	23	47
300	9	15	30	50
400	11	17	33	50
500	12	19	37	50

Radius of curvature in longitudinal section, m	Distance between columns, m			
	At the limit of curvature	When entering curvature		
		from the beginning until the first	from the first up to the second	from the latter until the third
1000	17	27	50	50
2000	25	40	50	50
3000	31	47	50	50
4000	35	50	50	50
5000	40	50	50	50
6000	45	50	50	50
8000	50	50	50	50

at the limit of the curvatures in the plan and at the arrival to them (three warning columns on each side) at the distances indicated in Table 13, when the height of the lift is not less than 1 m;

13-jadval

Radius of curvature in the plan, m	Distance between columns, m				
	at the limit of curvature		in the section adjacent to curvature		
	external on the side	on the inner side	from the beginning until the first	from the first up to the second	from the latter until the third
20	3	6	6	10	20
30	3	6	7	11	21
40	4	8	9	15	31
50	5	10	12	20	40
100	10	20	25	42	50
200	15	30	30	45	50
300	20	40	36	50	50
400	30	50	50	50	50
500	40	50	50	50	50
600	50	50	50	50	50

when the lifting height in the straight-line sections of the road is not less than 2 m, and the speed of movement is 2000 Celtic.at every 50 m, not less than a piece/milk;

at the border of the curvature of the road at one level intersection and connections, at a distance indicated in Table 60 for the outer side of the curvature;

15 m from wetlands and water bodies with a depth of 1 m to 2 m.every 10 meters of roads less than;

3 columns in front of bridges and overpasses every 10 m on either side of the road before and after the structure;

in front of the aqueduct pipes, if the pipe diameter is 1.5 m or greater, 1 column must be installed from each side of the road along the pipe axis and 3 columns at every 10 M before and after the structure on each side of the road; if the pipe diameter is less than 1.5 m, 1 column must be installed.

It is not recommended to install warning posts if the height of the lift in residential areas is less than 1 m, as well as if the height of the lift above the pipes (when there is a head) is less than 1 m.

Columns with artificial lighting are installed in residential areas, at the beginning of the dividing strip, and transport tunnels are installed in front of the side parts of the prop walls, as well as on the rising guide and security Islands.

In the indicated elements, columns may not be installed in the presence of illuminated road signs or traffic lights.

The reference islets are designed to separate the traffic flows haraka-Ti along the routes. The Islanders raised from the commuter section should be made at a height of 0.15-0.2 m.

Warning posts on category I roads must be installed in the following cases:

in the entire length of the road section between transport solutions, in the absence of devices blocking the commuting section, every 50 m;

on the border of turns at the exit, on each side in Table 60, come-at the risen distances.

Lifting columns should be installed at a distance of 0.35 m from the road stake, in the unbuilt part of the road collar.

Road signs must be applied according to the requirements of GOST 23457-86. Road signs must comply with the requirements of GOST 10807-78, road sign bases must comply with the requirements of GOST 25458-82 and GOST 25459-82, as well as existing namu-Navi solutions.

The linear signs of the road must comply with the requirements of GOST 23457-86, the character ele-hinges must comply with the requirements of GOST 13508-74.

It is necessary to observe the basics of landscape design of highways of all categories, Nature Protection, estimation of natural wind exchange on roads, noise protection of road-related areas, decoration and greening of road districts taking into account their natural, economic, historical and cultural characteristics.

Storage of roads and road structures from adjacent ravines, landslides, water flows from washing, sandblasting, planting special seedlings, as well as taking into account the experience of the bottom place, should be carried out through a set of geotechnical-engineering measures envisaged in the design of the road race.

To chemo mountain roads from snow drifts, the following should be envisaged:

construction of avalanche-intercepting and directional gullies (lifts), blue-kini-throwing devices, sheds and galleries;

maintaining the snow on a slope with the help of various devices that prevent it from slipping and sliding;

installation of snow-protective fences, construction of Prop walls or walls in front of avalanche-collecting devices that reduce the amount of snow stored in them;yo’llardan foydalanish jarayonida va boshqa hollarda ko’chki xavfi bor qismlardagi qorlarni tushirish va boshqalar.

Avoiding sand at the source of sand migration and fixing it, the vosi-TAs are divided into groups based on Table 14 on their own education.

The width of the reinforcing tape should be taken in the norms listed in Table 14, depending on the amount of avalanche sands that accumulate on the road during the year and the size of mechanical means of chemistry.

14- table

Group of means for protection against sand and its reinforcement	**Protection basis**	**Protective functions**	**Means of protection against sand and its reinforcement**
I	reducing the speed of the surface wind	Collecting sand, stopping the flow of sand without bringing it to the road	Barriers
II	Strengthening the bonding of sand particles	Prevent sand migration	Sand surface treatment
III	Reducing the size of sand gathering pools	Wind-not allowing the sand flow to move at great speed	Stopping sands in the area of the basin where sand accumulates with the help of Group II tools and barriers
IV	increasing ground wind speed	Sand migration acceleration	Sand sprayer and flow reference devices.

14-table

Place type	**Sand pressing type**	**Location description**	**Amount of sand accumulated during the year, m3 / m**	**Amount of sand held near the road, m3 / m**	**Mechanical means of protection that are installed before seed sowing or transplanting a plant**			**Reinforcement width, m**
					Height **N, m**	**Slope of the place, grad**	**Distance between rows, m**	
I	I A	Sand accumulates a lot	More than 30	0,6	0,3	0	13,3 N	More than 200
				0,5	0.3	5	11,4 N	More than 205
				0,25	0,3	10	5,7 N	More than 205
				1,05	0,4	0	13,3 N	More than 152
				0,9	0,4	5	11,4 N	More than 152
				0,45	0,4	10	5,7 N	More than 152
				1,6	0,5	0	13,3 N	More than 122
				1,4	0,5	5	11,4 N	More than 122
				0,7	0,5	10	5,7 N	More than 122

	I B	Sand accumulates a lot	20-30	0,6 0,5 0,25 1,05 0,9 0,45 1,6 1,4 0,7	0,3 0,3 0,3 0,4 0,4 0,4 0,5 0,5 0,5	0 5 10 0 5 10 0 5 10	13,3 N 11,4 N 5,7 N 13,3 N 11,4 N 5,7 N 13,3 N 11,4 N 5,7 N	133-200 137-205 137-205 101-152 101-152 101-152 83-125 81-125 81-125
II	II A	Sand accumulates moderately and poorly	10-20	0,6 0,5 0,25 1,05 0,9 0,45 1,6 1,4 0,7	0,3 0,3 0,3 0,4 0,4 0,4 0,5 0,5 0,5	0 5 10 0 5 10 0 5 10	13,3N 11,4N 5,7 N 13,3 N 11,4N 5,7 N 13,3 N 11,4 N 5,7 N	67-133 80-137 80-137 51-101 51-101 51-101 42-83 41-81 41-81
	II B	Sand accumulates less	Up to 10	0,6 0,5 0,25 1,05 0,9 0,45 1,6 1,4 0,7	0,3 0,3 0,3 0,4 0,4 0,4 0,5 0,5 0,5	- 5 10 - 5 10 - 5 10	13,3 N 11,4 N 5,7 N 13,3 N 11,4 N 5,7 N 13,3 N 11,4 N 5,7 N	67 gacha 80 gacha 80 gacha 51 gacha 51 gacha 51 gacha 42 gacha 41 gacha 41 gacha
III		Sand does not accumulate	-	-	-	-	-	-

The slopes, The Rock of the road ‘Moon, the road collars on the berms, carvings and lifts, as well as the reserves should be protected by Clay tallow, stinging Stone, large sand or gravel materials and simply by fastening local plant branches with tied or woven reeds.

Protective tapes should be distinguished on sand sources close to the road. The width of the protective bands is taken from 50 m to 500 m in agreement with the relevant ma-Halli departments, depending on the conditions of the indigenous place (the structure of the surface of the sands, the degree of their migration, foyer in economic work from the places, the location of the settlements, etc.). The outer border of the protective bands is represented by the corresponding marks on the elements or on the border of the band, which are clearly visible to the eye in the Earth's relief. In addition to making the slope of the slope of the road ‘Moon slope in the section of single-category migratory sands with the same surface structure, it is necessary to bar the wind on the arrival side or on both sides of the road, depending on the change in the terrain of the migratory Sands. It is necessary to align the striped bands in accordance with the terrain of the changing terrain and fasten them so that they do not invade the migratory Sands opposite these bands. The width of the flattened striped bands should be taken from 20 m to 50 m or more, depending on the conditions of the indigenous place (relief, shape, size,

description, movement of the sandy earth, etc.). The width of the fastening of movable sands in the tash-old of the leveled paving tapes is determined from 25 m to 150 m or more.

12- Design of roads in mountainous areas

Plan:

1. Longitudinal profile of mountain roads.
2. Cross-profile of mountain tracks.
3. Tirak walls.
4. Specificity of the mountainous regions of Uzbekistan.
5. Superstructure of mountain slopes.
6. Structure of mountain slopes.
7. Deformations of mountain slopes.

Base words: *Mountain relief, superstructure of slopes, structure of slopes, deformation of slopes. border longitudinal slopes, arched viaduct, tirak walls, continuous ascents ofestacadas and half Bridges.*

More than 30% of the CIS lands are mountainous regions. Most of the area of Armenia, Tajikistan, Kyrgyzstan in particular are mountainous areas. Since it is difficult to build developed rail networks in mountainous regions, the main volume of Transportation is carried out by roadways.
However, the design and construction of roads in mountainous areas requires the solution of a number of complex issues.

The mountain relief is characterized by a rather different character at a short distance, steep slopes of the mountains, deep curves of rivers-bugri valleys. The geological structure of a mountainous place can change dramatically on plots that are not so large. Mountain slopes do not stagnate, road construction can disrupt their balance, trace laughs and sit-ups, and activate push-ups and spills. Natural conditions change at short distances in the mountains, on top of which the influence of steep (vertical) regionalism (changes in climatic conditions as the sea level rises) and the location of slopes relative to the sides of the world (exposure) is sharply manifested. In the mountains, the air temperature drops by about 0.50 every 100 m of the average height. Cold air flows from the slopes into the berk Valley. In high-altitude regions, a rather large daily variation in temperature occurs.As the height increases, the air pressure decreases. The air pressure of the Marks is 1 mm sim.st. the corresponding differences are 10, depending on the air temperature and atmospheric pressure...It is 17 mm. The thinning of the air in high-altitude areas causes a decrease in the power of car engines due to the fact that the fuel is not fully burned.

The amount of precipitation that falls in the mountains is about 40 per 100 m height as it rises above sea level...Increases by 60 mm, reaches the maximum in the zone of rapid formation of clouds. In the summer in the mountains, the rains are intense, in which the annual precipitation-15 of Sochi...The amount of 20% falls.

All the cases mentioned require careful study in the design of mountain roads.

In contrast to other types of places, the choice of the direction of the track in the mountains largely depends on the location of the mountain ranges and their networks, the networks are water separators of river basins.

The road can pass from one basin to another only from the place of decline of mountain ranges-the mountain waist. For roads in mountainous areas, it is characteristic that the track is first carried up along the valley of the mountain river, where settlements are concentrated, towards the head of the river, and then rises along the mountain slopes to the waist of the mountain and passes along the section of the pass to the valley of another river. Designing roads in each of these places has its own characteristics.

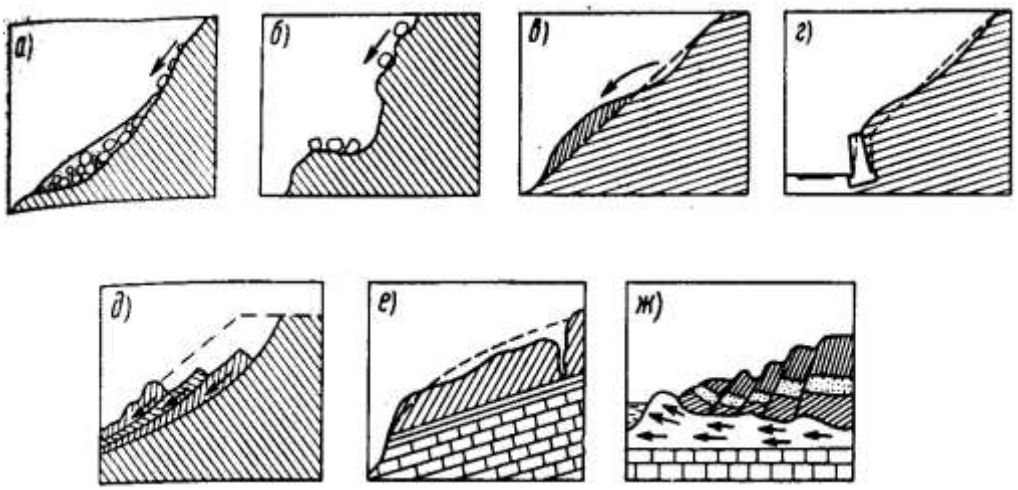
At the bottom of the mountain slopes, it is usually covered with weathering products of rocks. Only on steep slopes do rocks climb to the surface. Therefore, when building mountain roads, it is necessary to pass the track not directly on the generally solid mountain jinis, but over the clay that covers them, or the ŝementless products in the weathering of these rocks.

During searches, the degree of intensification of weathering processes on the mountain slopes can be estimated approximately by the plants that cover them.

The degree of influence of natural-climatic factors on mountain slopes depends on their location and steepness in relation to the sides of the world, this is due to the amount of heat that slopes receive. The south and south-west slopes are well warmed by the sun. Their radiance is intense. Spills are often formed on them, a pile of snowdrifts and flood discharge is formed. Snow goes quickly from these slopes, and the outflow of water from the sizot is rarely observed in them, and surges are formed. On the northern and northeastern slopes, snow is sometimes kept until the beginning of summer.The question of the choice of the location of the slopes on which the road is being carried out is necessary, depending on local conditions, primarily on the steepness and geological structure of the slopes-their further stagnation after the construction of the road and the likelihood of rapid intensification of weathering processes, to be resolved in a specific case.

When the road race is carved into the slope, the slope of the carving cuts through the layering and in doing so changes the state of tension that is composed in the very long geological history of the slopes. The integrity of individual layers is violated, and their stagnation, which was previously formed as a result of their resistance to interruption or resurrection, is ensured only by the resistance of weak layers to internal displacement and the fact that they are touched by bed layers on the surface. In some cases, the folds of easy-to-light rocks that were previously covered with somewhat stagnant rocks begin to glow rapidly as a result of their alternating moistening and drying, whereas in the conditions of their settlement they could be looked at in the style of Rock rocks.

A large number of practically occurring deformations of the slopes can be attributed to a number of the most typical cases (19-rasm):



19 Deformation of the slopes

spillage of nurash products from steep slopes;

from steep ravine sections consisting of highly serdarz mountain jinis, separate stones and their fractures are kissed and shed; (stone migration);

leakage of relatively thin surface layers from the surface of grunted slopes as a result of extreme wetting with precipitation (torrents);

plastic sliding of clay slopes, this situation occurs at a speed of several centimeters per year, often after several years of operation, the rake is manifested in a sudden erosion of the walls. The rate of deformation increases when the load falls on such slopes, they are cut and entered into carvings, or the surface water throw is broken, while plastic shifts can go into a lunge and fall;

the kiss of the same-sex grunt layer when the slope is excessively steep, which occurs with a cut on the surface of the slip that is formed and with a certain turn of the displaced part around the horizontal axis ;

the displacement of a part of the grunt as a result of the loss of thrust in the zone of contact on the surface of the layer lying at the base.

displacement to the side as a result of compression of underlying grunts (softened clay or leaning) with little ability to lift, extreme wetting of Super-sedimentary lyoss, vertical crushing formed due to melting of ice sheets in absolute frozen grunts.

The examples presented cover all possible cases of violation of slopes in their pure form.

In contrast to flat sections, where the longitudinal profile allows you to create a complete picture of the location of the road on the site and the construction of its road stem at any point, the working mark on the road axis when conducting a road along a mountain slope does not characterize the transverse profile and the volume of land excavations. This is due to the fact that large and small carvings, risers and stud walls can fit along the edges of the road stake when the slope is different at exactly the same mark on the road axis. Because of the frequent change of slope relief, the working signs of the road race vary greatly over the short distance of the road. Therefore, when designing roads in mountainous areas, the stagnation of the road Share situation is achieved by controlling the location of the

road race by transverse profiles, without forming retaining walls at a given slope of the project line, placing it mainly on racks.

In the longitudinal profile of the mountain road, passing the project line, all the time the road race is 1:100 of the place...1: 200 is checked for situations that are formed in transverse profiles drawn in scale. This uses transparent andases of the transverse profiles of the road stem on the slope, made at the same scale.

In order to take into account the geological structure of the place, it is necessary to use such a set of andases for transverse Profiles with sliding walls, the slopes of which are of different steepness, closing. By changing the design step, longitudinal slope and pushing the track on the horizontal in the plan, the best situation of the project line will be found.

When drawing the project line with boundary longitudinal slopes, it is necessary to reduce their value in small curves of the radius in the plan, since the resistance to the movement of cars, due to the additional consumption of engine power to the lateral thrust of the tires, increases in curvature, while the conditions of driving the car are complicated.

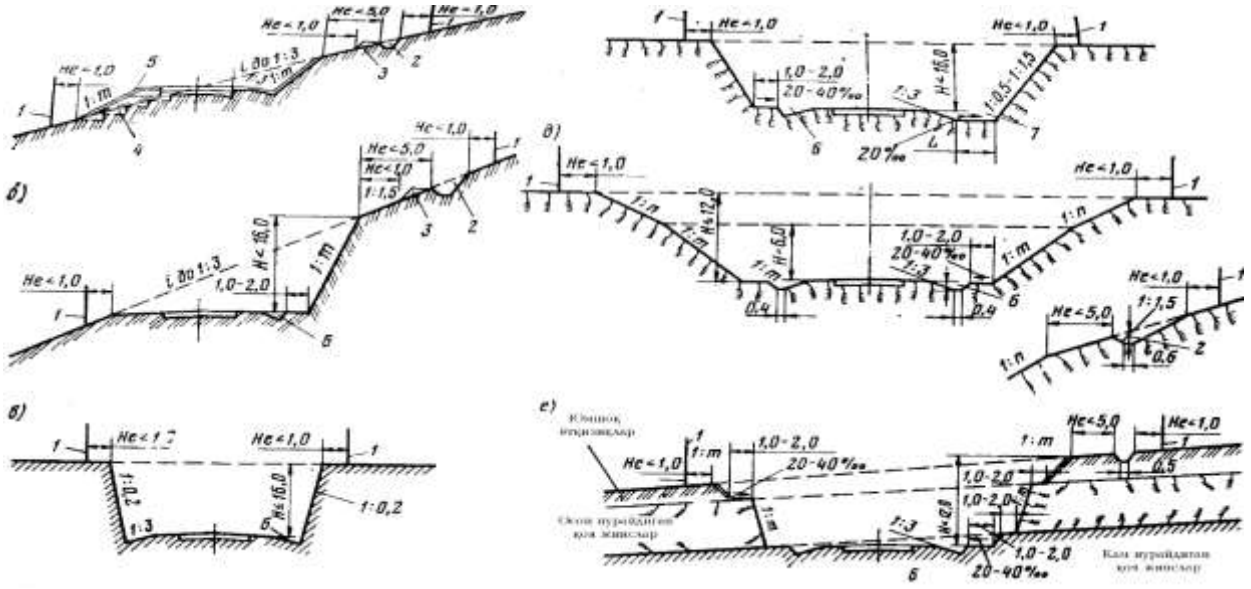
Longitudinal slope reduction curve 5...It starts when 10 m remains.

