

**O‘ZBEKISTON RESPUBLIKASI OLIY VA O‘RTA MAXSUS TA‘LIM  
VAZIRLIGI**

**TOSHKENT DAVLAT TEXNIKA UNIVERSITETI**

**GEOLOGIYA VA KONCHILIK ISHI FAKULTETI**

**“Marksheyderlik ishi va geodeziya” kafedrası**

**5311600 – “Konchilik ishi” ta’lim yo‘nalishi talabalari uchun  
“Marksheyderlik ishi” fanidan amaliy mashg‘ulotlarni bajarish uchun**

**USLUBIY KO‘RSATMA**

**TOSHKENT – 2016**

**Tuzuvchilar:** dotsent Inogamov I.I., Kazakov A.N.

5311600 – “Konchilik ishi” ta’lim yo‘nalishi talabalari uchun “Marksheyderlik ishi” fanidan amaliy mashg‘ulotlarni bajarish uchun uslubiy ko‘rsatma. – Toshkent, ToshDTU, 2018. 44 bet.

Ushbu amaliy mashg‘ulotlar to‘plamida “Marksheyderlik ishi” fanining dasturi asosida ishlab chiqilgan amaliy ishlarni bajarish tartibi keltirilgan.

Har bir amaliy ishda uning maqsadi bayon etilgan va qisqacha nazariy ma’lumotlar keltirilgan, amaliyot stendining asosiy qismlari tushuntirib o‘tilgan, amaliyot ishlarini bajarish uchun zarur bo‘lgan moslamalar hamda ishlarni bajarish tartibi, hisobotning tarkibi, zaruriy adabiyotlarning ro‘yxati berilgan.

Ko‘rsatmadan maqsad nazariy ma’lumotlarni tajriba o‘tkazish natijalaridan kelib chiqqan ma’lumotlar yordamida hisoblab amalda qo‘llash ishlari ko‘zda tutilgan. Har bir parametrlar bo‘yicha misollar keltirilgan bo‘lib talabalarning bilimlarini mustahkamlashda ma’lum bir ko‘nikmalar hosil qilishda muhim rol o‘ynaydi.

Amaliy ishlari to‘plami oliy ta’lim bakalavriat bosqichining 5311600 – “Konchilik ishi” yo‘nalishi talabalari uchun mo‘ljallab tuzilgan.

**Tuzuvchilar:** Inogamov I.I. - TDTU, GKIF, «Marksheyderlik ishi va geodeziya» kafedrası dotsenti;  
Rahimova M.X. - TDTU, GKIF, “Marksheyderlik ishi va geodeziya” kafedrası assistenti.

**Taqrizchilar:** Nosirov O‘.F. - “Konchilik ishi” kafedrası mudiri, t.f.d, dotsent.  
Naimova R.Sh. - TDTU, GKIF, «Marksheyderlik ishi va geodeziya» kafedrası dotsenti;

Ushbu uslubiy qo‘llanma “Marksheyderlik ishi va geodeziya” kafedrası majlisida muhokama qilingan va №\_\_\_\_ sonli «\_\_»\_\_\_\_\_ 201\_\_ Bayonnomasi bilan tasdiqlangan.

Kafedra mudiri

dots. Sayyidqosimov S.S.

Geologiya va konchilik ishi fakulteti o‘quv-uslubiy Kengashi majlisida muhokama qilingan va qo‘llash uchun tavsiya etilgan. «\_\_»\_\_\_\_\_ 201\_\_ yil.

GKIF O‘UK raisi

Xodjayev X.S.

## **1-Amaliy ishi. Profil chiziqlari bo'yicha reperlarning siljishini kuzatish natijalarini hisoblash**

Kon lahimlarini o'tish natijasida tog' jinslaridagi kuchlanishlar qayta taqsimlanadi. Agar vujudga kelgan kuchlanish tog' jinslarining mustahkamligiga ta'sir etsa, bu holat tog' jinslarining buzilishiga olib keladi va ularning buzilishi kon lahimi tomonga suriladi. Bunday holat siljish tog' jinslari deb ataladi. Kon lahimini o'lchami va kon ishlarining o'zaro chuqurligi ta'sirida tog' jinslarining siljish zonasi er yuzasigacha chiqadi. Buning natijasida er yuzasida cho'kish hosil bo'ladi, bu zonani siljish muldasi deb ataladi.

### **1. Ishdan maqsad:**

1.1 Kuzatish natijalarini hisoblash tartibini o'rganish.

1.2 Kuzatuv natijalari tahlilini o'rganish

### **2. Ishni bajarish tartibi:**

2.1 Variantga asosan jadvaldan profil chizig'i joylashadigan hududni geologik va kon texnik sharoitlarini yozib olish.

2.2 Profil chizig'i bo'yicha 1:1000 yoki 1:2000 masshtabda geologik kesim qurish.

2.3 Geologik kesmaga kon ishlarini tushirish.

Izoh: qatlam yotiqligiga ko'ndalang kesimdagi profil chizig'i uchun qazish ishlari markazi 15-reperni qatlam yuzasiga bo'lgan gorizontal proeksiyasiga mos tushadi.

2.4 Profil chiziqlari bo'yicha so'nggi kuzatish natijalarini analitik hisoblash.

1) Ishchi reperlarning cho'kishini hisoblash.

2) Alohida reperlarning qiyaligini hisoblash.

3) Alohida reperlar uchun egrilik aniqlansin.

4) Ishchi reperlarni gorizontal siljishini aniqlash.

5) Alohida intervallarni deformatsiyasini aniqlash.

2.5 Analitik hisoblash natijalari bo'yicha so'nggi kuzatish grafiklarini tuzish.

1) Cho'kish.

2) Gorizontal siljishi.

3) Deformatsiyalar.

a) Qiyaliklar.

b) Egriliklar.

s) qisilish va cho'zilish.

2.6 Deformatsiyalar grafiklarida er yuzasining havfli siljishi zonalarini ko'rsatish va ular orqali burchaklarini aniqlash.

2.7 Siljish burchaklarini aniqlash.

2.8 Cho'kish va deformatsiya grafiklarida chegaraviy burchaklarini aniqlash uchun siljish muldasi chegarasini tushirish.

2.9 Profil chizig'ida maksimal cho'kish nuqtasini belgilash va maksimal cho'kish burchagini aniqlash.

2.10 Siljish muldasi asosi chegaralarini belgilash va to'liq siljish burchaklarini aniqlash.

2.11 Cho'kish va deformatsiya grafiklarida xarakterli nuqtalarni aniqlash va ularning o'zaro bog'liqligini aniqlash.

### 3. Hisoblash.

3.1 Tog‘ jinslarining surilish jarayoni vektorlar bilan ifodalanadi, hamda vertikal va gorizontalar deformatsiyalar bilan. Vertikal tashkil etuvchi vektori siljishning **cho‘kishi** (osedaniya) deb ataladi.

Ishchi reperlarning cho‘kishi quyidagicha aniqlanadi.

$$\eta = Z_H - Z_K$$

$Z_H$  - reperning boshlang‘ich otmetkasi.

$Z_K$  - reperning oxirgi otmetkasi.

3.2 Qo‘shni nuqtalar orasidagi cho‘kish qiymatlari farqini nisbati **qiyalik** deyiladi. Alohida intervallarning qiyaligi quyidagicha aniqlanadi.

$$i = \frac{\Delta h}{l_{1-2}}, \quad \Delta h = h_1 - h_2$$

$\Delta h$  - ishchi reperlarning qiymatlari farqi.

$l_{1-2}$  - ishchi reperlarning gorizontalar siljish qiymatlari.

3.3 Alohida ishchi reperlarning **egriligi** quyidagicha aniqlanadi.

$$K = (i_n - i_{n-1}) \setminus l_{sr} = 2(i_n - i_{n-1}) \setminus (l_n - l_{n-1})$$

$i_n - i_{n-1}$  - oldingi va keyingi qiyalik kattaliklari,

$l_n - l_{n-1}$  - oldingi va keyingi o‘lchashdagi intervallar.

3.4 Siljish jarayonida gorizontalar tashkil etuvchi vektor gorizontalar siljish deb aytiladi.

$$\xi = l_2 - l_1$$

$l_2 - l_1$ , tayanch reperdan o‘lchanayotgan reperi bo‘lgan masofa. Oldingi va keyingi o‘lchash natijalari.

3.5 Gorizontalar siljish shuningdek gorizontalar deformatsiya bilan xarakterlanadi.

$$\varepsilon = \frac{\Delta l}{l_H}, \quad \Delta l = l_H - l_K.$$

Hamma hisoblash ishlari jadval asosida olib boriladi.

Er osti kon ishlarini olib borishda inshoot va ob‘ektlarni saqlash uchun xavfli siljish chegarasini, siljish burchagini va buzilish burchaklarini aniqlash zarur. Qirgimlarda siljish burchagi siljish jarayonlari tugagandan keyin aniqlanadi. Xavfli siljish zonalarining chegarasida nuqtalar olinadi,  $0,2 \cdot 10^{-3}$  m egrilik,  $2 \cdot 10^{-3}$  m- qisilish va cho‘zilish,  $4 \cdot 10^{-3}$  m qiyalik. Xavfli surilishi chegarasi nuqtadagi mulda chegarasi kilib 15 mm dan oshmagan yoki,  $0,5 \cdot 10^{-3}$  m cho‘kish nuqtasi olinadi.

Boshlang'ich ma'lumotlar:

1- jadval

Variant	Profil chiziqlarning joylashishi		№15 ishchi reper ostidan qatlami chuqurligi	Lavani uzunligi, m	Qatlami og'ish burchagi, grad.	Qatlam qalinligi, m	yuqori qatlam qalinligi, m
	Ko'ndalangi bo'yicha	Bo'ylamasini bo'yicha					
1	+		150	190	19	1.2	15
2		+	110			1.6	10
3	+		142	175	17	2.5	15
4		+	136			2.2	15
5	+		140	170	20	2.7	12
6		+	70			1.0	15
7		+	85			1.4	10
8		+	75			1.1	5
9	+		66	90	1	1.3	10
10		+	80			1.2	12
11	+		75	92	5	1.3	10
12		+	66			1.2	12
13	+		69	100	9	1.4	15
14		+	90			2.0	10
15	+		80	95	5	1.8	12
16		+	80			1.2	10
17	+		74	100	8	2.0	15
18		+	85			1.2	12
19	+		93	110	7	1.5	12
20		+	70			2.0	15
21	+		90	102	13	1.6	10
22		+	70			2.0	12
23	+		90	120	8	1.7	10
24		+	136			1.9	15
25	+		105	110	16	1.7	10

№ №	Reperlarning absolyut o'tmetkasi		Tayanch reperdan ishchi repergacha bo'lgan masova	
	Boshlang'ich kuzatuv natijalari, m	Oxirgi kuzatuv natijalari, m	Boshlang'ich kuzatuv natijalari, m	Oxirgi kuzatuv natijalari, m
1	2	3	4	5
№1 variant				
1	316.275	316.275	512.906	512.906
2	315.725	315.233	497.544	497.544
3	315.071	315.062	421.251	481.660
4	314.315	314.297	466.391	466.386
5	313.527	313.500	450.729	450.716
6	311.972	311.934	435.797	435.770
7	312.095	312.042	420.205	420.149
8	311.838	311.763	405.146	405.056
9	312.681	312.762	390.089	389.968
10	313.813	313.534	374.866	374.681
11	314.564	314.292	358.372	359.144
12	315.134	314.590	344.223	343.943
13	315.346	314.561	328.686	328.482
14	316.238	315.140	313.527	313.532
15	316.868	315.696	298.277	298.470
16	317.316	316.185	283.233	263.568
17	317.428	316.420	268.968	269.412
18	317.414	316.616	253.664	254.192
19	316.676	316.109	238.901	239.105
20	316.400	316.022	223.662	224.097
21	316.285	315.995	208.610	208.893
22	315.715	316.576	193.074	193.265
23	315.534	315.441	177.699	177.833
24	314.006	314.550	162.413	162.513
25	314.271	314.238	147.561	147.533
№2 variant				
1	233.599	233.699	66.404	66,404
2	233.162	233.155	77.301	77,307
3	233.210	233.193	88.392	88,398
4	233.596	233.572	99.354	99,36
5	233.774	233.737	110.524	110,53
6	233.684	233.603	121.634	121,64
7	233.861	233.770	132.601	132,607
8	233.429	233.283	143.523	143,529
9	233.092	232.865	154.505	154,512
10	233.026	232.620	165.601	165,609
11	233.417	232.821	176.484	176,493
12	233.197	232.475	187.455	187,465
13	232.796	231.987	198.398	198,409
14	233.086	232.240	209.502	209,514
15	232.871	232.018	220.572	220,585
16	232.762	231.899	231.283	231,297
17	232.400	231.536	242.473	242,486
18	232.063	231.208	253.160	253,172

19	231.914	231.036	264.035	264,024
20	232.128	231.274	275.968	275,958
21	232.370	231.510	287.135	287,126
22	232.079	231.229	299.068	299,06
23	231.466	230.625	309.173	309,166
24	230.708	229.947	320.977	320,971
25	230.129	229.293	331.617	331,612
№3 variant				
1	299.407	299.407	485.551	485.551
2	298.886	298.883	471.008	471.008
3	298.267	298.258	456.152	456.151
4	297.651	297.834	441.516	441.512
5	296.808	296.780	426.690	426.677
6	295.333	295.298	412.554	412.528
7	295.449	295.400	397.795	397.741
8	295.207	295.136	383.538	383.458
9	296.194	296.081	369.284	369.160
10	297.077	296.906	354.872	354.698
11	297.787	297.530	340.205	339.989
12	298.326	297.202	325.864	325.599
13	298.528	297.784	311.156	310.963
14	299.372	298.332	296.806	298.810
15	299.988	298.859	282.368	282.552
16	300.392	299.322	268.127	268.444
17	300.499	299.563	264.613	285.043
18	300.485	299.720	240.135	240.636
19	299.780	299.249	226.159	226.636
20	299.525	299.167	211.733	212.145
21	299.342	299.141	197.484	197.780
22	298.877	298.745	182.777	182.957
23	298.700	298.627	188.222	168.348
24	297.886	297.774	153.751	153.846
25	297.510	297.479	139.691	139.759
№4 variant				
1	307.926	307.926	87.532	87.532
2	307.349	307.340	101.897	101.904
3	307.413	307.391	116.516	118.532
4	307.926	307.890	130.967	130.992
5	306.157	308.108	145.690	145.725
6	307.999	307.931	160.335	166.383
7	308.258	308.151	174.792	174.854
8	307.702	307.516	189.189	189.300
9	307.258	306.958	203.666	203.856
10	307.171	306.636	218.292	218.646
11	307.686	306.900	232.648	233.100
12	307.396	306.444	247.100	247.509
13	306.858	305.801	261.525	261.777
14	307.254	306.134	276.161	276.292
15	306.966	305.841	290.754	290.802
16	306.823	305.685	304.873	304.893
17	306.346	305.205	319.624	319.531
18	305.901	304.774	333.710	333.712

