Tacis

TRACECA - Project

Trade and Transport Sectors

Implementation of Pavement Management Systems

Feasibility Study for Rehabilitation of Transit Roads in Azerbaijan

Draft Final Feasibility Report Volume II

October 1997

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APPENDIX 1

A 1.1 TERMS OF REFERENCE

EUROPEAN UNION - TACIS

Technical Assistance to the Southern Republics of the CIS and Georgia - TRACECA

TRADE AND TRANSPORT SECTORS

Terms of Reference

for

Transit Roads - Azerbaijan

Final Recipients:
TRACECA Region Ministries of Transport

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1. Background

1.1 During May 1993 a conference was held in Brussels organised by the Commission and attended by authorities of the eight Republics of the south of the former USSR:

Armenia,	Kyrgyzstan,
Azerbaijan,	Tadjikistan,
Georgia,	Turkmenistan,
Kazakstan,	Uzbekistan.

They are the Beneficiary States of this programme.

The objectives of the conference were :

- to stimulate co-operation among the participating Republics in all matters pertaining to the development and improvement of trade within the Region
- to promote the Central Asian - Trans Caucasian - Europe Transport Corridor
- to identify problems and deficiencies in the Region's trade and transport systems
- to define, in terms of contents and timing a Technical Assistance Programme to be financed by the European Union (EU).

TRACECA (Transport Corridor Europe Caucasus Asia) was thence created as a component of the TACIS interstate programme.

1.2 Regional sectoral Working Groups (trade, rail, road, maritime), composed of experts and officials from each TRACECA state and the EU, have been established as part of the TRACECA programme. They meet periodically in the Region and in Europe. They have inaugurated substantial specific projects of Regional importance, including this present one, and they will monitor results.

1.3 . The World Bank (WB) is negociating separate loans to two TRACECA States, Armenia and Georgia. In the case of Georgia there is the possibility of additional financing to accompany the WB loan, from another International Financial Institution (IFI). This present project comprises two modules, each linked respectively to the two WB programmes in the neighbouring Beneficiary States.

1.4 The EBRD is interested in financing a roads project in Azerbaijan. A TACIS national project has produced a feasibility study of the road south from Baku, to Alyat and further to the south. However the major TRACECA route turns west at Alyat towards the Georgian border. It now remains to investigate this route. The Islamic Bank has commissioned some studies of this route, but the outcome appears inconclusive.

2A. Introduction - Module A

In Georgia, the World Bank is prepared to engage limited resources for a Transport Rehabilitation Project, to avoid a complete collapse of the sector in the immediate future. Two components are foreseen: Institutional and Investment. For investment, road maintenance is considered a priority. This present project arises from the need to encourage other International Financial Institutions (IFI) to participate in concertion with the package, and to broaden the focus to consider rehabilitation.

In Azerbaijan, the EBRD interest in the east west route must be encouraged.

3A. Objectives

The objective of the project is to review existing reports and elaborate to the standard necessary for definitive negociations between Georgia and IFI, a feasibility study for rehabilitation works on the following road sections:

Tblisi-Kashuri
Tblisi-Taltari-Azeri Border (-then continuing to Alyat, see below)
Tblisi-Marneuli-Guguti-Armenian Border
Marneuli-Sadakhlo-Armenian Border
Tblisi bypass
Samtrelia-Lanchkhuti-Ureki (shortening the route Tblisi-Batoumi)

These objectives are extended for Azerbaijan to the section of road:

Alyat-Gjandza-Azeri Border

4A. Scope of Work

4A.1 General

"General Requirements for the Preparation of the Feasibility Study" issued by one possible funding institution are included in annex. The Final Report of this project, in so far as concenrs Georgia, must satisfy these Requirements.

As these requirements are so general certain particular aspects of the project are highlighted hereafter.

The work in Azerbaijan should conform to standards for feasibility studies set by the EBRD.

4A.2 Existing Studies

Extensive "Technical Documentation on Rehabilitation of the Highways of the Republic of Georgia-Volumes I and II, Tblisi 1995" has been prepared by the The State Highways Survey and Design Institute (Saksakhgzaprojecti), and is also included in annex.

The contents of this study are essentially technical. It identifies works which are to be included in this study.

The TRACECA Pavement Management System project will also provide pertinent input and it may influence the selection of priority works to be undertaken.

4A.3 Road Condition Assessment

The consultant will acquire and record all data necessary for road condition assessment and identify the works required to attain appropriate standards for the traffic. Typically this will include road geometry, pavement structure sub-grade characteristics, pavement deterioration and measurements such as deflection and roughness. Drainage systems and structures including bridges, tunnels and retaining works should be similarily inventoried.

4A.4. Traffic Data

Archived traffic data will be collected and reviewed. It is to be anticipated that traffic counts will need to be performed within the scope of this project.

Traffic should be categorised according to an internationally acceptable standard. Axle load surveys on sample sections must be performed. Transit traffic should be separately counted.

Road traffic forecasts should be projected for the next fifteen years. The forecasts may be based on macro-economic appraisal of trade and passenger flows, include high-low scenarios, and take into account the most authoritative economic projections available (eg.World Bank,...).

Any particuliarities of the traffic which might distort projections should be recorded (eg.food distribution campaign convoys,...).

4A.5 Definition of Technical Solutions

The Consultant should review the current road and bridge design standards, justify and recommend appropriate acceptable standards for the future design to the various project sections.

The Consultant shall study the merits of the technical solutions proposed for the rehabilitation or completion of the designated roads, drainage, slope protections, bridges and any other necessary works. He should suggest any necessary changes and fully integrated the final proposed solution with the economic analysis, and the possible budget envelopes to be discussed with all parties to the project.

Unit costs for road, bridge and associated rehabilitation works shall be established and justified in accordance with the standard recommendations of IFI.

The availability and quality of all resources necessary to carry out the works should be verified. After discussion with Georgian and Azeri authorities and IFI, recommendations should be made on the division of works into appropriate lots.

The definition of technical solutions should be developed to the level of detail necessary to validate the economic analysis, and to establish the technical feasibility of the recommendations.

4A.6 Economic Evaluation

Vehicle operating costs (VOC) should be established for the known range of vehicle types. VOC should be formulated using a standard internationally accepted model (eg.HDM3), modified as necessary for local conditions.

The roads shall be considered in separate homogenous sections, for incremental cost/benefit analysis. The standard economic indexes such as cost/benefit, NPV, and IERR are to be presented.

Based on the preceding the consultant shall present the final economic evaluation and define the appropriate programme for the construction and rehabilitation works.

A multi-criteria approach may be presented to account for environmental, safety or other factors, (while respecting the overall "General Requirements for the Preparation of the Feasibility Study" in Georgia).

All data generated within the project should be stored on computerised spread sheets, and left with the Recipient State in an organised and reusable format. A copy should be provided to TACIS.

4A.7 Equipment

Any pavement testing equipment, computer hardware, software or other equipment required for the project should be left with the Recipient State. The Consultant should provide full details in his Technical Proposal.

4A.8 Other Related Projects

Several related reports prepared by Western consultants precede this project. They include:

Aménagement de la Section Erevan-Batoumi de l'Axe Routier Meghri-Batoumi		
	Georgia and Armenia	TACIS
Road Development Study	Republic of Kazakhstan	EBRD
Armenia Highway Study	Republic of Armenia	TACIS
Roads & Road Transport Study	Russia, Ukraine, Kazakhstan & Bielorussia	EBRD
Azerbaijan Road Project	Azerbaijan	TACIS

At the time of writing the following TRACECA projects, sharing certain domains of interest with this one, are expected to commence shortly. The first two are of particular relevance to the scope of this project:

- Implementation of Pavement Management Systems
- Regional Traffic Forecasting
- Improvement of Roadside Services

Other related projects are or may be expected to commence within the timeframe of this present one.

The Consultants appointed to carry out this project are to co-ordinate their work closely with all other related activities within the TRACECA region. A full collaboration with such projects will be required, including data sharing.

The preceding listing of related projects must not be considered limitative.

4A.9 Local Participation

National consultants should be deeply involved in all aspects of the project. All TRACECA countries have Institutions specialising in various aspects of transport planning and engineering. It is a firm requirement that Organisation and Methodologies include local experts and Institutions to:

- make full use of local experience, antecedent projects and data bases
- promote the emergence of a financially viable local consulting sector
- ensure the effective transfer of know-how to the Beneficiary states
- ensure the enduring effect of project output

Consultants should base their activities for this module largely in Georgia, carrying out the project in collaboration with a local technical organisation(s), and employing both senior and junior professional staff.

Consultants must make amply clear in their Technical Proposal the arrangements they have made to work with local entities. This should include the time allocated to locally hired staff (as distinct from counterpart staff).

Allthough training is not a defined objective of this project, the consultant may propose training initiatives for the transfer of project know-how unfamiliar to local professionals.

4A.10 Foreign Expertise

The Consultant is free to compose his expatriate Team for this project as he sees fit. The following domains of expertise should be visible in his proposed staff list:

- highway engineering
- structural engineering
- geotechnical engineering
- transport economics

Time allocated to foreign staff should be clearly described in the Technical Proposal, as should the division between time on site and time at home office.

4A.11 Logistics

The Consultant shall be responsible for arranging necessary living accommodation, international and local transportation, telecommunications, equipment (IT and other), surveys, investigations, document reproduction, printing, secretarial services, interpretation, translation, office space and all other input required for the purposes of the work.

5A. Time Table and Reporting

5A.1 The project is to be completed within a period of six months to Draft Final Report stage.

Task durations and staff assignments are to be clearly shown on planning schedules in the proposal. Milestones for output and key dates for data acquisition are to be indicated.

5A.2 All reports are to be delivered in the numbers, languages and locations as follows:

	Bound		Loose-leaf		Diskette
	English	Russian	English	Russian	(Eng.+Rus)
TACIS Brussels	5	1	1	1	2
TRACECA CU (Georgia)	1	5	1	1	0
IFI	5	1	1	1	0

The word processing programme to be used will be agreed with TACIS (and DOS compatible).

5A.3 Reporting is to be in accordance with standard TACIS Guidelines and foresee:

Project inception report

An Inception Report shall be issued within 2 months of the commencement of the project. It shall summarise initial findings and propose any modifications to the methodology and work plan. In particular it will adapt the work plan to the Recipient State and funding institutions' needs, into account the parallel activities of other Technical Assistance programmes, avoiding duplication of effort.

Final Report

The Draft Final Report will be submitted at the end of month 6.

It will comprise the full feasibility study.

Any comments on the Draft Final Report will be issued by TACIS Brussels within six weeks of its receipt. The Final Report incorporating any modifications will be issued one month thereafter (2,5 months after issue of the Draft Final)

APPENDIX 2

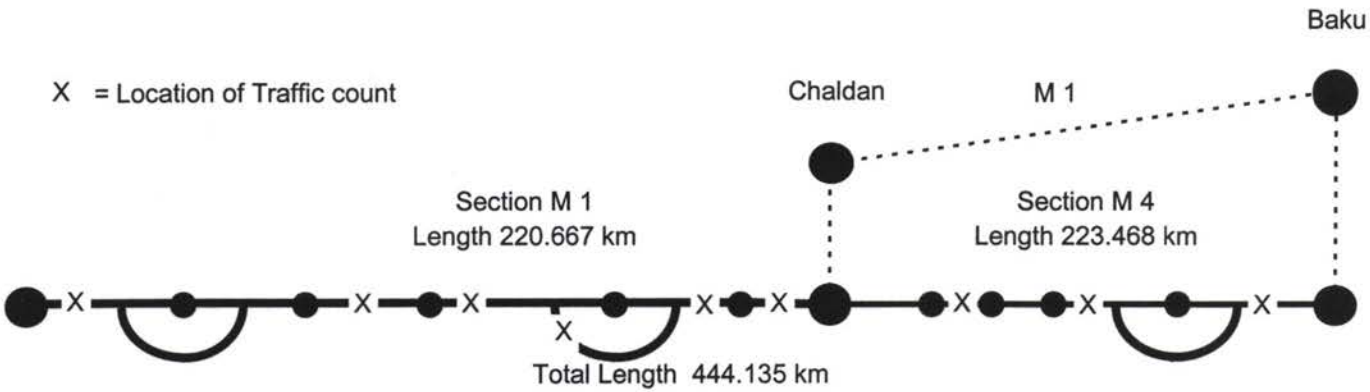
A 2.1 GENERAL LAYOUT

TRACECA - Feasibility Study for Road Rehabilitation in Azerbaijan

KOCKS
INGENIEURE

Alyat - Ganja - Georgian Border (M 4/M 1)

- General Layout -



Traffic-sections			13		12		11		10		9	8	7	6	5	4	3		2		1			
Chainage from Alyat	M 4												223+468	216+500	170+500	124+300	58+980			43+450	0+000			
Chainage from Baku	M 1	501+350	463+500		456+500	451+000	433+500	431+000	428+500	369+500		333+500	288+700	280+683										
Location / Village		Georgian Border		Gazakh		Aghstafa		Tovuz			Ganja		Mingechevir		Yevlakh	Ujar	Kyurdamir		Gazi-Mammad		Alyat			

Station/Layout

h1

APPENDIX 4

Table A.5.1 Classified Volume Count Hourly Form

ROAD:

Traffic Section No.		**Direction of Traffic**	**From:**
Trafic Section Name	**From:**		**To :**
	To:		
Date:		**Hour Begining:**	

	Car Jeep	Minibus	Van Pickup Truck <3 tons	Bus	TRUCKS					Motor Cycles	Agricultural Tractors
					2 axles > = 3 tonnes	3 axles	4 axles	5 axles	> 5 axles		
National											
International											
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TOTAL:											
National											
International											

Table A.5.2 ALYAT-GEORGIAN BORDER ROAD: RESULTS OF CLASSIFIED VOLUME COUNTS - FEBRUARY AND MARCH 1997

Road No.	Link Name	Vehicle Nationality	Average Daily Traffic (ADT) not adjusted for seasonality												Other Vehicles		Grand Total
			CAR	UTILITY			BUS	TRUCK 2-AXLE	TRUCK 3-AXLE	TRUCK > 3 AXLE				TOTAL (4+ wheels	Motor cycles	Tractors	
				Minibus	Pickup	Sub total				ruck 4 ax	ruck 5 ax	ruck >5 a	Sub total				
M4	Alyat-Kazi Magomet	Azerbaijan	2,923	213	30	243	341	250	338	84	114	3	201	4,298	16	24	4,338
		Foreign	108	7	-	7	14	3	59	49	42	5	96	288	-	-	288
		Total	3,032	221	30	251	355	254	397	133	156	8	297	4,586	16	24	4,626
M4	Kazi Magomet-Kiurdamir	Azerbaijan	2,410	77	45	122	292	193	367	255	125	3	382	3,767	5	12	3,784
		Foreign	104	13	13	26	14	-	86	114	112	5	231	460	-	-	460
		Total	2,514	90	59	148	306	193	453	368	237	8	613	4,227	5	12	4,244
M4	Kazi Magomet-Kiurdamir	Azerbaijan	2,553	128	45	174	446	214	240	52	44	3	99	3,725	10	23	3,758
		Foreign	193	11	24	35	10	137	272	121	52	5	178	823	-	-	823
		Total	2,746	139	69	208	456	350	512	172	96	8	277	4,548	10	23	4,581
M4	Kurdamir-Mususlu-Udjar-Jevl	Azerbaijan	3,267	139	60	199	519	212	296	41	84	3	129	4,623	15	30	4,668
		Foreign	249	29	26	56	44	284	326	117	80	5	202	1,161	-	-	1,161
		Total	3,516	169	86	255	563	496	622	159	164	8	331	5,783	15	30	5,829
M4	Kurdamir-Mususlu-Udjar-Jevl	Azerbaijan	1,886	37	54	91	317	116	172	43	19	-	62	2,644	18	33	2,695
		Foreign	156	11	33	44	28	188	293	91	28	-	119	828	-	-	828
		Total	2,042	48	87	135	345	304	465	134	47	-	181	3,472	18	33	3,523
M1	Jevlah-Mingacheur Station	Azerbaijan	2,378	77	55	131	362	191	174	23	19	1	43	3,279	10	22	3,311
		Foreign	168	6	15	21	13	63	262	32	14	1	47	573	-	-	573
		Total	2,546	82	70	153	374	254	436	54	33	2	90	3,852	10	22	3,884
M1	Mingacheur St.-Gjandza bypas	Azerbaijan	3,014	49	35	85	338	177	202	168	88	-	256	4,072	-	28	4,100
		Foreign	116	2	15	18	14	3	74	54	59	2	115	339	-	-	339
		Total	3,130	52	51	102	352	180	276	222	147	2	371	4,411	-	28	4,439
M1	Gjandza bypass	Azerbaijan	2,150	60	42	102	251	134	198	256	87	5	348	3,183	-	4	3,187
		Foreign	113	5	13	17	5	1	106	83	47	11	141	384	-	-	384
		Total	2.263	65	55	119	256	135	304	339	134	16	489	3,567	-	4	3,571
M1	Gjandza bypass-Dallar-Tovuz	Azerbaijan	2,900	31	96	128	339	219	143	117	41	-	158	3,886	5	26	3,917
		Foreign	185	16	33	49	20	7	271	29	50	-	79	611	-	-	611
		Total	3,085	47	130	177	359	226	414	146	91	-	237	4,497	5	26	4,528
M1	Tovuz-Akstafa-Kazach	Azerbaijan	1.957	137	188	325	288	205	147	43	22	-	65	2,987	29	30	3,046

Table A.5.2 ALYAT-GEORGIAN BORDER ROAD: RESULTS OF CLASSIFIED VOLUME COUNTS - FEBRUARY AND MARCH 1997

Road No.	Link Name	Vehicle Nationality	Average Daily Traffic (ADT) not adjusted for seasonality												Other Vehicles		Grand Total
			CAR	UTILITY			BUS	TRUCK 2-AXLE	TRUCK 3-AXLE	TRUCK > 3 AXLE				TOTAL (4+ wheels	Motor cycles	Tractors	
				Minibus	Pickup	Sub total				ruck 4 ax	ruck 5 ax	ruck >5 a	Sub total				
		Foreign	195	25	21	46	27	14	373	201	36	8	245	900	-	-	900
		Total	2,152	162	209	371	315	219	520	244	58	8	310	3,887	29	30	3,946
M1	Kazach-Georgian border	Azerbaijan	1,850	320	113	433	248	223	100	55	7	2	64	2,918	17	53	2,988
		Foreign	205	24	69	93	59	29	315	139	84	28	251	954	-	-	954
		Total	2,055	344	183	526	308	253	415	194	91	30	315	3,872	17	53	3,942

Source: Classified volume counts carried for the Consultants by Azeravtoyol staff.

Note: Only 4+ wheeled traffic was used in the economic analyses of road improvements.

Table A.5.3 Alat - Georgian Border Road: Hourly Traffic Distribution at Km 174 from Alat (Kiurdamir - Jevlah section)

Hour From	Hour To	Hourly Traffic Distribution - All Vehicles										Hourly Distribution (%)		
		Car	Minibus	Pickup	Bus	2-ax GV	3-ax GV	4-ax GV	5-ax GV	6+ax GV	TOTAL	Azerbaijan	Foreign	Total
24	1	25	-	-	6	10	12	4	1	-	58	1.4	2.4	1.7
1	2	16	-	-	16	3	14	4	-	-	53	1.3	2.2	1.5
2	3	23	5	4	17	5	16	-	3	-	73	2.3	1.4	2.1
3	4	19	-	-	7	5	4	4	2	-	41	1.3	1.0	1.2
4	5	17	1	-	2	8	8	1	1	-	38	0.9	1.8	1.1
5	6	23	-	-	6	8	5	4	2	-	48	1.4	1.3	1.4
6	7	42	8	6	2	19	19	6	4	-	106	2.6	4.6	3.1
7	8	86	9	9	20	21	25	13	3	-	186	4.9	6.8	5.4
8	9	101	1	3	12	16	19	6	-	-	158	4.5	4.7	4.6
9	10	122	2	4	23	9	13	3	-	-	176	5.5	3.9	5.1
10	11	146	4	9	34	12	15	6	2	-	228	7.2	4.7	6.6
11	12	112	1	8	30	18	25	2	-	-	196	5.7	5.4	5.7
12	13	118	-	2	13	10	28	9	3	-	183	5.4	5.0	5.3
13	14	135	3	6	28	12	19	10	4	-	217	6.4	5.8	6.3
14	15	137	1	5	17	20	23	10	3	-	216	5.8	7.5	6.2
15	16	186	1	3	21	11	42	6	1	-	271	8.1	6.9	7.8
16	17	151	4	11	19	27	27	9	5	-	253	7.4	7.0	7.3
17	18	139	1	10	11	18	23	5	2	-	209	6.4	4.8	6.0
18	19	95	-	-	16	18	36	9	2	-	176	4.9	5.6	5.1
19	20	91	1	2	11	9	27	2	1	-	144	4.4	3.3	4.2
20	21	81	2	2	8	9	21	7	3	-	133	3.8	3.9	3.8
21	22	78	3	3	8	17	25	9	2	-	145	3.7	5.8	4.2
22	23	58	-	-	7	13	9	3	2	-	92	2.7	2.5	2.7
23	24	34	1	-	12	6	10	2	1	-	66	1.9	1.8	1.9
TOTAL		2,035	48	87	346	304	465	134	47	-	3,466	100.0	100.0	100.0
Expansion factors (08.00-20.00 12 hrs. to 24 hour basis)		1.33	2.53	1.38	1.47	1.69	1.57	1.74	2.04	-	1.43	1.39	1.55	1.43

Source: Classified Volume Counts carried out for the Consultants by Azeravtoyol staff.

Note: GV goods vehicles.

Table A.5.4 Alyat-Georgian Border Road: Percentage Distribution of Traffic by Vehicle Type, 1997

Road No.	Link Name	Vehicle Nationality	Percent of Total						
			Car	Utility	Bus	Truck 2 axle	Truck 3 axle	Truck >3 axle	TOTAL
M4	Alyat-Kazi Magomet	Azerbaijan	68	5.7	7.9	5.8	7.9	4.7	100.0
		Foreign	37.6	2.5	4.9	1.1	20.6	33.3	100.0
		Total	66.6	5.5	7.8	5.6	8.5	6	100.0
M4	Kazi Magomet-Padar	Azerbaijan	64	3.2	7.8	5.1	9.7	10.1	100.0
		Foreign	22.5	5.7	3	-	18.6	50.2	100.0
		Total	60.5	3.4	7.4	4.7	10.5	13.5	100.0
M4	Padar-Kiurdamir	Azerbaijan	68.5	4.7	12	5.7	6.4	2.7	100.0
		Foreign	23.4	4.2	1.2	16.6	33	21.6	100.0
		Total	62.2	4.6	10.5	7.3	10.2	5.3	100.0
M4	Kazi Magomet - Kurdamir (weighted average)	Azerbaijan	66.5	4	10.1	5.5	7.9	5.9	100.0
		Foreign	23.1	4.7	1.8	11.6	28.7	30.2	100.0
		Total	61.5	4.1	9.2	6.2	10.3	8.7	100.0
M4	Kurdamir-Udjar	Azerbaijan	70.7	4.3	11.2	4.6	6.4	2.8	100.0
		Foreign	21.4	4.8	3.8	24.5	28.1	17.4	100.0
		Total	63	4.4	10.1	7.7	9.8	5.1	100.0
M4	Udjar-Jevlah	Azerbaijan	71.3	3.4	12	4.4	6.5	2.3	100.0
		Foreign	18.8	5.3	3.4	22.7	35.4	14.4	100.0
		Total	61.4	3.8	10.4	7.8	11.9	4.6	100.0
M4	Kurdamir - Jevlah (weighted average)	Azerbaijan	70.9	4	11.5	4.5	6.4	2.6	100.0
		Foreign	20.3	5	3.6	23.7	31.2	16.1	100.0
		Total	62.4	4.2	10.2	7.8	10.6	4.9	100.0
M1	Jevlah-Mingacheur Station	Azerbaijan	72.5	4	11	5.8	5.3	1.3	100.0
		Foreign	29.2	3.7	2.2	11	45.7	8.2	100.0
		Total	67.6	4	10	6.4	9.9	2.1	100.0
M1	Mingacheur St.-Gjandza bypa	Azerbaijan	74	2.1	8.3	4.3	5	6.3	100.0
		Foreign	34.1	5.2	4.3	0.8	21.7	33.9	100.0
		Total	71.7	2.3	8.1	4.1	5.9	7.9	100.0
M1	Gjandza bypass	Azerbaijan	67.6	3.2	7.9	4.2	6.2	10.9	100.0
		Foreign	29.4	4.5	1.4	0.4	27.6	36.7	100.0
		Total	64.4	3.3	7.4	3.9	8	13	100.0
M1	Gjandza bypass-Dallar-Tovuz	Azerbaijan	74.6	3.3	8.7	5.6	3.7	4.1	100.0
		Foreign	30.3	8.1	3.2	1.1	44.4	12.9	100.0
		Total	70	3.8	8.2	5.2	7.9	5	100.0
M1	Tovuz-Akstafa-Kazach	Azerbaijan	65.5	10.9	9.6	6.9	4.9	2.2	100.0
		Foreign	21.7	5.1	3	1.6	41.4	27.2	100.0
		Total	57.5	9.8	8.4	5.9	11.6	6.7	100.0
M1	Kazach-Georgian border	Azerbaijan	63.4	14.8	8.5	7.6	3.4	2.2	100.0
		Foreign	21.5	9.8	6.2	3.1	33.1	26.3	100.0
		Total	55.2	13.9	8.1	6.8	9.2	6.9	100.0

Table A.5.5 Alyat-Georgian Border Road - Percentage Distribution of Traffic By Vehicle Nationality

Road No.	Link Name	Vehicle Nationality	Percentage Distribution of Traffic By Nationalitry of vehicles, 1997						
			Car	Utility	Bus	Truck 2 axle	Truck 3 axle	Truck >3 axle	TOTAL
M4	Alyat-Kazi Magomet	Azerbaijan	97.3	97.8	97	99.1	88.5	73.9	95.3
		Foreign	2.7	2.2	3	0.9	11.5	26.1	4.7
		Total	100	100	100	100	100	100	100
M4	Kazi Magomet-Padar	Azerbaijan	96.9	86.4	96.6	100	85.3	69.1	91.7
		Foreign	3.1	13.6	3.4	-	14.7	30.9	8.3
		Total	100	100	100	100	100	100	100
M4	Padar-Kiurdamir	Azerbaijan	94.7	87.1	98.4	67.9	54.4	42.9	85.9
		Foreign	5.3	12.9	1.6	32.1	45.6	57.1	14.1
		Total	100	100	100	100	100	100	100
M4	Kazi Magomet - Kurdamir (weighted average)	Azerbaijan	95.6	86.8	97.8	78.2	67.6	59.9	88.4
		Foreign	4.4	13.2	2.2	21.8	32.4	40.1	11.6
		Total	100	100	100	100	100	100	100
M4	Kurdamir-Udjar	Azerbaijan	94.7	82.8	94.1	50.1	55.1	46.2	84.3
		Foreign	5.3	17.2	5.9	49.9	44.9	53.8	15.7
		Total	100	100	100	100	100	100	100
M4	Udjar-Jevlah	Azerbaijan	94.2	73.6	93.9	45.4	44.2	41.3	81.2
		Foreign	5.8	26.4	6.1	54.6	55.8	58.7	18.8
		Total	100	100	100	100	100	100	100
M4	Kurdamir - Jevlah (weighted average)	Azerbaijan	94.5	79.7	94	48.3	50.5	44.5	83.1
		Foreign	5.5	20.3	6	51.7	49.5	55.5	16.9
		Total	100	100	100	100	100	100	100
M1	Jevlah-Mingacheur Station	Azerbaijan	95	89.4	97.5	80.4	47.3	55.1	88.5
		Foreign	5	10.6	2.5	19.6	52.7	44.9	11.5
		Total	100	100	100	100	100	100	100
M1	Mingacheur St.-Gjandza bypa	Azerbaijan	97.2	86.6	96.9	98.8	78.8	75.1	94.2
		Foreign	2.8	13.4	3.1	1.2	21.2	24.9	5.8
		Total	100	100	100	100	100	100	100
M1	Gjandza bypass	Azerbaijan	96.3	88.8	98.4	99.2	71.7	76.9	91.8
		Foreign	3.7	11.2	1.6	0.8	28.3	23.1	8.2
		Total	100	100	100	100	100	100	100
M1	Gjandza bypass-Dallar-Tovuz	Azerbaijan	95.5	77.7	95.9	97.7	41.6	73	89.6
		Foreign	4.5	22.3	4.1	2.3	58.4	27	10.4
		Total	100	100	100	100	100	100	100
M1	Tovuz-Akstafa-Kazach	Azerbaijan	93.1	90.5	93.5	95.2	34.7	26.4	81.8
		Foreign	6.9	9.5	6.5	4.8	65.3	73.6	18.2
		Total	100	100	100	100	100	100	100
M1	Kazach-Georgian border	Azerbaijan	92.4	86.2	84.9	91.1	29.9	25.6	80.5
		Foreign	7.6	13.8	15.1	8.9	70.1	74.4	19.5
		Total	100	100	100	100	100	100	100

Table A.5.6 ALYAT-GEORGIAN BORDER ROAD: ANNUAL TRAFFIC GROWTH RATES BY VEHICLE CATEGORY

Road No.	Section Name	Best Estimate - Annual Average Traffic Growth (%) 1997 - 2010						
		Car	Utility	Bus	Truck 2 axle	Truck 3 axle	Truck >3 axle	TOTAL
M4	Alyat-Kazi Magomet	6.9	6.6	5.8	5.4	6.4	7.4	6.7
M4	Kazi Magomet - Kiurdamir (wt.avg.)	6.9	6.7	5.8	5.4	6.4	7.4	6.7
M4	Kiurdamir - Jevlah (wt.avg.)	7.0	6.7	5.9	5.4	6.5	7.5	6.7
M1	Jevlah-Mingacheur Station	6.9	6.7	5.9	5.4	6.4	7.4	6.7
M1	Mingacheur St.-Gjandza bypass	6.8	6.6	5.8	5.3	6.3	7.3	6.7
M1	Gjandza bypass	6.8	6.6	5.7	5.3	6.3	7.3	6.7
M1	Gjandza bypass-Dallar-Tovuz	6.9	6.6	5.8	5.4	6.4	7.4	6.7
M1	Tovuz-Akstafa-Kazach	6.9	6.7	5.8	5.4	6.4	7.4	6.7
M1	Kazach-Georgian border	6.9	6.7	5.8	5.4	6.4	7.4	6.7

Road No.	Section Name	Best Estimate - Annual Average Traffic Growth (%) 2010 - 2025						
		Car	Utility	Bus	Truck 2 axle	Truck 3 axle	Truck >3 axle	TOTAL
M4	Alyat-Kazi Magomet	6.2	5.9	4.9	4.6	5.6	6.6	6.0
M4	Kazi Magomet - Kiurdamir (wt.avg.)	6.2	5.9	4.9	4.6	5.6	6.6	6.0
M4	Kiurdamir - Jevlah (wt.avg.)	6.3	6.0	5.0	4.7	5.7	6.7	6.0
M1	Jevlah-Mingacheur Station	6.2	5.9	5.0	4.7	5.7	6.6	6.0
M1	Mingacheur St.-Gjandza bypass	6.1	5.8	4.9	4.6	5.5	6.5	6.0
M1	Gjandza bypass	6.1	5.8	4.8	4.5	5.5	6.5	6.0
M1	Gjandza bypass-Dallar-Tovuz	6.2	5.9	4.9	4.6	5.6	6.6	6.0
M1	Tovuz-Akstafa-Kazach	6.2	5.9	4.9	4.6	5.6	6.6	6.0
M1	Kazach-Georgian border	6.2	5.9	4.9	4.7	5.6	6.6	6.0

Road No.	Section Name	High Estimate - Annual Average Traffic Growth (%) 1997 - 2010						
		Car	Utility	Bus	Truck 2 axle	Truck 3 axle	Truck >3 axle	TOTAL
M4	Alyat-Kazi Magomet	9.3	8.1	7.2	6.8	7.9	8.9	8.8
M4	Kazi Magomet - Kiurdamir (wt.avg.)	9.1	8.6	7.3	7.6	8.6	9.6	8.8
M4	Kiurdamir - Jevlah (wt.avg.)	9.2	8.6	7.4	7.6	8.6	9.7	8.8
M1	Jevlah-Mingacheur Station	9.1	8.6	7.4	7.6	8.6	9.6	8.8
M1	Mingacheur St.-Gjandza bypass	9.0	8.5	7.2	7.5	8.5	9.5	8.8
M1	Gjandza bypass	9.0	8.5	7.2	7.5	8.5	9.5	8.8
M1	Gjandza bypass-Dallar-Tovuz	9.1	8.6	7.3	7.5	8.6	9.6	8.8
M1	Tovuz-Akstafa-Kazach	9.1	8.6	7.3	7.6	8.6	9.6	8.8
M1	Kazach-Georgian border	9.1	8.6	7.3	7.6	8.6	9.6	8.8

Road No.	Section Name	High Estimate - Annual Average Traffic Growth (%) 2010 - 2025						
		Car	Utility	Bus	Truck 2 axle	Truck 3 axle	Truck >3 axle	TOTAL
M4	Alyat-Kazi Magomet	8.2	7.6	6.1	6.6	7.6	8.6	8.0
M4	Kazi Magomet - Kiurdamir (wt.avg.)	8.3	7.7	6.2	6.7	7.7	8.7	8.0
M4	Kiurdamir - Jevlah (wt.avg.)	8.3	7.7	6.2	6.7	7.7	8.7	8.0
M1	Jevlah-Mingacheur Station	8.3	7.7	6.2	6.7	7.7	8.7	8.0
M1	Mingacheur St.-Gjandza bypass	8.2	7.6	6.1	6.6	7.6	8.6	8.0
M1	Gjandza bypass	8.2	7.6	6.1	6.6	7.6	8.6	8.0
M1	Gjandza bypass-Dallar-Tovuz	8.2	7.6	6.1	6.6	7.6	8.6	8.0
M1	Tovuz-Akstafa-Kazach	8.3	7.7	6.2	6.7	7.7	8.7	8.0
M1	Kazach-Georgian border	8.3	7.7	6.2	6.7	7.7	8.7	8.0

Table A.5.6 ALYAT-GEORGIAN BORDER ROAD: ANNUAL TRAFFIC GROWTH RATES BY VEHICLE CATEGORY

Road No.	Section Name	Low Estimate - Annual Average Traffic Growth (%) 1997 - 2010						
		Car	Utility	Bus	Truck 2 axle	Truck 3 axle	Truck >3 axle	TOTAL
M4	Alyat-Kazi Magomet	4.1	3.9	2.6	2.2	3.1	4.1	3.8
M4	Kazi Magomet - Kiurdamir (wt.avg.)	4.2	3.9	2.7	2.2	3.2	4.2	3.8
M4	Kiurdamir - Jevlah (wt.avg.)	4.2	4.0	2.7	2.2	3.2	4.2	3.8
M1	Jevlah-Mingacheur Station	4.2	3.9	2.7	2.2	3.2	4.2	3.8
M1	Mingacheur St.-Gjandza bypass	4.1	3.8	2.6	2.1	3.1	4.1	3.8
M1	Gjandza bypass	4.1	3.8	2.6	2.1	3.1	4.1	3.8
M1	Gjandza bypass-Dallar-Tovuz	4.1	3.9	2.6	2.1	3.1	4.1	3.8
M1	Tovuz-Akstafa-Kazach	4.2	3.9	2.7	2.2	3.2	4.2	3.8
M1	Kazach-Georgian border	4.2	3.9	2.7	2.2	3.2	4.2	3.8

Road No.	Section Name	Low Estimate - Annual Average Traffic Growth (%) 2010 - 2025						
		Car	Utility	Bus	Truck 2 axle	Truck 3 axle	Truck >3 axle	TOTAL
M4	Alyat-Kazi Magomet	5.0	5.3	4.3	4.0	5.0	6.0	5.0
M4	Kazi Magomet - Kiurdamir (wt.avg.)	5.2	4.9	3.9	3.6	4.6	5.6	5.0
M4	Kiurdamir - Jevlah (wt.avg.)	5.2	5.0	4.0	3.7	4.7	5.6	5.0
M1	Jevlah-Mingacheur Station	5.2	4.9	4.0	3.7	4.6	5.6	5.0
M1	Mingacheur St.-Gjandza bypass	5.1	4.8	3.9	3.6	4.5	5.5	5.0
M1	Gjandza bypass	5.1	4.8	3.8	3.6	4.5	5.5	5.0
M1	Gjandza bypass-Dallar-Tovuz	5.2	4.9	3.9	3.6	4.6	5.6	5.0
M1	Tovuz-Akstafa-Kazach	5.2	4.9	3.9	3.7	4.6	5.6	5.0
M1	Kazach-Georgian border	5.2	4.9	4.0	3.7	4.6	5.6	5.0

Source: Consultant's estimate

Note: Wt.avg. = weighted average

Table A.5.7 ALYAT-GEORGIAN BORDER ROAD: ANNUAL AVERAGE DAILY TRAFFIC BY VEHICLE TYPE

Road No.	Section Name	Annual Average Daily Traffic (AADT) - 1997						
		Car	Utility	Bus	Truck 2 axle	Truck 3 axle	Truck >3 axle	TOTAL
M4	Alyat-Kazi Magomet	4,055	336	474	341	516	368	6,090
M4	Kazi Magomet - Kurdamir (wt.avg.)	3,471	232	517	349	582	494	5,645
M4	Kurdamir - Jevlah (wt.avg.)	3,670	245	599	456	624	288	5,883
M1	Jevlah-Mingacheur Station	3,378	199	501	321	497	105	5,000
M1	Mingacheur St.-Gjandza bypass	4,185	132	470	242	347	460	5,836
M1	Gjandza bypass	3,016	155	344	182	373	610	4,681
M1	Gjandza bypass-Dallar-Tovuz	4,099	221	478	303	464	292	5,857
M1	Tovuz-Akstafa-Kazach	2,837	485	416	291	571	333	4,932
M1	Kazach-Georgian border	2,702	678	394	331	450	338	4,893

Road No.	Section Name	High Growth Forecast - Annual Average Daily Traffic (AADT) - 2010						
		Car	Utility	Bus	Truck 2 axle	Truck 3 axle	Truck >3 axle	TOTAL
M4	Alyat-Kazi Magomet	12,891	925	1,171	807	1,381	1,112	18,286
M4	Kazi Magomet - Kurdamir (wt.avg.)	10,758	676	1,292	901	1,697	1,625	16,950
M4	Kurdamir - Jevlah (wt.avg.)	11,461	720	1,509	1,186	1,833	955	17,664
M1	Jevlah-Mingacheur Station	10,531	584	1,260	833	1,458	348	15,013
M1	Mingacheur St.-Gjandza bypass	12,855	381	1,164	619	1,003	1,500	17,523
M1	Gjandza bypass	9,237	447	850	464	1,075	1,983	14,055
M1	Gjandza bypass-Dallar-Tovuz	12,666	642	1,191	780	1,349	958	17,586
M1	Tovuz-Akstafa-Kazach	8,823	1,419	1,043	754	1,671	1,099	14,809
M1	Kazach-Georgian border	8,419	1,987	990	859	1,319	1,118	14,692

Road No.	Section Name	Low Growth Forecast - Annual Average Daily Traffic (AADT) - 2010						
		Car	Utility	Bus	Truck 2 axle	Truck 3 axle	Truck >3 axle	TOTAL
M4	Alyat-Kazi Magomet	6,861	551	665	450	771	622	9,920
M4	Kazi Magomet - Kurdamir (wt.avg.)	5,906	383	730	463	874	840	9,195
M4	Kurdamir - Jevlah (wt.avg.)	6,282	407	850	609	943	492	9,583
M1	Jevlah-Mingacheur Station	5,755	329	708	426	748	179	8,144
M1	Mingacheur St.-Gjandza bypass	7,032	215	655	317	515	772	9,506
M1	Gjandza bypass	5,074	253	480	239	554	1,025	7,625
M1	Gjandza bypass-Dallar-Tovuz	6,924	362	670	399	692	493	9,540
M1	Tovuz-Akstafa-Kazach	4,833	801	588	387	859	567	8,034
M1	Kazach-Georgian border	4,602	1,120	557	440	677	575	7,970

Road No.	Section Name	High Growth Estimate - Annual Average Daily Traffic (AADT) - 2025						
		Car	Utility	Bus	Truck 2 axle	Truck 3 axle	Truck >3 axle	TOTAL
M4	Alyat-Kazi Magomet	42,224	2,788	2,864	2,117	4,163	3,849	58,005
M4	Kazi Magomet - Kurdamir (wt.avg.)	35,384	2,048	3,175	2,373	5,138	5,648	53,767
M4	Kurdamir - Jevlah (wt.avg.)	38,007	2,197	3,737	3,150	5,597	3,345	56,034
M1	Jevlah-Mingacheur Station	34,862	1,779	3,115	2,210	4,442	1,215	47,623
M1	Mingacheur St.-Gjandza bypass	41,837	1,143	2,830	1,614	3,004	5,158	55,586
M1	Gjandza bypass	29,974	1,334	2,060	1,207	3,210	6,800	44,585
M1	Gjandza bypass-Dallar-Tovuz	41,502	1,938	2,915	2,046	4,069	3,316	55,786
M1	Tovuz-Akstafa-Kazach	29,164	4,318	2,576	1,995	5,083	3,840	46,976
M1	Kazach-Georgian border	27,883	6,059	2,449	2,279	4,022	3,912	46,604

Road No.	Section Name	Low Growth Estimate - Annual Average Daily Traffic (AADT) - 2025						
		Car	Utility	Bus	Truck 2 axle	Truck 3 axle	Truck >3 axle	TOTAL
M4	Alyat-Kazi Magomet	14,270	1,195	1,254	813	1,604	1,487	20,623
M4	Kazi Magomet - Kurdamir (wt.avg.)	12,624	785	1,300	791	1,719	1,897	19,116
M4	Kurdamir - Jevlah (wt.avg.)	13,522	839	1,526	1,047	1,867	1,120	19,922
M1	Jevlah-Mingacheur Station	12,369	678	1,269	732	1,478	406	16,932
M1	Mingacheur St.-Gjandza bypass	14,899	437	1,157	537	1,003	1,729	19,763
M1	Gjandza bypass	10,723	512	846	403	1,077	2,290	15,852
M1	Gjandza bypass-Dallar-Tovuz	14,758	740	1,190	680	1,357	1,110	19,834
M1	Tovuz-Akstafa-Kazach	10,363	1,647	1,051	662	1,694	1,284	16,702
M1	Kazach-Georgian border	9,875	2,304	996	754	1,336	1,304	16,569

Source: Consultant's estimates

Table A.5.8 ALYAT - GEORGIAN BORDER ROAD - FORECAST OF VOLUME-CAPACITY RATIOS

Year	BEST ESTIMATE - VOLUME-CAPACITY RATIOS								
	M 4 Alat - Gazi Mohammed	M 4 Gazi Mohammed Kurdamir	M 4 Kurdamir - Jevlah	M 1 Jevlah - Mincacevar Station	M 1 Mincacevar Station - Ganja Bypass (E)	M 1 Ganja Bypass	M 1 Ganja Bypass (W) Tovuz	M 1 Tovuz - Kazakh	M 1 Kazakh - Georgian border
1997	0.3		0.3	0.2	0.3	0.2	0.3	0.2	0.2
1998	0.3	0.3	0.3	0.2	0.3	0.2	0.3	0.2	0.2
1999	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3
2000	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
2001	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3
2002	0.4	0.4	0.4	0.3	0.4	0.3	0.4	0.3	0.3
2003	0.4	0.4	0.4	0.3	0.4	0.3	0.4	0.3	0.3
2004	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4
2005	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
2006	0.5	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.4
2007	0.5	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.4
2008	0.6	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5
2009	0.6	0.6	0.6	0.5	0.6	0.5	0.6	0.5	0.5
2010	0.6	0.6	0.6	0.5	0.6	0.5	0.6	0.5	0.5
2011	0.7	0.7	0.7	0.5	0.6	0.6	0.6	0.6	0.6
2012	0.7	0.7	0.7	0.6	0.7	0.6	0.7	0.6	0.6
2013	0.7	0.7	0.7	0.6	0.7	0.6	0.7	0.6	0.6
2014	0.8	0.8	0.8	0.6	0.8	0.7	0.7	0.7	0.7
2015	0.8	0.8	0.8	0.7	0.8	0.7	0.8	0.7	0.7
2016	0.9	0.9	0.9	0.7	0.9	0.7	0.8	0.7	0.7
2017	0.9	0.9	0.9	0.7	0.9	0.8	0.9	0.8	0.8
2018	1.0	1.0	1.0	0.8	1.0	0.8	0.9	0.8	0.8
2019				0.8		0.9	1.0	0.9	0.9
2020				0.9		0.9		0.9	0.9
2021				0.9		1.0		1.0	1.0
2022				1.0					
2023									
2024									
2025									

Year	HIGH GROWTH ESTIMATE - VOLUME-CAPACITY RATIOS								
	M 4 Alat - Gazi Mohammed	M 4 Gazi Mohammed Kurdamir	M 4 Kurdamir - Jevlah	M 1 Jevlah - Mincacevar Station	M 1 Mincacevar Station - Ganja Bypass (E)	M 1 Ganja Bypass	M 1 Ganja Bypass (W) Tovuz	M 1 Tovuz - Kazakh	M 1 Kazakh - Georgian border
1997	0.3	0.3	0.3	0.2	0.3	0.2	0.3	0.2	0.2
1998	0.3	0.3	0.3	0.2	0.3	0.2	0.3	0.2	0.2
1999	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
2000	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
2001	0.4	0.4	0.4	0.3	0.4	0.3	0.4	0.3	0.3
2002	0.4	0.4	0.4	0.3	0.4	0.3	0.4	0.3	0.3
2003	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2004	0.5	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.4
2005	0.5	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.4
2006	0.6	0.6	0.6	0.5	0.6	0.5	0.5	0.5	0.5
2007	0.6	0.6	0.6	0.5	0.6	0.5	0.6	0.5	0.5
2008	0.7	0.7	0.7	0.5	0.7	0.6	0.6	0.6	0.6
2009	0.7	0.7	0.7	0.6	0.7	0.6	0.7	0.6	0.6
2010	0.8	0.8	0.8	0.6	0.8	0.7	0.8	0.7	0.7
2011	0.9	0.9	0.9	0.7	0.8	0.7	0.8	0.7	0.7
2012	0.9	0.9	0.9	0.7	0.9	0.8	0.9	0.8	0.8
2013	1.0	1.0	1.0	0.8	1.0	0.9	1.0	0.9	0.8
2014				0.9		0.9		0.9	0.9
2015				0.9		1.0		1.0	1.0
2016				1.0					
2017									
2018									
2019									
2020									
2021									
2022									
2023									
2024									
2025									

Source: Consultant's estimates

Note: Assuming a peak hour capacity in passenger car equivalents of (PCE) of 2,400.
Assumed PCE factors were: Cars and Utility vehicles 1.0 Buses and 2 and 3 axle trucks 2.0
Trucks of >3 axles 3.0

APPENDIX 5

Table A.6.1 AZERBAIJAN - VEHICLE OPERATING COST MODEL INPUTS 1997

Inputs	Unit	AZERBAIJAN					
		1 Car	4 Utility	5 Large Bus	8 Truck 2 axle (Medium)	9 Truck 3 axle (Heavy)	10 Truck >3 axle (Artic.)
Roadway Characteristics							
Surface type		Paved	Paved	Paved	Paved	Paved	Paved
Average roughness (IRI)	m/km	5	5	5	5	5	5
Average positive gradient	%	5	5	5	5	5	5
Average negative gradient	%	5	5	5	5	5	5
Proportion of uphill travel	%	50	50	50	50	50	50
Average horizontal curvature	deg/km	5	5	5	5	5	5
Average superelevation	fraction	0.00012C	0.00012C	0.00012C	0.00012C	0.00012C	0.00012C
Altitude of terrain	m.	100	100	100	100	100	100
Effective number of lanes		>1	>1	>1	>1	>1	>1
Vehicle Characteristics							
Tare (unladen) weight	kg	960	1,300	11,100	4,525	8,200	12,800
Load carried	kg	300	400	3,000	2,400	6,000	15,000
Maximum used driving power	metric HP	41	39	100	67	147	147
Maximum used braking power	metric HP	20	29	197	147	255	467
Desired speed	km/hour	98.3	94.9	93.4	88.8	88.8	84.1
Aerodynamic drag coefficient	dimensionless	0.45	0.46	0.65	0.85	0.85	0.63
Projected frontal area	m^2	1.8	2.72	6.3	5.2	5.2	5.75
Calibrated engine speed	rpm	3,500	3,300	2,300	1,800	1,800	1,700
Energy efficiency factor	dimensionless	0.95	0.95	0.95	1	1	1
Fuel adjustment factor (alpha 2)	dimensionless	1.16	1.16	1.15	1.15	1.15	1.15
Tyre Wear Data							
Number of tyres per vehicle		4	4	6	6	10	18
Wearable volume of rubber per tyre	dm^3			6.85	7.6	7.3	8.39
Retreading cost per new tyre	Fraction	0.3	0.3	0.3	0.3	0.3	0.3
Maximum number of recaps		1	1	1	1	1	1
Constant term of tread wear model	dm^3/m			0.164	0.164	0.164	0.164
Wear coefficient for tread wear model	10-3 dm^3/kj			12.78	12.78	12.78	12.78
Vehicle Utilisation Data							
Average annual utilisation	km	17,500	29,250	62,500	40,000	40,000	56,250
Average annual utilisation	hours	350	650	1,250	1,000	1,000	1,250
Hourly utilisation ratio (HURATIO)	Fraction	0.4	0.5	0.6	0.5	0.6	0.65
Average service life	Years	15	8	7	8	8	10
Use constant service life ?		No	No	No	No	No	No
Age of vehicle in km	km	131,250	175,500	218,750	240,000	200,000	281,250
Passengers per vehicle		2	5	32			
Unit Costs							
New vehicle price	US$	7,800	7,020	38,500	15,438	40,300	50,000
Fuel cost	US$/litre	0.30	0.30	0.27	0.27	0.27	0.27
Lubricants cost	US$/litre	1.32	1.32	1.32	1.32	1.32	1.32
New tyre cost	US$	57	57	200	150	250	250
Crew time cost	US$/hour	0.20	0.35	0.55	0.61	0.61	0.61
Passenger delay cost	US$/hour	0.200	0.175	0.175			
Maintenance labout cost	US$/hour	0.35	0.35	0.35	0.35	0.35	0.35
Cargo delay cost	US$/hour						
Annual interest rate (%)	%	12	12	12	12	12	12
Overhead per vehicle km	US$		0.01	0.02	0.025	0.025	0.025
Additional Coefficients							
KP - Maintenance parts		0.308	0.308	0.483	0.371	0.371	0.371
CPo - Maintenance parts	1.00E-05	32.49	32.49	1.77	1.49	8.61	13.94
CPq - Maintenance parts	1.00E-02	13.7	13.7	3.56	251.79	35.31	15.65
OIPo - Maintenance parts		120	120	190	0	0	0
CLo - Maintenance parts		77.14	77.14	293.44	242.03	301.46	652.51
CLp - Maintenance parts		0.547	0.547	0.517	0.519	0.519	0.519
CLq - Maintenance parts		0	0	0.006	0	0	0
COo - Lubricants		1.55	1.55	3.07	3.07	3.07	5.15
FRATIO0 - VCURVE		0.268	0.22	0.233	0.292	0.292	0.179
FRATIO1 - VCURVE	1.00E-03	0	0	0	0.094	0.094	0.023
ARVMAX - VROUGH		259.7	239.7	212.8	177.7	177.7	130.9
BW - VDESIR		1	1	1	1	1	1
BETA - Speed		0.274	0.31	0.273	0.31	0.31	0.244
E0 - Speed		1.003	1.004	1.012	1.013	1.013	1.018
A0 - Fuel		-8,201	6,014	-7,276	-22,955	-22,955	-30,559
A1 - Fuel		33.4	37.6	63.5	95	95	156.1
A2 - Fuel		0	0	0	0	0	0
A3 - Fuel		5,630	3,846	4,323	3,758	3,758	4,002
A4 - Fuel		0	1,398	0	0	0	0
A5 - Fuel		0	0	8.64	19.12	19.12	4.41
A6 - Fuel		4,460	3,604	2,479	2,394	2,394	4,435
A7 - Fuel		0	0	11.5	13.76	13.76	26.08
NH0 - Fuel		-10	-12	-50	-85	-85	-85
Alpha1		0.7	1	1	1	1	1

Table 5.2 - SUMMARY OF WORLD BANK AND OTHER CRUDE OIL PRICE FORECASTS

Source	Actual price US$/barrel			Forecasts @ Current US$ / barrel			Forecasts @ Constant 1990 US$ / barrel		Forecasts @ Constant 1996 US$ / barrel	
	1994	1995	1996	1994	1995	1996	2000	2005	2000	2005
No.of forecasts				7	7	7	8	8	8	8
High				16.25	18.25	19.00	24.30	26.85	29.16	32.22
Low				11.75	13.55	13.80	13.05	12.15	15.66	14.58
Average	15.65	17.19	19.59	14.00	15.70	16.55	18.10	20.65	21.72	24.78
World Bank (a)				14.50	15.50	17.00	17.50	17.00	20.52	19.92
World Bank (b)							16.60	16.10	20.45	19.84

Source	Actual price US$/litre			Forecasts @ Current US$ / litre			Forecasts @ Constant 1990 US$ / litre		Forecasts @ Constant 1996 US$ / litre	
	1994	1995	1996	1994	1995	1996	2000	2005	2000	2005
No.of forecasts				7	7	7	8	8	8	8
High				0.102	0.115	0.120	0.153	26.850	0.184	0.203
Low				0.074	0.085	0.087	0.082	12.150	0.099	0.092
Average	0.099	0.108	0.124	0.088	0.099	0.104	0.114	20.650	0.137	0.156
World Bank (a)				0.091	0.098	0.107	0.110	0.107	0.129	0.126
World Bank (b)							0.105	0.102	0.129	0.125

Source: World Bank

Note: (a) Deflated by G-V countries' Manufucaturing Unit Value (MUV) Index

(b)Deflated by G-V countries' Consumer Price Index (CPI)

Table 5.3 - ECONOMIC COST OF AUTOMOTIVE FUEL

Crude Oil Prices and World Bank Price Forecasts

Unit	Crude Oil Spot Prices (April 1997)			IEA Average Crude Import Costs		World Bank Forecasts	
	Gulf	North Sea	Russia	1996	1997	2000	2005
US$/barrel	16.50	18.00	17.00	19.59		20.45	19.84
US$/tonne	119.63	135.18	124.61	143.59		149.90	145.43
US$/litre	0.104	0.114	0.107	0.114		0.129	0.125

Automotive Fuel	Pre-Tax Auto. Fuel Prices Based on the Above Crude Price Forecasts Based on:						
	Spot Crude Prices (April 1997)			IEA Average Crude Import Costs		World Bank Forecasts	
	Gulf	North Sea	Russia	1996	1997	2000	2005
PETROL							
Premium Unleaded (US$/litre)	0.249	0.271	0.256	0.271		0.308	0.299
Premium Leaded (US$/litre)	0.241	0.263	0.249	0.263		0.299	0.290
Automotive Diesel:							
Non-commercial (US$ / litre)	0.218	0.237	0.224	0.237		0.270	0.262
Commercial (US$/litre)	0.214	0.234	0.221	0.234		0.266	0.258

Automotive Fuel Pre-Tax as % of Crude Oil Price		*Crude % of Pre-tax Autofuel*
Premium Unleaded	*239*	*42*
Premium Leaded	*232*	*43*
Diesel - Non Commercial	*209*	*48*
Diesel - Commercial	*206*	*49*

Physical Conversion Factors

Conversion	Crude Oil				Automotive Fuel			
	Gulf	North Sea	Russia		Petrol -Premium	Petrol -Regular	Petrol -average	Diesel
Specific Gravity (kg/litre)	0.87	0.84	0.86		0.76	0.74	0.75	0.84
Barrels/tonne	7.25	7.51	7.33		8.30	8.52	8.41	7.51
Litres/barrel	158.54	158.52	158.63		158.50	158.60	158.50	158.50
Litres/tonne	1,149.43	1,190.48	1,162.79		1,315.79	1,351.35	1,333.33	1,190.48

APPENDIX 6

A 6.1	Review of Road Design Standards
A 6.2	Road Geometry Standards
A 6.3	Geotechnical Report
A 6.4	Environmental Assessment
A 6.5	Pavement Strength Report
A 6.6	Existing Road Width
A 6.7	Surface Deficiencies
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APPENDIX 6.1

REVIEW OF ROAD DESIGN STANDARDS

TABLE OF CONTENTS

1. INTRODUCTION

This report on the Review of Road Design Standards in one of the reports being produced under the European Union - Tacis sponsored TRACECA Project for the Implementation of Pavement Management Systems. The Project covers eight states of the south of the former Soviet Union which are five states in Central Asia

- Kazakhstan
- Kyrghyzstan
- Tadjikistan
- Turkmenistan
- Uzbekistan

and another three states in the Caucasus area

- Armenia
- Azerbaijan
- Georgia.

The introduction of the Terms of Reference already describes a number of deficiencies which were also encountered during the Consultant's studies and review like

- low standard/quality of road construction (e. g. laying techniques, compaction, mix design, workmanship)
- modern Western performance criteria, technical specifications and implementation technologies are little known in the region
- high nominal standards (e. g. design speed of 150 km/h)
- road safety is inadequate

During the Consultant's activities in the project area the above listed deficiencies were further studied, detailed and discussed in a number of meetings and seminars in each of the eight recipient states with the two main headings:

BITUMINOUS BOUND MATERIALS

REVIEW OF METHODS, TECHNOLOGIES AND RELATED STANDARDS IN THE RECIPIENT STATES AND COMPARISON WITH EUROPEAN AND OTHER WESTERN METHODS, TECHNOLOGIES AND STANDARDS

ROAD DESIGN AND ROAD SAFETY

REVIEW OF RELEVANT ROAD DESIGN AND ROAD SAFETY STANDARDS FOR THE TRACECA ROADS (MAGISTRALE) IN THE RECIPIENT STATES AND COMPARISON WITH WESTERN EUROPEAN STANDARDS

In this report under the same headings the topics of the seminars are summarised and the review/analysis of the relevant standards is detailed.

2. BITUMINOUS BOUND MATERIALS

2.1. Pavement Design

2.1.1 Design Philosophies

The pavement design of a road general depends on:

- planned design life
- traffic volume (traffic forecast)
- road category

Taking into consideration the above basic design factors the main aim of the pavement design should be to achieve

- riding comfort acceptable to road users
- economy (implementation and life time)
- limited surface deflection

In the former Soviet Union Standards (SUS) the governing factor for pavement design is the so-called stiffness modulus of the pavement structure, comprising the different pavement layers (e. g. subbase, base course, asphalt concrete). With this stiffness modulus the total pavement thickness and the allowable deflection is specified. The stiffness modulus is calculated under consideration of E-moduli of the respective pavement layers. Based on researches the SUS specifies the E-moduli, which then are used without further verification for the design and on site. The criteria for determination of asphalt layer thickness is the limit on the tensile stress at the bottom of the asphalt layer.

In European/Western standards (E/WS) the pavement design is based on tolerable stresses induced in the subgrade by traffic load. The different subgrade materials and their behaviour are considered with the respective subgrade bearing capacity (e. g. CBR, plate load test) leading to the total pavement thickness. The total pavement thicknesses result from standardised pavement layer thicknesses which have been empirically determined. In addition the materials requirements are specified and have to be verified on site by regular testing to ensure the required bearing capacity of each layer. The criteria for determination of asphalt layer thickness is to provide a satisfactory service over the planned design life period of the pavement, taking into consideration the effects (climate, traffic) on the road surface.

The main differences between the SUS pavement design and E/WS pavement design are:

Requirement	SUS Design	E/WS Design
pavement deformation is limited by	stiffness modulus of the pavement structure	stress on subgrade
asphalt layer thickness is determined by	tensile stress at bottom of asphalt layers	limitation of deterioration resulting in acceptable surface condition

In summary the SUS design procedure is a method using theoretical material values. Although an adequate stiffness of a road structure is an important requirement, this does not necessarily translate into a well designed road, comfortable to use and economic in construction and maintenance.

The E/WS design procedure is based on empirical factors which are the results of practical experience with specified control of each pavement layer on site.

2.1.2 Characterisation of pavement layers

The surface course or wearing course is the top layer of an asphalt pavement and should be constructed of dense asphalt concrete. Between surface course and base course a more porous asphalt layer the so called binder course is placed. The binder course should be an asphalt mixture with a high stability and shear strength.

Below the binder the base course (road base) is the main load spreading layer of the pavement. It will normally consist of crushed stone or suitable natural gravel. For roads with high traffic load the base course can be a bituminous treated layer with high compressive strength for the total layer thickness or for the upper part combined with a lower base course laver of cement or lime treated or untreated gravel sand mixture.

The subbase is the second load spreading layer underlying the base course. It normally consists of a material of lower quality than the base course such as a natural gravel-sand mixture. This layer also serves as a separating layer preventing contamination of the base course by subgrade material during construction. Base course and subbase have to be frost-resistant.

The subgrade (existing natural ground or embankment fill) should be compacted to fulfil the requirements of a sufficient bearing capacity.

2.1.3 Assessment of existing design methods in comparisation with western design procedures

In the example below a pavement designed to SUS is recalculated and compared with an E/WS design method. The SUS design provides a service life of the pavement of 15 years. Less than 6 years service life for the same pavement is the result of the recalculation with the E/WS method, the empirical method of AASHTO (American Association of State Highway and Transport Officials).

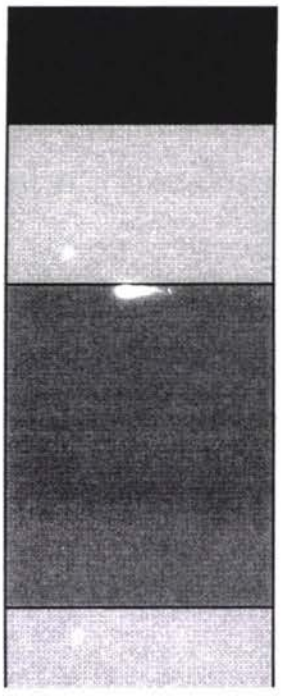
Design with SUS (VSN 46 - 72)

Design Traffic: 1342 equivalent standard vehicles per day in design lane

Initial traffic assuming 1.5 % growth = 1073 vpd

Accumulated $ESAL_{80} = 7.02 \times 10^6$ (15 years)

DESIGN SOLUTION
according to VSN 46 - 72



Wearing course 50 mm	$E_1 = 1500$ MN/m²
Binder course 80 mm	$E_2 = 1000$ MN/m²
Granular base 120 mm (crushed, cement treated)	$E_3 = 600$ MN/m²
Granular subbase 400 mm	$E_4 = 200$ MN/m²
Subgrade	$E_5 = 28$ MN/m²

Recalculation by AASHTO Method

The relation for the number of $ESAL_{80}$ is as follows :

$$\text{Log } ESAL_{80} = Z_R \, S_o + 9{,}36 \log (SN + 1) - 0.20 + \frac{\log ((PSI /(4.2-1.5))}{0.4 + (1094/ (SN +1)^{5,15}} + 2.32 \log M_R - 8.07$$

Z_R = - 1.645 (Normal deviate for 35 % reliability level)

S_o = 0.45 (Standard deviation)

$M_R = 5\ 10^3$ for example 1 (Subgrade resilient modulus)

PSI = 4.2 - 2.5 = 1.7 (Change in the present serviceability index)

PSI = 4.2 Construction Quality common in USA

PSI = 2.5 Minimum acceptable PSI

Log $ESAL_{80}$ = - 0.740 + 7.083 - 0.396 + 8.582 - 8.07 = 6.459

$ESAL_{80}$ = 2.88 * 10^6 (Number of passes by Equivalent Standard Axle Load)

Design Traffic : 1342 equivalent standard axle loads per day in design lane (assumption)

= 2,88 * 10^6 / 1342 = 2146

2146 / 365 = 5.8 years Design life according AASHTO

2.1.4 Assessment and recommendation

The SUS design is a theoretical procedure. It is recommended to use a method more based on values of experience and empirical studies as demonstrated in the above example. Specially the present practice with computation using the stiffness modulus and the tensile stress at the bottom of the asphalt layers should be discarded. If it is necessary to use still the SUS then more attention has to be paid to the bearing capacity of the subgrade (testing of CBR, moisture content, grading). For roads with a high traffic load, as the magistrale are, the upper layer of the base course (road base) should always be a bituminous layer. The thickness of all frost resistance layers should be reconsidered according to local conditions and experience.

For the asphalt concrete itself it is recommended to reduce the maximum grain size of the aggregates and to use as binder a destillation bitumen.

2.2 Materials

Asphalt concrete is a mixture of sand, aggregates and bitumen. A mineral powder is added as filler to provide a sufficient quantity of fine material, which can be also cement or crushed limestone. Between bitumen and aggregates a sufficient adhesion is required. The value of adhaesion depends on the kind of bitumen and the aggregate.

Aggregates
The maximum grain size of the aggregates is of great importance for the mechanical values of the asphalt and directly related to thickness of asphalt layers.

Bitumen
The bitumen used in Western European countries for road construction is named according the average penetration value. For example B65 means B for Bitumen, 65 for 65 1/10 mm medium penetration (max/min limits of penetration 50/75). Bitumen in Europe is produced by a two step destillation procedure (atmospheric and vaccuum destillation).

The following types of bitumen are available B15, B25, B45, B65, B80, B200, B300.

For road construction (rolled asphalt) bitumen B65 and B80 is preferably used, and Bitumen B200, B300 for road surface treatment

Natural asphalt (bitumen) is found in Azerbaijan, Turkmenistan.

Natural asphalt (bitumen) is found in Azerbaijan, Turkmenistan.

Asphalt job mix design criteria and laboratory testing
The asphalt job mix design provides the optimum values for
- density
- air voids content
- bitumen content
- stability and flow value

standard laboratory tests for bitumen carried out on construction site
- penetration
- softening point
- breaking point
- ductility

Assessment and recommendation
Existing laboratory equipment in the eight recipient states was produced in the fromer Soviet Union and complies with the relevant SUS.

Main laboratory testing procedures for aggregates, sand, bitumen and asphalt is done according the SUS which differ only little to European/western tests standards. The Marshall test is widely known, but not used due to lack of equipment and missing requirement for limitations.

2.3 Quality Control

The aim of quality control in production and implementation is to maintain a constant level of quality which in the long term results in a cost reduction

Regular testing of the product quality shall be done by the manufacturer before delivery to customers (testing as a measure of self controlling). Furthermore sample controlling and testing shall be carried out by an independent institution to supervise the manufactuer's testing in order to assure constantly the quality of the product/materials.

When materials are used for construction field and laboratory testing is required to assure that the materials used and the workmanship comply with the relevant standards and specifications. The usual approach on a construction site is that the contractor carries out own testing throughout the period of execution of works. The test results are to be submitted to the (independent) supervisor for verification and the supervisor will do own testing.

In the recipient states the European/western approach for quality control and the independent supervision of works is not existing and thus very often the materials and construction requirements of the existing standards and specifications are not achieved resulting in poor quality implementation and short service life with high maintenance costs. Therefore a quality control, a quality assurance system should be introduced which will support the durability of construction and encourage the countries' economy.

2.4 Asphalt Production and Pavement Placing Techniques

Asphalt products for road construction

There are generally two different types of asphalt mixtures used for road construction:

(i) rolled asphalt (with air voids)

The asphalt is placed and compacted at maximum density and there are still air voids not filled with bitumen. The specified temperature for placing hot asphalt mixtures is 120 - 180°C and compaction has to be completed before the temperature drops below 90°C.

In Europe the use of cold asphalt mixtures is restricted to special cases or locations (islands, moutainous regions, temporary repairs).

(ii) Mastic asphalt (without air viods)

In the asphalt mixture there are no air voids and therefore after placing no compaction is necessary. The specified paving temperature temperature is 220 - 240 °C.

Overheating of bitumen will result in a poor quality asphalt mixture and therefore the maximum admissible temperatures of bitumen for asphalt mixtures are specified:

Type of Bitumen	max. Temperature [°C]
B45	190
B65	180
B80	180

Lowest and highest temperatures for asphalt mixtures in °C leaving the mixer:

(i) SUS (GOST)

Type of Bitumen	Temperature of Asphalt [°C]
BND 40 / 60 BND 60 / 90 BND 90 / 130 BN 60 / 90 BN 90 / 130	140 - 160

Note: The maximum temperature may be 10 °C higher if the asphalt is placed at air temperatures below 5 °C.

(ii) E/WS (ZTV - Asphalt, German Standard)

Typ of Bitumen	Temperature of Asphalt for Binder Layer [°C]	Temperature of Asphalt for Surface Course [°C]
B45	130 - 190	140 - 190
B65	120 - 180	130 - 180
B80	120 - 180	130 - 180

Note: Surface course should not be placed at air temperatures below 3°C, Asphalt binder course not below 0 °C.

Asphalt mixing plants

A mixing plant for asphalt production shall be designed and operated so as to produce mixtures according to the Job-Mix-Formula. There are general two types of mixing plants used for asphalt production:

- Batch mixing plants
- Continuous mixing plants

Asphalt placing and compacting procedures

Placing of asphalt is done with an asphalt finisher (paver), normal working width 6 m to 8 m, which achieve a so-called precompaction of about 90% of required density. Paving speed is depending on kind, width and thickness of asphalt layers ranging from about 1.0 m/min. (surface course) to 2.5 m/min (binder course, base course).

Compacting of asphalt with tandem steel roller (vibration possible) and pneumatic roller.

Assessment and recommendation

In the recipient states the mixing equipment is of Soviet Union or east German origin. Most of the mixing plants are out of operation since a number of years by various reasons. Due to the lack of operating mixing plants and long haulage distances the use of cold mix asphalt became common for maintenance and repair works. Compacting was and is still done with static steel rollers. Pneumatic rollers and rollers with vibration possibility have not been encountered in the recipient states.

The existing mixing plants could produce a good quality asphalt, but this depends on the condition of the equipment and it is difficult to purchase spare parts. A similar problem for spare parts appears for asphalt placing equipment (pavers, rollers).

With regard to the above problems and the superiority of E/WS asphalt placing equipment some of the recipient states have started to use E/WS equipment to achieve a better quality in pavement construction. However, it is recommended to provide appropriate training for those equipment so that their possibilities are understood and can be fully utilised.

2.5 Rehabilitation of Asphalt Pavement

The deterioration of a pavement manifests itself by various signs of appearance or indicators which can be associated with the probable causes of the failure or imperfection. To determine if and to which extend rehabilitation measures are necessary as a first step an assessment of the road condition is required.

An assessment of road condition should include the following:

(i) surface condition
A visual condition survey of an asphalt pavement shall describe the types of pavement distress relating them to the likely causual factors. The visible manifestations related to pavementdistress generally fall into one of the following broad categories:

- cracking
- distortion
- disintegration
- skid resistance

(ii) bearing capacity
Special equipment is used to asses the actual bearing capacity. The Benkelman beam is widely known but the results of the measurements cannot be related to the different pavement layers. The Falling Weight Deflectometer (FWD) is a fast and most advanced method to collect relevant data from actual deflection measurements and following calculations give distinguished results for the different pavement layers.

(iii) pavement composition
Sampling and laboratory testing of the existing asphalt pavement reveals the actual condition of aggregates and bitumen as well as the used basecourse and subbase material.

(iv) pavement structure condition
After a certain time depending for example on traffic load and climatic conditions all pavements need maintenance and repairs to keep a certain level of ride comfort. If maintenance of a pavement is neglected for a longer period the deterioration of the road may accelerate. The pavement condition is quickly getting worse and is then unacceptable to road users. The high degree of deterioration of a neglected pavement results in destruction requiring an expensive reconstruction in the end. A permanent maintenance and repair of smaller deficiencies will extend the life time of a pavement and keeps the surface in good condition.

Assessment and Recommendation

During the road inspections carried out in the 8 recipient states very different quality of road maintenance/repair/rehabilitation works was observed ranging from good to very poor. Cases were observed where on the one hand cold asphalt was dropped into water filled potholes but also on the other hand proper edge cutting with preparation for receiving the asphalt and following compaction. Furthermore placing of asphalt concrete layers was carried out by pavers but without grade control or the materials was spread by graders. In only a few cases the resulting surface condition, in particular the road roughness, was satisfactory. When the above described deficiencies were discussed in the seminars with the specialists of the recipient institutes the main reason given was that maintenance is mostly done

according to financial possibilities/constraints and not according to technical requirements.

In summary the existing methodology as well as the equipment is in most of the recipient states unsatisfactory. As already described in the sub-chapter above some of the states have started to purchase modern European/western equipmnet and it is recommended to carry out training for operators, foremen, site engineers etc. to achieve an advanced knowledge in the methodology and techniques for road maintenance and rehabilitation works and for an optimum utilisation of the equipment.

2.6 Recycling Techniques and Methods for Asphalt Concrete

Cold and hot recycling

Cold recycled (cut/milled and pulverised) asphalt pavement can only be used for lower layers as base course or as binder course when adding bitumen emulsion and/ or cement or cement suspension. Depending on the traffic load and to achieve the required surface properties the compacted recycled road base is subsequently covered with a bituminous surface layer. Depending on laboratory testing results of the existing asphalt concrete hot recycled asphalt pavement may be used also for surface course with or without adding new materials.

Conventional methods

Deteriorated asphalt pavement is cut or milled and transported to a mixing plant. There the material is pulverised, heated and mixed with or without adding new aggregates and bitumen. The asphalt mixture is then transported to the construction site and placed on the road. This method is used when a mixing plant is close to the site since additional transport of removed asphalt pavement to the mixing plant and of the newly mixed material back to the road construction site has to be considered.

Mix in place recycling

The mix-in-place recycling is a very promising and economical method for the reconstruction of damaged asphalt roads. With this method the material of deteriorated roads is recycled in place and immediately used for the new pavement construction.

- Objectives of this method
  - Rehabilitation of road surface
  - Improvement of load bearing capacity
  - Improvement of frost resistance

- Advantages of this method
  - Avoidance of waste road construction material
  - Saving of natural resources
  - Environmental friendly
  - Reduction of material transports resulting in avoidance of traffic load burden on other rural/public roads in the area usually used for haulage

This construction method is characterised by a recycling equipment which cuts/mills and pulverises the existing road material if necessary including the unbound road base and subsequently mixes the crushed material with cement or bituminous binder agents. At this time available recycling equipment can be used on asphalt layers with a thickness of up to 150 mm. The following methods and techniques are used:

- Reshape: Deteriorated surface course/asphalt pavement will be heated, loosened and the hot material placed without adding material.
- Repave: The loosened and hot replaced material is immediately covered with a new hot asphalt layer containing only new material.
- Remix: Deteriorated surface course/asphalt pavement will be heated, loosened and new material (asphalt mixture or only bitumen) has to be added to get a mixture according the job mix design.

Assessment and Recommendation

Modern asphalt recycling techniques are requiring special equipment and a well trained labour force. In addition in all recipient states the budget for road maintenance and road repair is very limited so that recycling of asphalt concrete, if any, as for example in Uzbekistan and Kazakstan is very rare and done by specialised European/western companies.

However, the specialists of the recipient institutes met in the seminars are very interested in this modern and economical road/pavement rehabilitation technology. When the recycling technology is introduced it should be accompanied by special seminars and training not only for the use of equipment but also for technicians and engineers who have to do the laboratory testing of the existing pavement materials as well as the job mix design for the re-use.

3. ROAD DESIGN AND ROAD SAFETY

3.1 Road Design Standards

3.1.1 General

The standard for the geometrical design of roads and highways in the TRACECA states was developed in the former Soviet Union. In some of the states researches are ongoing for modification of this standard towards the development of national standards, which may consider local requirements as well as harmonisation with western European standards. However, no new standard has been published yet and the Soviet Union road standard (SNIP) is still in use.

For comparison with an western European standard the German standard for road and highway design is used and was presented in the seminars respectively.

The TRACECA Project includes selected international road links in the eight recipient states which in most cases are the so-called magistrale with the highest standard, but also with the next lower category of standard reflecting the requirements of lower traffic volume. The details of road design standards described in the following therefore cover these categories of the TRACECA roads.

3.1.2 Road Categories and Design Speeds

For an better overview all road categories and related design speeds are listed in the tables below. The relevant parameters of the Soviet Union road standard (SUS) are given in Table 3.1 and of the European/German road standard (E/GS) in Table 3.2. Categories not applicable for the TRACECA roads are shaded.

Apparent are the relative high design speeds of the SUS and the subdivision of the group category/road category with particulars of the E/GS. During seminars in the recipient institutes the scientific/research background of the two standards was discussed and some approaches were found as different, however, to discuss and evaluate all the differences of the development of the standards would be beyond the scope of the Project.

As discussed in the seminars the SUS design speed of 150 km/h has been used in flat terrain only (e.g. steppe of Kazakhstan) or not at all (e.g. Azerbaijan, Georgia, Kyrgyzstan, Uzbekistan) since the requirements are very high and the various constraints would have made the implementation to expensive. Considering this approach in the design practice, the differences of the two standards are marginal only.

Table 3.1: Soviet Union Road Standard 2.05.02-85, 1986

CATEGORY	DESIGN SPEED [Km/h]		
	GENERAL	WINDING TERRAIN	MOUNTAIN. TERRAIN
I - a	150	120	80
I - b	120	100	60
II	120	100	60
III	100	80	50
IV	80	60	40
V	60	40	30

Table 3.2: German Standard RAS-Q, 1982/1996

CATEGORY				DESIGN SPEED [km/h]
GROUP CATEGORY		ROAD CATEGORY		
A	MAGISTRALE, outside populated areas	A I	long distance/international link	90 - 120
		A II	regional link	80 - 120
		A III	interurban link	60 - 80 (100)
		A IV	major infrastructure link	60 - 80
B	HIGHWAYS, around or through towns	B II	major highway	(60) 70 - 80
		B III	main highway	(50) 60 - 70
		B IV	highway	50 - 60
C	MAJOR URBAN ROADS	C III	major road (highway)	50 (- 70)
		C IV	main road	(40) 50 (60)
D	URBAN MAIN ROADS	D IV	main road	40 - 50
		D V	main street	none
E	URBAN ACCESS ROADS	E V	street	none
		E VI	lane	none

Values in (...) = Exceptions

3.1.3 Geometrical Design Elements

Based on the selected road category and the design speed respectively the geometrical elements for the road design are defined.

The main parameters for ***horizontal and vertical alignment*** are summarised in Table 3.3 for the SUS and for the E/GS in Table 3.4. When as described above the requirements of the SUS design speed 150 km/h is not taken into consideration the two standards are very similar with more particulars given in the E/GS.

Table 3.3: Soviet Union Road Standard 2.05.02-85, 1986

DESIGN SPEED	MAX. GRADI - ENT	MINIMUM VERTICAL CURVE Radius Crest Curve	Radius Sag Curve general	Radius Sag Curve mountain.	MINIMUM HORIZONTAL CURVE general Radius	general Crossfall	mountainous Radius	mountainous Crossfall
150 km/h	3.0 %	30000 m	8000 m	4000 m	1200 m	2 - 3 %	1000 m	2 - 3 %
120 km/h	4.0 %	15000 m	5000 m	2500 m	800 m	3 - 4 %	600 m	5 - 6 %
100 km/h	5.0 %	10000 m	3000 m	1500 m	600 m	5 - 6 %	400 m	6 %
80 km/h	6.0 %	5000 m	2000 m	1000 m	300 m	6 %	250 m	6 %
60 km/h	7.0 %	2500 m	1500 m	600 m	150 m	6 %	125 m	6 %

Table 3.4: German Standard RAS-L-1, 1984, for Road Category **A**

DESIGN SPEED	MAX. GRADI - ENT	MINIMUM VERTICAL CURVE Radius Crest Curve	Radius Sag Curve	MINIMUM HORIZONTAL CURVE Radius and minimum Crossfall		Radius and maximum Crossfall	
120 km/h	4.0 %	20000 m	10000 m	3000 m	& 2.5 %	800 m	7 % (8 %)
100 km/h	4.5 %	10000 m	5000 m	1800 m	& 2.5 %	500 m	7 % (8 %)
90 km/h	5.0 %	7000 m	3500 m	1400 m	& 2.5 %	380 m	7 % (8 %)
80 km/h	6.0 %	5000 m	2500 m	1100 m	& 2.5 %	280 m	7 % (8 %)
70 km/h	7.0 %	3500 m	2000 m	800 m	& 2.5 %	200 m	7 % (8 %)
60 km/h	8.0 %	2750 m	1500 m	500 m	& 2.5 %	135 m	7 % (8 %)

Values in (...) = Exceptions

With the determined road category and the respective traffic volume both standards define the main parameters for the ***road cross section*** which are summarised in Table 3.5 for the SUS and for the E/GS in Table 3.6.