Options for building Trestles or arcuate viaducts that run over the valley in deep mountain valleys and intersections, as well as lifts with a pipe buried under them, should be compared. In the next case, when determining the holes, it is necessary to take into account the modes of mountain water flows-the flow of roots and swarms, the formation of heaps from objects by flooding, etc.

In absolutely complex conditions of relief on the right plots, in order to reduce the volume and value of construction, the permission to increase the boundary longitudinal slope by 15...20% 0 is turned, it is necessary to substantiate this by calculating the feasibility of construction. However, such plots worsen the traffic-use qualities of the road and greatly reduce the efficiency of transportation in cars.

It is necessary that in continuous climbs there are plots with a slope of less than 20% 0 when the longitudinal slopes are more than 60% 0, there are at least 3...5 cargo car landing sites will be built, which will provide plots or landings when the height above sea level is 1,5 m...From 2.5 km

Most of the length of the road share of mountain roads will be built on mountain slopes (fig.12)



20-fig. Transverse profiles of the roadway through the carvings:

a-half-up-half-carving; b-path held on a shelf in weak-radiating grongs; v-carving in solid rocks; g-carving in weak easy-radiating rocks with triangular ditches and ditches d, v-engraving on crossing rocks of different strength; 1-separated polosa border; 2-top ditch; 3-banquet, height at most 0.6 m; 4-steps made to make the Nov, depth at least 0.3 m; 7-extended cuvette (ditch) - Reserve.

In order for the lifts to stand against the push, when the transverse slope of the place is 1:5, the width is 1 after the removal of the grass from the mountain slopes. . .4 M are made of spikes, by them low 10...20% is given 0 transverse slope.If the side slopes have a consistency that ensures stagnation when the laying seam is large, but has been exposed to weathering, then a shelf or an extended ditch-tranche is dug at their foot in front of the side ditch, which serves to collect weathering products, these products must be lost from time to time during the road use process.

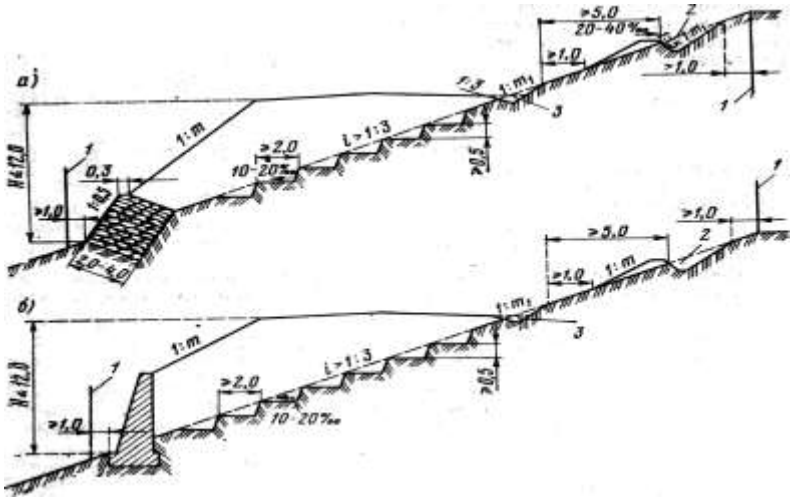
In order for the carvings to correctly determine the steepness of the side slopes, Geological Survey data at the time of searches and data on monitoring the slopes on existing roads, as well as the steepness and condition of natural openings, are of particular importance. Also, the methods envisaged in the performance of work should be taken into account.

On the mountain slope of the road, half-up-half-carved, balancing and placing the volumes of carved and raised parts theoretically corresponds to the minimum working volumes. However many grunt will be wasted when pouring grunt into the climbing part of the road race, it will fall into useless rolling down on steep mountain slopes. Digging up the slope by leaps and bounds does not ensure a sufficiently reliable connection of the riser with a natural slope. In seismic regions, when the Earth moves, sometimes a sliding fall of the section of the road share lift occurs. When building a hoist on steep slopes on a slope, the volume of Earth excavations increases significantly, since its slope is placed at an angle of not much greater than the slope. Therefore, on steep slopes of 1:1.5 and more, tiered walls are built, banquets are made from a dry stone wall when the steepness is from 1:3 to 1: 2. The banquet is built of non-luminous rocks, up to 0.4 m in size.

Tirak walls are made of stone and reinforced concrete. Their dimensions are determined by calculation.

Since the transverse slopes of the place change at a short distance, the rational location of the project line in a longitudinal profile can be found only after a number of attempts. At all characteristic points of the relief change during searches on mountain slope sections, transverse profiles are S'yomka with such a goal that at the cameral stage of design it is possible to draw the plan of the place on the horizontal ones, looking at them, and determine the situation (location) of the road towards it.

When building lifts on steep slopes, the volume of land excavations increases greatly (fig. And the lifting part of the road race will be unstable. Steps are made to increase stagnation until the grunt is shed when the slope of the mountain slope is up to 1:5, steepness is 1:2...Tirak banquets are built when they are up to 1: 3. When the steepness is large, stud walls are built from reinforced concrete, concrete or stone Thermae.



21-fig. transverse profiles of lifts on stable slopes, the slope of which is steep from 1:3: a-with the construction of a lower stone banquet; b-with the construction of a tiered Wall; 1-the border of the separated Strip; 2-top ditch.

To protect the side slopes of the carvings and natural steep mountain slopes, which do not have the necessary stability against the push, are composed of an easy-to-light, eroded and shed Mergel, as well as shale rocks, protective or covering walls are built.

Trestles and half-bridges are built to reduce the volume of work on steep mountain slopes, where the sloping walls are required to be quite high.

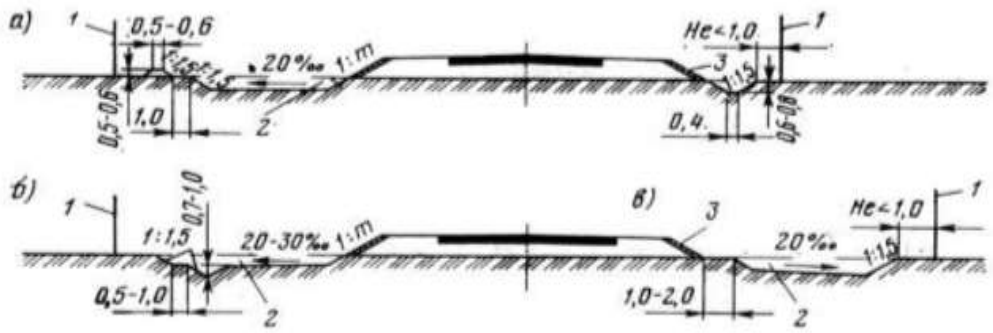
Complex natural conditions include mountainous areas, swampy areas, karst areas, arid areas, Suni irrigated areas, serzhar areas, sandy areas, saline areas. Features of the design of highways in artificially irrigated areas. Fertile lands are of great importance for agriculture in areas of artificial irrigation and their separation for road construction requires justification with great care, especially if it is associated with crop rotation disorders and the reconstruction of irrigation systems.

In this case, it will not be possible to dig side reserves, and the lift will rise with a transported grunt. In artificial irrigation areas, the waters of the sizot stand high.

Therefore, in artificial irrigation areas, it is most expedient to conduct highways on waterways and on their plots located above the irrigated fields of the place, on flat plots where it is difficult to exclude water, it is necessary to pass the road along the working open collectors, if their direction is suitable. In this case, the distance from the lifting hem or the edge of the side ditch to the edge of the channel should be at least 4 m. Design of a roadbed on artificially irrigated land. The road share of roads that constantly pass along channels full of water stands in unfavorable conditions with excessive humidification. Therefore, the surface of the coating should stand higher than the water sattshi in the irrigation network, in accordance with the requirements for places where superficial waters remain for a long time. In zones of continuous artificial irrigation, the coating will give the surface 50 surface to stand higher than the sizot water Sathi to the normative IV...In zones V, it is necessary to increase by 0.4 m, in Zone III-by 0.2 m. Due to the fact that the land on irrigated land is very valuable, slope slopes with a height of 1:3 of them are made only when the elevations are up to 1 m in height. The slopes of rather high lifts will be 1:1.5. Methods for conducting a road arrow line on artificially irrigated land.

Roads in general use are built on the basis of the intensity of movement (cargo flows) in order to satisfy the requirements of road transport. And the farm is carried out along the distribution channels, without occupying valuable land, without taking into account the ratio of a slight extension of the road. Sludge the road stem and transverse sections on irrigated land. Winter-velvet water satchels of Sizot waters. Slotting the transverse cross section along closed ditches and collectors. 30 milk of surface water. grief from or stand a lot. When laying transverse cross-section trunk channels, the road share is designed taking into account the impact of the irrigation system on the water-heat regime. Slotting the transverse cross section along Open collectors.

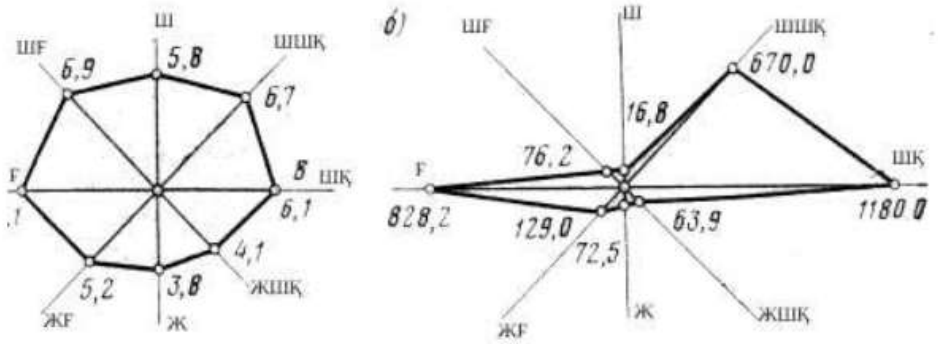
Specific features of the design of highways in the shurhok lands. 1.in surface layers..Soils with more than 1% easily soluble salts in free tsholat up to a depth of 2 m are called shurhoks. The amount of water-soluble salts in grunts greatly affects their physical and mechanical properties. When saline grunts get wet, their resistance to external forces is sharply reduced, while in cerium periods, lifting and carving slopes can be pushed and dropped. The salts present in the grunt can react aggressively to road pavement. Tsham absorbs the coating in two to three seasons when the amount of magnesium and sodium sulfates is Hutto 1%. Design of a road race on shurhok lands. Taking into account the difficulties that arise in the construction of Road Stakes and road pavements on saline grongs, first of all, it is necessary to look for opportunities for rolling the track from the sections where salts accumulate most intensively. The surface water or surface water of the coating rises from the Sathi by 20% of the normative in weak and moderately saline grunts, 30% for loamy soils and 30% for loams, and 40 in strongly saline grunts...It is necessary to increase by 60%.



22-fig. Transverse profiles of the road stem in the salty grunts.

a-a lift with a reserve on one side; b-a lift with a reserve and a longitudinal bar; V-a lift with a berm and a deeprezerv; 1-a dedicated place lane; 2-a reserve; 3-strengthening the side of the road stem.

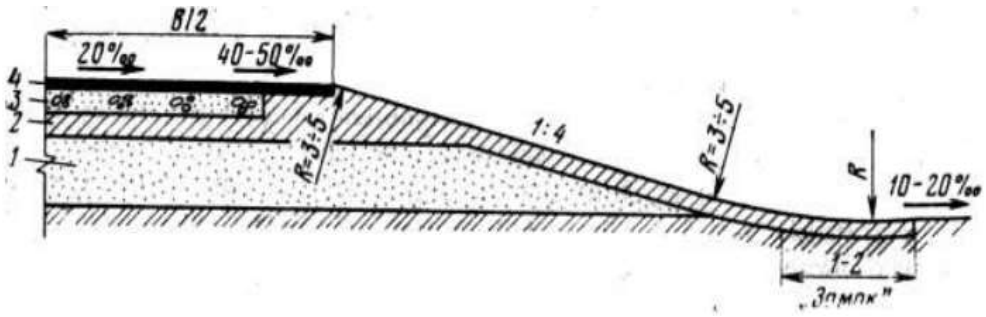
The characteristics of the climate and relief of sand deserts complicate the conditions for the construction and use of roads. The relief of sand deserts is unstable. The greater the wind speed on the surface of the Earth, the more it will fly large particles. When the wind-sand flow passes through the unevenness of the Sandy relief, local incremental plots of flow movement speeds, nesting plots and peace plots are formed. In the nesting zone, the sand will fly away, and in the peace zone it will sit. When designing paths in the zone of mobile Sands, the unevenness of the Sandy relief form creates the main difficulties. The amount of sand to be moved depends on the energy of the wind, and this energy is proportional to the square of the wind speed. Therefore, the analysis of "energy flowers" or "Dynamic flowers of winds" can be of great benefit when assessing the conditions of displacement of Sands. To make them, the sum of the multiplications of the squares of the speeds of the winds according to each Rhombus to the frequency of repeatability in the periods in which their sand transfer occurs is taken (fig. the time when the sand is tied with moisture or covered with snow is not taken into account. The dynamic flowers of the winds are especially effective in assessing the sandblastness of the road and in choosing measures to protect the road from sandblasting. In a 1 M Path 20...Roads where 30 m 3 sand comes from are roads where sand presses a lot, roads where less than 10 m 3 sand comes from are considered roads where sand presses less.



23-fig. Direction of winds:

a-typical; b-dynamic.

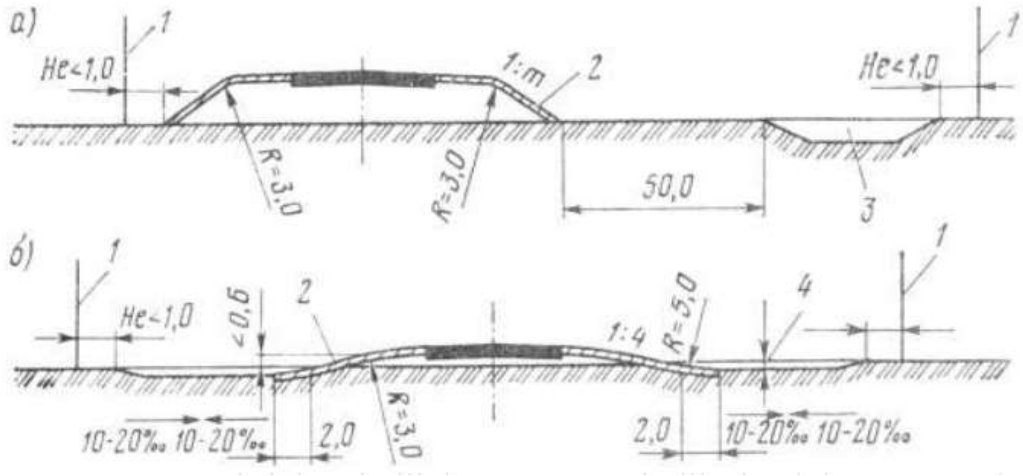
Road Share working mark 0.5...0.6 m and side bag 1: 4...1: 5 the slope is designed to be raised not too high. Shallow reservations up to 0.2 m deep are placed in the wind from the ripara side. sand systems (furrows) or elevations of more than 1 m in height passing through the depressions between the barkhans are necessary to be designed by observing the use of extendable carvings or quarries, located at a maximum of 50 m from the opposite side of the road to the wind. Slopes are laid 1:2 steep when fine Barhan sand is poured into the risers. On the road stake and its slopes 10...Bound 20 cm thick layers of grunt are laid, which prevent sand from being blown out and stone materials of the road surface from entering it (fig. For the same purpose, a grunt can be used, which is laid in a layer of 10 cm, matted with cement and bitumen.



24-fig. Strengthening the road race in the zone of mobile sands, where the wind blows:

1-a lift built of sand; 2-a protective layer from the bonded grout; 3-the base of the road Stake; 4-coating

High lifts can be made with a normal transverse profile, lifting the slopes at an angle of 1:1.5 steep. Lifts with a balance of up to 2 m rise on category I roads with a slope of 1:3 steep (25-fig).



25-fig. Transverse profiles of elevations in areas where vegetation presses on the surface and vegetation sparsely presses sands are scattered

a-in lifts; b-in zero marks; 1-separated land border; protective layer from a bonded grunt 2-10-20 cm thick; 3-Reserve (dimensions depending on the height of the lift); 4-leveling at a depth of at most 0.2 m.

Urban planning norm rules according to 2.05.02-07 AY, the road share structure should be designed in Barhan (mobile) Sandy districts, taking into account their relief, in the form of a lift that provides the least sand pressing. In this case, measures should be envisaged to preserve the road stem from the pressure of sand piles on an area with a width of at least 50 - 150 m, depending on the terrain of the place, wind speed and direction, the degree of migration of Sands, the strengthening of the surface with plants and other factors. In the conditions of large forms of relief, it is necessary to connect the direction of the road axis to the direction of the road and design according to the elongated shape of the relief, in the form of a lift with a height of 0.6-0.9 m, in the form of alternating lifts and, if possible, short carvings on transverse Barhan chains and systems. Height 2 m. the riser should be designed with a slope of 1: 3-1: 4. Slopes on a large bed or a variable slope of the side is also defined for Type I-II roads. Lifts with a height of more than 2m are mainly designed on a slope of 1:2.

Questions for supervision:

1. What conditions are included in the complex?
2. What is the irrigation system in artificially irrigated areas?
3. What should be paid attention to when designing highways in artificially irrigated areas?
4. What does the cross-section of the road look like in artificially irrigated areas?
5. What grnts are called salted grunts?
6. How to get the height of the road stem in salted grunts?
7. What is the interroom of the winds?
8. How is the arrow line held in sandy areas?
9. How is the transverse part of the road stem in sandy areas frightened?
10. What are the requirements for slope slope in sandy areas according to SHNQ 2.05.02-07 AY?