19	305.704	304.548	348.046	348.042
20	305.986	304.861	363.776	363.770
21	306.305	305.173	378.496	378.489
22	305.922	304.802	394.226	394.281
23	305.113	304.006	407.546	407.520
24	304.220	303.112	423.80	423.080
25	303.352	302.250	437.032	437.104
№5 variant				
1	309.980	309.950	512.906	512.906
2	390.410	309.407	497.544	497.544
3	308.769	308.760	421.251	481.660
4	308.628	308.911	466.391	466.386
5	308.256	307.330	450.729	450.716
6	308.732	305.695	435.797	435.770
7	308.853	305.301	420.205	420.149
8	308.601	305.528	405.146	405.056
9	308.623	306.507	390.089	389.968
10	307.537	307.361	374.866	374.681
11	308.272	308.006	358.372	359.144
12	308.831	308.288	344.223	343.943
13	309.046	308.289	328.686	328.482
14	308.913	308.837	313.527	313.532
15	310.530	309.582	298.277	298.470
16	310.970	309.581	283.233	263.568
17	311.080	310.101	268.968	269.412
18	311.085	310.283	253.664	254.192
19	310.342	309.786	238.901	239.105
20	310.072	309.701	223.662	224.097
21	309.382	309.675	208.610	208.893
22	309.401	309.264	193.074	193.265
23	309.223	309.132	177.699	177.833
24	308.313	308.259	162.413	162.513
25	307.286	307.953	147.561	147.533
№6 variant				
1	212.363	212.363	60.367	60.367
2	211.968	211.959	70.274	70.279
3	212.009	211.994	80.356	80.367
4	212.363	212.338	90.322	90.339
5	212.522	212.488	100.476	100.500
6	212.413	212.366	110.576	110.609
7	212.592	212.518	120.546	120.596
8	212.208	212.080	130.475	130.652
9	211.902	211.695	140.450	140.590
10	211.842	211.473	150.546	150.790
11	212.197	211.655	160.440	160.759
12	211.997	211.341	170.414	170.696
13	211.633	210.897	180.362	180.536
14	211.809	211.127	190.456	190.546
15	211.701	210.925	200.520	200.553
16	211.602	210.817	210.257	210.271
17	211.273	210.486	220.430	220.436
18	210.966	210.189	230.145	230.146

19	210.831	210.033	240.032	240.029
20	211.025	210.249	250.880	250.876
21	211.245	210.464	261.32	261.027
22	210.981	210.208	271.660	271.864
23	210.423	209.659	281.056	281.048
24	209.807	209.043	291.797	291.779
25	209.208	208.448	301.470	301.451
№7 variant				
1	288.814	288.814	82.099	82.099
2	288.272	288.264	95.573	95.579
3	288.332	288.312	109.284	109.299
4	288.814	288.780	122.868	122.861
5	288.030	288.984	136.984	136.680
6	288.882	288.818	150.383	150.428
7	288.125	289.024	163.943	164.011
8	288.603	288.429	177.446	177.551
9	288.187	287.905	191.024	191.202
10	288.195	287.603	204.743	205.074
11	288.588	287.851	218.198	218.632
12	288.316	287.424	231.763	232.147
13	287.821	286.820	245.292	245.529
14	288.183	287.133	259.020	259.143
15	287.913	286.858	272.707	272.752
16	287.779	286.711	285.950	286.969
17	287.331	286.261	299.785	299.792
18	286.914	285.857	312.997	312.999
19	286.430	286.645	326.444	326.439
20	286.994	286.939	341.197	341.191
21	287.293	286.231	355.004	354.997
22	286.934	286.883	369.757	369.734
23	286.175	286.136	382.250	382.225
24	286.338	284.298	396.844	396.819
25	284.523	283.489	409.999	409.973
№8 variant				
1	157.149	157.149	44.672	44.672
2	156.864	156.860	52.003	52.005
3	156.887	156.875	59.463	59.472
4	157.149	157.130	66.838	66.851
5	157.266	157.241	74.352	74.370
6	157.186	157.151	81.826	81.851
7	157.318	157.263	89.204	89.241
8	157.034	156.939	96.552	96.608
9	156.807	156.654	103940	104.037
10	156.760	156.490	111.404	111.586
11	157.086	156.626	118.726	118.962
12	156.878	158.393	126.106	126.315
13	156.608	156.064	133.468	133.597
14	156.805	156.234	140.927	141.927
15	156.669	156.084	148.385	148.409
16	156.586	156.004	155.590	155.600
17	156.342	155.760	163.118	163.122
18	156.115	155.540	170.307	170.308

19	156.015	153.424	177.624	177.621
20	156.158	155.584	185.651	186.648
21	156.321	155.743	193.161	193.180
22	156.126	155.554	201.191	201.179
23	155.713	155.148	207.989	207.976
24	156.267	154.692	215.930	215.916
25	154.814	154.252	223.088	223.074
№9 variant				
1	147.595	147,595	239,356	239,356
2	147.338	147,337	232,187	232,127
3	147.033	147,029	224,864	224,853
4	146.680	146,672	217,649	217,647
5	146.313	146,300	210,340	210,334
6	145,387	145,369	203,372	203,359
7	145,644	145,620	196,096	196,069
8	145,534	145,439	189,008	189,026
9	146,011	145,936	183,041	181,920
10	146,440	146,362	174,937	174,861
11	146,794	146,670	167,707	167,600
12	147,062	146,304	160,627	160,507
13	147,204	146,725	153,367	153,292
14	147,570	147,065	146,313	146,315
15	147,672	147,325	139,196	136,186
16	146,061	147,553	132,175	132,332
17	146,158	147,667	125,514	125,726
18	143,120	147,754	118,376	118,623
19	147,762	147,517	111,487	111,572
20	147,663	147,477	104,376	104,579
21	147,563	147,464	97,351	97,497
22	147,354	147,269	90,101	90,190
23	147,249	147,205	82,926	82,929
24	146,818	146,790	78,793	75,889
25	145,660	145,644	68,862	66,296
№10 variant				
1	161,396	161,396	45,879	45,879
2	161,093	161,089	53,408	53,412
3	161,127	161,115	61,070	61,079
4	161,396	161,377	68,645	68,658
5	161,517	161,491	76,362	70,380
6	161,434	161,395	94,038	84,063
7	161,670	161,514	91,615	91,653
8	161,273	161,181	99,161	99,220
9	161,045	160,688	108,749	106,843
10	161,000	160,719	114,418	114,600
11	161,270	160,385	121,934	122,177
12	161,118	160,619	129,515	129,729
13	160,541	160,288	137,078	137,207
14	161,043	160,456	144,736	144,815
15	160,193	160,383	152,395	152,420
16	160,818	160,221	159,796	159,206
17	160,567	159,969	167,527	167,531
18	160,334	159,744	174,910	174,911

19	160,232	159,525	182,424	182,422
20	160,379	159,789	190,660	190,666
21	160,546	159,953	198,384	198,330
22	160,346	159,756	206,629	206,616
23	159,921	159,341	218,610	213,596
24	159,458	158,872	221,766	221,752
25	159,359	158,870	223,645	223,635
№11 variant				
1	265,454	265,454	75,459	75,459
2	264,956	264,949	87,843	87,849
3	265,011	264,993	100,445	100,459
4	265,454	265,423	112,903	112,924
5	265,653	265,610	125,595	125,625
6	265,516	265,458	138,220	138,261
7	265,740	265,648	150,683	150,745
8	265,260	265,100	163,094	163,100
9	264,878	264,619	175,574	175,738
10	264,803	264,341	188,183	188,488
11	265,246	264,569	200,550	200,949
12	264,996	264,176	213,018	213,370
13	264,541	263,621	225,453	225,670
14	264,874	263,909	238,070	238,183
15	264,626	263,656	250,650	250,691
16	264,503	263,521	262,821	262,839
17	264,091	263,108	275,536	275,544
18	263,708	262,736	287,681	287,683
19	263,539	262,541	300,040	300,036
20	263,781	262,811	313,600	313,595
21	264,056	263,080	326,290	326,284
22	263,726	262,760	339,850	339,829
23	263,029	262,074	351,333	351,310
24	262,259	261,304	364,746	364,724
25	261,510	260,560	376,838	376,814
№12 variant				
1	168.680	168.680	273.550	273.550
2	168.386	168.388	265.357	265.357
3	168.038	168.033	256.987	256.986
4	167.634	167.625	248.742	248.739
5	167.214	167.200	240.386	240.389
6	166.385	166.365	232.425	232.410
7	166.450	166.422	224.110	224.079
8	166.314	166.274	216.078	216.030
9	166.870	166.806	208.047	207.978
10	167.367	167.271	199.928	199.830
11	167.767	167.622	191.665	191.543
12	158.071	167.776	183.586	183.436
13	168.233	167.766	175.299	175.190
14	168.660	168.074	167.214	167.217
15	168.996	168.371	159.081	159.184
16	169.235	168.632	151.058	151.236
17	169.295	168.762	143.444	143.686
18	169.287	168.862	135.287	135.570

19	168.894	168.591	127.414	127.682
20	168.746	168.545	119.286	119.518
21	168.643	153.530	111.258	111.258
22	168.382	168.307	102.307	103.973
23	168.285	168.235	94.773	94.844
24	167.790	167.760	86.620	86.674
25	167.611	167.594	78.699	78.738
№13 variant				
1	222.081	222.981	63.385	63.385
2	222.563	222.557	73.788	73.793
3	222.609	222.594	84.374	84.385
4	222.981	222.955	94.838	94.856
5	223.148	223.112	105.500	105.525
6	223.034	222.984	116.105	116.139
7	gaz.222	223.144	126.573	126.626
8	222.818	222.684	136.999	137.080
9	222.497	222.280	147.482	147.620
10	222.434	222.047	158.073	158.330
11	222.807	222.238	168.462	163.797
12	222.597	221.908	179.935	179.231
13	222.215	221.442	189.380	189.563
14	222.494	221.683	199.979	200.073
15	222.286	221.471	210.546	210.581
16	222.182	221.358	220.770	220.785
17	221.837	221.010	231.452	231.457
18	221.514	220.698	241.652	241.653
19	321.373	220.535	252.034	252.030
20	221.576	220.761	263.424	263.420
21	221.907	220.987	274.084	274.078
22	221.530	220.718	285.474	285.466
23	220.944	220.142	295.119	295.100
24	220.297	219.495	306.387	306.368
25	219.668	218.870	316.544	316.524
№14 variant				
1	164.463	164.463	266.711	266.711
2	164.177	164.175	258.726	258.723
3	163.837	163.832	250.563	250.562
4	163.444	163.434	242.523	242.521
5	163.034	163.020	234.379	234.472
6	162.225	162.206	226.614	226.600
7	162.289	162.262	218.507	218.477
8	162.156	162.117	210.676	210.629
9	162.698	162.636	202.846	202.778
10	163.183	163.089	194.930	194.834
11	163.573	163.432	186.873	186.755
12	163.869	163.432	186.873	186.755
13	164.027	163.571	170.917	170.811
14	164.444	163.873	163.034	163.036
15	164.771	164.162	155.104	155.204
16	165.004	164.416	147.281	147.455
17	165.063	IS4.543	139.858	140.094
18	165.055	164.640	131.905	132.180

19	164.671	164.376	124.228	124.490
20	164.528	164.331	116.304	116.530
21	164.427	164.317	108.477	108.640
22	164.172	164.100	100.398	100.498
23	164.078	164.029	92.403	92.473
24	163.395	163.566	84.455	84.507
25	163.421	163.404	76.732	76.769
№15 variant				
1	286.756	286.756	465.034	465.034
2	286.257	286.254	451.107	451.107
3	285.664	285.756	436.878	436.877
4	284.978	284.962	422.861	422.857
5	284.264	284.240	408.661	408.649
6	282.854	282.820	395.122	392.038
7	282.966	282.918	380.986	380.935
8	282.733	282.665	367.332	367.250
9	283.678	283.571	353.680	353.562
10	284.524	284.361	339.878	339.710
11	285.204	284.958	325.830	325.623
12	285.721	285.219	312.096	311.841
13	285.996	285.202	298.009	298.824
14	286.722	285.726	284.264	284.269
15	287.293	286.231	270.437	270.610
16	287.700	286.677	256.798	257.101
17	287.802	286.897	243.855	244.267
18	287.786	287.065	229.988	230.468
19	287.119	286.605	216.603	217.060
20	286.869	286.526	202.787	203.181
21	286.693	286.502	189.139	189.424
22	286.249	286.122	175.054	175.226
23	286.084	286.000	161.114	161.235
24	285.242	285.192	147.254	147.345
25	284.939	284.909	133.789	133.854
№16 variant				
1	160.246	160.246	259.872	259.872
2	159.967	159.966	252.089	252.089
3	159.636	159.631	241.5138	244.137
4	159.253	159.244	236.305	236.302
5	158.854	158.840	228.369	228.363
6	158.066	158.047	220.804	220.790
7	158.128	158.101	212.934	212.875
8	158.998	157.960	205.274	205.228
9	158.526	158.466	196.645	197.579
10	158.999	158.908	189.932	189.838
11	159.379	159.242	182.082	181.966
12	159.568	159.387	174.406	174.264
13	159.821	159.377	166.534	166.431
14	160.227	159.671	158.854	158.856
15	160.546	159.953	151.127	151.225
16	160.773	160.200	143.505	143.674
17	160.830	160.324	136.272	136.502
18	160.223	160.419	128.523	128.891