Again and as described for other parameters before the two standards for the road cross section are very similar and adequate with the exception of the decision point from two to four lanes in the SUS which requires at least four lanes for a traffic volume of above 14,000 vehicles per day. In the highest category A I of the E/GS and for up to 27,000 vehicles/day the 1982 RAS-Q standard required two lanes only which with regard to traffic flow and road safety recently has been revised (RAS-Q 1996, published on 15.08.96) to three lanes.

Table 3.5: Soviet Union Road Standard 2.05.02-85, 1986

CAT	TRAFFIC VOLUME (ADT) NORMAL + WINDING	DIFFIC. TERRAIN	LANES NO.	WIDTH	SHOULDER TOTAL (PAVED)	MEDIAN TOTAL (PAVED)	TOTAL ROAD WIDTH
I-a	> 80000	> 70000	8	3.75 m	3.75 m (0.75m)	6.00 m (1.00m)	43.50 m
	> 40000 ≤ 80000	> 34000 ≤ 70000	6	3.75 m	3.75 m (0.75m)	6.00 m (1.00m)	36.00 m
	> 14000 ≤ 40000	> 14000 ≤ 34000	4	3.75 m	3.75 m (0.75m)	6.00 m (1.00m)	28.50 m
I-b	> 80000	> 70000	8	3.75 m	3.75 m (0.75m)	5.00 m (1.00m)	42.50 m
	> 40000 ≤ 80000	> 34000 ≤ 70000	6	3.75 m	3.75 m (0.75m)	5.00 m (1.00m)	35.00 m
	> 14000 ≤ 40000	> 14000 ≤ 34000	4	3.75 m	3.75 m (0.75m)	5.00 m (1.00m)	27.50 m
II	6000 - 14000		2	3.75 m	3.75 m (0.75m)	- -	15.00 m
III	2000 - 6000		2	3.50 m	2.50 m (0.75m)	--	12.00 m
IV	200 - 2000		2	3.00 m	2.00 m (0.50m)	--	10.00 m
V	< 200		1	(2.25 m)	1.75 m (--)	--	8.00 m

Table 3.6: German Standard RAS-Q, 1996

ROAD CAT.	TRAFFIC VOLUME (ADT) [veh./day]	LANES NO	WIDTH	SHOULDER TOTAL (PAVED)	MEDIAN TOTAL (PAVED)	TOTAL ROAD WIDTH	NOTE
A I	45000 - 61000	6	3.75 m 3.50 m	4.50 m (3.00 m)	5.00 m (2x0.75m)	35.50 m	i
	29000 - 39000	4	3.75 m	4.75 m (3.25 m)	5.00 m (2x0.75m)	29.50 m	
	14000 - 27000	3	3.75 m 3.50 m 3.25 m	1.75/2.75 m (0.25 m)	0.50 m (0.50 m)	15.50 m	ii
A II	54000 - 66000	6	3.50 m	4.00 m (2.50 m)	4.00 m (2x0.50m)	34.00 m	
	35000 - 42000	4	3.50 m	4.00 m (2.50 m)	4.00 m (2x0.50m)	26.00 m	
	22000 - 27000	3	3.75 m 3.50 m 3.25 m	1.75/2.75 m (0.25 m)	0.50 m (0.50 m)	15.50 m	ii
	14000 - 21000	2	3.50 m	1.75 m (0.25 m)	--	10.50m	
A III	33000 - 42000	4	3.25 m	2.00 m (0.50m)	3.00 m (2x0.50m)	20.00 m	
	11000 - 21000	2	3.00 m	1.75 m (0.25m)	--	9.50 m	
A IV	11000 - 14000	2	3.00 m	1.75 m (0.25m)	--	9.50 m	

NOTES: (i) total width of 35.50 m with width of right lane 1 x 3.75 m and left lanes 2 x 3.50 m

(ii) total width of 15.50 m:
- no. of lanes 3 (2+1 alternating)
- width of single (1) lane 1 x 3.75 m with shoulder 2.75 m (0.25m paved)
- width of double (2) lanes 1 x 3.50 m (right) + 1 x 3.25 m (left) with shoulder 1.75 m (0.25m paved)
- width of "median" 0.50 m (paved)

3.2 Road Safety and Road Design Aspects

3.2.1 Preliminary Remarks

Road and traffic safety is based on the three 'E' which can be described as:

Engineering (e. g. standards for road design and traffic engineering, control of quality in implementation, supervision of works for and maintenance of a good/safe road condition)

Education (e. g. education of pedestrians and motorists, training, public promotion)

Enforcement (e. g. laws and regulations, police, justice)

and is a complex process where dynamic, visual, geometrical, drainage and psychological requirements need to be optimised.

In the following those aspects concerning road safety and related road design details are described which were presented and discussed in the seminars held in the recipient states.

3.2.2 Technical Aspects of Road Safety and Road Design

- **Sequence of Radii for horizontal Alignment**

  The relation of the radii of horizontal curves in the road alignment is specified in both standards, the SUS as well as the E/GS. The aim is to achieve a relative constant travelling speed resulting in safety for the road users (avoidance of unexpected narrow curves). In cases where constraints do not allow to follow the requirements of the standard(s) extensive signalisation is necessary.

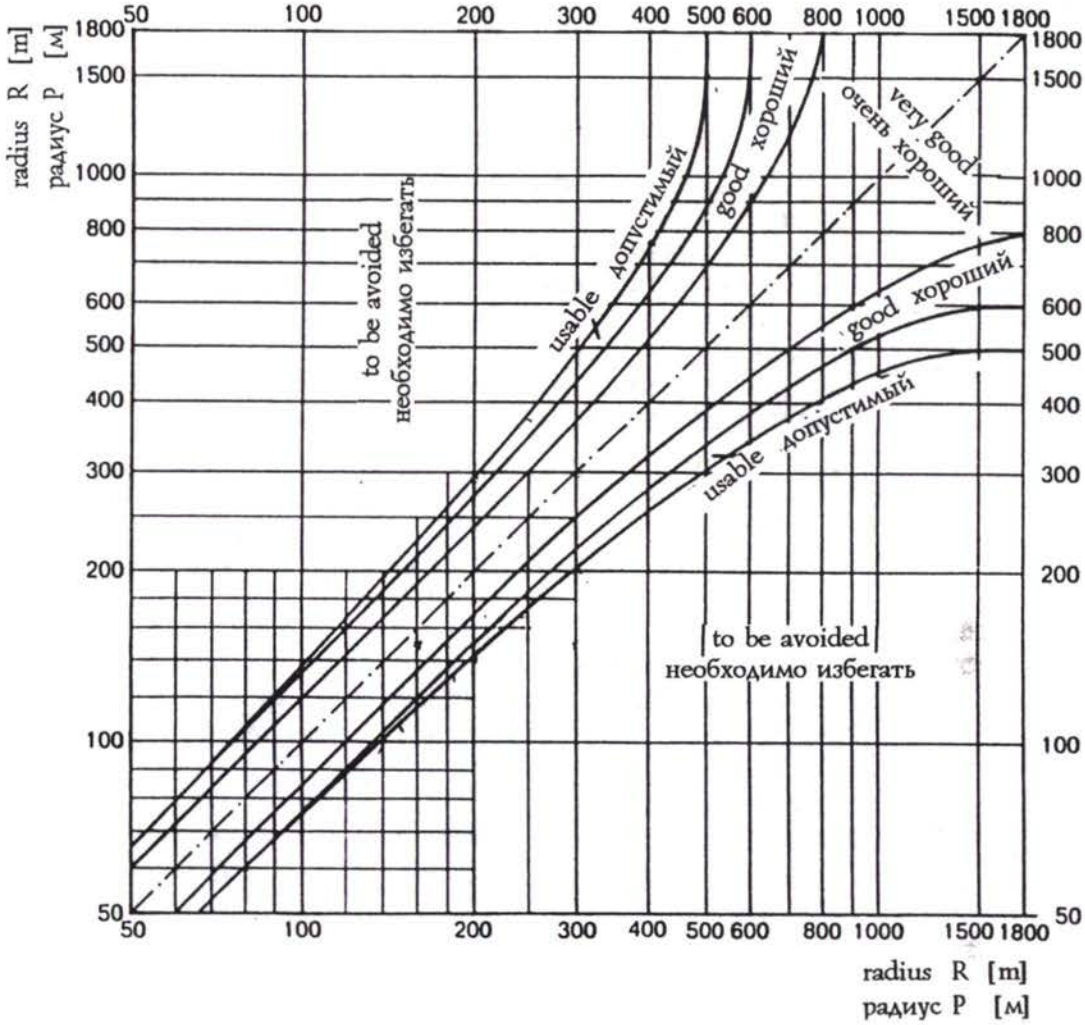
  In sub-chapter 4.3.3 of the SUS (SNIP 2.05.02 - 85) the relation of radii is specified as

  $$R_1 : R_2 = 1 : (\text{maximum } 1.3)$$

  which is considered as to rigid and not reflecting the requirements of moving vehicle dynamics.

  The suitability of the sequence of radii in the E/GS (RAS-L-1, 1984) is determined according to the diagramm below and improvement of the SUS is recommended.

Sequence of Radii for Horizontal Curves, RAS-L-1, 1984



- **Length of straight Road Section and minimum Radius of Curve after straight Road Section**

  At long straight road section it is rather difficult for drivers to assess distance and speed of approaching vehicles. Furthermore for the safety of road users it is important to decide on an appropriate radius after a straight section of road, where vehicles may build up speed. The SUS (SNIP) specifies maximum 5 km length of straight and should be complemented by the requirements of the E/GS for the radius after a straight road section as summarised in table 3.7 below.

Table 3.7: German Standard RAS-L-1, 1984

ROAD CATEGORY	LENGTH OF STRAIGHT	MINIMUM RADIUS
A I, A II	L ≥ 600 m	min R > 600 m
	L < 600 m	min R > L
A III, A IV, B II	L ≥ 500 m	min R > 500 m
	L < 500 m	min R > L

- **Junctions incl. Approaches and Slowing Down/Acceleration Lanes**

  For Junctions and intersections one of the main design requirement is safety for the road users which can be achieved when the junction/intersection system

  - provides adequate visibility
  - is easy to understand
  - is designed for appropriate speed
  - is furnished with adequate horizontal and vertical signalisation (road markings and traffic signs)

  Those requirements are of high importance especially for non-local drivers, who also need information signs for orientation and decision which direction to take well ahead of the junction.

  The priority in the SUS for junctions at grade is to achieve a relative high speed for vehicles entering and moving in the junction. The resulting relative big radii used in those junctions lead to large islands and a large area for the entire junction itself with the consequence of a reduced visibility.

  In comparison the E/GS has relative small radii in the junction with small islands resulting in a good visibility. To achieve a speed of entering vehicles with little difference to the through traffic acceleration lanes are provided.

  In summary the E/GS with constructural measures reducing the speed in the junction approach and providing good visibility which both make the 'system' of the junction clearly understandable has advantage in traffic safety and therefore the SUS should be improved accordingly.

  The SUS for grade separated junctions/intersections including clover leaves is very similar to the E/GS. During field visits in the course of the seminars several cases were observed where the SUS has been modified and shorter slowing down/acceleration lanes were constructed. This modification was explained with budget constraints and the relative low traffic volume at the time of the implementation. The theory is to provide the necessary slowing down/acceleration lanes when the traffic volume has reached a certain level and the full standard is required.

- **Signalisation**

  The SUS for road and traffic signs is in line with western European/international standards and modification is considered not to be necessary. In many cases the information signs were encountered with description in Latin letters in addition to the Cyrillic, which is appreciated by foreign road users and which should be shown on all informative signs along the international, the TRACECA roads. However, the quality of materials should be improved, especially the brightness of reflective material and/or the workmenship should be better controlled.

  The same applies for road marking. The SUS is appropriate and the materials/quality should be improved. Some modification/additions should be considered to increase traffic safety as for example on two lane roads arrows in the centreline ahead of a continous centreline marking (non overtaking). In general road marking has been neglected in the TRACECA states for some time by various reasons - budget constraints for maintenance, broken down equipment, supply of paint abandoned etc.

In the TRACECA states marker posts are used at junctions, bridge approaches, railway crossings and at culvert locations only. According to the SUS the posts are white with a black stripe, reflective material or reflectors are not used. The existing standard is considered as not appropriate and should be improved: size of post and use of reflectors. Marker posts are a very important component of road safety, especially in the darkness they provide together with an appropriate road marking the best possible guidance for road users. It is understood that the provision of marker post for the entire road network in the TRACECA states would be rather costive, but it is recommended that marker posts with an appropriate spacing (say 50 to 75 m) along the international, the TRACECA roads are successively installed when road sections are improved/rehabilitated.

- **Safety for Town Passages with high Traffic Volume**

The magistrale, the TRACECA roads inspected often run through towns and villages which is inconvenient for both the road users as well as the inhabitants. For the latter besides environmental inconvenience (exhaust gases, noise) the traffic on the magistrale form a danger for crossing vehicles and pedestrians. Low speed in the town passages resulting in longer travelling time (economic losses) is the inconvenience for drivers together with the potential high danger of an accident.

A by-pass for those towns and villages would be the best solution for the above problems. As in Europe also in the TRACECA states it takes several years up to decades to prepare such a by-pass project - feasibility, financing, land acquisition etc. - and until the implementation. Therefore it is necessary to implement measures for immediate improvement of the traffic safety and if possible for mitigation of the other inconveniences.

In the meetings and seminars held in the recipient it carried out that the local engineers/specialists are familiar with and aware of the required safety improvements but financing is not available possibly because other projects have a higher priority. The following measures were discussed and include also low-cost solutions which can produce considerable improvement:

(i) Where sufficient space can be made available private accesses to the magistrale should be abandoned and collected with a parallel minor road which then enters into the magistrale with a proper junction (= reduction of danger points).

(ii) Provision of safe pedestrian crossings
- subways or bridges (= very expensive)
- traffic lights (= expensive)
- prefabricated islands bolted on the road surface as safety waiting zone after crossing of one lane and before crossing the other (= low cost and quickly implemented)

(iii) Adequate road marking and traffic signs (= minimum requirement)

(iv) Sensibly determined/useful speed limits which will be understood and accepted by drivers:

- when the houses/village is situated on one side of the road only there is hardly any crossing traffic (vehicles and pedestrians) and the village name signboards which require a speed of 50 or 60 km/h should be removed and a speed of 70 or 80 km/h should be allowed by traffic signs (= improvement of traffic flow, reduction of travelling time)

- village name signboards which very often are placed several hundred meters before the first houses appear (leads to disregarding of the 50/60 km/h limit) should be relocated close to the real village entrance, where necessary the approach can be provided with a first speed limit of 70 or 80 km/h (= improvement of traffic flow, reduction of travelling time).

- **Emergency Escape Lanes at extended Descends**

The SNIP does not include such a standard. Due to the nature of the terrain and the necessity local standards were developed in for example Kazakhstan and Kyrgyzstan which are appropriate.

- **Winter Maintenance**

In those TRACECA states where winter conditions are experienced the aim and the requirements of winter maintenance are well known by the engineers/specialists of the institutes and departments in the recipient states. Presently the problem is that a reduced scope of winter maintenance can be carried out only due to budget constraints and equipment at the end of service life. In most cases application of salt or grit is done by throwing the material by shovel from a moving truck.

In meetings and seminars (and during the Study Tour to Europe in November 1996) European methods and technologies were presented and possible development/improvements discussed which can be summarised as

- updating/upgrading of winter maintenance management plans

- introduction of modern/economically working equipment for removal of snow and for application of grit/salt (including the benefit for the environment)

3.2.3 Non Technical Aspects of Road Safety

- **Public Promotion/Information Programmes**

The above sub-chapters present and discuss a number of technical safety measures which are the one part of road and traffic safety. The other part which is assumed to be the more difficult one is the so-called human factor, which includes all participants in the public traffic from vehicle drivers to pedestrians. Technical safety measures may not provide the planned results when the human factor fails. It has been experienced for example when a bad road was rehabilitated and had received a smooth surface, all necessary signalisation and safety measures (road marking, marker posts etc.) the number of accidents increased because drivers tended to overspeed.

Risky behaviour may in many cases result from lack of discipline but also from not understanding or accepting measures and regulations. Therefore public promotion/information programmes are of high importance to provide the necessary background information for understanding and acceptance to increase safety. But also to enhance the understanding of one another like pedestrians and drivers as for example:

- pedestrians must understand that a car with a speed of, say, 50 km/h cannot come to a full stop within 10 metres.
- drivers have to control/keep the allowable maximum speed, if necessary reduce it, to give pedestrians a chance to cross safely the road
- etc.

Before independence of the TRACECA states public promotion/information programmes existed (e. g. on TV, radio) but only a few are left like the education/training of primary school pupils. It is therefore recommended to re-activate or initiate those programmes - on TV and radio, with brochures, advertisement etc. - which in Europe are running since decades and always have to continue.

- **Enforcement of Regulations**

During the seminars in the recipient institutes the decreasing discipline and the increase of violation of traffic regulations was put into discussion as another problem of road safety aspects. Besides the above mentioned public promotion/information programmes for education possibilities to control and discipline road users repeatedly violating regulations were discussed. As an example the system in force in Germany was presented as described below.

- **Point System for Violation of Traffic Regulations (Germany)**

In addition to fines a central register has been installed for supervising repeated violations. Registration is done for all fines above 55 US$. Samples of the point system are shown in the table below.

VIOLATION	POINTS	NOTE
Exceeding of speed limit in towns		
21 - 25 km/h	●	
26 - 30 km/h	●●●	
31 - 40 km/h	●●●	
41 - 50 km/h	●●●●●	i
51 - 60 km/h	●●●●●	i
> 60 km/h	●●●●●●	ii
Driving under the influence of alcohol		
0.8 - 1.1 °/oo	●●●●	
> 1.1 °/oo	●●●●●●●	
Exceeding technical vehicle check > 8 months	●●	
Driving without valid driving licence	●●●●●●	
Driving without valid third party insurance	●●●●●●	
Misuse of number plate	●●●●●●	
Bad signalisation of broken down vehicle	●●	
Worn out tyres (< 1.6 mm)	●●●●	
Disappearance of accident site	●●●●●●●	
Dangerous overtaking	●●	
Disregarding NO OVERTAKING sign	●●●●	
Disregarding STOP sign	●●●	
Disregarding RED traffic light	●●●	
Insufficient space to vehicle in front	●●●●	
Aggressive closing up and use of flashing light	●●●●●●●	
Driving without light in fog or heavy rain	●●●	
Turning or reversing on a motorway	●●●●	
Right-hand side overtaking outside towns	●●●	

NOTES: (i) One month confiscation of driving licence in addition
(ii) Two months confiscation of driving licence in addition

Action is taken by the central register department at a

SUM OF 9 POINTS: A warning letter is issued and advise is given to attend a training course, which attendance results in the deletion/reduction of 4 points.

SUM OF 14 POINTS: The theoretical and in some cases the practical examination test for the driving licence has to be repeated.

SUM OF 18 POINTS: A medical - psychological examination is required. Non-appearance is equal to not being qualified for a driving licence, which will then be confiscated.

- **Violation of Load Regulations (Germany)**

  For vehicles with a gross weight of >7.5 tons the following fines apply when the maximum gross weight or the allowable maximum axle load is exceeded.

EXCESS	> 5 %	FINE	70 US$
	> 10 %		80 US$
	> 15 %		90 US$
	> 20 %		140 US$
	> 25 %		200 US$
	> 30 %		270 US$

In cases with an excess of >30 % unloading might be required.

- **Legislation**

  In the meetings and seminars further questions and problems concerning road/traffic safety were discussed which can only be controlled by appropriate legislation as demonstrated in the above paragraphs with possibilities for enforcement of regulations.

  Two highlighted problems are given below:

  After independence in some of the recipient states it became somehow rather easy to get a driving license. The training is not any more comprehensive enough and many drivers drive vehicles (e. g. trucks) which class they have not acquired with their driving license.

  Another growing problem is the import of right-hand steering vehicles. Since the driver has a considerably reduced sight, overtaking other vehicles becomes dangerous. Also right-hand steering vans and mini buses have the doors for passengers on the left side, the road side respectively resulting in a danger for leaving/entering passengers especially children.

4. CONCLUSION AND RECOMMENDATION

4.1 Bituminous Bound Material

The low standard and the low quality of road construction respectively encountered in most of the eight recipient states is mainly caused by:

- an inadequate pavement design methodology
- use of sub-standard materials
- poor workmanship
- inadequate equipment

A modification/improvement of the pavement design is recommended in order to base the design on empirical data which are results of practical experience. Together with a longer service life of the pavement a more economical construction and maintenance can be expected.

However, an improved design methodology will not automatically improve the quality of the roads. Two of the above reasons for the present low quality of the roads can be summarised as the problem of quality and quality control. In the former Soviet Union the supervision of works was not functioning and although the testing procedures for materials differ only little to European/western test standards sub-standard/low quality materials have been used for construction. Even when good quality materials were available the specified standards were not achieved due to poor workmanship. A quality control/assurance system should be introduced which is essential for the durability of all road components (pavement, earthworks, bridges, etc.) and should include the testing of materials as well as the supervision of construction works. Furthermore training of all levels of staff involved in road construction and road maintenance works is necessary.

On the equipment side the situation deteriorated during the past years mainly due to lack of spare parts (may be funds as well) and associated maintenance. In some states modern European/western equipment was already introduced to improve the situation. Appropriate training in the use of this equipment is recommended. In this context special seminars and training for the new recycling technology is recommended which should range from testing of existing pavement material, pavement design for re-used materials to the operation of equipment.

4.2 Road Design and Road Safety

The road design standard presently used in the TRACECA states, the Soviet Union road standard (SNIP), is as far as reviewed in the course of the Project in most aspects adequate. Under consideration of economical and safety aspects some modifications are recommended which should be introduced in the current standard or in the national standards under preparation:

- deletion of the design speed of 150 km/h and its related design parameters
- introduction of a road cross section with three lanes (2+1 alternating) for a traffic volume of 14,000 to 27,000 vehicles per day
- improvement of road design standards for junctions and horizontal alignment
- improvement of signalisation
- improvement of safety in town passages

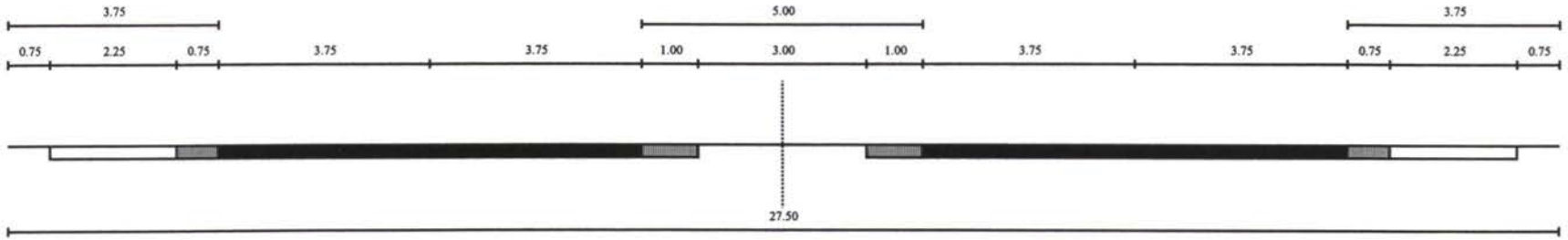
- reactivation/implementation of public promotion/information programmes for road/traffic safety
- amendments/additions of legislation if and where necessary

It should be noted that the three lane (2+1 alternating) cross section was encountered in a section of one of the TRACECA roads, namely in town/village passages of the M 39 in Kyrgyzstan west of Bishkek to Kara Balta and the border with Kazakhstan. This local standard should be reviewed with regard to results and findings described above.

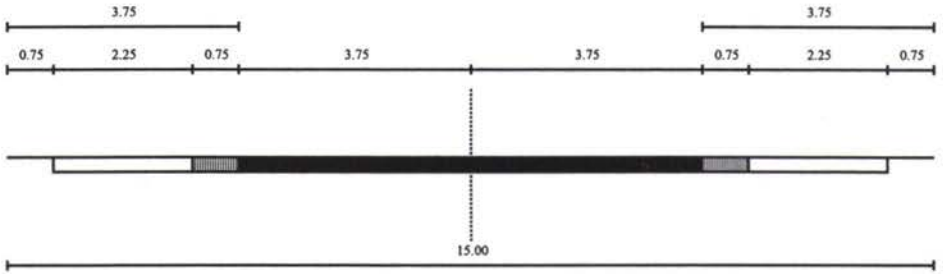
APPENDIX 6.2

ROAD GEOMETRY STANDARDS

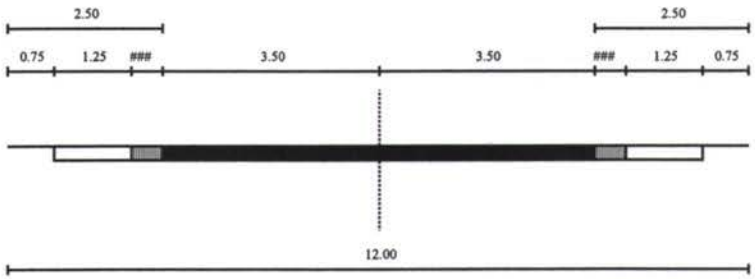
ROAD CATEGORY I - b (SNIP 2.05.02-85)



ROAD CATEGORY II (SNIP 2.05.02-85)



ROAD CATEGORY III (SNIP 2.05.02-85)



APPENDIX 6.3

GEOTECHNICAL REPORT

TABLE OF CONTENTS

Abbreviations:

CBR:	California bearing ratio
DIN:	German Standards - Deutsche Industrie Normen
DD:	Dry density
D.H.	Dam height
DPL:	Dynamic penetrometer - light
LL:	Liquid limit
MC:	Moisture content
MDD:	Maximum dry density
OMC:	Optimum moisture content
PI:	Plasticity index
PL:	Plastic limit

GEOTECHNICAL REPORT

1. Geotechnical & Materials Investigation

1.1 Introduction

This chapter presents the summary of soil and asphalt laboratory test results which have been carried out in the laboratories of "AZERAVTOYOL" in Baku and of "TURKMENAVTOYOLLARY" in Ashgabat. The obtained geological, geotechnical and construction materials data which are provided by the Client "AZERAVTOYOL" and collected by the Consultant during site visits and site investigations, have been studied and analysed and are the basis of this report.

1.2 Scope of work

- Collecting information and available geological maps covering the general project area
- Studying and reviewing the material reports which were provided to the Consultant by the Client "AZERAVTOYOL"
- On the job-training of laboratory assistants on site
- Carrying out additional geotechnical investigations
- Carrying out soil and asphalt laboratory tests
- Digging of trial pits to determine the pavement structure
- Developing conclusions and recommendations, based on the obtained field and laboratory findings

1.3 Purpose of investigations and soil testing

The purpose of the site investigations and the geological, geotechnical and materials study is to provide the design team with all the necessary and required data.

While site investigations, the field operations, includes studies of the geology and history of the site as well as subsurface explorations, the study of the existing road construction and in-situ testing, laboratory testing permits a greater degree of accuracy of measurements than does field testing.

The parameters determined from site investigations and laboratory tests, taken together with descriptive data relating to the soil are required from the design team to determine the future structure of the road.

2. Geological Overview

2.1 Section **Alyat - Gazi Mammad** has been described already in ARAB CONSULT'S final report.

The project road lies on a type of sediments which belongs to the same family of alluvial deposits, although there are some varieties within the constituents, especially in size.

These deposits consist mainly of modern alluvial composed of loam materials (colluvials deposits may also exist side by side with wadi deposits at some locations). Also offshore deposits of Caspian Sea were observed at the beginning of the Project.

2.2 General description of geological structure **Gazi Mammad - Kyurdamir** section: This road section crosses Kura-Araks region and Shirvan alluvial-prolluvial foothill depressions.

The area consists of upper-pliocen-quaternary and quaternary alluvial - proluvial deposits, with a thickness about 10 - 100m. These deposits are comprising gravel - pebbles, and clayish silts with gravel and pebbles. In the lower parts of foothill depressions these deposits are consisting of clays, clayish silts, silty fines sands with gravel and gravel-pebbles. Close to Kura riverbed the deposits are made of clays, clayish silts and silty fine sands. .Alluvial deposits of riverbeds are consisting of fragmented sandy gravelly materials. The genesis of these deposits is alluvial-proluvial.

Depth of ground water in this area is about 1 - 160m. In some places composition of ground water includes sulphates, which is aggressive to concrete

The seismic activity in the region is up to 7 - 8 degrees on the intensity scale.

2.3 General description of geological structure Kyurdamir - Georgian border

Kura Araks area consist of clayish - sandy deposits of Neogen and quaternary period. Neogen deposits comprises hard sandy clays with layers of sand and clayish silts and sands with limestones. The thickness is about 32 -500m.

Lower quaternal deposits are made of clays, clayish silts and sands with a thickness about 120m up to 170m. Upper quaternal deposits are consisting of gravel - pebbles and coarse sands from alluvial, proluvial, deluvial and eolian periods. Riverbeds consist of clayish silts, sandy silts, clays, gravel - pebbles. Thickness is about 25m. Depth of ground water is about 5 - 10m, and close to channels only 1m. Composition consist of chlorid - sulphate - natrium and is aggressive to concrete. Seismic activity of the area is about 7 degrees according to intensity scale.

3. <u>Training of laboratory assistants</u>

Equipment required for field investigations was imported from Germany and handed over to "AZERAVTOYOL". The Client's laboratory staff has been thoroughly introduced to the use of these devices during several days.

The photos below show laboratory assistants while carrying out drop penetration testings and drill soundings.

Drop Penetration Test

Drill sounding, analyse of extracted soil sample

4. Geotechnical and materials investigations

Between the 01.05. and the 31.05.97 an investigation programme was carried out on site, to collect data on the pavement, the pavement foundation and the stability of existing earthstructure consisting of:

⇒ 56 Nrs. of drop penetration tests up to 5 m depth, to determine the compactness and the consistency of the soil
- 3 Nrs. - section **Alyat - Gazi Mammad** (for geotechnical information only)
- 12 Nrs. - section **Gazi Mammad - Kyurdamir**
- 41 Nrs. - section **Kyurdamir - Georgian border**

⇒ 56 Nrs. of drill-soundings up to 5 m depth, to determine the type of soil and the moisture content in different layers
- 3 Nrs. - section **Alyat - Gazi Mammad** (for geotechnical information only)
- 12 Nrs. - section **Gazi Mammad - Kyurdamir**
- 41 Nrs. - section **Kyurdamir - Georgian border**

(The DPL diagrams and soil sections are presented in Appendix 2)

⇒ 10 Nrs. of trial pits to determine the type of soil and the structure of existing embankment, to take samples for laboratory testing and to get information about the pavement structure
- 1 Nr. - section **Alyat - Gazi Mammad**
- 3 Nrs. - section **Gazi Mammad - Kyurdamir**
- 6 Nrs. - section **Kyurdamir - Georgian border**

(The trial pit diagrams are shown in Appendix 3)

⇒ 30 Nrs. of trial pits to determine the structure of pavement
- 8 Nrs. - section **Gazi Mammad - Kyurdamir**
- 22 Nrs. - section **Kyurdamir - Georgian border**

(Details of pavement structures are given in Appendix 4)

⇒ 4 Nrs. of asphalt mixture tests, to determine the bitumen content and the composition of the existing asphalt.
(Test results are summarised in Appendix 5)

The dynamic cone penetrometer (DCP) was used for a rapid survey of the existing layer. The penetrometer described in the German Standard DIN 4094.

5. Laboratory test programme

The samples taken from the trial pits were brought to the Client's laboratory in Baku and tested as follows:

⇒ 156 Nrs. of moisture contents, oven dried
(Results are shown in Appendix 6)

⇒ 18 Nrs. of sieve analysis, according to SIS (Soviet Industrial Standards) and DIN 18 123 (for comparison), to determine the relative proportions of each size range
⇒ 2 Nrs. - section **Alyat - Gazi Mammad**
6 Nrs. - section **Gazi Mammad - Kyurdamir**
10 Nrs. - section **Kyurdamir - Georgian border**

⇒ 5 Nrs. of liquid limits according to SIS and DIN (for comparison), to determine the moisture content at which soil passes from the plastic to the liquid state

⇒ 5 Nrs. of plastic limits (PL) according to SIS and DIN (for comparison), to determine the moisture content at which a soil passes from the plastic state to the solid state

⇒ 15 Nrs. of sulphate content tests according to SIS, to determine the content of total sulphates in soil
5 Nrs. - section **Gazi Mammad - Kyurdamir**
10 Nrs. - section **Kyurdamir - Georgian border**

Since no CBR - test equipment was available in Baku, 200 kg of soil have been brought by plane to Ashgabat/Turkmenistan to the laboratory of "TURKMENAVTOYOLLARI".
The following tests have been carried out there:

⇒ 17 Nrs. of compaction tests according to DIN 18127 to determine:
a) the moisture content (OMC) of the soil at which a specified amount of compaction will produce the maximum dry density
b) the maximum dry density (MDD) obtained using a specified amount of compaction at the optimum moisture content
2 Nrs. - section **Alyat - Gazi Mammad**
6 Nrs. - section **Gazi Mammad - Kyurdamir**
9 Nrs. - section **Kyurdamir - Georgian border**

⇒ 18 Nrs. of unsoaked and
⇒ 18 Nrs. of soaked California Bearing Ratio Tests - CBR, to determine the ratio of the force required to penetrate a piston into compacted soil in a special mould, compared to that required for simular penetration into a standard sample of compacted crushed rock (100% CBR)
4 Nrs. - section **Alyat - Gazi Mammad**
12 Nrs. - section **Gazi Mammad - Kyurdamir**
20 Nrs. - section **Kyurdamir - Georgian border**

(Laboratory test results are summarised in Appendix 7)

6. Typical surface distresses

Ruttings-Deformations, unevenness in the transverse profile, are caused by plastic deformations, either because of

- compaction under traffic with volumetric decrease or displacement of material without volumetric decrease or
- wrong choice of material and/or
- wrong composition of material and/or
- insufficient compaction

Water splashes (rare), unevenness' in the longitudinal profile, are caused in bituminous layers by deformations due to horizontal stress-applications.

Cracks, are caused either by

- unsuitable material or under dimensioned gravel layers below the asphalt or
- because of deformations due to under dimensioned pavement structure or
- because of wrong choice of bitumen or
- because of material fatigue

Pot-holes are resulting from

- wrong granulometric graduation
- wrong and/or overdosage of bitumen

Due to the suction effect of the tires, first bitumen and subsequently the aggregates are pulled out of the road surface

Loss of surface roughness or polishing effect due to subside of surface grains in the bituminous mortar as a result of

- wrong choice of bitumen
- over dosage of bitumen

7. Materials in the existing road

7.1 Fill-material

Obviously the embankments were constructed with the in - situ soil next to the road.

The material found in the embankment consists mainly of clayish, fine sandy silts of low and moderate plasticity and is partly not suitable as subgrade. The plasticity index varies from 12.7 to 23.0 %. In particular it's loosing bearing capacity under the influence of water.

The CBR-results are as follows:

	unsoaked %	soaked %
Alyat - Gazi Mammad	7.2	4.1
Gazi Mammad - Kyurdamir	1.3 - 8.3	1.0 - 2.6
Kyurdamir - Georgian border	11.3 - 19.6	0.0 - 5.3

In-situ moisture contents measured in the earth embankment ranges between 10.61 and 26.90% in the upper layers and between 13.9 and 30.2 % in layers below 1 m. This would indicate that the in-situ moisture content conditions are sometimes below or around the optimum, but very often above. First tests resulted in OMC's between 16.3 and 24.1 %. General moisture content conditions, i.e. drainage problems and the influence of ground water in the embankment have to be investigated in greater detail.

Because of the low bearing capacity and the sensitivity to the influence of water it is recommended to replace or reinforce this material particularly in reconstruction sections where the elevation of the road is close to the existing ground surface, by selected fill-material of minimum CBR of 15 % for a minimum thickness of 0.4 m.

Due to traffic and time the consolidation of the embankments can be assumed to be completed. The performed DPL tests result in high to medium resistance 10 - 40 blows/10 cm = firm to semi stiff consistency often higher, rarely 3 - 10 blows/10 cm = soft. Soft consistency in the embankment was found in the section Gazi Mammad - Kyurdamir between ch. 80+100 - 115+000 and in the section Kyurdamir - Georgian border at ch. 170+000 and from ch. 426+713 up to 473+215.

Below the embankment soft consistency has been discovered in the section Gazi Mammad - Kyurdamir from ch. 49+800 - ch. 57+400 and from ch. 108+000 - 118+000, in the section Kyurdamir - Georgian border from ch. 128+000 - 159+000, and around ch. 230+500, 395+215 and 442+215.

7.2 Road base material/sub-base

The layer under the asphalt does not correspond with the technical specifications for sub-base or road base. Neither the particle size distributions nor the CBR results fulfil the requirements. Moreover, due to the high fines content the gravel is very sensitive to water and cannot be evaluated as separating or filter layer. Partly this layer is composed of a varying blend of rounded to flat gravel and cobbles in a clayey matrix of moderate plasticity. No crushed material has been found.

This material can be partly classified as ordinary sub-base, partly as fill-material only. Since the thickness of this layer in some sections is not as designed a levelling and reinforcing layer has to be previewed in reconstruction sections.

The CBR - results are as follows:

	unsoaked %	soaked %	
Alyat - Gazi Mammad	12.8	1.9	(low fill quality)
Gazi Mammad - Kyurdamir	1.3 - 19.5	1.0 - 4.0	(low fill quality)
Kyurdamir - Georgian border			
chainage 124 - chainage 391+215	14.5 - 47.1	2.6 - 33.6	(good fill quality, low subbase quality)
chainage 448+215	108	102	(road base quality)

Since neither an internal nor an external drainage was found the layers below the asphalt are confined between impermeable fill and shoulder material. The evacuation of penetrated water is not possible. During sampling works on site, water has been noticed under the asphalt after rainfall in the section **Gazi Mammad - Kyurdamir**.

Due to the unsealed shoulders and the cracked asphalt, both sections are pervious, saturation of the "sub-base" is likely and may have been one of the causes for surface distresses. According to the CBR-results this silty gravel is loosing, like the fill-material, bearing capacity under influence of water. Further laboratory tests have shown that the stability of this material is degrading rapidly when the optimum moisture content has been exceeded. For that reason the composition of the new overlay has to be dense to prevent water to penetrate into the road structure.

7.3 Bituminous material

The composition of the existing pavement differs strongly. Mostly the pavement consists of two bituminous layers placed on a natural untreated granular/sand/clay base of low bearing capacity. The upper layer, the wearing course, is a more or less well graded bituminous mixture, while the layer below, the binder course, has a less dense aggregate structure and the bitumen content is less as well. Mostly this layer is only a bitumen stabilised gravel. The total thickness of the bituminous layer is varying between 4 - 20 cm.

In large parts of the road surface, the bleeding of bitumen and polished aggregates is conspicuous. The bitumen content is partly much too high, between 6.41 and 13.48 %, the bitumen is too soft and the aggregates are not well graded. Segregation, deformations and ruttings, as well as other surface damages are the consequences.

Obviously the gravel itself is too week and will not fulfil the abrasion requirements.

8. Conclusions and recommendations

Intensive site investigation and laboratory testing works shall be carried out to identify homogenous sections of the road and to verify if the results of the present first test series are representative for the whole road.

Alyat - Kyurdamir
Kyurdamir - km 407+215
According to the already obtained test results and to several visual inspections, the bearing capacity of the upper layers of the road structure is already insufficient for the present traffic load. Traffic study identifies for the planning horizon of 15 years distinct increase of traffic load. Measures have to be taken to strengthen the pavement including the road base and the sub-base, to assure the load sharing between the different layers and to avoid further surface distresses. A simple asphalt overlay is not recommended.

The existing base course material (gravel/sand/silt mixture) could be used as subbase, provided that a CBR value of min. 30 % is reached and the designed thickness has been obtained. But due to high fines-content this material is very sensitive to water and cannot be evaluated as separating or filter layer. Should the material fail to reach 30 % soaked CBR, substitution of material is necessary.

In this case tests should be carried out to investigate if the existing bituminous mixes, specially the bitumen stabilised gravel, can be re-used to reinforce the subbase after milling, sieving and the addition of missing gradations.

Km 407+215
At chainage 448+215 CBR - value of the gravel layer below the asphalt reaches 102.4%, i.e. that the bearing capacity of the material itself is sufficient, but since the thickness of this layer is varying from 10 to 55 cm a levelling and reinforcing layer has to be partly included in the planning.

In those sections, where the required thickness has not been reached, additional load bearing tests should be carried out to determine the in-situ bearing capacity. Based on these results it can be decided whether a reinforcement of this layer is necessary.

If the CBR- result is representative for the whole section and where the required thickness is achieved, it will be sufficient to reinforce the existing pavement by an appropriate overlay, after repair works.

9. Materials for further Construction Works

9.1 **Fill material** for embankment will not be necessary, but if needed will be provided from borrow-sources adjacent to the road. Almost all types of soils can be used, only soils with high sulphate content should be avoided.

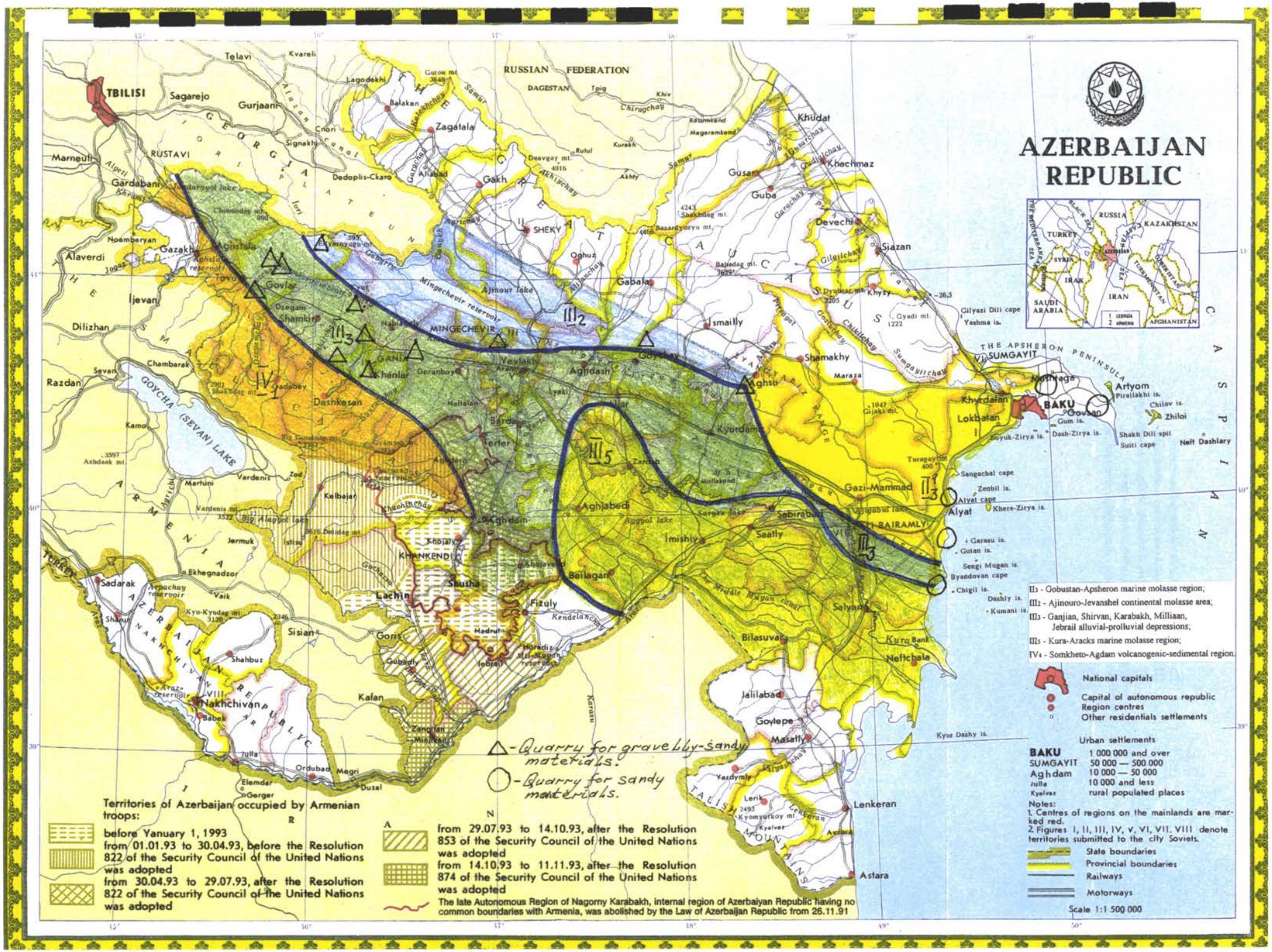
9.2 **Sub-base material** secondary load spreading layer underlaying the road-base, consists normally of a lower quality than that used in the roadbase, such as unprocessed natural gravel. The greater part of natural occurring materials has to be processed before placing i. e. sieved over 35 mm and screened. but since recycled asphalt will be used to reinforce the existing gravel layer, natural sub-base deposits are only important for shoulder construction works.

9.3 The use of **crushed stone roadbase or mechanically stable natural gravel** is not planned.

Quarries which might be taken into consideration for exploitation for pavement construction works are drawn in the geological map, Appendix G.

APPENDIX 1

GEOLOGICAL MAP


AZERBAIJAN REPUBLIC
RUSSIAN FEDERATION
DAGESTAN
GEORGIA
ARMENIA
TURKEY
TBILISI
BAKU
SUMGAYIT
THE APSHERON PENINSULA
MINGECHEVIR
GANJA
KHANKENDI
SHEKY
Mingechevir reservoir
GOYCHA (SEVAN) LAKE
NAKHCHIVAN AUTONOMOUS REPUBLIC
THE GREATER CAUCASUS
TALISH MOUNTAINS
CASPIAN SEA
III2 - Gobustan-Apsheron marine molasse region;
III2 - Ajinouro-Jevanshel continental molasse area;
III3 - Ganjian, Shirvan, Karabakh, Milliaan, Jebrail alluvial-proluvial depressions;
III5 - Kura-Aracks marine molasse region;
IV1 - Somkheto-Agdam volcanogenic-sedimental region.
△ - Quarry for gravelly-sandy materials.
○ - Quarry for sandy materials.
Territories of Azerbaijan occupied by Armenian troops:
before Yanuary 1, 1993
from 01.01.93 to 30.04.93, before the Resolution 822 of the Security Council of the United Nations was adopted
from 30.04.93 to 29.07.93, after the Resolution 822 of the Security Council of the United Nations was adopted
from 29.07.93 to 14.10.93, after the Resolution 853 of the Security Council of the United Nations was adopted
from 14.10.93 to 11.11.93, after the Resolution 874 of the Security Council of the United Nations was adopted
The late Autonomous Region of Nagorny Karabakh, internal region of Azerbaiyan Republic having no common boundaries with Armenia, was abolished by the Law of Azerbaijan Republic from 26.11.91
National capitals
Capital of autonomous republic
Region centres
Other residentials settlements
Urban settlements
BAKU 1 000 000 and over
SUMGAYIT 50 000 — 500 000
Aghdam 10 000 — 50 000
Julfa 10 000 and less
Kyalvaz rural populated places
Notes:
1. Centres of regions on the mainlands are marked red.
2. Figures I, II, III, IV, V, VI, VII, VIII denote territories submitted to the city Soviets.
State boundaries
Provincial boundaries
Railways
Motorways
Scale 1:1 500 000

KOCKS
INGENIEURE

APPENDIX 2

DPL DIAGRAMS AND SOIL SECTIONS

DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 1**

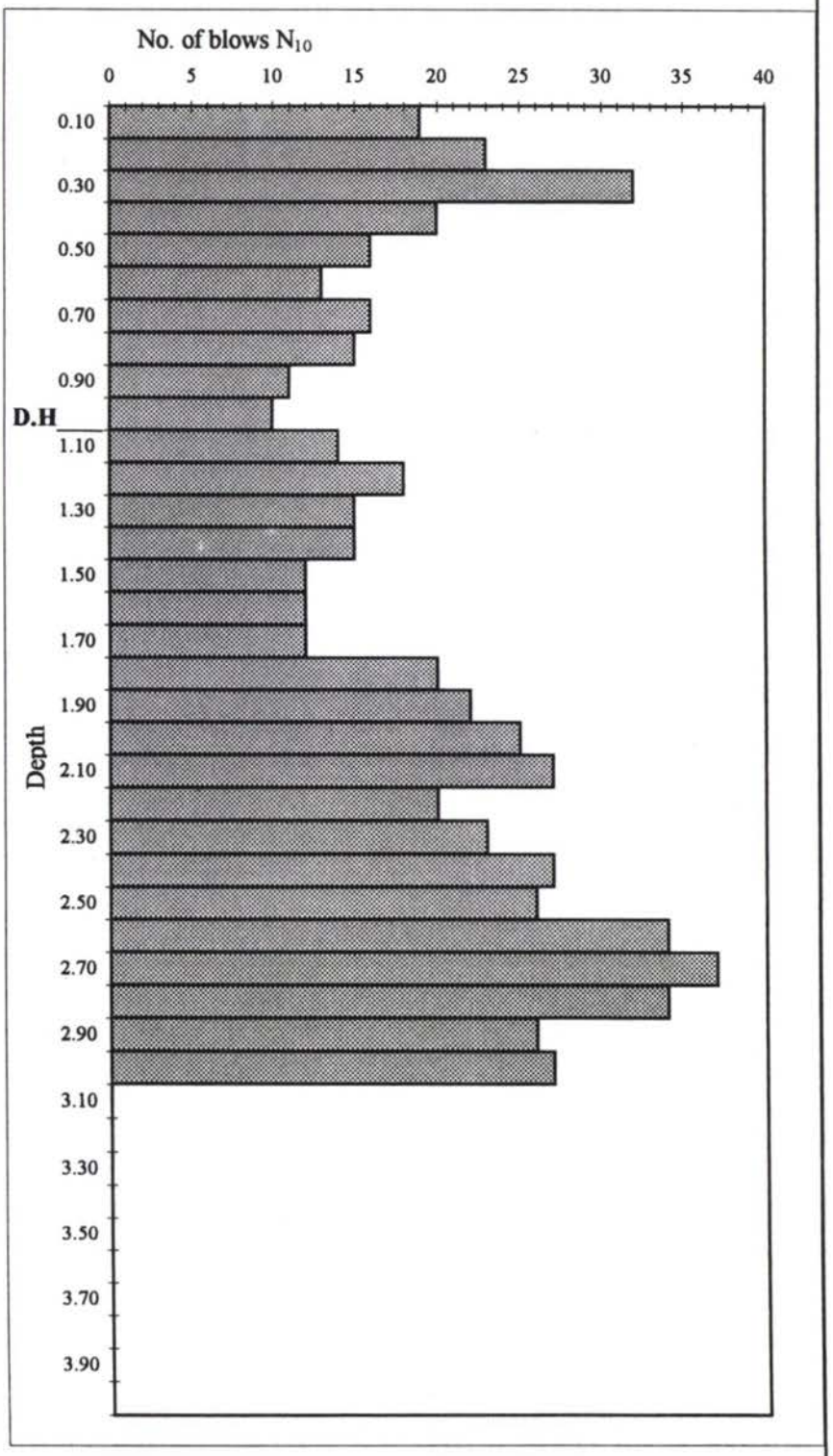
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 001+500 / R

Date / Дата : 03. 04. 1997

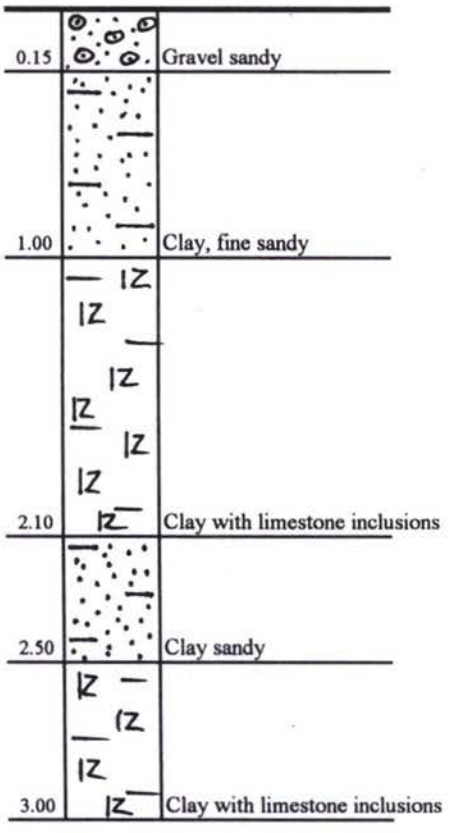
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	19
0.20	23
0.30	32
0.40	20
0.50	16
0.60	13
0.70	16
0.80	15
0.90	11
1.00	10
1.10	14
1.20	18
1.30	15
1.40	15
1.50	12
1.60	12
1.70	12
1.80	20
1.90	22
2.00	25
2.10	27
2.20	20
2.30	23
2.40	27
2.50	26
2.60	34
2.70	37
2.80	34
2.90	26
3.00	27
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION **No. 1**

Location/Место: km 001+500 / R
Data/Дата: 03.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 2**

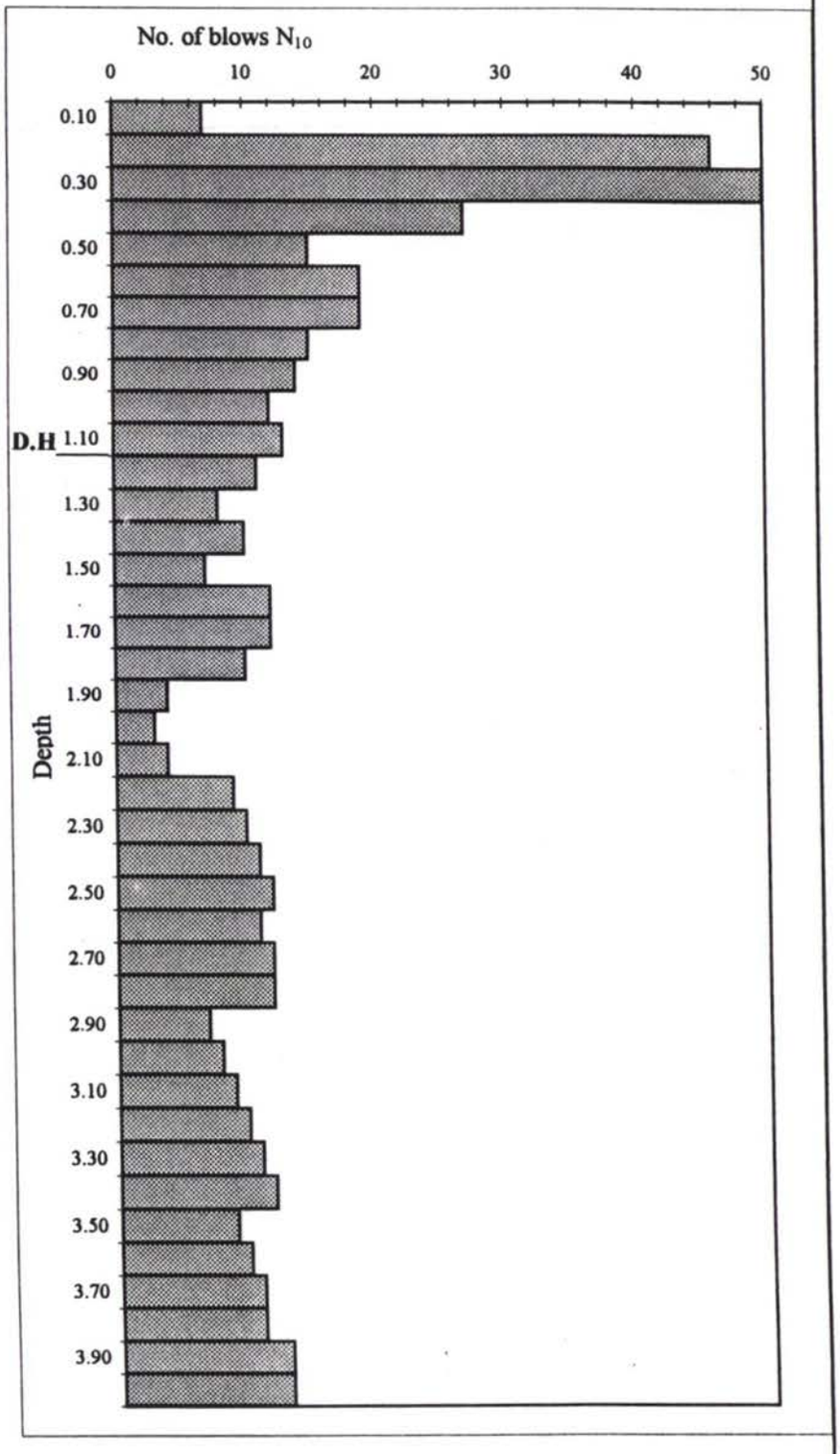
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 018+800 / L

Date / Дата : 03. 04. 1997

Level / Уровень : Shoulder surface

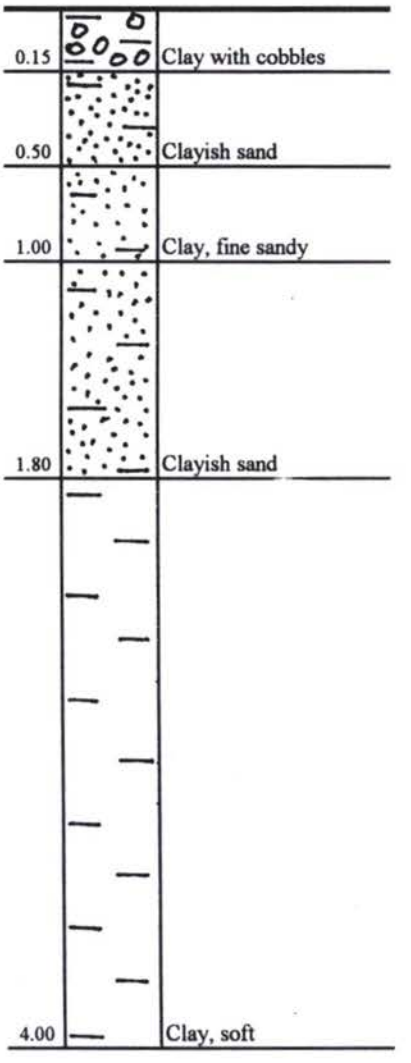
Depth	No. of blows
Глубина	Число вдуваний
[m]	N_{10}
0.10	7
0.20	46
0.30	50
0.40	27
0.50	15
0.60	19
0.70	19
0.80	15
0.90	14
1.00	12
1.10	13
1.20	11
1.30	8
1.40	10
1.50	7
1.60	12
1.70	12
1.80	10
1.90	4
2.00	3
2.10	4
2.20	9
2.30	10
2.40	11
2.50	12
2.60	11
2.70	12
2.80	12
2.90	7
3.00	8
3.10	9
3.20	10
3.30	11
3.40	12
3.50	9
3.60	10
3.70	11
3.80	11
3.90	13
4.00	13



SOIL SECTION

No. 2

Location/Место: km 018+800 / L
Data/Дата: 03.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 3**

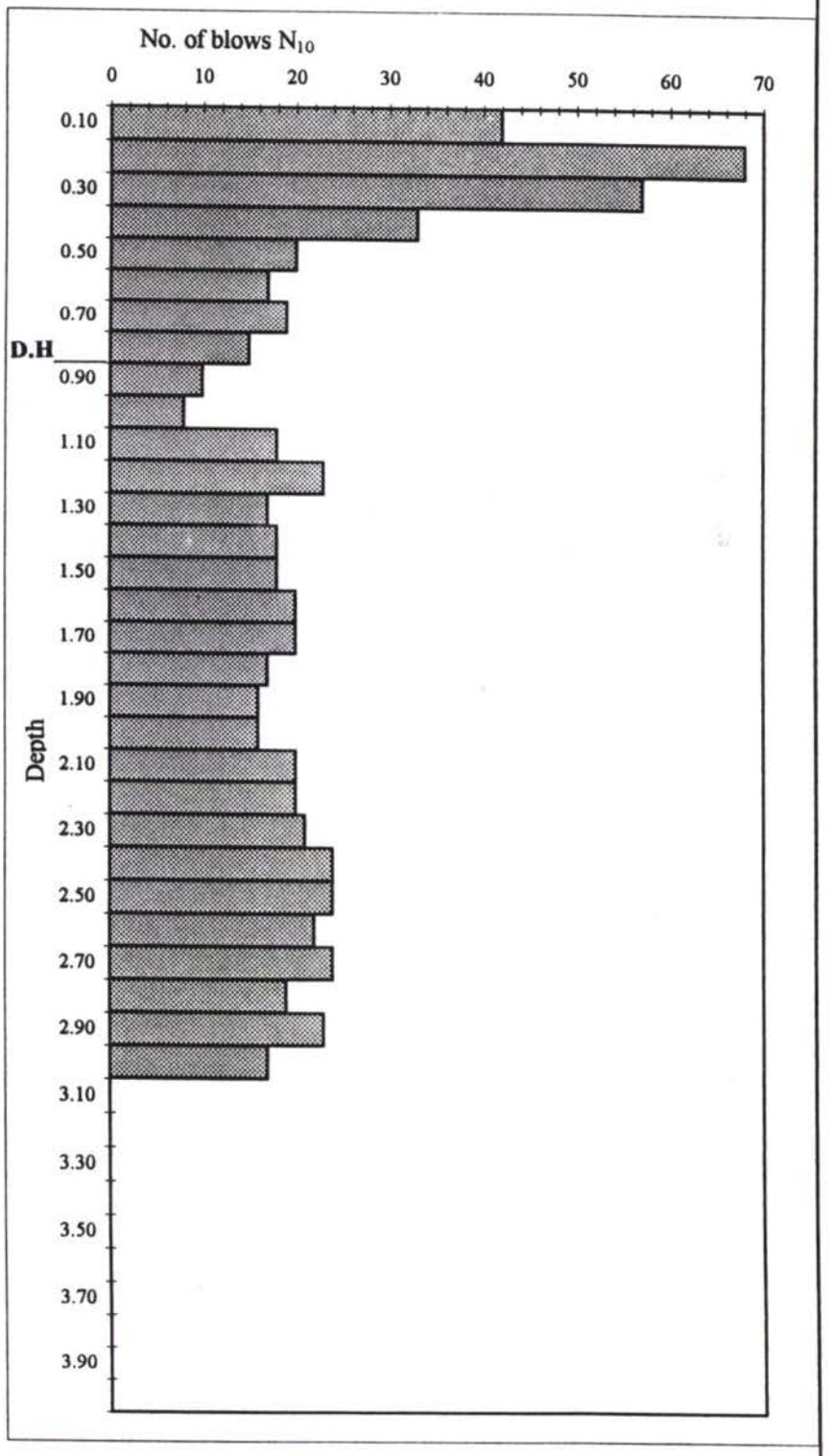
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 031+500 / L

Date / Дата : 03. 04. 1997

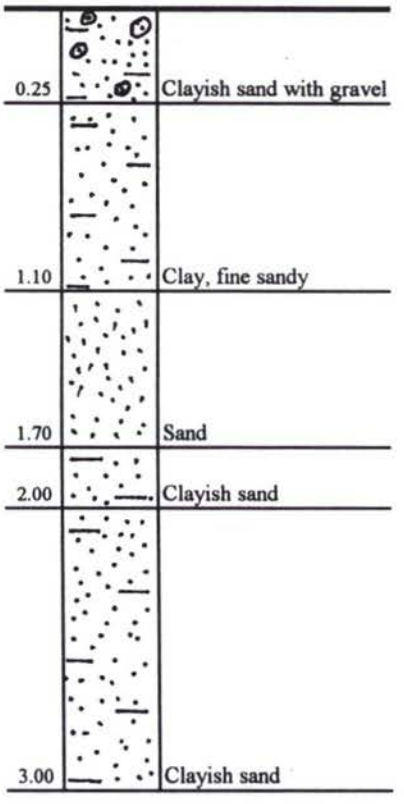
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	42
0.20	68
0.30	57
0.40	33
0.50	20
0.60	17
0.70	19
0.80	15
0.90	10
1.00	8
1.10	18
1.20	23
1.30	17
1.40	18
1.50	18
1.60	20
1.70	20
1.80	17
1.90	16
2.00	16
2.10	20
2.20	20
2.30	21
2.40	24
2.50	24
2.60	22
2.70	24
2.80	19
2.90	23
3.00	17
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION **No. 3**

Location/Место: km 031+500/ L
Data/Дата: 03.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 4**

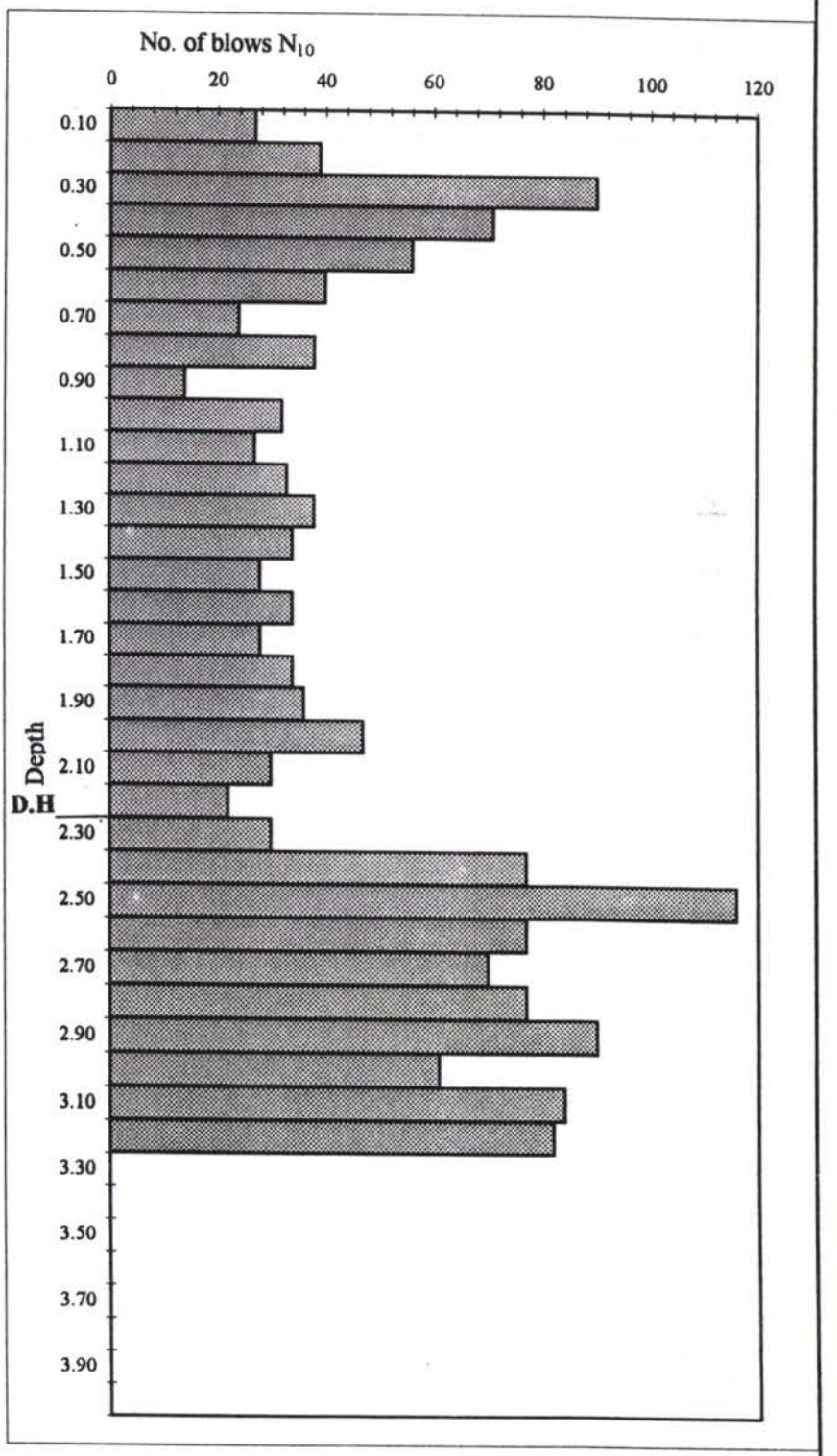
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 044+000 / R

Date / Дата : 04. 04. 1997

Level / Уровень : Shoulder surface

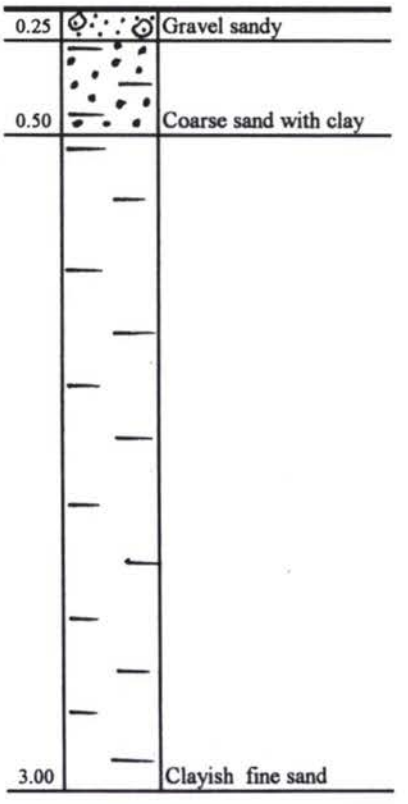
Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	27
0.20	39
0.30	90
0.40	71
0.50	56
0.60	40
0.70	24
0.80	38
0.90	14
1.00	32
1.10	27
1.20	33
1.30	38
1.40	34
1.50	28
1.60	34
1.70	28
1.80	34
1.90	36
2.00	47
2.10	30
2.20	22
2.30	30
2.40	77
2.50	116
2.60	77
2.70	70
2.80	77
2.90	90
3.00	61
3.10	84
3.20	82
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION

No. 4

Location/Место: km 044+000 / R
Data/Дата: 04.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094)

No. 5.1

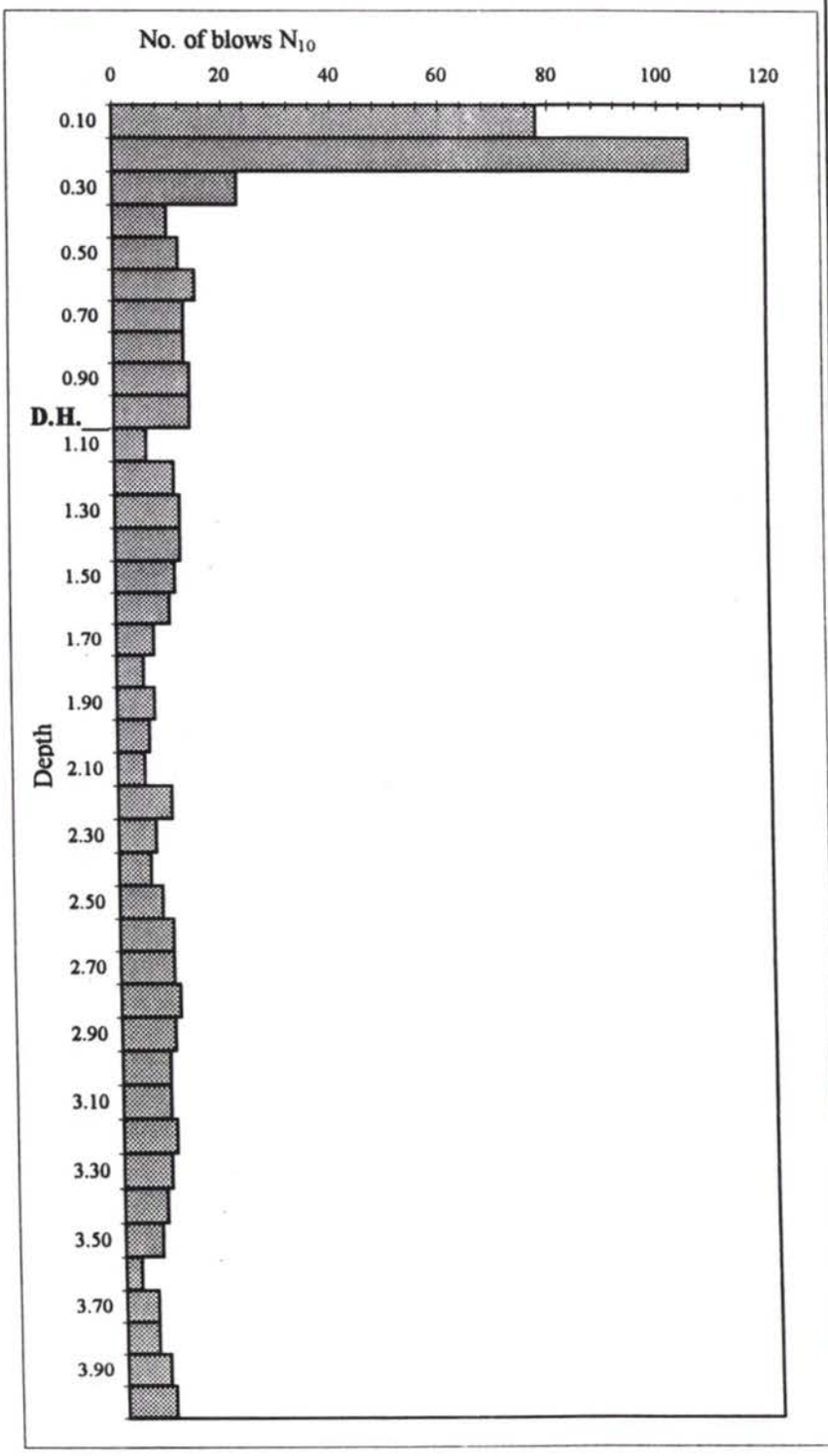
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 049+800 / R

Date / Дата : 04. 04. 1997

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	78
0.20	106
0.30	23
0.40	10
0.50	12
0.60	15
0.70	13
0.80	13
0.90	14
1.00	14
1.10	6
1.20	11
1.30	12
1.40	12
1.50	11
1.60	10
1.70	7
1.80	5
1.90	7
2.00	6
2.10	5
2.20	10
2.30	7
2.40	6
2.50	8
2.60	10
2.70	10
2.80	11
2.90	10
3.00	9
3.10	9
3.20	10
3.30	9
3.40	8
3.50	7
3.60	3
3.70	6
3.80	6
3.90	8
4.00	9



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 5.2**

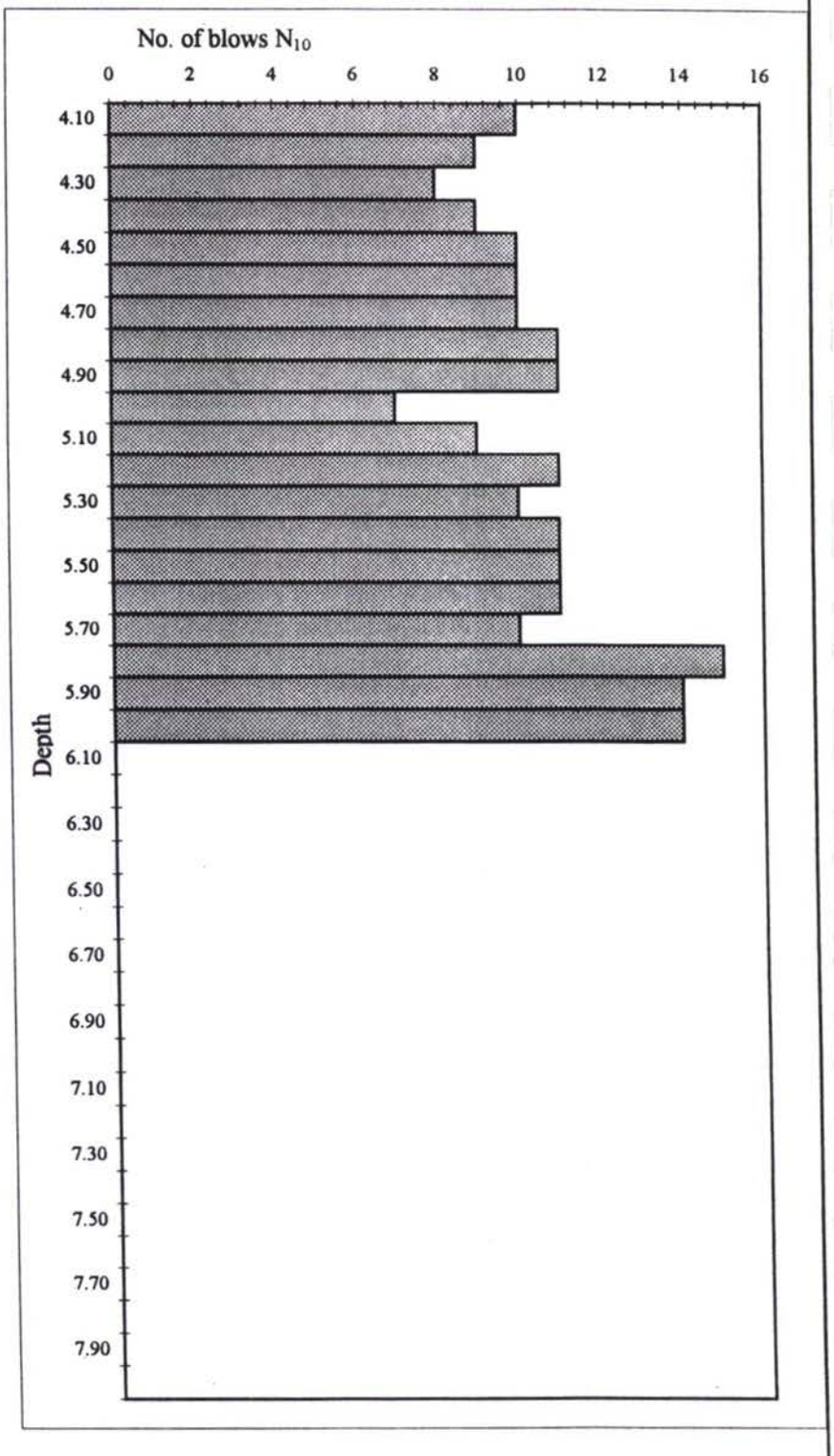
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 049+800 / R

Date / Дата : 04. 04. 1997

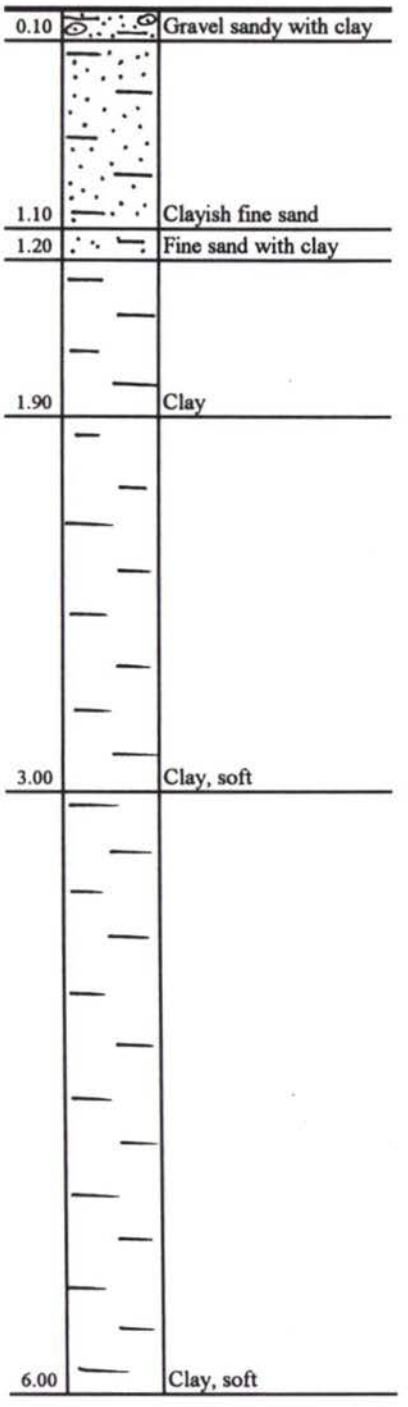
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
4.10	10
4.20	9
4.30	8
4.40	9
4.50	10
4.60	10
4.70	10
4.80	11
4.90	11
5.00	7
5.10	9
5.20	11
5.30	10
5.40	11
5.50	11
5.60	11
5.70	10
5.80	15
5.90	14
6.00	14
6.10	
6.20	
6.30	
6.40	
6.50	
6.60	
6.70	
6.80	
6.90	
7.00	
7.10	
7.20	
7.30	
7.40	
7.50	
7.60	
7.70	
7.80	
7.90	
8.00	