13 Design of roads in arid lands.

Plan:

1. Complex climatic conditions.
2. Irrigation system on artificially irrigated land.
3. Design of highways on artificially irrigated land.
4. Transverse sections of the road on artificially irrigated land.

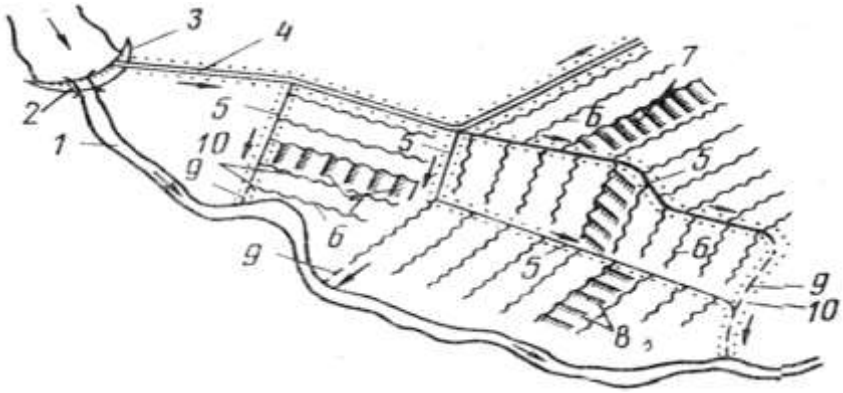
Base words and phrases: *irrigation system, artificial irrigated lands, side reserves, trunk channel; distribution channels; temporary irrigation channels;*

Complex natural conditions include mountainous areas, swampy areas, karst areas, arid areas, Suni irrigated areas, serzhar areas, sandy areas, saline areas.

Features of the design of highways in artificially irrigated areas. Fertile lands are of great importance for agriculture in areas of artificial irrigation and their separation for road construction requires justification with great care, especially if

it is associated with crop rotation disorders and the reconstruction of irrigation systems. In this case, it will not be possible to dig side reserves, and the lift will rise with a transported grunt.

In artificial irrigation areas, the waters of the sizot stand high. Therefore, in artificial irrigation areas, it is most advisable to conduct highways on their plots located on water separators and above the irrigated fields of the place, it is necessary to pass the road on flat plots, where it is difficult to exclude water, if their direction is suitable, along operating open collectors-ditches. In this case, the distance from the lifting hem or the edge of the side ditch to the edge of the channel should be at least 4 m.

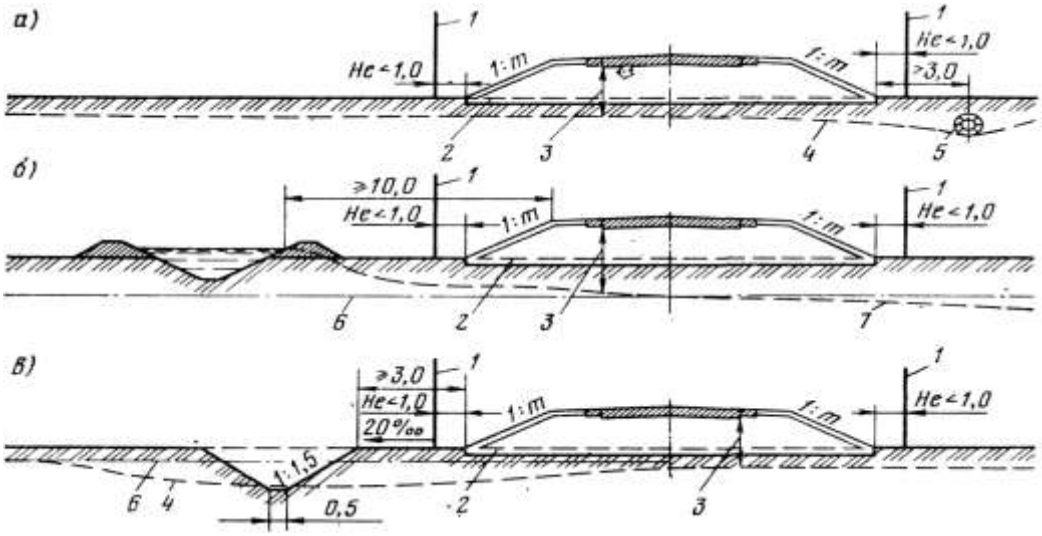


26-rasm. Scheme of the irrigation system. 1- River; 2- dam; 3- water intake facility; 4- main channel; 5- distribution channels; 6- temporary irrigation channels; 7- water outlet owners; 8- irrigation owners; 9- water collection channels; 10- road planted tree (shrubs).

Design of a roadbed on artificially irrigated land. The road share of roads that constantly pass along channels full of water stands in unfavorable conditions with excessive humidification. Therefore, the surface of the coating should stand higher than the water sattshi in the irrigation network, in accordance with the requirements for places where superficial waters remain for a long time. IV that the surface of the coating in the zones of permanent artificial irrigation stands higher than the surface of the sizot waters Sathi to the normative...In zones V, it is necessary to increase by 0.4 m, in Zone III-by 0.2 m. Due to the fact that the land on irrigated land is very valuable, slope slopes with a height of 1:3 of them are made only when the elevations are up to 1 m in height. The slopes of rather high lifts will be 1:1.5. Sun’iy sug’oriladigan erlarda yo’l o’k chizig’ini o’tkazish usullari.

Roads in general use are built on the basis of the intensity of movement (cargo flows) in order to satisfy the requirements of road transport. And the farm is carried out along the distribution channels, without occupying valuable land, without taking into account the ratio of a slight extension of the road.

Sludge the road stem and transverse sections on irrigated land. Winter-velvet water satchels of Sizot waters. Slotting the transverse cross section along closed ditches and collectors. 30 milk of surface water. grief from or stand a lot. When laying transverse cross-section trunk channels, the road share is designed taking into account the impact of the irrigation system on the water-heat regime. Slotting the transverse cross section along Open collectors.



27-figure. Transverse cuts of paths in artificial irrigation climates. a-along closed ditches and collectors; b-along the main ditches; v-along Open collectors; 1-the boundary of the allocated place; 2-the removable layer of the plant grunt;3-the calculated rise of the roadbed bottom; 4-the lowered row of sizot waters with ditches or ditches;5-tubular ditches-collectors; 6-the highest row of sizot waters until the construction of the irrigation system;

Conclusions on the 13th topic:

1. According to the rules of the urban planning norm 2.05.02-07, It is necessary to design the road race in the form of lifts in irrigated areas.
2. In irrigated areas, the road should be built from the groves that will be transported.
3. The road share is designed taking into account the impact of the irrigation system on the water-thermal regime.

Questions for supervision:

1. What conditions are included in the complex?
2. What is the irrigation system in artificially irrigated areas?
3. What should be paid attention to when designing highways in artificially irrigated areas?
4. What does the cross-section of the road look like in artificially irrigated areas?

14 Features of highway design

Plan:

1. Requirements for highway roads.
2. Features of highway roads.
3. Classification of highway roads and their main elements.

Base words and phrases: *car trunk, highway classification,drive, main elements, radius,transverse force, amount of movement.*

Car highways are said to be motorways designed for high-speed non-stop movement over long distances. On highways, a dividing strip is designed between the commuting section to carry out high-speed movement without prejudice to the cars coming across. Highways are considered expensive roads and form the basis of road networks. The United Nations has developed a project to create an international network of Automobile highways. In this project, the idea of building highways connecting European Asian and African countries with each other was put forward.

The main requirements for highways, in a number of which they consist of:

- to be a separate commuting part for the movement of opposing cars;
- departure parts are separated by a separation tape;
- absence of intersections in one SATX;

-restriction of the movement of tractors, motorcycles, bicycles and horses-mounts.

The classification of roads in the General Assembly mainly includes highways of the I A category.

On highway roads, two separate carriageway sections are designed, which must be separated by a cross-dividing strip.

Each commute part is designed for one-way action, provided that the condition for overtaking the car is provided.

It is envisaged that the traffic flow on highway roads will not be hindered by the movement of local and passengers, and to bypass the lands where settlements are located.

There should be no traffic lights and road signs prohibiting movement from highway roads.

The transition from other roads to highway roads is carried out only through separate lanes. In this, the construction of transitional– acceleration and deceleration bands is foreseen.

Since highways are long-distance roads, it is necessary to have fuel injection stations, technical and medical service stations,hotels, canteens on the sidewalks.

Highway roads differ from highway by the number of cars passed in one day.

The calculated speed was taken Vx = 120÷150 km/s on highway roads.

The radius of the egrinig in the plan is designed as R = 3000÷5000 m.

In this case, the transverse force coefficient is taken to be equal to μ = 0.05÷0.08.

Highway roads are divided into the following classifications:

I-highway roads;
II-fast highways;
III-ordinary highways.
Highway roads are marked with the following letters. E, M, A.
E - international importance Highway.

The cross-sections of highway roads will be different than those of ordinary roads.

The opposite action is designed separately with each other through a dividing strip.If, after the completion of the reconstruction work, the road was turned into a highway, then the cross section will be as follows:

Depending on the speeds of cars moving in one direction, several motion bands are designed edge parts of the coating are reinforced by a 0.5-0.75 mda consistency band.

Road collars-on vtomogistrals will definitely strengthen. It is permissible to park cars on the roadside only at the time of a car malfunction. The width of the reinforced road collar was assumed to be at least 3 m.
Ground Road collars are designed to be 0.7÷1 m wide, where beams are mainly installed.

The dividing strip was taken as 5 m ÷ 6 m. This is the most minimal indicator. It can actually be up to 13.5 m.

Virage must be built on highway roads where the radius of Egri is R< 3000. Virage construction can be as follows:
1. Lifting one side of the road by road share.
2. Lifting separate movement straps.

Questions

1. What do you mean by highway?
2. What is the calculated speed of movement on highway roads equal to?
3. What are the main requirements for highway roads?
4. Show by drawing the cross-section of the highway.
5. How many meters is the dividing strip taken on highway roads?

15 Design of bridge crossings.

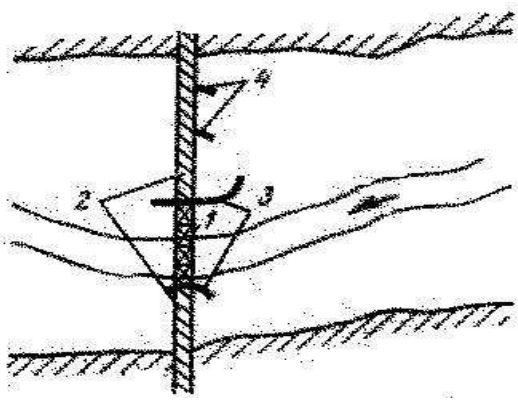
Plan:

1. Types of passages through open streams of water
2. Types of bridges by length.
3. Basic Rules for the design of bridge crossings.
4. Division of rivers by type of water supply.

Base words: *open water flow, bridged passages,erosion zone, transit zone, conical deposits of sediments.*

Highways and railways cross a large number of rivers, streams, periodic open water flows and GES reservoirs.

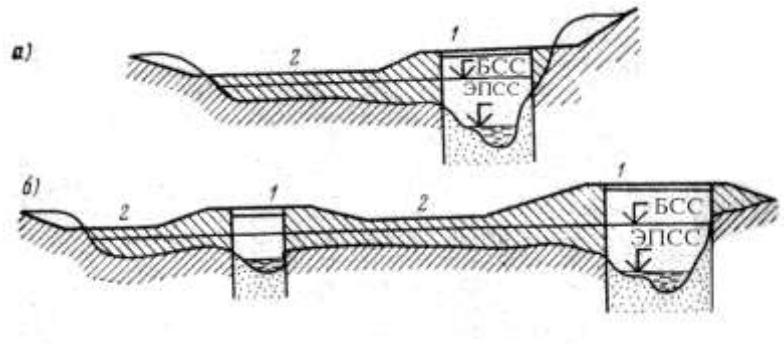
To pass through any water barrier, a system of structures is built, which are called passages from an open stream of water.



28-rasm. Plan of the bridge crossing; 1-artificial structures; 2-ways to come (pass) to the bridge;
3-flow reference structures (dams); 4-caves (traverses).

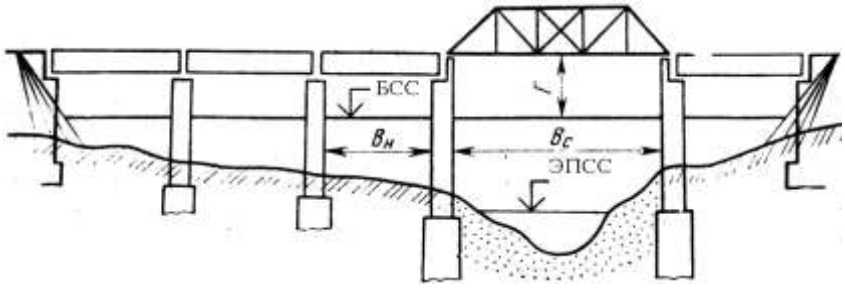
Passages through an open stream of water include (Figure 1) paths to artificial structures that serve to cross the flow of water itself, these are usually built in the form of grunt lifts, constantly or periodically flushing their slopes (slopes) with water; control and Protection facilities, they are designed to protect artificial structures and access roads from the possibility of water flow damage.

Typically, a bridged crossing will contain one bridge covering the river core (figure 2,a). Several bridges can be built in a single passage outside Ozan at times when water levels rise in rivers that spread widely(Figure 2,b). Additional bridges placed outside the özan are called Birch bridges.



29-fig. Scheme of bridge crossings:
a-one-bridge; b-two-bridge; 1-Bridge; 2-lift

Bridges are divided into three groups in length. Typically, bridges up to 25 m long are called small bridges, those from 25 to 100 m are medium-sized bridges, and those from 100 m long are called large bridges. Bridges that are less than 100 m long, but have more than 30m prolutes, also belong to the group of large bridges.



30-fig. For dividing the bridge into proletarians and for ship commuting prolotes separation

In cases where the course of ships in rivers where the ship travels is stagnant, only a part of the proliats is adapted for carrying ships. the remaining prolotes can be built much smaller. The most profitable length of small prolongs is chosen on the basis of the necessary cost-effective.

The operating conditions of large bridges are more complicated than the operating conditions of small artificial structures, since they are at greater risk as water flow damage. Chunonchi, the reason for this is that the duration of the periods of strenuous operation of the structures is different: small artificial structures work intensively for several hours a year for water transfer; large bridges work in conditions of long floods for weeks and sometimes months. In addition, the river core is excitable and easily washed away, while under large bridges it is practically impossible to build artificial reinforcements, so compressing the river with the structures of the bridge crossing will definitely lead to the washing of the core. Bridge supports are installed on the facade, there is a risk of their washing, in this regard, an increase in the flow rate under a large bridge is significantly limited compared to the rate of non-flow.

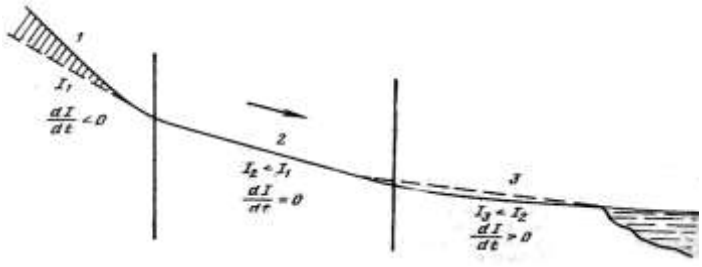
The bridge crossing is a component of the road, therefore, when designing it, it is necessary first of all to take into account the main requirement-excellent service of freight transport by road. Choosing a place to cross the river, one should be guided by this requirement.

Violation of the stagnation of structures entering the transition system through the water flow in the practice of using highways and railways occurs almost all the time as a result of the unfavorable development of Uzan changes, as a result of which the foundations of the bridge supports are washed away, the risers of the arrival roads are eroded, (control) adjustment and protection

Year-round flow of flowing water is observed only on the river core, in which for a minimum flow it is often used not all of the Uzan, but the so-called Uzan of a medium level.

The processes of leaching at the top of the river valley and the deposition of sediments at its bottom form a layer, and the fading of this over time should also be considered as the current processes of the sign, without being considered as the slow-going ancient processes of river valleys formation. In this regard, three specific parts can be distinguished in the length of the Valley (fig. The first (higher in Flow) part, the slope of which is the largest I1, is called the erosion (erosion, weathering) zone.

The second (middle) part with a slope of I2 is called the transit (skip) zone of sediments. The slope of the third (lower) section of the river in terms of flow is i3 low, which is characterized by the fact that the flowing water can no longer move the amount of sediment flowing along the second section.



31-fig. Scheme of dividing the valley of the main river into characteristic sections

As a result, part of the sediment collapses and sinks in the lower part of the Valley, and its bottom rises. This part is called the sediment accumulation zone. In a number of cases, the sedimentary layer reaches such a size that the stream in the lower reaches of the river rises above the surrounding area. In such cases, the lower part of the river valley is called conical deposits of sediments (fig.

The water supply of the river occurs unevenly. The rapid flow of a large mass of water into the river sharply increases the consumption in it and the saturation of the limb associated with it, the saturation of the limb, that is, the rise in water level, is referred to as flooding. The term "flood" is replaced by the word “flood” in design practice. Flooding in different rivers occurs at different times of the year, in accordance with the origin of the maximum flow.

Rivers are divided into four groups by type of water supply:

I-rivers with rain floods, during the year they are mainly supplied with rainwater;

II-solubility in floodplain rivers, provided by mostly melt snow water throughout the year;

III-flooded rivers from the melting of glaciers;

IY-mixed supply rivers, the flooding of which is provided by streams formed from the melting of rain and snow or glaciers.

The graph of the change in the water level over time is called the graph of the measurement of water for the same place, and it consists of a clear picture of the course of the supply of the river.

Hydrological and hydrometric calculations in the design of bridge crossings

The structures of the bridge crossing interact with the flow of water and are at risk of flooding, flushing and flushing from the bottom with running water, as well as damage by noise. The degree of risk of damage to structures is determined by the height of the flood, which varies from year to year under all other equal conditions. It is necessary that the bridge crossings fulfill their function during the period of long-term service. During this time, not only small floods can occur in the river, but also strong large floods from the flood recorded in the same watercourse.

The results of predictions based on statistical data should be checked in every possible way, mainly in comparison with the natura (original) data on the floods that have occurred.

The maximum consumption of a flood with a certain value can be characterized by its probability, which is expressed by even greater spending.