19	160.449	160.162	121.043	121.298
20	160.309	160.118	113.322	113.542
21	160.211	160.111	105.695	105.854
22	159.963	159.892	97.824	97.921
23	159.871	159.823	90.034	90.102
24	159.400	159.372	82.289	82.340
25	159.231	159.214	74.764	74.801
№17 variant				
1	238.261	238.261.	386.389	386.389
2	237.846	237.844	374.816	374.816
3	237.353	237.346	362.994	362.993
4	236.784	236.770	351.348	351.344
5	236.190	236.170	339.549	339.539
6	235.019	234.990	328.300	328.280
7	235.111	235.072	316.555	316.512
8	234.918	234.861	305.210	305.142
9	235.703	235.614	293.867	293.768
10	236.406	236.271	282.398	282.259
11	236.971	236.767	270.727	270.555
12	237.401	236.984	259.315	259.103
13	237.629	236.969	247.610	247.456
14	238. g32	237.405	236.190	236.194
15	238.707	237.824	224.702	224.847
16	239.045	238.193	213.369	213.621
17	239.129	238.377	202.615	202.957
18	239.118	238,517	191.093	191.492
19	238.562	238.135	179.972	180.351
20	238.354	238.070	168.492	168.820
21	238.209	238.049	157.152	157.389
22	237.839	237.734	145.449	145.593
23	237.702	237.632	133.867	133.976
24	237.003	236.961	122.351	122.426
25	236.751	236.726	111.163	111.217
№18 variant				
1	206.633	206.633	335.098	335,098
2	206.273	206.271	325.061	325,062
3	205.846	205.840	314.809	314,808
4	205.352	205.340	304.708	304.706
5	204.839	204.820	294.476	294.467
6	203.821	203.797	284.720	284.703
7	203.902	203.867	274.534	274.497
8	203.734	203.685	264.695	264.636
9	204.415	204.338	254.858	254.773
10	205.025	204.907	244.912	244.791
11	205.515	205.337	234.789	234.640
12	205.887	205.526	224.892	224.709
13	206.085	205.513	214.742	214.608
14	206.609	205.892	204.838	204.841
15	207.020	206.255	194.874	195.000
16	207.313	206.574	185.046	185.264
17	207.387	206.734	175.719	176.016
18	207.377	206.855	165.727	166.073

19	206.895	206.524	156.082	156.4II
20	206.714	206.467	146.126	146.410
21	206.588	206.450	136.292	136.496
22	206.267	206.176	126.142	126.266
23	206.149	206.088	116.097	116.184
24	205.542	205.506	106.110	106.175
25	205.324	205.302	96,407	96.454
№19 variant				
1	244.586	244.586	396.647	396.647
2	255.160	244.158	384.767	384.767
3	243.655	243.648	372.631	372.630
4	243.070	243.056	360.675	360.672
5	242.461	242.440	348.564	348.563
6	241.258	241.229	337.016	338.995
7	241.358	241.312	324.959	324.915
8	241.353	241.097	313.313	313.243
9	241.155	241.869	301.668	301.568
10	241.561	241.543	289.896	289.753
11	242.682	242.052	277.914	277.738
12	243.262	243.275	266.199	265.982
13	243.703	243.260	254.184	254.026
14	243.938	243.708	242.461	242.464
15	244.557	244.138	230.667	230.817
16	245.044	244.517	219.034	219.292
17	245.478	244.706	207.994	208.345
18	245.466	244.849	196.166	196.576
19	244.896	244.457	184.750	185.139
20	244.659	244.390	172.965	173.302
21	244.533	244.369	161.325	161.567
22	244.153	244.045	149.3II	149.458
23	244.013	243.941	137.421	137.524
24	243.295	243.252	125.599	125,677
25	243.036	243.011	124.114	114.170
№20 variant				
1	156.029	156.029	253.033	253.033
2	155.757	155.756	245.455	245.455
3	155.435	155.430	237.713	237.712
4	155.062	155.053	230.086	230.084
5	154.673	154.660	222.360	222.353
6	153.906	153.887	214.993	214.980
7	153.967	153.941	207.301	207.273
8	153.840	153.803	199.872	199.827
9	154.354	154.296	192.444	192.379
10	154.815	154.726	184.933	184.842
11	155.185	155.051	177.290	177.177
12	155.466	155.193	169.817	169.678
13	155.615	155.183	162.152	162.051
14	156.0II	155.469	154.673	154.676
15	156.321	155.743	147.150	147.245
16	156.543	155.985	139.728	139.893
17	156.598	156.105	132.686	132.910
18	156.591	156.197	125.141	125.402

19	156.227	155.947	117.858	118.106
20	156.090	155.904	110.340	110.555
21	156.995	155.891	102.914	103.069
22	155.753	155.684	95.250	95.344
23	155.663	155.618	87.665	87.731
24	155.205	155.178	80.124	80.173
25	155.040	155.024	72.797	72.832
№21 variant				
1	231.935	231.935	376.131	376.131
2	221.531	231.529	364.866	364.866
3	231.052	231.045	353.357	353.356
4	230.497	230.484	342.020	342.016
5	229.920	229.900	330.535	330.525
6	228.779	228.652	319.584	319.564
7	228.869	228.831	308.151	308.109
8	228.681	228.626	297.107	297.041
9	229.446	229.359	286.065	285.969
10	230.130	229.998	274.901	274.766
11	230.680	230.481	263.539	263.372
12	231.098	230.692	252.430	252.225
13	231.320	230.678	241.036	240.887
14	231.908	231.102	229.920	229.923
15	232.370	231.510	218.736	218.878
16	232.698	231.869	207.703	207.950
17	232.781	232.048	197.236	197.569
18	232.770	232.185	186.020	186.408
19	232.229	231.810	175.294	175.563
20	232.026	231.749	164.019	164.338
21	231.884	231.729	152.980	153.210
22	231.525	231.422	141.588	141.727
23	231.392	231.323	130.313	130.411
24	230.711	230.670	119.103	119.176
25	230.465	230.441	108.211	108.264
№22 variant				
1	198.199	198.199	321.421	321.421
2	197.854	197.852	311.794	311.794
3	197.444	197.439	301.960	301.959
4	196.970	196.959	292.271	292.269
5	196.477	196.460	282.457	282.448
6	195.502	195.479	273.099	273.082
7	195.579	195.546	263.329	263.293
8	195.418	195.371	253.891	253.835
9	196.072	195.998	244.455	244.374
10	196.656	196.544	234.915	234.800
11	197.126	196.956	225.206	225.063
12	197.484	197.137	215.713	215.537
13	197.674	197.125	205.977	205.849
14	198.176	197.487	196.477	196.480
15	198.570	197.836	186.920	187.041
16	198.852	198.143	177.493	177.702
17	198.922	198.296	168.547	168.832
18	198.912	198.412	158.962	159.294

19	198.450	198.095	149.711	150.027
20	198.277	198.040	140.162	140.434
21	198.156	198.023	130.729	130.925
22	197.848	197.761	120.993	121.112
23	197.735	197.676	111.358	111.442
24	197.153	197.118	101.779 t	101.841
25	196.943	196.922	92.472	92.517
№23 variant				
1	267.780	267.780	434.260	434.260
2	267.313	267.311	421.254	421.254
3	266.760	266.752	407.967	407.966
4	266.120	266.104	394.877	394.873
5	265.453	265.430	381.617	381.606
6	264.136	264.104	368.874	368.952
7	264.240	264.196	355.774	355.726
8	264.023	263.959	343.023	342.947
9	264.905	264.805	330.275	330.164
10	265.695	265.543	317.386	317.229
11	266.330	266.101	304.268	304.075
12	266.813	266.344	291.442	291.205
13	267.070	266.328	278.287	287.115
14	267.748	266.818	265.453	265.457
15	268.281	267.289	252.541	252.705
16	268.661	267.705	239.804	240.087
17	268.756	267.911	227.717	223.192
18	268.743	268.068	214.768	215.217
19	268.119	267.639	202.269	202.696
20	267,885	267.765	189.367	189.735
21	267.721	267.542	176.623	176.888
22	267.306	267.188	163.469	163.631
23	267.152	267.073	150.452	150.565
24	266.366	266.319	137.509	137.594
25	266.083	266.055	124.935	124.996
№24 variant				
1	274.105	274.105	444.518	444.518
2	273.628	273.625	631.205	431.205
3	273.061	273.053	417.604	417.603
4	272.406	272.390	404,205	404.201
5	271.723	271.700	390.632	390.620
6	270.375	270.343	377.690	377.667
7	270.482	270.436	364.178	364.129
8	270.260	270.196	351.126	351.048
9	271.163	271.060	338.077	337.964
10	271.972	271.816	324.883	324.723
11	272.622	272.386	311.455	311.258
12	273.116	272.636	298.327	298.083
13	273.378	272.619	284.861	284.684
14	274.073	273.121	271.723	271.727
15	274.619	273.603	258.506	258.674
16	275.007	274.029	245.469	245.759
17	275.105	274.239	233.097	233.490
18	275.090	274.400	219.842	220.301

19	274.452	273.961	207.047	207.484
20	274.213	273.885	193.840	194.217
21	274.045	273.662	180.795	181.067
22	273.620	273.499	167.331	167.496
23	273.463	273.382	154.006	154.122
24	272.658	272.610	140.758	140.845
25	272.368	270.340	127.886	127.949
№25 variant				
1	265.454	265.454	75.459	75.459
2	264.956	264.949	87.843	87.849
3	265.011	264.993	100.445	100.459
4	265.454	265.423	112.903	112.924
5	265.653	265.610	125.595	125.625
6	265.516	265.458	138.22S	138.261
7	265.740	265.648	150.683	150.745
8	265.260	265.100	163.094	163.190
9	264.878	264.619	175.574	175.738
10	264.803	264.341	188.183	188.488
11	265.246	264.569	200.550	200.949
12	264.996	264.176	213.018	213.370
13	264.541	263.621	225.453	225.670
14	264.874	263.909	238.070	238.183
15	264.626	263.656	250.650	250.691
16	264.503	263.521	262.821	262.839
17	264.091	263.108	275.538	275.544
18	263.708	262.736	287.681	287.683
19	263.539	262.541	300.040	300,036
20	263.781	262.811	313.600	313.595
21	264.056	263.080	326.290	326.284
22	263.726	262.760	339.850	339.829
23	263.029	262.074	351.333	351.310
24	262.259	261.304	364.746	364.724
25	261.510	260.560	376.838	376.814
№26 variant				
1	263.563	263.563	427.421	427.421
2	263.104	263.101	414.620	414.620
3	262.559	262.551	401.543	401.541
4	261.929	261.914	388,659	388.655
5	261.273	261.250	375.608	375,596
6	259.976	259.945	363.164	363,141
7	260.079	260.035	350.171	350.124
8	259.865	259.803	337.621	337.546
9	260.734	260.635	325.074	324.965
10	261.511	261.361	312.388	312.234
11	262.136	261.910	299.476	299.286
12	262.610	262.150	286.853	286.619
13	262.864	262.134	273.905	273.735
14	263.531	262.616	261.273	261.276
15	264.056	263.080	248.564	248.725
16	264.430	263,489	236.028	236.306
17	264.524	263.692	224.131	224.510
18	264.511	263.846	211.386	211.828

19	263.896	263.424	199.084	199.504
20	263.666	263.351	186.385	186.748
21	263.505	263.329	173.841	174.103
22	263.096	262.980	160.895	161.054
23	262.945	262.868	148.083	148.194
24	262.171	262.125	135.344	135.428
25	261.893	261.865	122.968	123.028
№27 variant				
1	257.237	257.237	417.163	417.163
2	256.789	256.787	404.669	404.669
3	256.257	256.250	391.905	391.904
4	255.642	255.628	379.331	379.327
5	255.002	254.980	366.593	366.582
6	253.737	253.708	354.448	354.426
7	253.837	253.794	341.767	341.721
8	253.628	253.657	329.518	329.445
9	254.476	254.380	317.272	317.166
10	255.235	255.089	304.890	304.740
11	255.845	255.624	292.289	292.103
12	256.555	255.843	279.968	279.740
13	256.309	255. a58	269,331	287.165
14	257.207	256.313	255.002	255.006
15	257.719	256.766	242.598	242.756
16	268.084	25?.165	230.363	230.635
17	258.175	257.363	218.752	218.122
18	253.163	257.514	206.313	206.744
19	257.563	257.102	194.306	194.306
20	257.338	257.031	182.912	182.266
21	267.181	257.009	169.669	169.924
22	256.782	256.668	157.034	157.188
23	256.634	256.559	144.529	144.637
24	255.879	255.634	132.096	132.177
25	255.607	255.580	120.016	120.075
№28 variant				
1	253.020	253.020	410.324	410.324
2	252.580	252.577	398.035	398.035
3	252.056	252.049	385.481	385.480
4	251.452	251.437	373.112	373.109
5	250.827	250.800	360.583	360.572
6	249.577	249.547	348.637	348.616
7	249.776	249.634	336.164	336.119
8	249.870	249.410	324.116	324.044
9	250.304	250.210	312.071	311.966
10	251.051	250.907	299.892	299.744
11	251.651	251.434	287.497	287.315
12	252.107	251.664	275.387	275.154
13	252.349	251.648	262.949	262.786
14	252.990	252.112	250.822	250.815
15	253.499	252.557	238.621	238.776
16	253.853	252.948	226.586	226.854
17	253.943	253.144	215.166	215.530
18	253.931	253.293	202.931	203.354