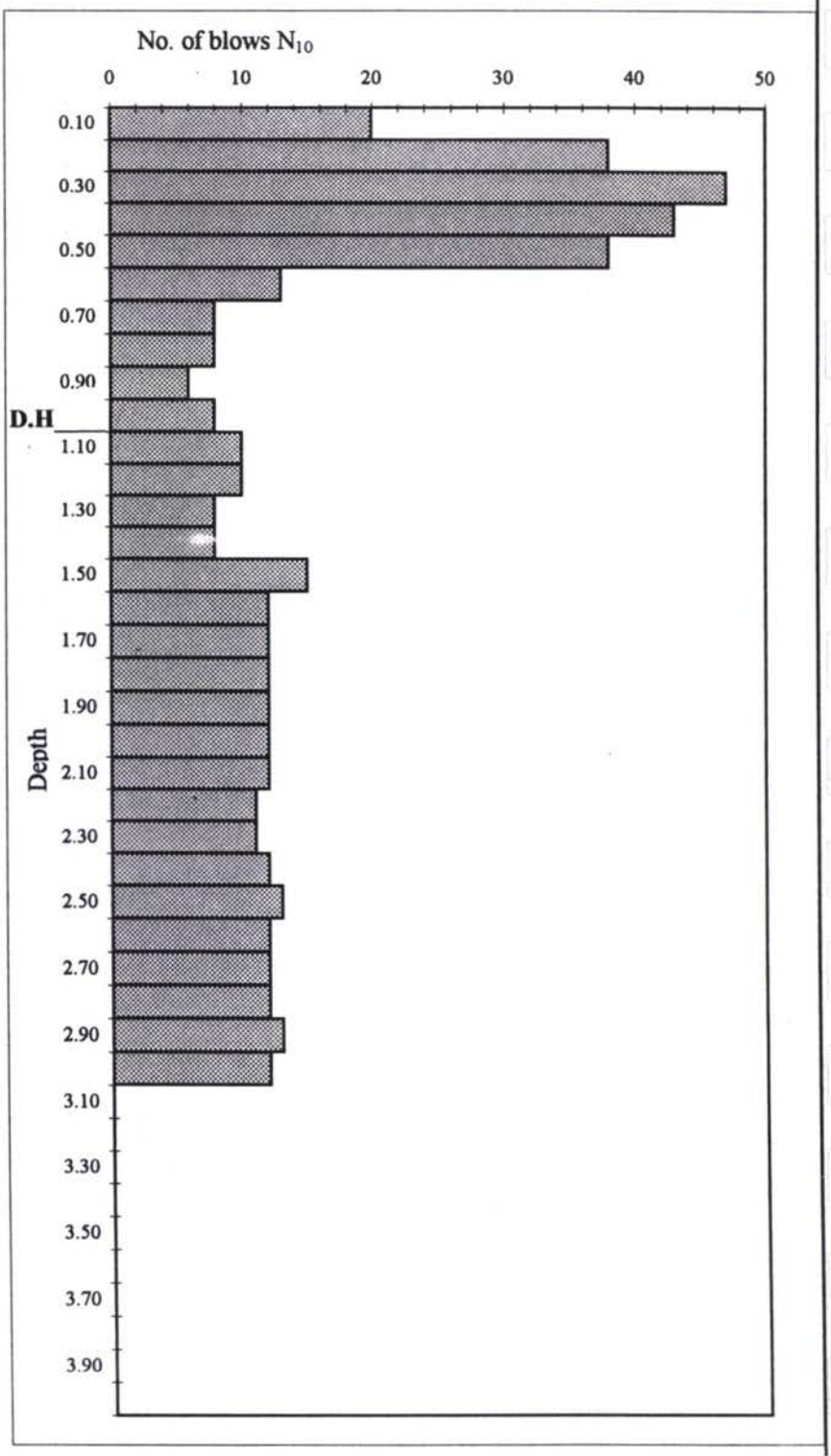
SOIL SECTION **No. 5**

Location/Место: km 049+800/ R
Data/Дата: 04.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 6**
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)
Location /место : km 053+800 / R
Date / Дата : 05. 04. 1997
Level / Уровень : Shoulder surface

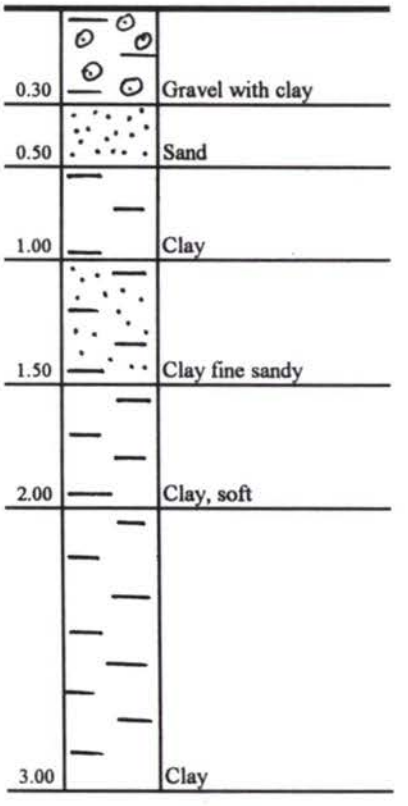
Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	20
0.20	38
0.30	47
0.40	43
0.50	38
0.60	13
0.70	8
0.80	8
0.90	6
1.00	8
1.10	10
1.20	10
1.30	8
1.40	8
1.50	15
1.60	12
1.70	12
1.80	12
1.90	12
2.00	12
2.10	12
2.20	11
2.30	11
2.40	12
2.50	13
2.60	12
2.70	12
2.80	12
2.90	13
3.00	12
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION

No. 6

Location/Место: km 053+800 / R
Data/Дата: 05.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094)

No. 7

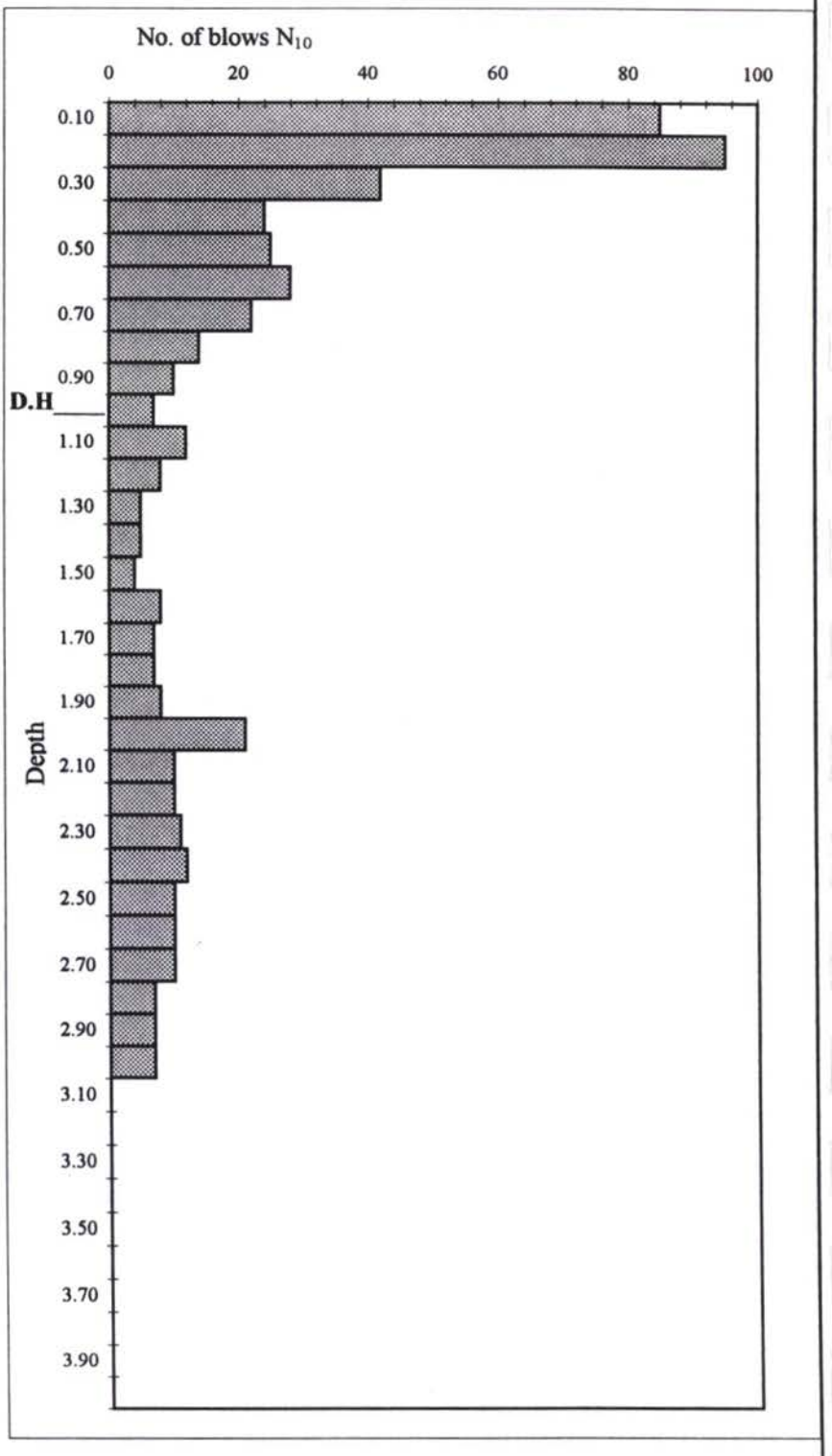
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 057+400 / L

Date / Дата : 05. 04. 1997

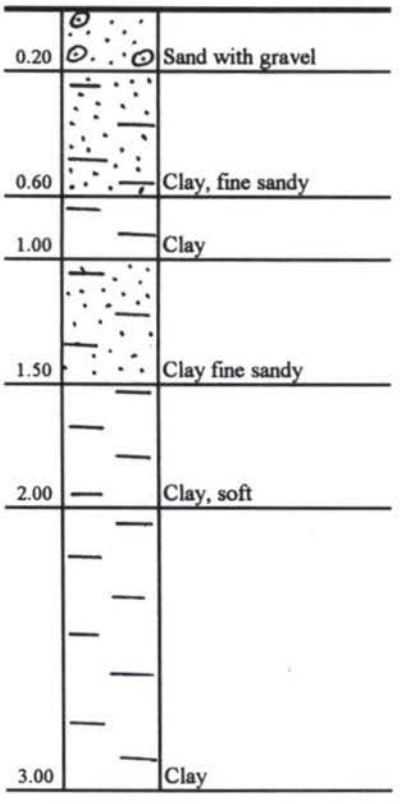
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	85
0.20	95
0.30	42
0.40	24
0.50	25
0.60	28
0.70	22
0.80	14
0.90	10
1.00	7
1.10	12
1.20	8
1.30	5
1.40	5
1.50	4
1.60	8
1.70	7
1.80	7
1.90	8
2.00	21
2.10	10
2.20	10
2.30	11
2.40	12
2.50	10
2.60	10
2.70	10
2.80	7
2.90	7
3.00	7
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION **No. 7**

Location/Место: km 057+400 / L
Data/Дата: 05.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 8**

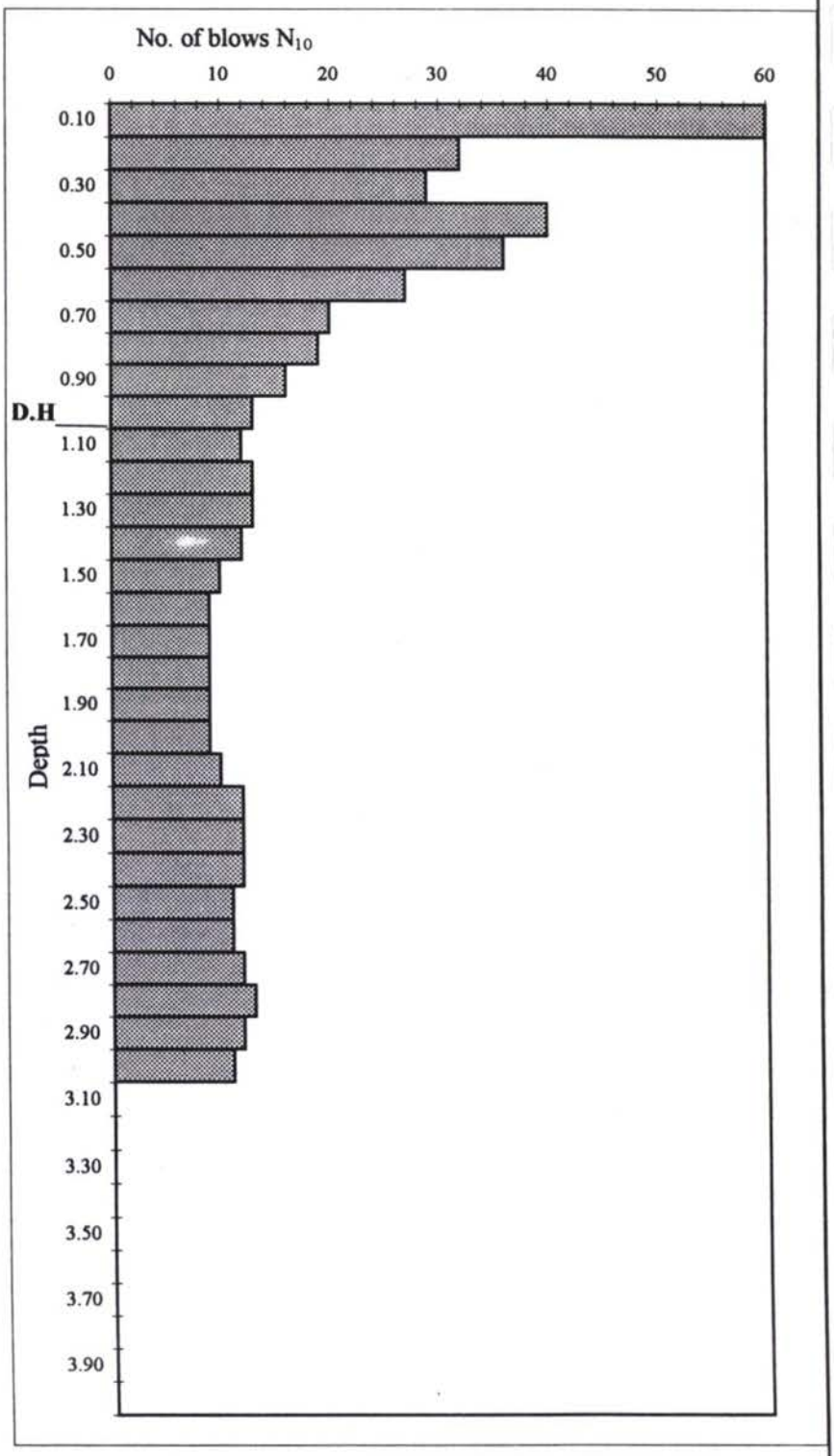
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 063+100 / R

Date / Дата : 05. 04. 1997

Level / Уровень : Shoulder surface

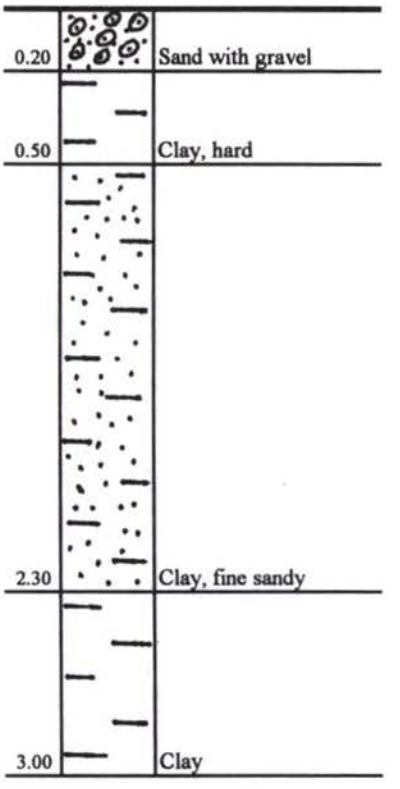
Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	60
0.20	32
0.30	29
0.40	40
0.50	36
0.60	27
0.70	20
0.80	19
0.90	16
1.00	13
1.10	12
1.20	13
1.30	13
1.40	12
1.50	10
1.60	9
1.70	9
1.80	9
1.90	9
2.00	9
2.10	10
2.20	12
2.30	12
2.40	12
2.50	11
2.60	11
2.70	12
2.80	13
2.90	12
3.00	11
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION

No. 8

Location/Место: k 063+100 / R
Data/Дата: 05.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) No. 9

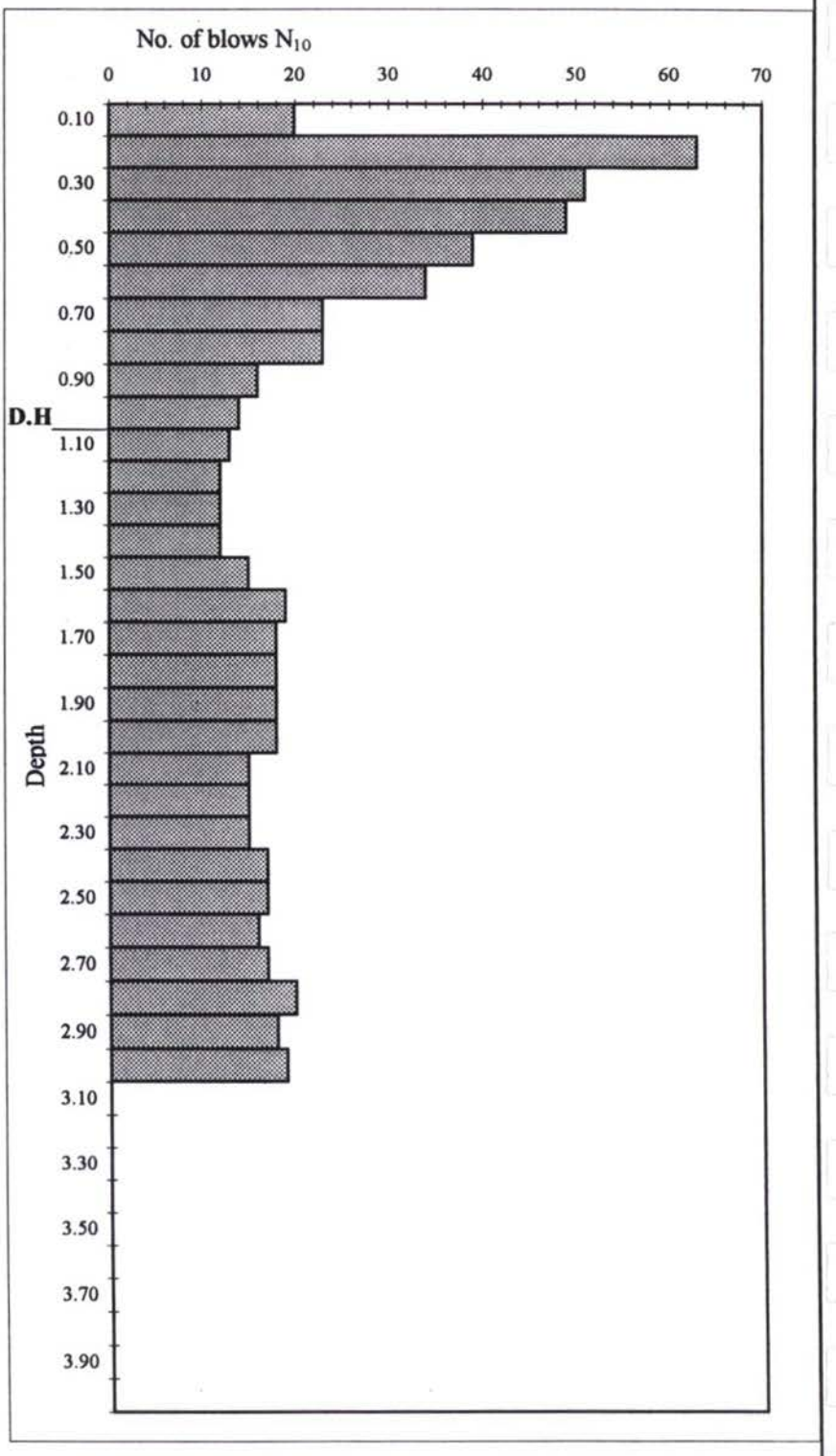
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 075+800 / R

Date / Дата : 06. 04. 1997

Level / Уровень : Shoulder surface

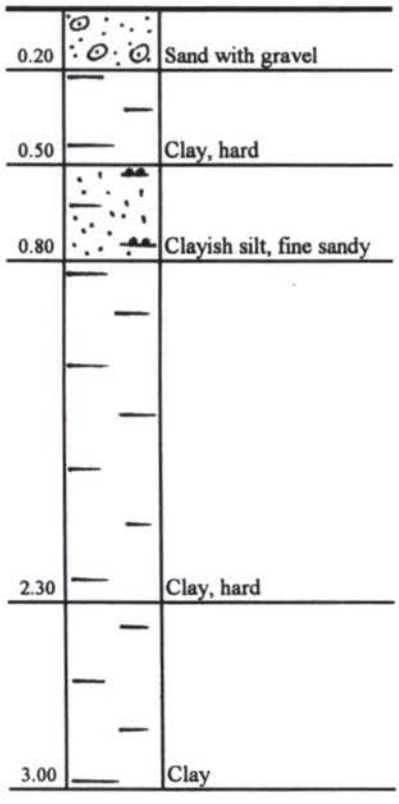
Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	20
0.20	63
0.30	51
0.40	49
0.50	39
0.60	34
0.70	23
0.80	23
0.90	16
1.00	14
1.10	13
1.20	12
1.30	12
1.40	12
1.50	15
1.60	19
1.70	18
1.80	18
1.90	18
2.00	18
2.10	15
2.20	15
2.30	15
2.40	17
2.50	17
2.60	16
2.70	17
2.80	20
2.90	18
3.00	19
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION

No. 9

Location/Место: km 075+800 / R
Data/Дата: 06.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 10**

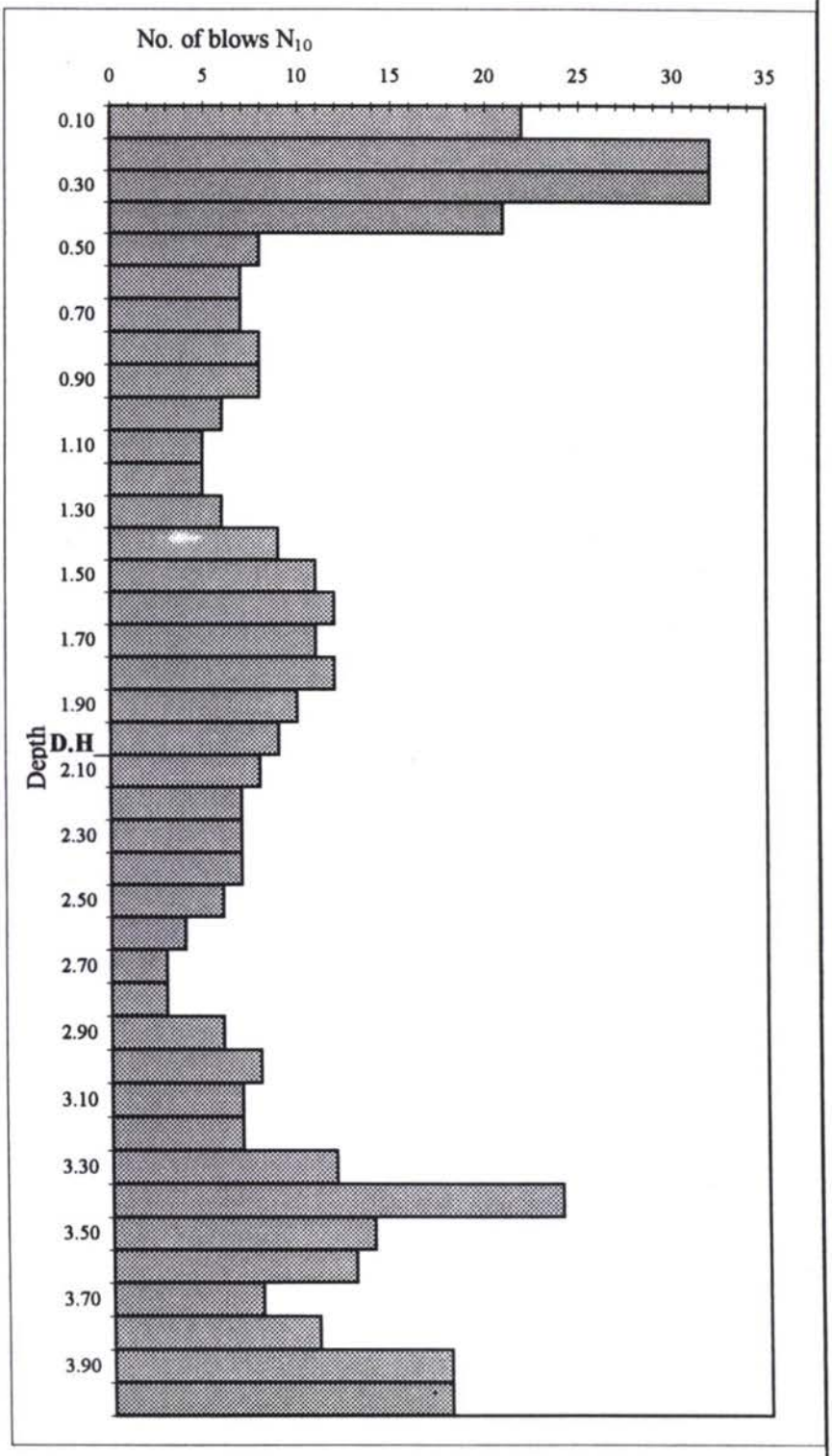
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 080+100 / R

Date / Дата : 06. 04. 1997

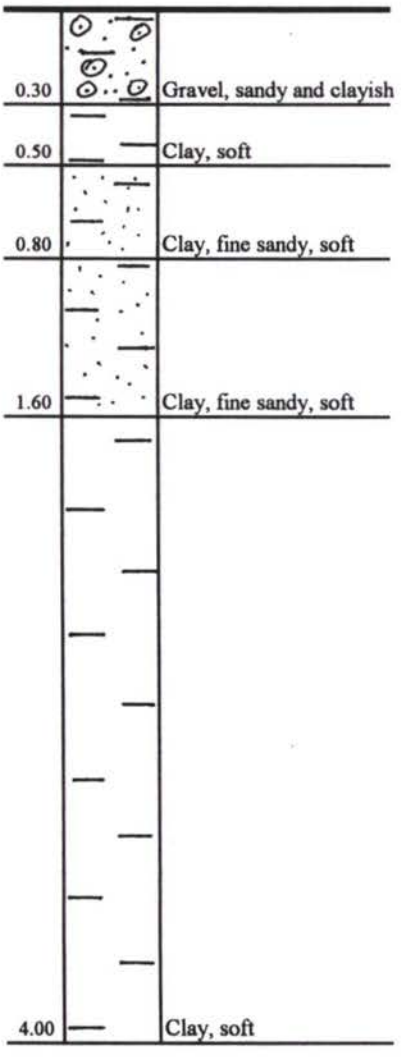
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	22
0.20	32
0.30	32
0.40	21
0.50	8
0.60	7
0.70	7
0.80	8
0.90	8
1.00	6
1.10	5
1.20	5
1.30	6
1.40	9
1.50	11
1.60	12
1.70	11
1.80	12
1.90	10
2.00	9
2.10	8
2.20	7
2.30	7
2.40	7
2.50	6
2.60	4
2.70	3
2.80	3
2.90	6
3.00	8
3.10	7
3.20	7
3.30	12
3.40	24
3.50	14
3.60	13
3.70	8
3.80	11
3.90	18
4.00	18



SOIL SECTION **No. 10**

Location/Место: km 080+100 / R
Data/Дата: 06.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 11**

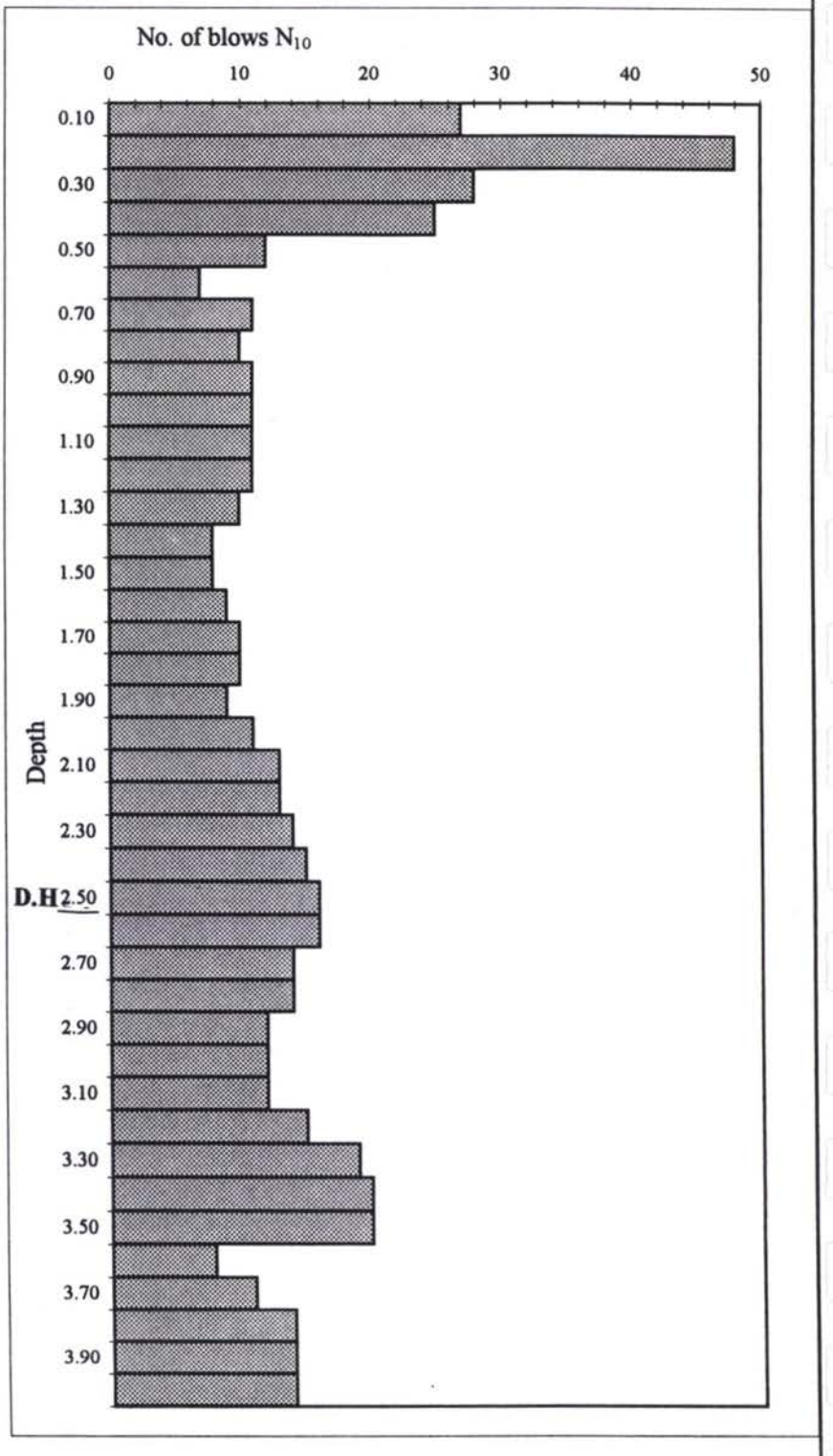
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 088+000 / R

Date / Дата : 06. 04. 1997

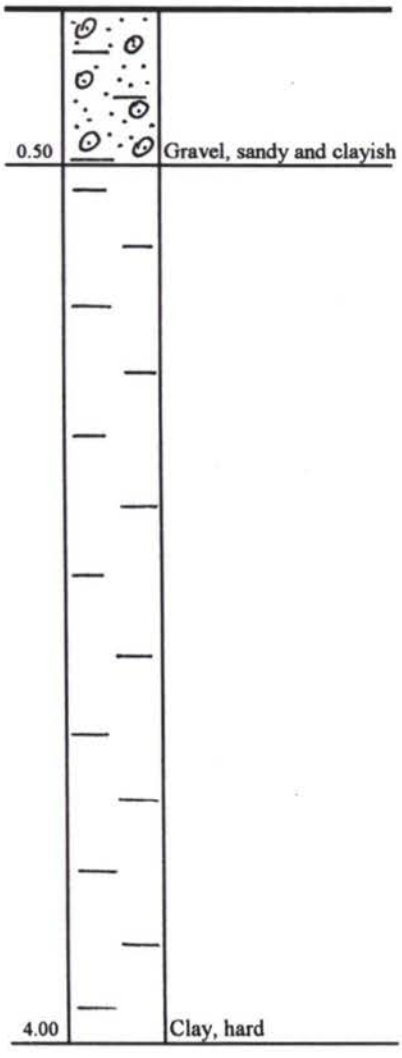
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	27
0.20	48
0.30	28
0.40	25
0.50	12
0.60	7
0.70	11
0.80	10
0.90	11
1.00	11
1.10	11
1.20	11
1.30	10
1.40	8
1.50	8
1.60	9
1.70	10
1.80	10
1.90	9
2.00	11
2.10	13
2.20	13
2.30	14
2.40	15
2.50	16
2.60	16
2.70	14
2.80	14
2.90	12
3.00	12
3.10	12
3.20	15
3.30	19
3.40	20
3.50	20
3.60	8
3.70	11
3.80	14
3.90	14
4.00	14



SOIL SECTION **No. 11**

Location/Место: km 088+000 / R
Data/Дата: 06.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) No. 12

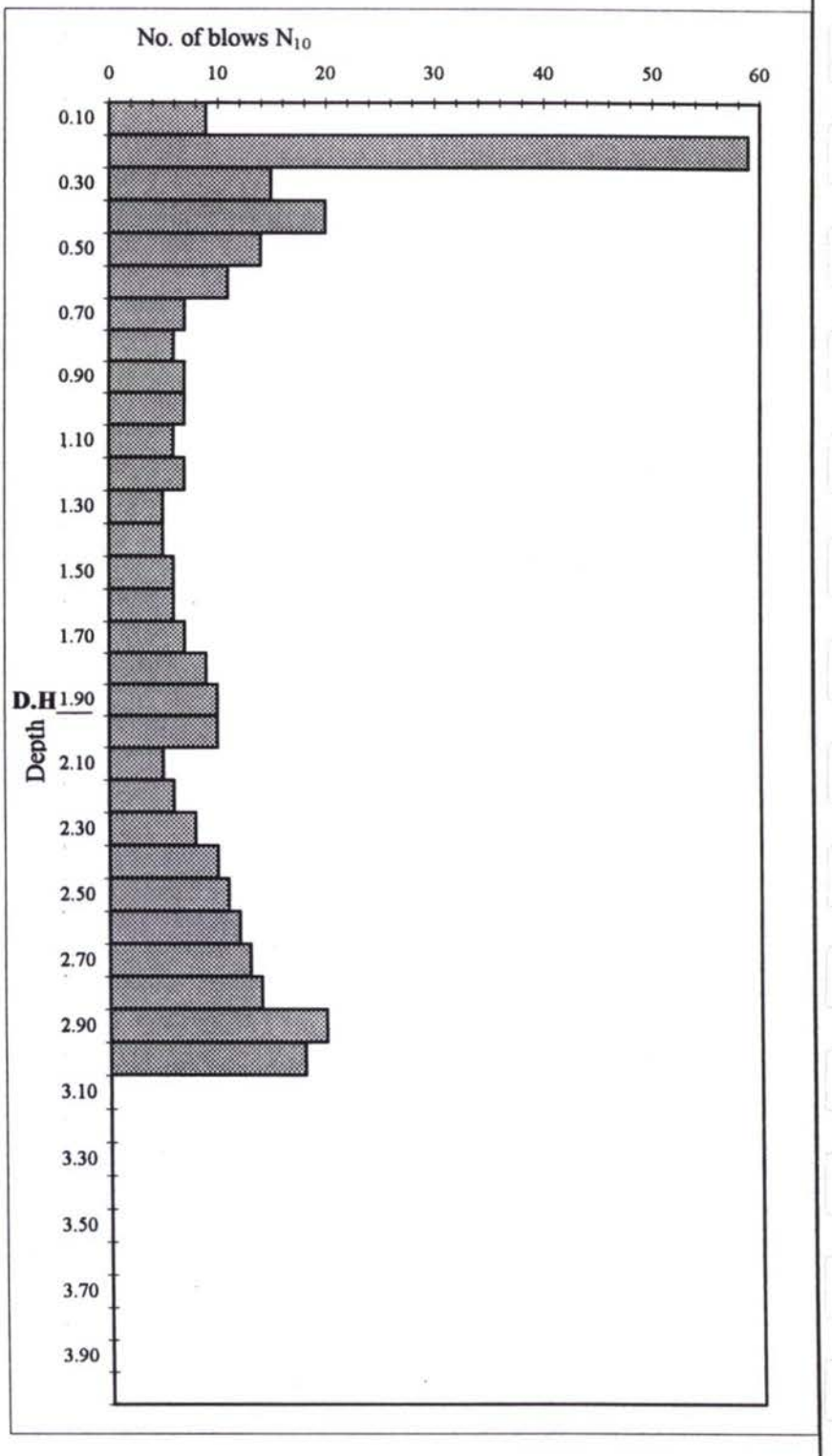
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 099+000 / R

Date / Дата : 06. 04. 1997

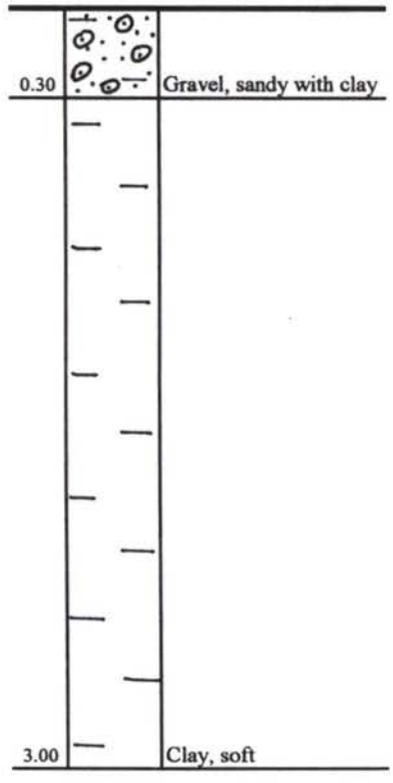
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	9
0.20	59
0.30	15
0.40	20
0.50	14
0.60	11
0.70	7
0.80	6
0.90	7
1.00	7
1.10	6
1.20	7
1.30	5
1.40	5
1.50	6
1.60	6
1.70	7
1.80	9
1.90	10
2.00	10
2.10	5
2.20	6
2.30	8
2.40	10
2.50	11
2.60	12
2.70	13
2.80	14
2.90	20
3.00	18
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION No. 12

Location/Место: k 099+000/ R
Data/Дата: 06.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094)

No. 13

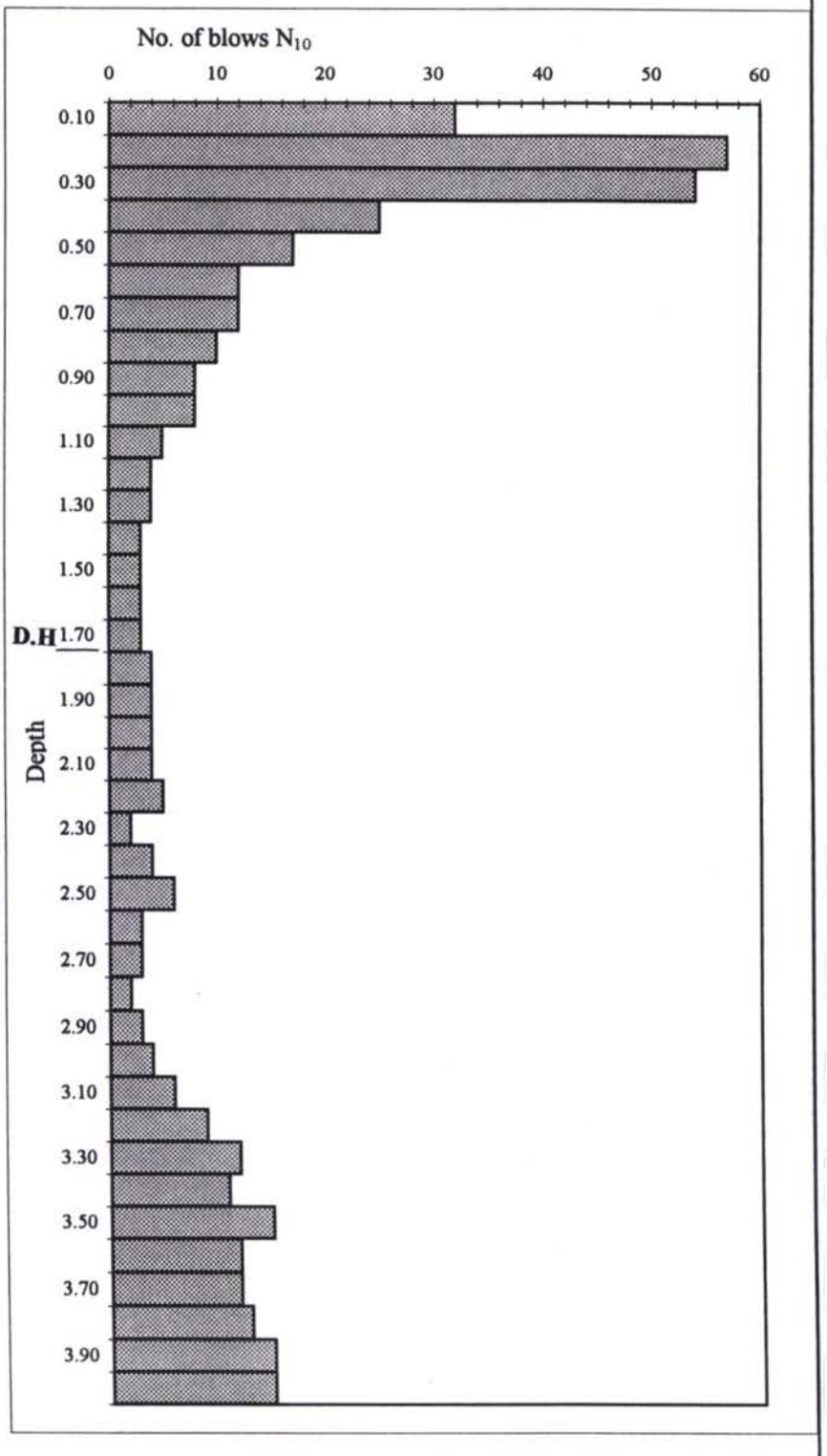
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 108+000 / R

Date / Дата : 06. 04. 1997

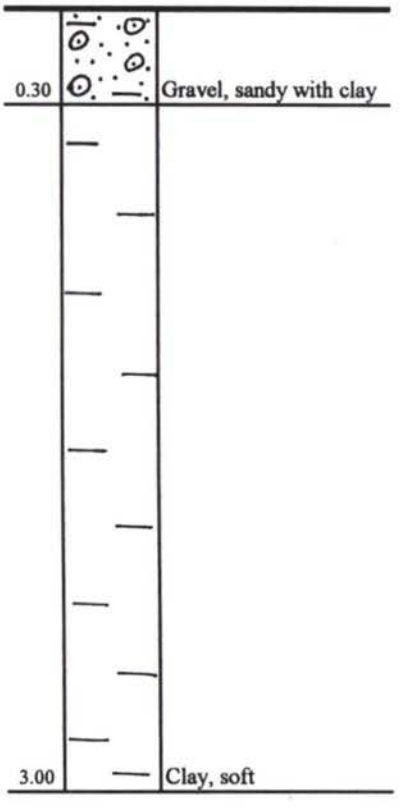
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	32
0.20	57
0.30	54
0.40	25
0.50	17
0.60	12
0.70	12
0.80	10
0.90	8
1.00	8
1.10	5
1.20	4
1.30	4
1.40	3
1.50	3
1.60	3
1.70	3
1.80	4
1.90	4
2.00	4
2.10	4
2.20	5
2.30	2
2.40	4
2.50	6
2.60	3
2.70	3
2.80	2
2.90	3
3.00	4
3.10	6
3.20	9
3.30	12
3.40	11
3.50	15
3.60	12
3.70	12
3.80	13
3.90	15
4.00	15



SOIL SECTION **No. 13**

Location/Место:km 108+000 / R
Data/Дата: 06.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094)

No. 14

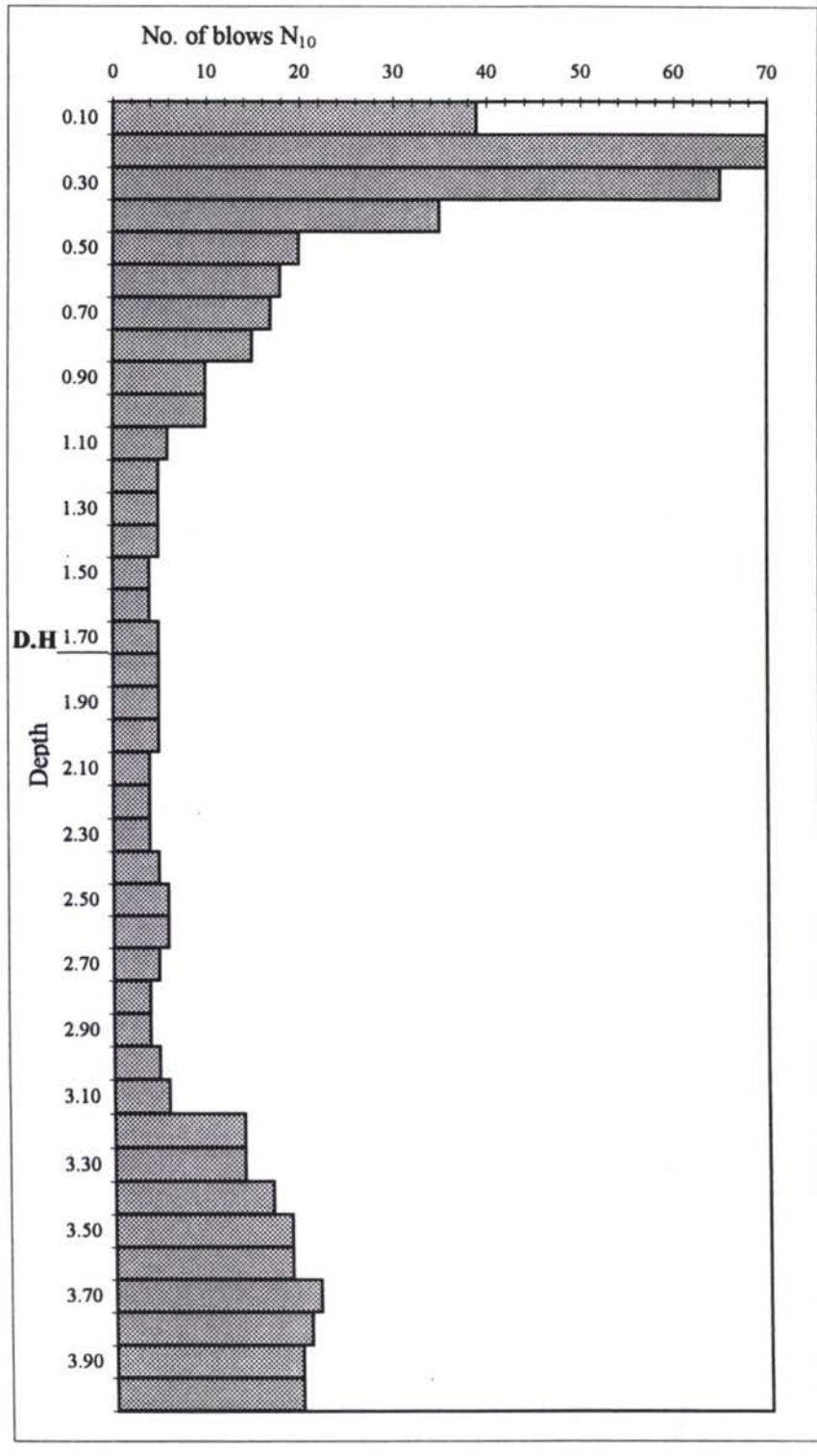
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 115+500 / L

Date / Дата : 06. 04. 1997

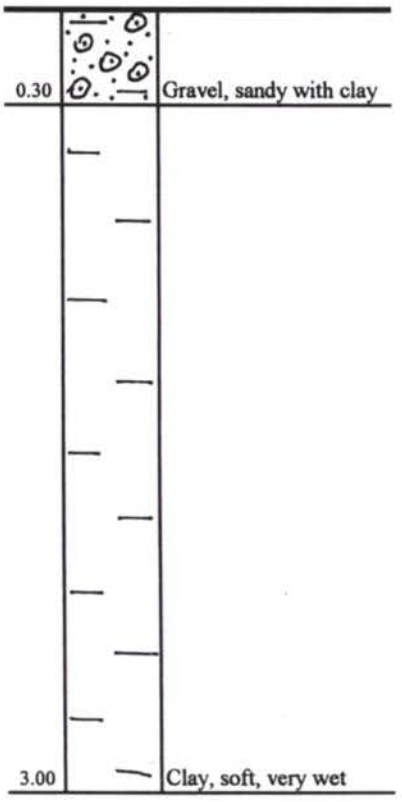
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	39
0.20	70
0.30	65
0.40	35
0.50	20
0.60	18
0.70	17
0.80	15
0.90	10
1.00	10
1.10	6
1.20	5
1.30	5
1.40	5
1.50	4
1.60	4
1.70	5
1.80	5
1.90	5
2.00	5
2.10	4
2.20	4
2.30	4
2.40	5
2.50	6
2.60	6
2.70	5
2.80	4
2.90	4
3.00	5
3.10	6
3.20	14
3.30	14
3.40	17
3.50	19
3.60	19
3.70	22
3.80	21
3.90	20
4.00	20



SOIL SECTION **No. 14**

Location/Место:km 115+500 / L
Data/Дата: 06.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 15**

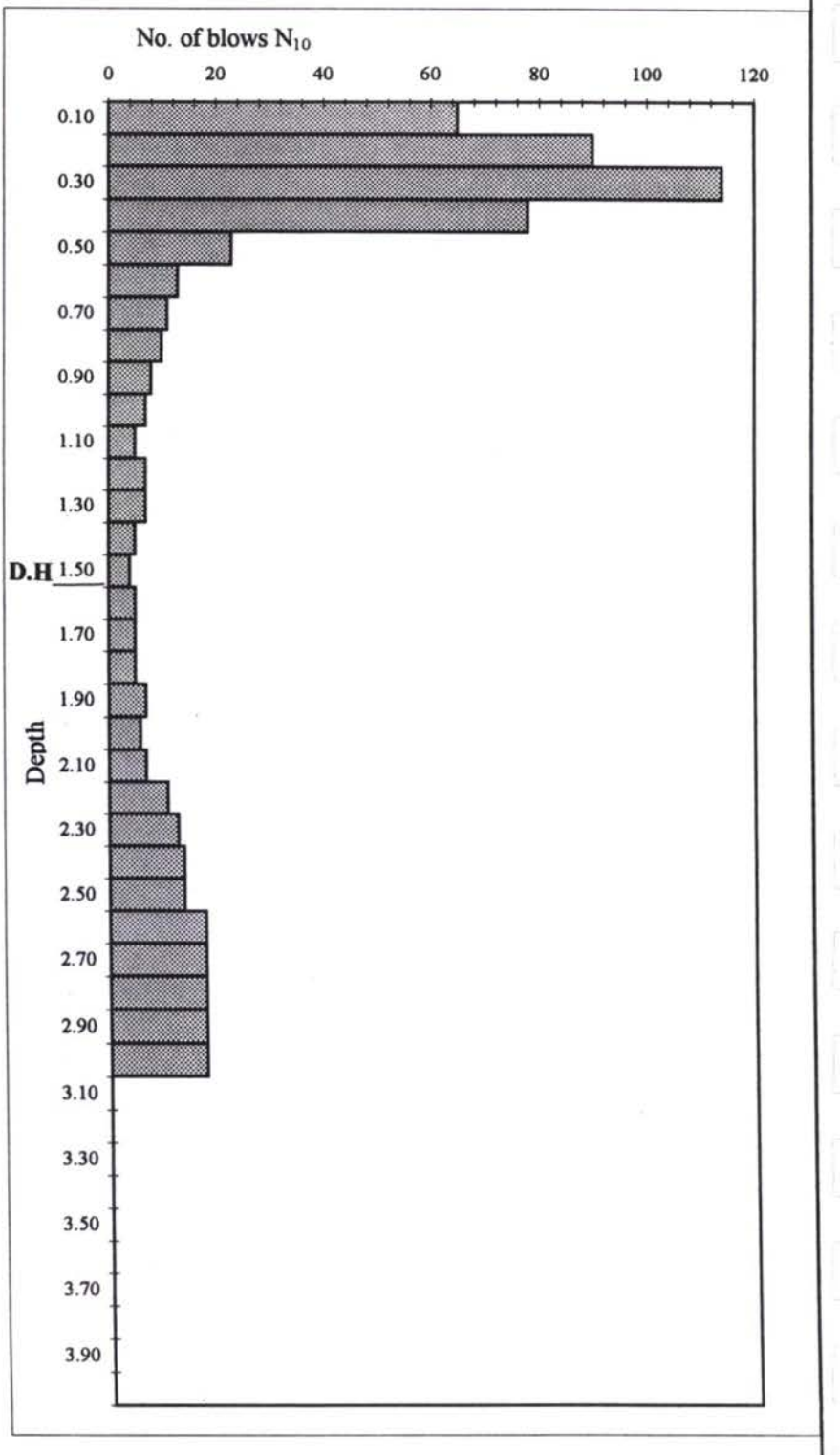
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 118+800 / R

Date / Дата : 06. 04. 1997

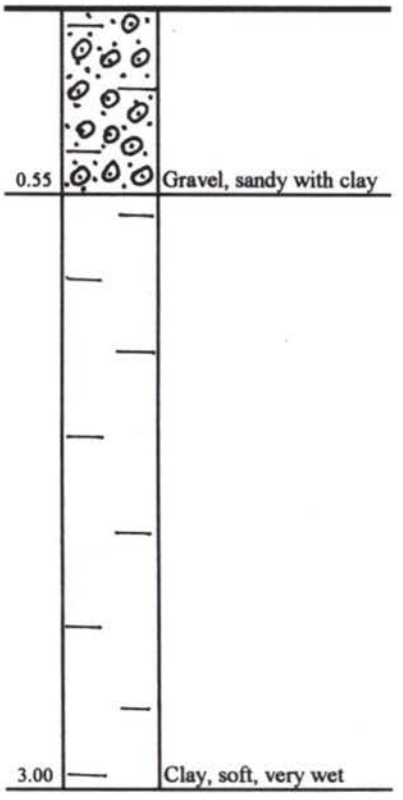
Level / Уровень : Shoulder surface .

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	65
0.20	90
0.30	114
0.40	78
0.50	23
0.60	13
0.70	11
0.80	10
0.90	8
1.00	7
1.10	5
1.20	7
1.30	7
1.40	5
1.50	4
1.60	5
1.70	5
1.80	5
1.90	7
2.00	6
2.10	7
2.20	11
2.30	13
2.40	14
2.50	14
2.60	18
2.70	18
2.80	18
2.90	18
3.00	18
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION **No. 15**

Location/Место: km 118+800 / R
Data/Дата: 06.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) No. 16

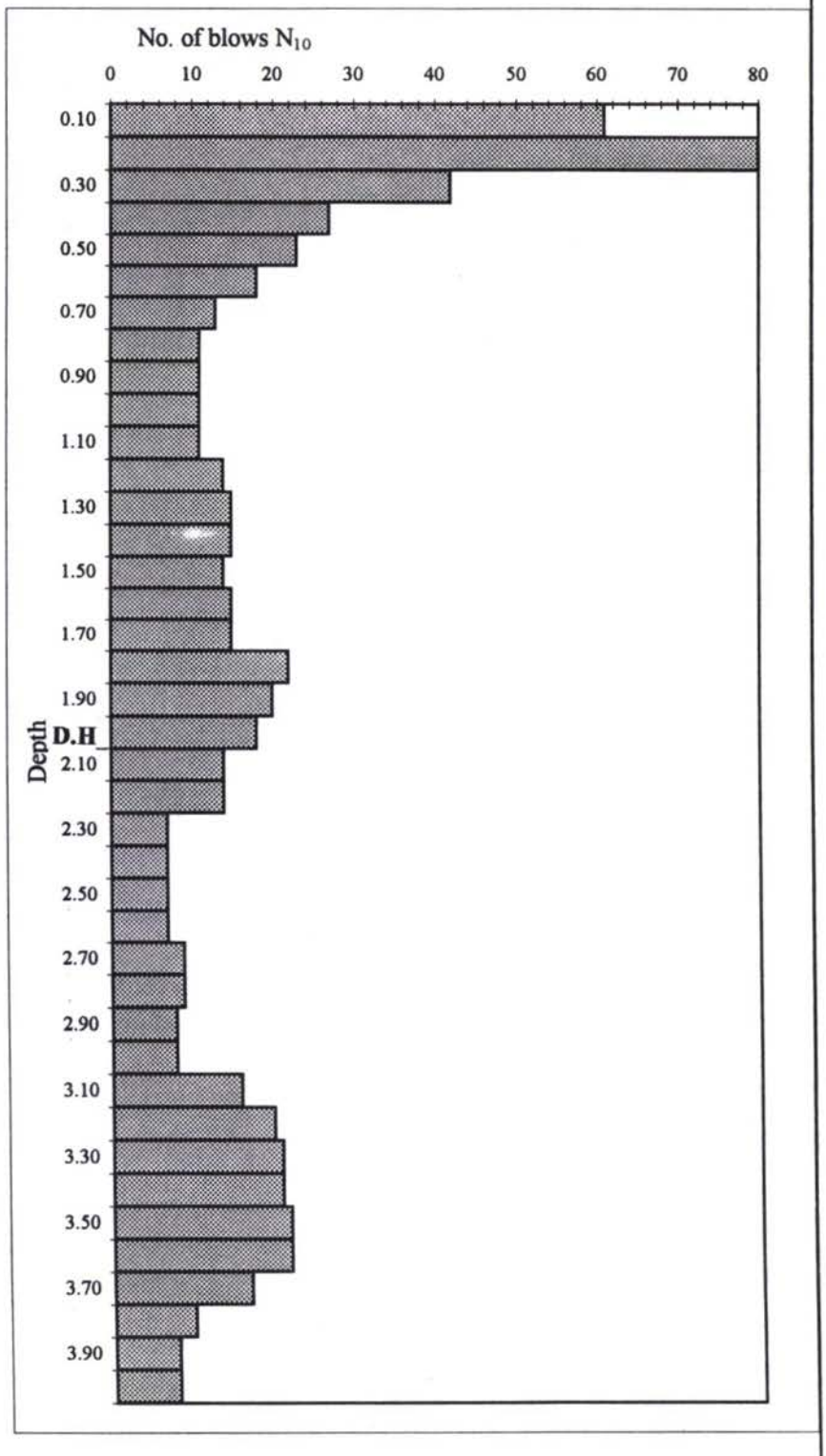
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 128+800 / R

Date / Дата : 06. 04. 1997

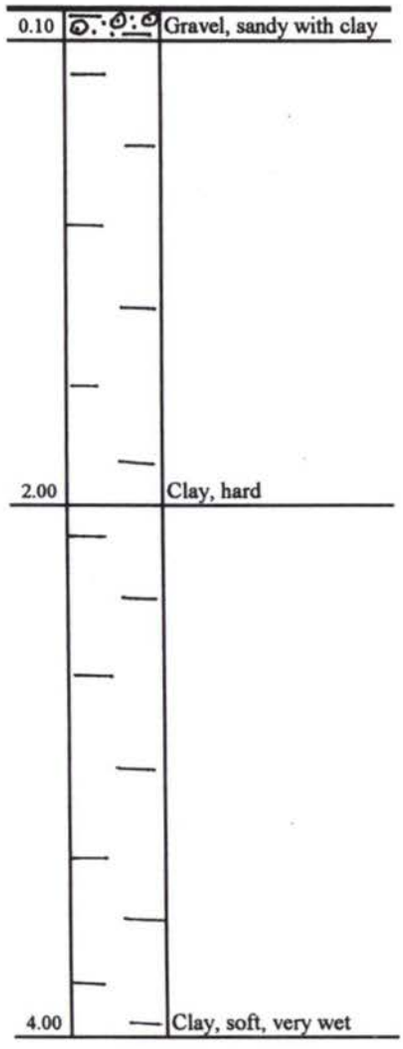
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	61
0.20	80
0.30	42
0.40	27
0.50	23
0.60	18
0.70	13
0.80	11
0.90	11
1.00	11
1.10	11
1.20	14
1.30	15
1.40	15
1.50	14
1.60	15
1.70	15
1.80	22
1.90	20
2.00	18
2.10	14
2.20	14
2.30	7
2.40	7
2.50	7
2.60	7
2.70	9
2.80	9
2.90	8
3.00	8
3.10	16
3.20	20
3.30	21
3.40	21
3.50	22
3.60	22
3.70	17
3.80	10
3.90	8
4.00	8



SOIL SECTION **No. 16**

Location/Место: km 128+800 / R
Data/Дата: 06.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 17**

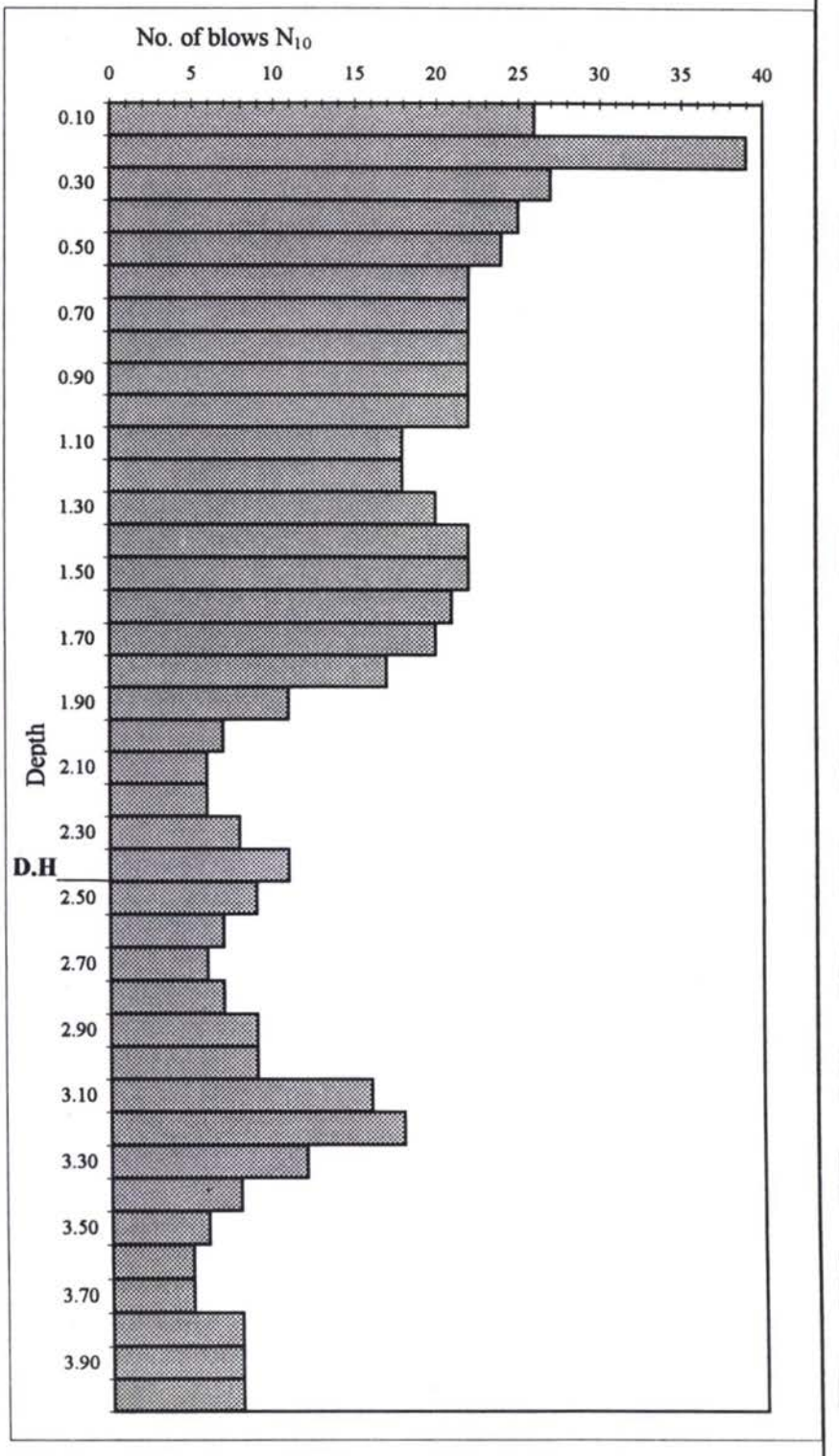
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 135+200 / R

Date / Дата : 07. 04. 1997

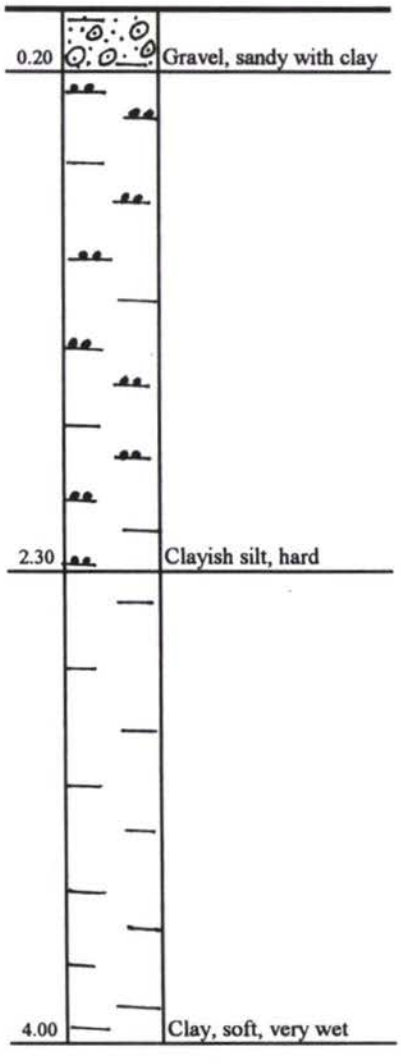
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	26
0.20	39
0.30	27
0.40	25
0.50	24
0.60	22
0.70	22
0.80	22
0.90	22
1.00	22
1.10	18
1.20	18
1.30	20
1.40	22
1.50	22
1.60	21
1.70	20
1.80	17
1.90	11
2.00	7
2.10	6
2.20	6
2.30	8
2.40	11
2.50	9
2.60	7
2.70	6
2.80	7
2.90	9
3.00	9
3.10	16
3.20	18
3.30	12
3.40	8
3.50	6
3.60	5
3.70	5
3.80	8
3.90	8
4.00	8



SOIL SECTION **No. 17**

Location/Место: km 135+200 / R
Data/Дата: 07.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094)

No. 18

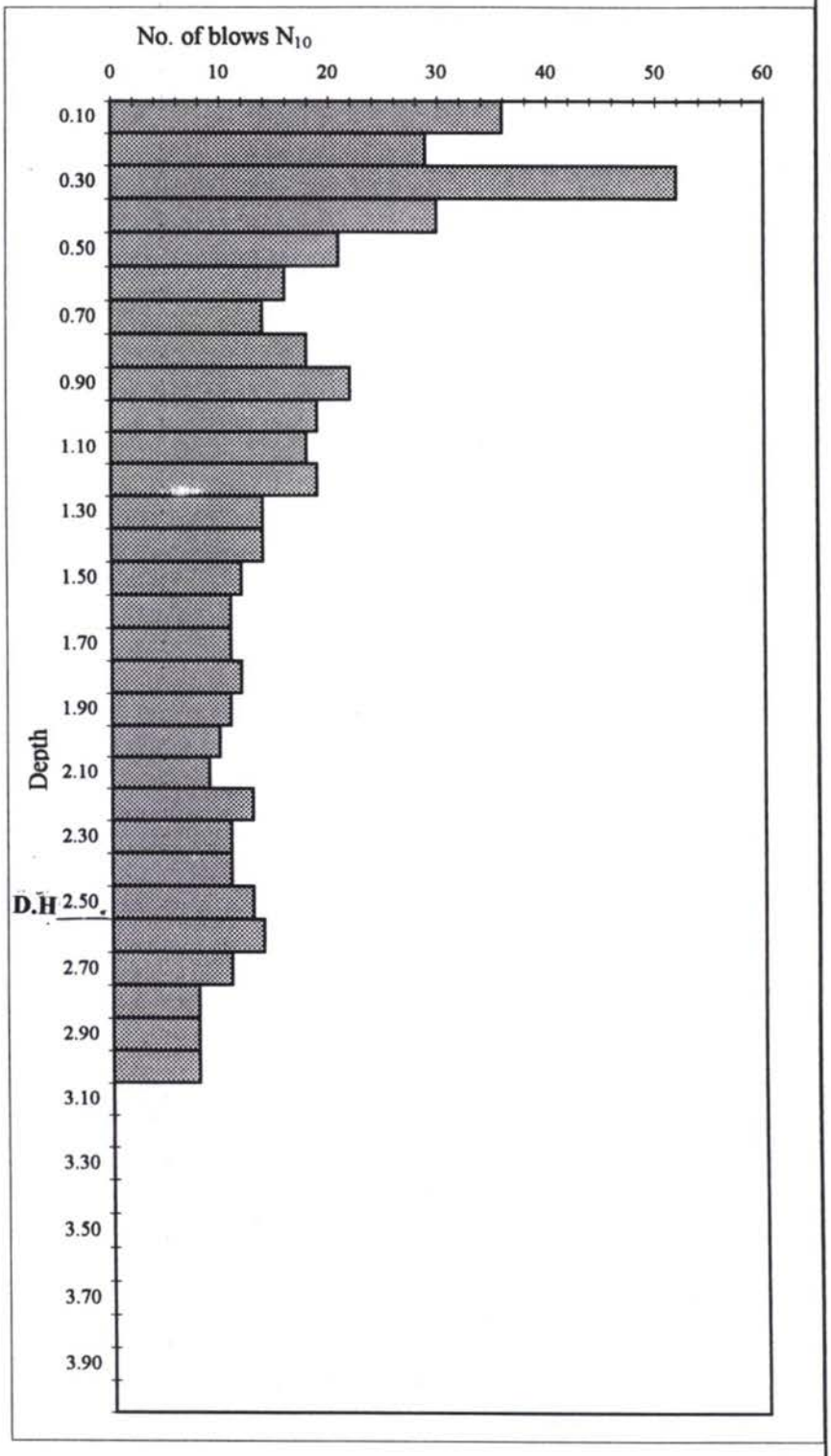
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 145+200 / R

Date / Дата : 07. 04. 1997

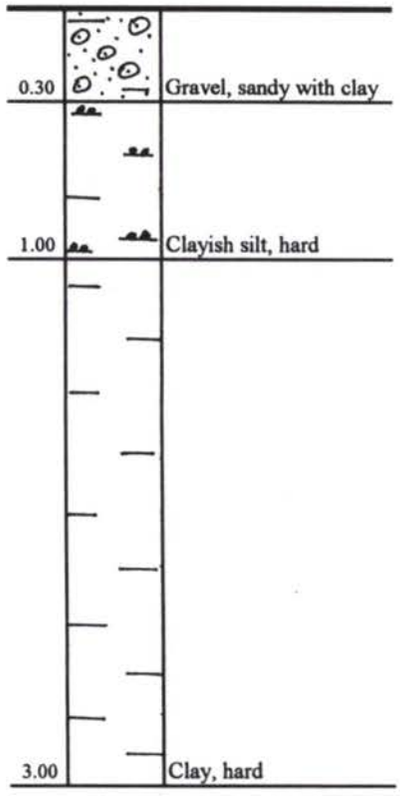
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	36
0.20	29
0.30	52
0.40	30
0.50	21
0.60	16
0.70	14
0.80	18
0.90	22
1.00	19
1.10	18
1.20	19
1.30	14
1.40	14
1.50	12
1.60	11
1.70	11
1.80	12
1.90	11
2.00	10
2.10	9
2.20	13
2.30	11
2.40	11
2.50	13
2.60	14
2.70	11
2.80	8
2.90	8
3.00	8
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION **No. 18**

Location/Место: km 145+200 / R
Data/Дата: 07.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094)

No. 19.1

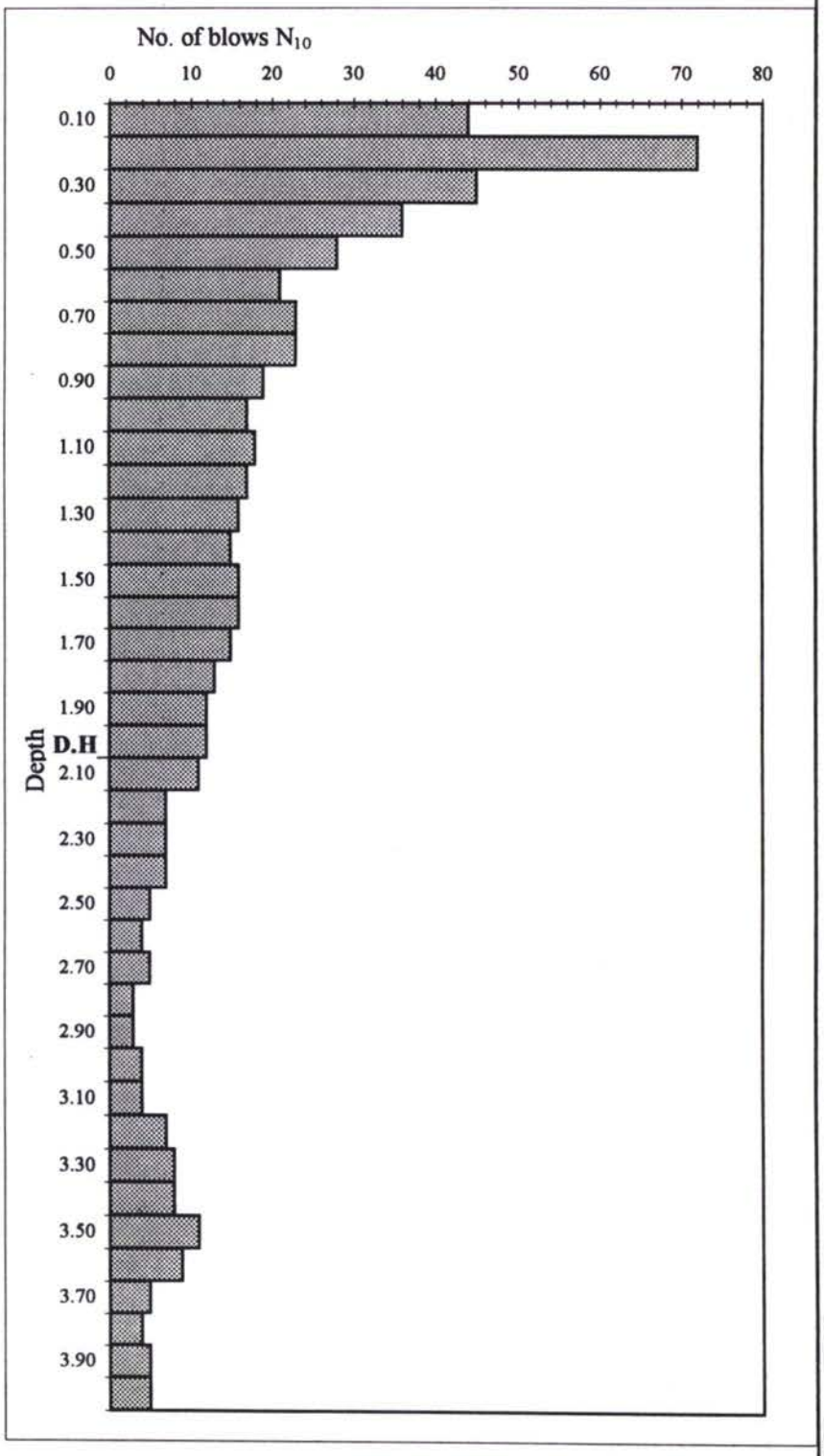
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 151+000 / R

Date / Дата : 07. 04. 1997

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	44
0.20	72
0.30	45
0.40	36
0.50	28
0.60	21
0.70	23
0.80	23
0.90	19
1.00	17
1.10	18
1.20	17
1.30	16
1.40	15
1.50	16
1.60	16
1.70	15
1.80	13
1.90	12
2.00	12
2.10	11
2.20	7
2.30	7
2.40	7
2.50	5
2.60	4
2.70	5
2.80	3
2.90	3
3.00	4
3.10	4
3.20	7
3.30	8
3.40	8
3.50	11
3.60	9
3.70	5
3.80	4
3.90	5
4.00	5



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 19.2**

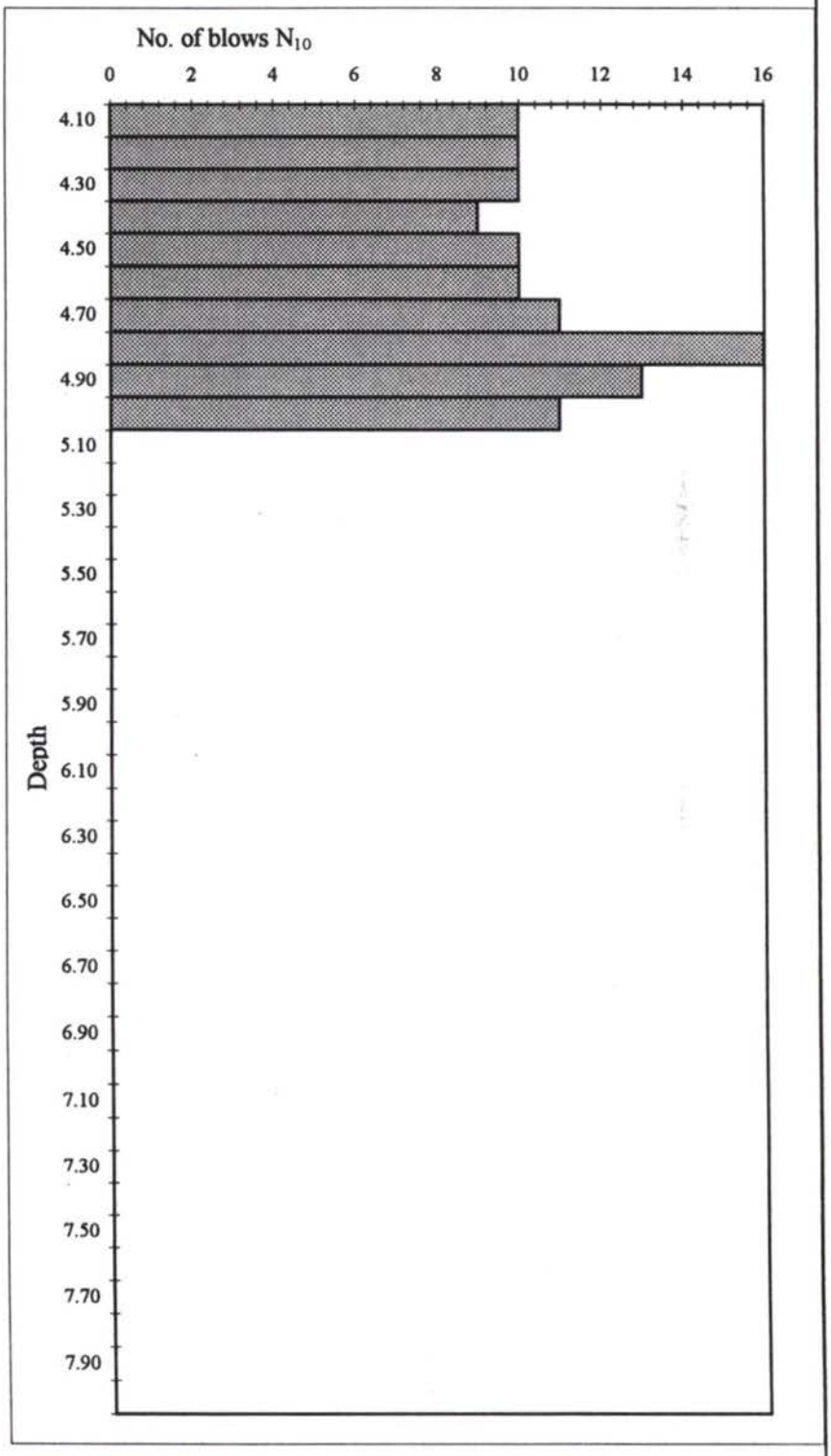
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 151+000 / R