The likelihood of an increase will be relevant not only for a year, but also for a long-term period of time. The probability of an increase in this case can be viewed as the same as in the case of a repetition, that is, the number of cases of an increase for the same period. For example, if the probability of an increase in the maximum consumption of a spring flood that occurs once a year is equal to 0.02 every year, then at the same time it means that such a maximum consumption increases again with large spending: on average once every 50 years; 2 times in 100 years, etc. The increase in consumption in the long term is approximately correct (Table 1).

1-table

Facilities	**Category of roads**	**Settlement floods the probability of an increase in the maximum consumption of,%**
Large and medium bridges	I…III, IIIp and city streets and roads	I*
Hence itself	IY,IYaY,Ic,Iic	2*
Small bridges and pipes	I	I**
Hence itself	II,III,IIIa, city streets and roads	2**
Hence itself	IY,IYp, va domestic farm roads	3**

For small bridges and pipelines intended for highways, it is allowed to accept the likelihood of an increase in the developed regions as 2% instead of 1% in the feasibility study, 5% instead, 10% on roads of the II s and IIIC category.

The simplest formula of empirical probability, which is determined by re, is:

$$p_э = m/n, \ ёкu \quad p_э = (m/n) \bullet 100\%,$$

where m is the number of order in a given row of the row Hadi; n is the total number of row Hadi (the number of years in which the river regime is observed).

The direct determination of the calculated levels cannot be supported for stvors located in the conical deposits of sediments, as well as for the upper sections of rivers (where the carving of the river into the bottom rocks occurs on a legal basis). The xisabi satx is an anikali to kyllash the maximum size.

According to the study of the order of rivers, it is divided into two groups:
a) hydrological data of rivers according to the study of good:
there are 15-20 years of data on this.
b) hydrological data of rivers good has not been studied: there is very little or no data in this.

The maximum consumption of a flood with a certain value is characterized by its excitability, expressed by even greater spending.

Determination of the passage hole with a large bridge.

We find the maximum water consumption at the bridge crossing.

To do this, we determine the core of the live cut, the left and right boat the height of the water level and the surface of these fragments. In terms of the live cut of water consumption , Qxis and double, Q kayirs are determined.

If the water consumption in the core is smaller than 85%, water-tracer structures are designed.

Washes occur in Rivers, general and local.

As a result of the compression of the live cut by the bridge, the general washing occurs locally at the base of the supports.

The washing coefficient will be R = 1.25-2.20.

When determining the hole of a passage with a large bridge, professor O.V. The calculation of the bridge hole according to Andreev's method consists of two parts, firstly determining the cross section uzasi, and secondly determining the hole between the edges ni.

We determine the length of the largest bridge when the smallest UV coefficient is:

$$L_{\max} = \frac{B_{t.o`.}}{1-\lambda}\left(\frac{Q_{his}}{Q_{m.\bar{y}.x}}\right)^{4/3}$$

Here is Bt.own.- width of the flowerhead in a natural case, m.

λ is the coefficient of compression of the flow with supports.

Questions for supervision:

1. What are the types of passages through open streams of water?
2. How many types are bridges divided by length?
3. What are the main rules for the design of bridge crossings?
4. How many types are rivers divided by water supply?
5. How is the analytical prediction of the maximum water consumption in Rivers carried out?
6. What is the likelihood of an increase?
7. What is taken into account in morphometric calculation?
8. Where do washes occur?
9. How is the largest bridge length determined?

PRACTICAL TRAINING WORK

1-PRACTICAL TRAINING

Topic: Urban planning norm rules 2.05.02-07 determination of the elements of the road category based on "highways".

In the design of newly built and reconstructed public-use highways in the Republic of Uzbekistan, the norms and rules of SHNQ 2.05.02-07 are used.

Highways are divided into categories according to Table 1 of UPN 2.05.02-07, depending on whether their entire length or parts are determined according to their economic, administrative significance and function.

The category of roads is taken according to Table 2, depending on their assigned task and the intensity of movement in perspective.

2 – jadval

Economic importance of the road	Road category	Calculated effort intensity, quoted units/Day
Roads of international and state significance	Ia (Highway)	More than 14000
	Ib (quick way)	More than 14000
	II	6000 - 14000
	III	2000 - 6000
Roads of local importance	IV	200 - 2000
	V	At 200

Explanation: 1. When the amount of passenger cars in the total traffic flow is less than 30%, the calculated speed of movement in the transport unit is acceptable.

2. Ia, when the same requirements are applied to Category I roads, in the text they are considered category I.

The coefficients of bringing the intensity of movement of various vehicles to the passenger car-Niki are taken according to Table 3.

As the intensity of the calculated movement, it is necessary to take the sum of two directions based on the data of Economic Research. In this regard, depending on the established task of the road, the average daily movement intensity of the last year of the lunar season (summer, autumn, spring) or lunar perspective period is assumed. It is also accepted that the prospect as the intensity of the calculated movement is brought to the intensity of passenger cars, the greatest intensity of one hour, which grows (or increases) within 50 hours in the last year of the period.

If a different road category is required in terms of the intensity of the calculated movement and the task setting, a relatively high road category must be adopted in the project.

3-jadval

Type of vehicles	Coefficient of citation
Passenger cars	1,0
motorcycles	0,75
Motorcycles and mopeds	0,5
Trucks, according to the carrying capacity, t:	
2,0	1,5
6,0	2,0
8,0	2,5
14,0	3,0
14,0 dan ortiq	3,5
Autopoezds, according to the possibility of lifting, t :	
12,0	3,5
20,0	4,0
30,0	5,0
30,0 dan ortiq	6,0
Wheeled tractor trains:	
1 trailer	3,0
2 trailer	3,5
3 trailer	5,5
4 trailer	9,0

Explanation: 1. The quotient coefficient at the intermediate value of the carrying capacity of vehicles should be determined by the interpolation method.

2. Buses and special cars the carrying capacity of the koef-fitsienti should be taken as the main auto-billar's, which corresponds to their carrying capacity.

3. The citation coefficient for trucks, cars and tractor trailers for mountainous and lowland areas should be increased by 1.2 times.

When determining the category of the road, when designing elements of the plan, longitudinal and transverse sections, it should be assumed that the perspective period is equal to 20 years.

When designing road beds, it is necessary to take into account the period of perspective, taking into account the inter-repair deadlines.

The year of the beginning of the construction of the road (or a separate part of it) is adopted as the initial year of the period of reckoning.

Common-use highways are designed to transfer vehicles of the following sizes: in length - single cars up to 12 m, auto trains and wheeled tractor trains up to 24 m, in width - up to 2.5 m, in height - up to 4 m.

The main technical solutions adopted in the projects on the location, plan, longitudinal and transverse cross-section elements and their mutual alignment, types of intersections and adjoining mas, road bed and Road share structures should create the basis for increasing labor productivity, saving construction materials and fuel and energy resources. Their technical and economic indicators should be substantiated by developing comparable options: construction prices, road repair and maintenance costs, losses associated with the impact on the natural environment in construction and operation, transportation costs (consumption of a

car tire and parts, fuel consumption), cost of Transportation, Safety and comfort of movement, changes in the production conditions of the farm and roadside hu-dudes It is necessary to take into account the costs incurred in order to make the lands occupied by the existing roads suitable for agricultural use by the existing roads or the subsequent unused sections of the existing roads using certain parts of them.

Road construction is carried out in complex engineering and geological conditions in Ganda, the construction of a roadbed is allowed to be carried out in stages if the duration of the roadway reinforcement exceeds the road construction period.

Highways of the I-III category are mainly held with the construction of access roads to them, bypassing settlements. In this case, the distance from the share of the bypass to the construction line of the settlement should be taken according to the general plan, but at least 200 m long.

In some cases, if it is advisable to transport roads of the I-III level from settlements on the basis of technical and economic calculations, they should be designed on the basis of the requirements of SHNQ 2.07.01-03.

The length of the entrance parts of the highways to the cities (the main part of the highways)should be calculated according to the following indicators, according to the number of urban residents:

the number of residents of the city, million. man: 0,5-1,0 ,0-2,0 2,0-4,0
length of the main part of the highways, km: 5-10 10-15 15-20.

The number of traffic bands on multi-lane roads, environmental protection measures, road crossings and junctions, road bed structures, equipment elements, engineering equipment (including barriers, bike lanes, lighting and communications), the composition of buildings and structures serving the road and auto-transport, in order to reduce the costs of concurrent traffic, should be taken into account the increase in the speed of

The intensity of movement is 4000 Celtic. on Type II roads with more than units/milk (achieved in the first five years of use), with a length of more than 1 km and a longitudinal slope of more than 30‰, as well as on Category III roads with a length of more than 0.5 km and a longitudinal slope of more than 40‰, an additional strip should be provided

The width of the additional strip should be 3.5 m over the entire length.

The main dimensions of the cross-section of the road

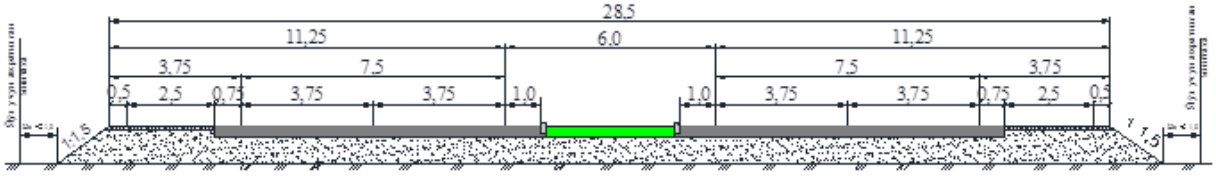
4- table

Dimensions of road elements	higway	Quick way	Typical road type
	category		

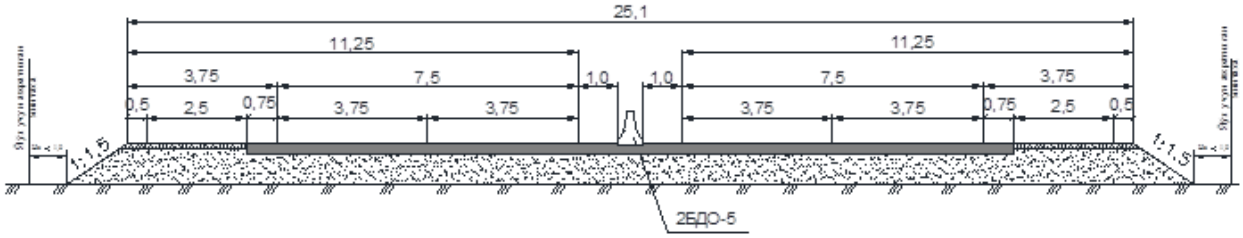
	Ia	Ib	II	III	IV	V
Total number of motion bands	More than 4	More than 4	2	2	2	1
Motion tape width, m	3,75	3,75	3,75	3,5	3,0	4,5
Road collar width, m	3,75	3,75	3,75	2,5	2,0	1,75
Edge band width on roadside, m	0,75	0,75	0,75	0,5	0,5	-
Width of the reinforced part of the road collar, m	2,5	2,5	2,0	1,5	1,0	-
Minimum width of the central dividing strip when no barriers are installed along the road axis, m	6,0	5,0	-	-	-	-
The minimum width of the central dividing strip when obstacles are installed along the road axis, m	2 m + set width		-	-	-	-
Width of the safety band at the edge of the dividing band, m	1,0		-	-	-	-
Road stem width, m	More than 28,5	More than 27,5	15,0	12,0	10,0	8,0

Cross-section of the highway

Тоифа Iа



Тоифа Iб



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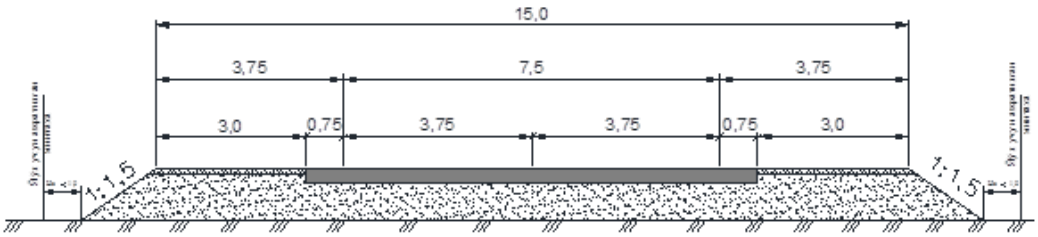
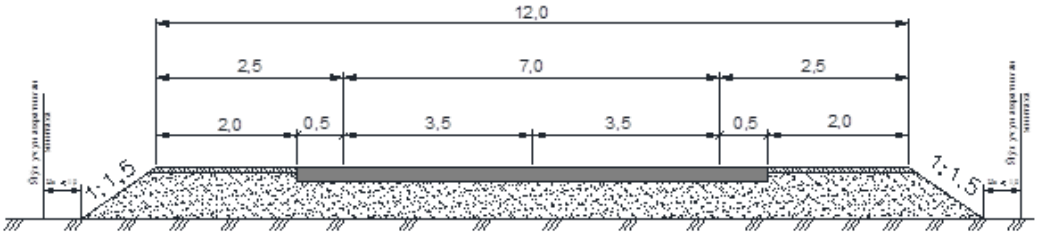
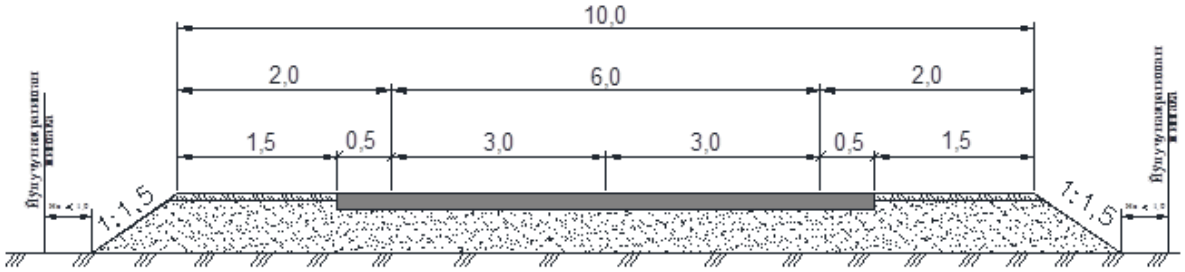


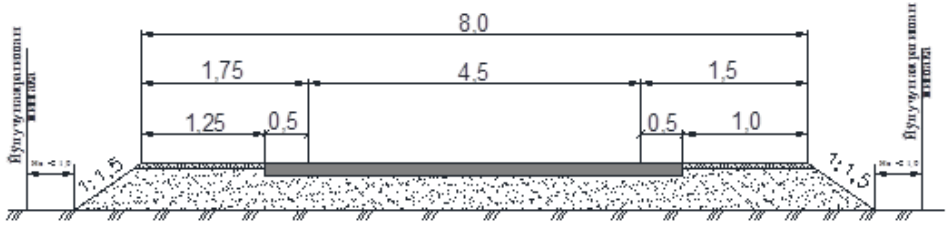
Тоифа III



Тоифа IV

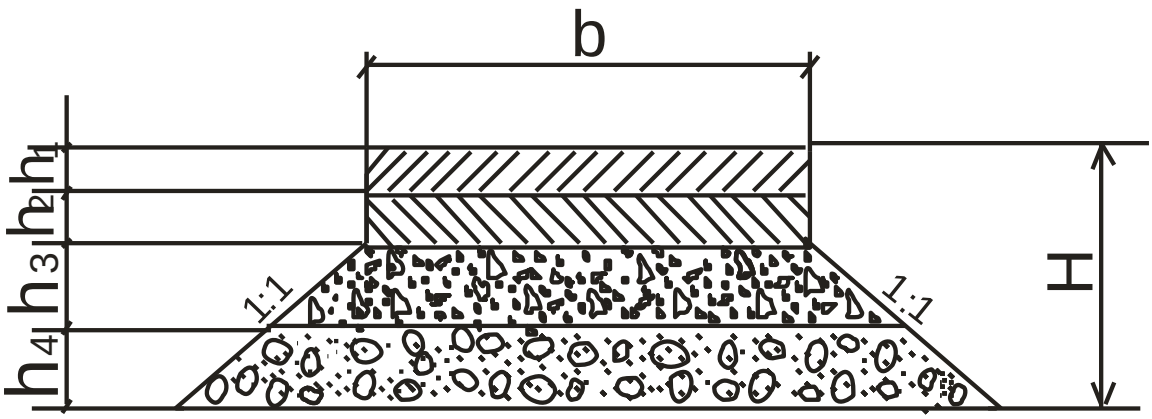


Тоифа V



Road bed

construction



$$V_{é/ò} = V_1 + V_2 + V_3 + V_4$$

2-PRACTICAL TRAINING.
Subject: calculation of road share and commute part width

• 1 The car actually moves along some sinusoidal trajectory. The deviation of this trajectory from a straight line, the higher the speed of movement.
• 2. The higher the speed of movement of the car, the greater the width of the road it will be needed on the road. The distance at which the driver removes the car

from the edge of the adjacent line depends on the speed of movement of the opposite car to the angle (1). If the driver looks directly in front of the car, then this car has a limited angle of view of 2R, which is approximately equal to 90° in the horizontal plane ("field of view").

• 3. A limit value, in which the driver, without turning his head, separates the movement of the opposite car, a = 90-(3. The value corresponding to it is L = Z tg (90° - p).

• 4. The distance between cars seeking to resist drivers is directly proportional to the speed z = of these cars .

The required width of the lane consists of the width of the car's Cabaret, the distance from the cabaret to the edge of the adjacent line and from the wheel to the edge of the road. These distances depend on the characteristics of the drivers themselves and vary within certain limits.

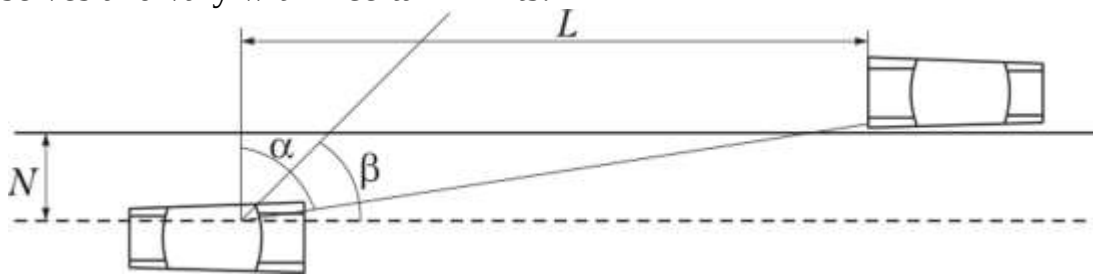
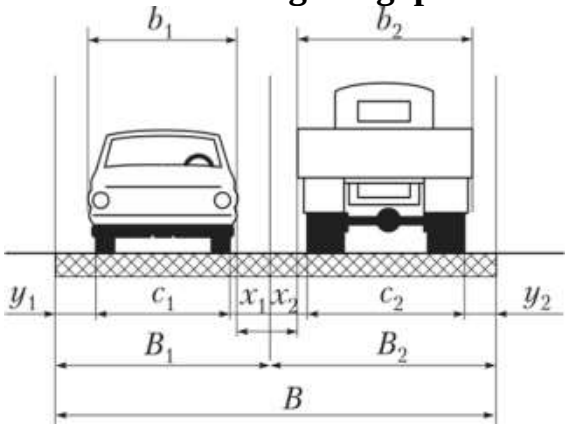


Figure 1 scheme for determining the gap between existing cars



Scheme for determining the width of the line

The width of the track is recommended to determine the connection with two ways

$$B = b + c + 2y + x,$$

where b is the width of the car, m; C is the motorway (the distance between the outer edges of the track of the most common wheels), m; X is the gap between the injection tools, m; y is the distance from the outer edge of the wheel track to the edge of the track, m.