19	253.340	252.887	191.120	191.524
20	253.120	252.817	178.930	179.978
21	252.965	252.796	166.888	167.138
22	252.572	252.461	154.459	154.612
23	252.427	252.323	142.159	142.266
24	251.684	251.640	129.930	130.010
25	251.417	251.390	118.049	118.106
№29 variant				
1	189.765	189.765	307.743	307.743
2	189.435	189.433	298.526	298.526
3	189.042	189.037	289.III	289.110
4	188.589	188.578	279.834	279.832
5	188.116	188.100	270.437	270.429
6	187.183	187.160	261.478	261.462
7	187.257	187.225	252 L 23	252.089
8	187.103	187.058	243.033	243.087
9	187.728	187.557	234.053	233.975
10	188.288	188.180	224.919	224.808
11	188.738	188.575	215.683	215.486
12	189.080	188.748	206.534	206.366
13	189.262	188.736	197.212	197.089
14	189.743	189.084	188 L16	188.119
15	190.121	189.418	178.966	179.082
16	190.390	189.711	169.940	170.141
17	190.457	189.758	161.375	161.647
18	190.448	189.969	152.198	152.516
19	190.005	189.665	143.340	143.643
20	189.840	189.613	134.197	134.458
21	189.724	189.597	125.166	125.354
22	189.429	189.346	115.844	115.959
23	189.320	189.265	106.619	106.700
24	188.763	188.730	97.448	97.508
25	188. raz	188.	88.537	88.580
№30 variant				
1	169,890	169,890	48,294	48,294
2	169,572	169,567	56,219	56,223
3	169,607	169,595	64,285	64,294
4	169,890	169,870	72,268	72,271
5	170,018	169,990	80,324	80,400
6	169,930	169,893	88,461	88,487
7	170,074	170,014	96,437	96,437
8	169,766	169,664	104,380	104,442
9	169,522	169,356	112,367	112,472
10	169,474	169,178	120,437	120,632
11	169,758	169,324	128,352	128,607
12	169,598	169,073	136,331	136,557
13	169,306	168,718	144,290	144,429
14	169,519	168,902	152,365	152,437
15	169,361	168,740	160,416	160,442
16	169,282	168,654	168,206	168,217
17	169,018	168,389	176,344	176,34b
18	168,773	166,151	184,116	184,117

19	168,665	168,026	192,026	192,023
20	168,820	168,199	200,704	200,759
21	168,996	168,371	208,826	206,822
22	168,785	168,166	217,504	217,450
23	168,338	167,727	224,853	224,838
24	167,866	167,244	233,438	233,423
25	167,366	166,758	241,176	241,161
№31 variant				
1	198,199	198,199	321,421	321, 421
2	197,854	197,852	311,794	310. 704
3	197,444	197,439	301,960	301. 959
4	196,970	196,959	292,271	292. 269
5	196,477	196,460	282,457	282. 448
6	195,502	195,479	273,099	273. 082
7	195,579	195,546	263,329	263. 293
8	195,416	195,371	253,891	253,835
9	196,072	195,908	244,455	244,374
10	198,656	196 D44	234,915	234,800
11	197,126	196,956	225,206	225,063
12	197,484	197,137	215,710	215,537
13	197,674	197,125	205,977	205,849
14	196,176	197,487	196,477	196,480
15	198,570	197,636	186,920	187,041
16	198,851	196,143	177,493	177,702
17	198,922	198,296	168,547	168,832
18	198,912	198,412	158,962	159,294
19	198,450	198,095	149,711	150,027
20	198,277	198,040	140,162	140,434
21	198,156	198,023	130,729	130,925
22	197,848	197,761	120,993	121,112
23	197,735	197,676	111,358	111,442
24	197,153	197,118	101,779	101,841
25	196,943	196,922	92,472	92,517
№32 variant				
1	157,149	157,149	44,672	44,672
2	156,854	156,850	52,006 n)	52,006
3	156,887	156,876	59,463	59,472
4	157,149	157,130	66,838	66,851
5	' 157,266	157,241	74,352	74,370
6	157,186	157,151	81,826	81,851
7	157,318	157,263	89,204	89,241
8	157,034	156,939	96,552	96,608
9	156,807	156,654	103,940	104,037
10	156,760	156,490	111,404	111,585
11	157,026	156,625	118,726	118,962
12	? 156,878	156,393	126,106	126,315
13	156,608	156,064	133,466	133,597
14	156,805	156,234	140,927	141,927
15	156,659	156,084	146,385	148,409
16	156,585	156,004	155,590	155,600
17	156,342	155,760	163,118	163,122
18	156,115	155,540	170,307	170,30o

19	156,015	155,424	177,624	177,696
20	156,158	155,584	185,651	165,648
21	153,321	155,743	193,101	193,160
22	156,126	155,554	201,191	201,179
23	155,713	155,148	207,989	207,976
24	155,287	154,692	215,930	215,916
25	154,814	154,252	223,088	223,074
№33 variant				
1	244. 586	244. 586	396,647	396. 647
2	244160	244. 158	384,767	384. 767
3	243,655	243. 648	372,631	372,630
4	243. 070	243,056	360,675	360. 672
5	242,461	242,440	348,563	348,563
6	241,258	241,229	337,016	336,995
7	241,353	241,312	324,959	324,915
8	241,155	241,097	313,313	313,243
9	241,961	241,869	301,668	301,568
10	241,961	242,543	289,896	289,753
11	243,262	243,052	277,914	277,738
12	243,703	243,275	266,199	265,982
13	243,938	243,260	254,184	254,026
14	244,557	243,708	242,461	242,464
15	245,044	244,138	230,667	230,817
16	245,391	244,517	219,034	219,292
17	245,478	244,706	207,994	208,345
18	245,466	244,849	196,166	196,576
19	244,896	244,457	184,750	185,139
20	244,682	244,390	172,965	173,302
21	244,533	244,369	161,325	161,567
22	244,153	244,045	149,311	149,458
23	244,013	243,941	137,421	137,524
24	243,295	243,252	125,599	125,677
25	243,036	243,011	114,114	114,170
№34 variant				
1	231,935	231,935	376,131	376,131
2	231,531	231,529	364,866	364,866
3	231,052	231,045	Z3Z,057	353,356
4	230,497	230,484	342,020	342,016
5	229,920	229,900	330,535	330,525
6	228,779	228, 52	319,584	319,564
7	228,869	228,831	308,151	308,109
8	228,681	228,626	297,107	297,041
9	229,446	229,359	286,065	285,969
10	230,130	229,998	27^,901	274,766
11	230,680	230,481	263,539	263,372
12	231,098	230,692	252,430	252,225
13	231,320	230,678	241,036	240,887
14	231,908	231,102	229,920	229,923
15	232,370	231,510	218,736	218,878
16	232,098	231,869	207,703	207,950
17	232,781	232,048	197,236	197,569
18	232,770	232,185	186,020	186,408

19	232,239	231,810	175,194	175,563
20	232,026	231,749	164,019	164,338
21	231,884	231,729	152,980	153,210
22	231,525	231,422	141,586	141,727
23	231,392	230,401	130,313	130,411
24	230,711	230,670	119,103	119,176
25	230,465	230,441	108,211	108,264
№35 variant				
1	206,633	206,633	335,098	335,098
2	206,273	206,271	325,062	325,062
3	205,846	205,840	314,809	314,808
4	205,352	205,340	304,708	304,706
5	204,838	204,820	294,476	294,467
6	203,821	203,797	284,720	284,703
7	203,902	203,867	274,534	274,497
8	203,734	203,685	264,695	264,636
9	204,415	204,338	254,858	254,773
10	205,925	204,907	244,912	244,791
11	200,015	205,337	234,789	234,640
12	205,887	205,526	224,892	224,709
13	206,085	205,513	214,742	214,608
14	206,609	205,891	204,838	204,841
15	207,020	206,255	194,874	195,000
16	207,313	206,574	185,264	185,264
17	207,387	206,734	175,719	176,016
18	207,377	206,855	165,727	166,073
19	206,895,	206,524	156,082	156,411
20	206,714	206,467	146,126	146,410
21	206,588	206,450	136,292	136,496
22	206,267	206,176	126,142	126,266
23	206,149	206,088	116,097	116,184
24	205,542	205,506	106,110	106,175
25	205,324	205,302	96,407	96,454
№36 variant				
1	274,105	274,105	444,518	444,518
2	273,628	273,625	431,205	431,205
3	273,061	273,053	417,604	417,603
4	272,406	272,390	404,205	404,201
5	271,723	271,700	390,632	390,620
6	270,375	270,343	377,690	377,667
7	270,482	270,436	364,178	364,129
8	270,260	270,195	351,126	351,048
9	271,163	271,060	338,077	337,964
10	271,972	271,816	324,883	324,723
11	272,622	272,386	311,455	311,258
12	273,116	272,636	298,327	296,083
13	273,378	272,619	284,661	284,684
14	274,073	273,121	271,723	271,727
15	274,619	273,603	258,500	258,674
16	275,007	274,029	245,469	245,759
17	275,105	274,239	233,097	233,490
18	275,090	274,400	219,842	220,301

19	274,452	273,961	207,047	207,484
20	274,213	273,885	193,840	194,217
21	274,045	273,862	180,795	181,067
22	273,620	273,499	167,331	167,496
23	273,463	273,382	154,006	154,122
24	272,658	272,610	140,758	140,845
25	272,368	270,340	127,886	127,949
№37 variant				
1	148,654	148,654	42,257	42,257
2	148,376	148,371	49,192	49,192
3	148,406	148,396	56,249	56,257
4	148,654	148,637	63,225	62,237
5	148,765	148,742	70,333	70,350
6	148,689	148,656	77,403	77,426
7	148,814	148,763	84,382	84,417
8	148,546	148,456	91,332	91,386
9	148,331	148,186	98,321	98,413
10	148,288	148,031	105,382	105,553
11	148,548	148,158	112,308	112,531
12	148,398	147,939	119,290	119,487
13	148,143	147,628	126,253	126,375
14	148,329	147,789	133,310	133,382
15	148,191	147,648	140,364	140,387
16	148,121	147,572	147,180	147,190
17	147,897	147,340	154,301	154,304
18	147,676	147,132	161,102	161,102
19	147,582	147,023	168,023	168,020
20	147,718	147,174	175,616	175,613
21	147,872	147,325	182,722	182,719
22	147,687	147,146	190,316	190,304
23	147,296	146,761	196,746	196,734
24	146,865	146,380	204,258	204,245
25	146,446	145,914	211,029	211,016
№38 variant				
1	169,890	169,890	48,294	48,294
2	169,572	169,567	56,219	56,223
3	169,607	169,595	64,285	64,294
4	169,890	169,870	72,268	72,271
5	170,018	169,990	80,398	80,400
6	169,930	169,893	88,461	88,487
7	170,074	170,014	96,437	96,437
8	169,766	169,664	104,380	104,442
9	169,522i	169,356	112,367	112,472
10	169,474	169,178	120,437	120,632
11	169,758	169,324	128,352	128,607
12	169,598	169,073	136,331	136,557
13	169,306	168,718	144,290	144,429
14	169,519	168,902	152,365	152,437
15	169,361	168,740	160,416	160,442
16	169,282	168,654	168,206	168,217
17	169,018	168,389	176,344	176,348
18	168,773	168,151	184,116	184,117

19	168,665	168,026	192,026	192,023
20	168,820	168,199	200,704	200,759
21	168,996	168,371	208,826	208,822
22	168,785	168,166	217,504	217,450
23	168,338	167,727	224,853	224,838
24	167,866	167,244	233,438	233,423
25	167,366	166,756	241,176	241,161
№39 variant				
1	164,463	164,463	266,711	266,711
2	164,177	164,175	258,726	258,723
3	163,837	163,832	250,563	250,562
4	163,444	163,434	242,523	242,521
5	163,034	163,020	234,379	234,375
6	162,225	162,206	226,614	226,600
7	162,289	162,262	218,507	218,477
8	162,156	162,117	210,676	210,629
9	162,698	162,636	202,846	202,778
10	163,182	163,089	194,930	194,834
11	163,573	163,432	186,873	186,755
12	163,570	163,432	175,892	175,889
13	164,027	163,571	170,917	170,811
14	164,444	163,873	163,034	163,036
15	164,771	164,162	155,104	155,204
16	165,004	164,416	147,281	147,455
17	165,063	164,543	139,858	140,094
18	165,516	164,640	131,905	132,180
19	164,671	164,376	124,228	124,490
20	164,528	164,331	116,304	116,530
21	164,427	164,317	106,477	108,640
22	164,172	164,100	100,398	100,498
23	164,078	164,029	92,403	92,473
24	163,995	163,566	64,455	84,507
25	163,421	163,404	76,732	76,769
№40 variant				
1	189,765	189,765	307,743	307,743
2	189,435	189,433	298,526	298,526
3	189,042	189,037	289,111	289,110
4	188,589	188,578	279,834	279,832
5	188,116	188,100	270,437	270,429
6	187,183	187,160	261,478	261,462
7	187,257	187,225	252,101	252,089
8	187,103	187,058	243,087	243,033
9	187,728	187,657	234,053	203,975
10	188,288	188,180	224,919	224,808
11	188,738	188,575	215,623	215,486
12	189,080	188,748	206,534	206,366
13	189,262	186,736	197,212	197,089
14	189,743	189,084	188,116	188,119
15	190,121	189,418	178,966	179,082
16	190,390	189,611	169,940	170,141
17	190,457	169,758	161,375	161,647
18	190,448	189,969	152,198	152,516

19	190,005	189,665	143,340	143,643
20	189,840	189,613	134,197	134,458
21	189,724	189,597	125,166	125,354
22	189,429	189,346	115,844	115,959
23	189,320	189,265	106,619	106,700
24	188,763	188,730	97,446	97,508
25	188,563	188,549	88,537	88,580

### **Foydalanilgan adabiyotlar:**

1. Pravila oxраны soorujeniy i prirodnyx ob'ektov ot vrednogo vliyaniya gornyx работ. M., Nedra, 1981 g.
2. Spravochnik po marksheyderskomu delu. M., Nedra, 1981 g.
3. Marksheyderskoe delo. Ogloblin D.N. M., Nedra 1981 g.
4. Sbornik upravneniy i zadach po marksheyderskomu delu. Evdokimov A.V., Simankin A.G. M., MGGU 2004 g.