Date / Дата : 07. 04. 1997

Level / Уровень : Shoulder surface

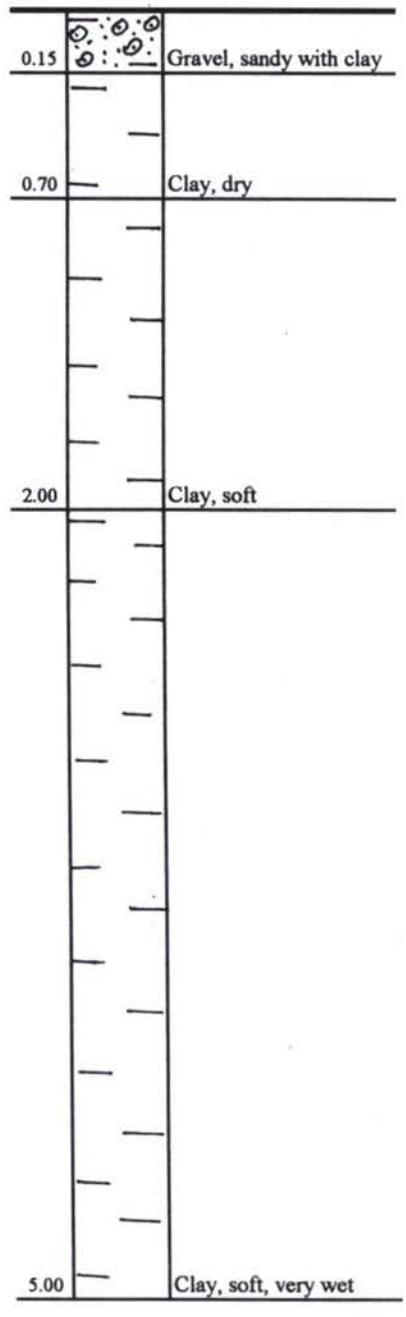
Depth Глубина [m]	No. of blows Число вдуваний N_{10}
4.10	10
4.20	10
4.30	10
4.40	9
4.50	10
4.60	10
4.70	11
4.80	16
4.90	13
5.00	11
5.10	
5.20	
5.30	
5.40	
5.50	
5.60	
5.70	
5.80	
5.90	
6.00	
6.10	
6.20	
6.30	
6.40	
6.50	
6.60	
6.70	
6.80	
6.90	
7.00	
7.10	
7.20	
7.30	
7.40	
7.50	
7.60	
7.70	
7.80	
7.90	
8.00	



SOIL SECTION

No. 19

Location/Место: km 151+000 / R
Data/Дата: 07.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 20.1**

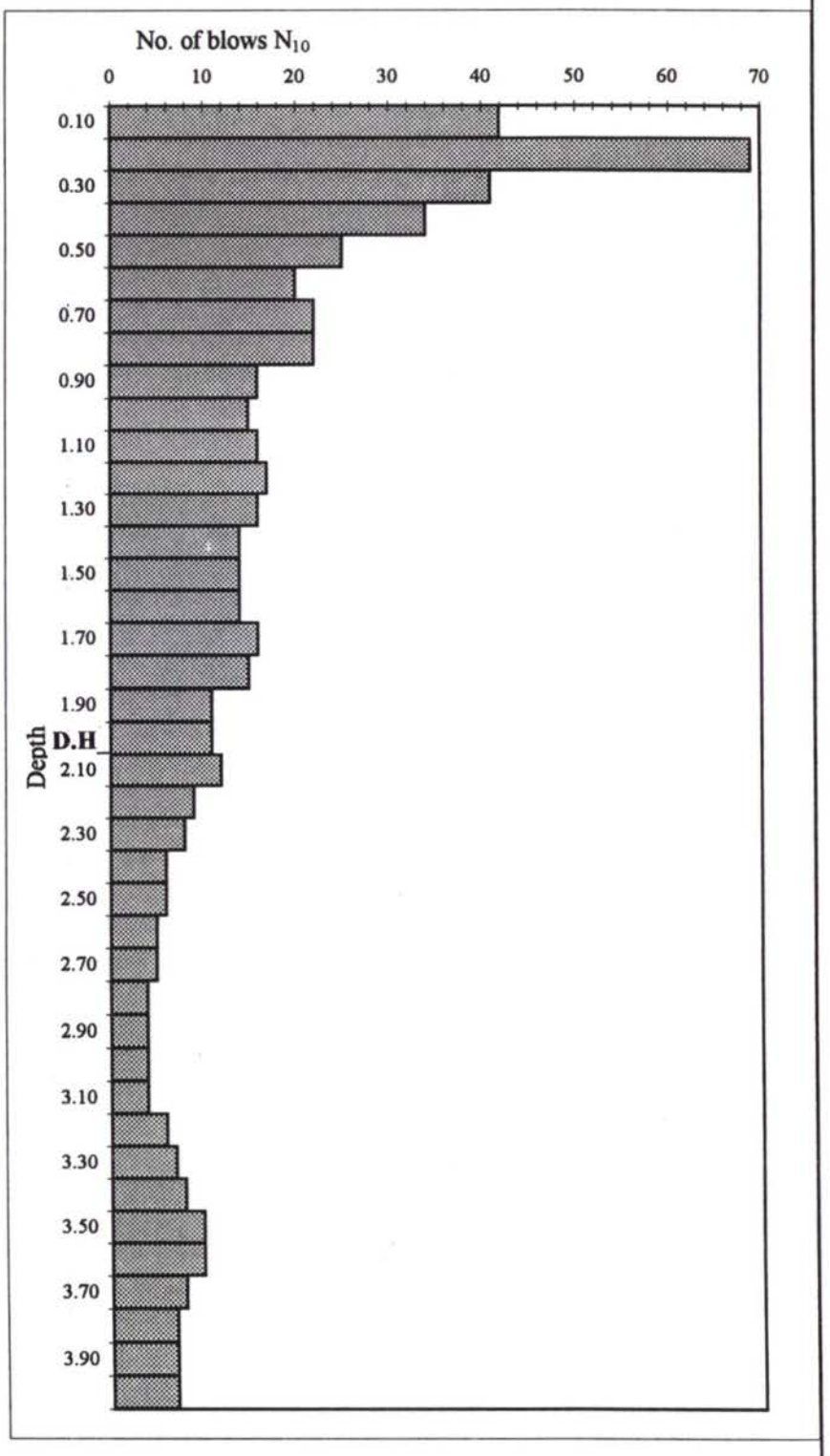
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 159+500 / R

Date / Дата : 07. 04. 1997

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	42
0.20	69
0.30	41
0.40	34
0.50	25
0.60	20
0.70	22
0.80	22
0.90	16
1.00	15
1.10	16
1.20	17
1.30	16
1.40	14
1.50	14
1.60	14
1.70	16
1.80	15
1.90	11
2.00	11
2.10	12
2.20	9
2.30	8
2.40	6
2.50	6
2.60	5
2.70	5
2.80	4
2.90	4
3.00	4
3.10	4
3.20	6
3.30	7
3.40	8
3.50	10
3.60	10
3.70	8
3.80	7
3.90	7
4.00	7



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 20.2**

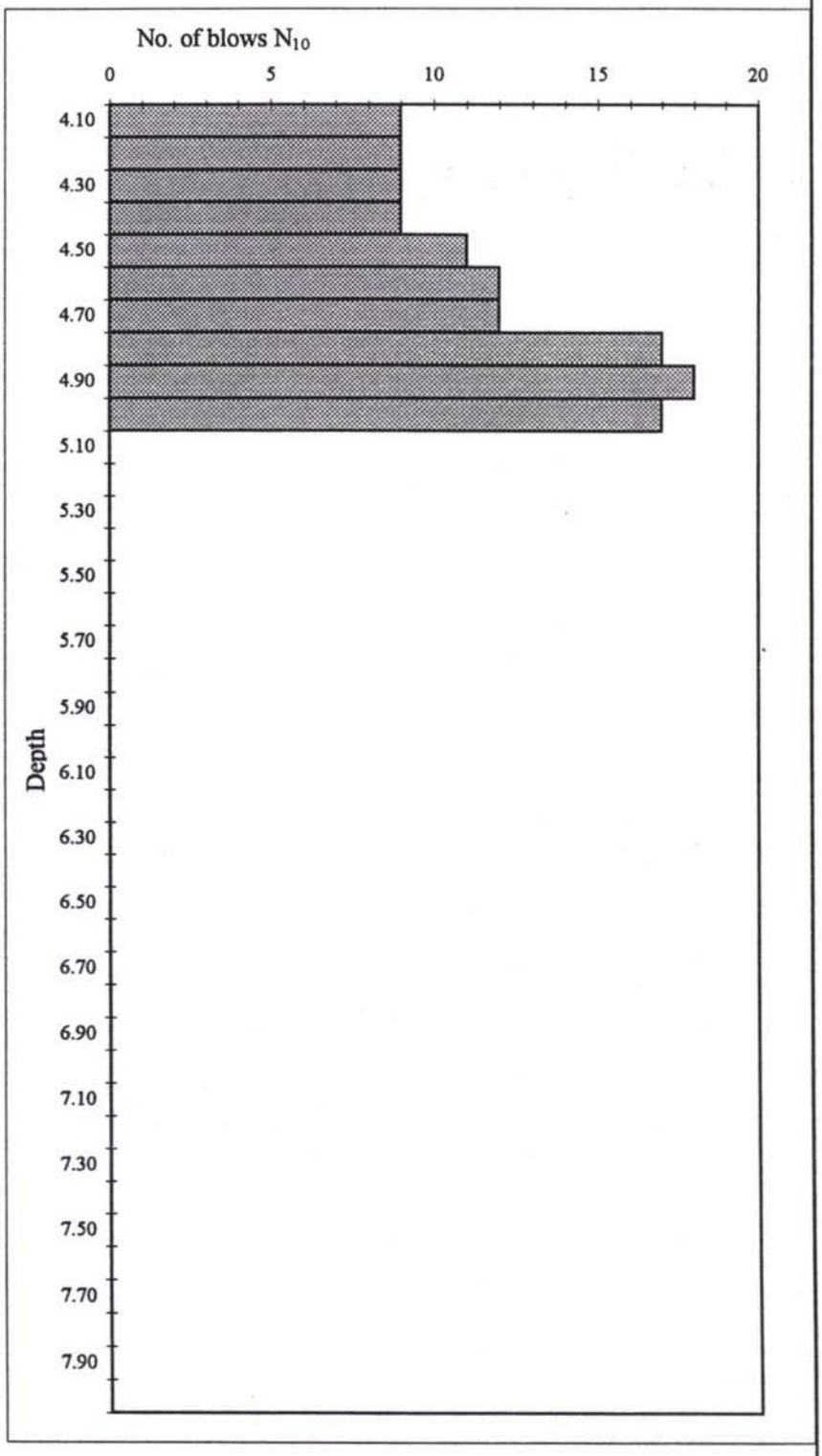
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 159+500 / R

Date / Дата : 07. 04. 1997

Level / Уровень : Shoulder surface

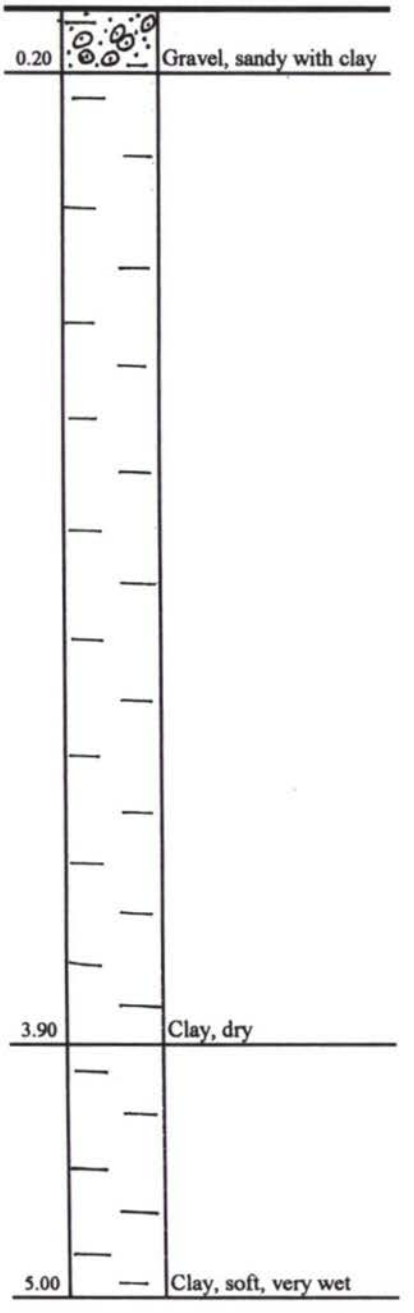
Depth Глубина [m]	No. of blows Число вдуваний N_{10}
4.10	9
4.20	9
4.30	9
4.40	9
4.50	11
4.60	12
4.70	12
4.80	17
4.90	18
5.00	17
5.10	
5.20	
5.30	
5.40	
5.50	
5.60	
5.70	
5.80	
5.90	
6.00	
6.10	
6.20	
6.30	
6.40	
6.50	
6.60	
6.70	
6.80	
6.90	
7.00	
7.10	
7.20	
7.30	
7.40	
7.50	
7.60	
7.70	
7.80	
7.90	
8.00	



SOIL SECTION

No. 20

Location/Место: km 159+500 / R
Data/Дата: 07.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) No. 21

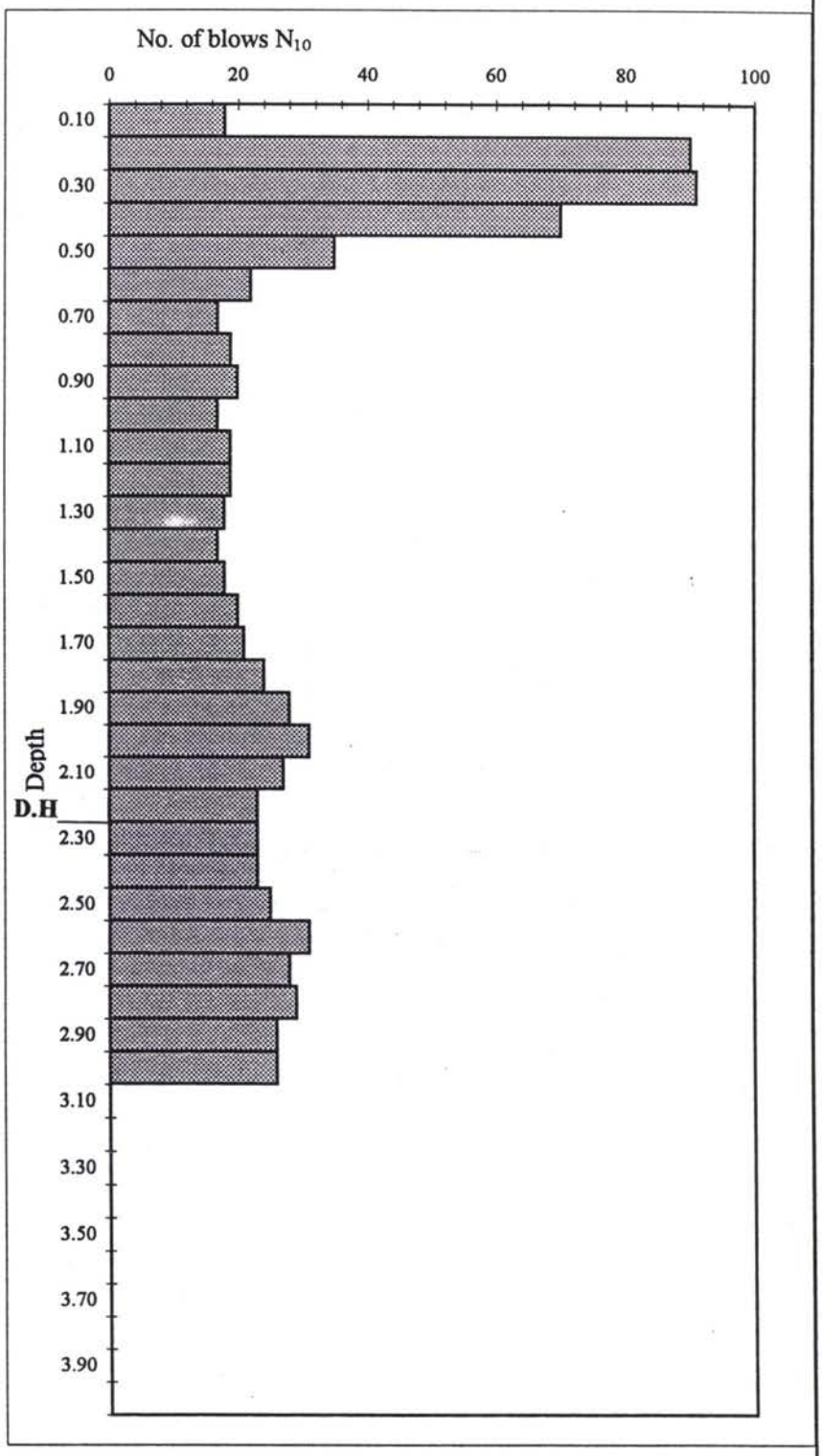
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 162+500 / R

Date / Дата : 08. 04. 1997

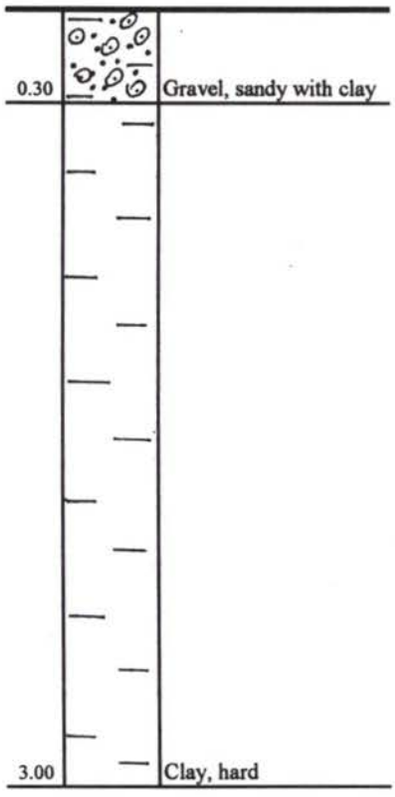
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	18
0.20	90
0.30	91
0.40	70
0.50	35
0.60	22
0.70	17
0.80	19
0.90	20
1.00	17
1.10	19
1.20	19
1.30	18
1.40	17
1.50	18
1.60	20
1.70	21
1.80	24
1.90	28
2.00	31
2.10	27
2.20	23
2.30	23
2.40	23
2.50	25
2.60	31
2.70	28
2.80	29
2.90	26
3.00	26
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION **No. 21**

Location/Место: km 162+500 / R
Data/Дата: 08.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094)

No. 22

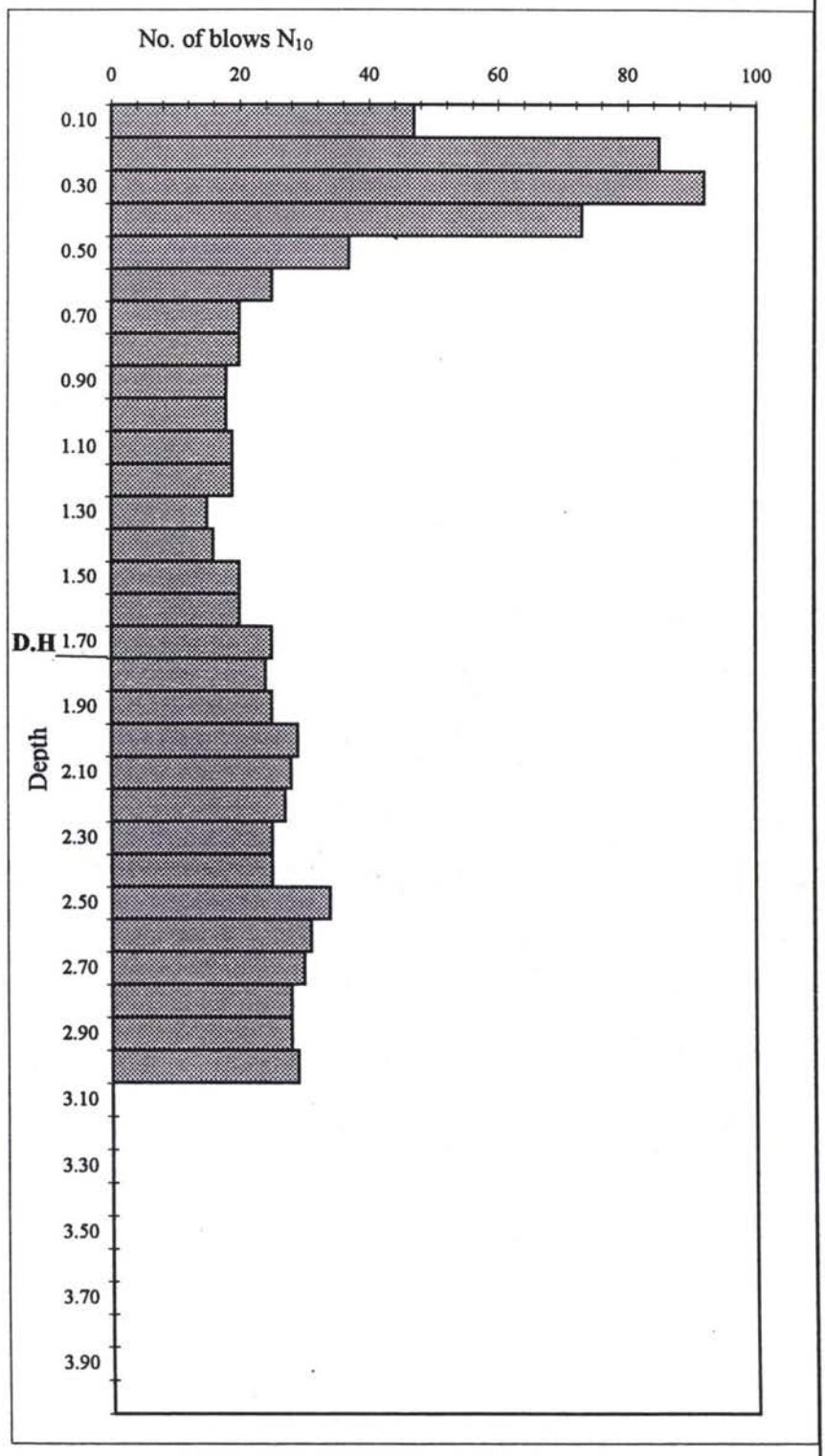
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 164+000 / R

Date / Дата : 08. 04. 1997

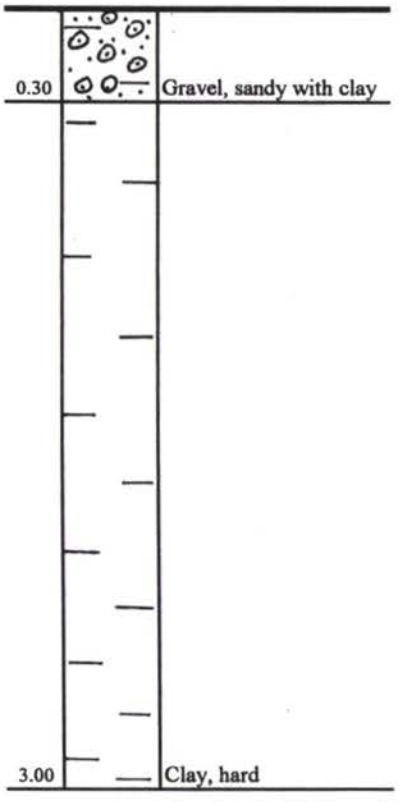
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	47
0.20	85
0.30	92
0.40	73
0.50	37
0.60	25
0.70	20
0.80	20
0.90	18
1.00	18
1.10	19
1.20	19
1.30	15
1.40	16
1.50	20
1.60	20
1.70	25
1.80	24
1.90	25
2.00	29
2.10	28
2.20	27
2.30	25
2.40	25
2.50	34
2.60	31
2.70	30
2.80	28
2.90	28
3.00	29
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION **No. 22**

Location/Место: km 164+000 / R
Data/Дата: 08.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 23**

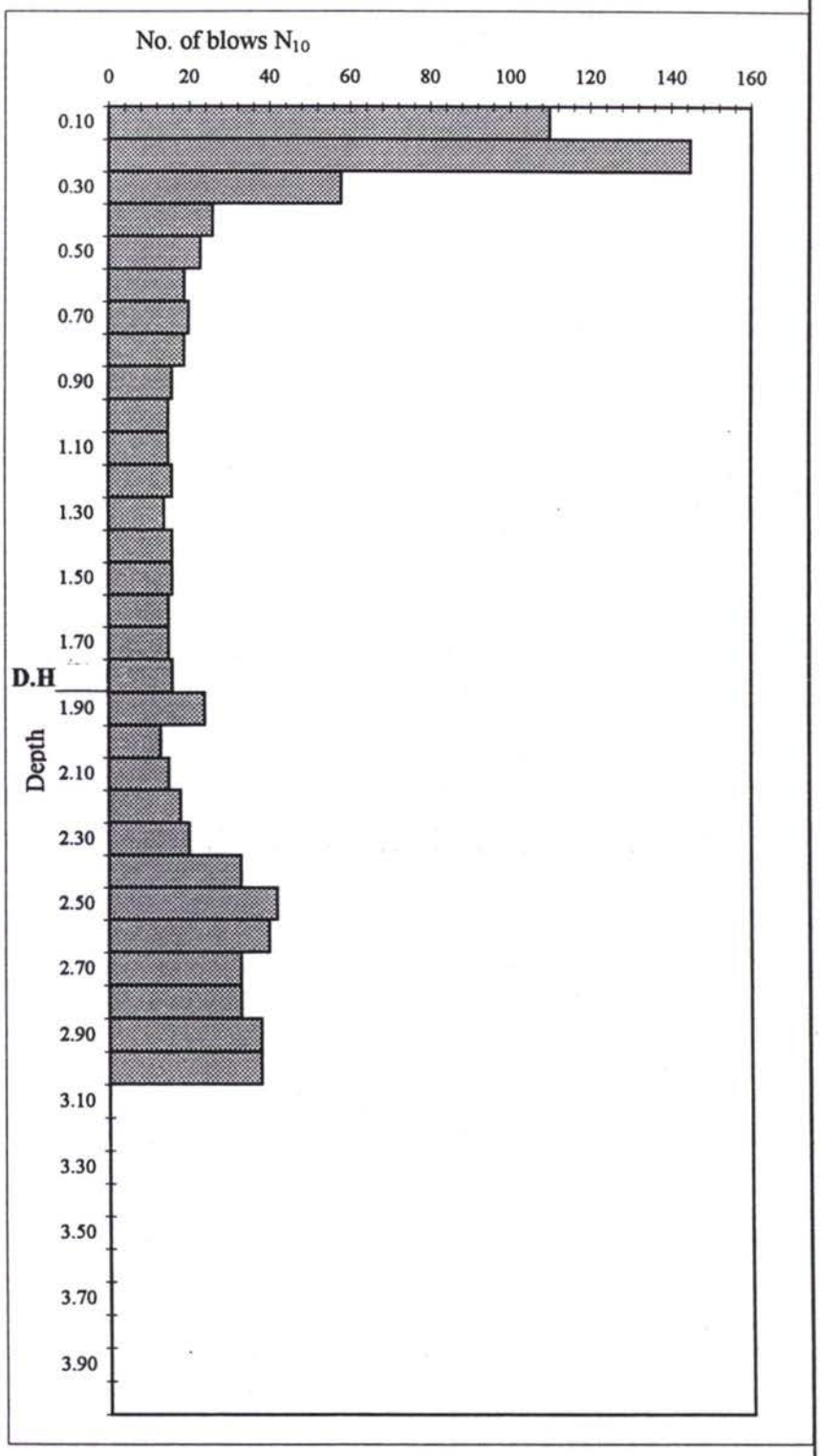
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 167+000 / R

Date / Дата : 08. 04. 1997

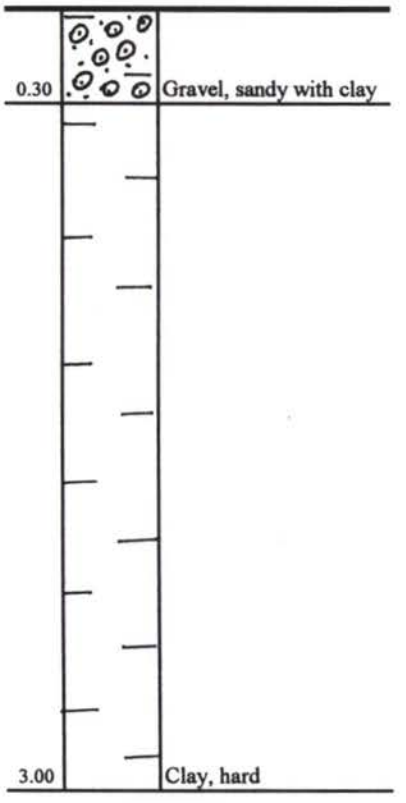
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	110
0.20	145
0.30	58
0.40	26
0.50	23
0.60	19
0.70	20
0.80	19
0.90	16
1.00	15
1.10	15
1.20	16
1.30	14
1.40	16
1.50	16
1.60	15
1.70	15
1.80	16
1.90	24
2.00	13
2.10	15
2.20	18
2.30	20
2.40	33
2.50	42
2.60	40
2.70	33
2.80	33
2.90	38
3.00	38
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION No. 23

Location/Место: km 167+000 / R
Data/Дата: 08.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 24**

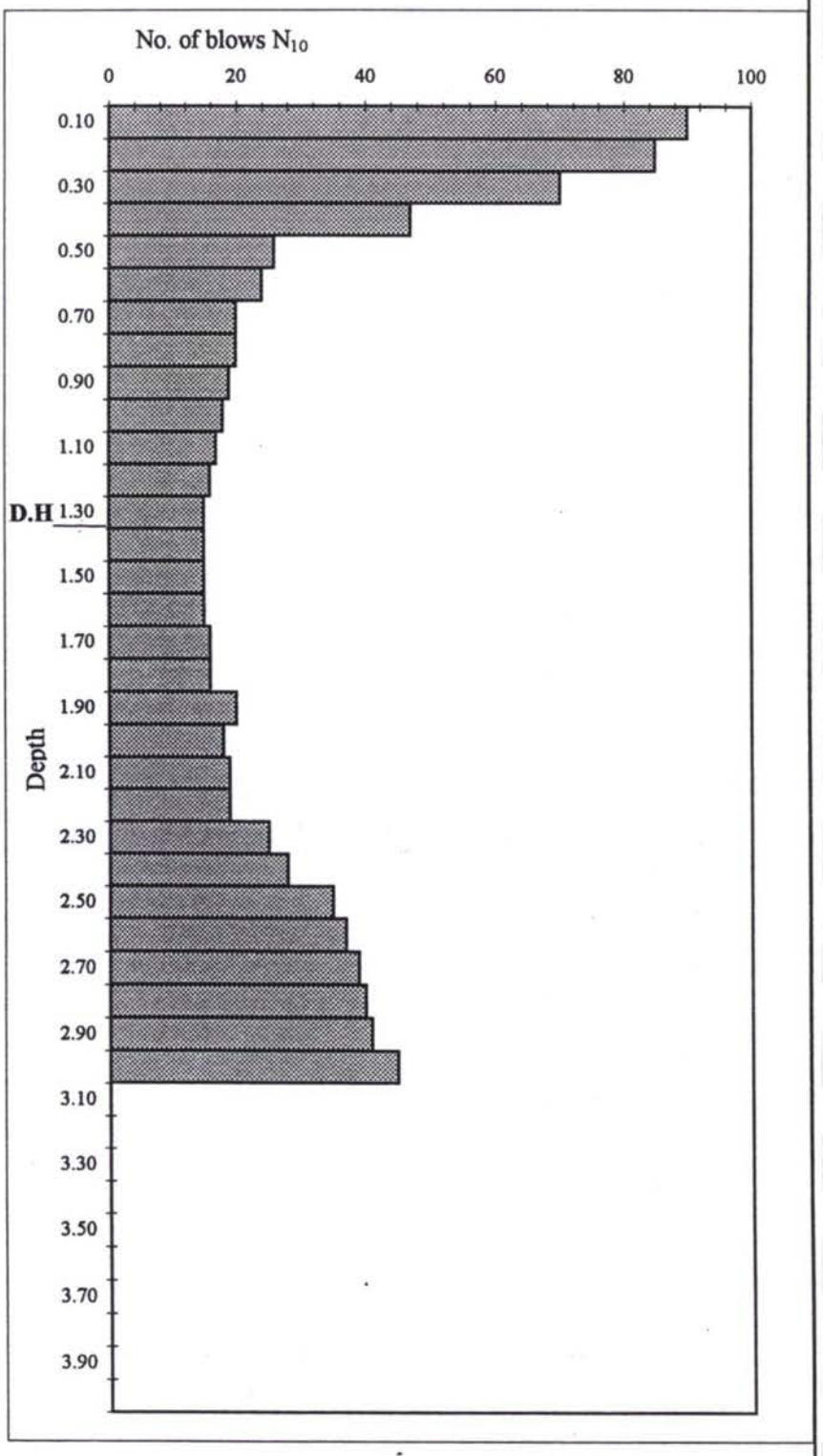
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 168+000 / R

Date / Дата : 09. 04. 1997

Level / Уровень : Shoulder surface

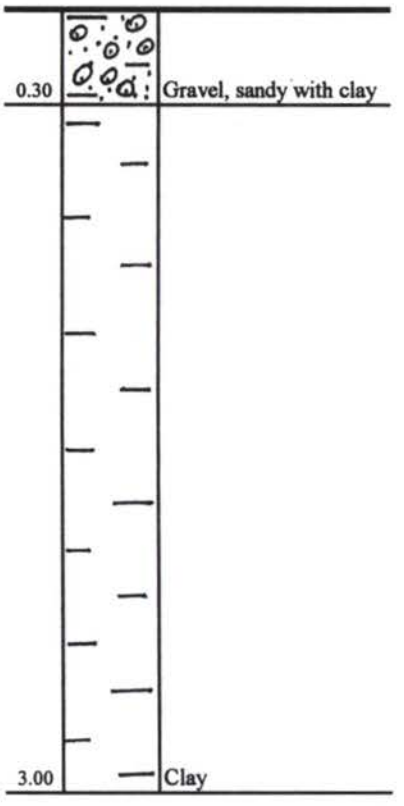
Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	90
0.20	85
0.30	70
0.40	47
0.50	26
0.60	24
0.70	20
0.80	20
0.90	19
1.00	18
1.10	17
1.20	16
1.30	15
1.40	15
1.50	15
1.60	15
1.70	16
1.80	16
1.90	20
2.00	18
2.10	19
2.20	19
2.30	25
2.40	28
2.50	35
2.60	37
2.70	39
2.80	40
2.90	41
3.00	45
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION

No. 24

Location/Место: km 168+000 / R
Data/Дата: 06.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094)

No. 25

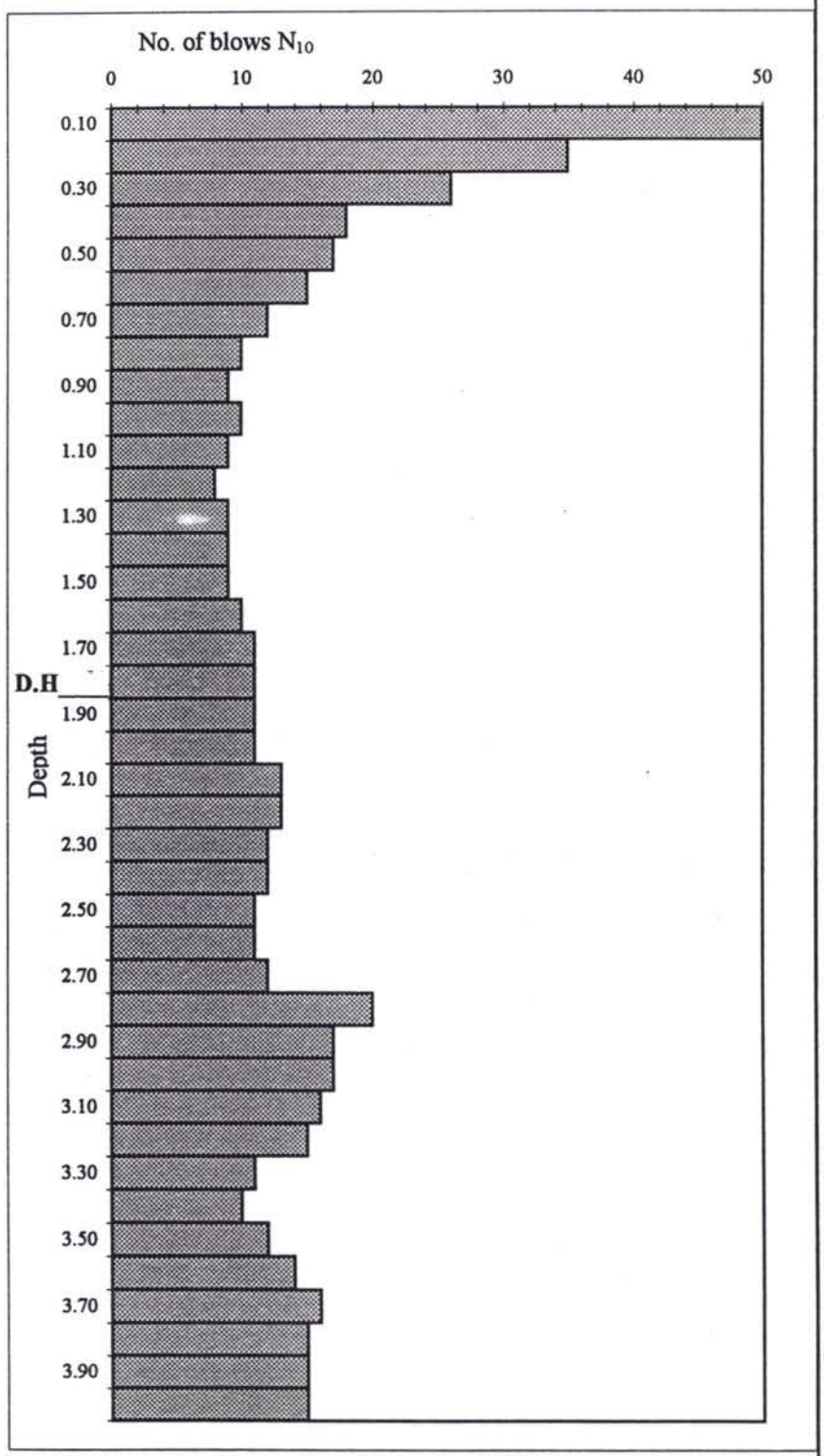
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 170+700 / R

Date / Дата : 09. 04. 1997

Level / Уровень : Shoulder surface

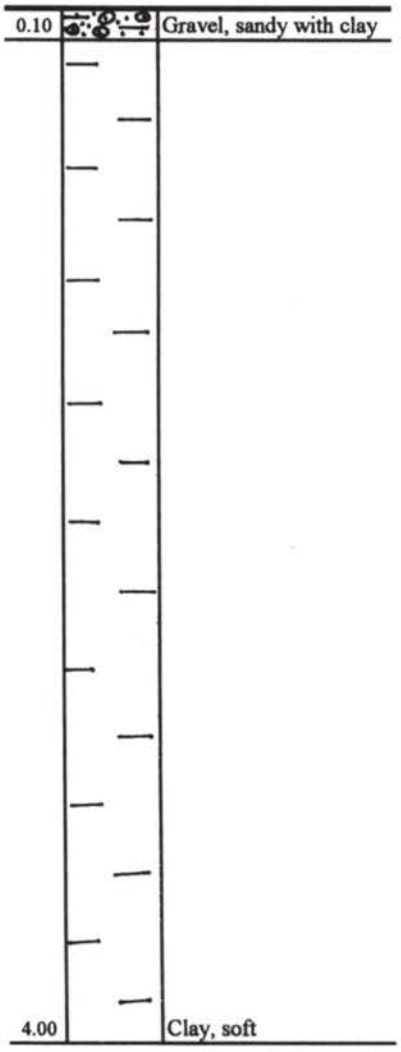
Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	50
0.20	35
0.30	26
0.40	18
0.50	17
0.60	15
0.70	12
0.80	10
0.90	9
1.00	10
1.10	9
1.20	8
1.30	9
1.40	9
1.50	9
1.60	10
1.70	11
1.80	11
1.90	11
2.00	11
2.10	13
2.20	13
2.30	12
2.40	12
2.50	11
2.60	11
2.70	12
2.80	20
2.90	17
3.00	17
3.10	16
3.20	15
3.30	11
3.40	10
3.50	12
3.60	14
3.70	16
3.80	15
3.90	15
4.00	15



SOIL SECTION

No. 25

Location/Место: km 170+700 / R
Data/Дата: 09.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094)

No. 26

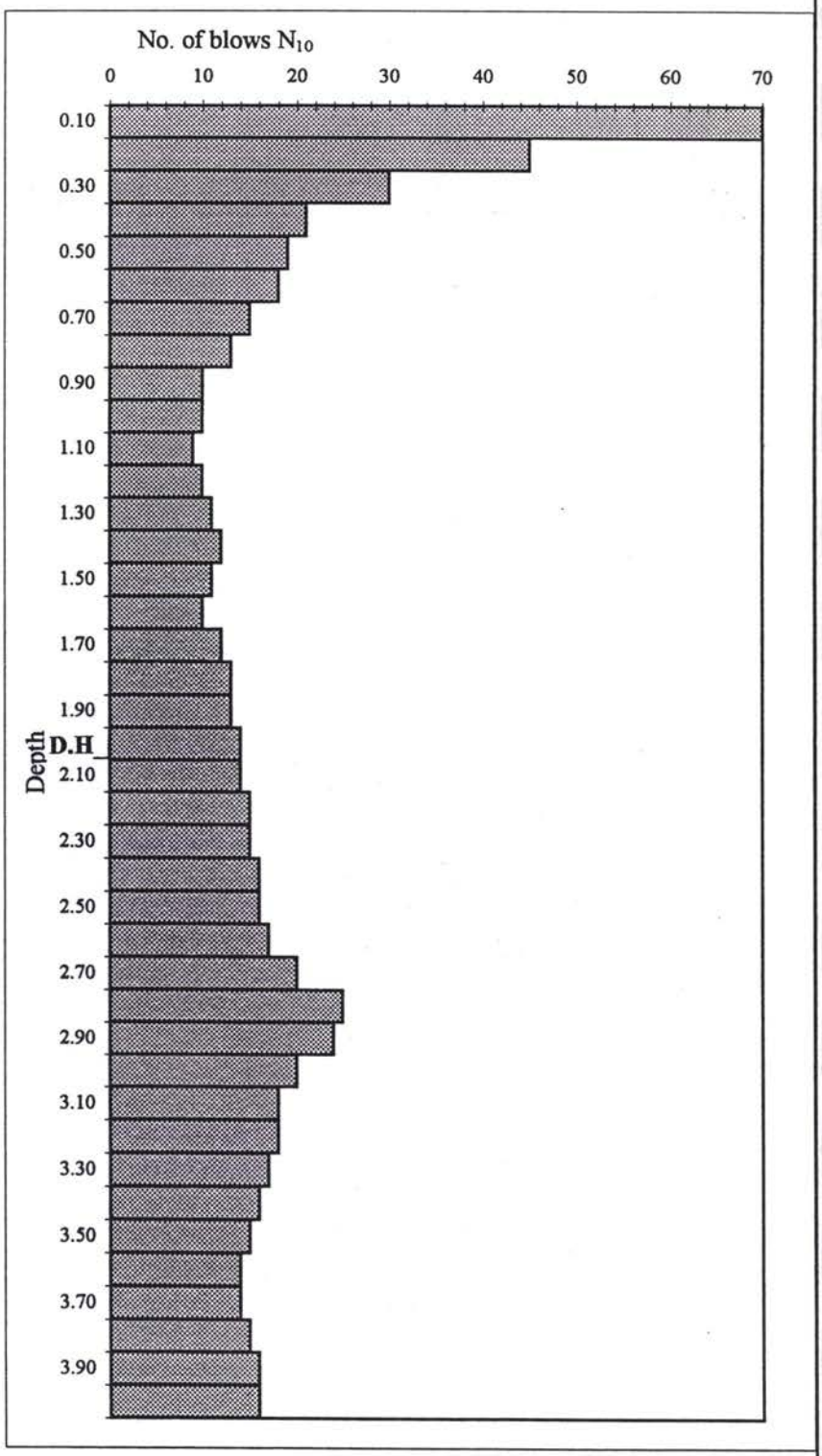
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 191+600 / R

Date / Дата : 09. 04. 1997

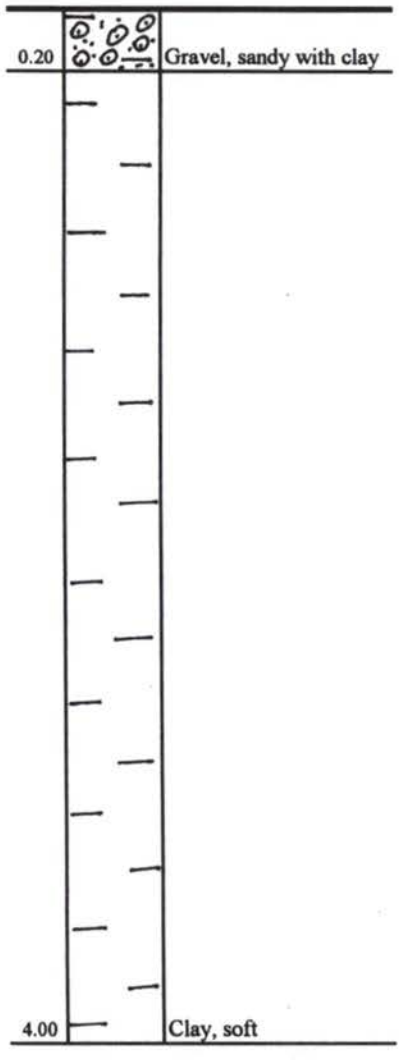
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	70
0.20	45
0.30	30
0.40	21
0.50	19
0.60	18
0.70	15
0.80	13
0.90	10
1.00	10
1.10	9
1.20	10
1.30	11
1.40	12
1.50	11
1.60	10
1.70	12
1.80	13
1.90	13
2.00	14
2.10	14
2.20	15
2.30	15
2.40	16
2.50	16
2.60	17
2.70	20
2.80	25
2.90	24
3.00	20
3.10	18
3.20	18
3.30	17
3.40	16
3.50	15
3.60	14
3.70	14
3.80	15
3.90	16
4.00	16



SOIL SECTION **No. 26**

Location/Место: km 191+600 / R
Data/Дата: 09.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 27**

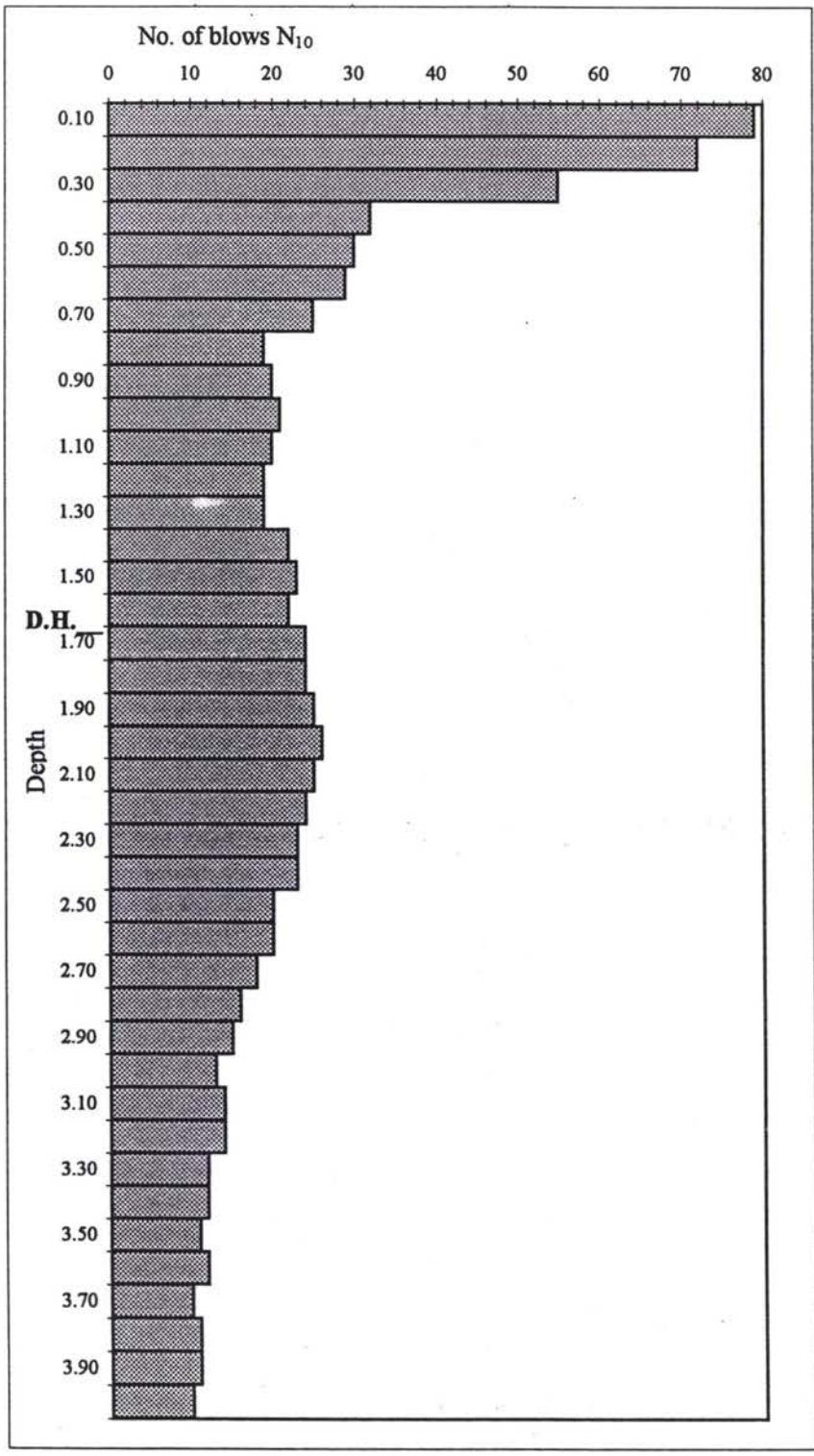
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 196+000 / L

Date / Дата : 10. 04. 1997

Level / Уровень : Shoulder surface

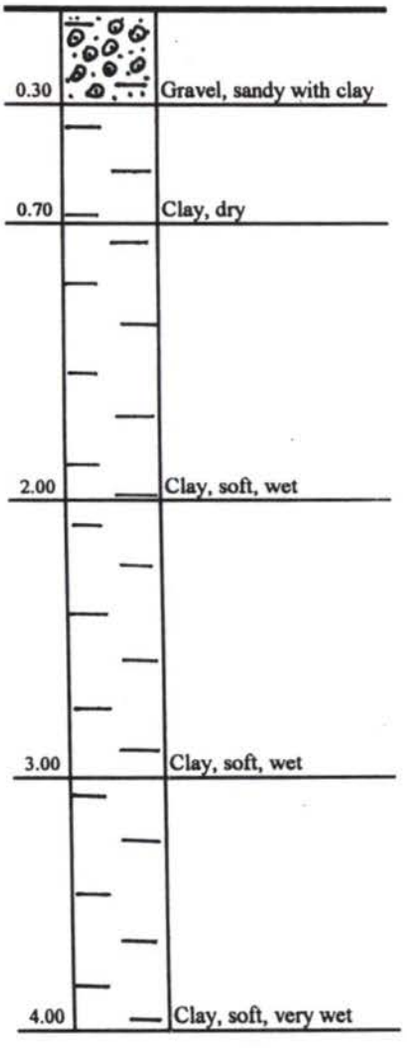
Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	79
0.20	72
0.30	55
0.40	32
0.50	30
0.60	29
0.70	25
0.80	19
0.90	20
1.00	21
1.10	20
1.20	19
1.30	19
1.40	22
1.50	23
1.60	22
1.70	24
1.80	24
1.90	25
2.00	26
2.10	25
2.20	24
2.30	23
2.40	23
2.50	20
2.60	20
2.70	18
2.80	16
2.90	15
3.00	13
3.10	14
3.20	14
3.30	12
3.40	12
3.50	11
3.60	12
3.70	10
3.80	11
3.90	11
4.00	10



SOIL SECTION

No. 27

Location/Место: km 196 + 000 / L
Data/Дата: 10.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 28**

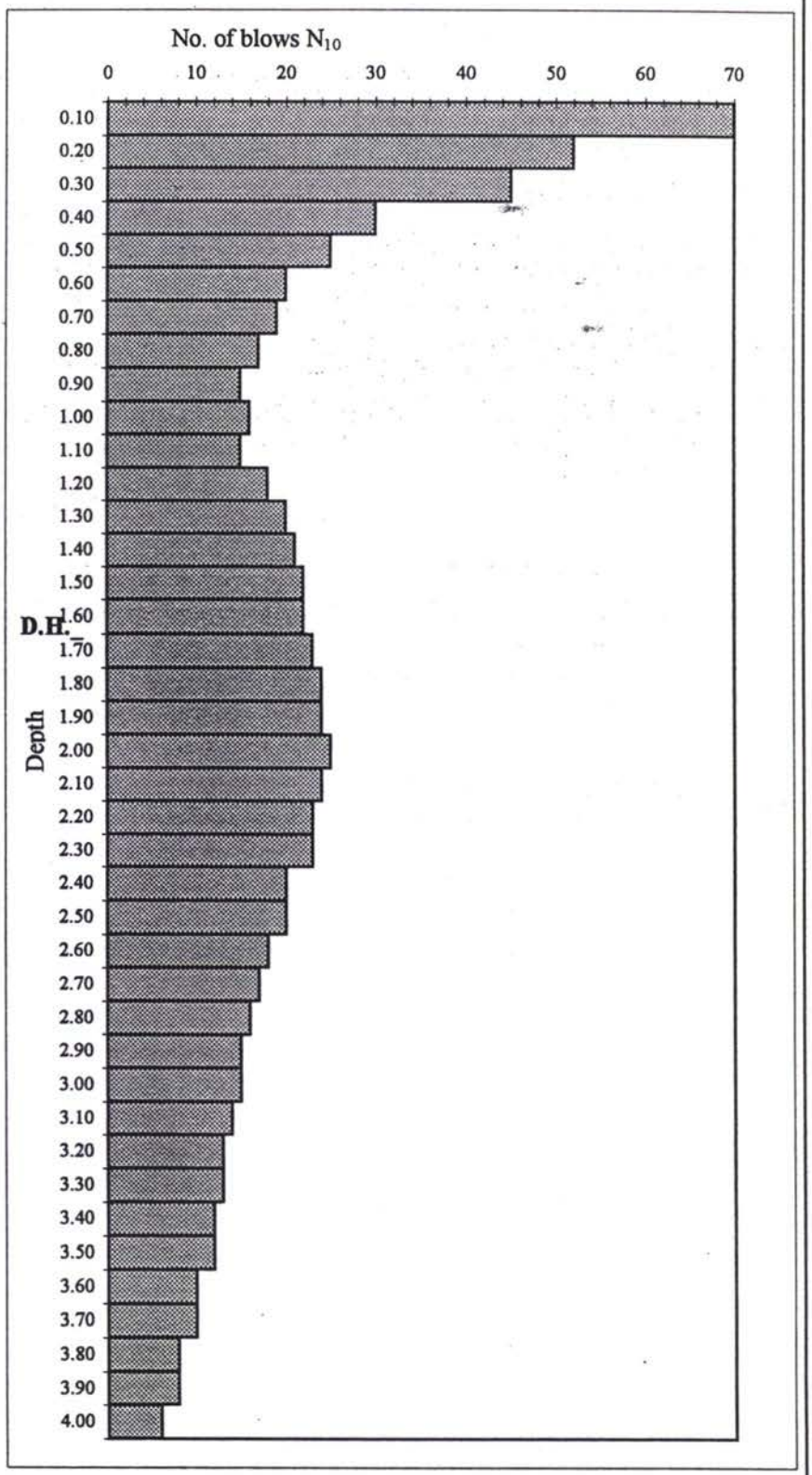
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 202 + 000 / L

Date / Дата : 10.04.97

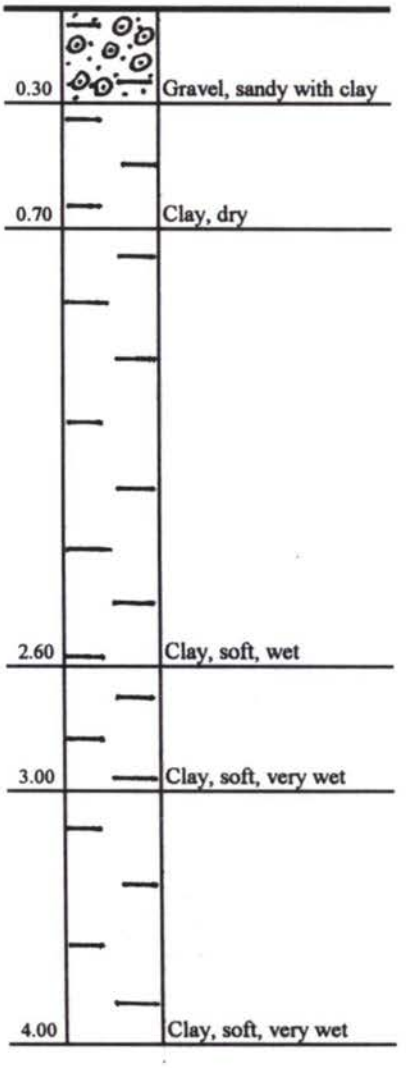
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	70
0.20	52
0.30	45
0.40	30
0.50	25
0.60	20
0.70	19
0.80	17
0.90	15
1.00	16
1.10	15
1.20	18
1.30	20
1.40	21
1.50	22
1.60	22
1.70	23
1.80	24
1.90	24
2.00	25
2.10	24
2.20	23
2.30	23
2.40	20
2.50	20
2.60	18
2.70	17
2.80	16
2.90	15
3.00	15
3.10	14
3.20	13
3.30	13
3.40	12
3.50	12
3.60	10
3.70	10
3.80	8
3.90	8
4.00	6



SOIL SECTION **No. 28**

Location/Место: km 202+000 / L
Data/Дата: 10.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 29**

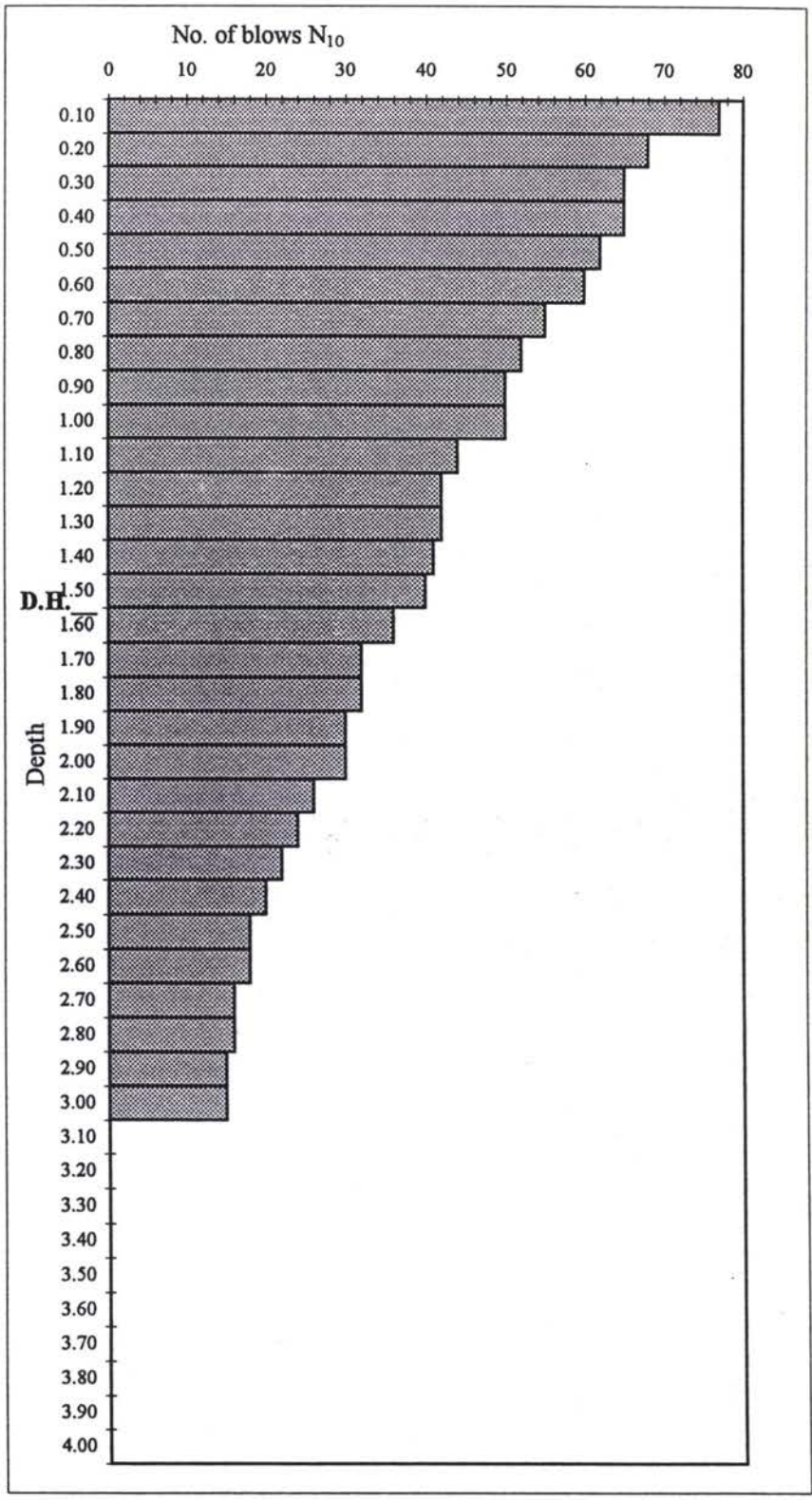
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 206 + 000 / L

Date / Дата : 11.04.97

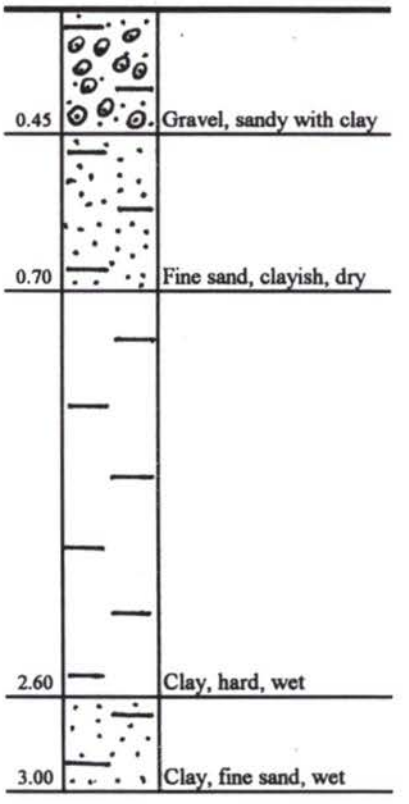
Level / Уровень : Shoulder surface

Depth	No. of blows
Глубина	Число вдуваний
[m]	N_{10}
0.10	77
0.20	68
0.30	65
0.40	65
0.50	62
0.60	60
0.70	55
0.80	52
0.90	50
1.00	50
1.10	44
1.20	42
1.30	42
1.40	41
1.50	40
1.60	36
1.70	32
1.80	32
1.90	30
2.00	30
2.10	26
2.20	24
2.30	22
2.40	20
2.50	18
2.60	18
2.70	16
2.80	16
2.90	15
3.00	15
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION **No. 29**

Location/Место: km 206+000 / L
Data/Дата: 11.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 30**

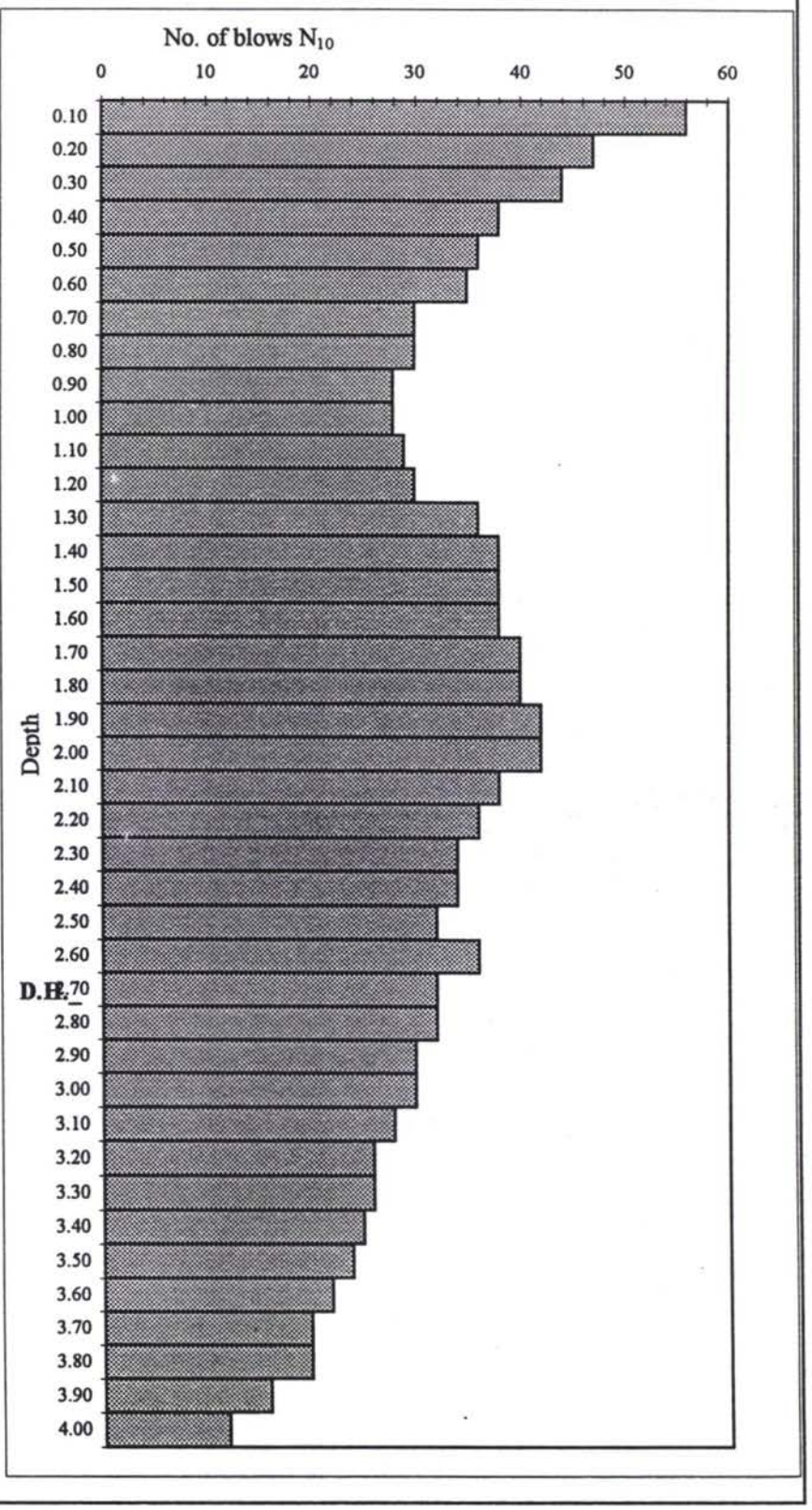
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 212 + 300 / L

Date / Дата : 12.04.97

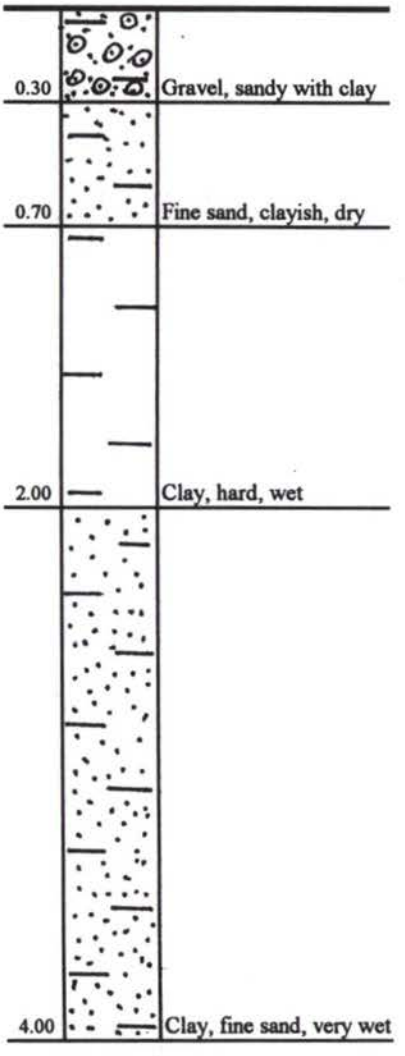
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	56
0.20	47
0.30	44
0.40	38
0.50	36
0.60	35
0.70	30
0.80	30
0.90	28
1.00	28
1.10	29
1.20	30
1.30	36
1.40	38
1.50	38
1.60	38
1.70	40
1.80	40
1.90	42
2.00	42
2.10	38
2.20	36
2.30	34
2.40	34
2.50	32
2.60	36
2.70	32
2.80	32
2.90	30
3.00	30
3.10	28
3.20	26
3.30	26
3.40	25
3.50	24
3.60	22
3.70	20
3.80	20
3.90	16
4.00	12



SOIL SECTION **No. 30**

Location/Место: km 212 + 300 / L
Data/Дата: 12.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) No. 31

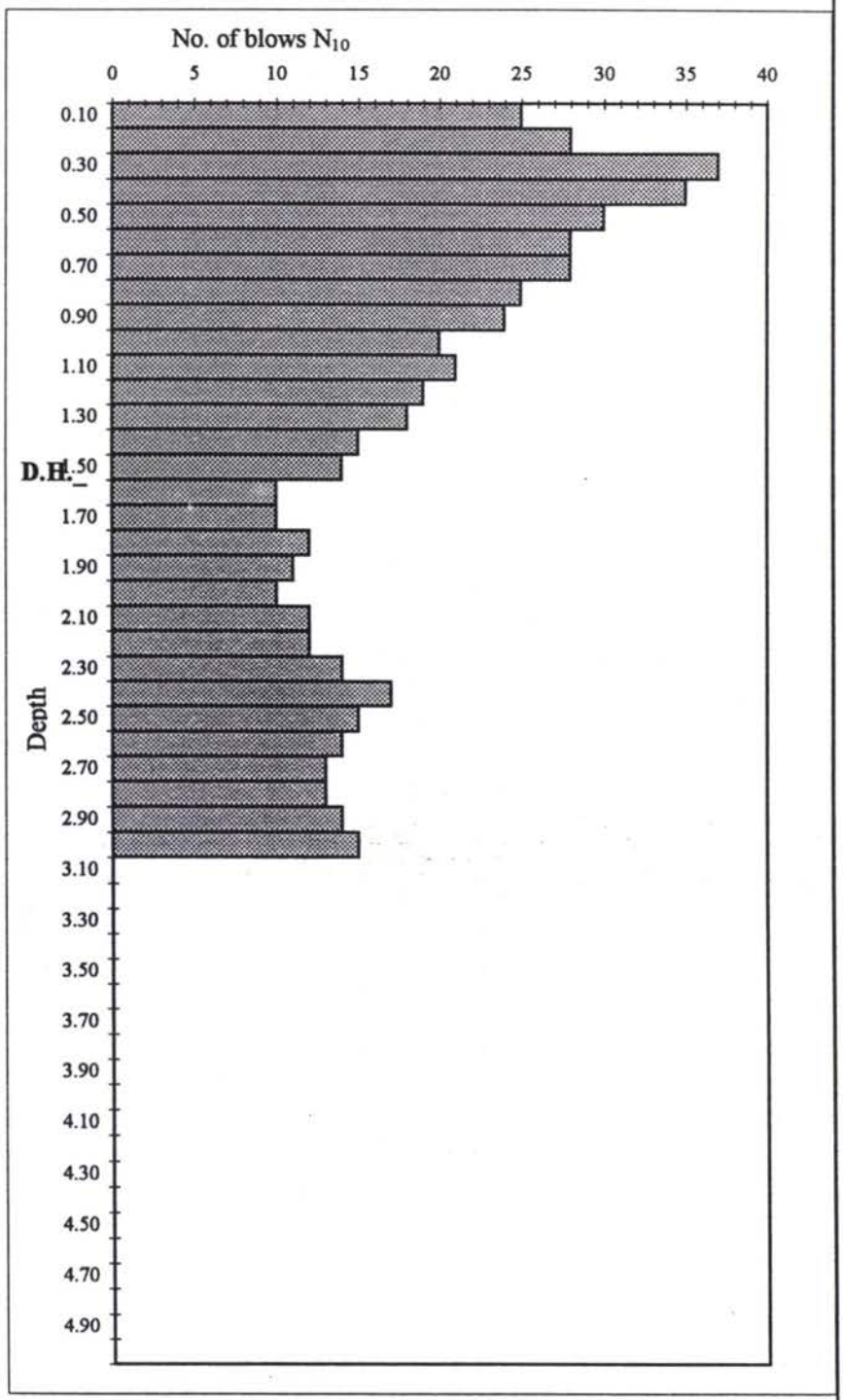
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 214 + 100 / L

Date / Дата : 13.04.97

Level / Уровень : Shoulder surface

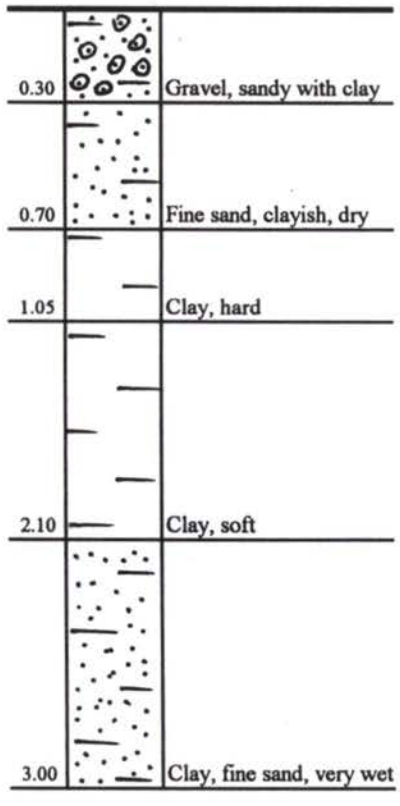
Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	25
0.20	28
0.30	37
0.40	35
0.50	30
0.60	28
0.70	28
0.80	25
0.90	24
1.00	20
1.10	21
1.20	19
1.30	18
1.40	15
1.50	14
1.60	10
1.70	10
1.80	12
1.90	11
2.00	10
2.10	12
2.20	12
2.30	14
2.40	17
2.50	15
2.60	14
2.70	13
2.80	13
2.90	14
3.00	15
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	
4.10	
4.20	
4.30	
4.40	
4.50	
4.60	
4.70	
4.80	
4.90	
5.00	



SOIL SECTION

No. 31

Location/Место: km 214 + 100 / L
Data/Дата: 13.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 32**

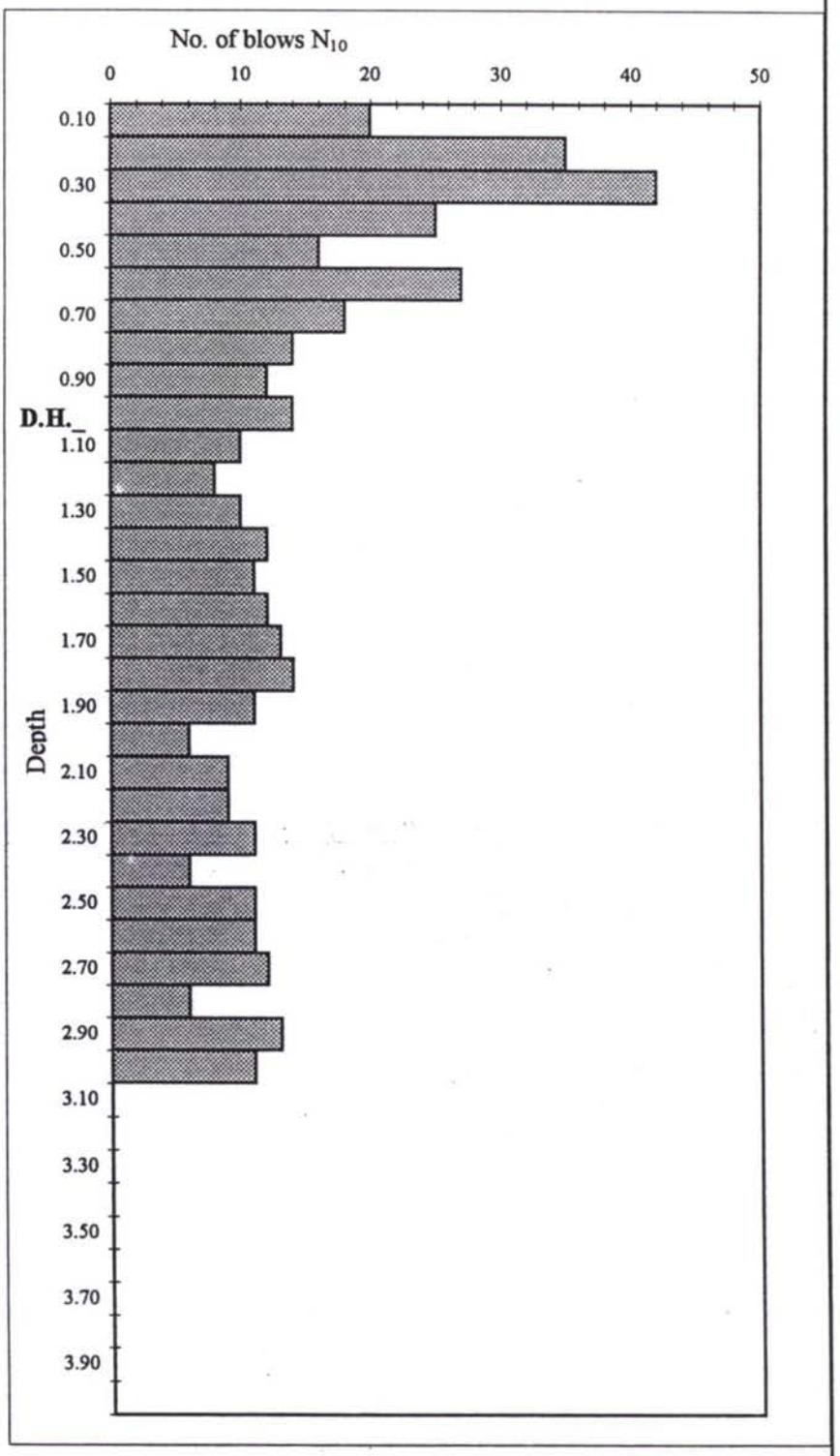
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 287 + 715 / L

Date / Дата : 14.04.97

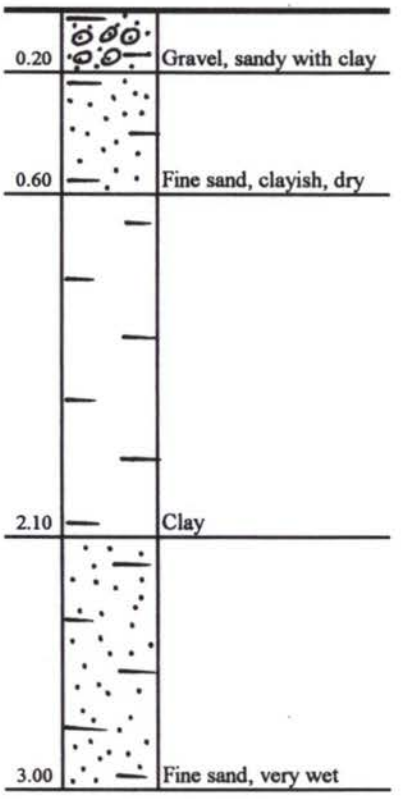
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	20
0.20	35
0.30	42
0.40	25
0.50	16
0.60	27
0.70	18
0.80	14
0.90	12
1.00	14
1.10	10
1.20	8
1.30	10
1.40	12
1.50	11
1.60	12
1.70	13
1.80	14
1.90	11
2.00	6
2.10	9
2.20	9
2.30	11
2.40	6
2.50	11
2.60	11
2.70	12
2.80	6
2.90	13
3.00	11
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION **No. 32**

Location /место : km 287 + 715 / L
Data/Дата: 14.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 33**