The values of X are determined by the following empirical formulas:

$x = 0{,}3 + 0{,}1\wedge + v_2$; $y = y/0{,}1 + 0{,}0075$a.

when moving in one direction along the adjacent lines of the road, for example, when walking,

$$x = 0{,}3 + 0{,}075_{y}Jv_{l} + v_{2}\text{ , a } y = yJ0{,}1 + 0{,}0075\text{a}$$

The formula provides movement in one part of the road, is equally suitable for a strong Flat Road. The road divider sets the distance from the bardyur to the edge of the road and the bardyur at a height of 2-3.

At the moment, the calculations of the width of the tracks of the I-III category are based on less speed of movement than on bringing the elements and length of the plan to the profile requirements. This solution is considered mandatory, since road elements are the most expensive part of the road, and from this, large tasks of road construction require the maximum economic use of the funds allocated to the road economy. Road expansion is easy in the process of further operation, it is often difficult to reconstruct the road in the plan and profile.

When determining the required width of the strip, it is necessary to consider two possible states of the cars:

1) passenger cars are small in width , but with high speed driving;
2) trucks with a wide-gauge body, but moving at low speeds.

The width of the road is the commuter part and economic functions. The width and construction of low-density traffic and road lines on roads will be less bandwidth, knowing the need to reduce speed on several rural highways. In difficult conditions and on domestic roads (categories VI-A and VI-b), sometimes one of the cars allows you to build roads with a single - direction track with special ears-a rhenium device, waiting for the timer to pass. The following should be seen from each expansion.

Technical standards provide the following width of One Road, which satisfies the average modern transport conditions on roads: 1-a — 3.75 m; 1-6, 1-b, II, III - 3.5 m; IV-3.0 m; V-2.75 m.

The width of the road in a closed type of parking is determined by the following requirements:

• the car should enter the rear with one turn;

* the distance from a moving car to cars standing on the ground or part of the building should not be less than the radius of the inner protective zone;
* the distance from a moving car to opposite cars or any obstacle should not be less than the outer protective zone.

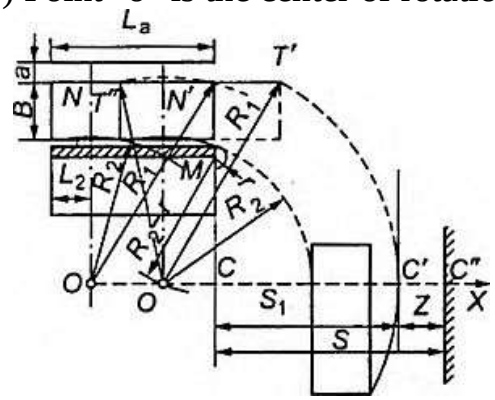
The value of the protection zone (external and internal) depending on the length of the machine is given below:

Car length	Protection zone, м	
	Inside	External
Up to 6 m	0,2	0,7
From 6 to 8 m	0,3	0,8
Up to m	0,4	1.0

In determining the width of the placement of the width of motion in the direction (2) Two "a" shaped cars are depicted to leave cars in the form of a rectangle in the front direction for sudden movement. The car standing on the left side opens on the right.

Graphic definition of road width at the parking lot when leaving the front line

Using a turning radius or I2, OI is determined in a straight line (continuation of the rear axle of the car) Point "o" is the center of rotation of the car.



Next, the machine moves in the direction of several forward longitudinal axes, so the circle characterized by Radius I2 touches the circle described by radius g from point M.

The next stage of construction is to find the center of rotation of the o ' car, where the above conditions must be met. To do this, draw a flat ox parallel to the longitudinal axis of the car from the" o " point. The radius i2-g, which has a center at Point M, carries an arc determined by a flat ox at Point O.

The"O '"point is the desired turning Center in the new position of the car, and the right' line parallel to the ohm line corresponds to the new position of the rear axle of the car. To find out the new position of the rear axle, you can apply the contour of the car, and then the radius"=/"., describe with a straight line of the circle before crossing the second at Point" C "from Point "o'". SS distance ' is the minimum theoretically necessary width. The correct SS 'value x-to continue the width of the outer zone, we get SS" = 51, that is, the full width of the path.

If the cars in the sequence are at an angle to the longitudinal axis of the road or the car is turned not to the right, but to the left, the construction procedure will not change.

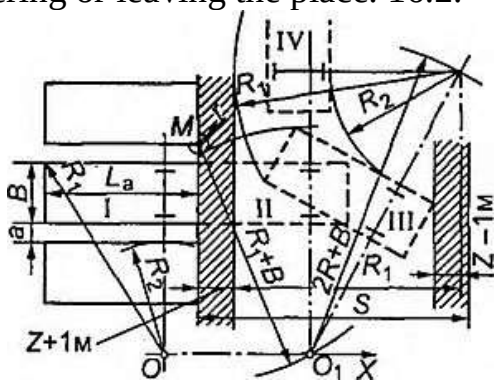
During storage in open areas, the width of the road is determined taking into account the following conditions: cars move to the front or rear; when entering or leaving the place, it is possible to reverse the car on the road with a one-time method of transmission of the rear Road (when entering the front); the distance between the car (at the time; the distance from a moving car to opposite cars or any obstacle should not be less than the outer protective zone.

Name of the zone	Length of the car, m		
	6dan	From 6 to 8	Above 8
Internal security zone for the car	0,3	0,4	0,5

For auto trains	0,4	0,5	0,6
External protection zone for the car	0.8	1,0	1,2
For auto trains	0,9	1,0	1.2'

Table 1. The value of protective zones when storing cars in open spaces, m
The position of the center of rotation of the "o" car when the car goes back (fig. 16.2) radius from point m) and straight oh.

Further construction, a clear form, arising from the unacceptable conditions of use of the back when entering or leaving the place. 16.2.



Graphic definition of road width in the parking lot when exiting the rear

When entering the place on the back of the car and leaving the front Road, the method of determining the width of the road is the same as when leaving the car when stored in a closed type parking lot.

The geometric dimensions of the parking room are significantly influenced by the columns supporting the columns. The grid of columns depends on the length and design of the floor.

3-PRACTICAL TRAINING

Subject: determination of the strength of the wheel resistance between the road surface and the car wheel

The car is affected by the following forces at the time of movement: force of gravity, force of resistance to movement and force of inertia Figure-1-2. The force of inertia can be directed in a forward, backward and transverse direction, depending on the mode of movement.

To the forces of resistance to movement: the force of resistance to the wheel of the wheel-Rf, the force of resistance of air to the car-Rw , The Force of resistance to the exit to the height – Ri , the force of inertia – Rg. To overcome the forces of resistance, the power produced by the car's engine is used. The torsion torque generated in the engine is transmitted through the transmission to the leading wheels. The wheels form a rotational force acting on the winding road cover. The equal impact force of the road leads to the movement of the car. All the forces acting on the car can be indicated by the following expression:

$$R_t = R_f + R_w + R_i + Rg.$$

in this

Rt-gravity

Rf-wheel resistance power

Ri-height output resistance force

Rw-air resistance force ,

Rg. - force of inertia

This expression is called the gravity balance formula or the balance equation of forces and determines how the force of gravity is distributed.

The force of resistance of the wheel to the wheel is formed as a result of the impact of the tire with the road coverand is determined by the following expression:

in this Rf-the strength of the resistance to the wheel

Ga-weight of the car

f-coefficient of resistance to the wheel of the wheel

- longitudinal slope of the road, grad.

The coefficient of resistance to the wheel of the wheel takes into account all factors affecting the resistance force of the track and is equal to the following values:

asphalt in good condition	- 0,015-0,018
asphalt in satisfactory condition	- 0,018-0,020
gravel road	- 0,020 – 0,025
stone dialed path	- 0, 023– 0, 030
grunted road	- 0, 025 - 0,030
dry sandy road	- 0, 100 – 0,300
ice	- 0,018-0,020

The height output resistance force motorways consist of horizontal, incline and altitudes. Horizontal paths are rare. The slope of the road is characterized by its angle or I 3fig.

$$i = \frac{H}{B} = tg\ \alpha$$

in this H is the height of the slope, m

V is the length of the slope, m

At small slopes, i = tg = sin can be taken as equal.

We divide the force of gravity of a car moving on a slope by 2: parallel to the slope sin force and perpendicular to the slope to cos forces.

To sin we designate the force with the expression Ri, this force is the force of resistance to rising to a height.

$$\mathbf{Ri = Ga}\ \boldsymbol{sin}\ \alpha\ \mathbf{= Ga}\ \boldsymbol{i}$$

This force is reversed when the car moves to a slope.

Slopes in the transverse profile of modern highways can change without interruption. The strength of the resistance to the exit to the height also changes.

Air resistance force. During the movement of the car, it is affected by the resistance force of the air. This force is determined by the following expression:

$$\mathbf{R_w = K\ F V_a^2}$$

in this case, the coefficient of overcoming K - air resistance

F-front surface of the car, m2

And-the speed of the car, m / s

Inertia force the vehicle is affected by inertia forces at the time of movement. The change in the speed of the car creates inertia force. The force of inertia depends on the mass of the car.. The force of inertia is determined by the following expression:

$$\mathbf{Rg} = \frac{Ga}{g}\mathbf{j}$$

in this G-free fall acceleration, m / s2

j - vehicle acceleration, m / s2

The bite force of the wheel tire with the road cover.

As a result of a road surface bite with a leading wheel for the movement of the car, the bite force appears.

The bite force depends on the mass of the car, the position of the tire and the roadway.

$$\mathbf{R_{sts} = Ga}\,\varphi$$

in this Rsts-bite force

Ga-weight of the car

- bite coefficient

The bite coefficient depends on the tire, road cover and their condition

Determination of movement speed decrease caused by coating noravonlik. It consists in determining what factors the coefficient of resistance of the car wheel to the wheel with the road surface depends on.The resistance to the wheel depends on the normality of the coating, speed and elasticity of the tires.

At speeds of < 50 km / h, the coefficient of resistance to the wheel practically does not change. It can be considered to have the following values , depending on the type of coating.

Coating type	**The coefficient of resistance to the wheel**
Cement concrete and asphalt concrete	0.01-0.02
Gravel, Flint or garden.materials reinforced with materials	0.02-0.025
On grunted roads	0.03-0.06
In swampy, Sandy grands	More than 0.05-030

At speeds of 60<V<150, the coefficient of resistance to the wheel can be expressed as follows

fv = f0 (1+4.5 . 10-5 . v2) here, fo-the coefficient of resistance to the wheel at a speed of up to 60 km/h.

Example: car speed V=70 km/h, coating type - asfaltobeton.

$/_{70}$ = 0,02(l + 4,5 * 10“^{5} * 70^{2})= 0,02(1 + 0,022) = 0,0204

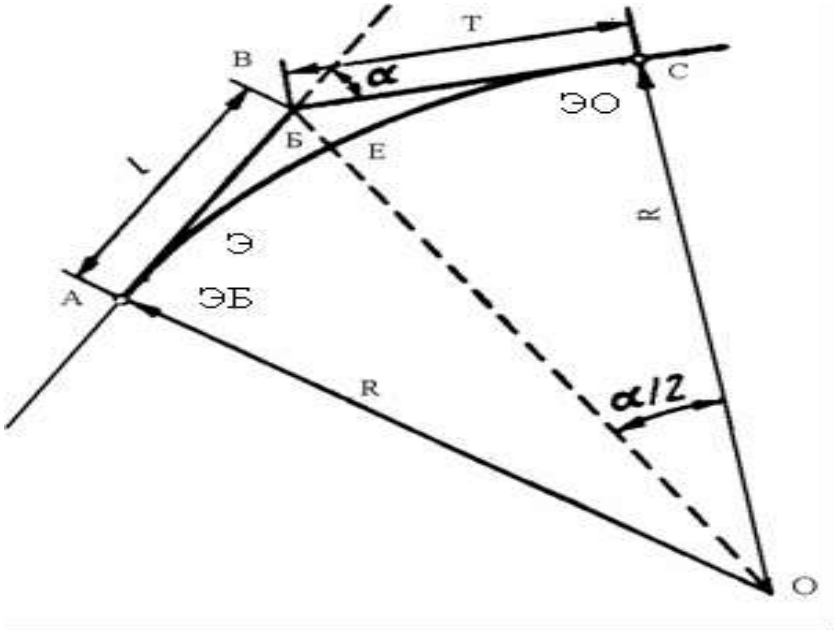
Assignment: calculate the coefficient of wheel resistance based on the calculated speed of the given car and the type of coating.

4-5-practical training

Topic: conducting road options in topokharita in complex climatic conditions and drawing up a table of vertices and curves

To design the track (track) options, the student is given a map of Joi 1:25,000 or 1: 50,000 scale that passes the road .

Between points A and B indicated in the assignment, at least two variants of the path are drawn on the map and they are compared among themselves (Table 6) After the variants of the track are drawn to the map, they are allocated to pickets.



1-rasm . Elements of the curve.

α-angle of rotation, R-radius, T-tangent, V-bisector, D-domer, value of e-curve.

In the plan, each change in the direction of the track is determined by the angle α of the turn. The work of dividing into pickets is performed graphically on the scale of the map. The radii of the curves are selected so that they do not require a sharp turn lozim.To the length of the cave plots should not exceed 3.5 - 5 km,

depending on the category of the road. The main elements of the horizontal circular curves are shown in Figure 1.[5.1 table] in a table compiled from one minute for 0 to 150 turning angles of the track , the curves give the tangent, the bissectrises and the values of the basic elements with a precision of five digits after the comma for the radius R=1m of the horizontal circular curves are given .

They are obtained from Table 1 [5] the values \ u200b \ u200bof T,E,D and B in accordance with the angle of rotation of the track α,and they are rounded to the required accuracy by multiplying the received radius of the curve by R.

The main points of the curve are determined in the following order:

1. Picketing Egri's head – ПК ЕВ= ПК ВU– Т
2. Picketing the middle part of the curve

$$\text{ПК EO'} = \text{ПК } EB + \frac{E}{2}$$

3. Picketing the end of the curve ПК ЕО = ПК ЕВ +Е

Check:ПК ЕО = ПК ВU + Т-D

The elements of the curve can also be found calculated by the formula. The picketing of key points on the curve is considered in a specific example. As you know, the tip of the first turn angle (this) is located at PK 15+ 50 (See Figure 3) the left turn angle α = 170 30

The radius of the curve R=2000m was taken from the condition of ensuring the visibility of the road in the plan , since the road was shot from the Woodland.

Elements of the curve we find T,E,D and B from Table 1 (5) for radius R= 1 m

T=0,15391m;

E=0,30543 m;

D=0,00239m;

B=0,01178m;

R =2000m bo'lganda

T=0,15391x2000=307,82m

E=0,30543 x2000=610,86m;

D=0,00239x 2000=4,78m;

B=0,01178x2000= 23,56m;

Check D=2T –К = 615,64-610,86=4,78m

Once the pickets at the beginning and end of the curve are found, the curve is cut into pieces.

(Figure 2). For each variant of the path , a table of angles of rotation, straight and curved parts is drawn up indicating the results of the examination (table 7) the correct structure of the table is checked as follows:

1.The difference in directional angles on the sides of the start and tone of the track should be equal to the difference in the sum of the angles of the left and right turns.

$$A_{3bosh} - A_{3\ ohir} + \sum \alpha_{chap} - \sum \alpha_{\ o'ng}$$

2 the difference between the sum of the curves with the sum of the two tangents should be equal to the sum of the domains.

$$2\sum T - \sum E = \sum Д$$

3. The sum of the length of the straight and curves should be equal to the length of the track

$$\sum P \pm \sum E = L_{tr} \ .$$

4.The difference between the sum of the intervals of the angular ends and the sum of the domains should be equal to the length of the track;

$$\sum S \pm \sum Д = Ltr$$

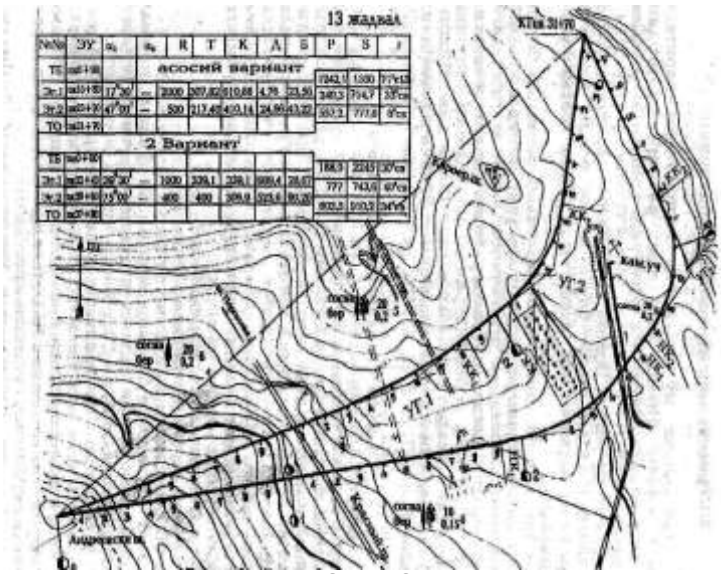


Figure 2. Transfer of track options on the map

6-PRACTICAL TRAINING
Topic: comparison of road options

The intended variants of the track are drawn to the map first with a pencil, and after approval by the leader, draw over it with a dream in different colors.The basic (accepted track) option is formalized with a black pen, while the second category option on a red pen, along with its respective entries, is formalized.