## 2 – Amaliy ishi. YAkka tartibdagi ob'yekt ostiga muhofazalovchi selik qoldirish

O'ekt ostiga muxofaza ustunini qurish, foydali qazilmani bo'ylama va ko'ndalang vertikal qirqimlari bo'yicha bajariladi.

Siljishning havfli chegarasi burchaklar bo'yicha aniqlanadi: yuqori qatlam uchun  $\varphi$ , ko'ndalang qirqimini asosiy jinslari uchun  $\beta$  va  $\gamma$  va foydali qazilmani ko'ndalang kesimi uchun  $\delta$ .

### 1. Ishdan maqsad:

1.1. Nazariy bilimlarni mustahkamlash va muhofaza ustunlarini qurishni o'rganish.

### 2. Ishni bajarish tartibi:

2.1. Boshlang'ich ma'lumotlarga asosan (jadvalga qara) quyidagi masshtablardan birida (1:1000, 1:2000, 1:5000) muhofazalanuvchi ob'ekt va qatlamni o'zaro joylashish plani chizilsin.

2.2. Muhofazalanuvchi bino uchun deformatsiyalar yig'indisi ko'rsatkichi aniqlansin. ( $[\Delta l_d]$ )

2.3. Bino uchun yo'l qo'yarli gorizontal deformatsiyalar ( $[E_d]$ ) aniqlansin.

2.4. Ushbu qatlamni xavfsiz qazish chuqurligi ( $N_b$ ) aniqlansin.

2.5. Bermani kengligi aniqlansin ( $V$ ).

2.6. Ob'ekt uchun muhofaza maydoni qurilsin.

2.7. Muhofazalanuvchi bino ostiga havfsiz qazish chuqurligini hisobga olgan holda vertikal qirqimlar usulida muhofaza ustuni qurilsin.

2.8. Qatlam bo'yicha muhofaza ustunida qazilma boylikni zahirasi aniqlansin.

3. Boshlang'ich ma'lumotlar variantlar asosida jadvaldan olinadi.

### 4. Uslubiy ko'rsatmalar.

4.1. Ishni har bir talaba o'qituvchi bergan variant asosida bajaradi.

4.2. Ish 11 yoki 12 formatli millimetr qog'ozida yoki vatmanda bajariladi.

4.3. Deformatsiyalar yig'indisi ko'rsatkichi quyidagicha aniqlanadi:

$$[\Delta l_d] = [\Delta l_d]_n \cdot n_1 \cdot n_2 \cdot n_3 \cdot n_4 \cdot n_5 \quad (1)$$

Bu erda  $[\Delta l_d]_n$  - m'yorlanadigan deformatsiyalar yig'indisi ko'rsatkichi,

$n_1$  - er qatlami sharoitini hisobga oluvchi koeffitsient,

$n_2$  - devor qalinligi va materialini hisobga oluvchi koeffitsient,

$n_3$  - eskirishni hisobga oluvchi koeffitsient,

$n_4$  - bino usti mustahkamligini hisobga oluvchi koeffitsient,

$n_5$  - bino shaklini hisobga oluvchi koeffitsient.

4.4. Bino uchun yo'l qo'yiladigan gorizontal deformatsiya quyidagi formula bo'yicha aniqlanadi:

$$[E_d] = \frac{[\Delta l_d]}{1,2 m_\varepsilon l} \quad (2)$$

Bu erda  $m_\varepsilon$  - ish sharoiti koeffitsienti,

$l$  - bino uzunligi.

4.5. Yo‘l qo‘yiladigan gorizontal deformatsiyani aniqlangandan so‘ng (1) ifoda bo‘yicha muhofaza bermasi kengligi  $b$  topiladi.

4.6. Havfsiz qazish chuqurligi quyidagi formula bo‘yicha aniqlanadi:

$$H_{\sigma} = K_{\varepsilon} \cdot \frac{m}{E_{\text{Д}}} \quad (3)$$

Bu erda  $K_{\varepsilon}$  - konkret kon uchun qatlamni og‘ish burchagiga bog‘liq bo‘lgan koeffitsient [1].

$m$  - qatlam qalinligi.

Agar  $H_{\sigma}$  bino osti kon ishlari amaldagi chuqurligidan katta bo‘lsa, u holda bu bino ostiga muhofaza ustuni quriladi.

4.7. Ustunlarni qurish uchun [1] dan foydalanib ushbu kon uchun surilish burchaklari ( $\varphi, \beta, \gamma, \delta$ ) va hisob uchun zarur boshqa qiymatlar olinadi.

4.8. Ustundagi zahira quyidagicha hisoblanadi:

$$Q = S \cdot m \cdot \gamma;$$

$$Q = S' \cdot m \cdot \gamma / \cos \alpha;$$

$$Q = V \cdot \gamma$$

Bu erda  $V$  - qazilma boylikni hajmiy oo‘irligi;

$V$  - qazilma boylik hajmi;

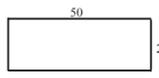
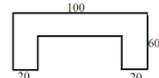
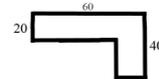
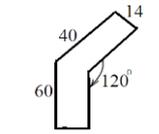
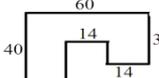
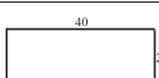
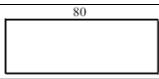
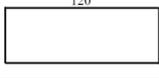
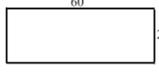
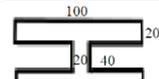
$S$  - ustun yuzasi (qiya), m;

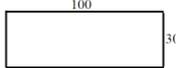
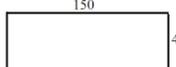
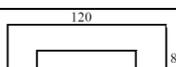
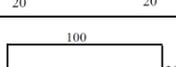
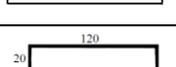
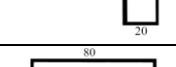
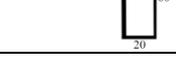
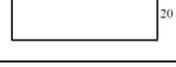
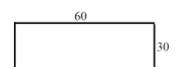
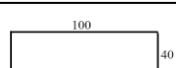
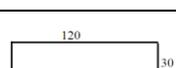
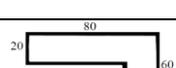
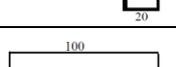
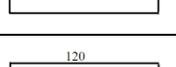
$m$  - qatlam qalinligi;

$S'$  - yuzaning gorizontal loyihasi;

$\alpha$  - qatlamning qiyalik burchagi.

Binoning tasnifi								Er qatlami	Bino markazi ostida qatlam chuqurligi	Qatlam og‘ish burchagi	Qatlam qalinligi	Erning ustki qatlam qalinligi	Bino o‘qi bilan qatlam yotiqligi orasidagi burchak
Variantlar	Bino va kon nomi	etajligi	devor materiali	devor qalinligi	bino tomi mat.	devor eskirishi	Binoning shakli va o‘lchami						
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Angren maktab	4	g‘isht	400	j/b	10% gacha		Jips loy	180	9	3.0	20	18
2	Donetsk kasalxona	5	g‘isht	400	j/b	20% gacha		bo‘sh ang er	130	15	1.2	15	30
3	SHarg‘un profilaktoriya	4	shlak-blok	400	j/b	30% gacha		qumlik	120	45	3.0	10	18
4	CHelyabinsk yashash uyi	5	g‘isht	510	j/b	30% gacha		toshlik	130	25	1.5	-	28
5	Donetsk institut	4	g‘isht	380	j/b	30% gacha		Jips loy	100	20	0.8	15	30

6	Kuznetsk yashash uyi	3	shlak-blok	510	j/b	20% gacha		qumlik	180	40	2.5	5	10
7	Kuznetsk poliklin.	3	shlak-blok	400	j/b	20% gacha		qumlik	180	37	2.2	12	37
8	Karaganda kinoteatr	2	g'isht	510	j/b	10% gacha		Jips loy	175	18	1.7	20	30
9	Kuznetsk maishiy kombinat	3	shlak-blok	400	j/b	20% gacha		Qoya toshlar	200	10	2.0	-	50
10	Donetsk yashash uyi	5	g'isht	380	j/b	10% gacha		qumlik	180	45	1.2	10	40
11	Kuznetsk instiut	5	g'isht	510	j/b	10% gacha		Jips loy	300	43	3.0	16	40
12	Kuznetsk yashash uyi	4	shlak-blok	400	j/b	30% gacha		Bo'shang er	380	40	2.0	10	22
13	Donetsk kasalxona	4	g'isht	380	j/b	30% gacha		Jips loy	100	27	1.2	10	40
14	Karaganda kosalxona	2	g'isht	380	j/b	30% gacha		Jips loy	80	15	1.5	10	30
15	Kuznetsk poliklin.	3	shlak-blok	400	j/b	10% gacha		qumlik	150	37	2.2	12	60
16	Karaganda maktab	3	shlak-blok	600	j/b	30% gacha		qumlik	200	25	1.6	10	20
17	Karaganda yashash uyi	2	g'isht	380	j/b	10% gacha		Jips loy	220	20	2.2	14	25
18	Kuznetsk poliklin.	2	shlak-blok	400	j/b	30% gacha		Jips loy	180	15	1.8	10	28
19	Kuznetsk kinoteatr	2	g'isht	510	j/b	yangi		qumlik	190	35	2.6	14	35
20	Karaganda yashash uyi	3	g'isht	510	j/b	10% gacha		Jips loy	200	45	2.0	18	15
21	Donetsk yashash uyi	5	g'isht	380	j/b	10% gacha		qumlik	200	40	1.2	10	23
22	Karaganda yashash uyi	5	g'isht	380	j/b	10% gacha		qumlik	80	42	2.2	20	18
23	Karaganda bog'cha	2	shlak-blok	600	j/b	20% gacha		loy	160	30	2.2	10	75
24	Kuznetsk maktabi	3	g'isht	510	j/b	10% gacha		Jips loy	180	25	2.5	20	30

25	Karaganda kosalxona	4	shlak-blok	600	j/b	30% gacha		qoya	280	16	2.5	-	45
26	Karaganda yashash uyi	3	shlak-blok	600	j/b	10% gacha		Jips loy	240	18	2.0	10	46
27	Karaganda kombinat	4	g'isht	380	j/b	10% gacha		qoya	200	40	2.0	-	30
28	Kuznetsk maktabi	2	g'isht	380	j/b	20% gacha		qoya	150	25	1.5	-	25
29	Kuznetsk yashash uyi	5	shlak-blok	600	j/b	10% gacha		Jips loy	200	12	2.5	10	18
30	Kuznetsk kasalxona	4	g'isht	380	j/b	30% gacha		Jips loy	250	17	2.5	18	35
31	Kuznetsk kombinat	4	shlak-blok	600	j/b	20% gacha		qumlik	220	45	2.5	5	32
32	Karaganda kasalxona	4	g'isht	380	j/b	30% gacha		qoya	160	20	2.0	-	20
33	Karaganda bog'cha	2	g'isht	510	j/b	30% gacha		Jips loy	120	35	2.0	10	35
34	Karaganda maktab	5	g'isht	510	j/b	30% gacha		qumlik	140	30	2.4	5	37
35	Donetsk yashash uyi	4	g'isht	380	j/b	20% gacha		Jips loy	100	10	0.9	10	36
36	Donetsk poliklin.	5	shlak-blok	600	j/b	30% gacha		Jips loy	80	20	0.8	5	35
37	Donetsk maktab	5	g'isht	510	j/b	10% gacha		qumlik	120	40	1.2	10	45
38	Karaganda yashash uyi	4	g'isht	380	j/b	30% dan ko'p		qumlik	120	45	2.2	5	40
39	Karaganda kinoteatr	2	shlak-blok	600	j/b	10% gacha		qoya	200	50	2.5	-	45
40	CHelyabinsk maktab	4	g'isht	380	j/b	10% gacha		loy	150	23	2.0	15	62

### **Foydalanilgan adabiyotlar**

1. Kon ishlarini havfli ta'siridan tabiiy ob'ekt va inshootlarni muxofazalash qoidalari (Pravila ohrany soorujeniy i prirodnykh ob'ektov ot vrednogo vliyaniya gornyx rabot) M., Nedra, 1981 g.
2. Spravochnik po marksheyderskomu delu M., Nedra, 1981 g.
3. Marksheyderskoe delo. Ogloblin D.N. M., Nedra, 1981 g.
4. Marksheyderskoe delo. Ushakov I.N., chast 2. M., Nedra, 1987 g.
5. Sbornik upravlnkiy i zadach po marksheyderskomu delu. Evdakimov A.V., Simankin A.G. M., 2004 g.

### 3-Amaliy ishi. Temir yo‘l ostiga muxofaza ustunini o‘rnatish

**1. Ishdan maqsad:** Temir yo‘l ostiga muxofazalovchi ustun qurish malakasiga ega bo‘lish.

**2. Ishni bajarish tartibi:**

2.1. 1-jadvaldan variant bo‘yicha temir yo‘lining xarakterli nuqtalarini koordinatalari va temir yo‘l uchastkalarini nishabliligini, qidiruv quduqlarining va qatlamda yotgan nuqtaning koordinatalari yozib olinsin.

2.2. Temir yo‘lni va qidiruv quduqlarining plani quyidagi masshtablardan birida (1:1000, 1:2000, 1:5000) qurilsin.

2.3. Temir yo‘lni egri uchastkalarida radius va burilish burchaklari aniqlansin.

2.4. Er yuzasidagi gorizontallar hisoblansin.

Izoh:

a) AV uchastkada temir yo‘l ko‘tarmasi 10 m;

b) VS uchastkada o‘yiqlik 5 m;

v) SD uchastkada temir yo‘l ko‘tarmasi norma doirasida.