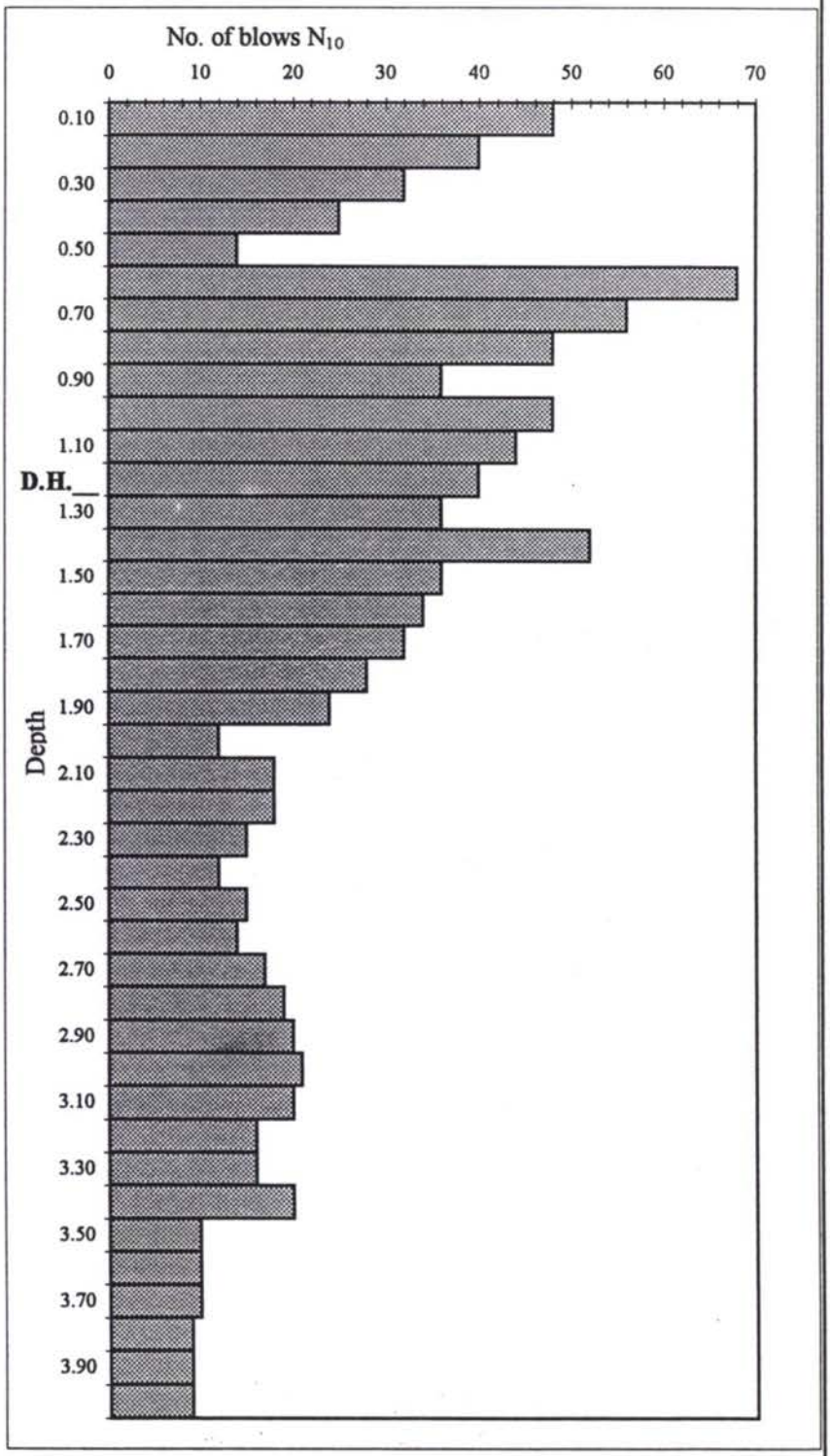
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 294 + 015 / L

Date / Дата : 15.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	48
0.20	40
0.30	32
0.40	25
0.50	14
0.60	68
0.70	56
0.80	48
0.90	36
1.00	48
1.10	44
1.20	40
1.30	36
1.40	52
1.50	36
1.60	34
1.70	32
1.80	28
1.90	24
2.00	12
2.10	18
2.20	18
2.30	15
2.40	12
2.50	15
2.60	14
2.70	17
2.80	19
2.90	20
3.00	21
3.10	20
3.20	16
3.30	16
3.40	20
3.50	10
3.60	10
3.70	10
3.80	9
3.90	9
4.00	9



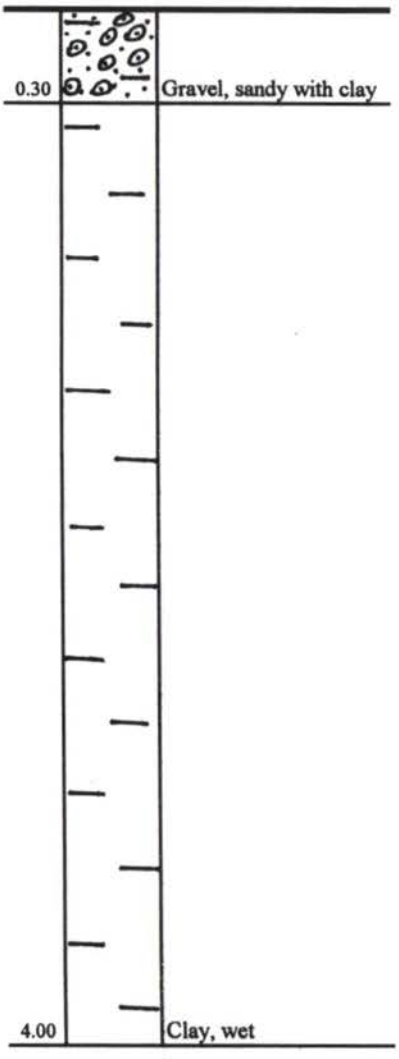
SOIL SECTION

No. 33

Location /место : km 294 + 015 / L

Data/Дата: 15.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 34**

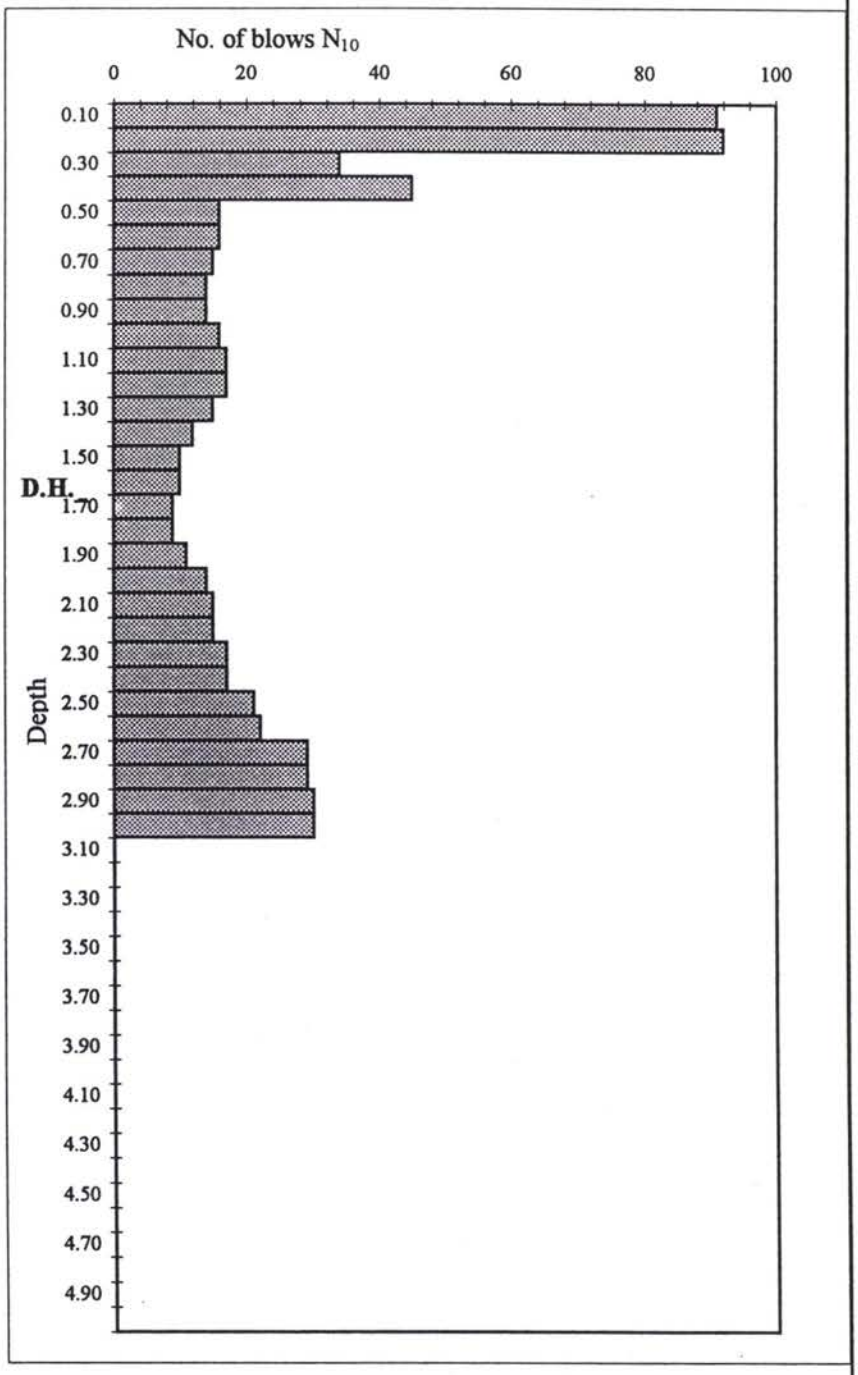
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 301 + 215 / L

Date / Дата : 16.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	91
0.20	92
0.30	34
0.40	45
0.50	16
0.60	16
0.70	15
0.80	14
0.90	14
1.00	16
1.10	17
1.20	17
1.30	15
1.40	12
1.50	10
1.60	10
1.70	9
1.80	9
1.90	11
2.00	14
2.10	15
2.20	15
2.30	17
2.40	17
2.50	21
2.60	22
2.70	29
2.80	29
2.90	30
3.00	30
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	
4.10	
4.20	
4.30	
4.40	
4.50	
4.60	
4.70	
4.80	
4.90	
5.00	



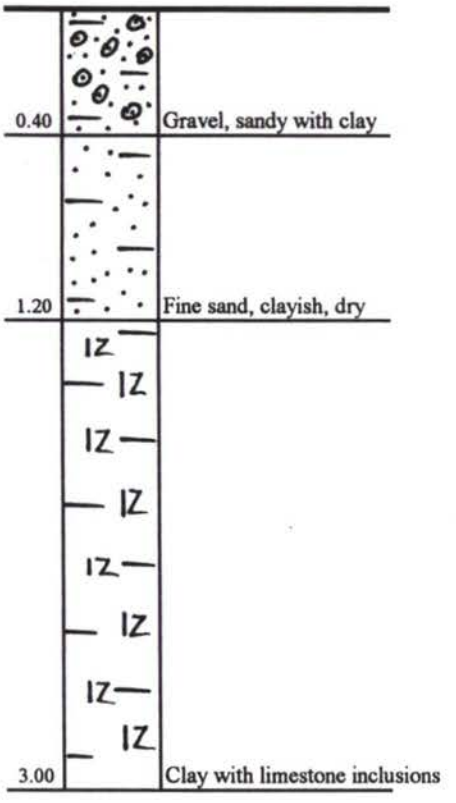
SOIL SECTION

No. 34

Location /место : km 301 + 215 / L

Data/Дата: 16.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 35**

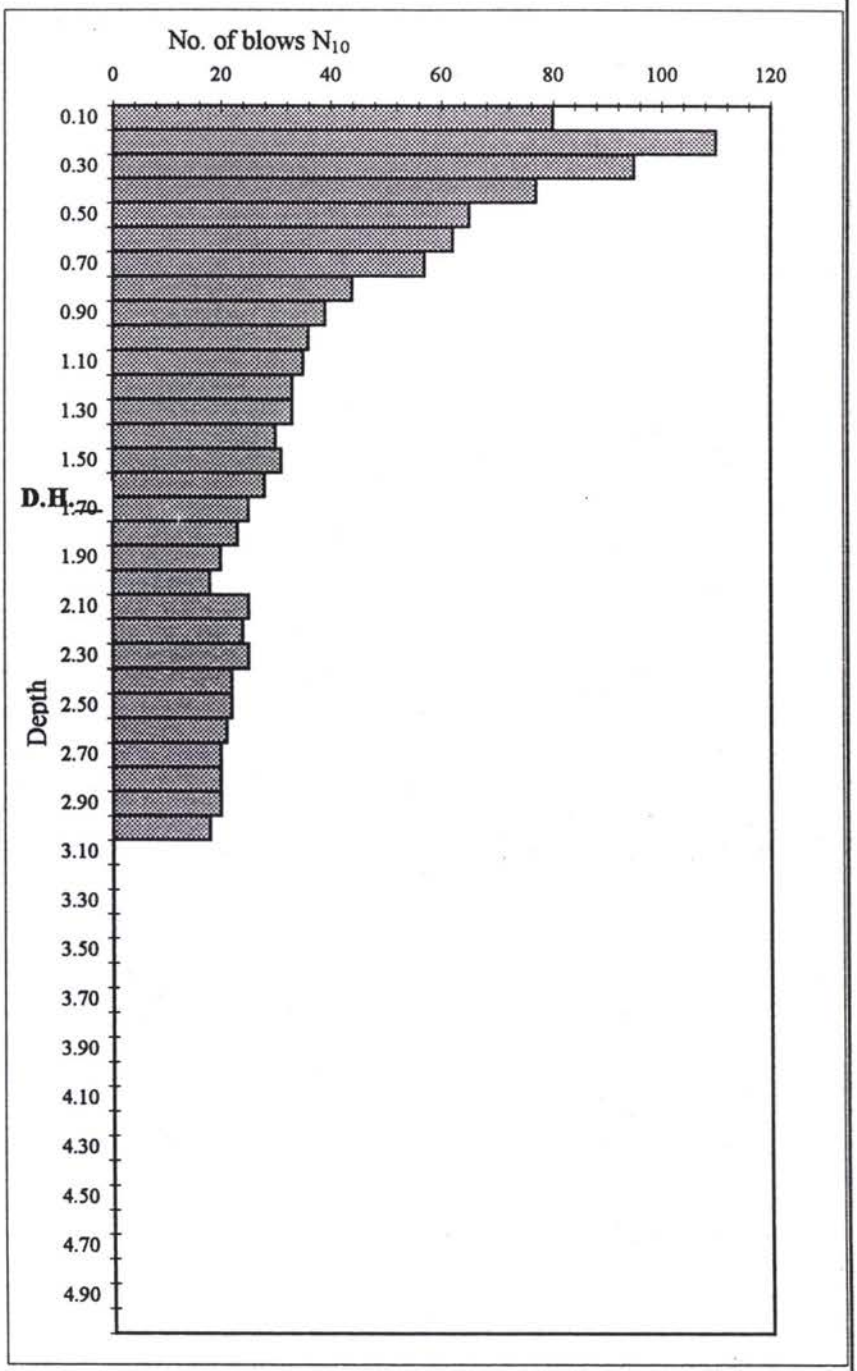
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 308 + 215 / L

Date / Дата : 17.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	80
0.20	110
0.30	95
0.40	77
0.50	65
0.60	62
0.70	57
0.80	44
0.90	39
1.00	36
1.10	35
1.20	33
1.30	33
1.40	30
1.50	31
1.60	28
1.70	25
1.80	23
1.90	20
2.00	18
2.10	25
2.20	24
2.30	25
2.40	22
2.50	22
2.60	21
2.70	20
2.80	20
2.90	20
3.00	18
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	
4.10	
4.20	
4.30	
4.40	
4.50	
4.60	
4.70	
4.80	
4.90	
5.00	



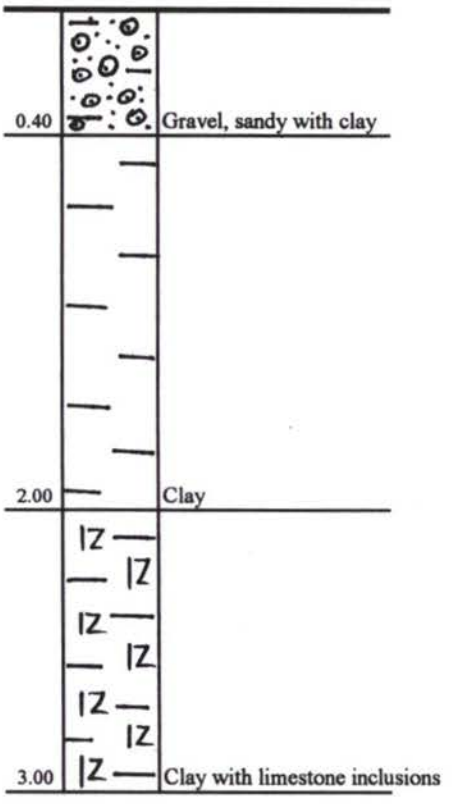
SOIL SECTION

No. 35

Location /место : km 308 + 215 / L

Data/Дата: 17.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 36**

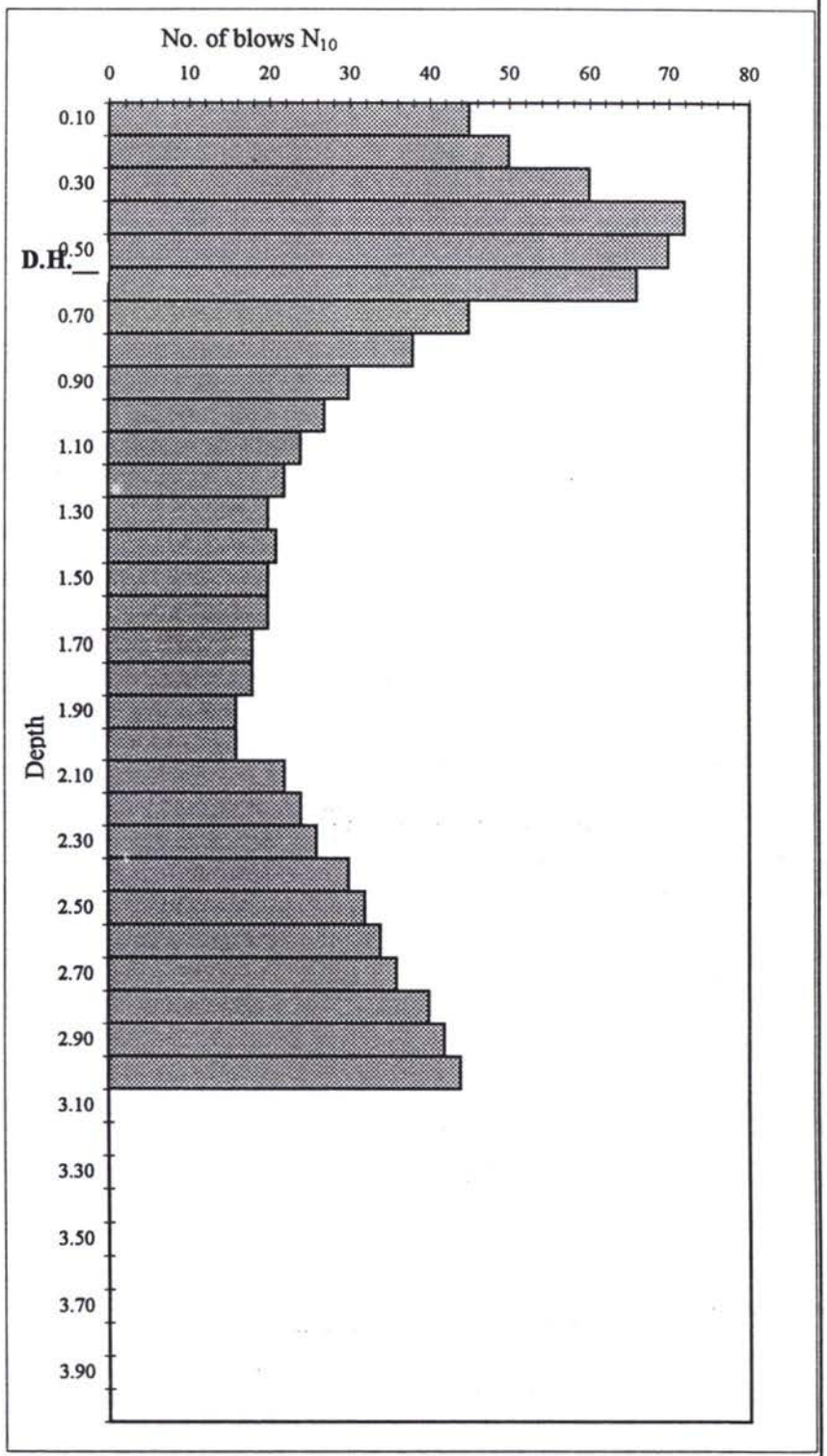
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 315 + 315 / L

Date / Дата : 18.04.97

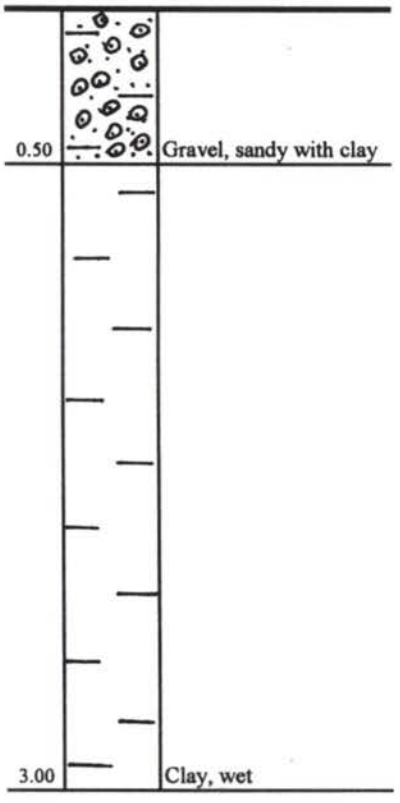
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	45
0.20	50
0.30	60
0.40	72
0.50	70
0.60	66
0.70	45
0.80	38
0.90	30
1.00	27
1.10	24
1.20	22
1.30	20
1.40	21
1.50	20
1.60	20
1.70	18
1.80	18
1.90	16
2.00	16
2.10	22
2.20	24
2.30	26
2.40	30
2.50	32
2.60	34
2.70	36
2.80	40
2.90	42
3.00	44
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION **No. 36**

Location /место : km 315 + 315 / L
Data/Дата: 18.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 37**

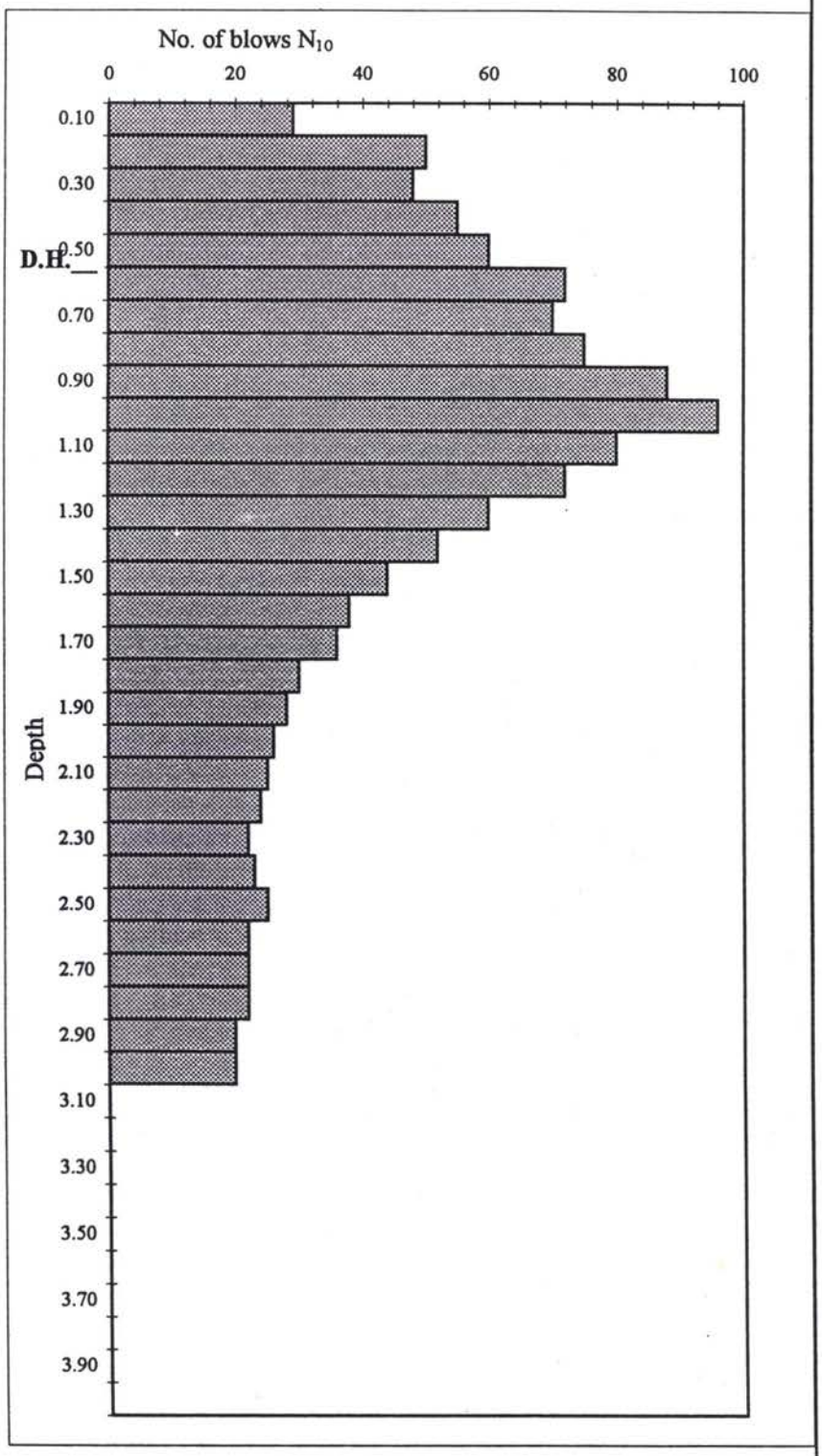
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 320 + 215 / L

Date / Дата : 19.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	29
0.20	50
0.30	48
0.40	55
0.50	60
0.60	72
0.70	70
0.80	75
0.90	88
1.00	96
1.10	80
1.20	72
1.30	60
1.40	52
1.50	44
1.60	38
1.70	36
1.80	30
1.90	28
2.00	26
2.10	25
2.20	24
2.30	22
2.40	23
2.50	25
2.60	22
2.70	22
2.80	22
2.90	20
3.00	20
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	

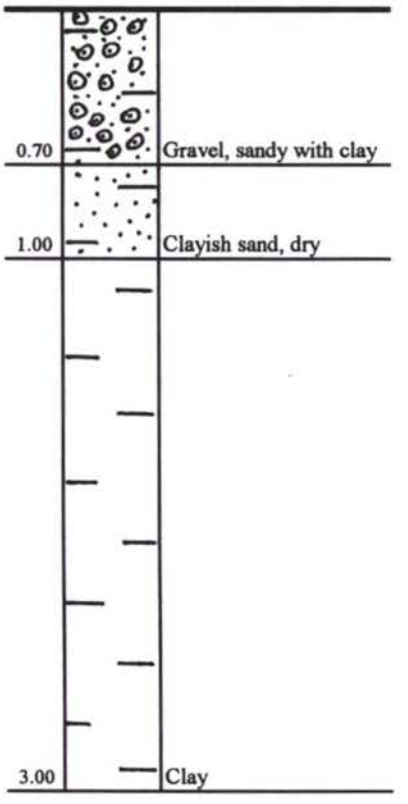


SOIL SECTION **No. 37**

Location /место : km 320 + 215 / L

Data/Дата: 19.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 38**

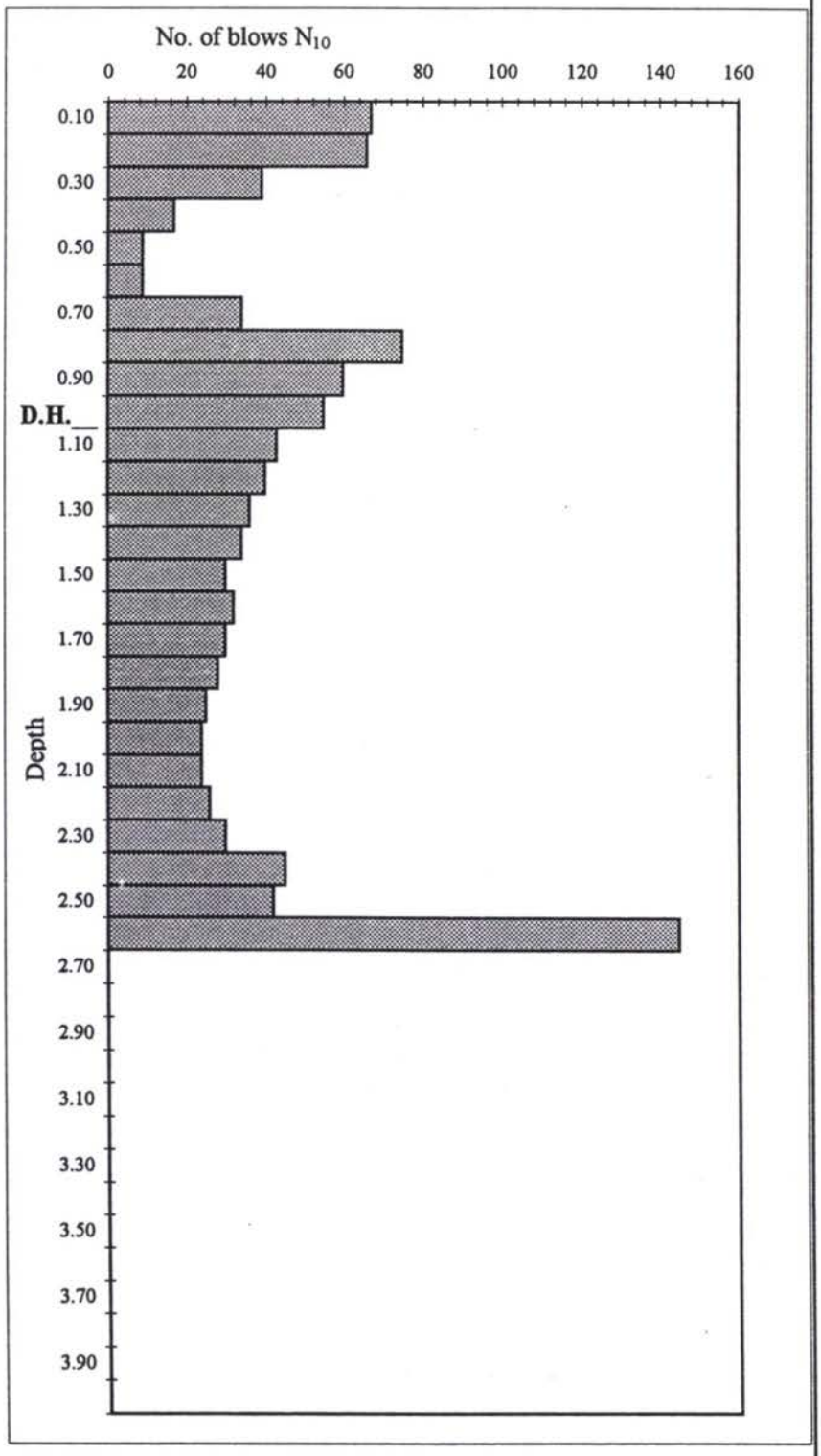
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 329 + 215 / L

Date / Дата : 22.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	67
0.20	66
0.30	39
0.40	17
0.50	9
0.60	9
0.70	34
0.80	75
0.90	60
1.00	55
1.10	43
1.20	40
1.30	36
1.40	34
1.50	30
1.60	32
1.70	30
1.80	28
1.90	25
2.00	24
2.10	24
2.20	26
2.30	30
2.40	45
2.50	42
2.60	145
2.70	
2.80	
2.90	
3.00	
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



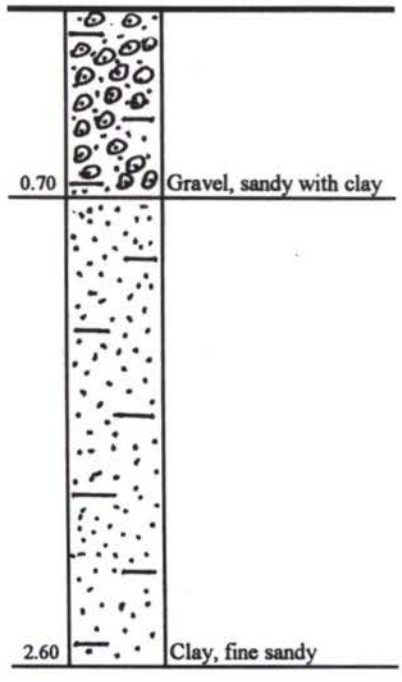
SOIL SECTION

No. 38

Location /место : km 329 + 215 / L

Data/Дата: 22.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 39**

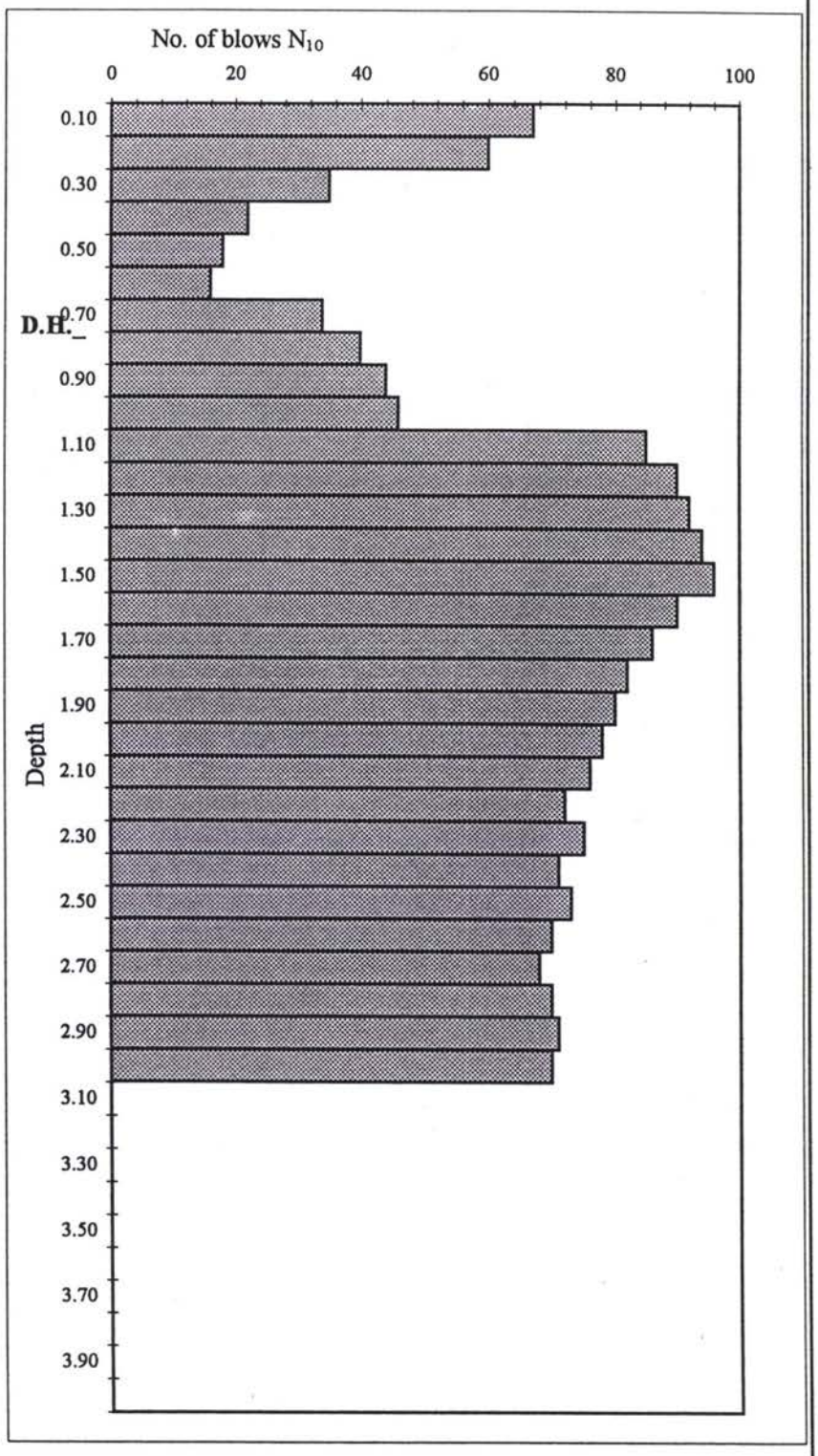
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 337 + 215 / L

Date / Дата : 22.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	67
0.20	60
0.30	35
0.40	22
0.50	18
0.60	16
0.70	34
0.80	40
0.90	44
1.00	46
1.10	85
1.20	90
1.30	92
1.40	94
1.50	96
1.60	90
1.70	86
1.80	82
1.90	80
2.00	78
2.10	76
2.20	72
2.30	75
2.40	71
2.50	73
2.60	70
2.70	68
2.80	70
2.90	71
3.00	70
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



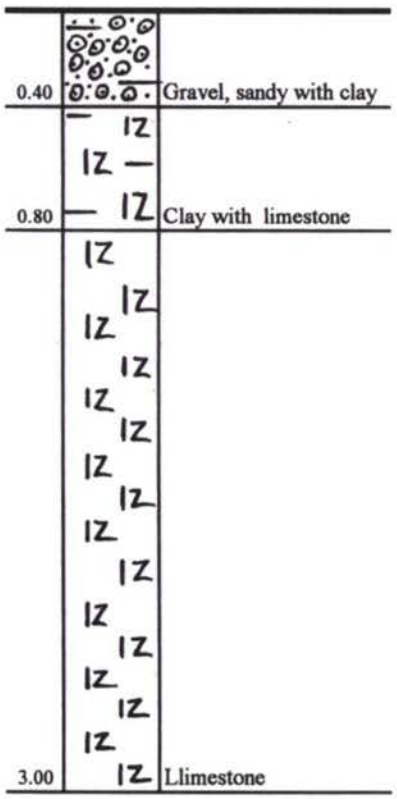
SOIL SECTION

No. 39

Location /место : km 337 + 215 / L

Data/Дата: 22.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 40**

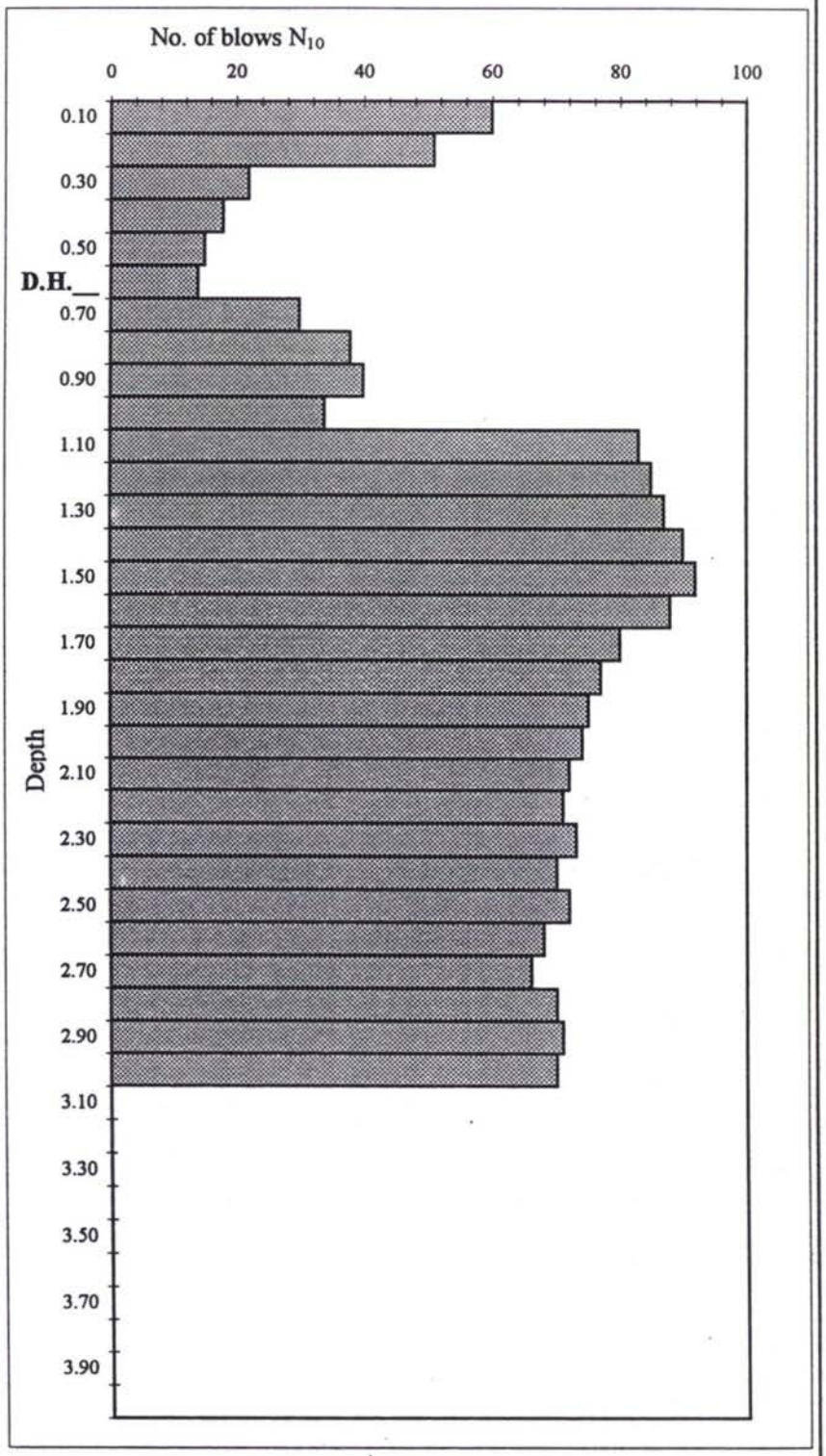
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 344 + 215 / L

Date / Дата : 22.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	60
0.20	51
0.30	22
0.40	18
0.50	15
0.60	14
0.70	30
0.80	38
0.90	40
1.00	34
1.10	83
1.20	85
1.30	87
1.40	90
1.50	92
1.60	88
1.70	80
1.80	77
1.90	75
2.00	74
2.10	72
2.20	71
2.30	73
2.40	70
2.50	72
2.60	68
2.70	66
2.80	70
2.90	71
3.00	70
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



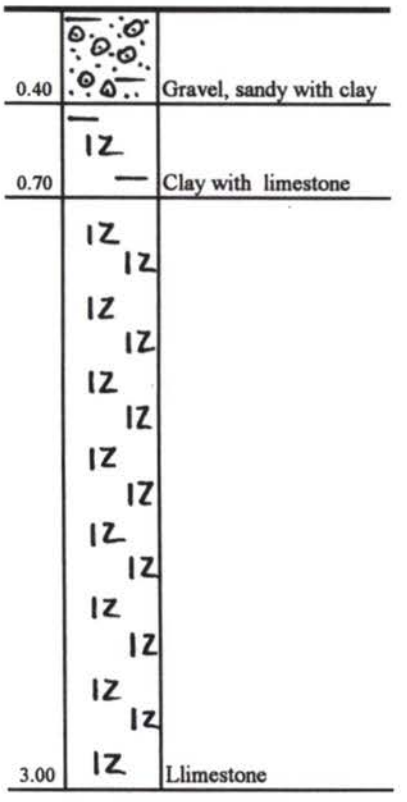
SOIL SECTION

No. 40

Location /место : km 344 + 215 / L

Data/Дата: 22.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 41**

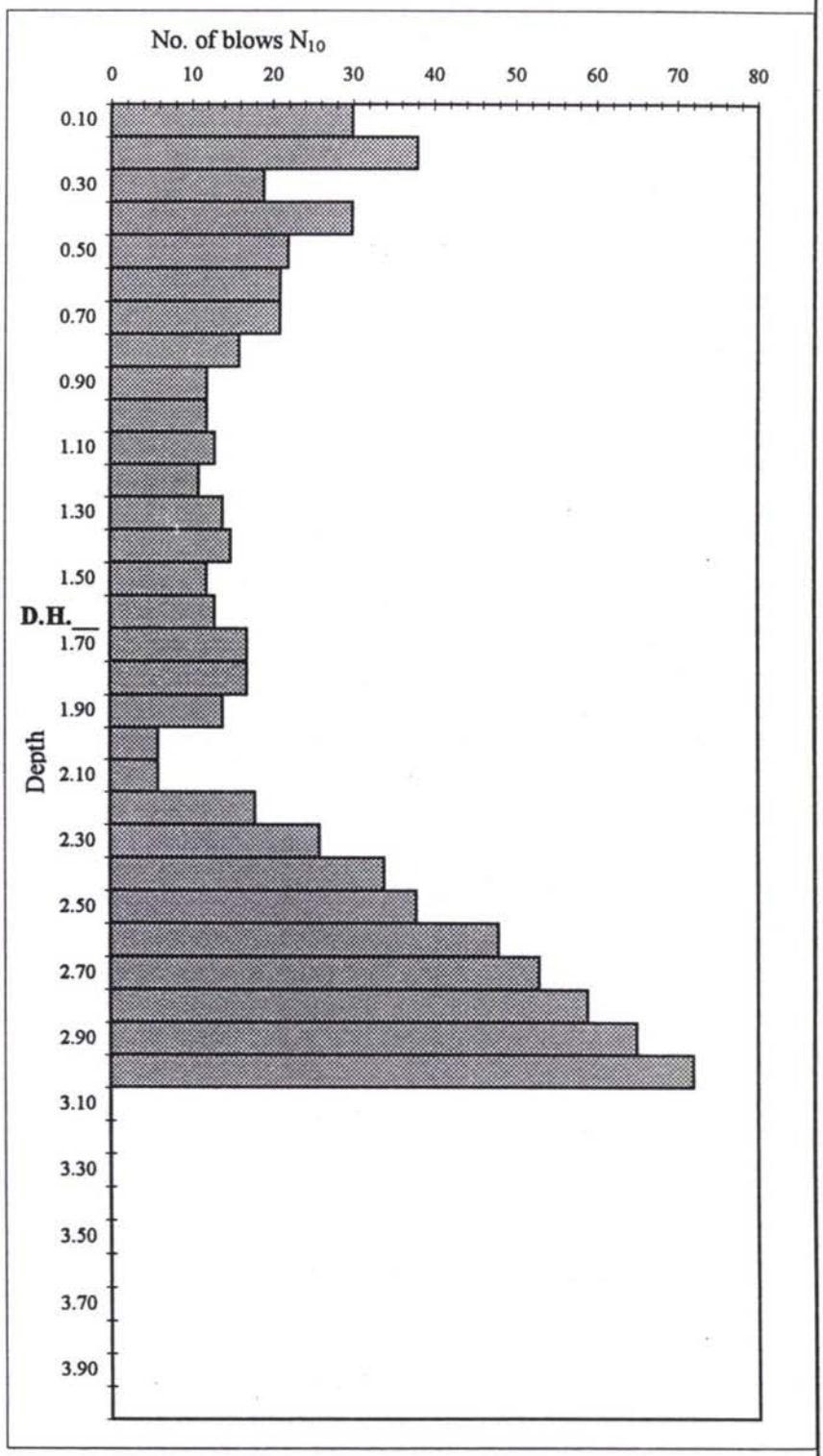
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 349 + 715 / L

Date / Дата : 23.04.97

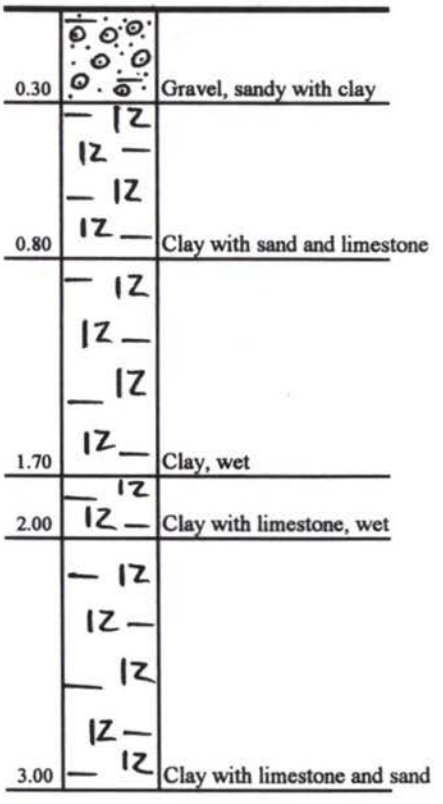
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	30
0.20	38
0.30	19
0.40	30
0.50	22
0.60	21
0.70	21
0.80	16
0.90	12
1.00	12
1.10	13
1.20	11
1.30	14
1.40	15
1.50	12
1.60	13
1.70	17
1.80	17
1.90	14
2.00	6
2.10	6
2.20	18
2.30	26
2.40	34
2.50	38
2.60	48
2.70	53
2.80	59
2.90	65
3.00	72
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION **No. 41**

Location /место : km 349 + 715 / L
Data/Дата: 23.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 42**

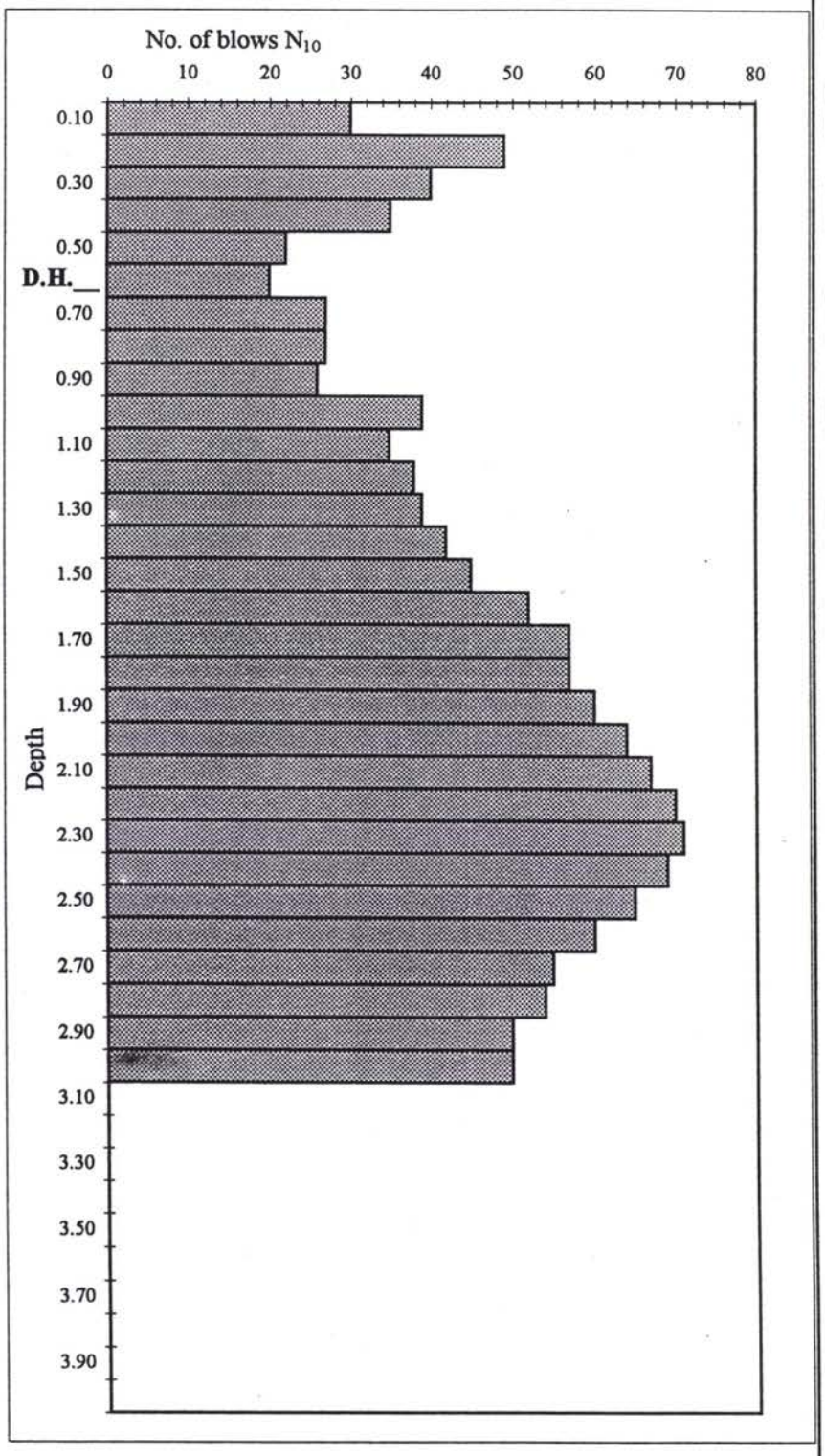
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 361 + 215 / L

Date / Дата : 23.04.97

Level / Уровень : Shoulder surface

Depth	No. of blows
Глубина	Число вдуваний
[m]	N_{10}
0.10	30
0.20	49
0.30	40
0.40	35
0.50	22
0.60	20
0.70	27
0.80	27
0.90	26
1.00	39
1.10	35
1.20	38
1.30	39
1.40	42
1.50	45
1.60	52
1.70	57
1.80	57
1.90	60
2.00	64
2.10	67
2.20	70
2.30	71
2.40	69
2.50	65
2.60	60
2.70	55
2.80	54
2.90	50
3.00	50
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



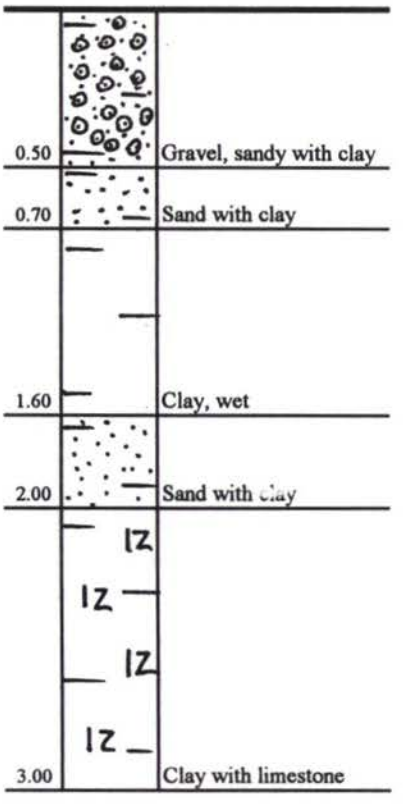
SOIL SECTION

No. 42

Location /место : km 361 + 215 / L

Data/Дата: 23.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 43**

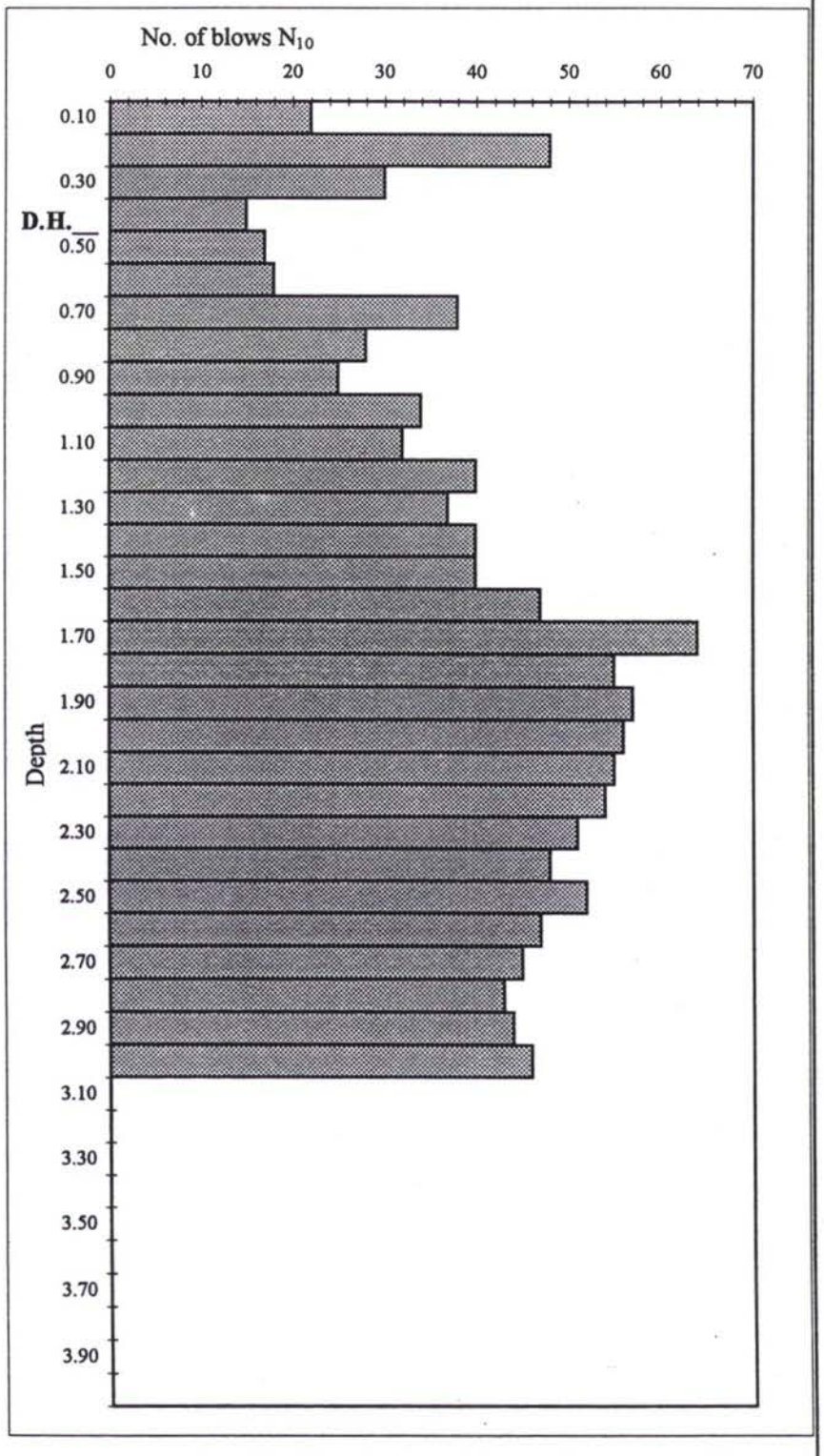
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 368 + 015 / L

Date / Дата : 23.04.97

Level / Уровень : Shoulder surface

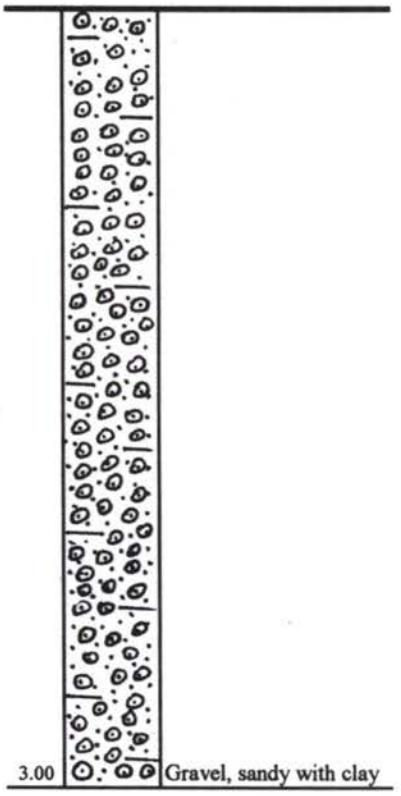
Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	22
0.20	48
0.30	30
0.40	15
0.50	17
0.60	18
0.70	38
0.80	28
0.90	25
1.00	34
1.10	32
1.20	40
1.30	37
1.40	40
1.50	40
1.60	47
1.70	64
1.80	55
1.90	57
2.00	56
2.10	55
2.20	54
2.30	51
2.40	48
2.50	52
2.60	47
2.70	45
2.80	43
2.90	44
3.00	46
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION

No. 43

Location /место : km 368 + 015 / L
Data/Дата: 23.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 44**

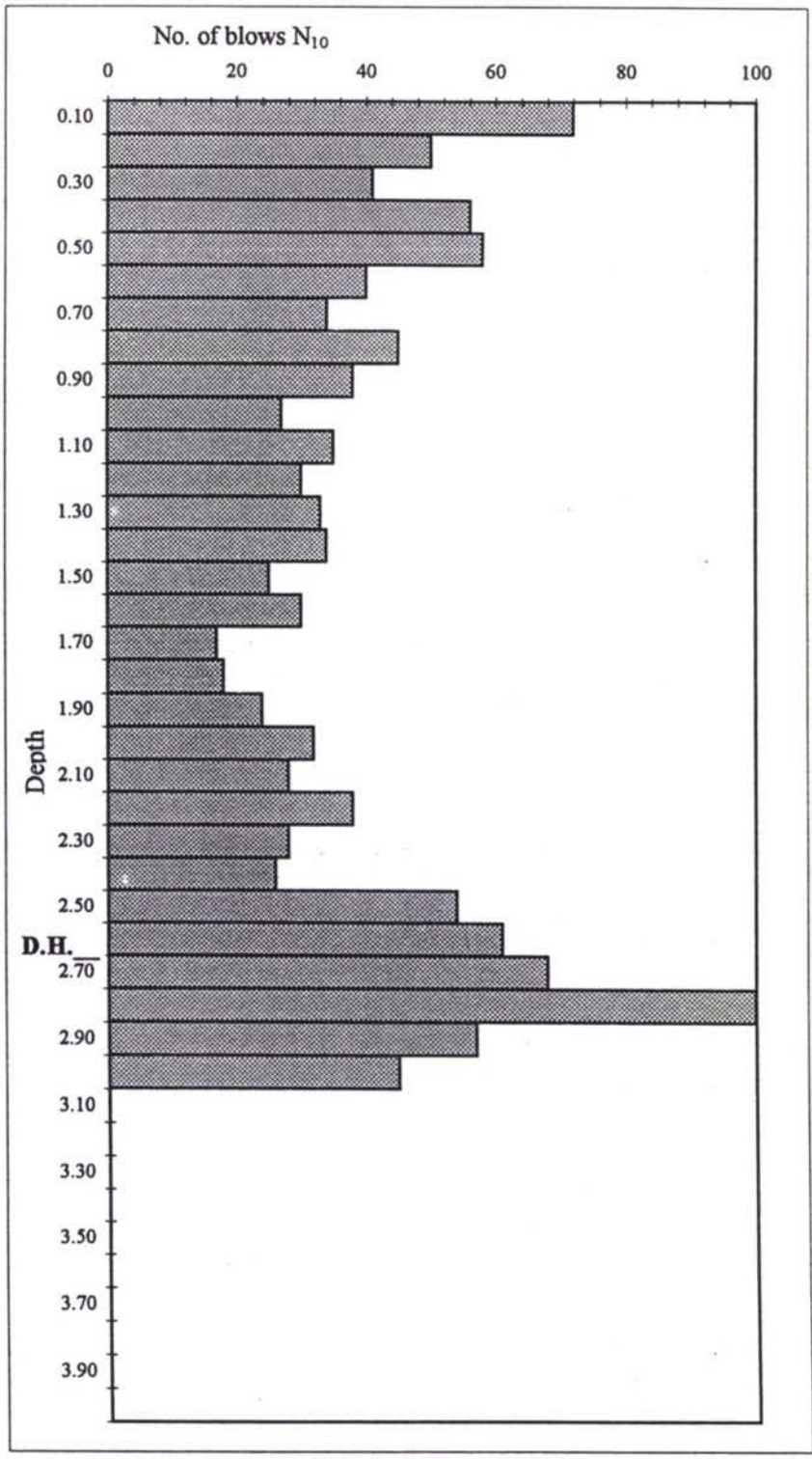
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 376 + 515 / L

Date / Дата : 24.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	72
0.20	50
0.30	41
0.40	56
0.50	58
0.60	40
0.70	34
0.80	45
0.90	38
1.00	27
1.10	35
1.20	30
1.30	33
1.40	34
1.50	25
1.60	30
1.70	17
1.80	18
1.90	24
2.00	32
2.10	28
2.20	38
2.30	28
2.40	26
2.50	54
2.60	61
2.70	68
2.80	100
2.90	57
3.00	45
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	

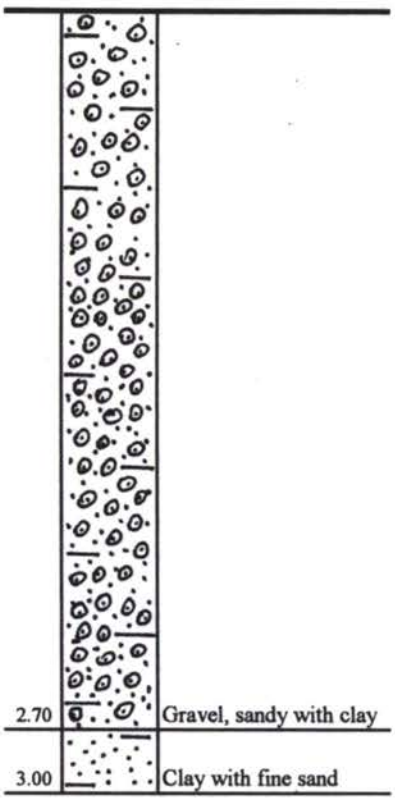


SOIL SECTION **No. 44**

Location /место : km 376 + 515 / L

Data/Дата: 24.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 45**

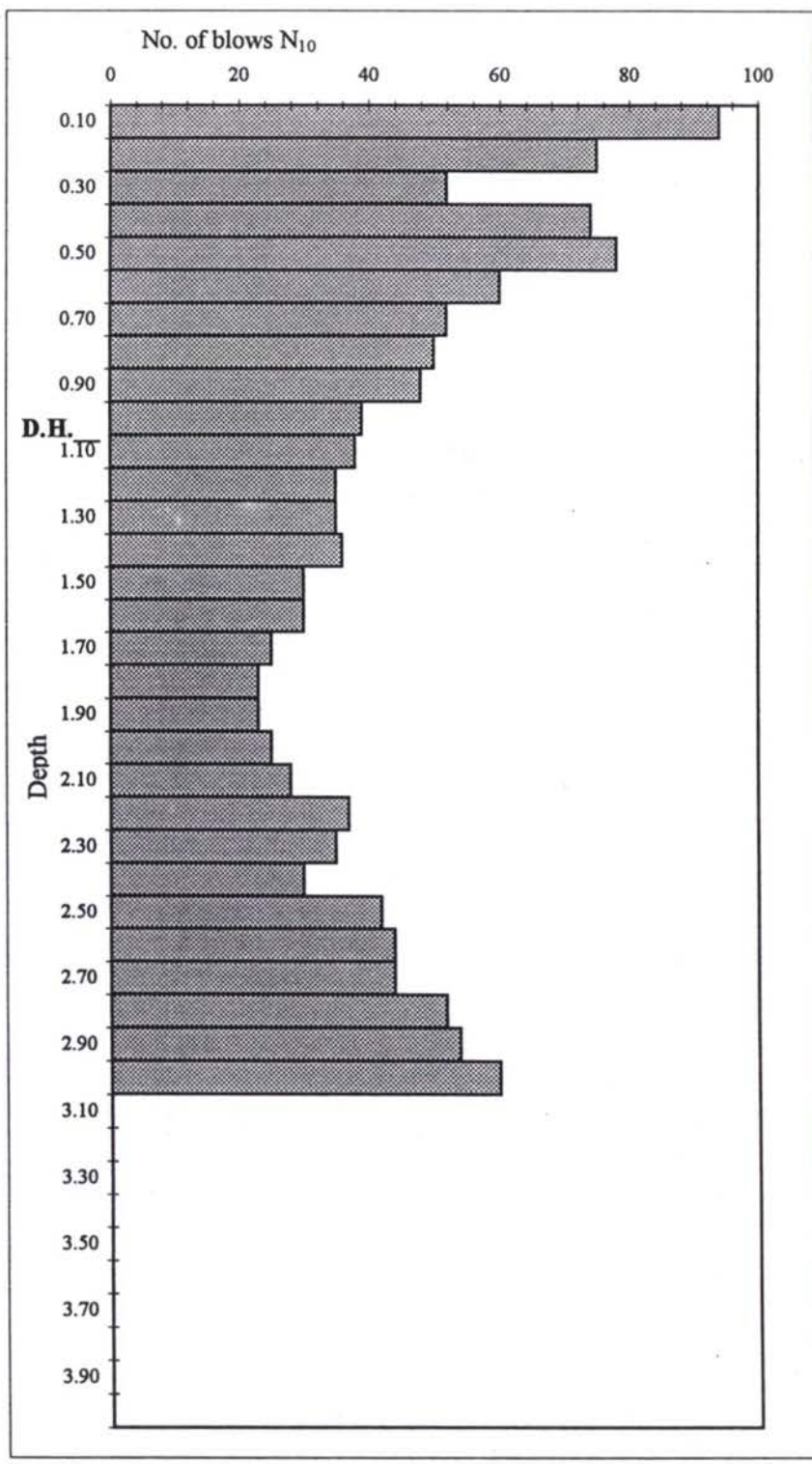
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 388 + 815 / L

Date / Дата : 24.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	94
0.20	75
0.30	52
0.40	74
0.50	78
0.60	60
0.70	52
0.80	50
0.90	48
1.00	39
1.10	38
1.20	35
1.30	35
1.40	36
1.50	30
1.60	30
1.70	25
1.80	23
1.90	23
2.00	25
2.10	28
2.20	37
2.30	35
2.40	30
2.50	42
2.60	44
2.70	44
2.80	52
2.90	54
3.00	60
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



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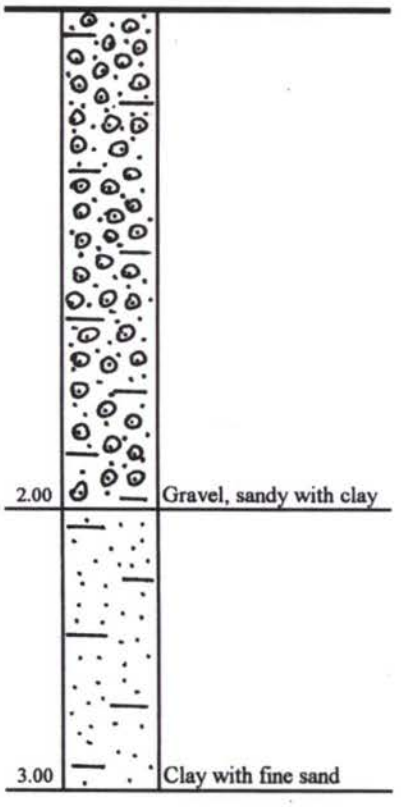
SOIL SECTION

No. 45

Location /место : km 388 + 815 / L

Data/Дата: 24.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 46**

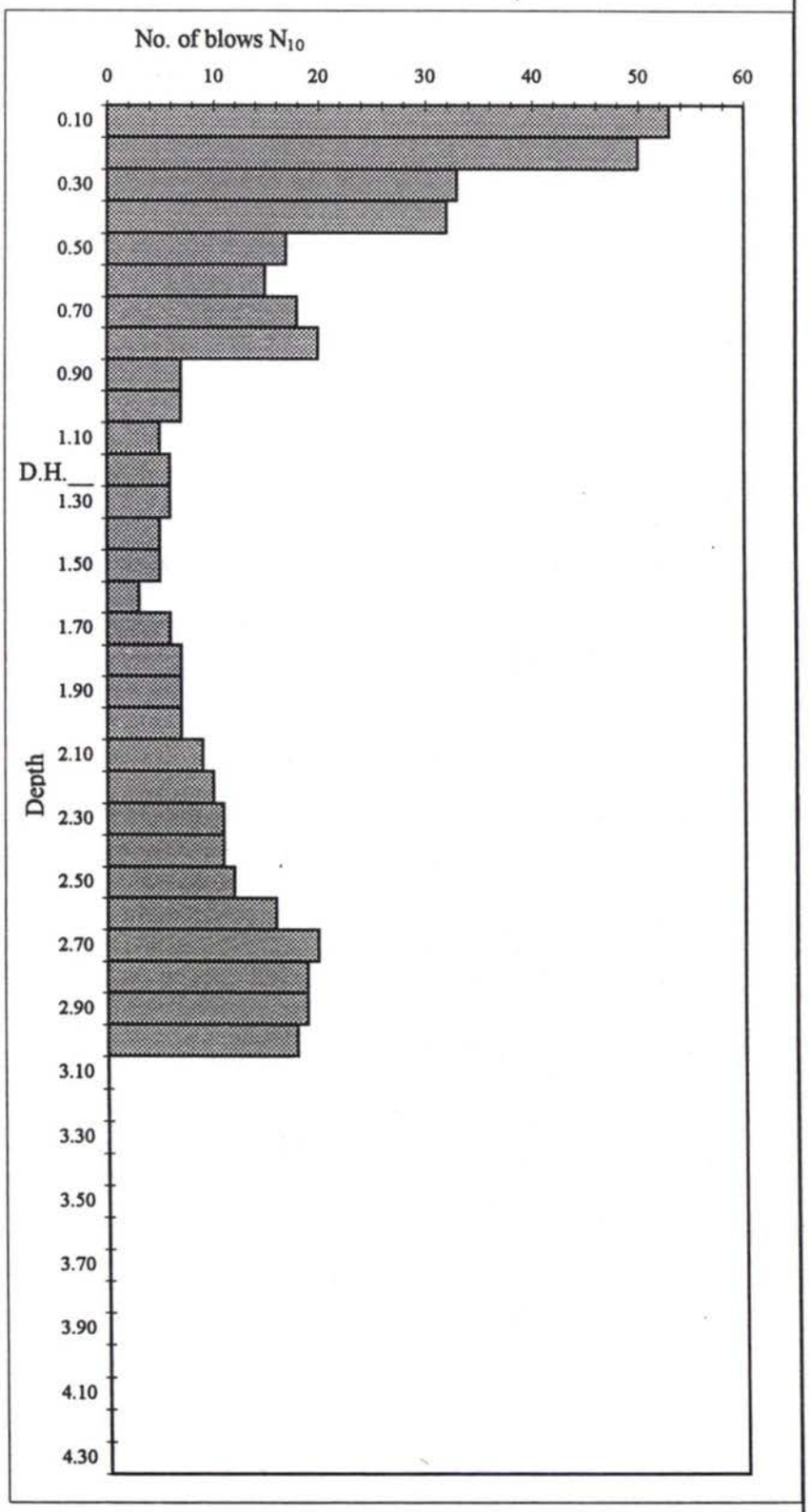
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 395 + 215 / L

Date / Дата : 24.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	53
0.20	50
0.30	33
0.40	32
0.50	17
0.60	15
0.70	18
0.80	20
0.90	7
1.00	7
1.10	5
1.20	6
1.30	6
1.40	5
1.50	5
1.60	3
1.70	6
1.80	7
1.90	7
2.00	7
2.10	9
2.20	10
2.30	11
2.40	11
2.50	12
2.60	16
2.70	20
2.80	19
2.90	19
3.00	18
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	
4.10	
4.20	
4.30	

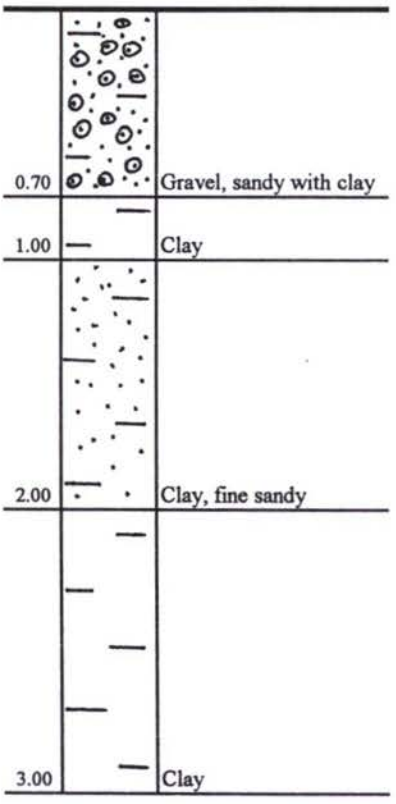


SOIL SECTION No. 46

Location /место : km 395 + 215 / L

Data/Дата: 24.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 47**

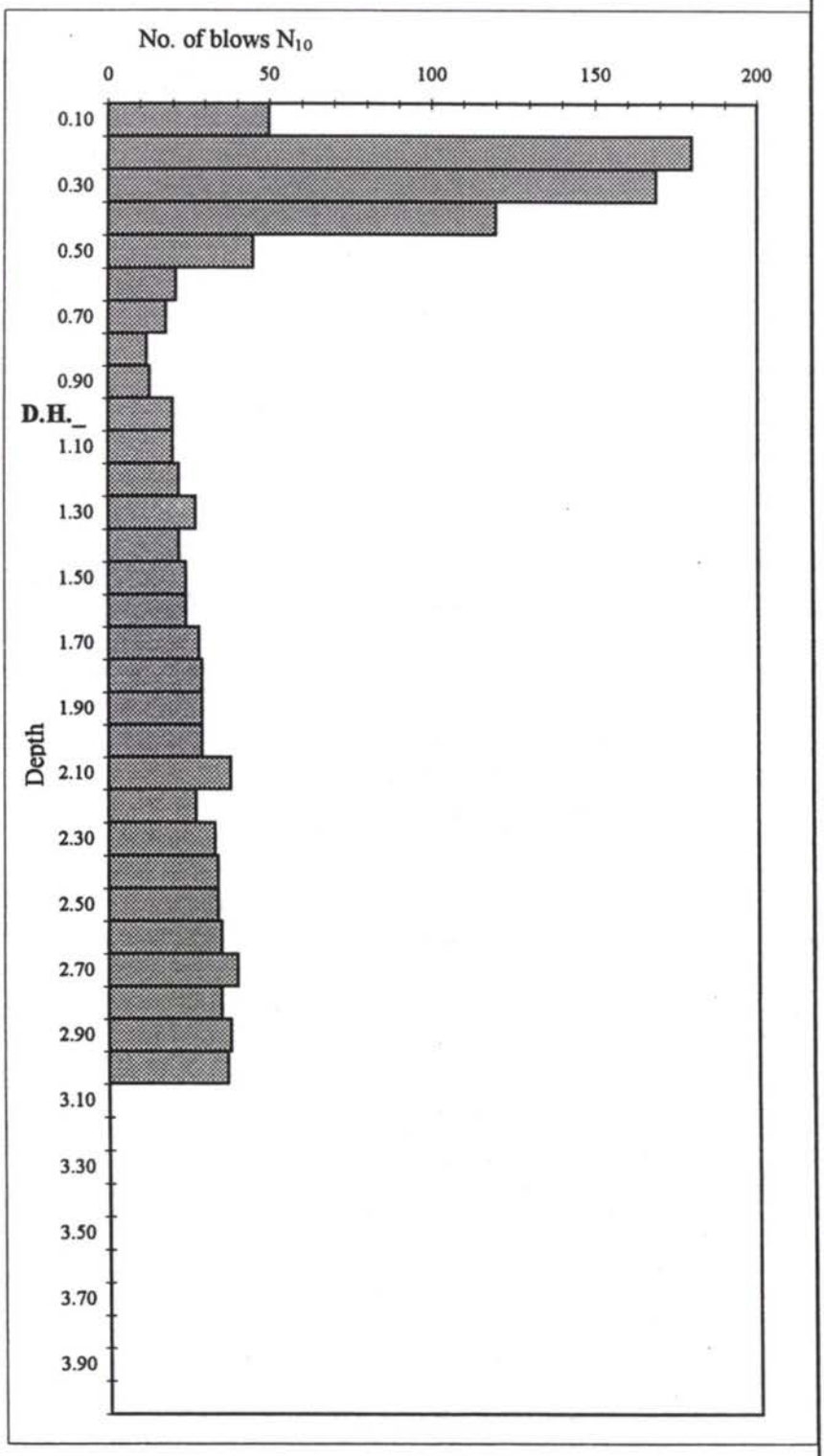
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 406 + 915 / L

Date / Дата : 25.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	50
0.20	180
0.30	169
0.40	120
0.50	45
0.60	21
0.70	18
0.80	12
0.90	13
1.00	20
1.10	20
1.20	22
1.30	27
1.40	22
1.50	24
1.60	24
1.70	28
1.80	29
1.90	29
2.00	29
2.10	38
2.20	27
2.30	33
2.40	34
2.50	34
2.60	35
2.70	40
2.80	35
2.90	38
3.00	37
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