Each option is divided into pickets and marked with numbers, the names of the turning angles are recorded, the pickets at the beginning and drift of the circular curves are recorded which line of the track axis are rhombuses, and under them (in the dowry) the lengths from the drift of the previous curve to the beginning of the next curve are written. The elements of the curves (T,E,B,D this, EB, EO) according to both options are written in the table

6-jadval

№	Name of indicators	Unit of measure ment	Value of variant indicators		Option advantage	
			I	II	I	II
1	2	3	4	5	6	7
1.	Track length	km				

2	Extension coefficient $K = \frac{Ltr}{L_{havo}}$					
3	Average value of the angle of rotation	grad				
4	Smallest turning radius	m				
5.	Ensuring visibility in the plan					
7	Number of ditches that cross	pieces				
8.	The length of the part of the track passing through uncomfortable and empty lands	km				
9.	The length of the part of the track that passes through the inhabited area	km				
10	The length of the part of the track that passed through the plantings	km				
11.	The length of the part of the track that passed through the Woodland	km				
12.	The area of the road occupied by lands	ga				
13	Number of highway crossings at one level.	pieces				
14.	Number of conductors	pieces				

7-PRACTICAL TRAINING

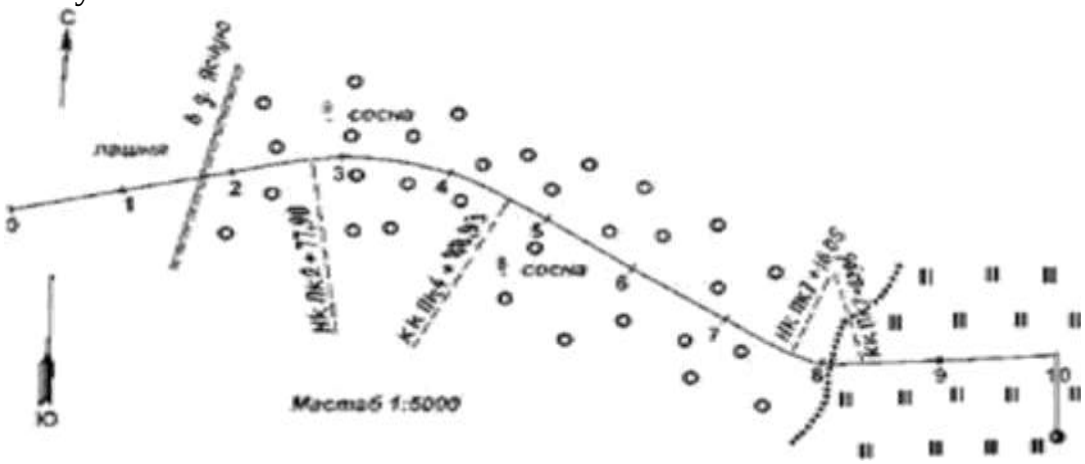
Topic: design of a road plan

Correct the road plan and according to the table of curves are drawn on a drawing sheet with a length of 841 mm and a width of 297 mm (half of the A1 format). On the drawing sheet, it is necessary to place the track in such a way that the top side of the sheet is directed to the North. In flat areas, the scale of the road plan was taken 1:5000b in high-low areas 1:5000, for mountainous areas 1:2000.

In the plan, the track is marked with a long continuous line. The track is marked every 100 meters, with stripes. The tangents are marked with a dotted line. Mileage marks along the track are released. At the corners of the turn, the number of the tip of the turn is placed, and the elements of the curve are placed in the account of the straights and curves placed in the free space. The scenery and situationism around the track are lowered using topographic map data. Signs and

inscriptions on the landscape are written parallel to the drawing frame. Pickets and other records of the track should be placed along the track or perpendicular to it.

All conditional signs should be marked as on the topographic map. In the case of the need to select the direction of the track in the track plan on low-plains and not too high, the horizontal ones are also lowered. In very strong low-rise areas and mountainous areas, horizontal ones are indicated along the length of the road. In the road plan, the angle of intersection and the picketage position of the intersection are indicated at the intersection of the railway and the roadway. At the top of the track, the names of the land users are written. In the free space, a drawing of the scheme for fastening the track is brought (fig. There is also an account of obstacles and curves and an arrow pointing north. In the upper left corner, a wind chute is brought. If the length of the track is very long and it is located on several sheets, the junction with the previous and subsequent sheets is indicated by a dotted line.



1- picture. Highway plan

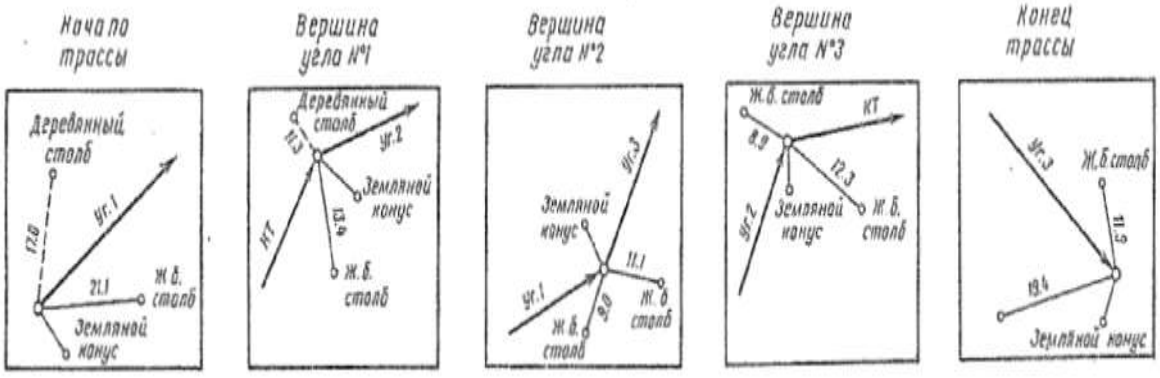


Figure 2. Connecting the highway axis to the location assignment: selected track design a road plan according to

8-practical training

Topic: methods for determining the signs of the Earth on the road axis.

For the accepted option, the longitudinal profile is drawn on millimeter paper. The longitudinal profile is drawn in accordance with the samples (fig. Before designing a longitudinal profile, marks on each picket and plus points are calculated on the horizons from the map. Before entering the longitudinal profile into the design, the following technical standards are established:

1.Largest longitudinal slope:

2. The smallest longitudinal slope:

3.The smallest radii of vertical curves

4.Leading (instruction) working signs providing road superstructure and conditions for its normative use, or the minimum height of the lift .

When designing roads, technical implementation according to the location conditions is possible and economically feasible, it is necessary to obtain the plan elements and longitudinal cross-section elements as proposed by the SCO.The leading working character depends on:

- according to the climatic region,the territory of Uzbekistan is divided into 4 zones according to road climatic conditions (7);
- by type according to the description of the hydration of the place;
- snow click description;
- depends on the type of Earth (grunt)

The recommended working mark of the road lift the coating according to URD 2.05.02-07 is adjusted depending on the place of the track where the sizot and surface waters on the wet and poison sections rise least above the level and where the elevation Coast rises least above the calculated snow layer level (Table 7)

7- table

Working layer soil	The minimum elevation of the coating surface depending on the climatic region of the road,m			
	I	II	III	IY
Fine sand, light large loam, light loam,	0,5 / 0,3	0,6 / 0,4	0,4 / 0,2	0,9 / 0,7
Dusty sand, dusty sandy,	0,8 / 0,5	1,0 / 0,6	0,7 / 0,4	1,2 / 0,8
light and heavy, suglinock, glina (loy)	1,1 / 0,8	1,3 / 1,0	1,0 / 0,7	1,5/1,2
heavy dusty sandy light and heavy dusty suglinock	1,2/0,8	1,4 /1,0	1,1/ 0,7	1,6/1,2

Note: in the photo - the rise of the surface of the road surface from the surface of the surface where the surface of the road surface will remain standing for more than 30 days, in the dowry the rise of the coating from the surface of the earth on sections where the waters do not flow, or from the level of the waters

1) the minimum rise in the coating level in the road climate region is determined on the basis of thermal technique calculations.

According to the conditions of moistening of the upper layers of the Earth (grunt) there will be three different places:

Type 1-dry areas, the slope is more than 10%, the surface waters flow, the sizot waters are deep, that is, the freezing of the Earth is located 1.5-2.0 m below the depth :

Type 2 zah places-since the Earth's slope is low, its waters on the surface do not flow, the waters of the sizot lie deep.

Type 3 wet lands-the water on the surface does not flow, and after melting from rain or snow, the water costs more than 30 days, or areas where the plots are constantly wet.

The embankment should be no less high than the calculated level of the snow layer than the following.(meter)

For type 1.2-i roads

For type 0.7-II roads

For type 0.6-III roads

For type 0.5 roads

For type 0.4-y roads

The design of the line begins with the release of control points on the longitudinal profile of the soil. As control points, the mark of the road conductor on the part of the car moving, the marks on the aqueduct pipes can be assumed:

1. The height of the lower part of the overpass crossbar above the surface of the road surface on which the car will move: when crossing roads of the I - III category, 5m, and when crossing roads of the I-III category, 4.5 are accepted.

2. Determination of the smallest sign of the embankment in front of the pipes. The minimum height of the riser or riser shore above the pipe (control point) is determined depending on the order in which the water flows through that pipe.

When water flows through the pipes without pressure, the mark of the lift bank, the mark of the stream, the diameter of the pipe, the thickness of the pipe (b) and the minimum height of the lift bank (the lift from the pipe) are equal. The height of the lift from the pipe is taken equal to Δ the thickness of the roadbed

$$H_{min} = h_t + b + \Delta$$

When water flows through pipes with half pressure or full pressure

$$H_{min} = H + 1{,}0$$

in this case, H is the height of the water in front of the pipe,m

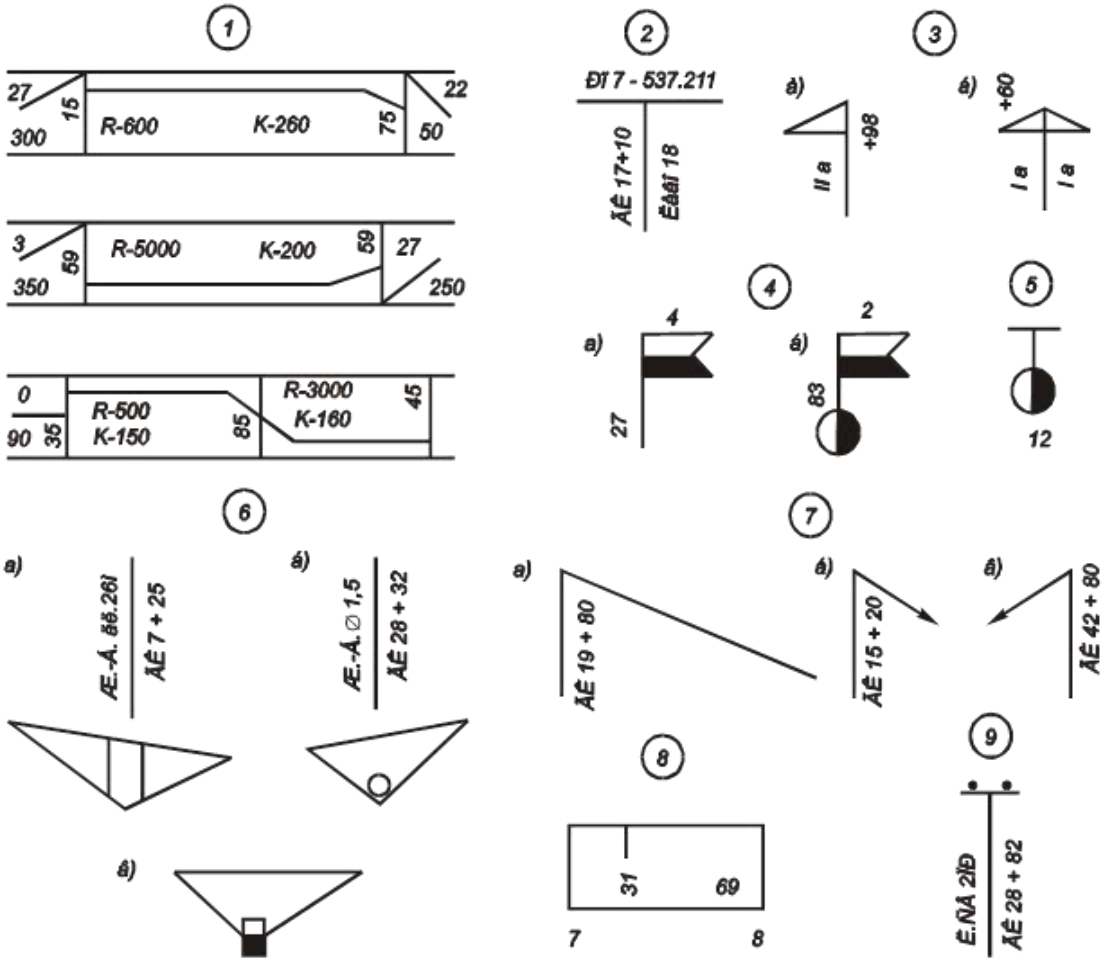
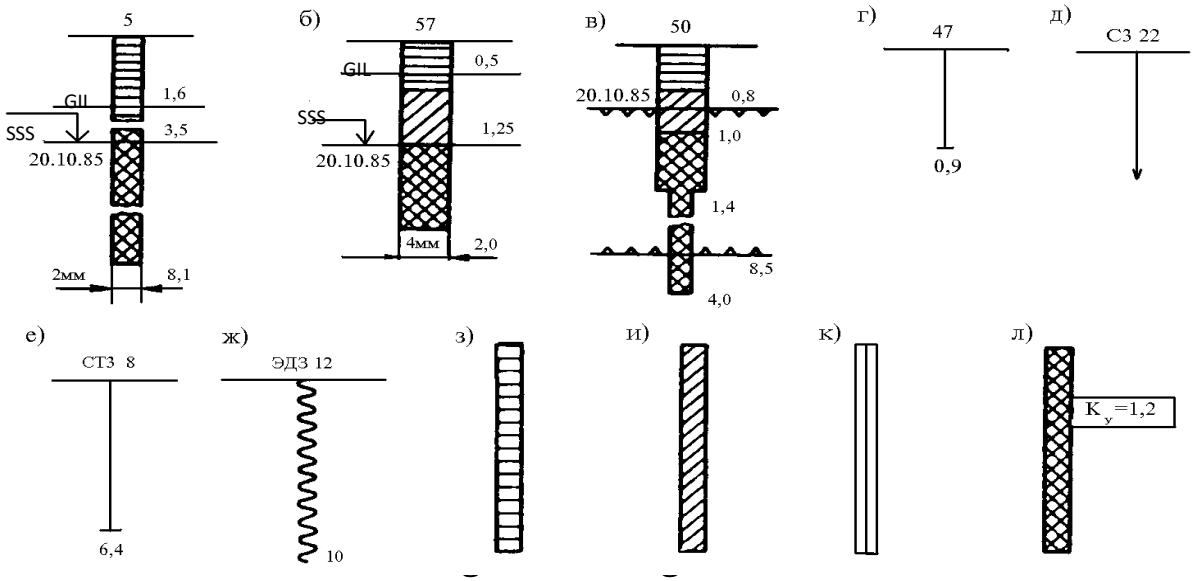


Figure 5 main conditional signs

1 - vertical curved lines; (A is a Convex curve with a lowering index; b is a concave curve with a rising index; v is the transition of a Convex curve to a rising index of a descending curve); 2 - 537, 211 - character rapper 7; 3 - coming out of the road: (a - left , II a – at 98 m from the beginning of the picket according to: (A - at 27 m from the head of an unguarded picket; B-Protected crossing; the numbers on the flags indicate the category of the passage); 5 – kilometer mark; 6 - Bridge and pipes: (a-reinforced concrete bridge or overpass; b-round pipe with a diameter of 1.5 L; V – Ridge rectangular pipe); 7 - water - removing ditches: (a - top ditch; b - throw water to the right; v - throw water to the left); 8 - sign of positive points; 9-two-wire



a - drilled well No. 5 with a depth of 8.1 m (the Gill is at a depth of 1.6 m, the sizot water at 20.10.85 is at a depth of 3.5 m); b - shurf No. 57; v - shurf with a deepened Well No. 50 (the upper limit of a constantly frozen grunt at 20.10.85 is at a depth of Point No. 8; J - electrodynamic inspection point No. 12; z - low - moisture sandy or hard or semi - solid clay grunts; I - wet sandy or hard plastic clay grunts; k - wet sandy or soft plastic clay grunts; l-water-saturated Sandy or plastic-permeable and water-saturated clay grunts, the coefficient of hydration greater than the optimal moisture content is 1.2.

9-PRACTICAL TRAINING
Topic: calculation of the distance of visibility on the road.

We determine the visibility distance for two intersecting highways: for a car trunk with a calculated speed of 150 km/h and for a Class III highway with a calculated speed of 100 km/h. For this, there are three visibility distance detection schemes: 1) visibility distance in front of the obstacle; 2) for cars moving opposite to brake; 3) overtaking the cargo car of a light car when there is counter movement.
We determine the viewing distance for the car trunk according to Scheme 1. We perform the calculation for the horizontal track section:

$$S_1 = \frac{v}{3,6} + \frac{K_э v^2}{254\varphi_1} + l_{з.б,}$$

Where: v —the speed of a light car, km/h; Ke— the efficiency coefficient of the brake, 1.3 for light cars, 1.85 for trucks; F1-the coefficient of longitudinal thrust, equal to 0.50; l x.m - safety Distance 5 m
Putting the expression in place, we find:

$$S_1 = \frac{150}{3,6} + \frac{1,3 * 150^2}{254 * 0,50} + 5 = 277,0 \text{ м} \approx 280 \text{ м.}$$

According to Scheme 1 on the adjacent track:

$$S_1 = \frac{100}{3,6} + \frac{1,3 * 100^2}{254 * 0,50} + 5 = 135,2 \text{ м} \approx 140 \text{ м}.$$

According to scheme 2:

$$S_2 = 2\left(\frac{v_л}{3,6} + \frac{K_э v_л^2}{254\varphi_1}\right) + 5 = \frac{100}{1,8} + \frac{1,3 * 100^2}{127 * 0,50} + 5 = 265,4 \text{ м} \approx 270 \text{ м}.$$

According to Scheme 3, a passenger car moving at a speed of Veng =100 km/h will climb onto the counter tape so that it can overtake a freight car with a speed of Vyuk=50 km/h. In this case, the distance between the light and the cargo car:

$$l_2 = l_1 + \frac{К_э(v_л^2 - v_г^2)}{254\varphi_1} - \frac{v_л}{3,6} + \frac{К_э(v_л^2 - v_г^2)}{254\varphi_1}$$

If we put the values in place:

$$l_2 = \frac{100}{3,6} + \frac{1,3(100^2 - 50^2)}{254 * 0,50} = 104,6 \text{ м}.$$

L1 presses the distance at T1= L1/Veng time until the passenger car reaches the freight car. At this time, the cargo car passes the distance L1- (l2-la) at the Vyuk speed. la=3 m. Compared to L1:

$$\frac{L_1}{v_л} = \frac{L_1 - (l_2 + l_a)}{v_г};\ L_1 = \frac{v_л}{v_л - v_г}(l_2 + l_a)$$

If we put the values in place:

$$L_1 = \frac{100}{100 - 50}(104,6 + 3) = 215,2 \text{ м}.$$

$$l_3 = \frac{K_э v_г^2}{254\varphi_1} + l_{э.б} = \frac{1,5 * 50^2}{254 * 0,50} + = 30,6 \text{ м}.$$

$$\frac{L_2}{v_л} = \frac{L_2 - (l_3 + l_a)}{v_г};\ L_2 = \frac{v_л}{v_л - v_г}(l_3 + l_a).$$

$$L_2 = \frac{100}{100 - 50}(30,6 + 3) = 67 \text{ м}.$$

When overtaking a passenger car, it covers the following distance:

$$L_3 = \frac{(L_1 + L_2)v_в}{v_п} = \frac{(215,2 + 67)55}{100} = 155,2 \text{ м}.$$

Viewing distance in overtaking:

S3=L1+L2+L3=215.2+67+155.2=437.4≈440 m

If the speed of the upcoming passenger car is 100km / s:

S_3= 215.2+67+282.2=564.4≈570 m

Side view distance:

$$S_{бок}\frac{v_П}{v_а}S_1 = \frac{10}{60}140 = 23,3 \text{ м} \approx 24 \text{ м}.$$

10-Practical Training
Subject: pipe hole detection.