2.5. Qatlamda yotgan uchta nuqta bo‘yicha temir yo‘l planiga qatlamning asosi gipsometrik plani qurilsin.

2.6. YUqori qatlam ostidan qatlamning chiqishi qurilsin.

2.7. Temir yo‘l uchun muxofazalovchi maydon qurilsin.

2.8. YUqori qatlam bilan qattiq tog‘ jinslari chegarasida muxofazalovchi maydon qurilsin.

2.9. Xavfsiz qazib olish chuqurligini xisobga ogan holda, temir yo‘l ostiga perpendikulyarlar usuli yordamida muhofazalovchi ustuni qurilsin.

2.10. Vertikal qirqimlar yordamida temir yo‘l ostiga kontrol muxofazalovchi ustuni qurilsin.

2.11. Muxofazalovchi ustundagi ko‘mirning zaxirasi aniqlansin (ko‘mirni solishtirma og‘irligi  $\gamma=1,3 \text{ t/m}^3$ ).

**3. Boshlang‘ich ma‘lumotlar:**

Izoh: Temir yo‘l bo‘ylab poezdning tezligi 80 km/s.dan oshmaydi.

1-jadval

variant	Ko'mir basseynini nomlanishi	temir yo'l uchastkalaridagi xarakterli nuqtalari va nishablighi				Xarakterli nuqtalarni koordinatalari, m			Qidiruv skvajasining koordinatalari, m			Ko'mir qatlamini qidiruv chuqurligini, m	Qatlam qalinligi, m	YUqori qatlam qalinligi, m	
		Xarakterli nuqtalarning nomi	Belgilanishi	Uchastkani ko'rinishi	nishablik	X	Y	Z	Tartib raqam.	X	Y				Z
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	CHelyabinskiy	k.k.	A	To'g'ri Egri to'g'ri	+0.005 0 -0.008	2500	5160	206	1	3226	5760	213	152	2	20
		n.k.	V			2835	5657		2	2280	5635	200	-350		
		k.k.	S			3000	6659		3	2440	6890	190	-18		
		n.k.	D			2828	7236								
2.	Karagandinskiy	k.k.	A	To'g'ri Egri to'g'ri	-0.008 0 -0.010	2250	4644	185	1	2900	5180	192	136	2.2	15
		n.k.	V			2552	5091		2	2050	5070	180	-313		
		k.k.	S			2695	5993		3	2196	6201	171	-20		
		n.k.	D			2546	6510								
3.	Kuznetskiy	k.k.	A	To'g'ri Egri to'g'ri	0 +0.006 0	1053	3208	210	1	1596	4674	212	-250	4	15
		n.k.	V			1320	3610		2	980	4150	180	-140		
		k.k.	S			1450	4420		3	1360	3270	200	+120		
		n.k.	D			1320	4890								
4.	Donetskiy	k.k.	A	To'g'ri Egri to'g'ri	0 +0.008 0	1250	3300	300	1	1700	4770	300	-260	1.0	20
		n.k.	V			1500	3700		2	1180	4250	268	-100		
		k.k.	S			1650	4530		3	1560	3370	290	+140		
		n.k.	D			1520	4990								
5.	Kuznetskiy	k.k.	A	To'g'ri Egri to'g'ri	+0.009 0 -0.010	3660	1000	300	1	4260	1730	310	+170	2	15
		n.k.	V			4160	1340		2	5130	1650	312	-600		
		k.k.	S			5160	1490		3	4600	1080	280	+210		
		n.k.	D			5740	1330								
6.	CHelyabinskiy	k.k.	A	To'g'ri Egri to'g'ri	-0.010 0 +0.006	1500	4160	225	1	2250	4750	230	175	3	25
		n.k.	V			1800	4700		2	1300	4650	220	-330		
		k.k.	S			2000	5700		3	1460	6000	212	0		
		n.k.	D			1830	6250								
7.	Kuznetskiy	k.k.	A	To'g'ri Egri to'g'ri	0 -0.005 0	3570	1200	300	1	5200	1774	300	-260	2	20
		n.k.	V			4000	1480		2	4600	1090	280	-100		
		k.k.	S			4910	1600		3	3640	1510	200	+140		
		n.k.	D			5430	1470								
8.	CHelyabinskiy	k.k.	A	To'g'ri Egri to'g'ri	+0.006 0 -0.008	3600	1180	250	1	5200	1770	250	-300	3	30
		n.k.	V			4030	1460		2	4600	1090	220	-150		
		k.k.	S			4950	1630		3	3640	1510	240	+150		
		n.k.	D			5460	1430								
9.	Kuznetskiy	k.k.	A	To'g'ri Egri to'g'ri	0 +0.008 0	1180	3570		1	1770	5190	234	-300	1.2	20
		n.k.	V			1480	4010		2	1090	4608	200	-130		
		k.k.	S			1615	4915		3	1516	3640	222	+130		
		n.k.	D			1470	5430								
10.	Kuznetskiy	k.k.	A	To'g'ri Egri to'g'ri	-0.005 0 +0.010	1000	3670		1	1730	4260	300	-220	5	20
		n.k.	V			1330	4160		2	1650	5150	280	-600		
		k.k.	S			1500	5160		3	1070	4600	260	-200		
		n.k.	D			1330	5740								
11.	Kuznetskiy	k.k.	A	To'g'ri Egri to'g'ri	0 -0.007 0	1300	3970		1	1990	5760	300	-300	3	15
		n.k.	V			1650	4500		2	1200	5100	280	-150		
		k.k.	S			1800	5460		3	1690	4000	290	200		
		n.k.	D			1630	6050								
12.	Kuznetskiy	k.k.	A	To'g'ri Egri to'g'ri	0 +0.004 0	2280	4650		1	2900	5180	210	140	2	20
		n.k.	V			2560	5090		2	2050	5080	200	-300		
		k.k.	S			2100	6000		3	2200	6200	190	-20		
		n.k.	D			2550	6510								
13.	Kuznetskiy	k.k.	A	To'g'ri	+0.007	500	3180		1	1220	3750	360	-500	5	15
		n.k.	V			840	3660		2	310	3650	370	-300		

		k.k.	S	Egri	0	990	4660		3	480	4900	340	220		
		n.k.	D	to'g'ri	-0.010	830	5240								
14.	Kuznetskiy	k.k.	A	To'g'ri	-0.009	3665	1000		1	4270	1700	362	220	3	30
		n.k.	V	Egri	0	4160	1340		2	5160	1640	369	-450		
		k.k.	S	to'g'ri	-0.007	5170	1500		3	4600	1080	340	250		
		n.k.	D			5740	1330								
15.	Karagandinskiy	k.k.	A	To'g'ri	0	500	3160		1	1200	3700	410	-460	2	15
		n.k.	V	Egri	+0.006	820	3600		2	280	3600	390	-400		
		k.k.	S	to'g'ri	0	975	4660		3	430	5000	400	210		
		n.k.	D			840	5210								
16.	Kuznetskiy	k.k.	A	To'g'ri	0	1000	3760	200	1	1730	4300	180	-210	3	20
		n.k.	V	Egri	-0.007	1340	4260		2	1600	5250	170	-600		
		k.k.	S	to'g'ri	0	1500	5260		3	1100	4720	160	-400		
		n.k.	D			1330	5800								
17.	Kuznetskiy	k.k.	A	To'g'ri	+0.009	2000	3700		1	2700	4250	240	-300	2	15
		n.k.	V	Egri	0	2330	4100		2	2600	5100	250	-500		
		k.k.	S	to'g'ri	-0.008	2500	5200		3	2080	4650	235	100		
		n.k.	D			2300	5800								
18.	Donetskiy	k.k.	A	To'g'ri	-0.006	5670	1000		1	6270	1730	315	180	0.8	30
		n.k.	V	Egri	0	6180	1350		2	7150	1600	300	-600		
		k.k.	S	to'g'ri	+0.012	7150	1500		3	6650	1080	290	150		
		n.k.	D			7800	1330								
19.	Karagandinskiy	k.k.	A	To'g'ri	0	4500	4180		1	5200	4800	260	100	3	25
		n.k.	V	Egri	+0.006	4950	4700		2	3300	4670	276	-400		
		k.k.	S	to'g'ri	0	5000	5660		3	3500	5890	285	-50		
		n.k.	D			4550	6200								
20.	Donetskiy	k.k.	A	To'g'ri	-0.006	3760	900		1	4365	1630	412	-200	1.2	20
		n.k.	V	Egri	0	4260	1200		2	5240	1540	400	250		
		k.k.	S	to'g'ri	+0.008	5260	1390		3	4700	990	390	-600		
		n.k.	D			5840	1230								
21.	Karagandinskiy	k.k.	A	To'g'ri	+0.008	1200	4070		1	1900	4630	125	-250	2	10
		n.k.	V	Egri	0	1530	4620		2	1000	4540	135	-400		
		k.k.	S	to'g'ri	-0.009	1720	5630		3	1150	5870	140	50		
		n.k.	D			1500	6140								
22.	Donetskiy	k.k.	A	To'g'ri	0	3170	800		1	4800	1380	160	-500	1.2	15
		n.k.	V	Egri	+0.005	3600	1080		2	4250	650	150	-50		
		k.k.	S	to'g'ri	0	4500	1200		3	3200	1100	145	60		
		n.k.	D			5000	1050								
23.	Karagandinskiy	k.k.	A	To'g'ri	0	3100	1200		1	4700	1790	405	-200	2	10
		n.k.	V	Egri	-0.006	3550	1480		2	4120	1100	390	250		
		k.k.	S	to'g'ri	0	4504	1650		3	3150	1550	410	-350		
		n.k.	D			9500	1450								
24.	Donetskiy	k.k.	A	To'g'ri	-0.007	1450	4210		1	2200	4810	130	-400	0.8	30
		n.k.	V	Egri	0	1800	4700		2	1220	4700	140	-50		
		k.k.	S	to'g'ri	+0.008	1950	5730		3	1400	5920	150	70		
		n.k.	D			1800	6290								
25.	Kuznetskiy	k.k.	A	To'g'ri	0	400	3060		1	1130	3670	210	-500	4	15
		n.k.	V	Egri	+0.010	730	3560		2	1000	4500	200	100		
		k.k.	S	to'g'ri	0	900	4560		3	460	4100	190	-200		
		n.k.	D			700	5100								
26.	Kuznetskiy	k.k.	A	To'g'ri	0	1020	3680		1	1750	4280	405	-400	4	20
		n.k.	V	Egri	-0.006	1350	4200		2	1640	5140	410	0		
		k.k.	S	to'g'ri	0	1490	5180		3	1070	4630	390	100		
		n.k.	D			1850	5750								
27.	Kuznetskiy	k.k.	A	To'g'ri	+0.007	4180	1520		1	4750	2260	320	100	5	30
		n.k.	V	Egri	0	4710	1830		2	4620	1330	330	-300		
		k.k.	S	to'g'ri	-0.006	5715	2050		3	6030	1440	320	150		
		n.k.	D			6240	1840								
28.	Kuznetskiy	k.k.	A	To'g'ri	0	1230	3580		1	1770	5170	210	-400	2.2	15
		n.k.	V	Egri	+0.009	1450	4020		2	1050	4600	200	0		
		k.k.	S	to'g'ri	0	1640	4930		3	1520	3600	210	150		
		n.k.	D			1500	5440								

29.	Donetskiy	k.k.	A	To'g'ri Egri to'g'ri	0 -0.007 0	1160	3610		1	1780	5230	460	-500	0.9	30
		n.k.	V			1450	4050		2	1100	4640	455	50		
		k.k.	S			1650	4920		3	1520	3650	440	300		
		n.k.	D			1400	5440								
30.	Donetskiy	k.k.	A	To'g'ri Egri to'g'ri	0 +0.005 0	3570	1150		1	5200	1780	410	100	0.8	15
		n.k.	V			4020	1460		2	4600	1100	420	-400		
		k.k.	S			4950	1630		3	3600	1520	390	300		
		n.k.	D			5400	1500								
31.	Kuznetskiy	k.k.	A	To'g'ri Egri to'g'ri	-0.006 0 +0.008	3680	980		1	4280	1750	160	-400	4	20
		n.k.	V			4180	1300		2	5180	1680	150	0		
		k.k.	S			5200	1500		3	4650	1090	170	60		
		n.k.	D			5750	1330								
32.	Kuznetskiy	k.k.	A	To'g'ri Egri to'g'ri	+0.007 0 -0.006	3980	1320		1	5700	2000	210	-50	2	30
		n.k.	V			4520	1640		2	5000	1250	200	-400		
		k.k.	S			5480	1820		3	4050	1700	190	120		
		n.k.	D			6040	1640								
33.	Kuznetskiy	k.k.	A	To'g'ri Egri to'g'ri	0 -0.010 0	4660	2290		1	5200	2950	290	-500	3	10
		n.k.	V			5100	2580		2	5100	2060	280	120		
		k.k.	S			6040	2120		3	6250	2250	300	-50		
		n.k.	D			6520	2560								
34.	CHelyabinskiy	k.k.	A	To'g'ri Egri to'g'ri	-0.012 0 +0.006	550	3180		1	1200	3700	190	100	2	25
		n.k.	V			850	3680		2	360	3600	205	-300		
		k.k.	S			1000	4600		3	500	5000	215	-50		
		n.k.	D			850	5200								
35.	Kuznetskiy	k.k.	A	To'g'ri Egri to'g'ri	+0.006 0 -0.004	1020	3670		1	1700	4200	150	-200	3	30
		n.k.	V			1350	4180		2	1650	5180	140	50		
		k.k.	S			1540	5200		3	1100	4600	130	-300		
		n.k.	D			1300	5760								
36.	Kuznetskiy	k.k.	A	To'g'ri Egri to'g'ri	0 +0.006 0	3165	550		1	3720	1250	90	-500	2.5	25
		n.k.	V			3650	830		2	3650	300	110	-50		
		k.k.	S			4700	1000		3	5050	450	100	-300		
		n.k.	D			5200	870								
37.	Kuznetskiy	k.k.	A	To'g'ri Egri to'g'ri	0 +0.012 0	3700	970		1	4250	1700	200	-350	2	40
		n.k.	V			4200	1300		2	5200	1620	180	130		
		k.k.	S			5200	1550		3	4700	1150	190	-50		
		n.k.	D			5820	1350								
38.	Karagandinskiy	k.k.	A	To'g'ri Egri to'g'ri	-0.006 0 +0.004	3760	2020		1	4200	2700	130	-360	3	25
		n.k.	V			4120	2350		2	5150	2650	125	0		
		k.k.	S			5240	2560		3	4630	2120	110	60		
		n.k.	D			5850	2360								
39.	CHelyabinskiy	k.k.	A	To'g'ri Egri to'g'ri	+0.005 0 -0.008	1050	5650		1	1750	6300	210	50	2	15
		n.k.	V			1400	6200		2	1620	7200	200	-400		
		k.k.	S			1520	7180		3	1090	6700	190	-80		
		n.k.	D			1340	7900								
40.	Donetskiy	k.k.	A	To'g'ri Egri to'g'ri	+0.012 0 -0.006	4200	4550		1	4820	5250	140	-600	1.2	15
		n.k.	V			4750	3890		2	4690	3300	135	0		
		k.k.	S			5620	5050		3	5900	3520	120	50		
		n.k.	D			6250	3850								

## Laboratoriya ishi №4

### Er osti kon ishlari ta'sirida er yuzasini siljish parametrlarini aniqlash.

1. Ishdan maqsad: Olingan nazariy bilimlarni mustahkamlash, siljish parametrlarini aniqlash usullari bilan tanishish.

2. Boshlang'ich ma'lumotlar: Variantlar 3 laboratoriya ishi bo'yicha olinadi, ya'ni kon va ob'ekt to'g'risidagi ma'lumotlar xuddi 3 laboratoriya ishi kabi bo'ladi.