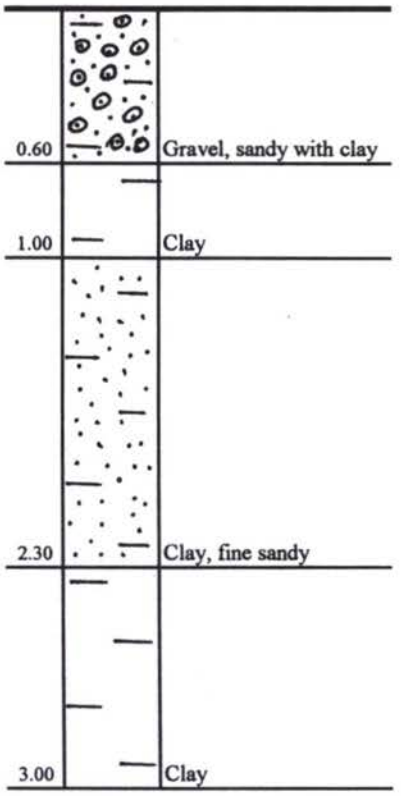
SOIL SECTION

No. 47

Location /место : km 406 + 915 / L

Data/Дата: 25.04.1997

Level/Уровень: Shoulder surface



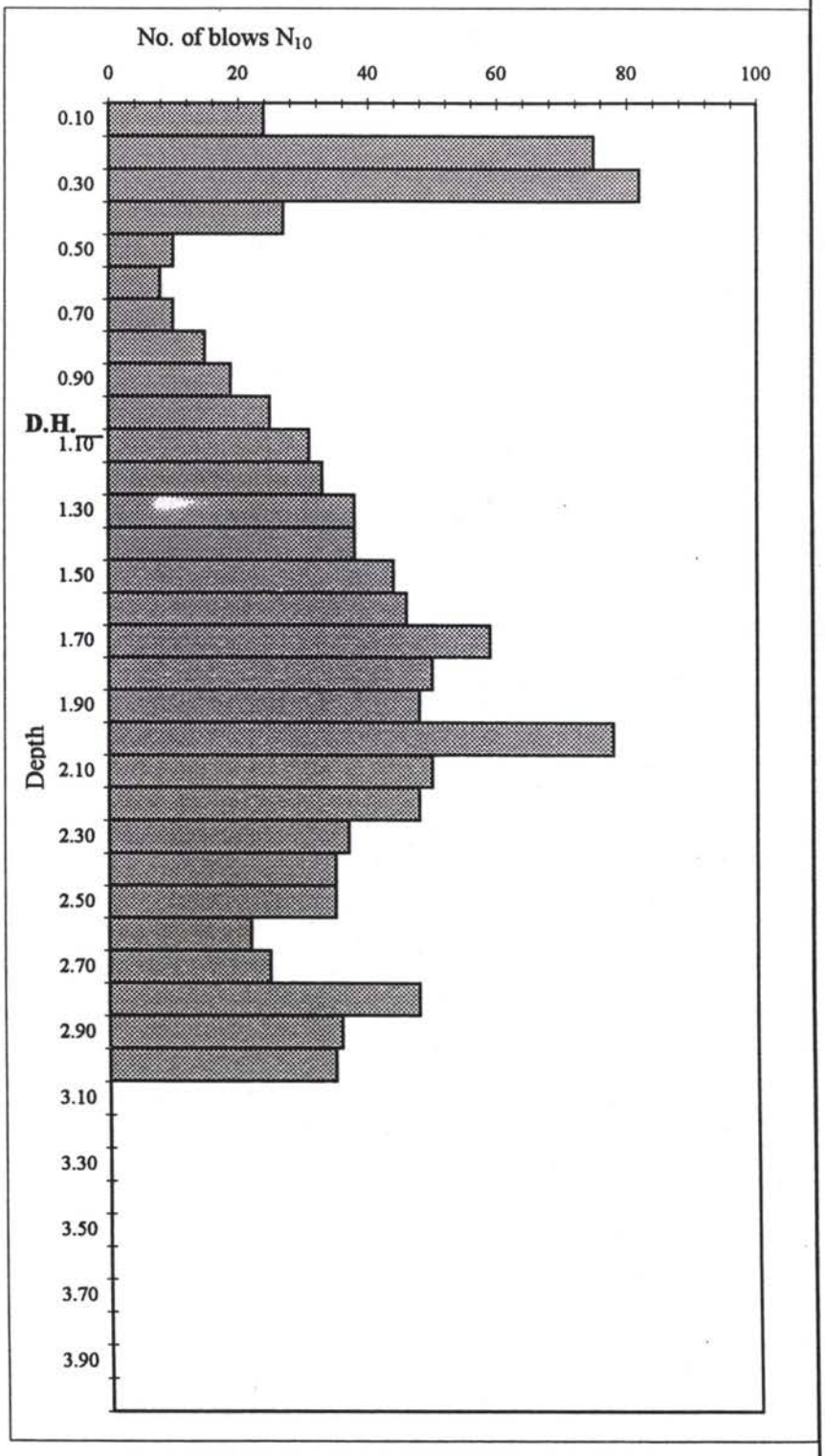
DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094)

Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

No. 48

Location /место : km 414 + 415 / L
Date / Дата : 25. 04. 1997
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	24
0.20	75
0.30	82
0.40	27
0.50	10
0.60	8
0.70	10
0.80	15
0.90	19
1.00	25
1.10	31
1.20	33
1.30	38
1.40	38
1.50	44
1.60	46
1.70	59
1.80	50
1.90	48
2.00	78
2.10	50
2.20	48
2.30	37
2.40	35
2.50	35
2.60	22
2.70	25
2.80	48
2.90	36
3.00	35
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



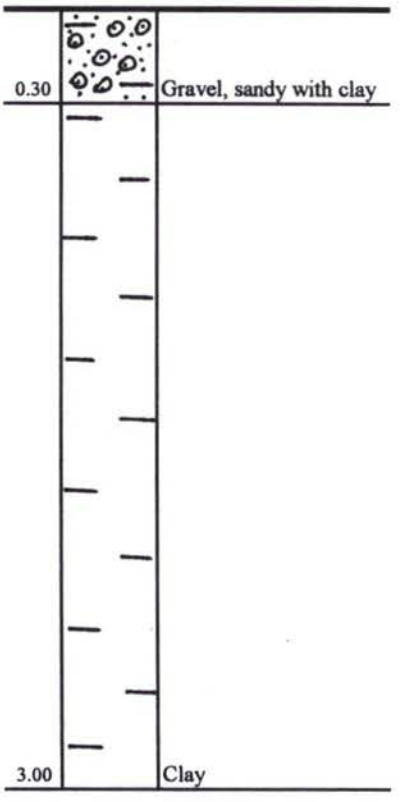
SOIL SECTION

No. 48

Location /место : km 414 + 415 / L

Data/Дата: 25.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 49**

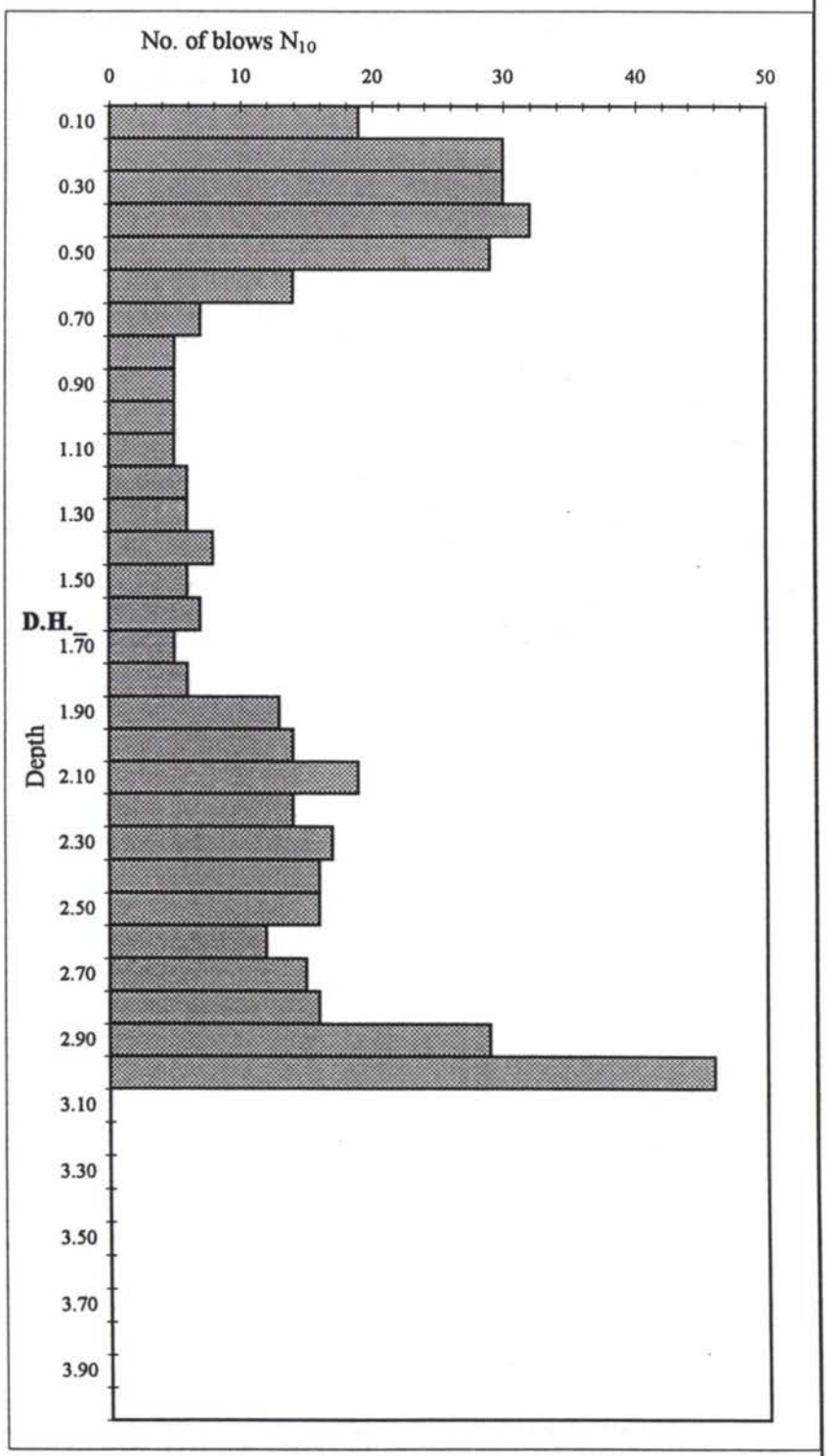
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 426 + 715 / L

Date / Дата : 25.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	19
0.20	30
0.30	30
0.40	32
0.50	29
0.60	14
0.70	7
0.80	5
0.90	5
1.00	5
1.10	5
1.20	6
1.30	6
1.40	8
1.50	6
1.60	7
1.70	5
1.80	6
1.90	13
2.00	14
2.10	19
2.20	14
2.30	17
2.40	16
2.50	16
2.60	12
2.70	15
2.80	16
2.90	29
3.00	46
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



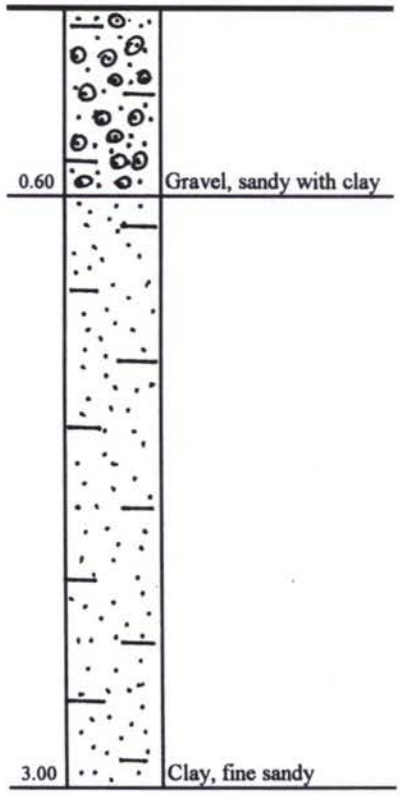
SOIL SECTION

No. 49

Location /место : km 426 + 715 / L

Data/Дата: 25.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 50**

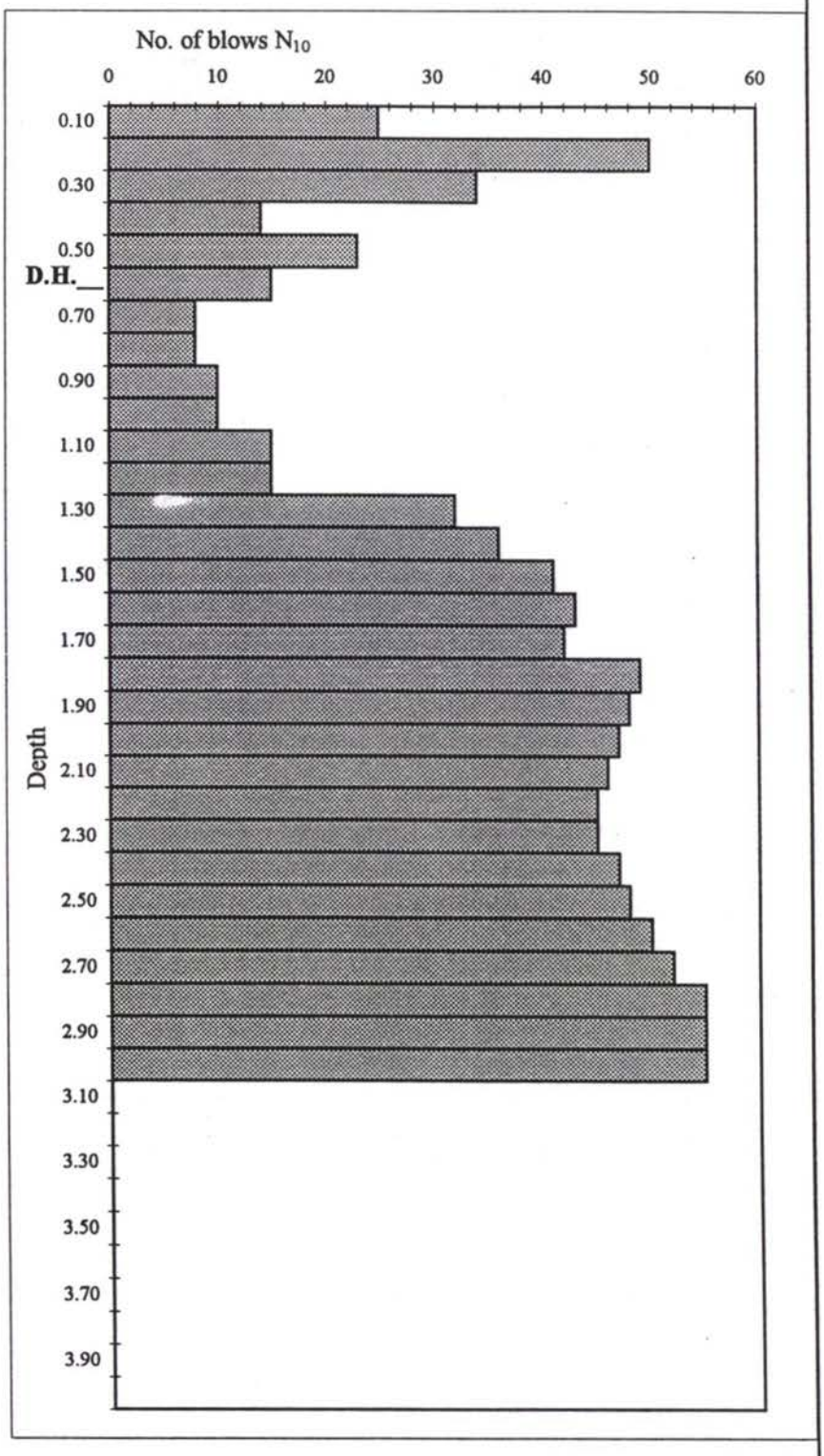
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 436 + 015 / L

Date / Дата : 25. 04. 1997

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	25
0.20	50
0.30	34
0.40	14
0.50	23
0.60	15
0.70	8
0.80	8
0.90	10
1.00	10
1.10	15
1.20	15
1.30	32
1.40	36
1.50	41
1.60	43
1.70	42
1.80	49
1.90	48
2.00	47
2.10	46
2.20	45
2.30	45
2.40	47
2.50	48
2.60	50
2.70	52
2.80	55
2.90	55
3.00	55
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



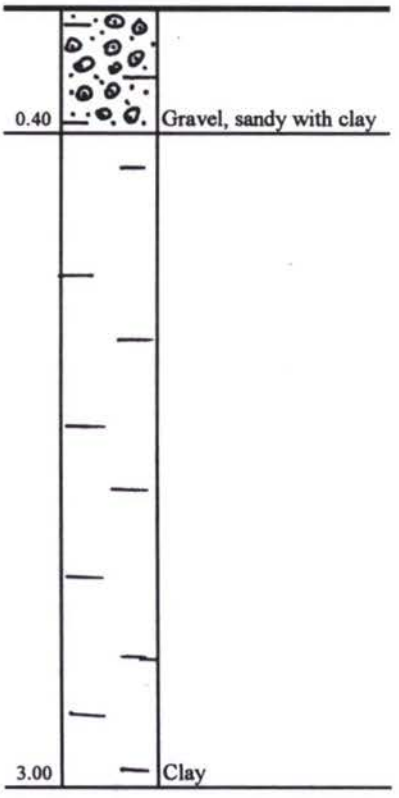
SOIL SECTION

No. 50

Location /место : km 436 + 015 / L

Data/Дата: 25.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 51**

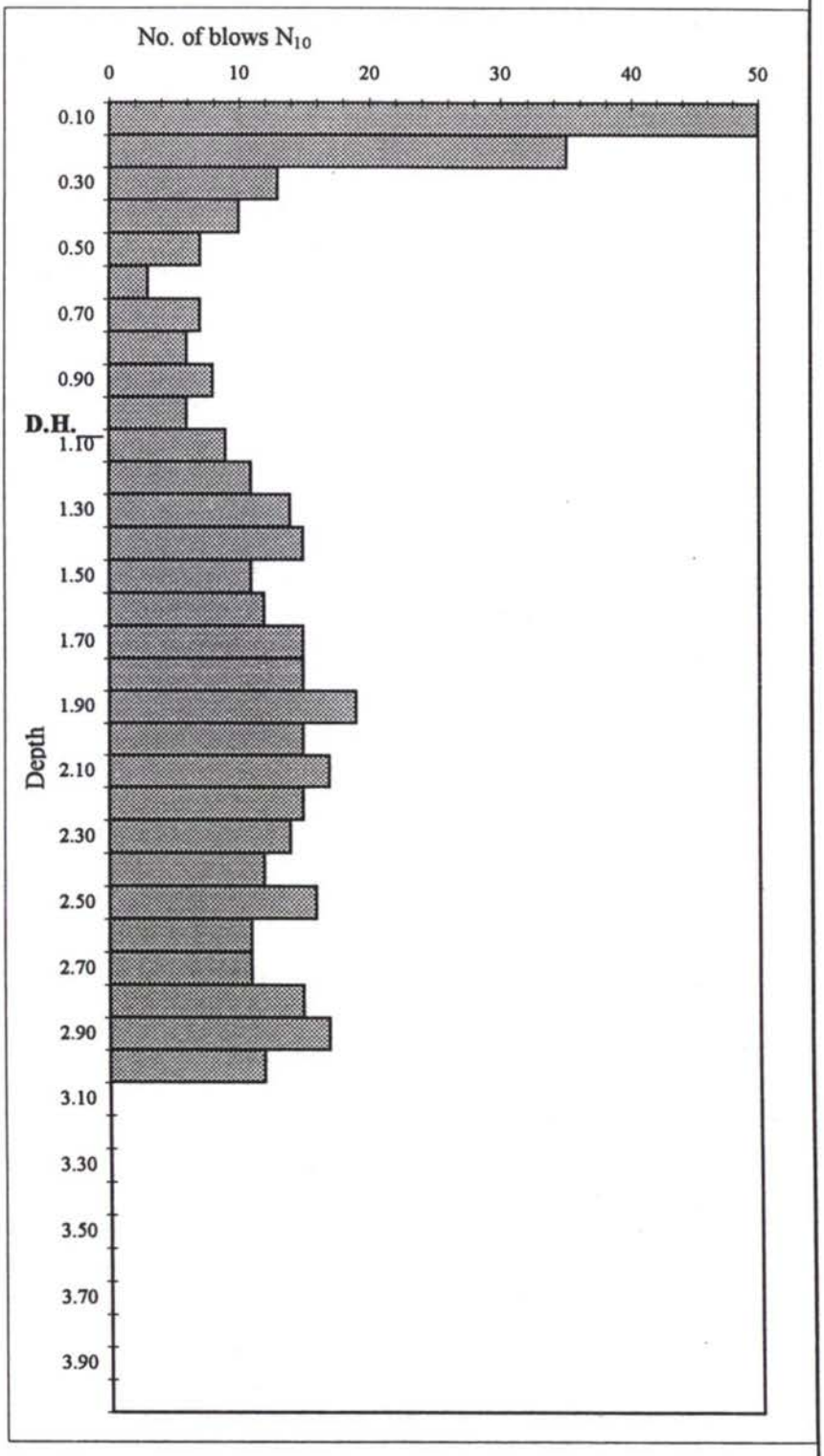
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 443 + 015 / L

Date / Дата : 25. 04. 1997

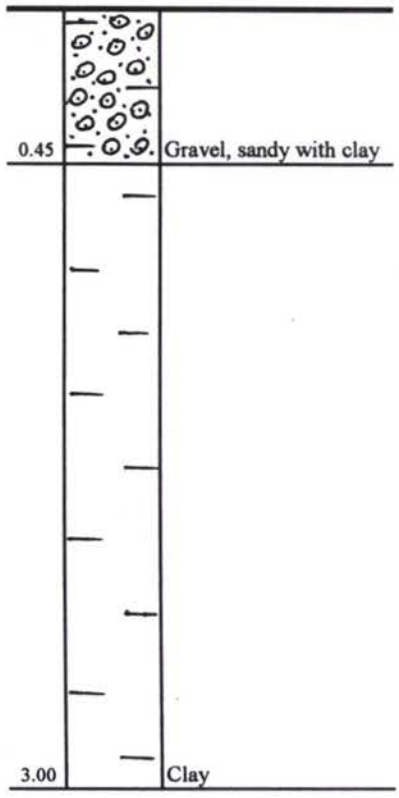
Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	50
0.20	35
0.30	13
0.40	10
0.50	7
0.60	3
0.70	7
0.80	6
0.90	8
1.00	6
1.10	9
1.20	11
1.30	14
1.40	15
1.50	11
1.60	12
1.70	15
1.80	15
1.90	19
2.00	15
2.10	17
2.20	15
2.30	14
2.40	12
2.50	16
2.60	11
2.70	11
2.80	15
2.90	17
3.00	12
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



SOIL SECTION **No. 51**

Location /место : km 443 + 015 / L
Data/Дата: 25.04.1997
Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 52**

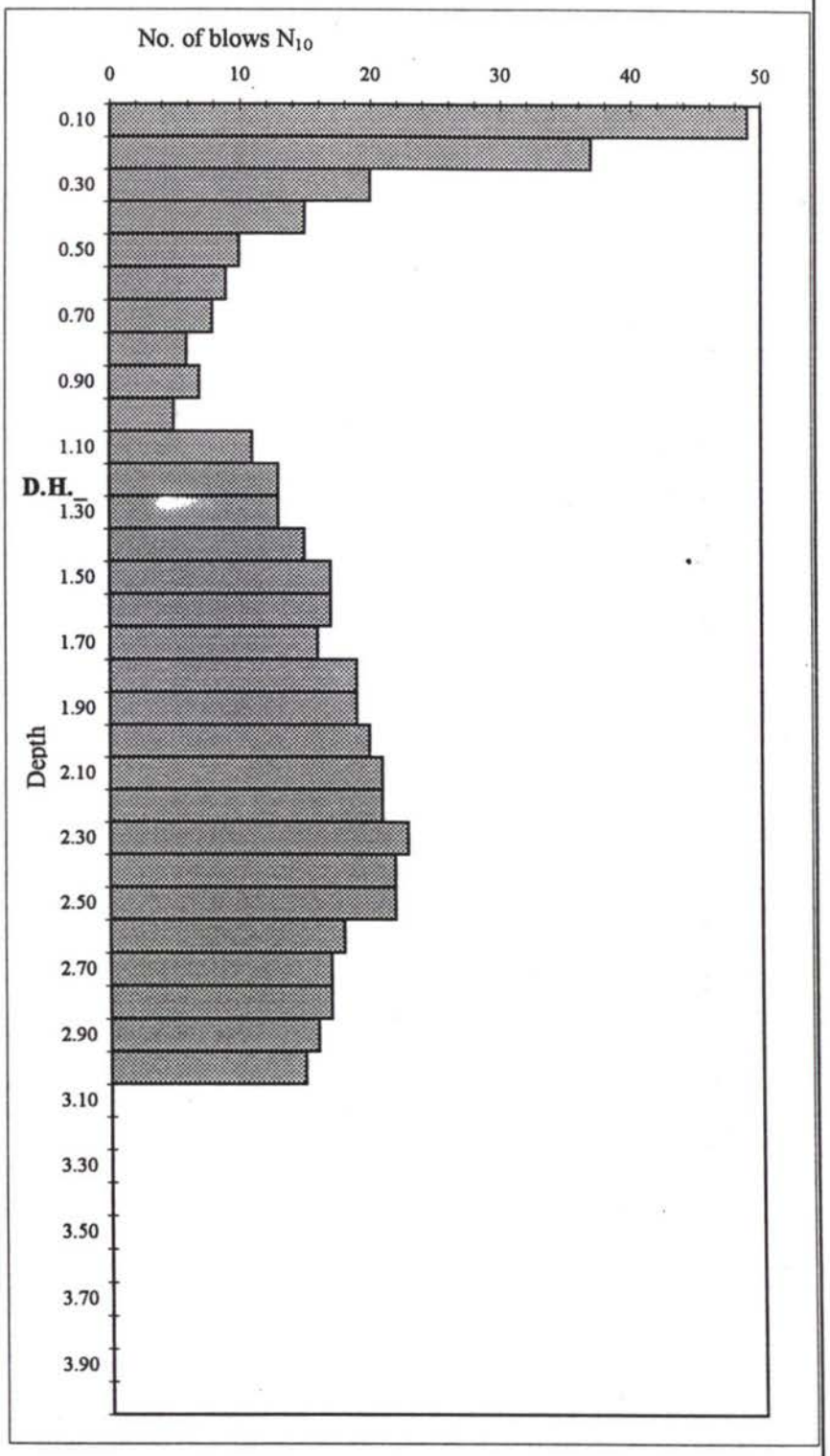
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 452 + 015 / L

Date / Дата : 25.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	49
0.20	37
0.30	20
0.40	15
0.50	10
0.60	9
0.70	8
0.80	6
0.90	7
1.00	5
1.10	11
1.20	13
1.30	13
1.40	15
1.50	17
1.60	17
1.70	16
1.80	19
1.90	19
2.00	20
2.10	21
2.20	21
2.30	23
2.40	22
2.50	22
2.60	18
2.70	17
2.80	17
2.90	16
3.00	15
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



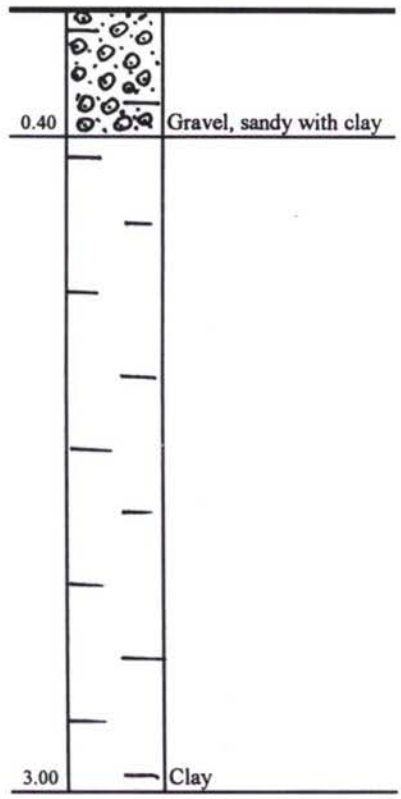
SOIL SECTION

No. 52

Location /место : km 452 + 015 / L

Data/Дата: 25.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 53**

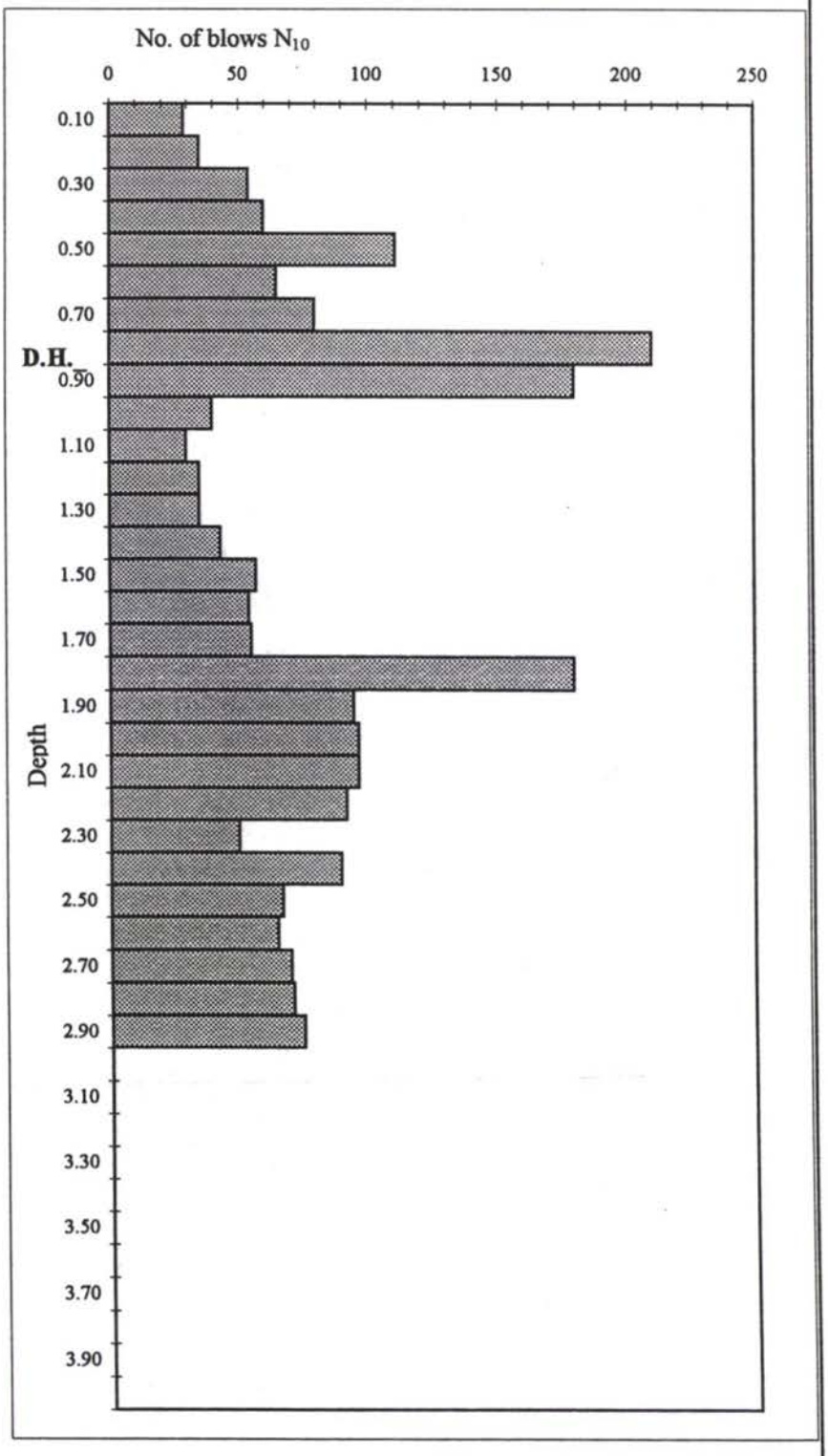
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 459 + 215 / L

Date / Дата : 26.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	29
0.20	35
0.30	54
0.40	60
0.50	111
0.60	65
0.70	80
0.80	210
0.90	180
1.00	40
1.10	30
1.20	35
1.30	35
1.40	43
1.50	57
1.60	54
1.70	55
1.80	180
1.90	95
2.00	97
2.10	97
2.20	92
2.30	50
2.40	90
2.50	67
2.60	65
2.70	70
2.80	71
2.90	75
3.00	
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



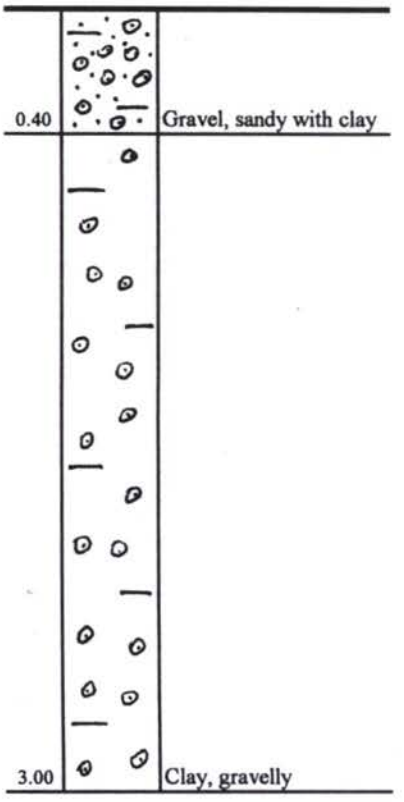
SOIL SECTION

No. 53

Location /место : km 459 + 215 / L

Data/Дата: 26.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 54**

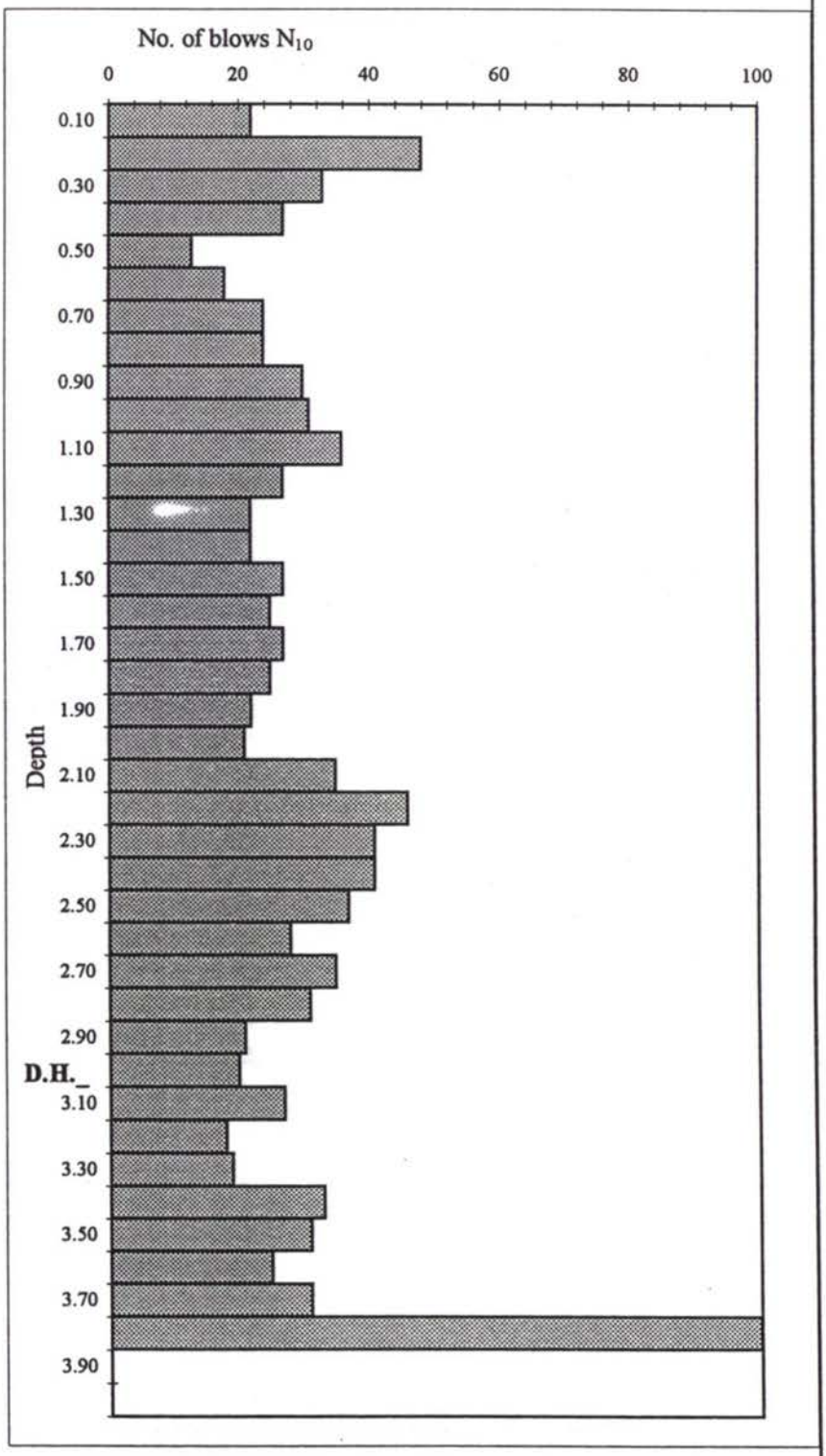
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 466 + 215 / L

Date / Дата : 26.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	22
0.20	48
0.30	33
0.40	27
0.50	13
0.60	18
0.70	24
0.80	24
0.90	30
1.00	31
1.10	36
1.20	27
1.30	22
1.40	22
1.50	27
1.60	25
1.70	27
1.80	25
1.90	22
2.00	21
2.10	35
2.20	46
2.30	41
2.40	41
2.50	37
2.60	28
2.70	35
2.80	31
2.90	21
3.00	20
3.10	27
3.20	18
3.30	19
3.40	33
3.50	31
3.60	25
3.70	31
3.80	100
3.90	
4.00	



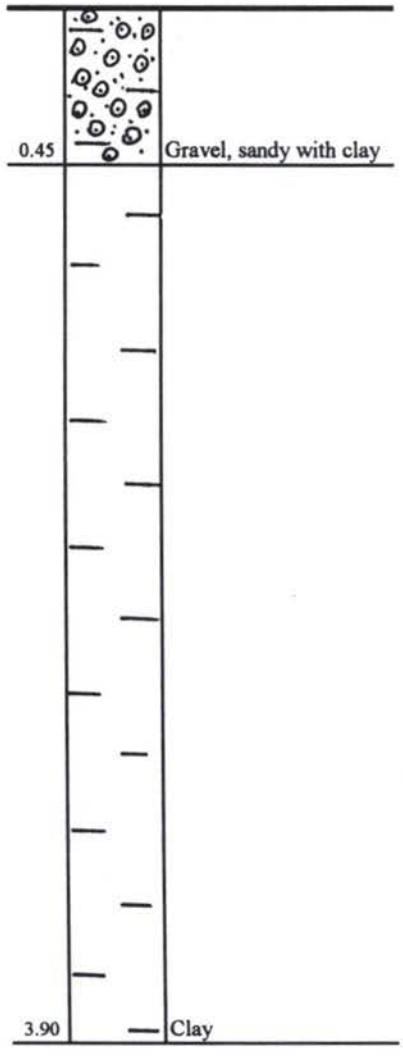
SOIL SECTION

No. 54

Location /место : km 466 + 215 / L

Data/Дата: 26 04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 55**

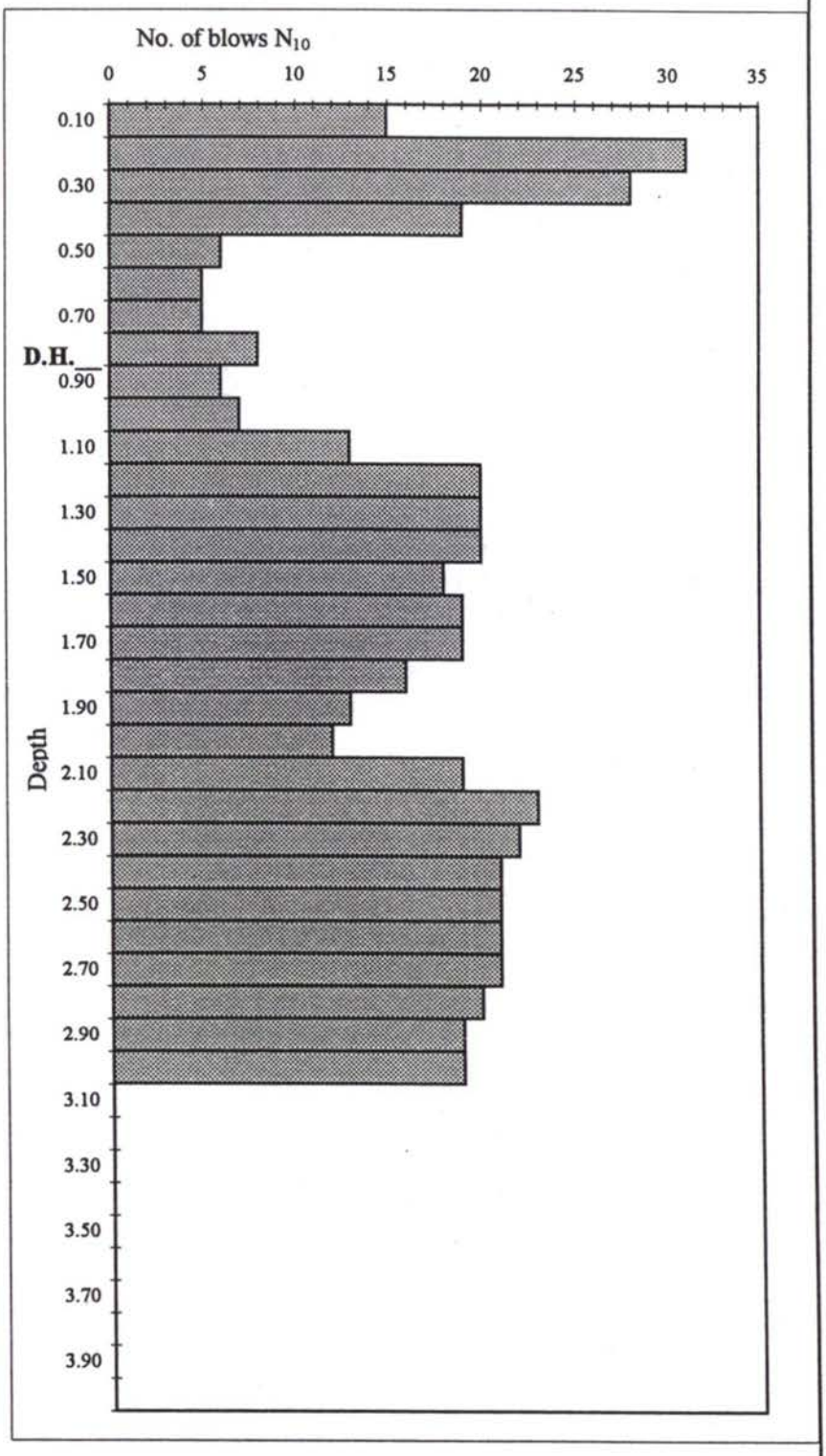
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 473 + 215 / L

Date / Дата : 26.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	15
0.20	31
0.30	28
0.40	19
0.50	6
0.60	5
0.70	5
0.80	8
0.90	6
1.00	7
1.10	13
1.20	20
1.30	20
1.40	20
1.50	18
1.60	19
1.70	19
1.80	16
1.90	13
2.00	12
2.10	19
2.20	23
2.30	22
2.40	21
2.50	21
2.60	21
2.70	21
2.80	20
2.90	19
3.00	19
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	



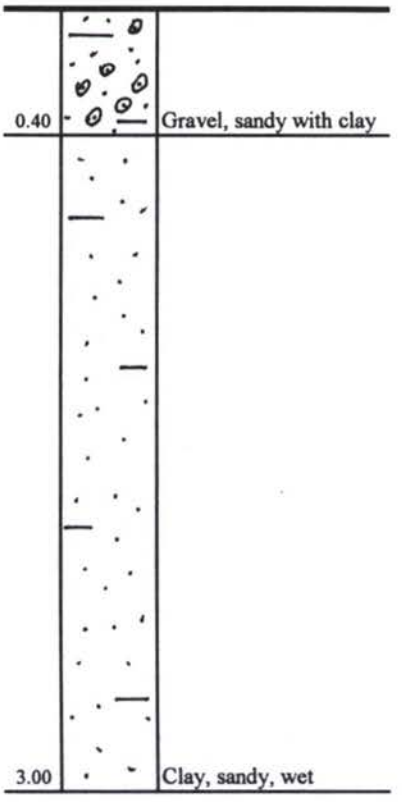
SOIL SECTION

No. 55

Location /место : km 473 + 215 / L

Data/Дата: 26.04.1997

Level/Уровень: Shoulder surface



DYNAMIC PROBING LIGHT (DPL - 5, acc. DIN 4094) **No. 56**

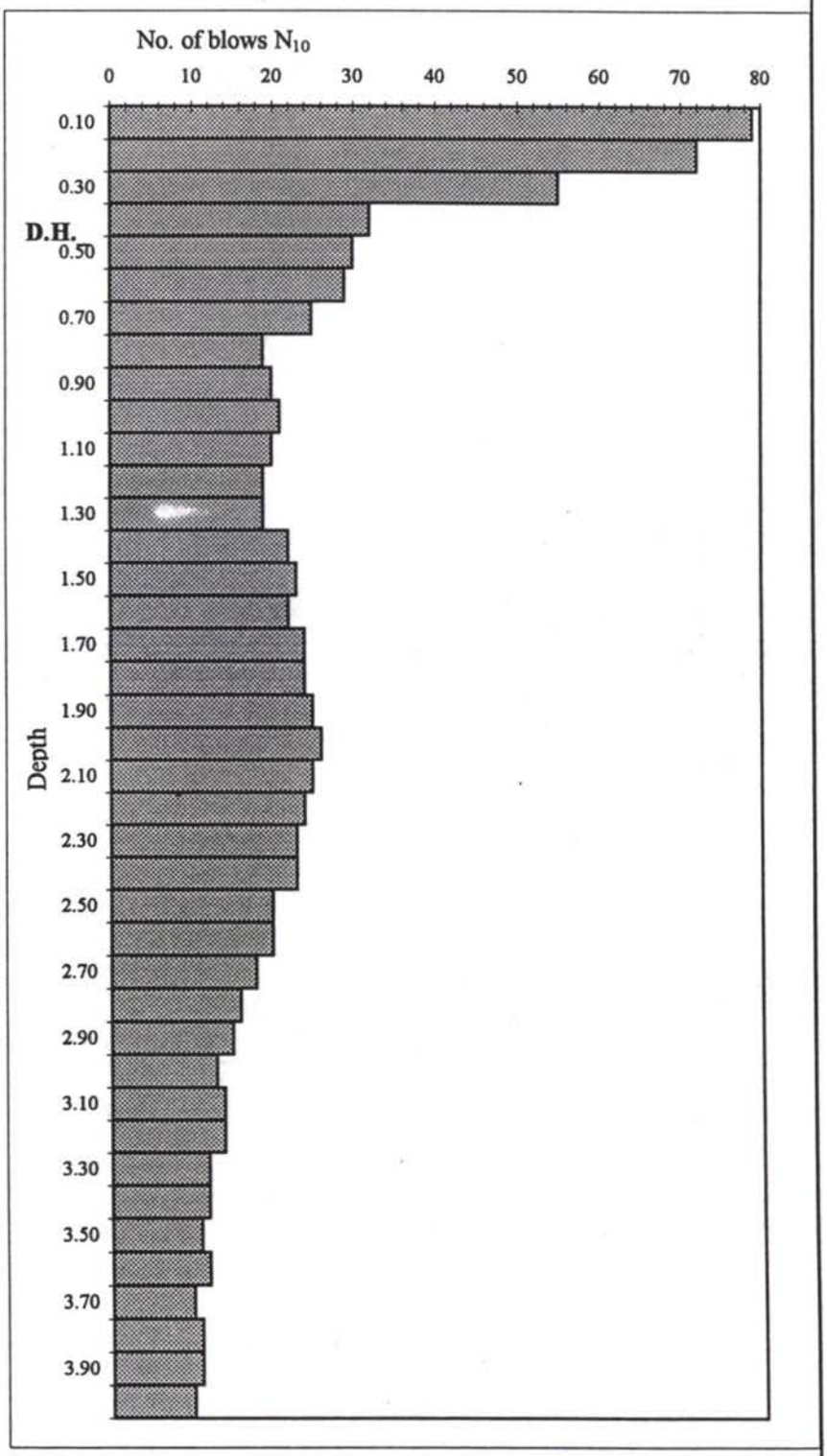
Динамические пробы Легкие (ДПЛ 5, в соотв.ДИН4094)

Location /место : km 481 + 715 / L ,

Date / Дата : 27.04.97

Level / Уровень : Shoulder surface

Depth Глубина [m]	No. of blows Число вдуваний N_{10}
0.10	79
0.20	72
0.30	55
0.40	32
0.50	30
0.60	29
0.70	25
0.80	19
0.90	20
1.00	21
1.10	20
1.20	19
1.30	19
1.40	22
1.50	23
1.60	22
1.70	24
1.80	24
1.90	25
2.00	26
2.10	25
2.20	24
2.30	23
2.40	23
2.50	20
2.60	20
2.70	18
2.80	16
2.90	15
3.00	13
3.10	14
3.20	14
3.30	12
3.40	12
3.50	11
3.60	12
3.70	10
3.80	11
3.90	11
4.00	10



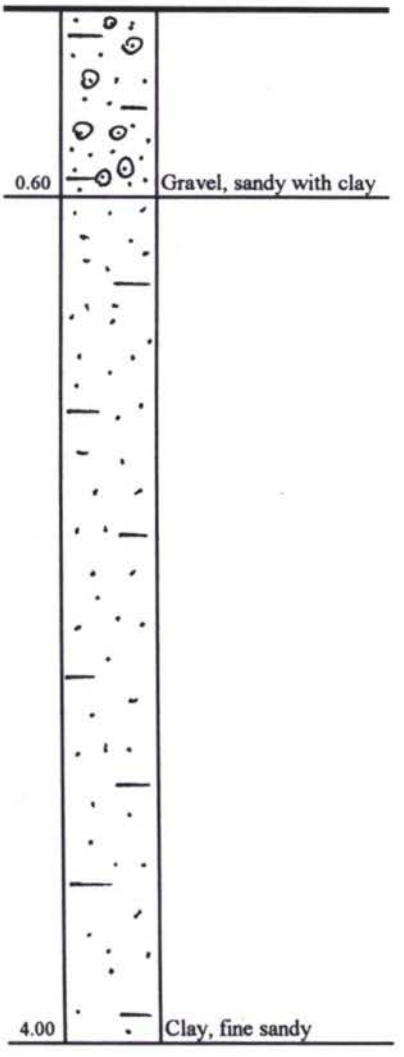
SOIL SECTION

No. 56

Location /место : km 481 + 715 / L

Data/Дата: 27.04.1997

Level/Уровень: Shoulder surface

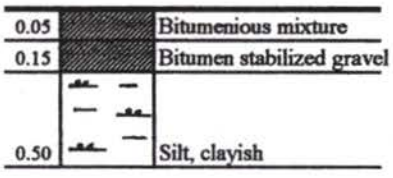


APPENDIX 3

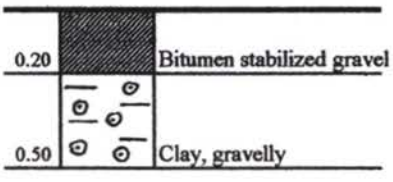
TRIAL PIT DIAGRAMS

TRIAL PITS

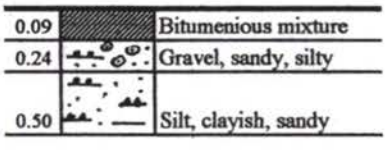
Location/Место: km 074+000 **No. TP - 1**
Data/Дата: 9.04.1997
Level/Уровень: Shoulder surface



Location/Место: km 087+000 **No. TP - 2**
Data/Дата: 10.04.1997
Level/Уровень: Shoulder surface



Location/Место: km 104+000 **No. TP - 3**
Data/Дата: 11.04.1997
Level/Уровень: Shoulder surface



TRIAL PITS

Location/Место: km 132+000 **No. TP - 4**
Data/Дата: 27.04.1997
Level/Уровень: Shoulder surface

0.04		Bitumenious mixture
0.11		Bitumen stabilized gravel
0.48		Gravel, sandy, silty
		Silt, clayish

Location/Место: km 180+000 **No. TP - 5**
Data/Дата: 27.04.1997
Level/Уровень: Shoulder surface

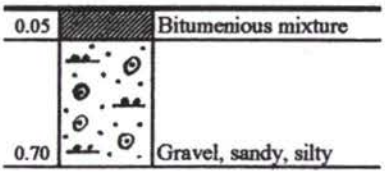
0.04		Bitumenious mixture
0.10		Bitumen stabilized gravel
0.33		Gravel, sandy, silty
		Silt, clayish

Location/Место: km 287+215 **No. TP - 6**
Data/Дата: 28.04.1997
Level/Уровень: Shoulder surface

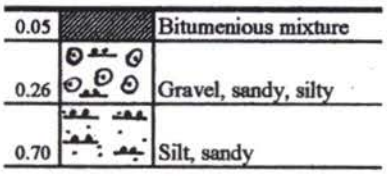
0.04		Bitumenious mixture
0.10		Bitumen stabilized gravel
0.30		Gravel, sandy, silty
		Silt, fine sandy

TRIAL PITS

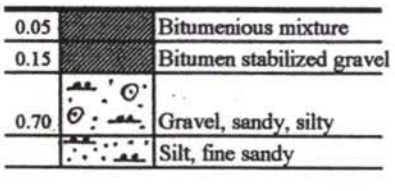
Location/Место: km 345+215 **No.** TP - 7
Data/Дата: 28.04.1997
Level/Уровень: Shoulder surface



Location/Место: km 391+215 **No.** TP - 8
Data/Дата: 29.04.1997
Level/Уровень: Shoulder surface



Location/Место: km 448+215 **No.** TP - 9
Data/Дата: 29.04.1997
Level/Уровень: Shoulder surface

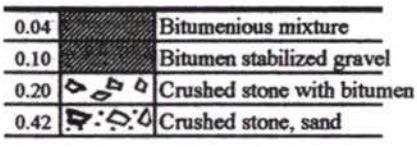


APPENDIX 4

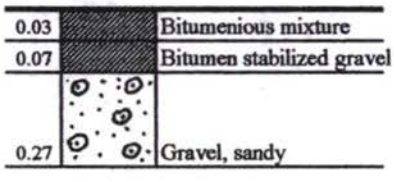
PAVEMENT STRUCTURES

STRUCTURE OF PAVEMENT

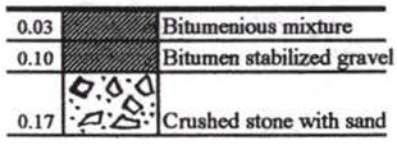
Location/Место: km 045+585 / L **No. PS-1**
Data/Дата: 12.04.1997
Level/Уровень: Shoulder surface



Location/Место: km 050+000 / L **No. PS - 2**
Data/Дата: 13.04.1997
Level/Уровень: Shoulder surface

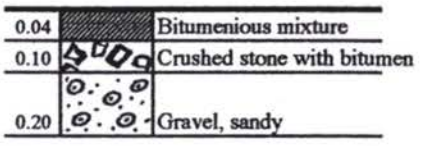


Location/Место: km 059+585 / L **No. PS-3**
Data/Дата: 14.04.1997
Level/Уровень: Shoulder surface

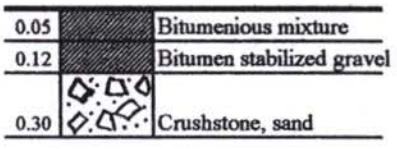


STRUCTURE OF PAVEMENT

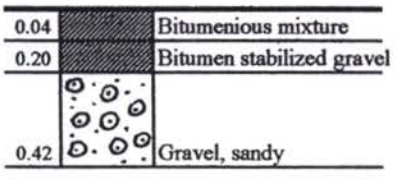
Location/Место: km 064+000 / L **No. PS- 4**
Data/Дата: 15.04.1997
Level/Уровень: Shoulder surface



Location/Место: km 074+585 / L **No. PS- 5**
Data/Дата: 16.04.1997
Level/Уровень: Shoulder surface

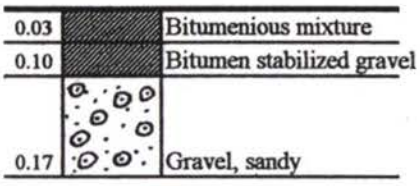


Location/Место: km 079+000 / L **No. PS- 6**
Data/Дата: 17.04.1997
Level/Уровень: Shoulder surface

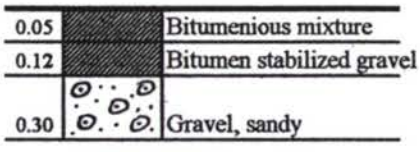


STRUCTURE OF PAVEMENT

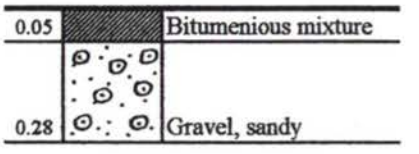
Location/Место: km 106+000 / L **No. PS- 7**
Data/Дата: 18.04.1997
Level/Уровень: Shoulder surface



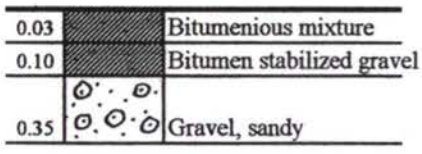
Location/Место: km 121+000 / L **No. PS- 8**
Data/Дата: 19.04.1997
Level/Уровень: Shoulder surface



Location/Место: km 128+000 / L **No. PS- 9**
Data/Дата: 20.04.1997
Level/Уровень: Shoulder surface

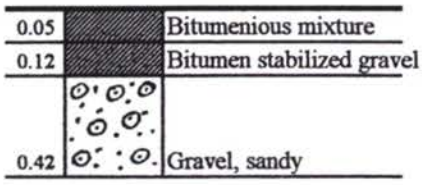


Location/Место: km 142+000 / L **No. PS- 10**
Data/Дата: 21.04.1997
Level/Уровень: Shoulder surface

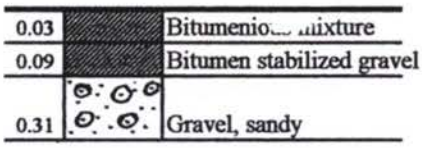


STRUCTURE OF PAVEMENT

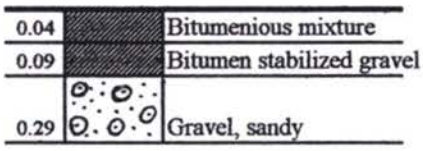
Location/Место: km 151+000 / L **No. PS- 11**
Data/Дата: 22.04.1997
Level/Уровень: Shoulder surface



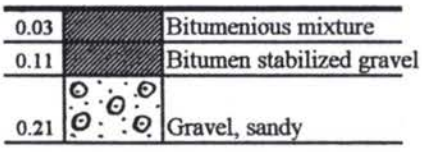
Location/Место: km 158+000 / L **No. PS- 12**
Data/Дата: 23.04.1997
Level/Уровень: Shoulder surface



Location/Место: km 167+000 / L **No. PS- 13**
Data/Дата: 24.04.1997
Level/Уровень: Shoulder surface

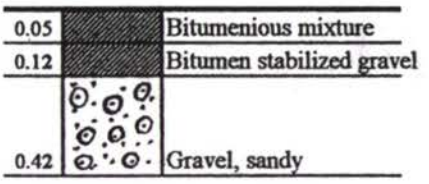


Location/Место: km 179+000 / L **No. PS- 14**
Data/Дата: 25.04.1997
Level/Уровень: Shoulder surface

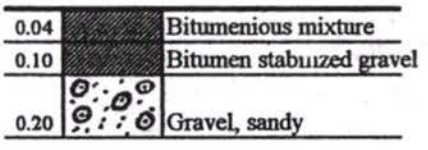


STRUCTURE OF PAVEMENT

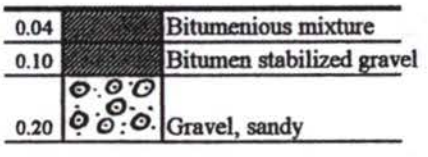
Location/Место: km 197+000 / L **No. PS- 15**
Data/Дата: 26.04.1997
Level/Уровень: Shoulder surface



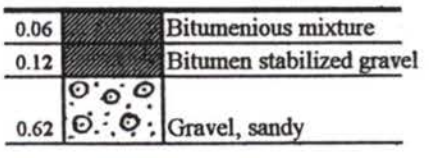
Location/Место: km 214+000 / L **No. PS- 16**
Data/Дата: 27.04.1997
Level/Уровень: Shoulder surface



Location /место : km 293 + 215 / L **No. PS- 17**
Data/Дата: 28.04.1997
Level/Уровень: Shoulder surface



Location /место : km 305 + 215 / L **No. PS- 18**
Data/Дата: 29.04.1997
Level/Уровень: Shoulder surface

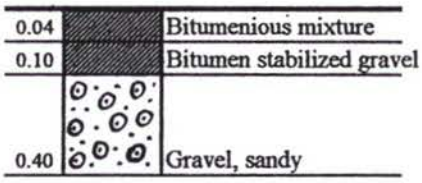


STRUCTURE OF PAVEMENT

Location /место : km 320 + 215 / L **No.** **PS- 19**

Data/Дата: 30.04.1997

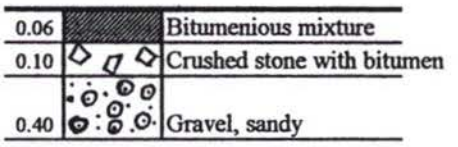
Level/Уровень: Shoulder surface



Location /место : km 335 + 215 / L **No.** **PS- 20**

Data/Дата: 01.05.1997

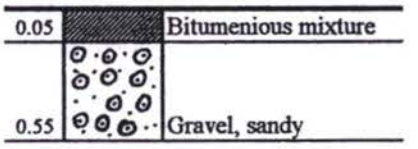
Level/Уровень: Shoulder surface



Location /место : km 349 + 715 / L **No.** **PS- 21**

Data/Дата: 02.05.1997

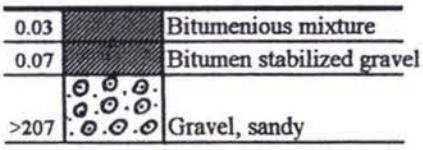
Level/Уровень: Shoulder surface



Location /место : km 367 + 215 / L **No.** **PS- 22**

Data/Дата: 03.05.1997

Level/Уровень: Shoulder surface



STRUCTURE OF PAVEMENT

Location /место : km 388 + 815 / L **No. PS- 23**

Data/Дата: 04.05.1997

Level/Уровень: Shoulder surface

0.05		Bitumenious mixture
0.08		Bitumen stabilized gravel
0.38		Gravel, sandy

Location /место : km 404 + 215 / L **No. PS- 24**

Data/Дата: 05.05.1997

Level/Уровень: Shoulder surface

0.03		Bitumenious mixture
0.08		Bitumen stabilized gravel
0.18		Gravel, sandy

Location /место : km 413 + 215 / L **No. PS- 25**

Data/Дата: 06.05.1997

Level/Уровень: Shoulder surface

0.04		Bitumenious mixture
0.08		Bitumen stabilized gravel
0.21		Gravel, sandy

Location /место : km 426 + 215 / L **No. PS- 26**

Data/Дата: 07.05.1997

Level/Уровень: Shoulder surface

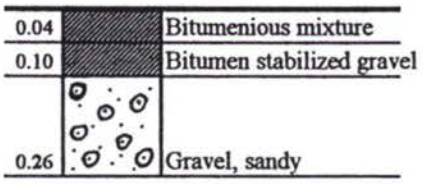
0.07		Bitumenious mixture
0.12		Bitumen stabilized gravel
0.15		Crushed stone with bitumen
0.35		Gravel, sandy

STRUCTURE OF PAVEMENT

Location /место : km 440 + 215 / L **No.** **PS- 27**

Data/Дата: 08.05.1997

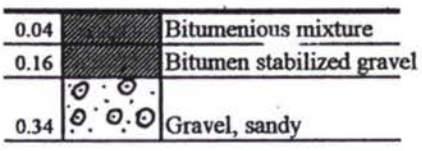
Level/Уровень: Shoulder surface



Location /место : km 452 + 015 / L **No.** **PS- 28**

Data/Дата: 09.05.1997

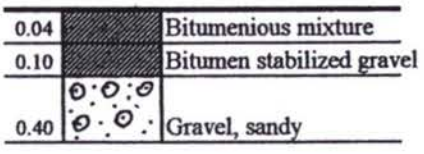
Level/Уровень: Shoulder surface



Location /место : km 474 + 215 / L **No.** **PS- 29**

Data/Дата: 10.05.1997

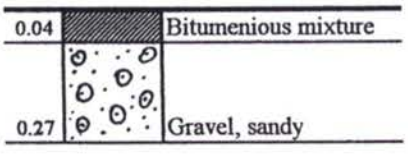
Level/Уровень: Shoulder surface



Location /место : km 481 + 715 / L **No.** **PS- 30**

Data/Дата: 11.05.1997

Level/Уровень: Shoulder surface



APPENDIX 5

ASPHALT TEST RESULTS

Sample	Grain size distribution in %										Bitumen	In-situ	Maximum	In-situ
Nr.	<20 mm	<15 mm	<10 mm	<5 mm	<2.5 mm	<1.25 mm	<0.63 mm	<0.315 mm	<0.14 mm	<0.071 mm	content %	density t/m3	density (Marshall) t/m3	density %
Nr. 1	84	72	56	41	33	26	20	14	6	1	7.02	2.32	2.33	99.6
Nr. 2	82	69	58	44	35	29	23	14	5	1	6.41	2.24	2.32	96.6
Nr. 3	100	94	85	68	53	47	38	23	7	2	10.19	2.25	2.27	99.1
Nr. 4	93	82	71	53	42	39	32	20	6	2	6.73	2.24	2.37	94.5
Nr. 5	97	93	84	65	54	49	41	25	7	2	7.42	2.24	2.27	98.7
Nr. 6	90	80	73	62	51	46	38	25	8	2	13.48	2.25	2.29	98.3

KOCKS
INGENIEURE

APPENDIX 6

NATURAL MOISTURE CONTENT

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Sample Nr.	Chainage	Depth m	Moisture content	Sample Nr.	Chainage	Depth m	Moisture content	Sample Nr.	Chainage	Depth m	Moisture content
1	001+500	0.15-0.3	12.50	53	151+000	2.0-2.45	20.58	132	287+715	1.1-2.1	37.50
2	001+500	0.3-1.0	17.92	54	151+000	2.45-3.0	21.77	133	287+715	2.1-2.9	31.08
3	001+500	2.5-3.0	20.90	55	151+000	3.0-4.0	31.35	129	294+015	0.3-1.0	26.20
4	018+800	0.15-0.3	14.26	56	151+000	4.0-4.5	31.92	130	294+015	2.0-4.0	26.84
5	018+800	0.3-1.0	19.92	57	151+000	4.5-5.0	32.68	126	301+215	1.2-1.6	21.59
6	018+800	1.8-4.0	23.08	58	159+500	0.2-0.7	13.48	127	301+215	1.6-2.3	40.74
7	044+000	0.15-0.5	10.09	59	159+500	0.7-1.5	18.51	128	301+215	2.3-3.0	39.54
8	044+000	0.5-3.0	14.84	60	159+500	2.0-2.5	21.00	123	308+215	1.6-2.0	14.13
9	049+800	0.1-1.1	20.03	61	159+500	2.5-3.0	29.90	124	301+215	2.0-2.3	21.01
10	049+800	1.5-1.9	20.75	62	159+500	3.0-3.9	31.36	125	301+215	2.3-3.0	18.64
11	049+800	1.9-3.0	28.69	63	159+500	3.9-4.5	29.74	120	315+315	1.3-1.7	17.65
12	053+800	0.45-1.0	23.07	64	159+500	4.5-5.0	33.07	121	315+315	1.7-2.6	18.95
13	057+400	0.2-0.6	14.48	65	162+500	0.3-1.0	17.92	122	315+315	2.6-3.0	26.84
14	057+400	0.6-1.0	18.12	66	162+500	1.0-2.3	19.45	119	320+215	1.4-2.0	10.74
15	063+100	0.5-1.0	18.30	67	162+500	2.3-3.0	19.81	118	329+215	0.7-1.0	7.65
16	063+100	2.3-2.8	22.58	68	164+000	0.3-0.2	20.32	116	337+215	0.4-0.8	17.58
17	063+100	2.8-3.0	22.68	69	164+000	1.0-2.4	20.74	117	337+215	0.8-1.0	24.00
18	075+800	0.2-0.8	15.04	70	164+000	2.4-3.0	20.40	114	344+215	0.15-0.4	16.86
19	075+800	1.9-3.0	16.40	71	167+000	0.3-1.2	19.68	115	344+215	0.7-1.0	24.70
20	080+100	0.3-0.7	26.90	72	167+000	2.3-3.0	19.37	110	349+715	0.3-0.8	17.76
21	080+100	1.0-1.6	16.74	73	168+000	0.3-1.3	21.00	111	349+715	0.8-1.0	25.79
22	080+100	1.6-2.0	28.13	74	168+000	2.3-3.0	18.61	112	349+715	1.7-2.0	32.12
23	080+100	2.6-3.0	24.81	75	170+700	0.1-1.1	23.53	113	349+715	2.6-3.0	13.79
24	080+100	3.0-3.4	37.61	76	170+700	2.0-3.0	27.00	108	361+215	0.5-0.7	6.42
25	080+100	3.4-4.0	23.09	77	170+700	3.0-4.0	27.11	109	361+215	0.7-1.0	26.91
26	088+000	0.5-1.0	25.49	78	191+600	0.2-1.2	23.03	107	376+515	2.7-3.0	19.63
27	088+000	2.4-3.0	25.16	79	191+600	2.0-3.0	28.55	106	388+815	2.0-3.0	18.65
28	099+000	0.3-1.0	23.43	80	191+600	3.0-4.0	25.90	103	395+215	0.7-1.0	12.17
29	099+000	2.6-3.0	25.05	151	196+000	0.3-0.7	14.41	104	395+215	1.0-2.0	18.05
30	108+000	0.3-1.0	19.59	152	196+000	0.7-1.0	21.87	105	395+215	2.3-3.0	18.42
31	108+000	1.0-2.0	26.78	153	196+000	1.0-1.4	23.46	100	406+915	0.6-1.0	13.75
32	108+000	2.0-3.0	26.92	154	196+000	1.4-2.0	25.82	101	406+915	1.0-2.3	13.51
33	115+500	0.3-1.0	20.08	155	196+000	2.7-3.0	25.46	102	406+915	2.3-3.0	12.86
34	115+500	1.0-2.0	25.39	156	196+000	3.5-4.0	26.74	98	414+415	0.3-1.0	19.22
35	115+500	2.0-3.0	27.86	145	202+000	0.3-0.7	13.83	99	414+415	2.0-3.0	12.02
36	118+800	1.0-2.0	22.27	146	202+000	0.7-1.0	22.01	95	426+715	0.6-1.0	12.27
37	118+800	12.0-3.0	25.85	147	202+000	1.0-1.5	23.84	96	426+715	1.6-2.0	22.74
38	128+800	0.6-1.0	18.47	148	202+000	1.5-2.0	24.38	97	426+715	2.8-3.0	6.63
39	128+800	1.0-2.0	15.36	149	202+000	2.6-3.0	23.86	93	436+015	0.4-1.0	20.70
40	128+800	2.4-3.0	18.10	150	202+000	3.4-4.0	25.87	94	436+015	1.0-2.0	15.70
41	128+800	3.0-3.85	29.96	142	206+000	0.5-1.0	16.93	91	443+015	0.45-1.0	20.87
42	128+800	3.85-4.0	22.96	143	206+000	1.5-2.0	18.89	92	443+015	1.6-2.0	14.30
43	135+200	0.2-1.0	19.32	144	206+000	2.6-3.0	19.72	90	452+015	0.4-1.0	13.68
44	135+200	2.3-3.0	24.36	137	212+300	0.7-1.0	24.64	88	459+215	0.4-1.0	14.54
45	135+200	3.0-3.25	24.25	138	212+300	1.3-1.8	18.35	89	459+215	1.0-2.0	19.96
46	135+200	3.25-3.75	27.39	139	212+300	1.8-2.0	27.48	86	466+215	0.45-1.0	10.61
47	135+200	3.75-4.0	27.09	140	212+300	3.0-3.5	51.61	87	466+215	1.5-2.0	9.28
48	145+200	0.3-1.0	13.84	141	212+300	3.5-4.0	33.25	83	473+215	0.4-1.1	16.94
49	145+200	1.0-2.7	20.37	134	214+100	0.7-1.0	20.00	84	473+215	1.5-2.0	25.82
50	145+200	2.7-3.0	19.36	135	214+100	1.0-2.0	30.17	85	473+215	2.1-3.0	14.55
51	151+000	0.15-0.7	12.50	136	214+100	2.0-3.0	32.63	81	481+715	0.6-1.0	18.86
52	151+000	0.7-2.0	13.92	131	287+715	0.6-1.0	19.54	85	481+715	1.4-3.0	12.55

APPENDIX 7

SOIL TEST RESULTS

TRACECA - Feasibility Study of Transit Roads in Azerbaijan

Laboratory Test Results

KOCKS
INGENIEURE

Chainage	Depth of sampling	Grain size distribution in %					Atterberg Limits			Moisture density relation		CBR, %	Sulphat
	m	>31.5 mm	>16 mm	>8 mm	>2 mm	< 0.063 mm	PL %	LL %	PI %	opt. W. %	max. DD	dry/soaked	%
Gazi Mammad - Kyurdamir													
074 + 000	0.15 - 0.50			6.1	7.6	88.6				20.0	1.68	1.3/1.0	0.8118
087 + 000	0.05-0.20				4.6	91.6				22.0	1.55	11.7 / 1.51	
087 + 000	0.20 - 0.50	9.6	24.8	28.7	32.0	63.3				18.0	1.75	2.7 / 2.6	0.1726
104 + 000	0.09 - 0.24	7.7	40.6	49.0	55.4	28.3				8.0	2.07	19.5 / 4.0	0.2575
104 + 000	0.24 - 0.50			6.6	8.8	74.3				16.0	1.79	8.3 / 1.4	0.1578
Kyurdamir - Georgian border													
132 + 000	0.11 - 0.48	8.7	51.7	62.5	71.6	12.6				8.0	2.12	45.6 / 19.6	0.0201
132 + 000	below 0.48		2.9	5.9	7.3	74.9	21.4	44.4	23.0	16.0	1.82	14.0 / 5.3	0.0451
180 + 000	0.10 - 0.33	4.0	21.1	39.3	57.4	18.2				10.00	2.29	14.5 / 14.0	0.0867
180 + 000	below 0.33			1.4	4.1	90.8	23.5	36.2	12.7	16.0	1.72	19.6 /0.0	0.02689
287 + 215	0.10 - 0.30	3.1	35.4	48.3	59.6	23.1				8.0	2.12	47.1 / 11.3	0.7088
287 + 215	below 0.30			0.8	2.1	80.7	20.8	39.0	18.2	16.0	1.76	16.6 / 3.0	1.3610
345 + 215	0.05 - 0.55	4.1	26.4	41.3	61.2	13.2				8.0	2.22	40.6 / 33.6	2.0525
391 + 215	0.05 - 0.26		27.6	38.8	55.6	15.5						15.9 / 2.6	0.0240
391 + 215	below 0.26			0.5	4.3	69.6	21.1	41.5	20.4	16.0	1.74	11.2 / 2.3	0.0636
448 + 215	0.15 - 0.70	7.0	25.4	42.0	65.2	8.1				8.0	2.23	108.2 / 102.4	0.0166

APPENDIX 6.4

ENVIRONMENTAL ASSESSMENT

CONTENTS

Note:

The present Environmental Assessment refers to the pure rehabilitation of the existing 2 lane road.

However, after the completion of this report, a most recent traffic survey revealed that a 4 lane road could be justified in the future.

In this case the potential environmental implications of the project would have to be reassessed.

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Environmental Consultant
Kocks Consult Koblenz

May 21 1997

1 Introduction

1.1 Project background and terms of reference

The project road is located on the territory of the Republic of Azerbaijan and is part of one of the major road connections between the Caspian and the Black Sea. The present feasibility study will determine the *design of pavement repair / rehabilitation* for one section of this road, namely the 80,85 km of *existing paved* road between Gazi-Mammad and Kyurdamir (see map 1). The layout of the road (alignment, width and gradient) shall mainly remain unchanged. Exceptions to this could be in those cases where the structural stability of existing bridges is questionable. Replacements may be necessary and they could be constructed either on or off line[1]. Given this project frame and the actual state of the road environment (see chapter 1.2) it can be assumed that the project will not entail *significant* impacts on the natural environment such as large scale soil erosion, changes to streams, underground water or interference with animal or plant life. However, according to the national legal and regulatory requirements and also according to EBRD-standards, this in fact does not exclude the need to plan for measures, that would help to avoid or minimize construction-related impacts and those impacts, that could potentially be related to the extraction of construction material from borrow pits.

In preparation of the planning stages to follow the present environmental assessment will comprize the following:

- Identification of project-related key concerns with regard to
  - environmental impacts
  - human health
  - human safety
- Compilation of key environmental, health and safety regulations that will be relevant to the proposed project
- Development of a rough concept of mandatory and additional measures for impact mitigation or environmental enhancement

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[11] When this report was prepared no decision had been taken with regard to the question whether rehabilitation of these bridges would be included in the project or not.

1.2 Short description of the project environment

The project area is located in the *Mugan Desert* between the range of the *Lyangyabiz Mountains* in the north and the *River Kyra* in the south. In this area the terrain is completely flat and the ground level lies slightly below sea level on average.

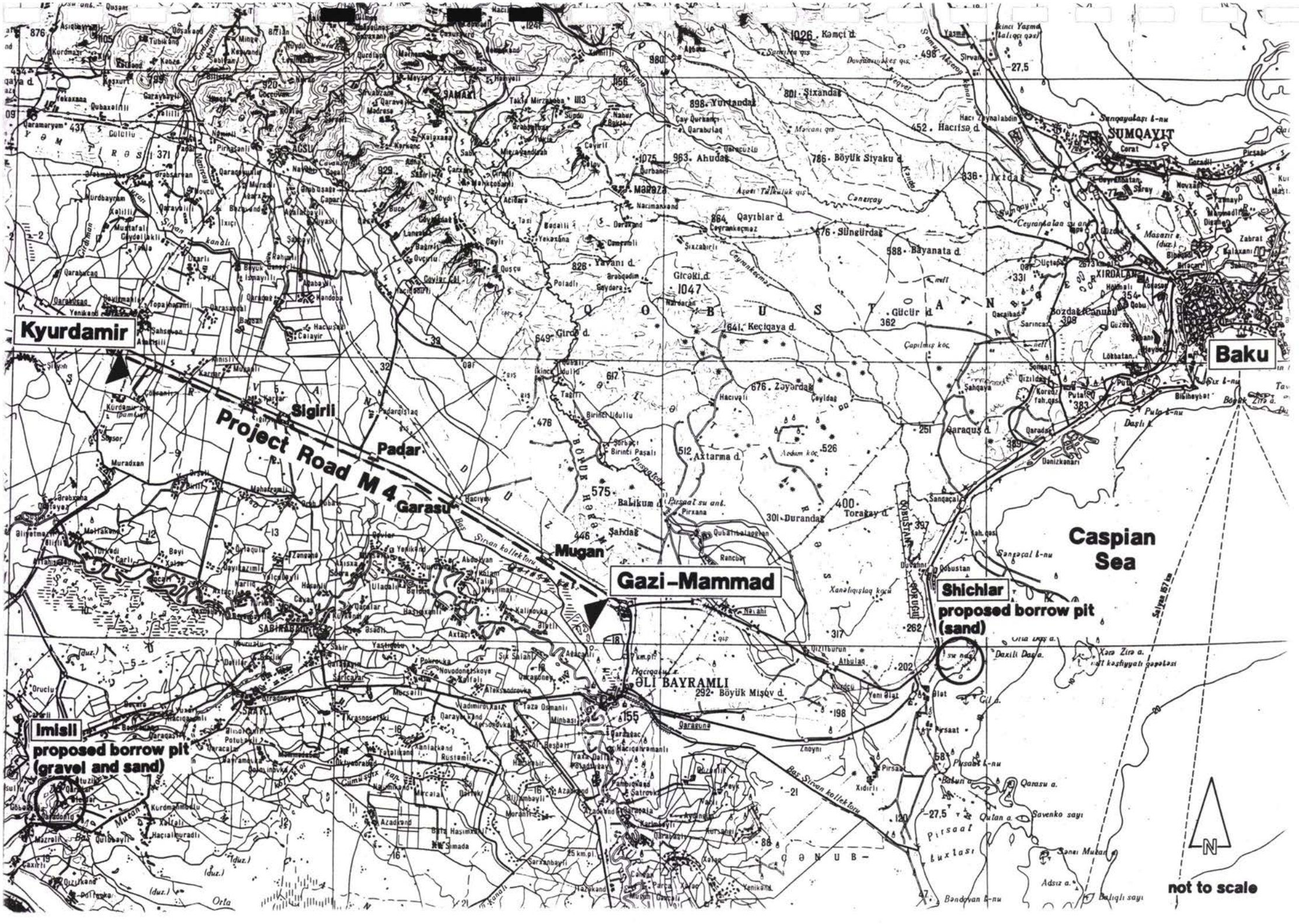
Between Gazi-Mammad and Kyurdamir the road environment is mainly composed of two types of landscape:

- ❒ treeless desertic to semi-desertic steppe in the section between Gazi-Mammad and Padar with sections being used for cattle grazing (mainly sheep)
- ❒ Irrigated, cultivated land, mainly west of Padar up to Kyurdamir

Between Gazi-Mammad and Kyurdamir the M 4 passes through four villages (from east to west): Mugan, Garasu, Padar and Sigirli (see map 1). In all cases the houses are widely spaced and located in distances between 20 and 100 m on both sides of the road.

The water courses crossed by the road are all irrigation or drainage channels and a number of these also follow the road on both sides and at variable distances. Furthermore, numerous stagnant and shallow water bodies exist in the immediate vicinity of the road. According to staff from Azeravtoyol material has been extracted at these locations and reused on the embankments when the road was built. These areas as well as the artificial channels often contain bigger stands of rushes which are often the only structures in the otherwise desertic landscape.