I.Preliminary data for the detection of pipe holes and small bridge holes:
1. Road level
2. Fatyn district
3. Increased probability of rain, %
4. Territorial location of the track
5. Type of Grunt, a
6. Basin Area, F km2
7. Soy length (from the highest point of the basin where precipitation falls to a small structure), L km
8. Soy slope, is %o
9. Structure slope, iinsh % o
10. Slope Slope, 1:m

When designing pipes and small bridges, the calculated values of the probable supply of the maximum flood consumption are taken as follows (QMQ 2.05.03-97);

Road category I II-III IV-V
Possible secured amounts,% 1 2 3

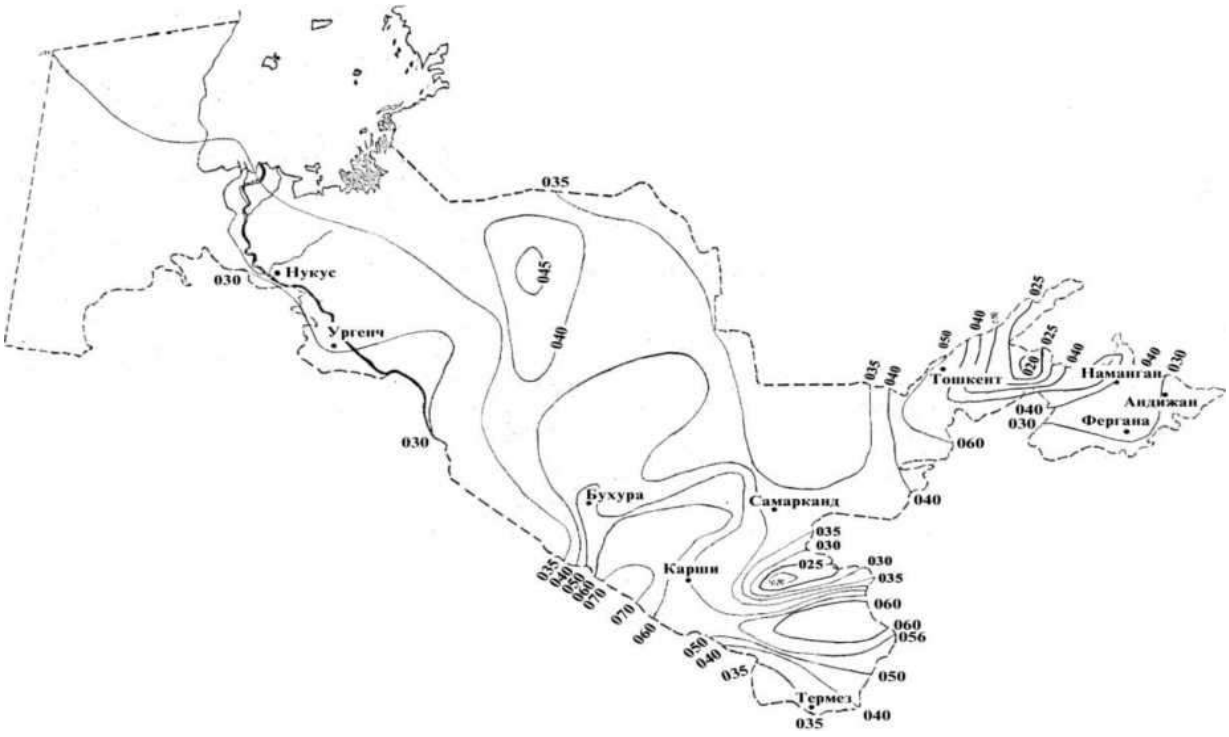


Figure 1. Intensity map of a one-hour liked rain in 1% supply

Regions	The increase is most likely an hour-long Jalan when intensity, %							
	10	5	4	3	2	1	0,3	0,1
1	0,27	0,27	0,29	0,32	0,34	0,40	0,49	0,57

2	0,29	0,36	0,39	0,42	0,45	0,50	0,61	0,75
3	0,29	0,41	0,47	0,52	0,58	0,70	0,95	1,15
4	0,45	0,59	0,64	0,69	0,74	0,90	1,14	1,32
5	0,46	0,62	0,69	0,75	0,82	0,97	1,26	1,48
6	0,49	0,65	0,73	0,81	0,89	1,01	1,46	1,79
7	0,54	0,74	0,82	0,89	0,97	1,15	1,50	1,99
8	0,79	0,98	1,07	1,15	1,24	1,41	1,78	2,07
9	0,81	1,02	1,11	1,20	1,28	1,48	1,83	2,14
10	0,82	1,11	1,23	1,35	1,46	1,74	2,25	2,65

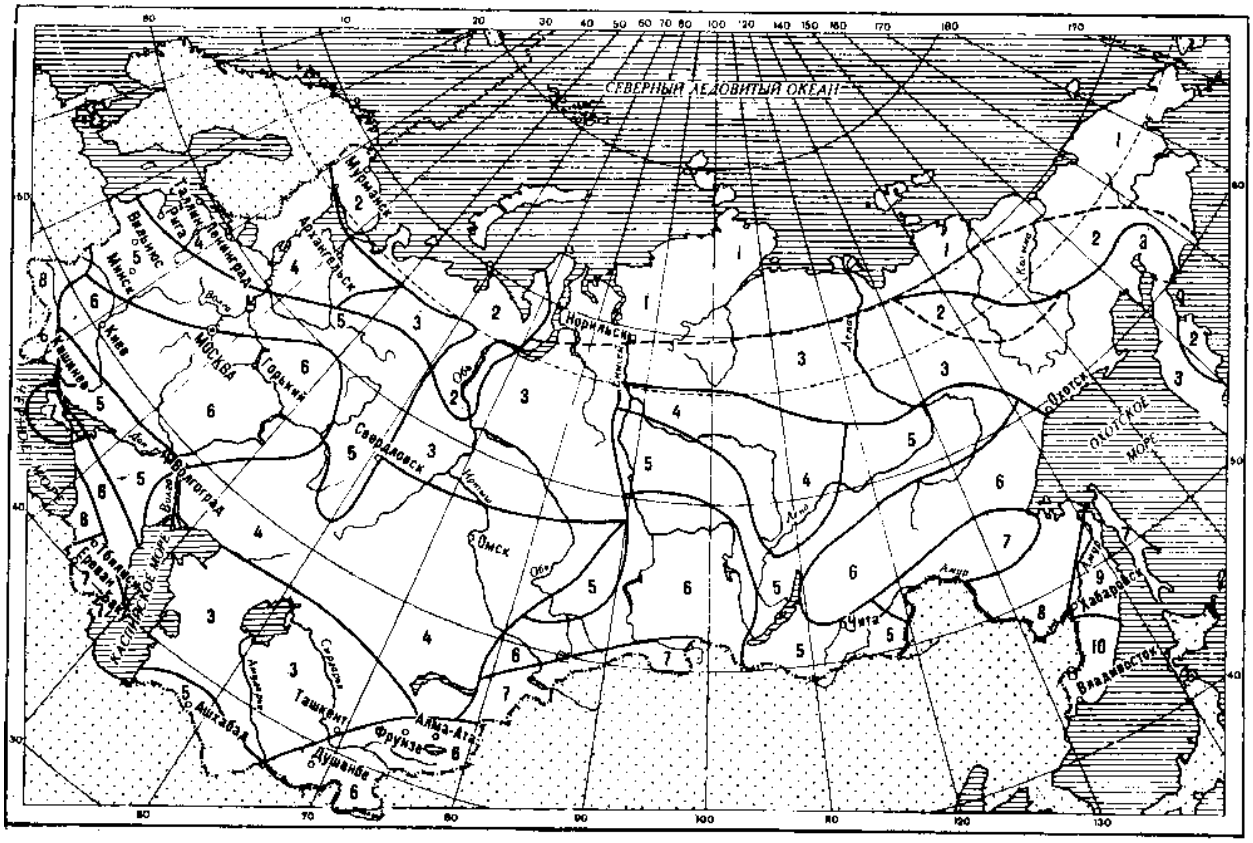


Figure 2.Map-scheme of the Jala area

II. Based on the information provided, the following views are determined.

1. The intensity of the rain that falls in an hour, asoat

2. The coefficient of transition from the duration of one hour of precipitation to the rain of a favorable duration, according to the length and slope of the stream (L=9.8 km I=0.0001 Kt=0.36) (from Table 2).

3. Flow loss coefficient, (from Table 3) α=0.6 for suglinock;

4. The reduction coefficient is determined according to the surface of the basin, (from Table 3)

The maximum over-probability flow of Jala waters depends on the category of the highway and is determined by the following formula:

$Q_{max}^{yog'} = 16.7a_{soat} K_t F\alpha\varphi$

Here: asoat - an hour-long jala intensity (determined from Table 1 or Figure 3), mm/min; asoat = 1.01

CT-the transition from an hour-long jala intensity to the calculated intensity ofkoeffisenti:

$$K_t = \left(\frac{60v_{ye.k}}{L}\right); \text{chim bosgan sirtlar } v_{ye.k} = 0{,}2I^{1/4}; \text{silliq sirtlar } v_{ye.k} = 0{,}6I^{1/4}$$

Vye.k Water arrival speed, km / min

F-the area of the water body , km2,is determined in the horizons by card; F =2.35 km2

A-flow cofficent, depends on the type of grunt on the surface of the water body, (3-jad)a=0.75

φ-reduction coefficient, taking into account the incompleteness of the flow

$Q_{max}^{yog'}$=16.7*1.01*0.36*2.35*0.75*0.45=4.82 m^2 /s

We determine the full flow of Qto. In doing so, the qto from QMax's health should not be large.

$Q_{i.o}$=87.5*1.01*2.35=207.68m^3/s

III. Determination of the total amount of water in the rain stream. It is determined by the following expression:

$$W_{jk} = 60000\frac{a_{soat}F\alpha\varphi}{\sqrt{K_t}} = 34800m^3$$

IV. Determination of the maximum value of the current from the snow dressing: it is determined by the following expression:

$$Q_{max}^{qor} = \frac{mF\delta_1\delta_2}{\sqrt[4]{F+1}} = \frac{0.07*2.35*0.9*1.0}{(2.35+1)^{\frac{1}{4}}} = 0.109m^3/s$$

Here: M is the maximum module of the current; (fig.

δ1, δ2 - coefficients taking into account the salinity and swamp of the place are obtained. δ_1= 0.9,δ_2=1.0

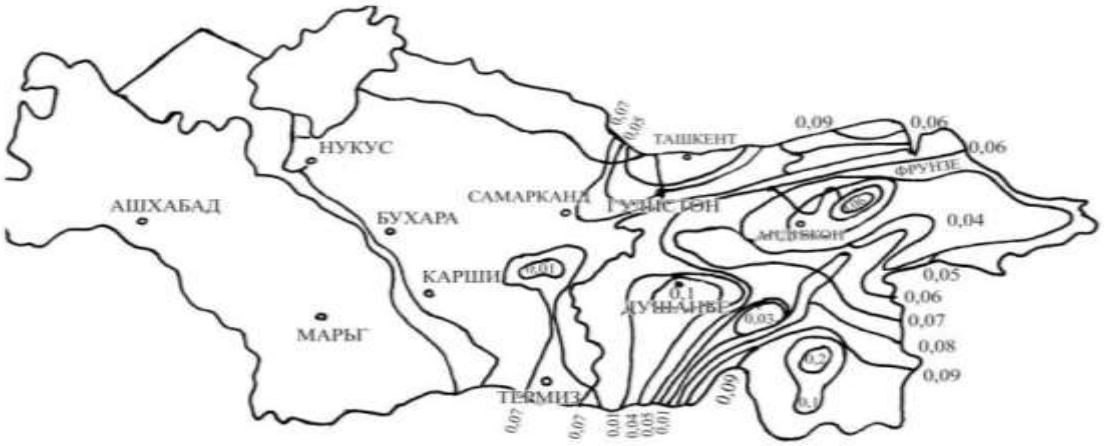


Figure 3. Snow water flow module map

$Q_{\max}^{yog'} > Q_{\max}^{qor}$ must be

$4.82 m^3/s > 0.109 m^3/s$

Comparing these, we take Qhis = 4.82m3 / s for the account.

We determine the pipe hole according to Table 4 [3]

Qmaxyog =4.82 m3/s can conduct a round pipe with a consumption of d = 1.5 m.

Water depth N = 1.81 m in front of the pipe, speed - 4.3 m/s.

Pressure-free mode because $N<1.2h_t$:

1.81<1.2*1.5=1.8m

№	LKm/ i	0,0001	0,001	0,010	0,1	0,2	0,3	0,5	0,7
1	0,15	4,25							
2	0,30	2,57	3,86						5,24
3	0,50	1,84	2,76	3,93					
4	0,75	1,41	2,08	2,97	4,50	5,05			
5	1,0	1,16	1,71	2,53	3,54	4,18	4,50	4,90	5,18
6	1,50	0,86	1,30	1,93	2,82	3 , 1 5	3,40	3,70	3,90
7	2,0	0,73	1,09	2,59	2,85	2,64	2,85	3,09	2,27
8	2,5	0,63	0,92	1,37	2,02	2,26	2,44	2,65	2,80
9	3,0	0,68	0,82	1,21	1,79	2,00	2,16	2,34	2,49
10	3,5	0,50	0,74	1,10	1,62	1,81	1,95	2,12	2,31

11	4,0	0,45	0,68	1,00	1,48	1,65	1,78	1,94	2,11
12	4,5	0,42	0,62	0,93	1,37	1,56	1,65	1,78	1,95
13	5,0	0,40	0,56	0,86	1,27	1,42	1,54	1,67	1,82
14	6,0	0,35	0,52	0,76	1,13	1,26	1,36	1,48	1,68
15	7,0	0,32	0,47	0,69	1,02	1,14	1,23	1,33	1,45
16	8,0	0,29	0,43	0,63	0,93	1,04	1,12	1,22	1,33
17	9,0	0,27	0,39	0,58	0,86	0,96	1,04	1,13	1,23
18	10,0	0,25	0,37	0,54	0,80	0,90	0,97	1,05	1,14
19	11,0	0,23	0,34	0,51	0,75	0,84	0,91	0,98	1,07
20	12,0	0,22	0,32	0,48	0,71	0,79	0,86	0,93	0,99
21	13,0	0,21	0,31	0,46	0,67	0,75	0,81	0,88	0,96
22	14,0	0,20	0,29	0,43	0,64	0,72	0,79	0,84	0,91
23	15,0	0,19	0,28	0,41	0,61	0,68	0,74	0,80	0,87
24	20,0	0,16	0,23	0,34	0,50	0,56	0,61	0,66	0,72

View and structure of the basin surface	F (km2) coefficient a According to the		
	0-1	1-10	10-100
Asphalt, concrete, crackless rock tie, tie	1	1	1
soil Suglinocks	0.80-0.95	0.65-0.95	0.55-0.90
Lyoss, carbonate soil Supes, steppe-	0.70-0.90	0.55-0.80	0.50-0.75
desert soils sandy, rocky, grainy rocky	0.55-0.80	0.45-0.75	0.35-0.65
soil	0.35-0.60	0.20-0.55	0.20-0.45

№	F km2	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	0,10
1	A	1	0,8	0,75	0,7	0,67	0,6	0,61	0,5	0,58	0,56
2	F km2	1,5	2	2,5	3	4	5	6	8	10	12
3	A	0,5	0,4	0,45	0,4	0,40	0,3	0,36	0,3	0,32	0,30
4	F km2	14	16	20	25	30	40	50	6	80	100
5	A	0,2	0,2	0,27	0,2	0,24	0,2	0,21	0,2	0,19	0,18

№	Head type	pipe diameter,m	Surfing, m 2/s	Thickness of water in front of the pipe, m	Water at the exit from the pipe
bosimsiz rejim					
1	Portal	0,75	0,25	0,41	1,40
			0,40	0,62	1,70
			0,60	0,79	2,00
			0,74	0,90	2,20
2	Rastrubli	1,00	1,00	0,94	2,40
			1,70	1,27	2,70
			1,40	1,15	2,70
3	Rastrubli zvenoli	1,00	0,60	0,57	1,40
			1,00	0,84	2,40
			1,40	1,03	2,70
			1,70	1,08	2,70
			2,00	1,31	3,30
			2,20	1,39	3,40
		1,25	1,00	0,77	2,20
			1,50	0,95	2,50
			2,00	1,13	2,70
			2,50	1,29	3,00
			3,90	1,74	3,80
			2,70	1,37	3,20
			3,00	1,46	3,30
			3,50	1,61	3,50
		1,50	2,50	1,19	2,90
			2,80	1,27	3,00
			3,00	1,32	3,00
			3,50	1,45	3,20
			3,90	1,54	3,30
			4,30	1,63	3,50
			4,70	1,75	3,70
			5,00	1,81	3,70
			6,00	2,08	4,10
		2,00	3,50	1,26	2,90
			4,00	1,36	3,00
			5,00	1,55	3,30
			4,50	1,47	3,20
			5,50	1,65	3,40
			6,00	1,73	3,50
			6,50	1,81	3,60
			7,00	1,90	3,70
			7,50	1,98	3,80
			8,00	2,06	3,90
			8,50	2,14	4,00
			9,00	2,22	4,10
			9,70	2,32	4,20
			10,00	2,38	4,30
			10,50	2,48	4,30
			11,00	2,54	4,50
			12,50	2,78	4,80
pressure-free mode					
4	Rastrubli s normal view	1,00	1,70	1,27	3,60
	Rastrubli s normal view		2,30	1,89	4,90
			2,50	2,12	5,30
			2,80	2,54	6,00