3. Umumiy ko'rsatmalar:

3.1. Ko'mir konlarida kuzatish stansiyalarini barpo qilish uchun quyidagilar bajariladi:

3.1.1. Qatlamning og'ish burchagi  $\alpha$  orqali [1] "Bino va inshootlarni er osti kon ishlarining zararli ta'siridan ximoyalash qoidalari" dan  $\beta$ ,  $\beta_1$ ,  $\gamma$ ,  $\delta$  siljish burchaklarini va chegaraviy burchak  $\varphi_0$ , shuningdek maksimal cho'kish burchagi  $\theta$  va to'liq siljish burchagi  $\psi_3$  aniqlanadi. "Yo'riqnoma ....." [2] asosan  $\Delta\beta, \Delta\beta_1, \Delta\gamma, \Delta\delta$  burchaklariga tuzatmalar kiritiladi.

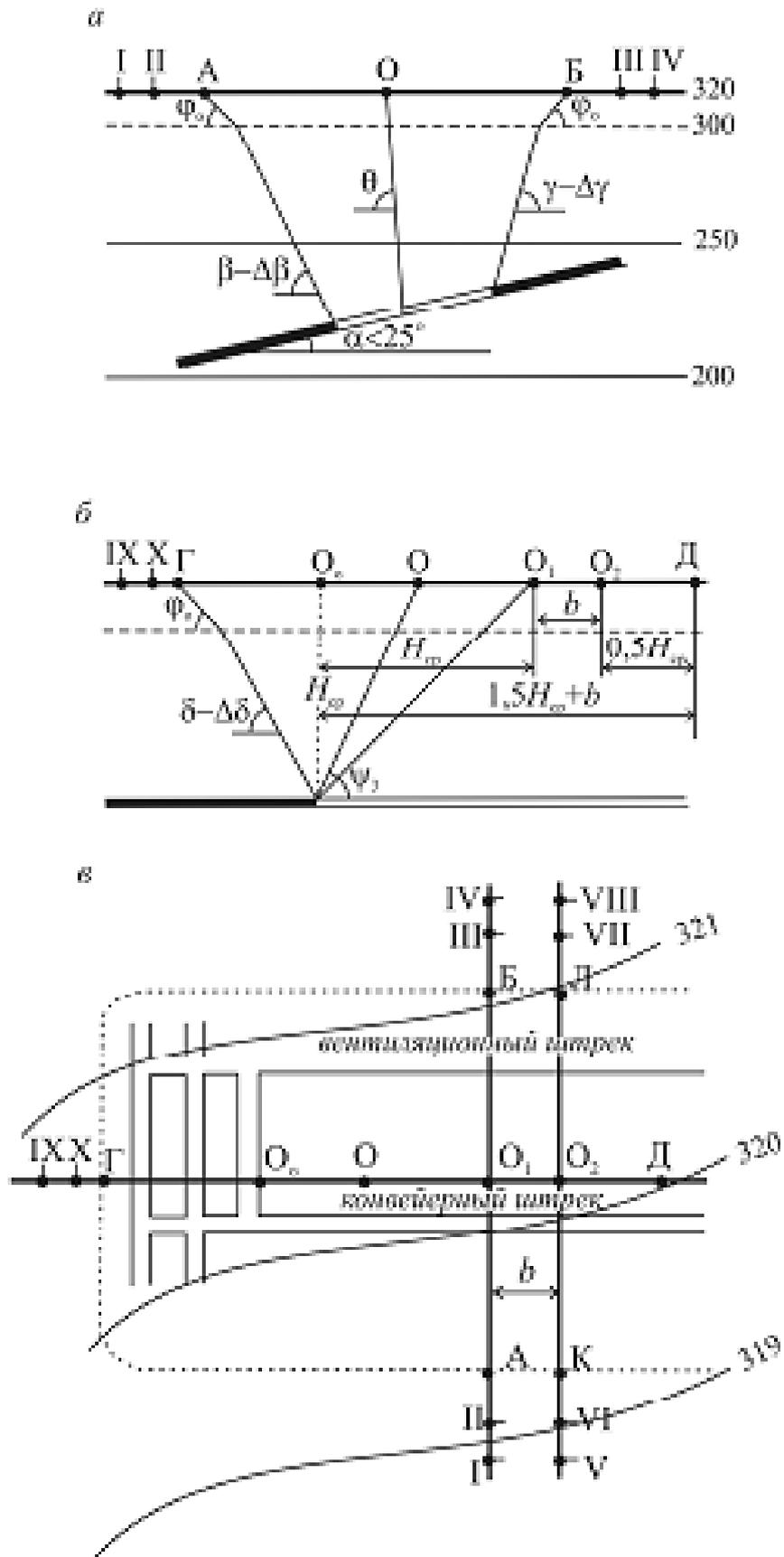
3.1.2. YOtiqligiga ko'ndalang asosiy kesmada ( $\beta - \Delta\beta$ ) burchak bo'yicha qatlam yotgan tomonidan, ( $\gamma - \Delta\gamma$ ) qatlamni tiklanish tomonidan va burchak  $\varphi$  – ustki qatlam bo'yicha qatlam yotiqligiga ko'ndalang yo'nalish bo'yicha profil chizig'ining (AB) ishchi qismi uzunligi aniqlanadi,  $\theta$  burchak bo'yicha esa profil chizig'ining o'rni aniqlanadi – nuqta (0) (1<sup>a</sup> –rasm).

3.1.3. Qatlam yotiqligi bo'yicha kesmada profil chizig'i GD ning ishchi qismi uzunligi va profil chizig'ining yotiqlikga ko'ndalang yo'nalish bo'yicha o'rni –  $O_1, O_2$  ( $\delta - \Delta\delta$ ) burchaklari va rasm 1<sup>b</sup> da ko'rsatilgan uzunliklar bo'yicha aniqlanadi.

4. Ruda konlarida kuzatish stansiyalarini barpo qilish uchun quyidagi tartibda ish bajariladi:

4.1. Ruda qatlamining og'ish burchagi, tarkibi va qattiqligiga qarab "Yo'riqnoma ....." [2] asosida tog' jinslari guruxi, siljish burchaklari  $\beta$ ,  $\beta_1$ ,  $\gamma$ ,  $\delta$ ,  $\varphi$  va siljish burchaklariga tuzatmalar aniqlanadi.

4.2. Qatlam yotiqligiga ko'ndalang yo'nalish va qatlam yotiqligi yo'nalishlari bo'yicha vertikal kesmalar quriladi va ular asosida profil chiziqlarining ishchi qismi uzunligi va ularning o'rni aniqlanadi.



Rasm. 1. Kesmalarda profil chiziqlar: a – ko‘ndalangi bo‘yicha; b –bo‘ylamasi bo‘yicha; v – kon ishlarini plandagi ko‘rinishi.

5. Vertikal kesmalardan foydalanib profil chiziqlarini planga ko‘chiriladi (rasm 1<sup>v</sup>). Planda tayanch, boshlang‘ich va ishchi reperlar ko‘rsatiladi.

6. Kuzatish stansiyalarini tushuntirish xatida quyidagilar ko'rsatiladi [3, 4, 5]:

- Ishchi reperlarning oraliq masofalari;
- Tayanch va ishchi reperlarning konstruksiyalari;
- Profil chiziqlarni joyga ko'chirish usuli;
- Reperlarni o'rnatish uslubi;
- Profil chiziqlarni planda va balandlik bo'yicha tarmoqqa bog'lash usuli;
- Boshlang'ich va oraliq kuzatish tartibi.

7. Kuzatish stansiyasini barpo qilish va kuzatish bo'yicha ish grafigi tuziladi, u o'z ichiga quyidagilarni kiritadi:

- Joyni rekognassirofka qilish;
- Profil chizig'ini loyihadan joyga ko'chirish;
- Reperlarni o'rnatish;
- Betonlash ishlari;
- Profil chizig'ini planda va balandlik bo'yicha tayanch tarmog'iga bog'lash;

– Boshlang'ich kuzatishlar (orasi 5 kundan ko'p bo'lmagan 2 ta kuzatish seriyasi);

- Oraliq kuzatishlar.

YUqorida ko'rsatilgan ishlar uchun vaqt va ishlab chiqarish me'yorlari [6, 7] asosan aniqlanadi.

YOtiqligi kichik bo'lgan qatlam uchun 1 rasmda misol keltirilgan.

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## Laboratoriya ishi №5

### Er yuzasidagi temir yo‘lga er osti ishlarini ta‘sirini xisoblash va ximoyalashni optimal chegaralarini aniqlash.

1. Ishdan maqsad: Olingan nazariy bilimlarni mustaxkamlash, temir yo‘llarni er osti kon ishlarini zararli ta‘siridan himoyalash choralari bilan tanishish.

2. Ishni bajarish tartibi: Temir yo‘li o‘tgan uchastka bo‘yicha vertikal kesmalar o‘tkaziladi, siljish va deformatsiya qiymatlari aniqlanadi, siljish va chegaraviy burchaklari va boshqa parametrlarni aniqlash, planga temir yo‘li tushiriladi. Interpolyasiya yordamida kutilayotgan cho‘kish qiymatlari aniqlanadi va xulosa beriladi.

3. Boshlang‘ich ma‘lumotlar: O‘qituvchi tomonidan har bir talabaga turli ko‘mir xavzalari beriladi.

4. Uslubiy ko‘rsatmalar:

4.1. Temir yo‘l ostidagi zaxirani qazish maqsadida 2 ta ishchi gorizont loyihalanaadi. Buning uchun uchastkada qatlamning tiklanish tomonidan qatlam yotiqiligiga ko‘ndalang yo‘nalish bo‘yicha vertikal kesma quriladi. Kesmada er yuzasi, er ustki qatlami, qatlam va kavjoy lahimlari ko‘rsatilgan bo‘lishi kerak. Kavjoy lahimlarni chegaralari planga tushiriladi.

4.2. Har bir kavjoy lahimi uchun siljish va deformatsiya qiymatlari aniqlanadi.

4.2.1. Chegaraviy burchak  $\beta_0, \gamma_0$  orqali siljish muldasi chegarasi, to‘liq siljish burchaklari  $\psi, \psi_2$  bo‘yicha yassi tublik chegaralari, maksimal cho‘kish burchagi  $\theta$  bo‘yicha maksimal cho‘kish nuqtasi aniqlanadi.

4.2.2. Maksimal cho‘kish qiymati hisoblanadi:

$$\eta\eta_{max} = q_0 m N_1 N_2 \cos\alpha \quad (1)$$

Bu erda:  $q_0$  – nisbiy maksimal cho‘kish, uni “Muhofazalash qoidalari .....” [1, 7 bo‘lim] aniqlanadi;  $m$ – qatlam qalinligi,  $m$ ;  $\alpha$ – qatlam og‘ish burchagi, grad;  $N_1, N_2$ –qazilganlik koeffitsientlari, ular quyidagicha aniqlanadi:

$N_1 - D_1/N_{o'r}$  bo‘yicha va

$N_2 - D_2/N_{o'r}$  bo‘yicha,

Bu erda  $D_1, D_2$  – lavaning yotiqiligiga ko‘ndalang va yotiqiligi yo‘nalishlari bo‘yicha o‘lchamlari;

$N_{o'r}$ – qatlamni qazishni o‘rtacha chuqurligi.

4.2.3. Kesmada yarim mulda  $L_1, L_2$  uzunligi aniqlanadi.

4.2.4.  $N_1$  koeffitsient bo‘yicha  $S(Z_{u1,2})$  [1, ilova 1, tabl. 17÷23] bo‘yicha aniqlanadi va hisoblanadi:

–  $Z_{u1,2}$  ning har bir qiymati uchun cho‘kish xisoblanadi.

$$\eta\eta_u = \eta_m S(Z_{u1,2}) \quad (2)$$

– Siljish muldasining qatlam yotiqiligiga ko‘ndalang yo‘nalishi bo‘yicha asosiy qirqimlardagi qiyaliklar:

$$i_{Y1,2} = \pm \frac{\eta_m}{L_{i1,2}} S'(Z_{u1,2}) \quad (3)$$

Bu erda  $S'(Z_{u1,2})$  – qiyalik funksiyasi [1, ilova 1, tabl. 17÷23] dan tegishli ko‘mir xavzasi uchun  $N_1$  koeffitsientiga nisbatan aniqlanadi.

– Egrilik:

$$K_{Y1,2} = \pm \frac{\eta_m}{L_{i1,2}^2} S''(Z_{u1,2}) \quad (4)$$

Bu erda  $S''(Z_{u1,2})$  – egrilik chizig‘i tipi,  $N_1$  koeffitsientiga nisbatan aniqlanadi.