Almost all of this land has been and still is subject to extensive human interference and uses such as the construction of the railway line north to the M 4, the construction of the electricity and telecommunication lines, the construction and maintenance of irrigation and drainage facilities, agriculture, grazing, development of settlements and last but not least the construction of the road itself. Moreover, most of the planning area suffers from severe salination of soils, so that significant natural habitats hardly remain. In this first 50 km-section of the study-road the overall impression of the area is that of a very monotone, deserted landscape (see picture 1 in Appendix 2).


Kyurdamir
Sigirli
Padar
Project Road M 4
Garasu
Mugan
Gazi-Mammad
Baku
Caspian Sea
Shichlar
proposed borrow pit
(sand)
Imisli
proposed borrow pit
(gravel and sand)
not to scale

West of Padar the landscape changes and huge fields with cereals and sometimes cotton or wine production border the M 4 on both sides. In many locations bushes grow in or below the embankments and planted trees follow the road in single, double or even more rows, which has a very positive effect on the perception of the landscape (picture 2 in Appendix 2).

Within the road section under study two 'vehicle repair ramps' exist. According to the existing regulations (SNIP 2.05.02-8) such facilities have to be installed every 80 km at least. As shown in fig. 5, 6 and 7 these ramps are sources of considerable pollution with waste, oil and probably many other harmful substances.

With respect to fauna mention shall be made of the White stork (*Ciconia ciconia*), a bird species showing significant long-term decline all over Europe, Asia and Africa. In the area east of Kyurdamir breeding sites of this species can be observed in significant numbers on the electricity masts some 50 to 100 m south of the M 4.

1.3 Borrow pits

Borrow pits that will be used as sources for construction materials have not been determined to date, but two potential sites have been visited.

The first borrow pit is located south of Alyat, near to **Shichlar** (Gobustan), where the mining area covers a 2 km section on the shore-line of the Caspian Sea (see picture 3 in Appendix 2). The material here is sand and coarse sand with admixtures of shells and gravel and material extraction reaches down to sea level (3 - 4 m). In order to preserve the beaches on the sea a 100 m wide strip between the shore line and the actual borrow pit is excluded from mining.

In previous times hydraulic pumps were in use at the site, but these are now out of order. Also, this method is considered to be too expensive.

Active recultivation is not done at Shichlar, but it is obvious, that the seaborne winds smoothen the site continuously. Also, natural regrowth of vegetation takes place (see picture 3 in Appendix 2).

The access road to the mining site is unpaved and in rather bad condition. Along that road a few *datchas* have been built in the recent past some 50 m distance from the road.

Azeravtoyol obtains permits for the extraction of defined volumes of material from the Ministry of Construction Material which must be approved by the regional administration Garadag.

The second borrow pit is located south of **Imisli** in an area with agriculture as predominant type of land use (picture 4 in Appendix 2). At this site gravel and sand are mined from an area which contains fluvial deposits from the river Kyra. The thickness of these deposits is about 40 m, but the actual extraction only reaches down to depths of 23 m.

A crushing plant and railway access exist directly on the site and this railway line leads in direction of the project road with rail-sidings at Ali Bayramli and Gazi-Mammad. According to staff from Azeravtoyol this site is the only one in the Kaukasus equipped with a pumping plant.

1.4 Observations on some road characteristics related to safety

The embankments of the existing M 4 are mainly between 1 and 1.5 m high and often rather steep (1:1 or 1:1.5 / horizontal : vertical). Where the road crosses existing culverts, the road gradient raises and the embankments sometimes reach up over 3 m height. In many such cases no crash barriers exist.

On one bigger bridge near Sigirli (km 105), space for pedestrians is very narrow (about 0.6 m) and there are no advertisements for drivers or pedestrians to this regard. Another inadequacy related to road safety is the very bad condition of the existing railings on this bridge (see pictures 8, 9 and 10 in Appendix 2).

In a number of road sections (e.g. in the area of km 68 left) the shoulders of the road do not exist anymore. In cases of emergency, evading maneuvers would not be possible.

Finally, mention shall be made of the existing road marks. Although the M 4 is a classified road, white lining does only exist partly in the road section under study and is mainly restricted to the center line.

2 Compilation of key environmental, health and safety regulations

The compilation of the existing legal and regulatory framework aims at

- ❒ the identification of the general national requirements for impact mitigation or other environmental protection measures with regard to human health and safety in pavement repair / rehabilitation and borrow pit operations
- ❒ the identification of further measures required for the project to meet international / EBRD standards

2.1 Laws and regulations

The Consultant has examined the Environmental laws of Azerbaijan as well as regulations on worker's health and safety related to road construction operations hat could be made available at Azeravtoyol. Moreover, representatives from the 'Azerbaijan State Committee on Ecology and Control of Natural Resources Utilization' (ASCE) were consulted for possible additional provisions that would be relevant in the case of the present project. Thus, the following laws and regulations have to be considered:

The **'Law of the Republic of Azerbaijan on the Protection of the Environment and the Utilization of Nature'** represents a general framework for all National objectives in the area of environmental protection. With regard to the present project 2 articles of this law are relevant.

Article 31 defines (among other s) the type of projects, that would require compulsory **'State Ecological Expertise'** (= EIA). Among construction projects 'reconstruction, extension and technical re-equipment projects' would fall under the requirements of this regulation, while pavement repair / rehabilitation on existing roads would not be affected.

Article 49 of the same law deals with '**General Ecological Demands During Siting, Designing, Construction, Commissioning of Enterprises Installations and Other Facilities**': 'During ... the feasibility study of the project ... the standards and requirements of ecological safety and protection of health of humans should be complied with, and measures for nature protection, rational utilization, restoration and reproduction of natural resources, saving of resources, regeneration of natural environment should be envisaged.

The system of ecological standards includes:

- maximum permitted concentrations of pollutants in natural environment
- maximum permitted discharges and emissions of pollutants into the natural environment;
- maximum permitted levels of noise, ... and other harmful physical influences as well as ... health norms ...'.

Specifications hereupon can be obtained from ***SNIP-Regulations*** (= construction norms and rules), ***GOST-standards*** (= state standards) and a number of further regulations. All of these documents are former Soviet Union regulations which date back to the time period between 1980 and 1989. However, according to a decision of the Cabinet of Ministers of the Republic of Azerbaijan (Nr. 217 of 15 April 1992) these documents will all remain officially binding until national regulations or standards are adopted.

The following is a short summary of the existing regulatory instruments related to environmental protection, health and safety issues associated with the Project.

SNIP 2.05.02-85: Regulation on Road Construction

This regulation deals with environmental issues under section 3. Most of the statements under this section are very general and do mainly apply to impact avoidance or mitigation on *new* road projects. However, some of the provisions (like those on the treatment of top soil during construction works) would also have to be applied in the case of the rehabilitation of existing roads.

BCH 8-89: Regulation on Environmental Protection in Construction, Rehabilitation and Maintenance of Roads

This document includes most comprehensive regulations on environmental protection in road construction, rehabilitation or maintenance activities (among others: use of soils, protection of water resources, protection of forests, flora and fauna, use, preparation and storage of road construction machinery and materials, provisional structures, provisional roads, fire protection, borrow pits and material transport, avoidance of dust, protection of soils from pollution, prevention of soil erosion etc.).

The appendices to this document also include standards for:

- the maximum permitted concentrations of toxic substances
- noise control measures
- soil pollution through losses of oil and fuel from construction equipment
- standards for quality of surface waters

SNIP III 4-80: Norms for Construction Safety

This document refers to construction activities in general and comprizes, among others, detailed regulations on worker's health and safety. With regard to the present project the chapters 2 and 5 may be relevant (organization of the construction site, the work sites and transport works). It also determines the maximum permissable concentration of toxic substances in the air, which could be relevant for road marking operations for example (Appendix 9).

Safety Regulations for Construction, Rehabilitation and Maintenance of Roads 1978 (corresponds to SNIP III A-11-70)

This document is a comprehensive compilation of safety rules for almost all aspects and stages of road construction, eg requirements for the technical safety for work with road construction equipment, the construction of dams, the rehabilitation and maintenance of bridges and culverts, loading and unloading operations, operation and maintenance of asphalt plants, work with toxic substances, work in quarries and borrow pits, work with compressors, mobile power plants, operation and maintenance of road construction machines etc.

GOST 13508-74

This document deals with road marking and describes the requirements and standards of white lining for the various road categories, which is an important aspect of road safety.

Convention on the Conservation of Migratory Species of Wild Animals (CMS)

The Migratory Species Convention (Bonn 1979) is a skeleton agreement on the conservation of migratory species of wild animals and prepares the establishment of further regional agreements. This convention was not signed by the former USSR at that time but is relevant for the EBRD as a European donor organization.

The White stork *Ciconia ciconia* which (as has already been mentioned) breeds in the immediate planning area is listed in the appendix of the Convention.

African-Eurasian-Waterbird Agreement (AEWA)

This regional agreement results from the aforementioned 'Bonn-Convention'. According to Article II (1.) parties to the agreement 'shall take co-ordinated measures to maintain migratory waterbird species in a favourable conservation status or to restore them to such a status'. With regard to human activities parties to the Agreement shall 'assess the impact of proposed projects ... and human interests... In cases where human disturbance threatens the conservation status ... parties should endeavour to take measures to limit the level of threat'. The agreement applies to species as listed in Annex 2, again including the White stork *Ciconia ciconia* .

The agreement remains open for signature at The Hague until the date of its entry into force. According to the Bonn Agreement secretariat this is expected to be by mid 1998 and it is also expected, that Azerbaijan will ratify the agreement.

2.2 Requirements for public participation

According to the existing legal provisions, public participation will be mandatory in cases where residents 'might be affected directly by disruption, displacement, noise, smells, traffic or some other impact; it also includes community organizations and special interest groups. Also among the public are professional organizations and individuals who may have valid, technical opinions and views'. ...[1].

[1] from: Handbook for the Environmental Impact Assessment Process in Azerbaijan. ASCE / UNDP, Baku 1996

With respect to road construction such regulations however would mainly apply to *new* road projects, where land acquisition is required in considerable amounts.

In the present case additional land shall only be temporarily required for the siting of the constractor's yard itself, while the pavement repair operations will be restricted to the existing carriageway. In the case of material extraction, the project will only use such sites, that have already been in operation for a long time, so hat no fundamentally new environmental impacts are to be expected. Also, transport roads are existing at all quarry sites so that no new facts or sources of disturbances will be created.

Given this frame the character of the proposed project is more that of *road rehabilitation* than *road construction,* so that special measures for public participation will not be required.

2.3 Conclusions

The existing national laws and regulations do in fact include the general conception of avoiding or minimizing construction-related impacts on the environment and also health and safety regulations seem to be adequate. From this point of view and also considering (the relatively few) requirements for the Project is assumed, that there are in general sufficient provisions to ensure environmentally sound planning and construction practices which would also meet EBRD-standards for road rehabilitation projects. In *practise* however, no bodies / institutions or mechanisms have been established, that would pursue the consistent implementation of the full range of existing laws and regulations.

The next planning stages will have to analyse the quoted norms and regulations in some more detail, identify remaining gaps and develop and establish mechanisms wich will ensure the consistent implementation of the necessary measures.

The following chapter outlines the legally required environmental protection and safety measures and also contains additional measures for environmental improvement or environmental enhancement opportunities, which do largely

follow World Bank recommendations for similar road rehabilitation projects[2]. As for the measures controlled by regulatory requirements, these proposals will then have to be discussed with the appropriate official bodies and developed to some more detail in the future planning stages.

A summary of all potential impacts, recommended measures and the existing regulatory framework is given in Appendix 1, tables 1 - 4.

3 Environmental impacts, avoidance and mitigation measures

The Consultant undertook visits to the project area (road and two potential borrow pits) and discussed the project features with staff from Azeravtoyol, representatives from the 'State Committee on Ecology and Control of Natural Resources'. The conclusions are as follows:

Environmental impacts

As the project is restricted to the repair of the pavement on an existing road *no significant* impacts are to be expected. Possible adverse impacts would be those that are caused by the purely *construction related activities*, the *temporary use of land* for the contractor's yard(s) as well as the extraction of construction material from *existing borrow pits*.

Human Health

As the project will improve the surface and the 'furniture' of an existing road potential negative impacts on human health would be restricted to the construction period where workers deal with exhaust fumes, noise, dust and potentially harmful substances and materials.

Human Safety

With regard to road users travelling safety will be improved through a smoother road surface and a better road furniture (crash barriers, road marking, traffic signs etc.)

During construction however, safety could be affected by construction traffic, activities within the contractor's yard and works in borrow pits.

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2 The World Bank 1994: 'Roads and Environment: A Handbook'

Measures

The measures to be specified as the planning proceeds will thus have to focus on the activities within the contractor's yard(s) and the management of construction works. The concept will have to address aspects like ground and surface water protection, dust control, waste management, materials handling and storage areas, worker's health and safety as well as road safety.

Expected project-related impacts as well as a *general concept* of suitable mitigation and proposals for additional environmental enhancement will be discussed in broader terms below. Where norms and regulations exist, these will be stated.

3.1 Establishment, setup and operation of the work site

Impacts

The location of work facilities is a key environmental issue during the establishment of the construction site. Depending on the site that is chosen, the installation of equipment and storage of materials may cause traffic disruption, noise and dust affecting road users and neighbouring residential areas (the latter could refer to the peripheries of the villages that exist along the road, if a construction camp was installed there). During harvest seasons temporary detours or road closures could create additional problems. Pollution of soils, surface and ground waters could result from equipment cleaning and materials storage and handling. Finally, site establishment could disturb the breeding sites of endangered species like the White stork, which are situated in the vicinity of the road in the area of Kyurdamir.

Mitigation measures (Appendix 1, table 1)

Reasonable siting of the contractor's yard would not exclusively take technical or economical aspects into account but would also consider environmental requirements. The project will have to develop criteria to this regard, e.g. the avoidance of lands adjacent to settlements, drinking water sources, avoidance of the disturbance of the breeding sites of the White Stork (Construction Norms BCH 8-89 no. 2.3.3, AEWA 1995).

Site selection and preparation shall also avoid, as far as possible, the removal of trees or bushes. Should trees be growing in the immediate vicinity or within the selected site, they shall be protected against damage by suitable

measures (BCH 8-89, no. 2.3.4 - 2.3.7). Also, site preparation shall include removal and storage of topsoil according to existing regulations (SNIP 2.05.02-85, no. 3.4 and 3.5).

Depending on the number of workers and the mode of accomodation (i.e. construction camp with containers or other accomodation facilities), provisions will also have to be established for the proper treatment of sewerage and waste (BCH 8-89 No. 2.2.1, 2.2.4, 2.2.5).

If not handled properly, storage and handling of hazardous substances such as detergents, lubricants, oil, fuels, paint etc. within the contractor's yard can be considerable sources of groundwater pollution, the pollution of surface water or soil or affect worker's health (Safety Regulations for Construction, Rehabilitation and Maintenance of Roads, Chapters 1,2,11 and 17; BCH 8-89 no. 2.2.1, 2.4.11 and 2.5; SNIP III-4-80). BCH 8-89 also defines protection zones along rivers, where the pollution of soils, storage of waste as well as vehicle parking and cleaning is prohibited. As mentioned in Chapter 1.2 of this Report, no natural rivers exist in the direct surroundings of the project road, but it is felt that the provisions of BCH 8-89 no. 2.2.9, 2.2.10 and 2.4.11 should be also applied to irrigation and drainage facilities of the project area, which sooner or later all flow into rivers.

Traffic safety within the contractor's yard shall be ensured by a well designed traffic management plan (only partly covered by the provisions of SNIP III-4-80 Nr. 2.20).

Also, it must be assumed, that the awareness about adverse environmental impacts potentially arising from operations within the contractor's yard (and also construction activities in general) will probably be very low among the workers. It is therefore also recommended that the construction supervision shall provide some on-site training or briefing for the workshop personnel as well as for those operating and maintaining machines and equipment.

Another important aspect of contractor responsibility shall be the restoration of work areas, work depots and material storage sites. Restoration would also include respreading of top soil, removal of all machines or waste material (partly covered by BCH 8-89, no. 2.4.1, 2.4.2) from the work site.

In order to ensure the proper implementation of the existing regulations and further recommended measures it is recommended that responsibilities shall be clearly defined and compliance monitored by an inspector or the construction supervision team. Also, the contractor shall submit a method statement for the establishment, maintenance and restoration of the work site.

3.2 Activities within the construction corridor

Impacts

According to the stage of the present project, no statements are yet available on the design of the technical improvement requirements of the various road sections. Consequently, only very general presumptions can be made with regard to the impacts that could be related to the construction activities, the temporary diversion of traffic or traffic management during construction. Safety of road workers and other road users can be put at risk by inadequate traffic management and work zone controls.

Also, attention should be paid to the existing stands of trees. In some sections (mainly west of Padar) planted trees and bushes grow very close to the roadside. If suitable protection measures are not carried out, destruction of road-side vegetation is rather likely.

In the case that existing bridges or culverts would need replacement this would require some major earthworks on the sensitive embankments of the streams and, if no further precautions are taken, soil erosion and water pollution could be caused.

Depending on the local soil properties, soil compaction may be caused by work-site machinery moving around the construction site which may harm the soil's potential for future agricultural use or other activities. Dust development could be caused by moving machinery.

Finally, abandoned machinery and waste materials could disfigure the landscape.

Mitigation measures (see Appendix 1, table 2)

With regard to traffic and worker's safety, potential risks and disturbances for local residents can be avoided or mitigated through well designed plans for

traffic and work management. The latter is partly covered by SNIP III-4-80 (safety provisions for construction activities in general, some of which would also apply to road construction) and also by the Safety Regulations on Construction, Rehabilitation and Maintenance of Roads of 1978 (corresponding to SNIP III A-11-70).

Within or near to settlements, where material transport may disturb local residents, minimization of dust development can be achieved by periodically watering the transport roads and using covered trucks (see also BCH 8-89, no. 4.1.1).

In the sections west of Padar trees sometimes grow in the immediate vicinity of the road so that construction operations in these sections should be carried out with special care with regard to the protection of road side trees (BCH 8-89, no. 2.3.4 - 2.3.7). The project shall work out mechanisms that ensure the implementation of such measures.

In the case that bridges are replaced, the material (reinforced concrete) shall be removed and disposed of properly in suitable locations. In cases of bridge rehabilitation safety regulations shall be considered (Safety Regulations on Construction, Rehabilitation and Maintenance of Roads, Chapter 6).

Wherever possible, processing and reuse of existing materials (subbase and surface material or material from demolished bridges for example) should be considered. This would help to avoid or minimize the need of waste disposal and also reduce adverse impacts potentially resulting from material extraction and transport.

Finally, all land that has been temporarily used for construction will have to be restored to the initial state. This shall also include the removal of all machines and waste material from the construction site (only partly covered by BCH 8-89, no. 2.4.1 and 2.4.2).

3.3 Material extraction and transport

Impacts

Borrow sites which provide road building materials may have substantial adverse impacts on soils, water, the natural environment and human health.

Any evaluation of the quality and dimension of potential environmental impacts that would be related to additional (yet unknown) amounts of material extraction from existing borrow sites can only be general in the present cases. The main reason for this is the lack of useful and reliable base-line data. In general, purely project-related, additional material extraction from existing and operating borrow sites is not expected to create serious additional or new impacts on the natural surroundings, animal or plant life, groundwater or landscape.

Measures (see Appendix 1, table 3)

As a first step to avoid or reduce transport-related disturbances for local residents and also road users in general it should be considered as to how far the existing railway line can be integrated into the material transport plan.

If transport through villages cannot be avoided, roads should be periodically watered (BCH 8-89, no. 4.1.1). The use of covered trucks would also mitigate dust development. In both cases a well designed traffic management plan should consider traffic safety and make statements on working hours for material transport. Again a contractor method statement on material handling and transportation should be sought for approval.

Local people should be informed of construction works to be carried out in advance of their start in order to allay fears and complaints.

With respect to worker's health and safety the existing safety regulations shall be applied and compliance monitored.

3.4 Proposals for additional environmental enhancement (App. 1, table 4)

Tree planting

As has been mentioned under chapter 1.2 of this Report, top soil has been scratched from the land adjacent to the road to be reused on the road embankments in many places. Within the villages these sites often contain polluted stagnant water and also waste (especially at Garasu and Mugan). It is suggested that all these sites shall be identified and recultivated, including removal of waste, filling, landscaping and tree planting. Within the coming design phase of the project the individual local requirements for this measures shall be analysed and evaluated and discussed with the local authorities in all four villages (locations and amount of land fill, requirements for waste removal, growing conditions for trees, suitable species, irrigation opportunities, maintenance demands and organization, views of local authorities etc.).

Vehicle Repair Ramps

It is felt that keeping up the situation as describrd under chapter 1.2 of this Report would not be in line with good western standards so that the Project should work out a concept to improve on that situation. First of all the usefulness of these ramps should be discussed among the appropriate bodies. If it is decided that these facilities are in fact necessary, some analyses of the quality and actual extent of soil pollution could be carried out. Based on the results of this, the existing regulations on the design of the ramps should then be revised under the aspect of the prevention of soil and groundwater pollution (e.g. sealing, oil/fuel separator etc.)

In addition to the purely technical improvement of the ramps it is also recommended that some kind of public advertisement / signboards with appropriate explanations on the handling of oil and waste shall be installed at the sites.

Establishment of a waste collection system

Along the M 4 numerous restaurants, kiosks, police posts and other stopping points are sources of waste generation. Since no alternatives exist, all waste (mainly tin cans, bottles and other packaging material) is disposed of in the surrounding landscape.

In order to alleviate this situation is proposed that a waste collection system be installed along the road which of course would have to include regular

waste collection, proper diposal and public advertisement by road signs, radio and newspaper advertisements etc. Together with the appropriate authorities the Project shall develop a taylor-made concept to improve on the present situation. This concept may then serve as a model for other sections of the national magistrate road network.

Measures for the improvement of road safety

Road safety may be improved by the consistent application of the existing regulations on road marking. Also, the present condition of the bridge near Sigirly represents a serious risk for pedestrians and drivers and it is recommended that immediate action be taken to improve on that situation (e.g. replacement of the existing handrails, see pictures 8, 9 and 10 in Appendix 2). Finally, some sections exist, where the embankments of the road are higher than 3 m. In these locations, crash barriers should be installed to improve road safety.

Appendix 1: Tabular Summary Potential Impacts, Measures and Regulations

Table 1: Establishment, setup and operation of the work site - potential impacts, measures and regulations

Potential Impact	Measures	Regulations
Loss or disturbance of valuable habitats	• **work site establishment to avoid breeding sites of protected endangered bird species and or sensible breeding period**	CNS 1979; AEWA 1995; BCH 8-89 no. 2.3.3
Loss of or damage to roadside trees and bushes	• **preserve / protect single trees and bushes within or adjacent to the work site**	BCH 8-89 no. 2.3.4 - 2.3.7
Loss of valuable topsoil	• **remove and store topsoil**	SNIP 2.05.02-85, no. 3.4 and 3.5
Pollution of soils, surface and ground waters	• **avoid water protection zones and surface waters, restrict activities in areas near to rivers or streams / irrigation facilities**	BCH 8-89, no. 2.2.5, 2.2.9, 2.2.10; BCH 8-89 no. 2.4.11
	• **proper storage, use and handling of hazardous materials (detergents, lubricants, fuel, oil, point etc.)**	Safety Regulations for Construction, Rehabilitation and Maintenance of Roads (corresponds to SNIP III A-11-70) Chapter 11; BCH 8-89 no. 2.2.1, 2.2.4, 2.2.5; SNIP III-4-80
	• temporary sealing of contractor's yard (storage area of machines, filling and washing sites, workshop, storage areas for hazardous substances), installation of oil-fuel separator	-.-
	• proper treatment of sewerage and waste from worker's accomodation	(BCH 8-89 no. 2.2.1 and 2.2.4)
	• raise awareness of workers and other personnel on use and handling of hazardous materials by on-site training / briefing	-.-
	• on completion of works: restore site (work areas, work depots and material storage site) to initial state; respread top-soil	-.-
	remove machines and waste material	-.-
	• define clear responsibilities, monitor compliance by inspector or construction supervision team	-.-
Noise development	• **use machinery corresponding to existiong noise regulations**	BCH 8-89 no. 2.4.2
	• work site establishment to avoid neighbourhood of settlements	-.-
Dust development	• **adopt dust control measures**	BCH 8-89 no. 4.1.1 (applies to roads within settlements)
Traffic disruption and worker's safety	• develop well designed traffic management plan	
Risk for worker's health and safety	• **apply and supervize safety regulations for road works**	Safety Regulations for Construction, Rehabilitation and Maintenance of Roads (corresponds to SNIP III A-11-70) Chapters 1, 2,11, 17; SNIP III 4-80 no. 2

Note: Measures in bold are mandatory due to existing regulations; (...) regulations only partly cover recommended measures
-.- indicates additional recommended measures

Table 2: Activities within the construction corridor - potential impacts, measures and regulations

Potential Impact	Measures	Regulations
Risk for worker's health and safety	• **apply and supervize safety regulations for road works**	Safety Regulations for Construction, Rehabilitation and Maintenance of Roads (corresponds to SNIP III A-11-70) Chapters 2, 9, 11
	• **in case of works on bridges and culverts apply and supervize specific regulations**	see above, Chapter 6
	• develop well designed traffic management plan	(SNIP III-4-80 no. 2.20)
Destruction of roadside trees	• **preserve / protect trees within or adjacent to the construction corridor**	BCH 8-89 no. 2.3.4 - 2.3.7
Surface water pollution (eg	• **respect protection zones along streams and rivers**	BCH 8-89 no. 2.2
Noise development	• **use machinery corresponding to existing noise regulations**	BCH 8-89 Annex 2
	• limit working hours	-.-
Dust development	• **adopt dust control measures**	BCH 8-89 no. 4.1.1
Worker's health	• apply health and safety regulations for road construction equipment	BCH 8-89 no. 2.4 and Annex 2; SNIP III-4-80
Generation of waste from road rehabilitation	• reuse material whereever possible	-.-
Traffic disruption	• develop well designed traffic management plan	-.-
For better control of measures to apply	• contractor to provide a method statement	-
Additonal environmental enhancement measures:	• identify possibilities for tree planting within villages along road; consider local conditions (growing conditions, land use etc.), irrigation opportunities, possibilities for maintenance organization	-.-

Table 3: Material extraction and transport - potential impacts, measures and regulations

Potential Impact	Measures	Regulations
Disturbances of local residents through material transport (noise, dust)	• consider possibility of material transport by railway • inform local people about project (responsibilities, purpose, duration...)	-.- -.-
	• **apply measures for dust control (watering of roads, covered trucks, speed restrictions etc.)**	(BCH 8-89 Nr. 3.4), no. 4.1.1
	•	
loss of valuable topsoil	• remove and store topsoil	SNIP 2.05.02-85 no. 3.4 and 3.5
safety risks because of material transport through settlements	• develop of well designed traffic management plan	(SNIP III-4-80), no. 2.20)
risk for worker's health and safety	• **apply and supervize safety regulations for works in quarries and borrow pits**	Safety Regulations for Construction, Rehabilitation and Maintenance of Roads (corresponds to SNIP III A-11-70) Chapter 12

Table 4: Further opportunities for positive environmental enhancement

Aim	Measures	Regulations
Improvement of road safety	• **white linings (preferably using environmentally friendly products)** • repair / improvement of bridge near Sigirli (km 105), especially handrails • **crash barriers in road sections with embankments > 3m height**	GOST 13508-74 -.- GOST
Improvement of road sides within settlements	• removal of waste from roadside depressions • landscaping • tree planting	-.-
Reduction of soil pollution at existing vehicle repair ramps	• rediscuss usefulness of facilities with appropriate bodies • carry out analyses with regard to quality and extent of actual soil pollution • removal of existing pollutants and waste • development of an improved technical design • development and installation of signpost with information on handling and treatment of waste, used oil and other potentially harmful substances	-.-
Waste management	• development of a concept for waste reduction and collection on Magistrale Roads (consultation with appropriate official bodies, establishment of a system for waste avoidance, collection and disposal, public information campaigns)	-.-

Appendix 2: Photographs

Fig. 1: Mugan desert: typical aspect of the road environment in the eastern part of the project area

Fig. 2: Roadside trees and bushes on the M 4 near Padar

Fig. 3: Potential borrow pit on the Caspian Sea near Shichlar

Fig. 4: Potential borrow pit near Imisli

Fig. 5, 6 and 7:
Vehicle repair ramps on the M 4: permanent sources of pollution with oil and waste and probably other harmful substances and waste

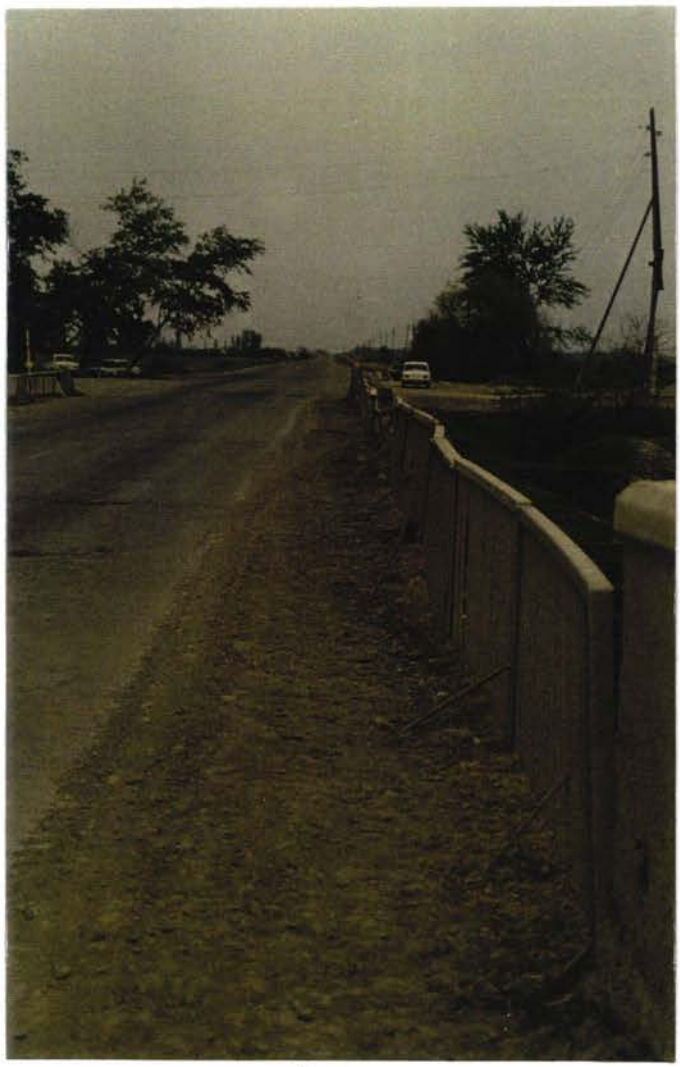

Fig. 8, 9 and 10: Safety deficits at the bridge near Sigirli:
railings are dilapidated and too low, fixing inadequate and dangerous

APPENDIX 6.5

PAVEMENT STRENGTH REPORT

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A/S PHØNIX
P. P. C

Client: TACIS

SECTION NO. 1 ALYAT TO GAZI-MAMMAD

Link no.: 37.001

Design date: 06-11-1997

Link ref.: M4

Mea. date: 970416 2

The classification is based on sections => 4 measurements.
For each section the overlay thickness is calculated as
average + 33% of the standard deviation.
The stated layer thickness must be considered as instructive, as there might be material or technical reasons why another layer thickness than the here stated should be carried out, especially in connection with thin overlay thicknesses.

Section	Overlay Thickness in mm	<--------Life--------> before years	after years	extra tons
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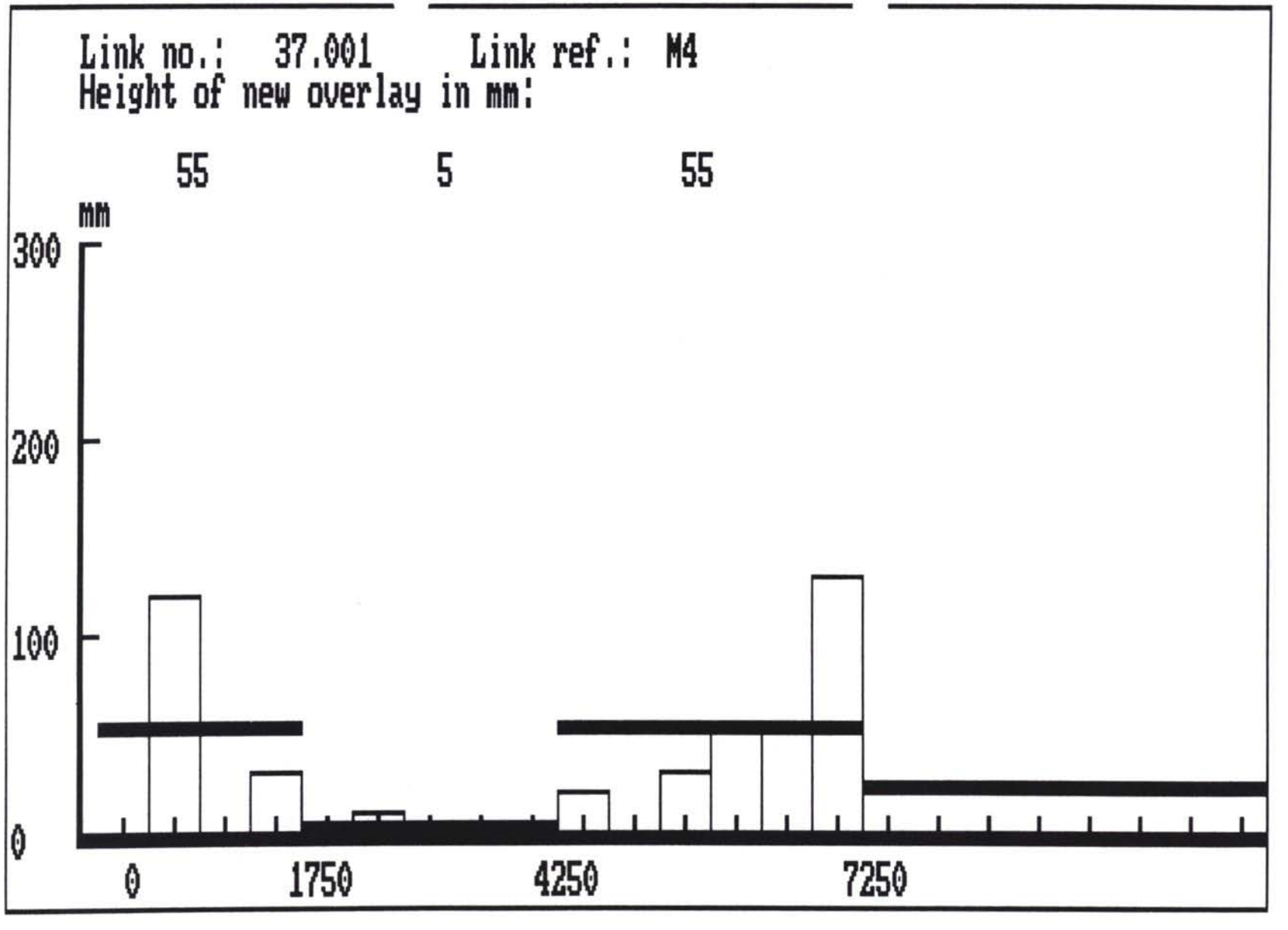
1750 - 4250	5	14	15	0
4250 - 7250	55	8	15	464
7250 - 42000	25	12	15	3682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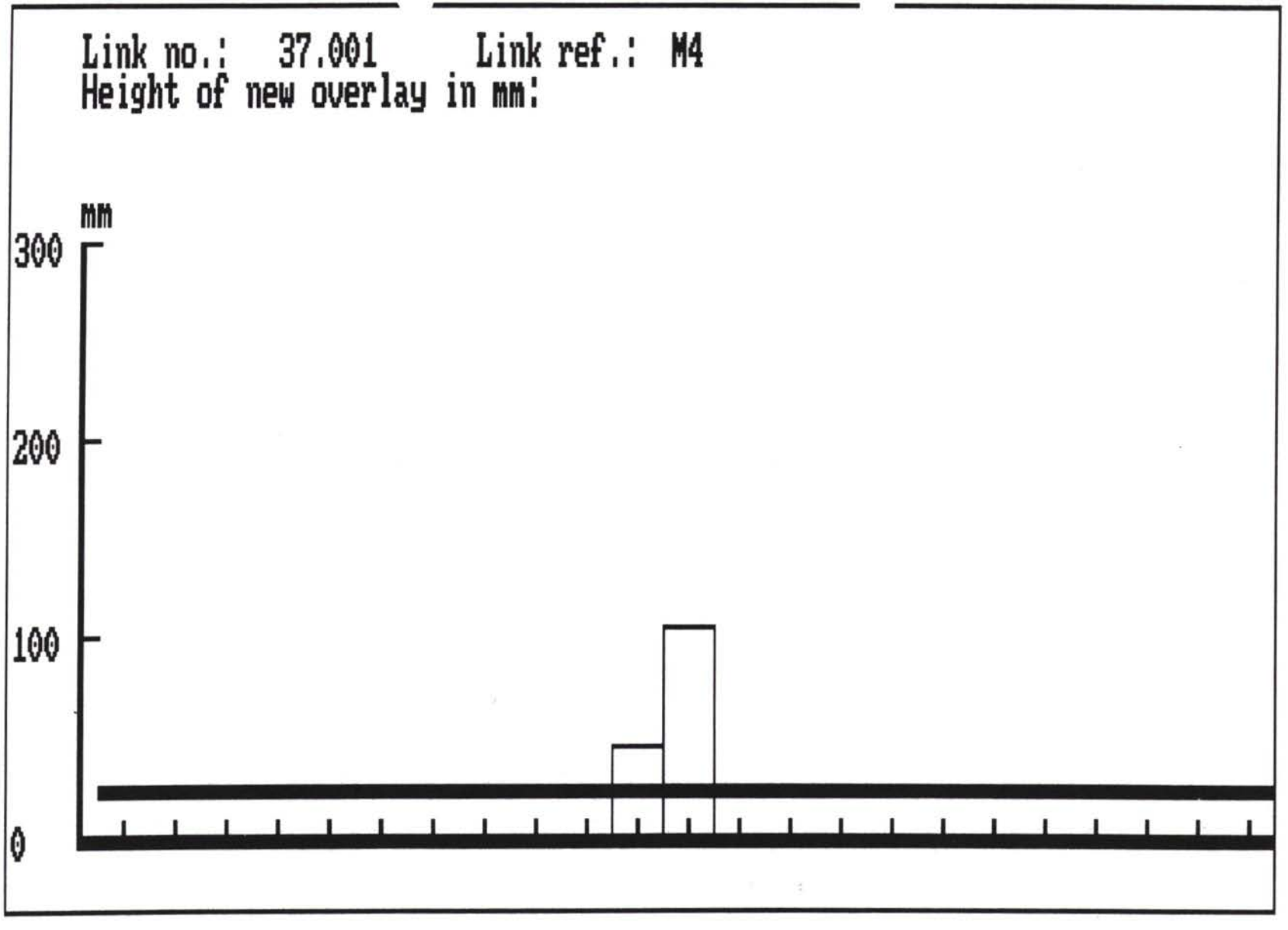
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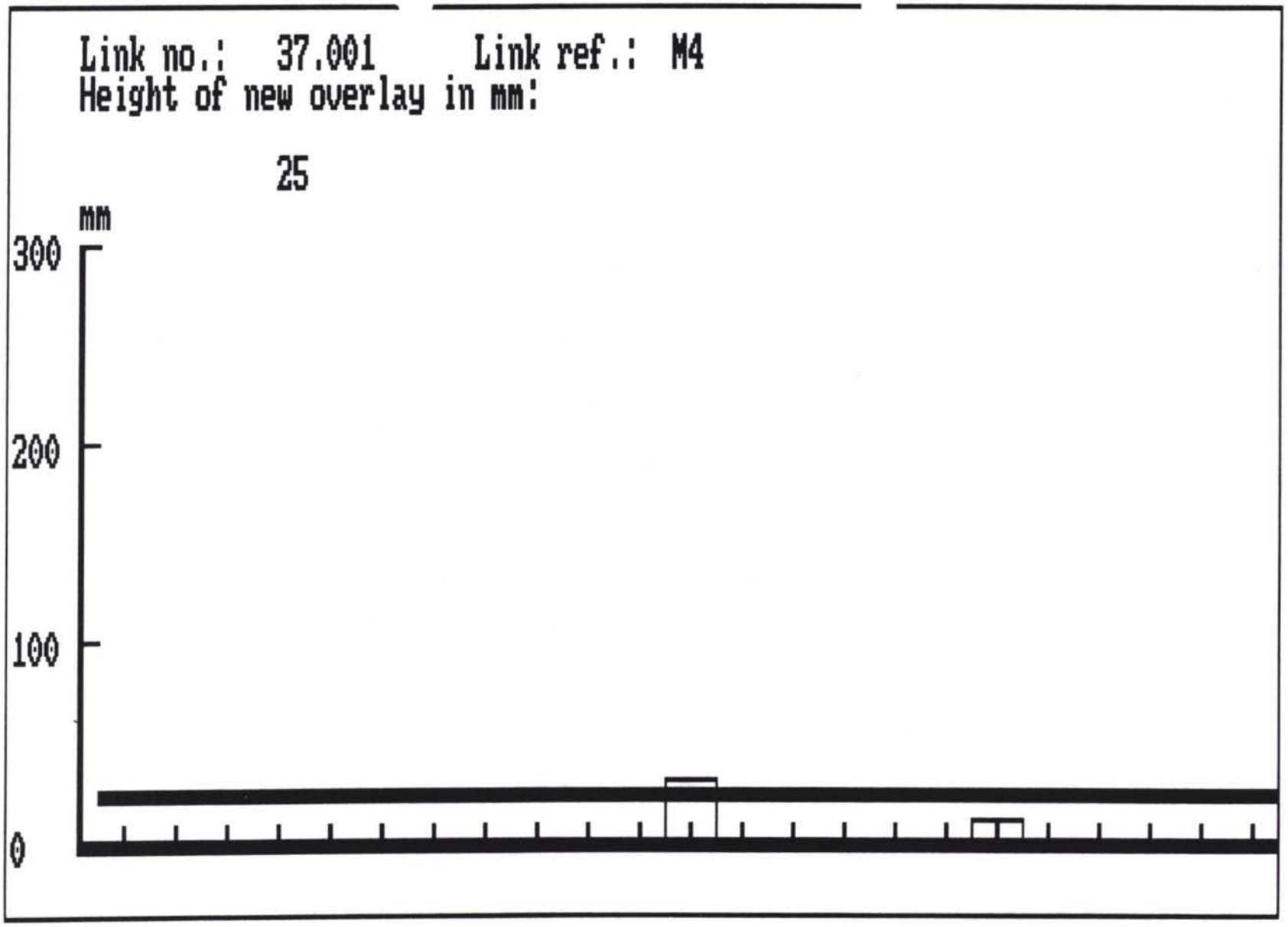
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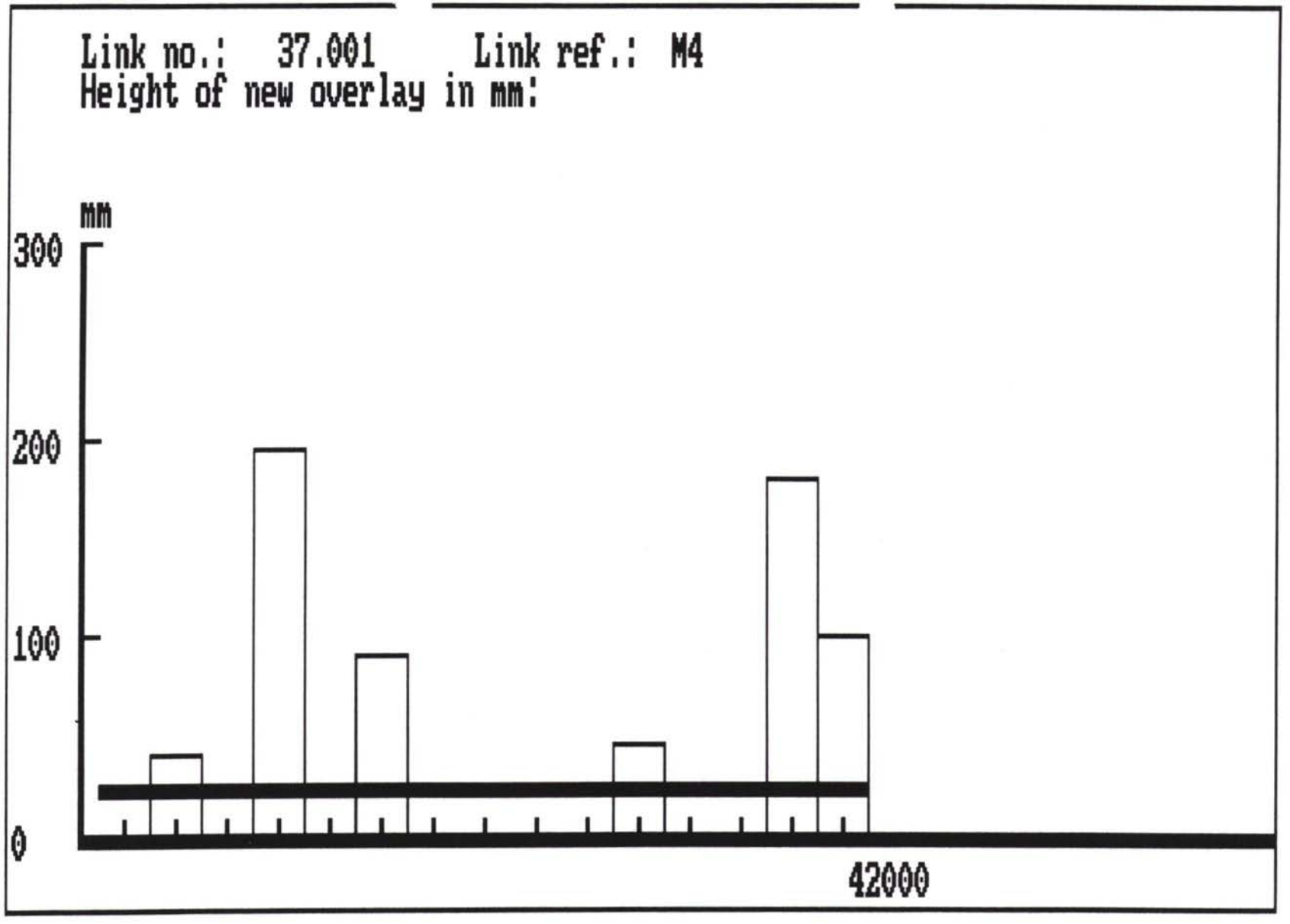
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BEARING CAPACITY OF EQUAL SECTIONS

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A/S PHØNIX
P. P. C

Client: TACIS

SECTION NO. 2 GAZI-MAMMAD TO KURDAMIR

Link no.: 0001

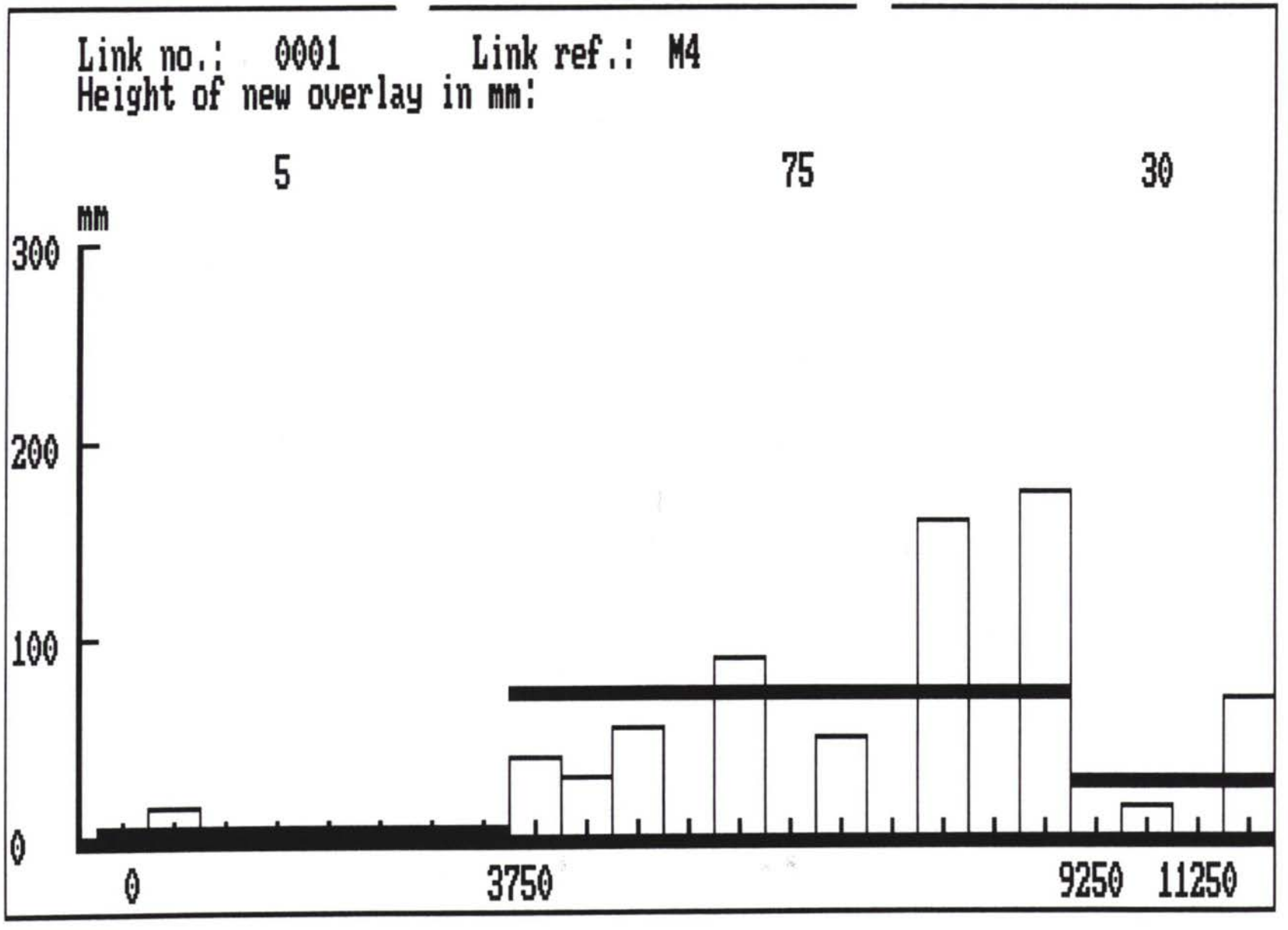
Design date: 06-11-1997

Link ref.: M4

Mea. date: 970413 2

The classification is based on sections => 4 measurements.
For each section the overlay thickness is calculated as
average + 33% of the standard deviation.
The stated layer thickness must be considered as instructive, as there might be material or technical reasons why another layer thickness than the here stated should be carried out, especially in connection with thin overlay thicknesses.

Section	Overlay Thickness in mm	<--------Life--------> before years	after years	extra tons
0 - 3750	5	14	15	0
3750 - 9250	75	6	15	937
9250 - 11250	30	11	15	203
11250 - 26250	15	14	15	886
26250 - 28250	105	3	15	177
28250 - 30250	35	7	15	76
30250 - 32750	10	14	15	0
32750 - 34750	90	5	15	532
34750 - 37750	135	2	15	987
37750 - 43750	45	9	15	608
43750 - 45750	75	5	15	304
45750 - 48250	135	2	15	987
48250 - 55250	15	14	15	405
55250 - 57500	115	3	15	304
57500 - 62250	5	14	15	76
62250 - 64250	90	3	15	0
64250 - 83500	60	13	15	3303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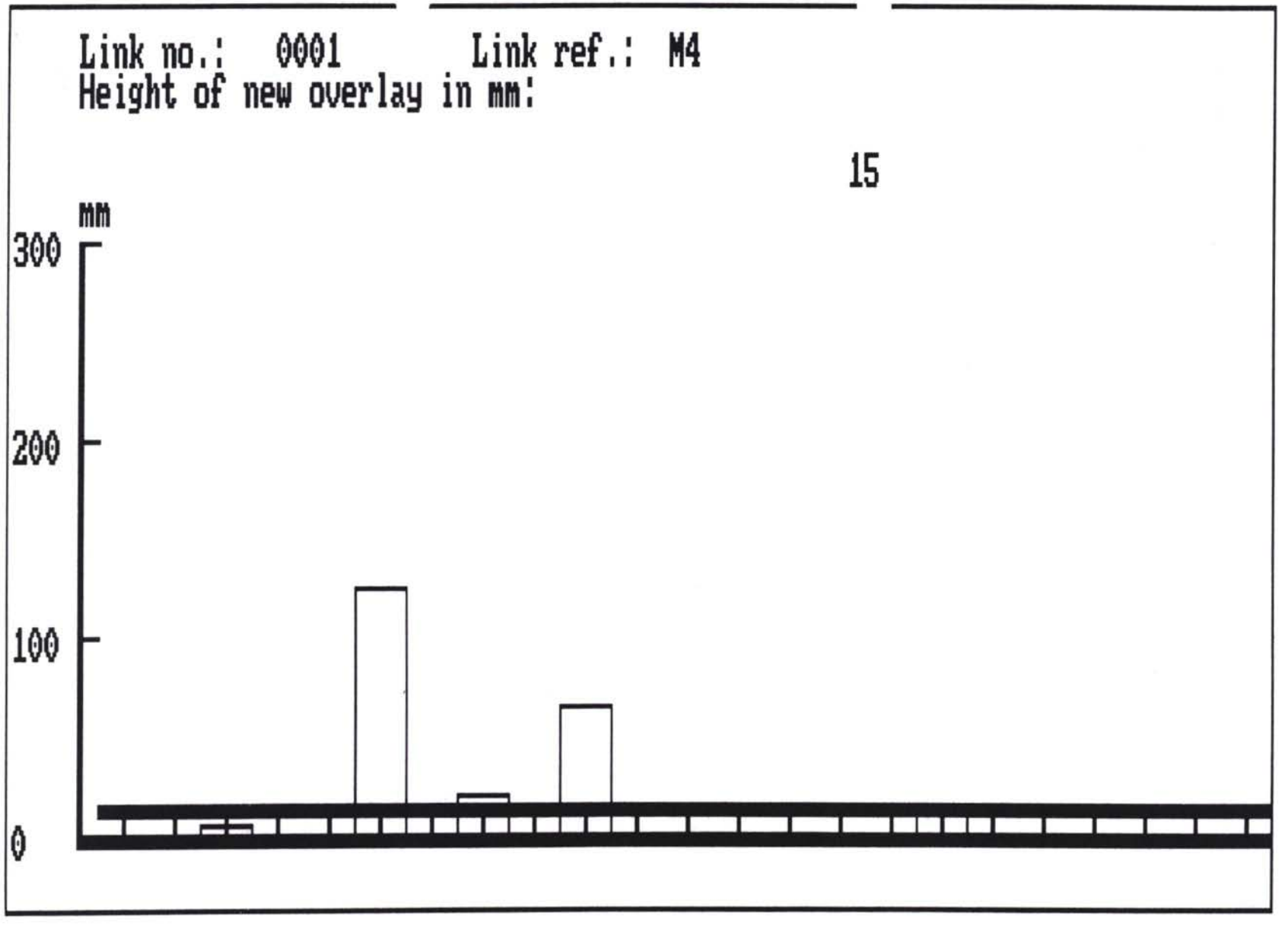
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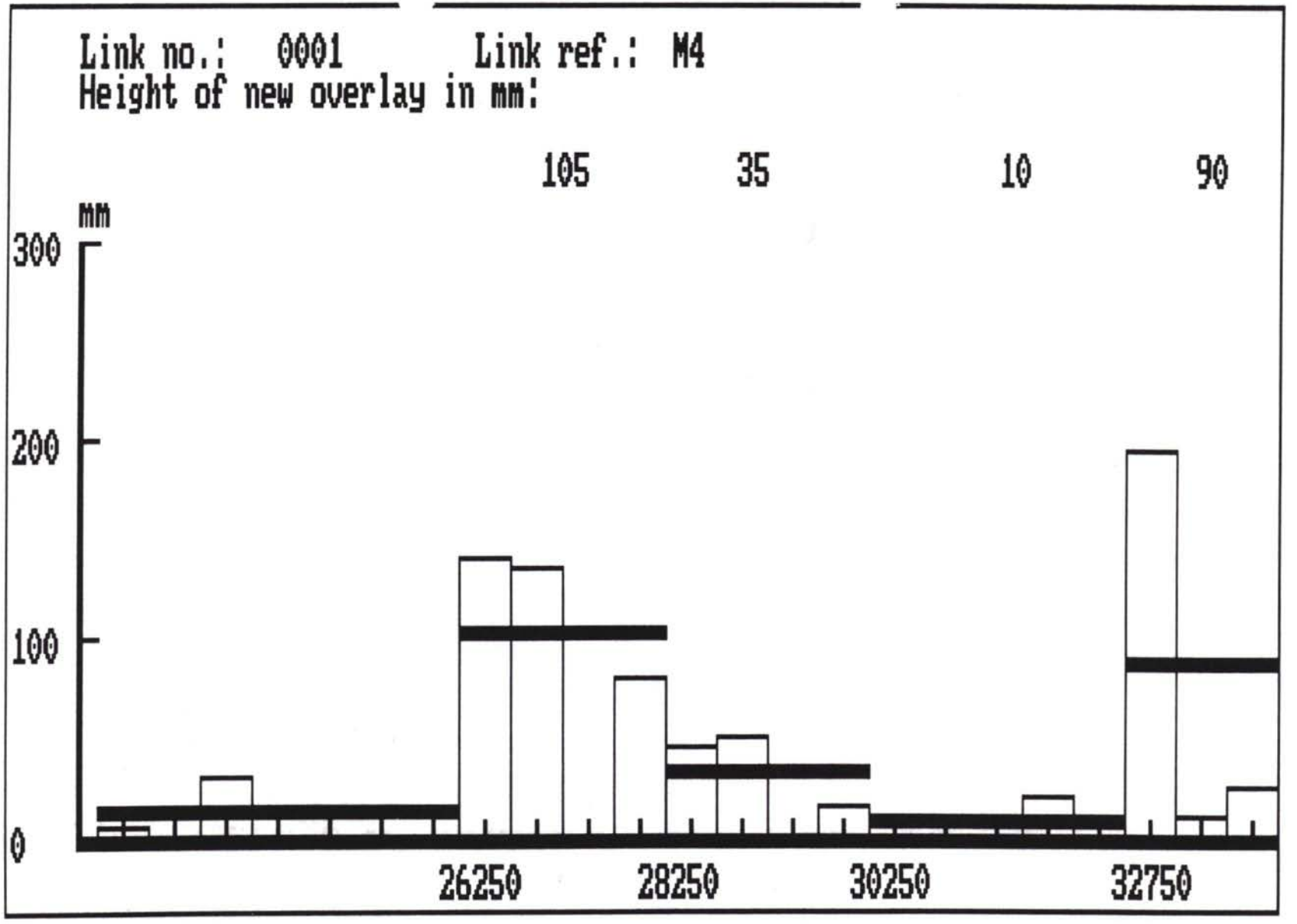
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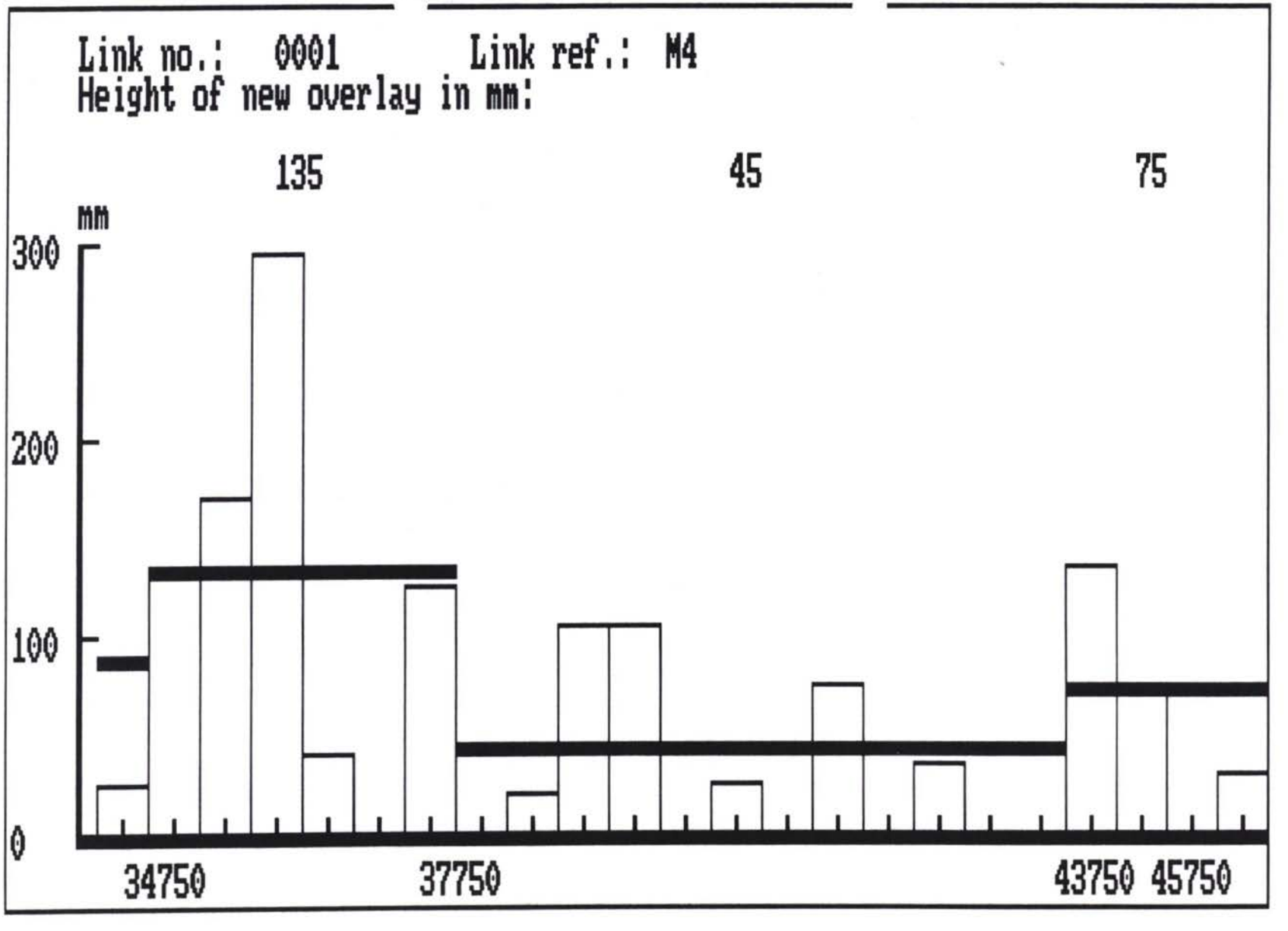
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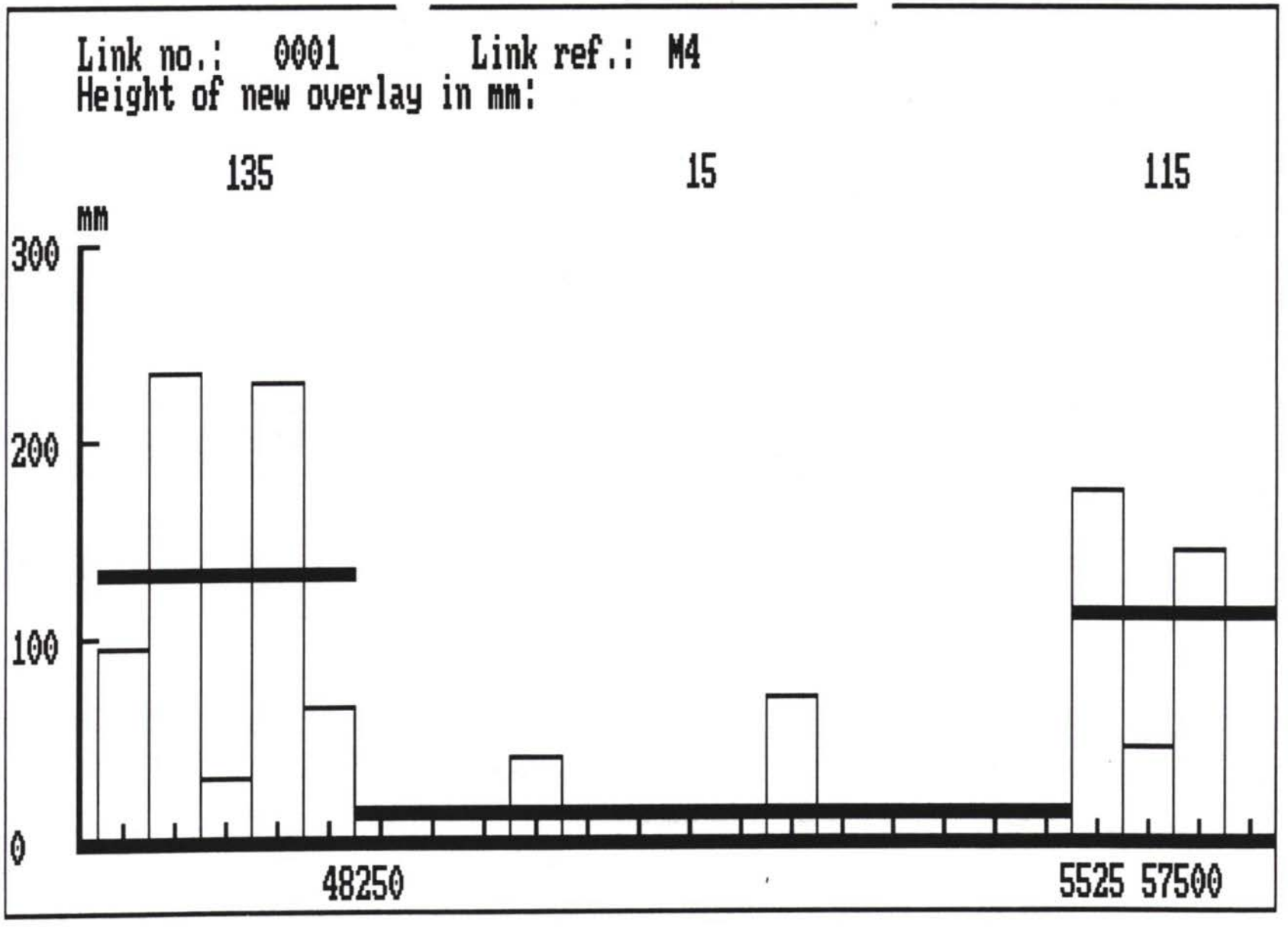
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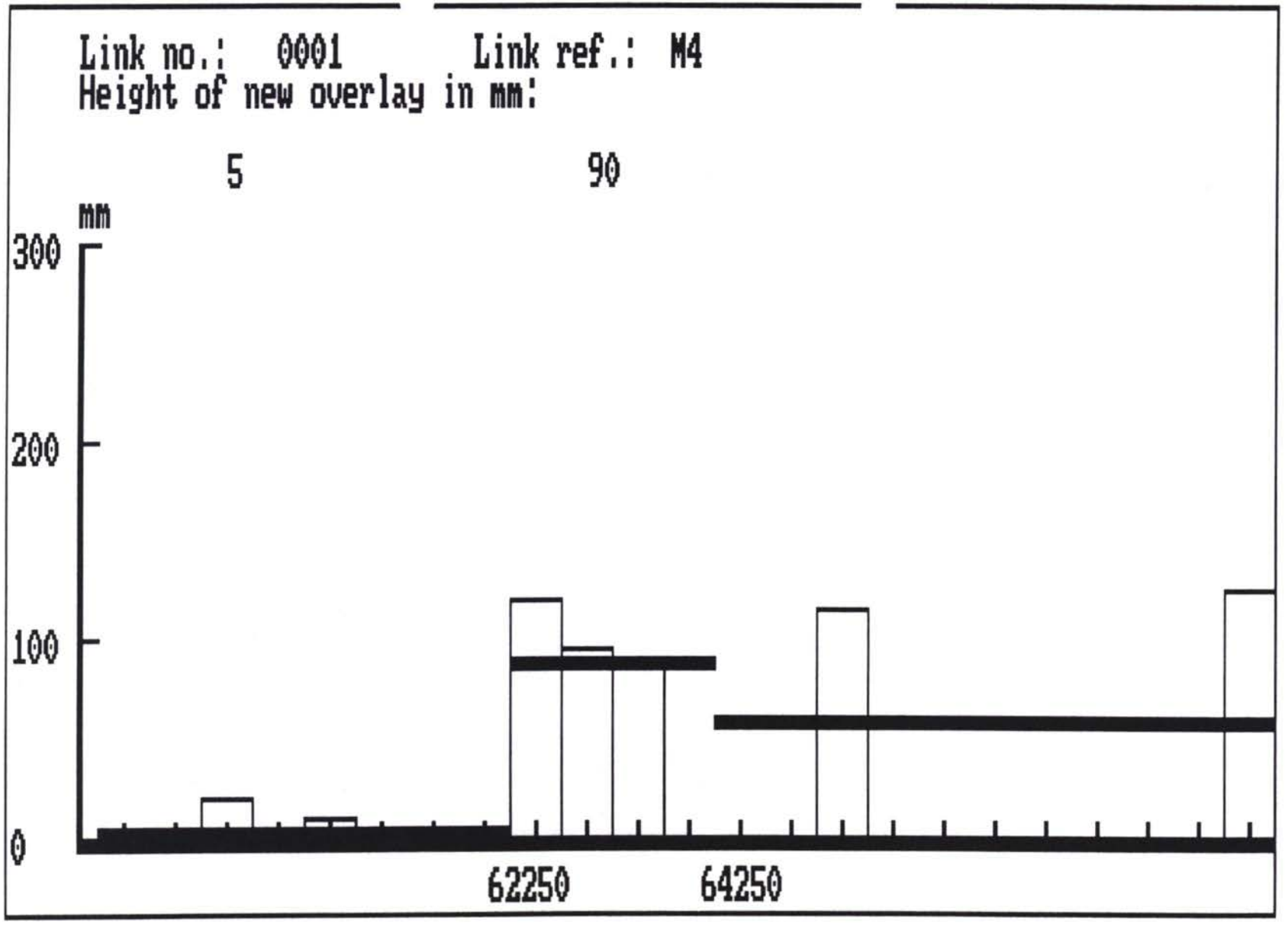
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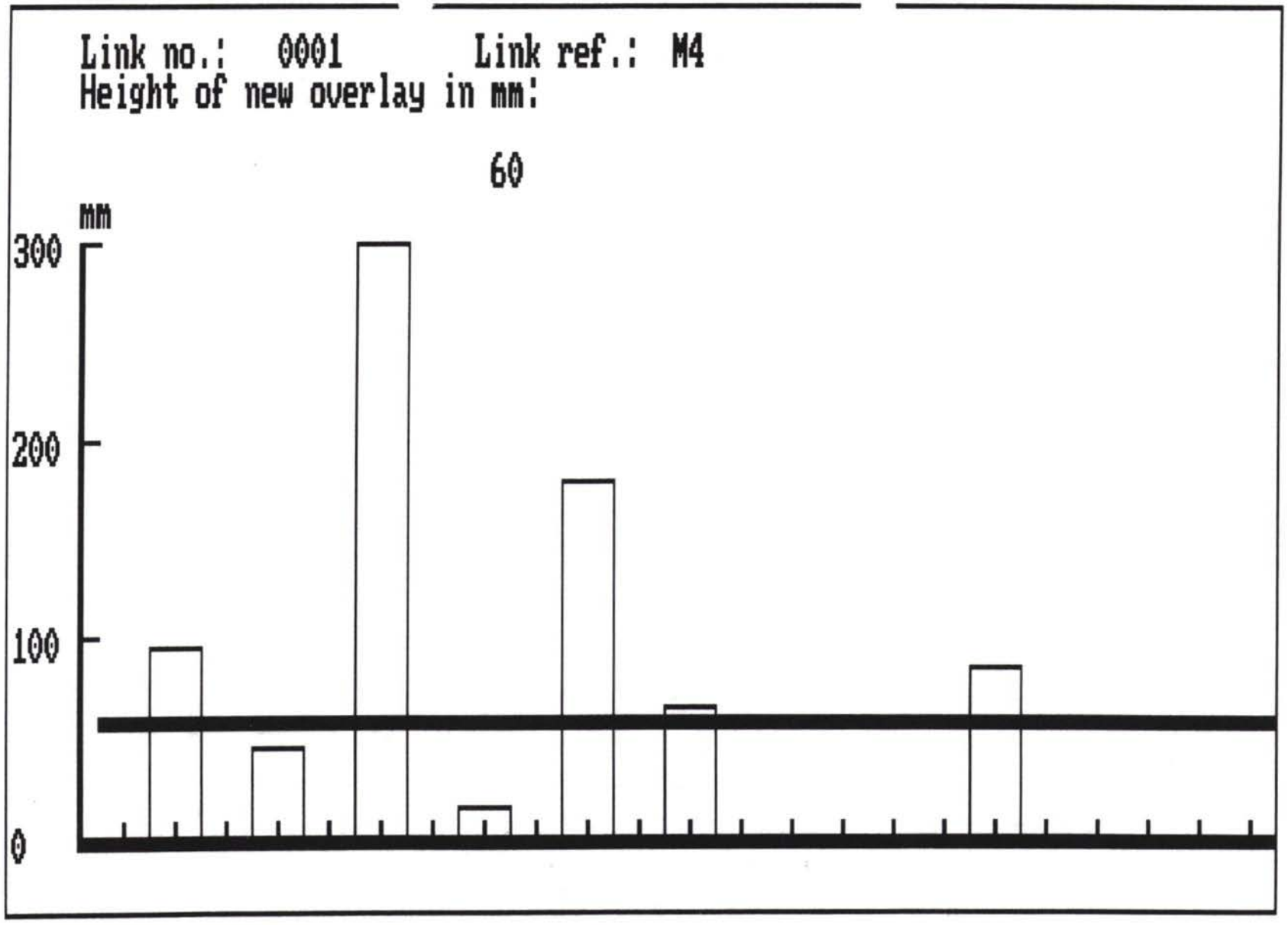
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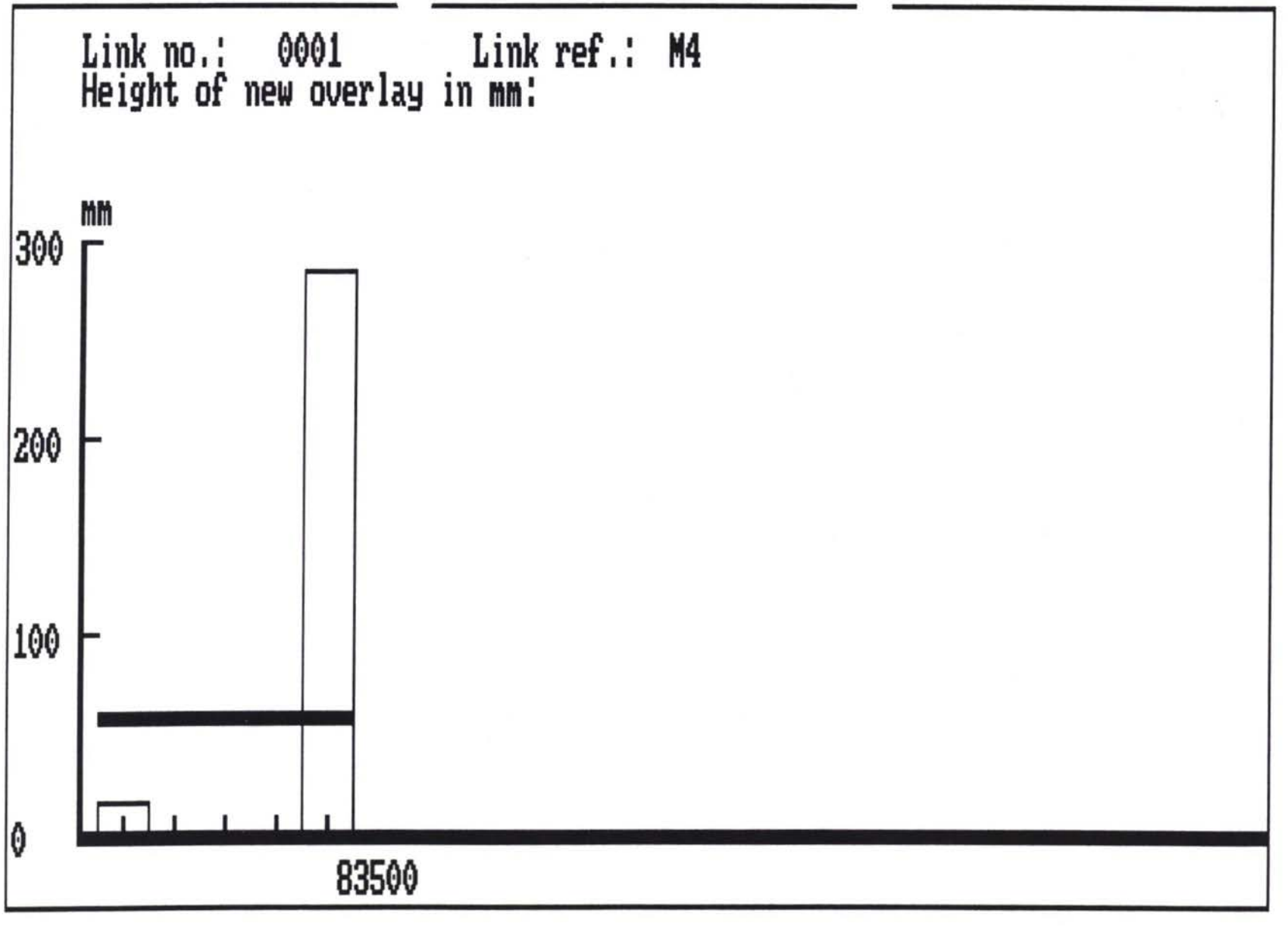
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BEARING CAPACITY OF EQUAL SECTIONS

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A/S PHØNIX
P. P. C

Client: TACIS

SECTION NO. 3 KYURDAMIR to UJAR

Link no.: 37.001

Design date: 06-11-1997

Link ref.: M4

Mea. date: 970417 2

The classification is based on sections => 4 measurements.
For each section the overlay thickness is calculated as
verage + 33% of the standard deviation.
The stated layer thickness must be considered as instructive, as there might be material or technical reasons why another layer thickness than the here stated should be carried out, especially in connection with thin overlay thicknesses.

Section	Overlay Thickness in mm	<--------Life--------> before years	after years	extra tons
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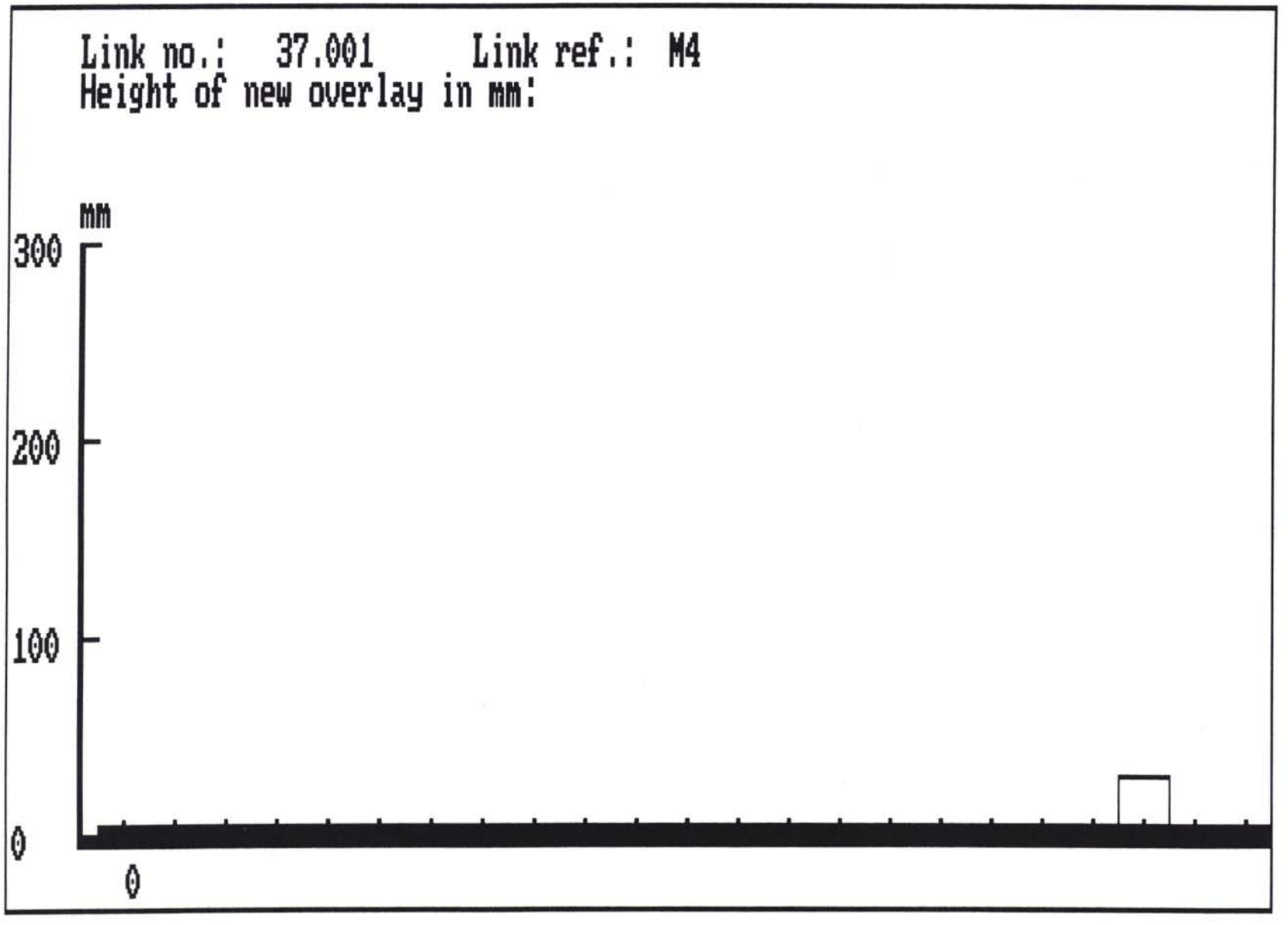
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BEARING CAPACITY OF EQUAL SECTIONS

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A/S PHØNIX
P. P. C

Client: TACIS

SECTION NO. 3 KYURDAMIR to UJAR

Link no.: 37.001

Design date: 06-11-1997

Link ref.: M4

Mea. date: 970417 2

The classification is based on sections => 4 measurements.
For each section the overlay thickness is calculated as
verage + 33% of the standard deviation.
The stated layer thickness must be considered as instructive, as there might be material or technical reasons why another layer thickness than the here stated should be carried out, especially in connection with thin overlay thicknesses.