		1,25	3,00	1,59	4,10
			3,50	1,00	4,80
			4,00	2,38	5,50
			4,40	2,73	6,00
		1,50	4,70	1,91	4,40
			5,20	2,21	4,90
			5,60	2,42	5,30
			6,00	2,64	5,70
			6,36	2,85	6,00
p					
5	outgoing zvenali	1,00	3,00	1,66	4,20
			3,50	2,02	5,00
		1,25	5,00	1,96	4,50
			6,00	2,45	5,40
		1,50	7,00	2,24	4,40
			8,00	2,40	5,00
			8,50	2,58	5,30
		2,00	13,50	2,86	4,90
			14,50	3,01	5,10
			16,00	3,11	5,70
			16,50	3,22	5,90

Assignment: determine the pipe diameter based on the information provided by the teacher

11-PRACTICAL TRAINING
Calculation of holes of small bridges and determination of the height of structures

We know the scheme of the flow of water under the bridge, determining the cost of calculating the flow htab (natural depth) to determine the hole of small bridges

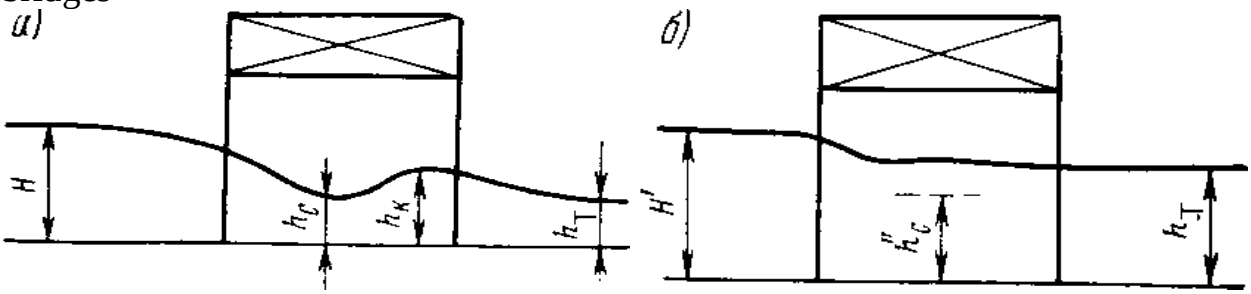


Figure 1. Scheme of water flow under a small bridge:

a-free flow; B-noerkin flow.

I. Determination of the type of flow flowing under a small bridge;
if htab < 1,3 hkr, there will be a free stream; if htab > 1,3 hkr, there will be noerkin stream.

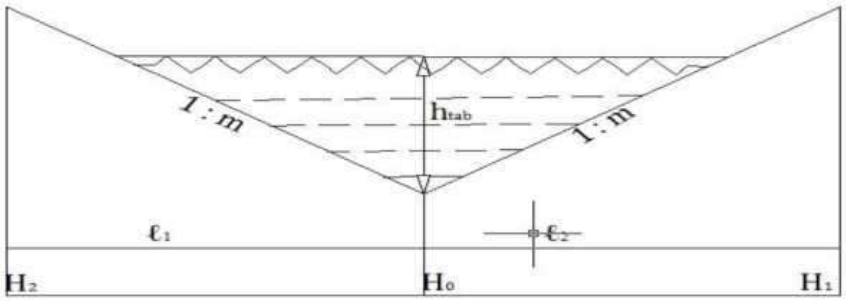
1. Determination of the critical height of the flowing water under a small bridge.

$$h_k = \frac{v_{siq}^2}{g} = \frac{3.85^2}{9.81} = 1.51m$$

Here: - the flow rate at the place of compression;
Vsiq - =1.1*Vroh =1.1*3.5=3.85 m/s
Vruh-fixed flow rate;
g-free fall acceleration (g=9.81)

Reinforcement	Reinforcement	Reinforcement	Reinforcement
Planting grass	0,8	Reinforced grunt of the following thickness, CM	1,0 2,5
Laying grass pressing	1,0	Low brand concrete	4-6
Grass click on the wall	1,8	Concrete slabs	5-7
15-25	2,5-3,5	Water discharge steps	5 dan orti
Laying two layers of stones 15-25 cm	3,5-4,5		

Determination of the natural depth of the flowing ocean under a small bridge.



$$h_{tab} = m\sqrt[3]{\frac{K}{J}};$$

Here: M is the parameter that takes into account the coefficient of friction,m=0.55

K- module consumption $K = \frac{Q_{his}}{\sqrt{J_0}}; K = \frac{40.3}{\sqrt{0.024}} = 260$

J- the sum of the transverse slope of the creek; $J=m_1+m_2=2.35+2.35=4.7$
J_0= structure slope; $J_0=0.024$

$$h_{tab} = 0.55\sqrt[3]{\frac{260}{4.7}} = 0.97m;$$
$$h_{tab} = 0.97m < 1.963 = 1.3 * 1.51$$

Kichi bridge hole detection (according to htab expression).

III. The smallest height mark of a small bridge is defined as:

$$H_{min}=0.88H+\Delta+h_{kon}$$

Where: 0.88-coefficient taking into account the slight decrease in water level when the current enters under the bridge;
Δ = 0.5 m-height of the base of the bridge arch over the water level,
When the King shabba flows Δ=1.0 m;
hkon - bridge archingconstructive height, m;
H-depth of water in front of the bridge, m;

INDEPENDENT TRAINING SESSIONS

The form and content of the organization of independent work

The main goal of the student's independent work is the formation and development of knowledge and skills in order to independently carry out certain educational work in the competence and control of the teacher. When organizing independent work of a student, the following forms are used:

- independent mastering of certain theoretical topics with the help of educational literature;
- preparation of information (Abstract) on the given topics;
- application of Azeri knowledge in practice;
- create layouts, models and samples;
- scientific article, preparation of the conference and x.k.

A set of instructions and recommendations, issues will be developed by the professors and teachers of the Department on the organization of practical classes. It provides students with practical issues and methods of solving examples on the main topics of lectures and issues for independent solution.

Topics of recommended independent work:

№	Independent educational topics	Assignment given
1	Study of government decisions and orders on the development of highways of the Republic of Uzbekistan.	Synopsis on the topic, drawing up test questions and preparing presentations
2	The study of Highway law.	
3	Study of regulatory documents on the design of roads.	
4	Modern standards for the design of highways.	
5	Classification of highways in foreign countries.	
6	Determination of visibility distance on roads.	
7	Virages and methods of their design.	
8	The main rules for choosing the direction of the track.	
9	Methods for taming road poi priority.	
10	When designing roads, take into account their compatibility with the environment.	
11	Design of intersections of different levels.	
12	Nobikir road mat design principles.	
13	Removal of surface waters in the road region.	
14	Drains. Removal of groundwater.	
15	Design of Bikir road beds.	
16	Road race design styles on artificially irrigated land.	
17	Road design peculiarities in swamps.	
18	Peculiarities of the design of roads in sandy areas.	
19	Peculiarities of road design in saline areas.	
20	Design of roads in mountainous areas.	
21	Analysis of serpentines on the roads of Uzbekistan.	

22	Methods for crossing open streams of water.	
23	Superstructure of the road race on the mountain slopes.	
24	Snow and landslide protection facilities.	
25	Prop walls. Half bridgehead, Trestles.	
26	The reason for the deformation of the bridge substructure. Uzan deformations.	
27	Causes of general and local washes and their calculation of depth.	

GLOSSARY

Highway - *avtomobil yo‘li* - an engineering structure envisaged for the movement of a car. A road stake, a roadbed, a commuting section, a road collar, artificial and permanent structures and all kinds of equipment are the main elements of the road.

Departmental road - *muassasa ixtiyoridagi avtomobil yo‘li* - in the balance sheet (account)of the enterprise and the organization and is intended for servicing the transportation of their production, technological cargo and is divided into technological, domestic economic, Service, Patrol and other ways adjacent to production facilities and public network roads.

On-farm road - *ichki xo‘jalik avtomobil yo‘li* - Highways of industrial enterprises

On-farm agricultural road -*qishloq xo‘jaligidagi ichki xo‘jalik yo‘li* - Road on a rental farm and farm. It connects the central region with divisions, livestock complexes, farms, Field sheds, enterprises for the preparation, storage and primary processing of products, as well as these enterprises by mutual and general sectoral means.

The road is temporary-*vaqtinchalik avtomo-bil yo‘llari* - A road designed for a service life of less than 5 years and providing the movement of vehicles or vehicles in general use for the service of cargo and passenger transportation during the period of construction, reconstruction or repair of new facilities.

Auxiliary road - *yordamchi avto-mobil yo‘li* - a road adjacent to and approaching the main network of the road, serving to provide transportation to the territory of the Republic, Region, District.

Minor road - *ikkinchi darajali avtomobil yo‘li* - in terms of its importance, carrying capacity or technical solutions, the intersecting or adjacent to it gives way to the road.

Main road - *asosiy avtomobil yo‘li* - oin its importance is the path superior to the paths that cut or adjoin them in terms of movement flow, volume of transport or technical solutions.

Mountain road - *tog‘dagi avtomobil yo‘li* - a path through a mountainous place with a large slope in the longitudinal section, with a small radius in the plan, with a curvature, Serpentine and special engineering structures that protect against landslides, drifts, avalanches and stone spills, as well as others.

Winter road (winter winch) - *qishki avto-mobil yo‘li* - a road built of layered improved ice or condensed snow and ice, and passed along the improved river and lake ice.

Ring road - *halqasimon avtomobil yo‘li* - a road that bypasses the planned area of the city or other territory by closed curvature, interconnecting access roads to the city, intended to free the suburban roads and the urban street network from transit movements.

Multi-lane road - *ko‘p tasmali (polosali) avtomobil yo‘li* - the place of the vehicles and the road that provides more rigorous movement.

Local Highway - *mahalliy ahamiyatdagi avtomobil yo‘li* - on the border of the administrative district is a road that ensures the interaction of enterprises, institutions.

Highway of regional (regional) significance - *viloyat, o‘lka ahamiyatidagi avtomobil yo‘li* - connecting the administrative centers of the Capitals, regions and regions of the autonomous republics; connecting the administrative centers and towns of the districts among themselves and with railway stations, airports, River harbors, treatment and recreation facilities, sports complexes, as well as roads of general state and Republican significance.

Shared network highway - *umum tarmoq avtomobil yo‘li* - the road in general use, which meets the requirements of the state standard (by weight and size), provides for the movement of vehicles. Stands on the account of Road farm organizations of neighboring respub-Likas. The national network highway is divided into roads of National, Republican, local, regional and local importance according to its national economy and administrative significance.

Biclothoid - *biklotoida* - a curve consisting of two clotoids of the same curvature, with the same small radii at the junction point, and a common attempt.

Curve bisector - *egrining bissektrisasi* - the track is a section of a straight line that connects the tip of the angle of rotation with the center of the curve.

Bordyur - *hoshiya* - constructive side border of the coating installed on the same level or higher with the surface of the commuting part.

Brow - *yo‘l qirg‘og‘i* - 2.2. bandga qarang.

Turn - *viraj* a cross-section with a slope of the commuting part, which is built on small radial curves, directed towards the center of the curve. The main elements of the Virage are: the transverse slope of one section of the carriageway; the length of the section with one slope; the length of the passage to the Virage (the part where the transition from a two-Slope section to a one-Slope section and vice versa is carried out). The choice of the value of these dimensions depends on the calculated speed, the radius of the curve and its central angle, the width of the commuting part. It will be built to increase the priority of the car on the curve. It is possible to build a staircase with different transverse slopes.

Straight insert - *gorizontal egri orasidagi to‘g‘ri chiziq* - bir yoki qaram-qarshi tomonga yo‘nalgan rejadagi yonma-yon egrilar orasidagi trassaning to‘g‘ri qismi.

Travel clothing - *yo‘l to‘shamasi* - a multilayer (in some cases single-layer) structure that receives the weight from the vehicles and transfers it to an earthen base or underground part. The top layer of the roadbed consists of a road covering, and the bottom layer consists of additional layers of the base and base.

Subgrade - *yo‘l poyi* - a road structure, which will be the basis for the placement of structural layers of the roadbed and other elements of the roadway. The road stake rises from local (or transported) soils, ensuring

the priority of road collars, side slopes and Tabbi ostki soils. The road stake is built in a raised or carved look, and the mountain side is built in a half - up-half-carved look. The road race includes systems for removing water associated with it: ditches, reserves, devices for escaping the poison of the Earth. Road share width is the distance between the banks and is determined by the category of road.

Side ditch (ditch) - *yo'l chetidagi ariq (yon ariq)* - the cross-section can be in the form of a trough, triangle or Trapezium, which is located along the road stake to collect and remove groundwater flowing from the carriageway and the surrounding area.

Clotoid - *klotoida* - curvature is an increment in the inverse proportion to its length ($R=F^2/L$)' egri. SHuningdek "Biklotoida"ga qarang.

Curve in plan - *rejadagi egri* - a section of road with a curved line that is built in the plan of the road when the direction of the track changes. It can be made up of a single circular curve with a large radius, or several curves, that is, a circular curve, and generally variable radial curves that are built to improve motion conditions in small radial circular curves.

Auxiliary curve - *yordamchi egri* - the transition curve between the direction of the track and the set line of Serpentine.

Curve in the longitudinal profile (vertical) - *bo'ylama kesimdagi (vertikal) egri* - in the slope change, the longitudinal cross section is the curve adjacent to the turn. Curves can be bubble and concave. The bubble curve is used when the slope decreases or the slope increases when going down from elevation to height, as well as when climbing to height. The bogie curve is used when the slope decreases or the slope increases when climbing from low to high, as well as when going down. Depending on the category of paths that differ from the slope in the place where the longitudinal cross section project line is broken, a vertical curve should be designed in the longitudinal cross section.

Box curve - *korobali egri chiziq* - a series of circular curves. A curve that has common attempts at junction points, consisting of a series of rotational curves with a curvature in one direction.

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APPLICATIONS

TESTS ON THE SUBJECT" DESIGN OF HIGHWAYS"

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

What standards of motorway design are given in the document
SHNQ 2.05.02-07
SHNQ 3.05.04-08
SHNQ 4.05.05-09
SHNQ 5.05.06-07

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

From when the law of the Republic of Uzbekistan "on highways"came into force
From October 2, 2007
From August 24, 2007
Since June 29, 2007
From October 2, 2008

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

When was the decree of the president of the Republic of Uzbekistan No. 4954 PF " on measures to further improve the road management system" adopted
February 14, 2017
2018il24 August
October 2, 2017
2018il29 June

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

Determine the line in which the classes of highways are correctly indicated
Highways, expressways, typical road types
International, state, local
Ia, Ib, II, III, IV, V
Highways, expressways, international, state, local and typical road types

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

Determine the line in which the name of the tracks is correctly indicated according to its economic importance
Roads of international, state and local importance
Highways, expressways, typical road types
Highways, expressways, international, state, local and typical road types
Highways, expressways, typical road types

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

If the intensity of the calculated effort is equal to several listed units/Day, the projected path is considered to be of Category III
2000-6000 quoted PCs/day
6000-14000 quoted PCs/day
200-2000 quoted PCs/day
Up to 200 pieces / day

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

Road elements of Category IV: total number of traffic bands; width of the movement band determine the line correctly indicated in accordance with the dimensions of the road collar width
2; 3,0; 2,0
2; 3,75; 3,75
2; 3,5; 2,5
1; 4,5; 1,75

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

Determine the correctly indicated line according to the coefficients of bringing cargo cars of 2.0, 6.0, 8.0 tons according to the possibility of lifting
1,5, 2,0, 2,5
2,0, 2,5, 3,0
2,5, 3,0, 3,5
3,0, 3,5, 4,0

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

When designing a highway of Category III, determine the line in which the calculated speeds adopted in the main, low-high and mountainous areas are correctly indicated
100 km / h, 80 km / h, 50 km / h
150 km / h, 60 km / h, 40 km / h
80 km / h, 40 km / h, 30 km / h
60 km / h, 50 km / h, 30 km / h

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

The position of the geometric line of the road in place is called its ...
Track
Plan
Cross section
Longitudinal cut

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

The graphic image of the projection of the track on the horizontal plane at a reduced scale is called ...
Track plan
Track
Cross section
Longitudinal cut

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

Geometric elements of curves correctly determine the specified row
Angle; radius; curve; tangent; bisector
Trassa; angle; radius; curve; tangent; bisector
Plan; angle; radius; curve; tangent; bisector
Cross section; angle; radius; curve; tangent; bisector

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

The projection of the path axis shown by spreading on the plane of the drawing on the vertical plane is called ...
Longitudinal profile of the road
Track plan
Track
Cross section

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

The line connecting the ground surface marks on the longitudinal profile is called ...
Earth Surface line
Longitudinal profile of the road
Track plan
Cross section

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

The image of the cut of the path with a vertical plane in a reduced scale is called ...
Transverse profile
Track plan
Track
Longitudinal profile of the road

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

The strip of the road surface on the part where cars move is called ...
Commuting part
Transverse profile
Track plan
Track

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

The upper part of the roadbed is called ...
Coating
Main
Commuting part
Road collar

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

The distance between the road banks is called ...
Width of the road stem
Commute part width
Road collar width
Coating width

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

When the car was given a full load graph of the dependence of the dynamic factor on the speed of movement professor Ye.A. By Chudakov .. called
Dynamic characteristic
Kinematic characteristics

Static characteristic
Statistical characteristic

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

For emergency stopping of the car or reducing the speed ... applies
Braking
Acceleration
Slow down
Stop or speed reduction

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

Total time for determining the elements of highways in the plan and profile when calculating the braking path .. is called
Driver sensing time
Stop or speed reduction time
Braking time
Time to slow down

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

The grunts used to build a lift are divided into nech groups
4
5
6
7

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

How many meters should be the minimum distance to see an obstacle on the road when the calculated speed is 100 km/h
200 meters
300 meters
100 meters
150 meters

Chapter No. 1fan-1; Department of Science-1; Difficulty Level-1;

How many meters should be the minimum distance to see the car coming across when the calculated speed is 100 km/h
350 meters
300 meters
100 meters
150 meters