– Gorizont siljish: og‘ish bo‘yicha yarim muldada

$$\xi_{u1} = 0,5a_o \eta_m (S'(Z_{u1}) + 2VS(Z_{u1})) \quad (5)$$

Tiklanish bo‘yicha yarim mulda

$$\xi_{u2} = -0,5a_o \eta_m (S'(Z_{u2}) - 2VS(Z_{u2})) \quad (6)$$

Bu erda:  $V$  – quyidagi formula bilan aniqlanadigan koeffitsient;

$$B = \frac{1}{\alpha_0} \left( \operatorname{tg} \alpha - \frac{h_H + h_M}{H_{cp}} \right) \geq 0 \quad (7)$$

Bu erda  $\alpha_0$  – gorizont siljishni nisbiy qiymati, uni [1, 7 bo‘lim] dan olinadi,  $h_H$  – ustki qatlam qalinligi,  $h_M$  – gorizontotal yotgan mezazoy qatlami qalinligi ( $\alpha \leq 5^\circ$ ).

Gorizont deformatsiyalar:

Og‘ish burchagi yarim muldada:

$$\varepsilon_{u1} = 0,5a_o \frac{\eta_m}{L_2} [S''(Z_{u1}) + 2VS'(Z_{u1})] \quad (8)$$

Tiklanish bo‘yicha yarim muldada:

$$\varepsilon_{u2} = 0,5a_o \frac{\eta_m}{L_2} [S''(Z_{u2}) - 2VS'(Z_{u2})] \quad (9)$$

Hisoblash natijalari 3,4 jadvalga kiritiladi.

Deformatsiyani hisoblash uchun boshlang‘ich ma‘lumotlar 3-Jadval.

Parametr	Belgilanishi	Lava I	Lava II
Qatlam qalinligi, m	$m$		
Qatlamni og‘ish burchagi, grad.	$a$		
Ustki qatlam qalinligi, m	$h_H$		
Lavani yotishi bo‘yicha o‘lchami, m	$D_1$		
YOtig‘ligi bo‘yicha lava o‘lchami, m	$D_2$		
O‘rtacha chuqurlik, m	$H$		
	$D_1/H$		
Qazilganlik koeffitsienti	$N_1$		
	$D_2/H$		
Qazilganlik koeffitsienti	$N_2$		
CHegaraviy burchaklar, grad.	$\beta_0$		

	$\gamma_0$		
	$\varphi_0$		
To'liq siljish burchaklari, grad.	$\psi_1$		
	$\psi_2$		
Maksimal cho'kish burchagi, glar.	$\theta$		
Nisbiy maksimal cho'kish	$q_0$		
Nisbiy maksimal siljish	$\alpha_0$		
Maksimal cho'kish, mm	$\eta_m$		
YArim mulda uzunligi, m	$L_1$		
	$L_2$		
	$\frac{\eta_m}{L_1} 10^{-3}$		
	$\frac{\eta_m}{L_2} 10^{-3}$		
	$\frac{\eta_m}{L_1^2} 10^{-3}$		
	$\frac{\eta_m}{L_2^2} 10^{-3}$		
	$0,5a_o\eta_m 10^{-3}$		
	$0,5a_o\frac{\eta_m}{L_1} 10^{-3}$		
	$0,5a_o\frac{\eta_m}{L_2} 10^{-3}$		
	$B$		

Siljish va deformatsiya qiymatlari, 4-Jadval

Z	S	S'	S''	$\eta$ , mm	$i \times 10^{-3}$	$K \times 10^{-3}$ , 1/m	$\xi$ xmm	$\epsilon \times 10^{-3}$
Lava I, og'ish burchagi yarim mulda								
0								
0,1								
...								
0,9								
1								

2.5. Har bir yarim mulda uzunligi bir-biriga teng 10 qismga bo'linib, (8)-(9) formulalar bilan hisoblangan qiymatlar bo'yicha siljish va deformatsiya grafiklari har bir lava uchun ixtiyoriy masshtabda quriladi (10 rasm).

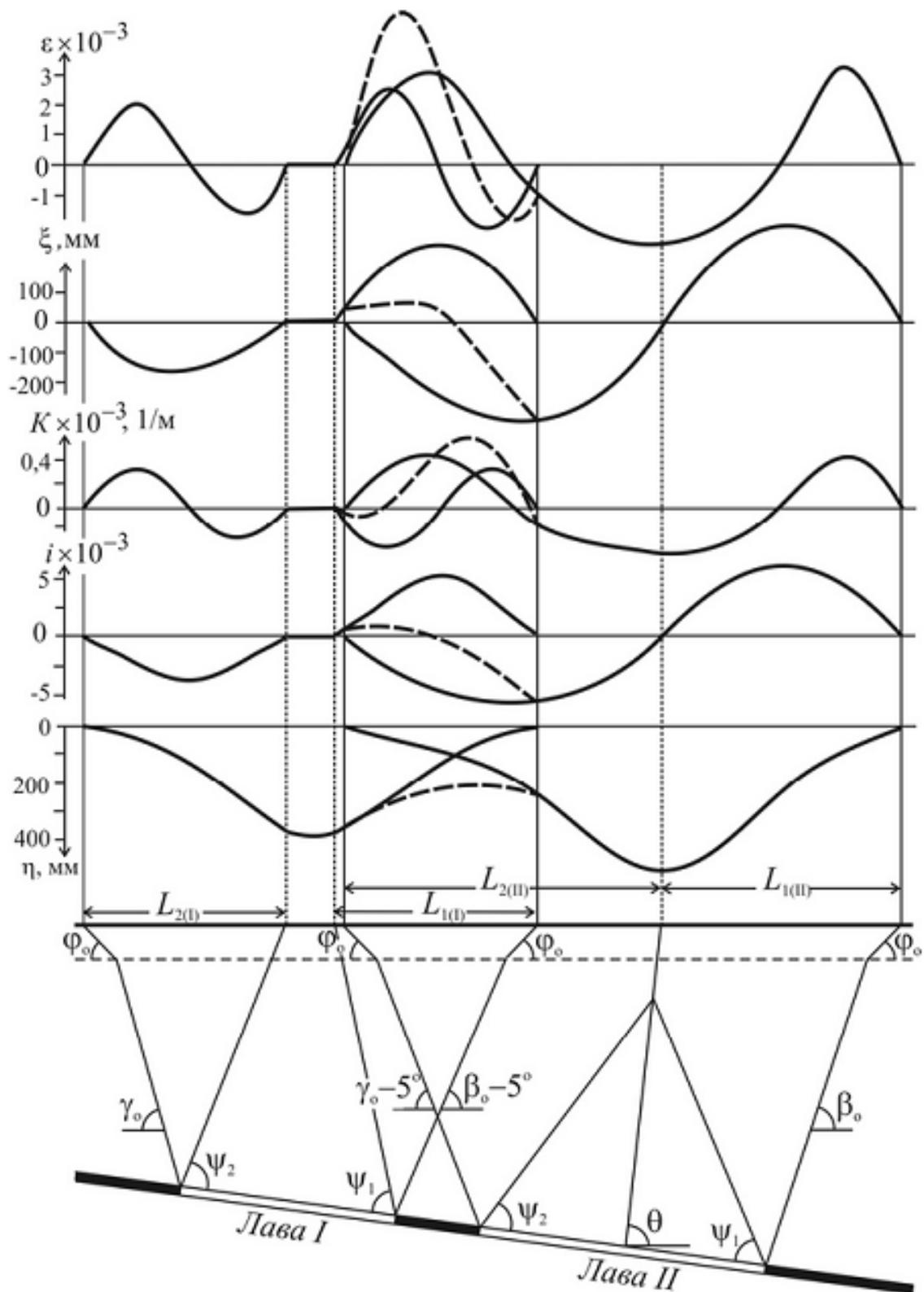
3. Grafikdagi tegishli deformatsiyalar (ishoralarga qarab) yig'indisi hisoblanadi.

4. Temir yo'l o'qi bo'yicha er yuzasi deformatsiyasi va siljishini kutilayotgan qiymatlari hisobalanadi.

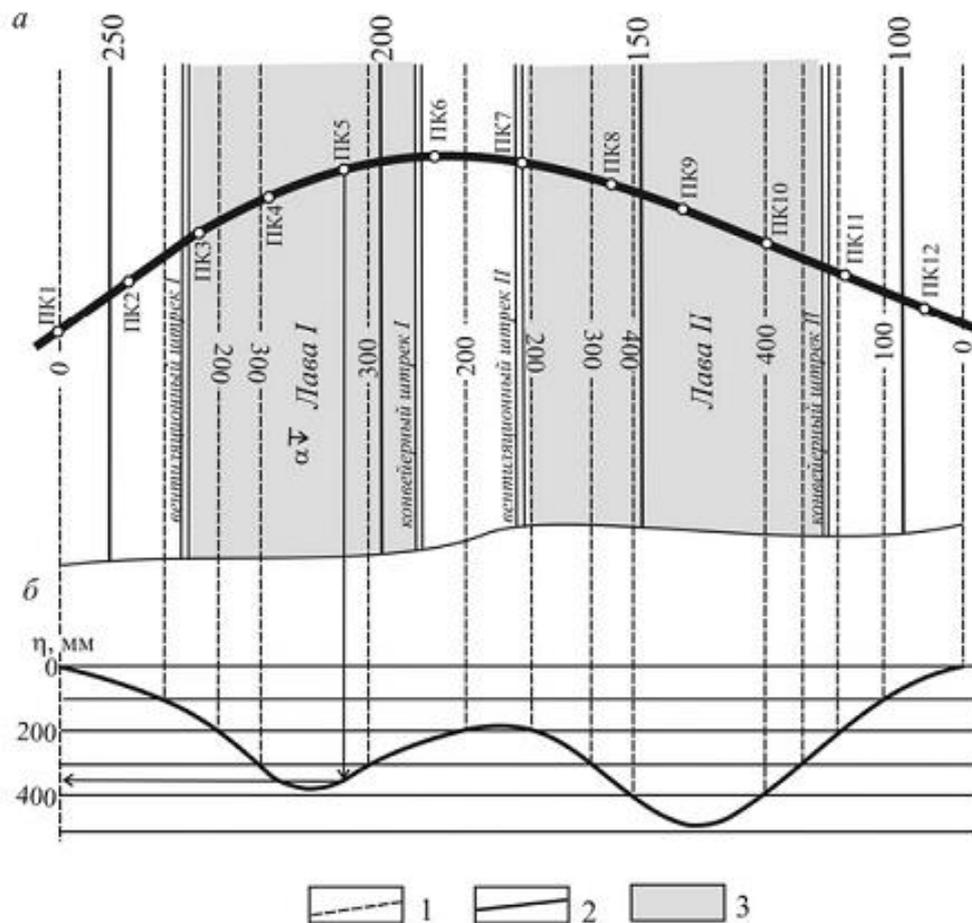
4.1. Cho'kish izochizqlarida mulda surilishi quriladi, buning uchun mulda surilishini asosiy qirqimidan foydalaniladi (1. rasm).

4.2. Mulda surilish planiga temir yo'li tushiriladi.

4.3. Temir yo'l o'qi bo'yicha har bir piketni kutilayotgan cho'kish kattaligi, cho'kish izochizig'ini interpolyasiya qilish yo'li bilan aniqlanadi ( $\eta_i$ ).



Rasm 1. Qatlam yotqligiga ko'ndalang vertikal qirqim, siljish va deformatsiya grafiklari bilan.



Rasm 2. Cho‘kish izochizqlarida siljish muldasi: a-loyihalanayotgan kon lahimlari plani; b-qatlam yotiqligiga ko‘ndalang qirqimda cho‘kish yig‘indisi grafigi; 1-cho‘kish izochizqlari; 2-qatlam asosi izogipsi; 3-qazish lahimi.

#### 4.4. Hisoblanadi:

- Kutilayotgan qiyalik deformatsiyasi:

$$i = \frac{\eta_i - \eta_{i-1}}{l_{PK}} \quad (10)$$

Bu erda  $\eta_i$ ,  $\eta_{i-1}$  – piketlarni keyingi va avvalgi cho‘kish mm;  $l_{PK}$  – piketlar orasidagi qabul qilingan masofa mm.

- Kutilayotgan egrilik:

$$K = \frac{i_j - i_{j-1}}{l_{PK}} \quad (11)$$

Bu erda  $i_j$ ,  $i_{j-1}$  – keyingi va avvalgi intervallarni qiyalik qiymatlari.

Qo‘shimcha yuklanganlik koeffitsientini hisobga olgan holda surilish va deformatsiyani hisoblash parametrlarini aniqlash [1, ilova 1, 3-tabl.] (5-tabl.)

4.5. Temir yo‘l o‘qi bo‘yicha cho‘kish, qiyalik va egrilik grafigini qurish. Grafikdagi gorizontal ko‘rinishdagi chiziq, ruxsat etilgan deformatsiyani ko‘rsatadi (temir yo‘l kategoriyasi bo‘yicha) [1, tabl. 4.16] va ruxsat etilgandan yuqori bo‘lgan yo‘l uchastkasidagi deformatsiyani aniqlaydi.

5-Jadval.

Temir yo‘l o‘qi bo‘yicha surilish va deformatsiya qiymatlari

Piket	Siljish va deformatsiya					
	Kutilayotgan			Xisoblangan (qo‘shimcha yuklanganlik koeffitsientini hisobga olgan holda)		
	$\eta$ , mm	$i \times 10^{-3}$	$K \times 10^{-3}$ , 1/m	$1,2\eta$ , mm	$1,4i \times 10^{-3}$	$1,8K \times 10^{-3}$ , 1/m
1	0			0		
		1,2			1,68	
2	60		0,002	72		0,004
		1,3			1,82	
3	125		0,026	150		0,047
		2,6			3,64	

4.6. Qabul qiingan sxema bo‘yicha temir yo‘l ostida qazish ishlarini olib borish mumkinligi haqida xulosa qilinadi va temir yo‘lni muxofazalash choralari taklif qilinadi.

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