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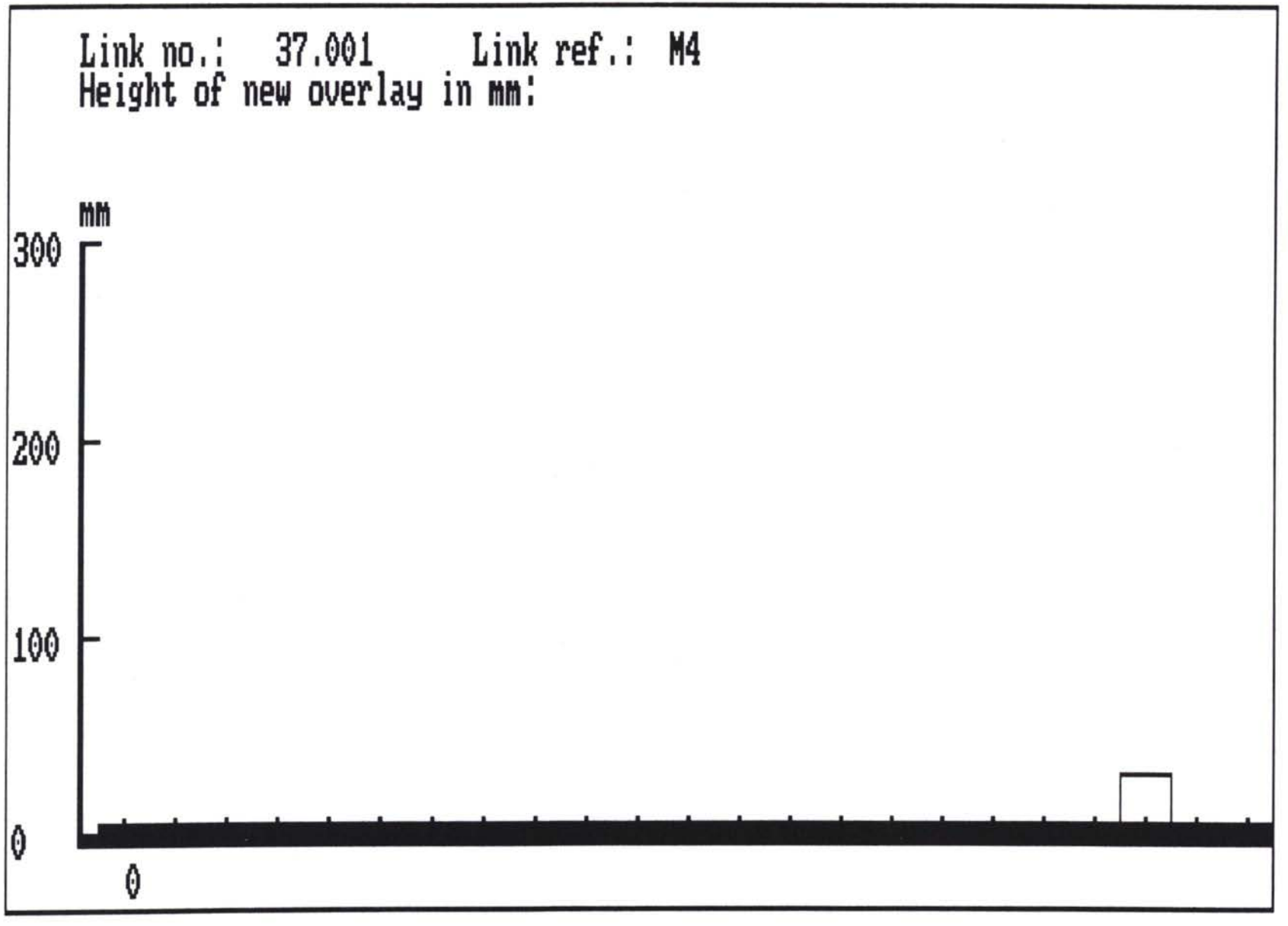
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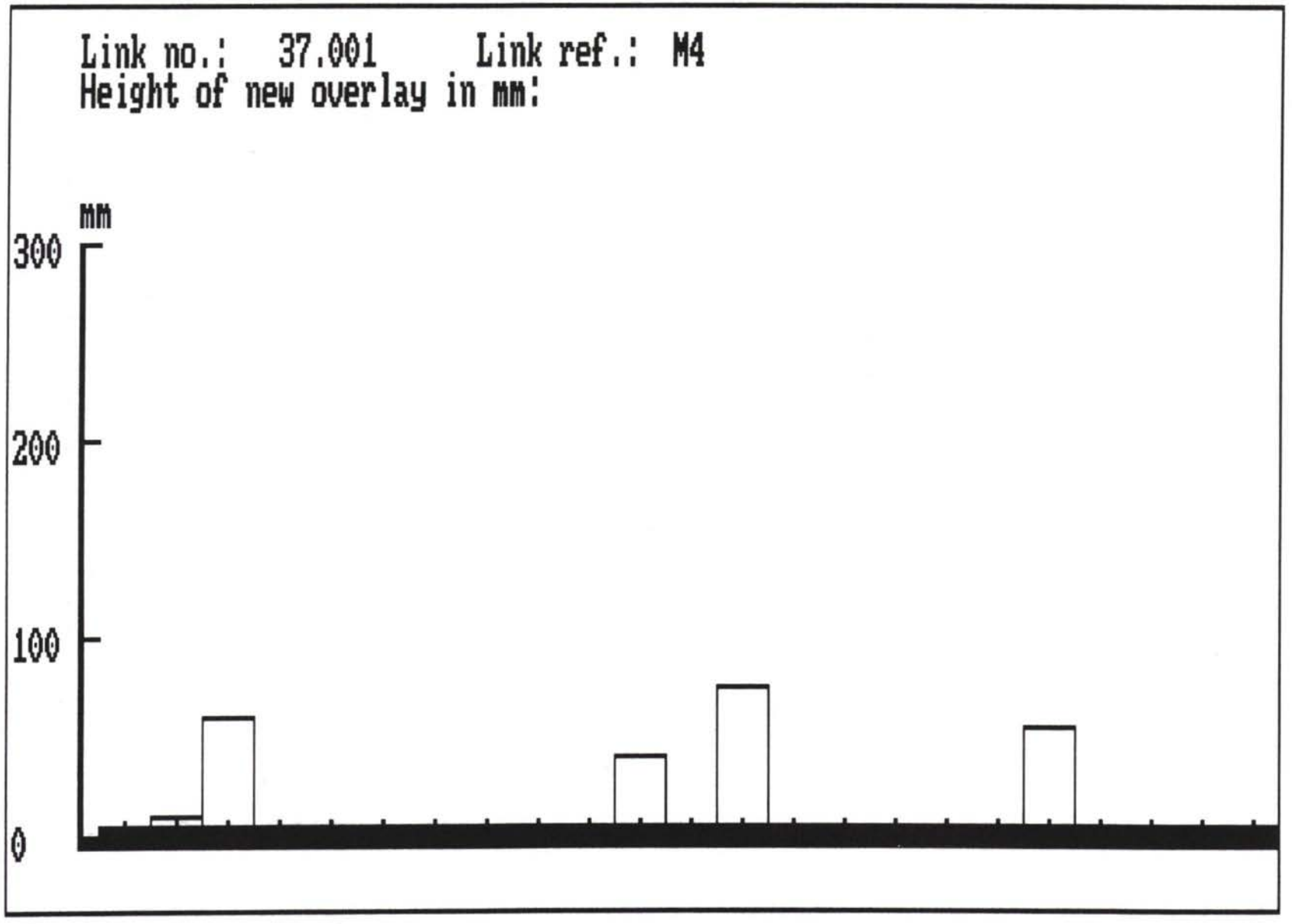
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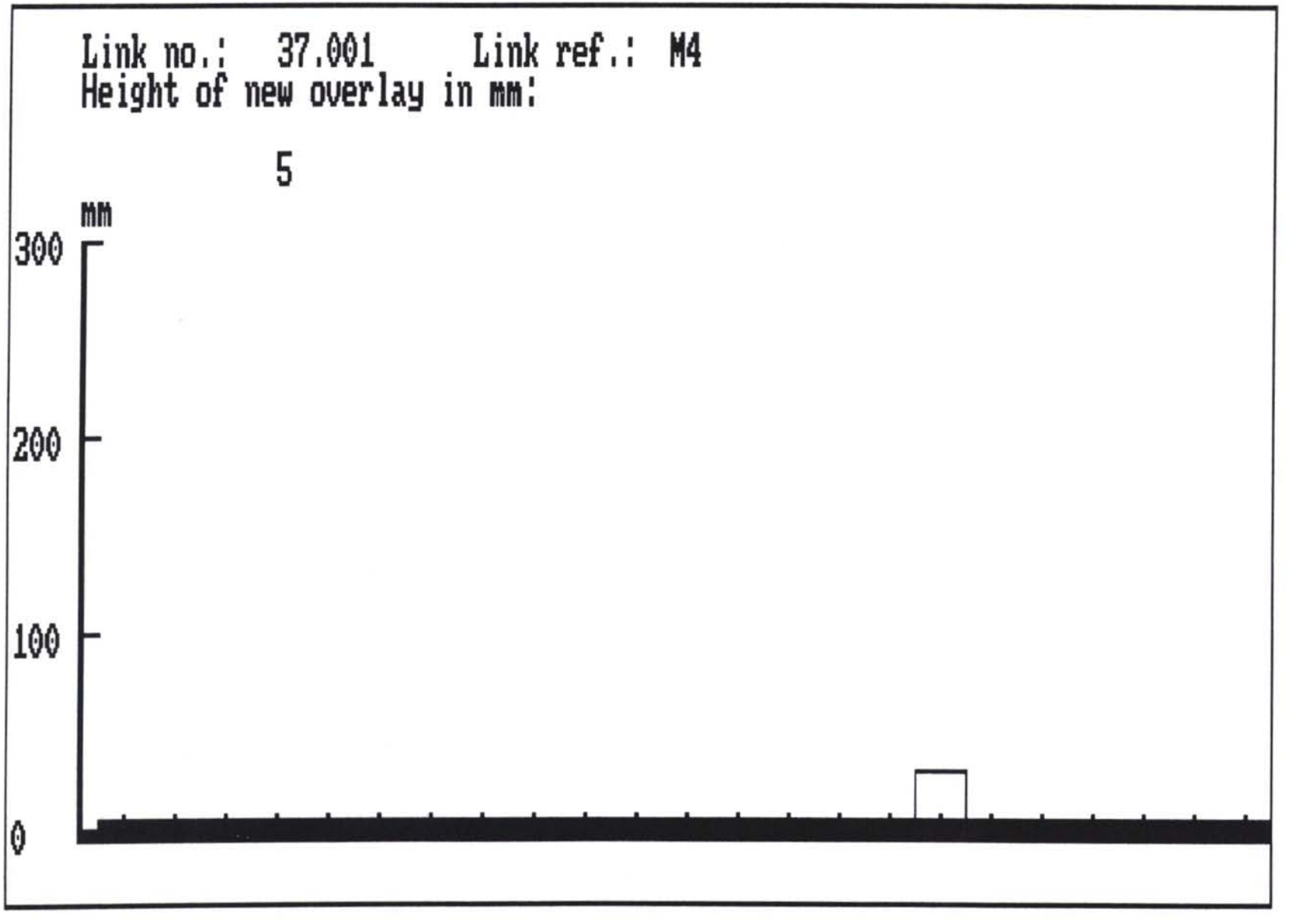
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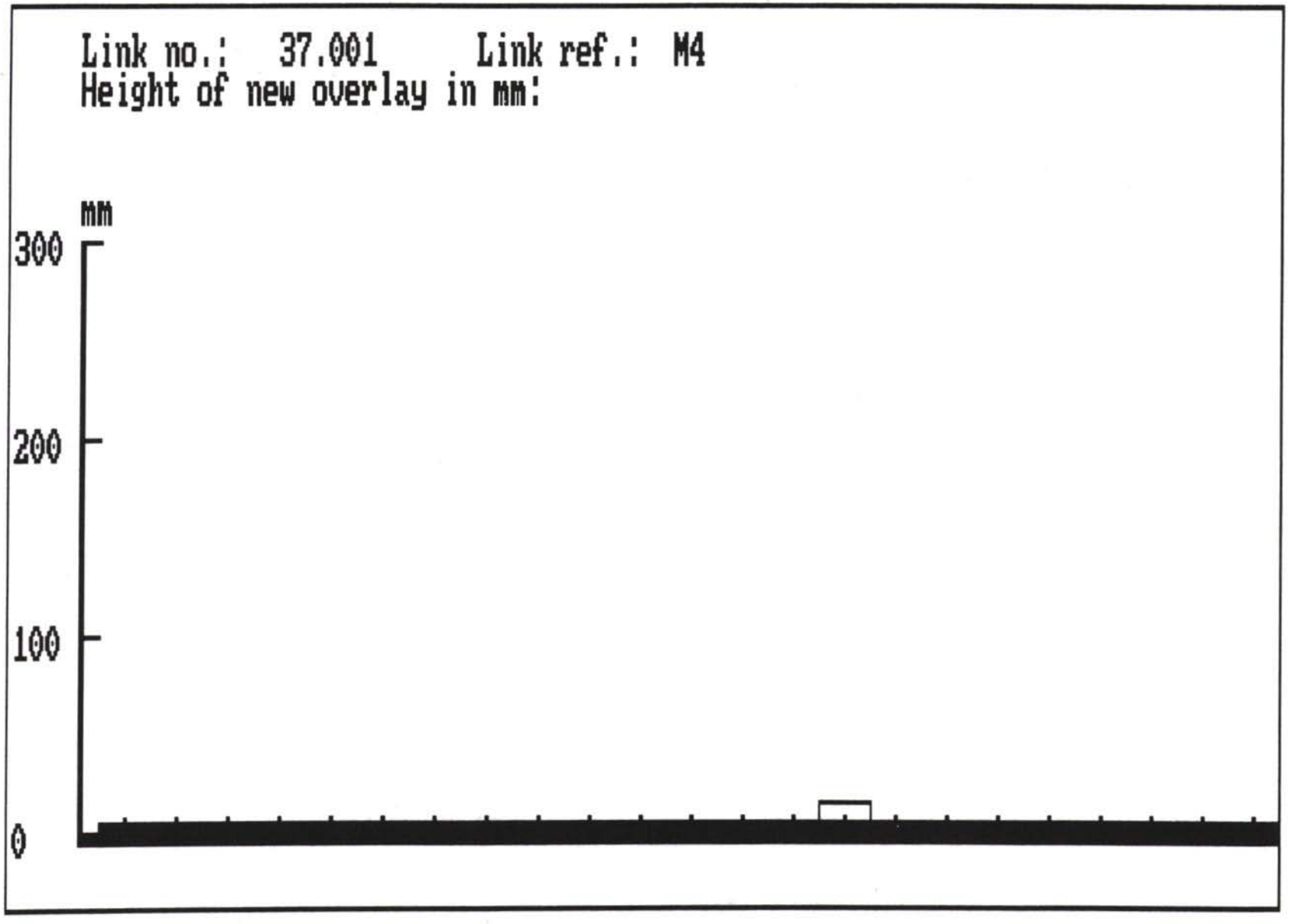
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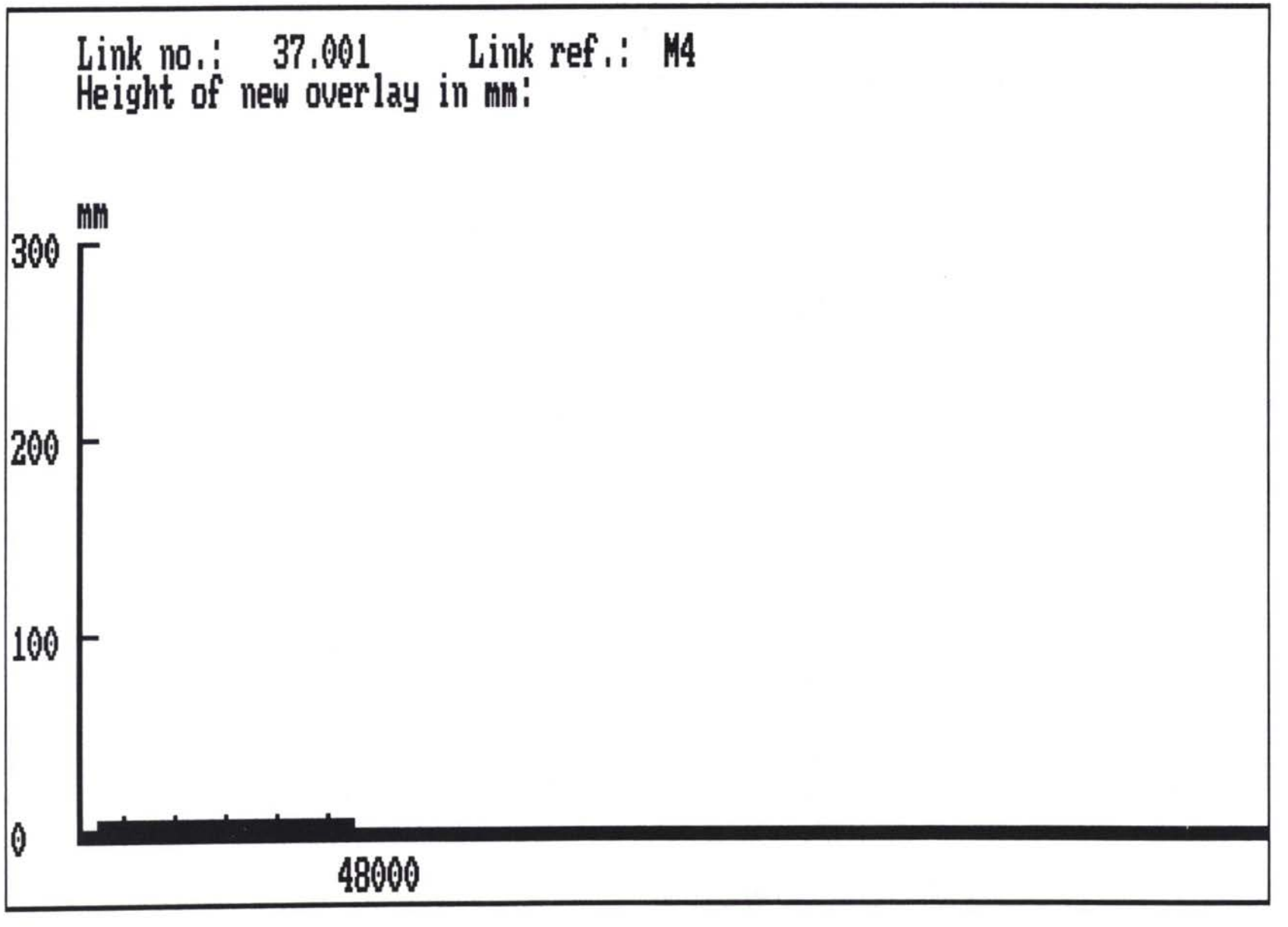
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A/S PHØNIX
P. P. C

Client: TACIS

SECTION NO. 4 UJAR to MINGACHEUR

Link no.: 37.001

Design date: 06-11-1997

Link ref.: M4

Mea. date: 970418 2

The classification is based on sections => 4 measurements.
For each section the overlay thickness is calculated as
verage + 33% of the standard deviation.
The stated layer thickness must be considered as instructive, as there might be material or technical reasons why another layer thickness than the here stated should be carried out, especially in connection with thin overlay thicknesses.

Section	Overlay Thickness in mm	<--------Life--------> before years	after years	extra tons
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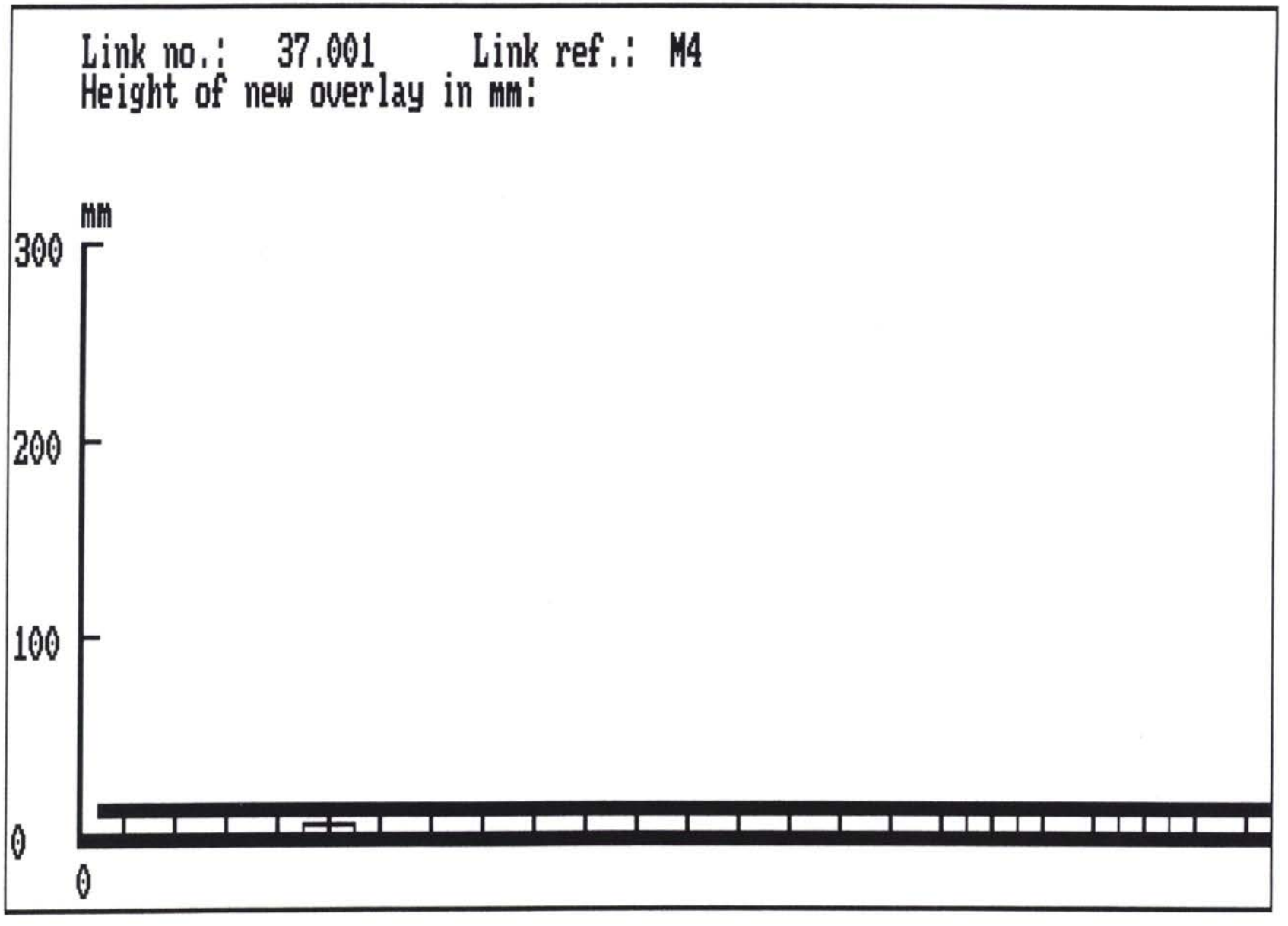
25250 - 27750	65	5	15	217
27750 - 46000	10	14	15	1083
46000 - 56250	120	1	15	2970
56250 - 61500	15	13	15	62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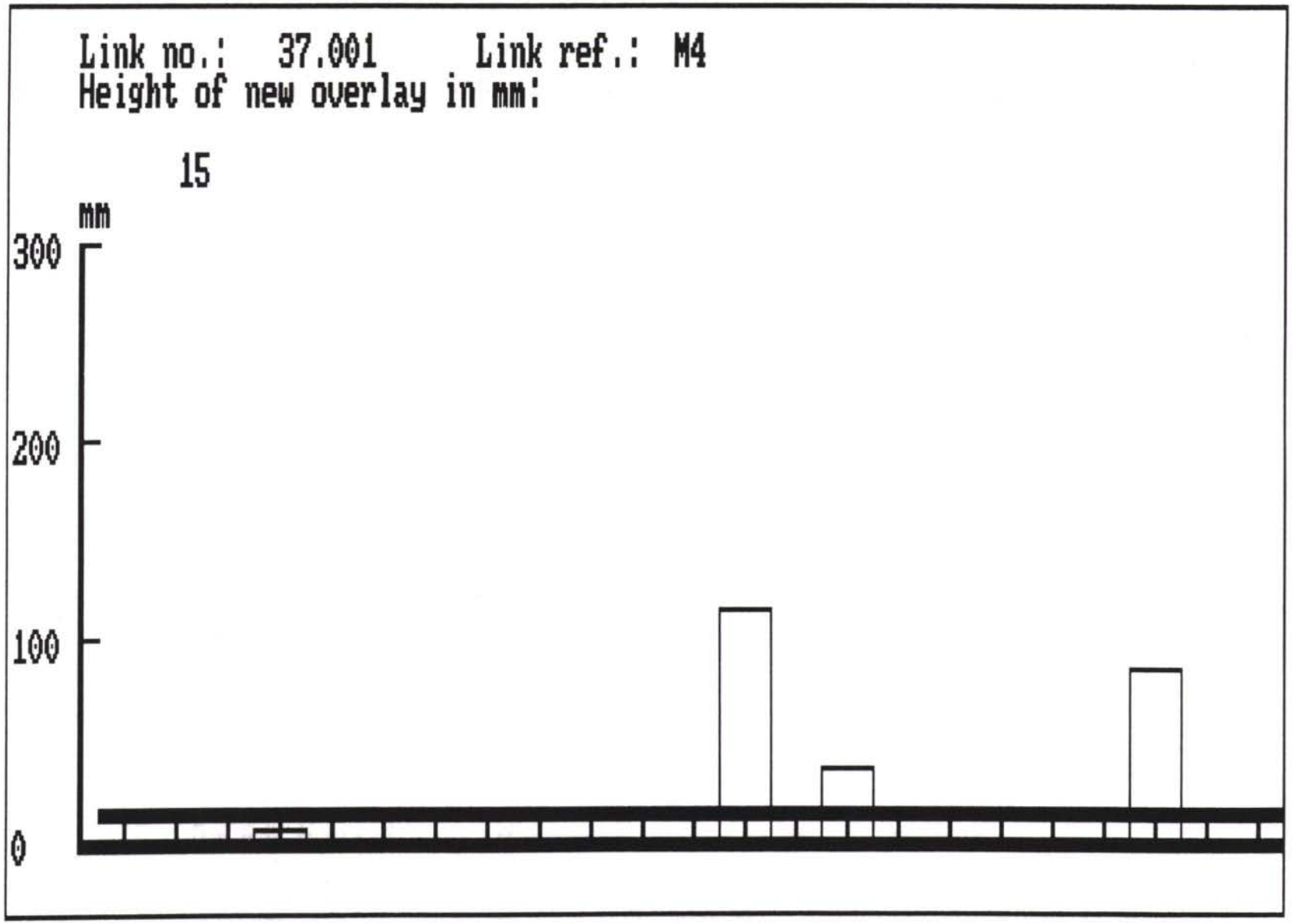
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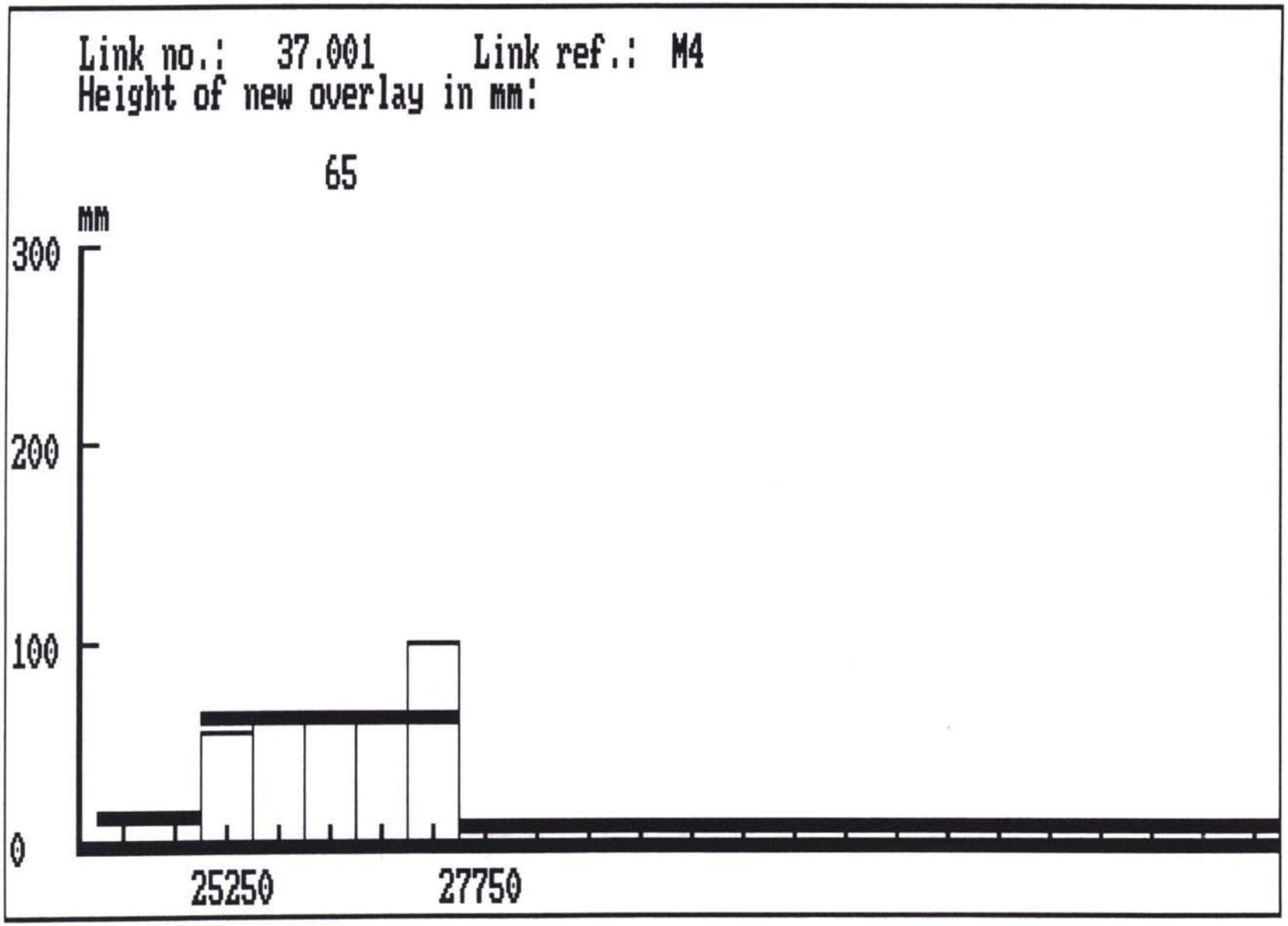
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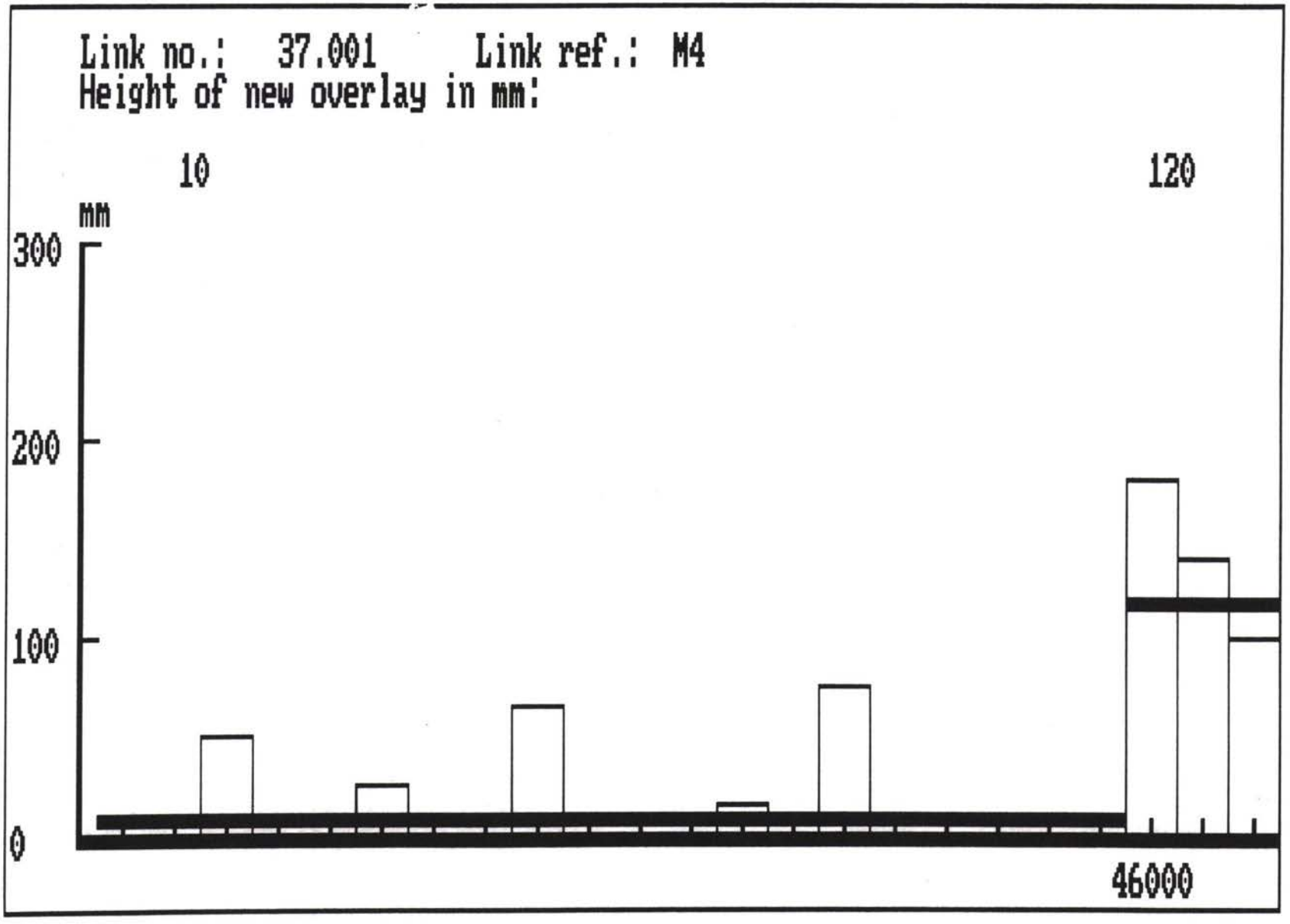
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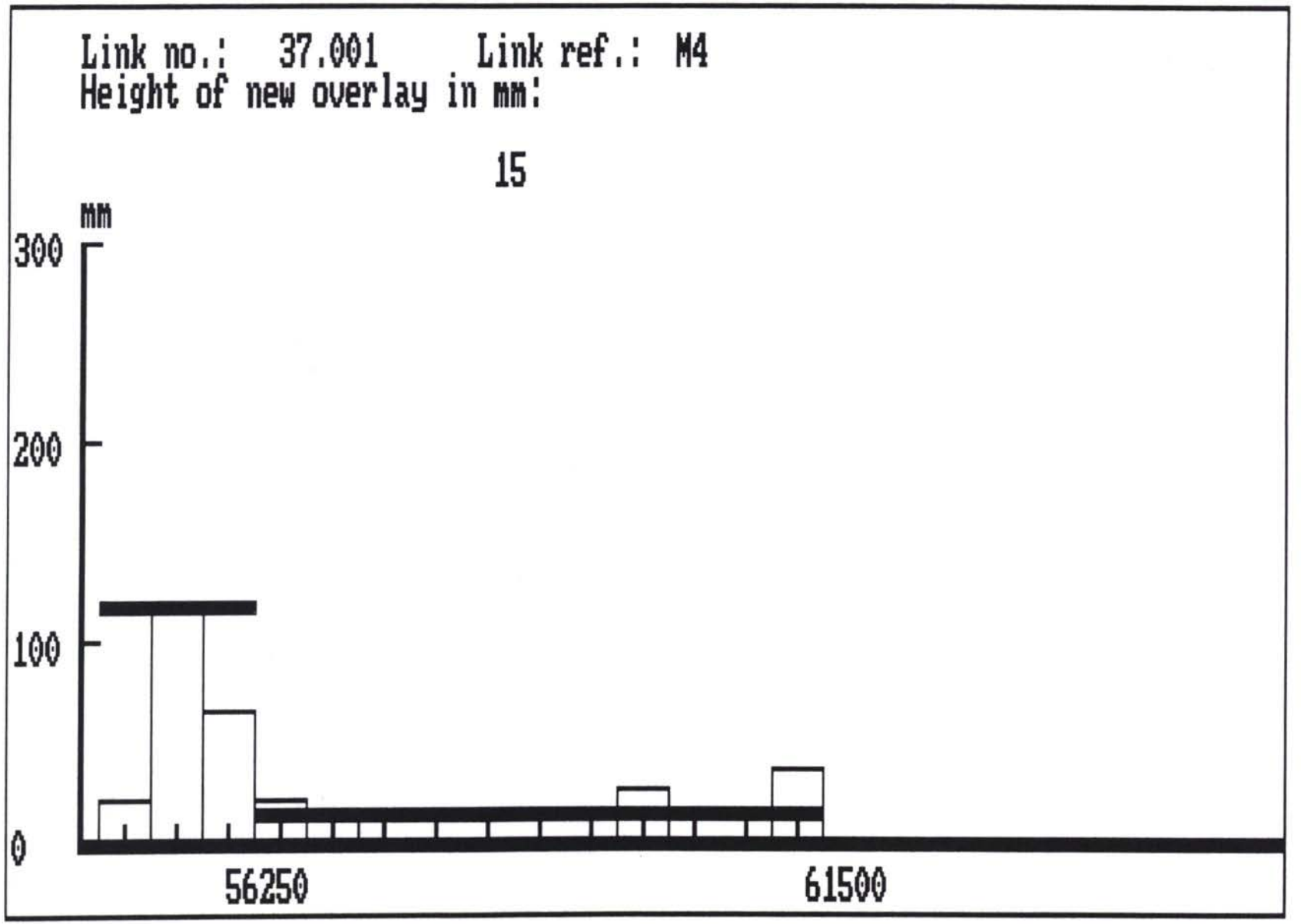
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A/S PHØNIX
P. P. C

Client: TACIS

SECTION NO. 5 MINGACHEUR TO GJANDZA

Link no.: 37.001

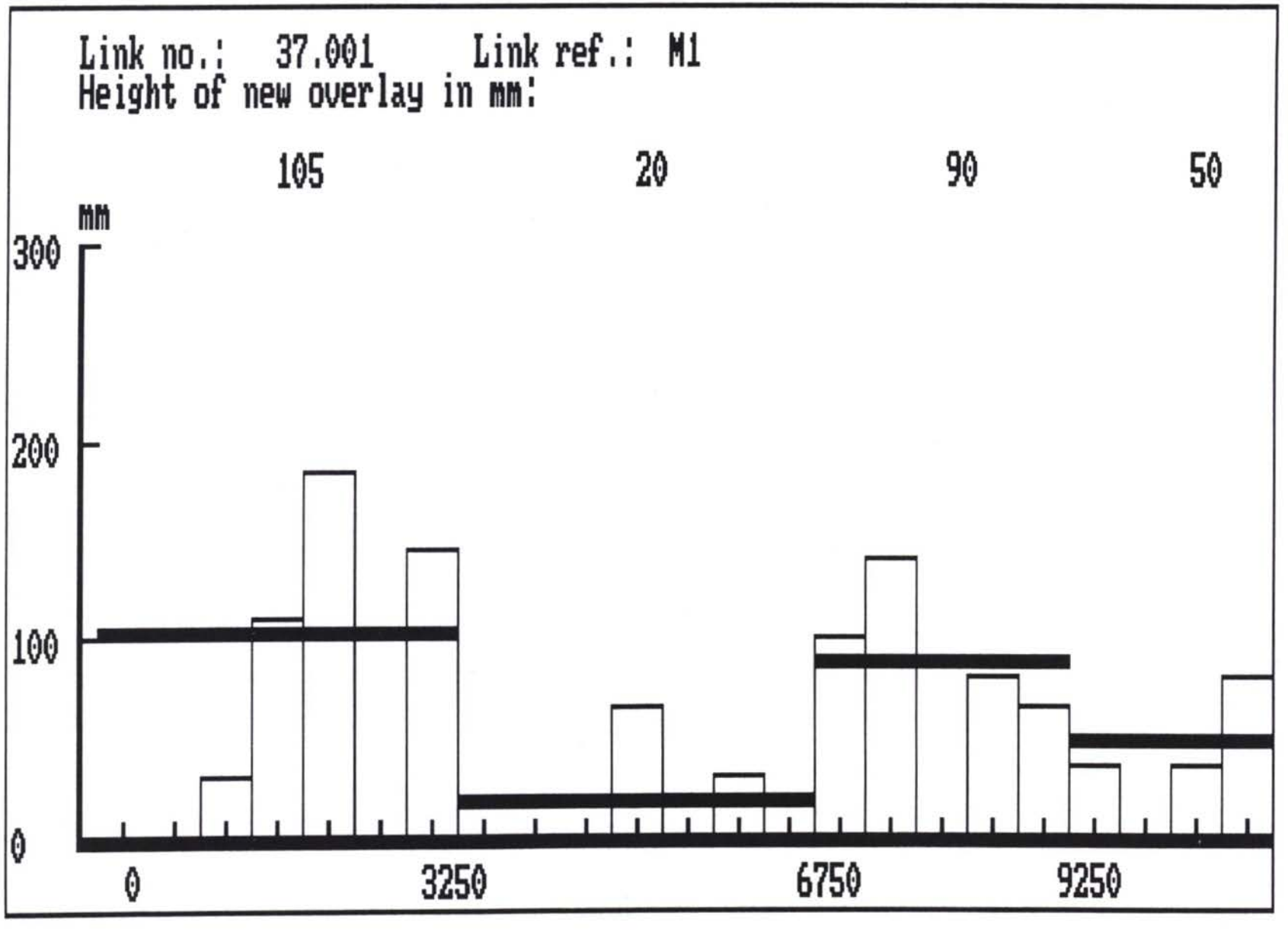
Design date: 06-11-1997

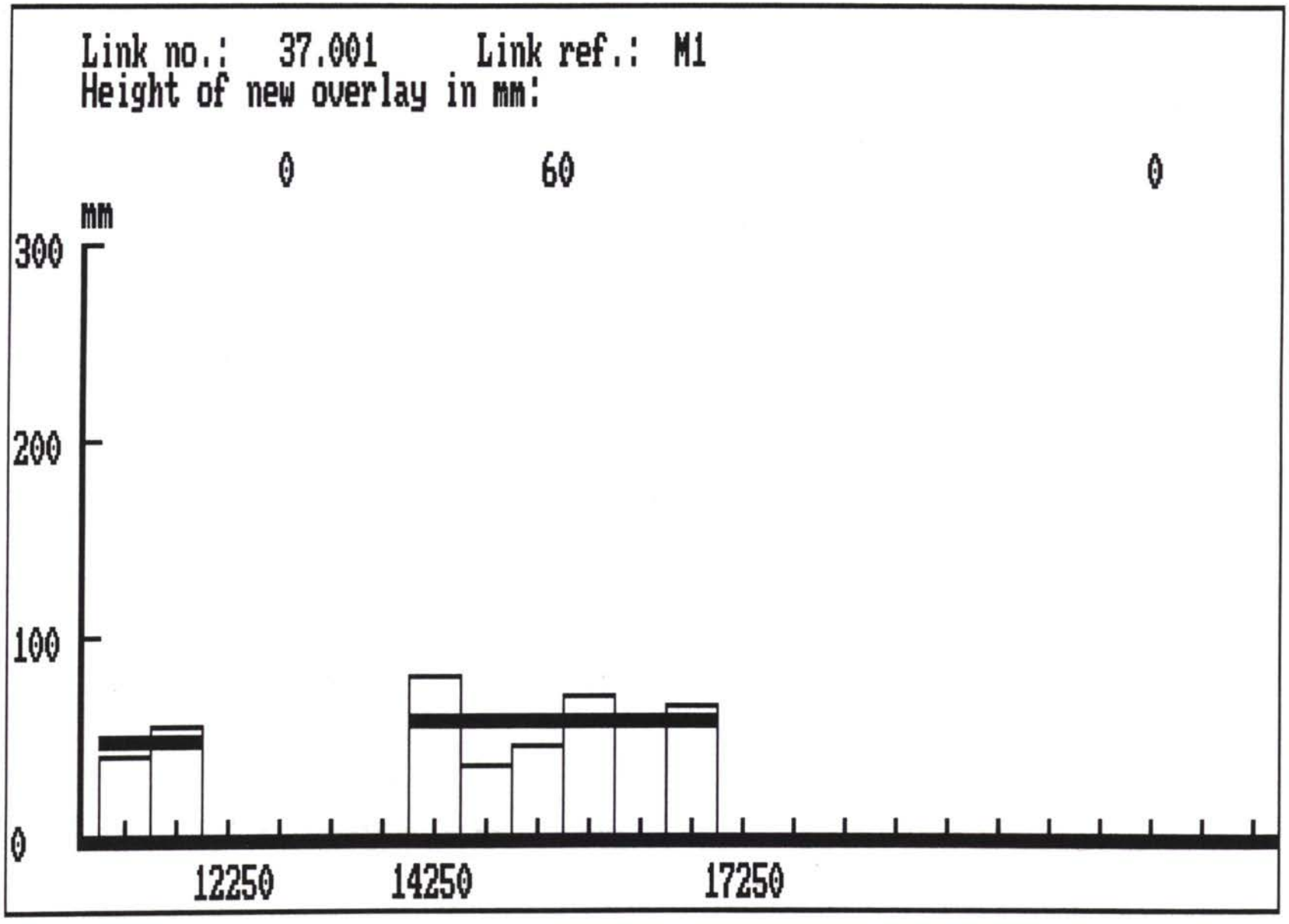
Link ref.: M1

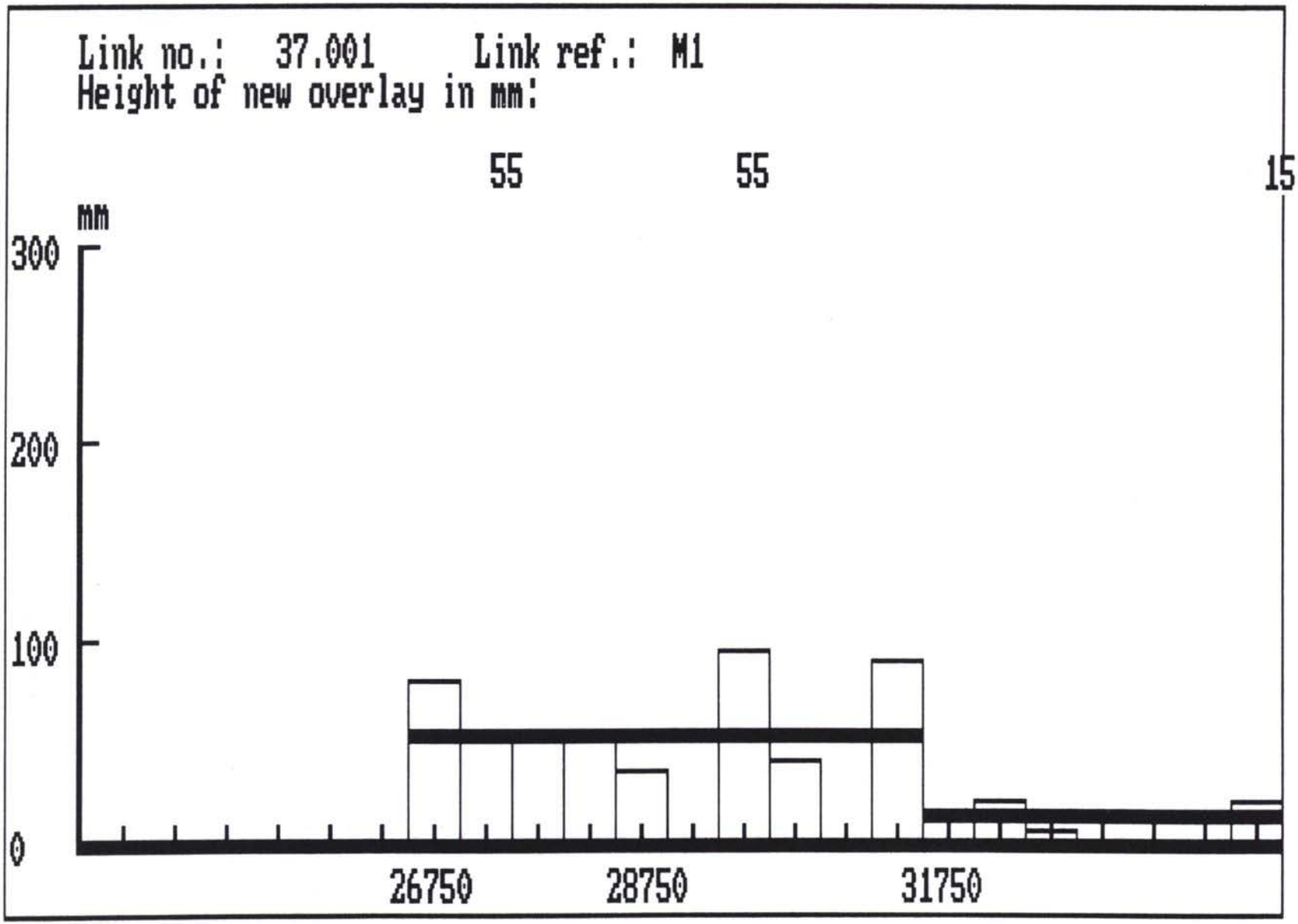
Mea. date: 1804 2

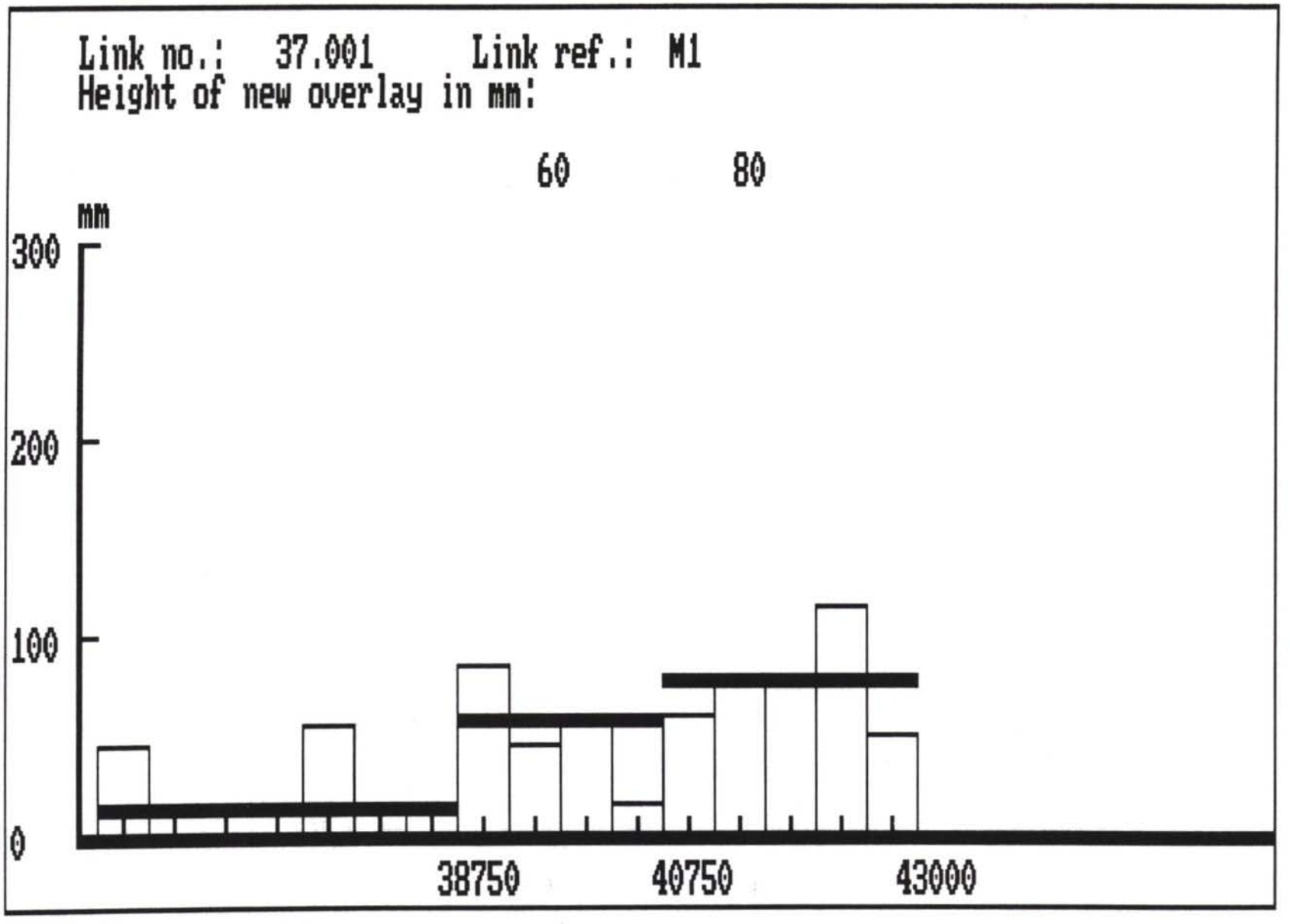
The classification is based on sections => 4 measurements.
For each section the overlay thickness is calculated as
verage + 33% of the standard deviation.
The stated layer thickness must be considered as instructive, as there might be material or technical reasons why another layer thickness than the here stated should be carried out, especially in connection with thin overlay thicknesses.

Section	Overlay Thickness in mm	<--------Life--------> before years	after years	extra tons
0 - 3250	105	4	15	743
3250 - 6750	20	13	15	278
6750 - 9250	90	2	15	309
9250 - 12250	50	5	15	186
12250 - 14250	0	20	20	0
14250 - 17250	60	4	15	0
17250 - 26750	0	20	20	0
26750 - 28750	55	4	15	155
28750 - 31750	55	6	15	464
31750 - 38750	15	13	15	433
38750 - 40750	60	3	15	155
40750 - 43000	80	2	15	217


Link no.: 37.001 Link ref.: M1
Height of new overlay in mm:
105
20
90
50
mm
300
200
100
0
0
3250
6750
9250


Link no.: 37.001 Link ref.: M1
Height of new overlay in mm:
0
60
0
mm
300
200
100
0
12250
14250
17250


Link no.: 37.001 Link ref.: M1
Height of new overlay in mm:
55
55
15
mm
300
200
100
0
26750
28750
31750


Link no.: 37.001 Link ref.: M1
Height of new overlay in mm:
60
80
mm
300
200
100
0
38750
40750
43000

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A/S PHØNIX
P. P. C

Client: TACIS

SECTION NO. 6 START OF GJANDZA BYPASS TO END OF GJANDZA

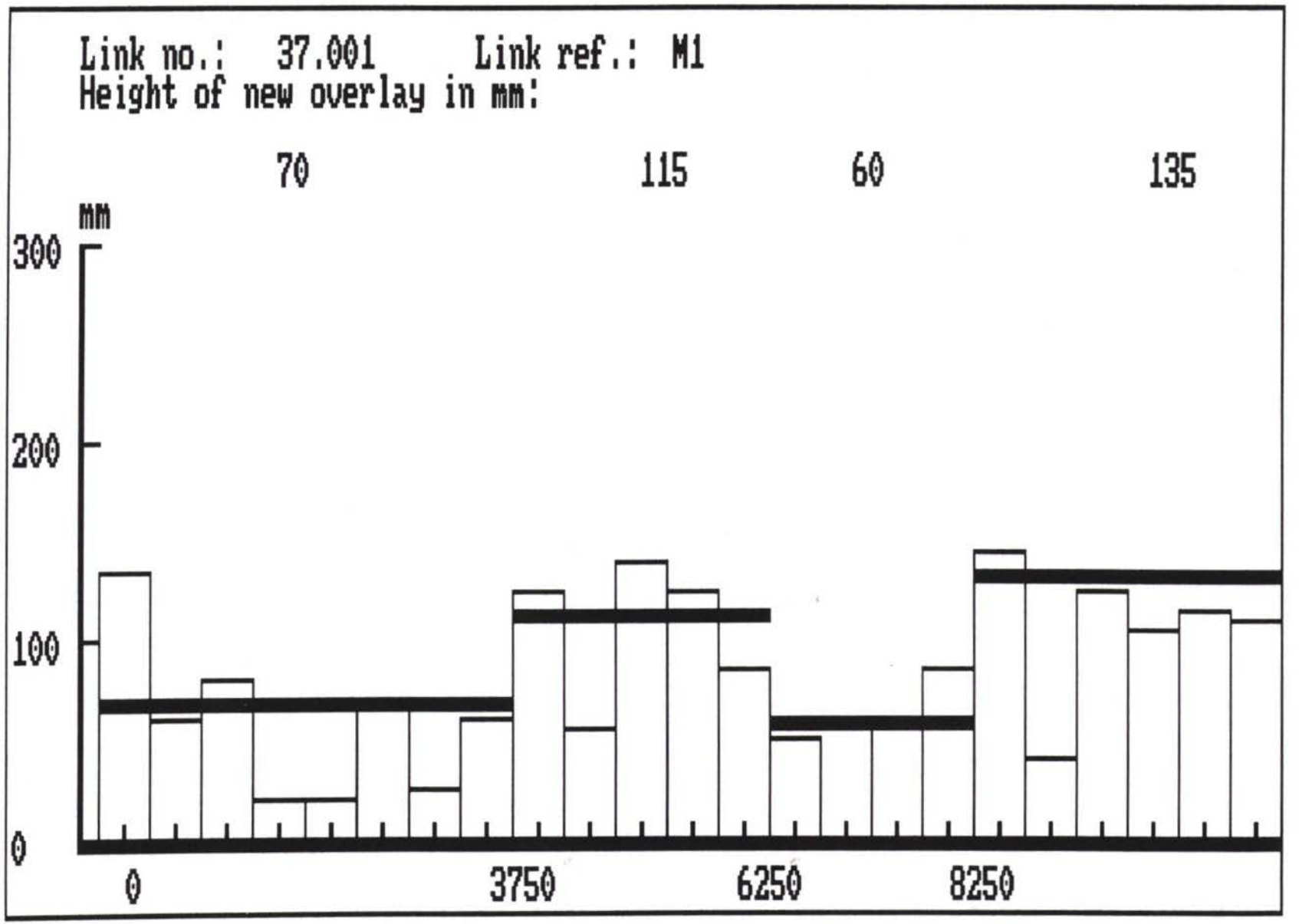
Link no.: 37.001

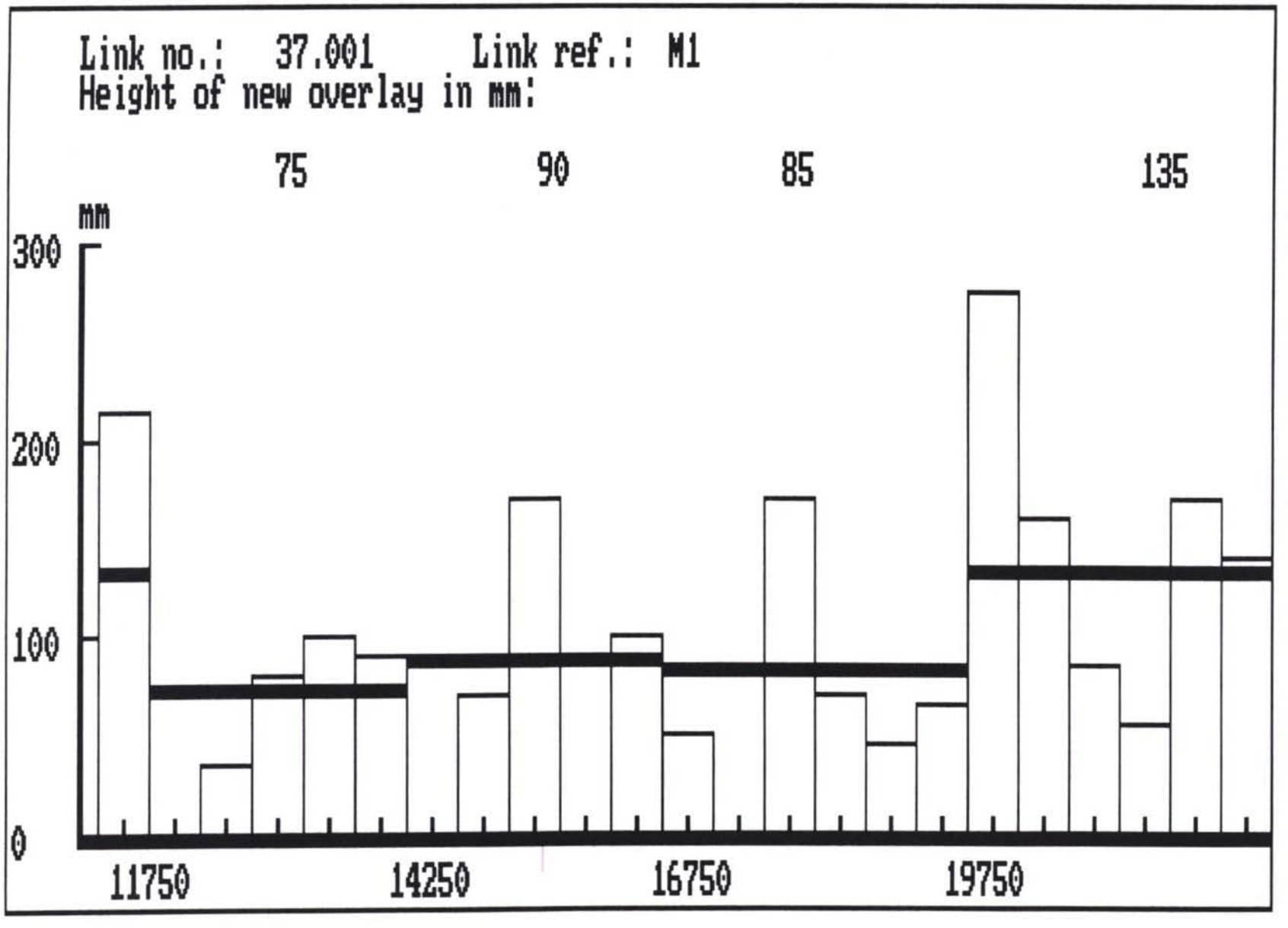
Design date: 06-11-1997

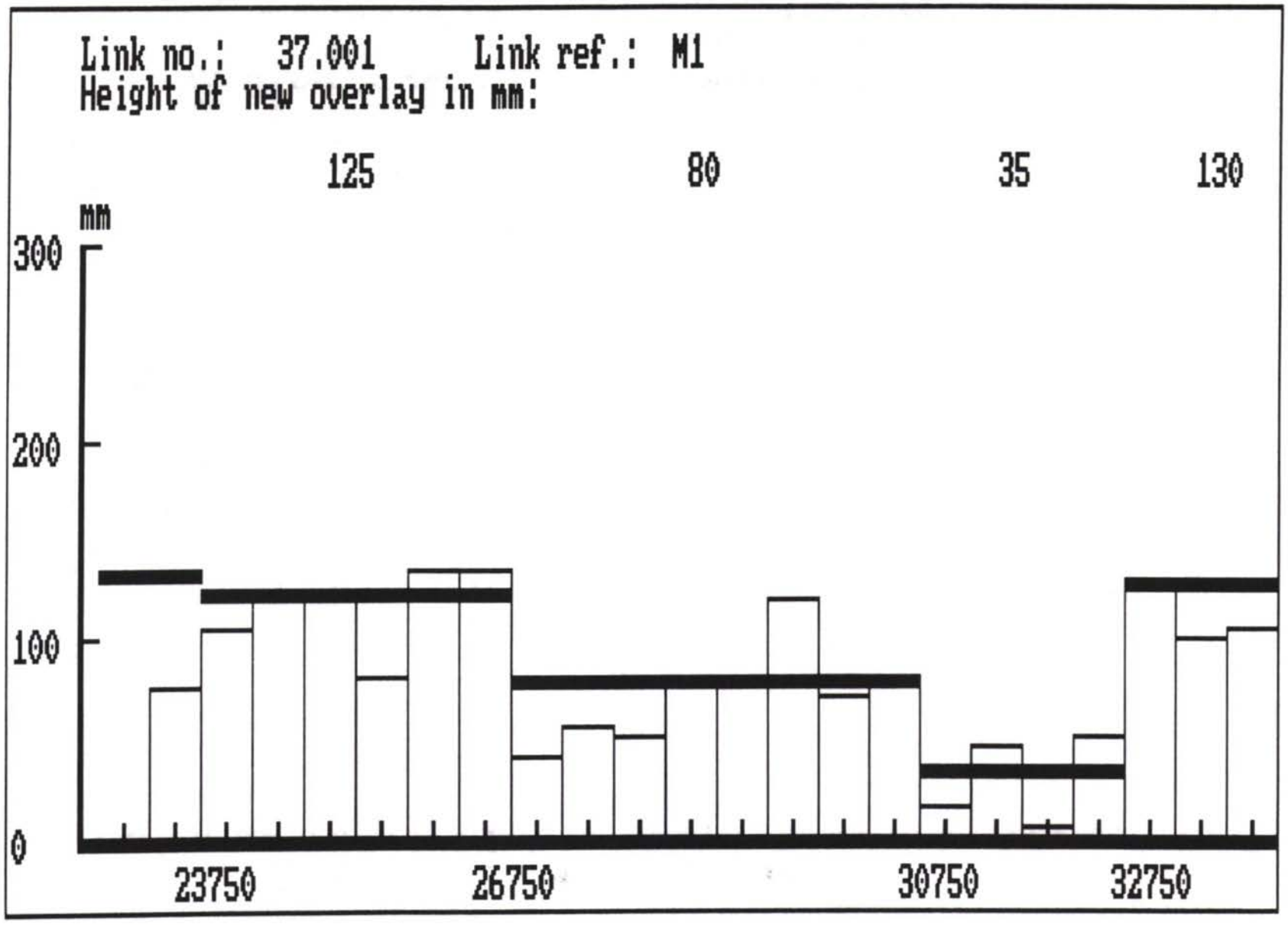
Link ref.: M1 Mea. date: 1804 2

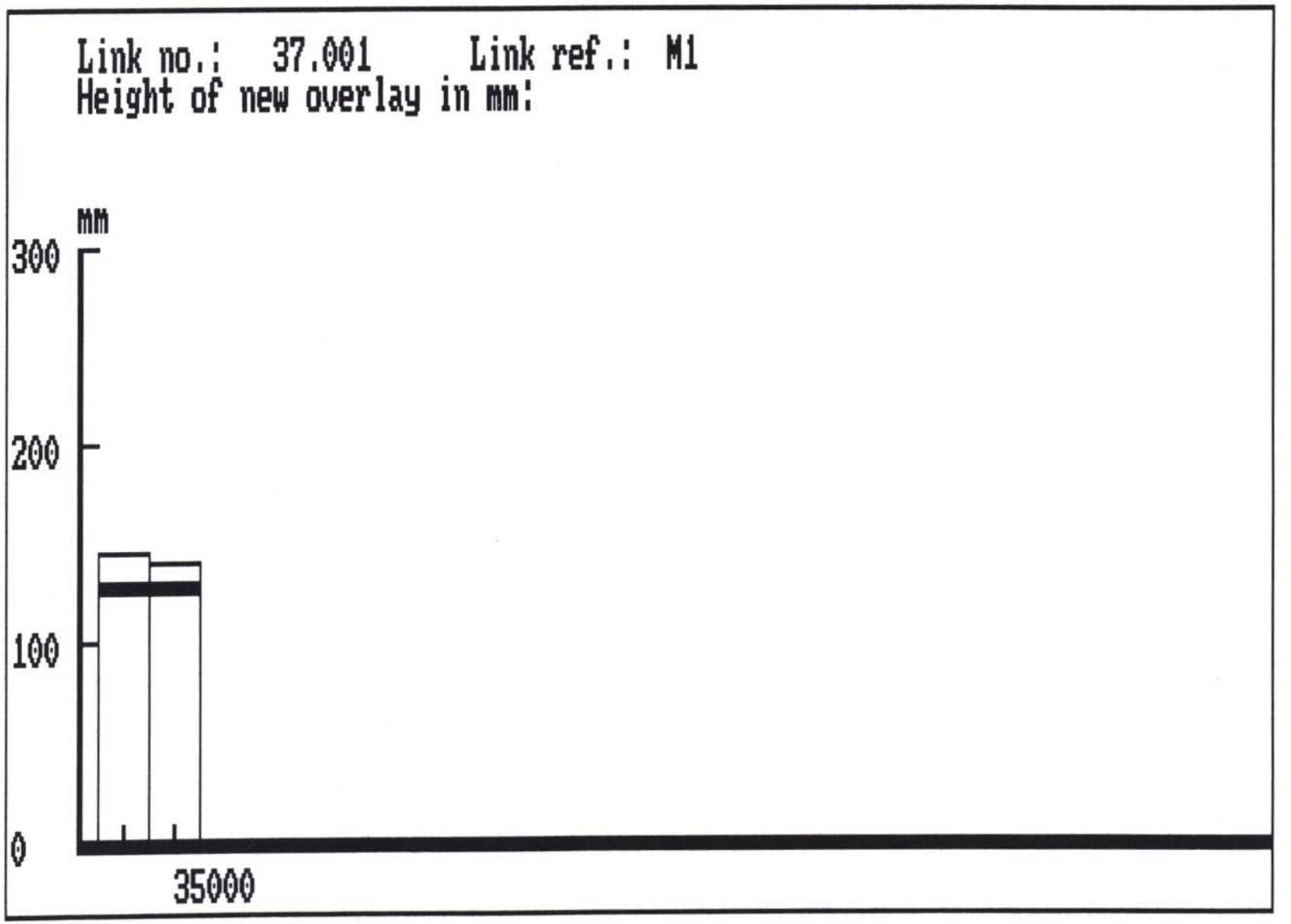
The classification is based on sections => 4 measurements.
For each section the overlay thickness is calculated as
verage + 33% of the standard deviation.
The stated layer thickness must be considered as instructive, as there might be material or technical reasons why another layer thickness than the here stated should be carried out, especially in connection with thin overlay thicknesses.

Section	Overlay Thickness in mm	<--------Life--------> before years	after years	extra tons
0 - 3750	70	4	15	201
3750 - 6250	115	0	15	0
6250 - 8250	60	3	15	155
8250 - 11750	135	0	15	495
11750 - 14250	75	3	15	0
14250 - 16750	90	5	15	495
16750 - 19750	85	3	15	526
19750 - 23750	135	1	15	1083
23750 - 26750	125	0	15	0
26750 - 30750	80	2	15	248
30750 - 32750	35	7	15	93
32750 - 35000	130	0	15	0


Link no.: 37.001 Link ref.: M1
Height of new overlay in mm:
70
115
60
135
mm
300
200
100
0
0
3750
6250
8250


Link no.: 37.001 Link ref.: M1
Height of new overlay in mm:
75
90
85
135
mm
300
200
100
0
11750
14250
16750
19750


Link no.: 37.001 Link ref.: M1
Height of new overlay in mm:
125
80
35
130
mm
300
200
100
0
23750
26750
30750
32750


Link no.: 37.001 Link ref.: M1
Height of new overlay in mm:
mm
300
200
100
0
35000

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A/S PHØNIX
P. P. C

Client: TACIS

SECTION NO. 7 END OF GJANDZA BYPASS TO AKSTAFA

Link no.: 37.001

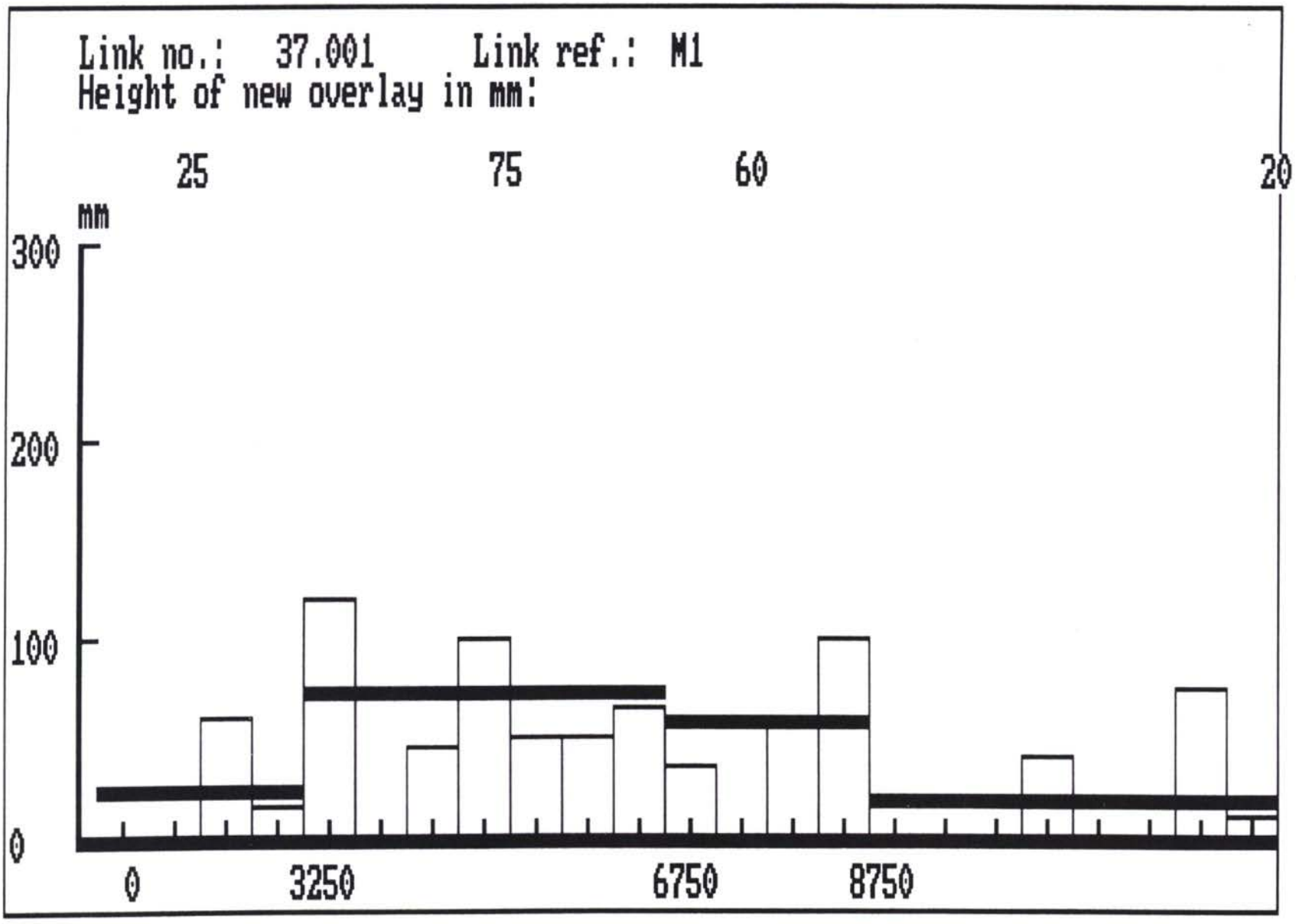
Design date: 06-11-1997

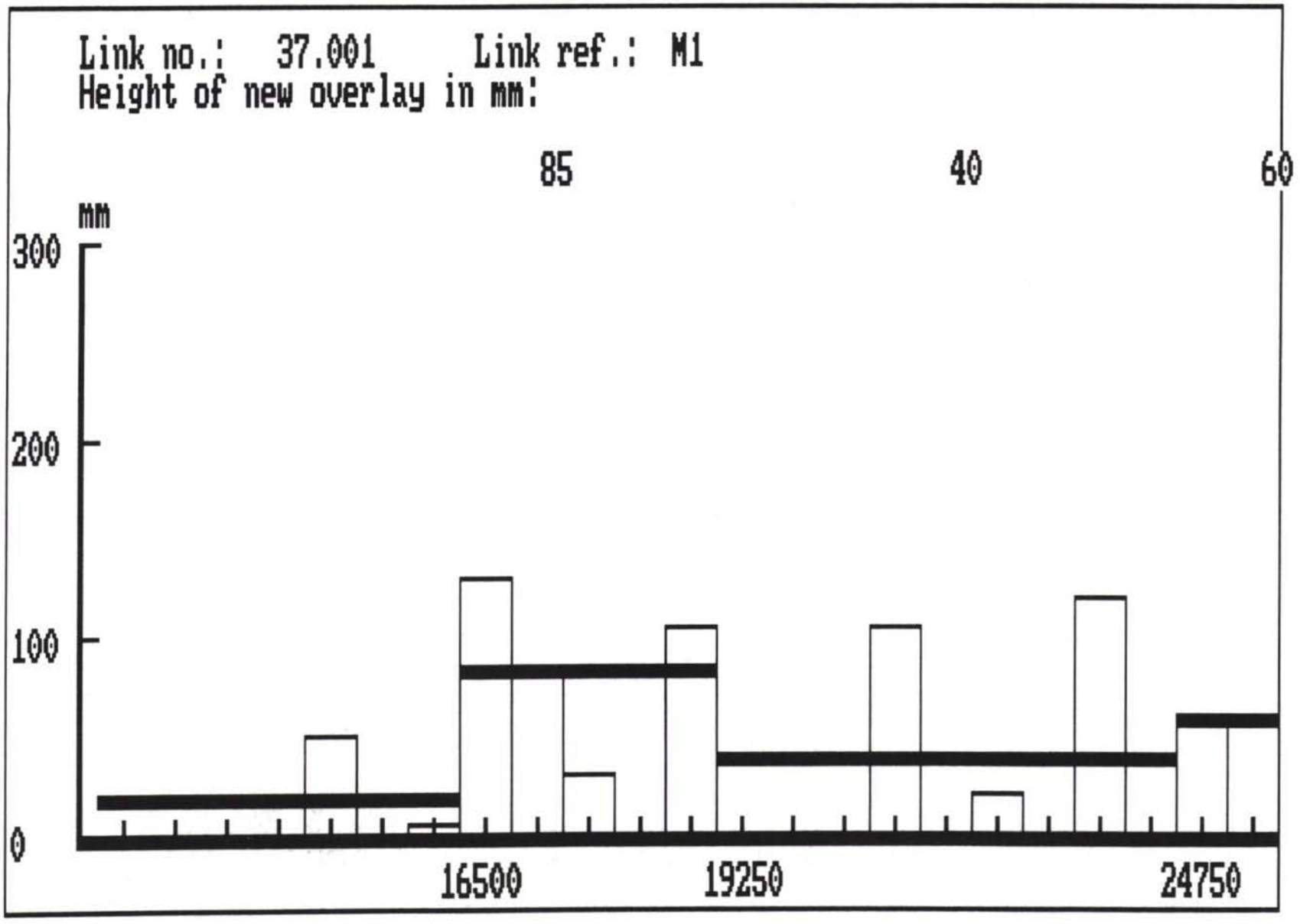
Link ref.: M1

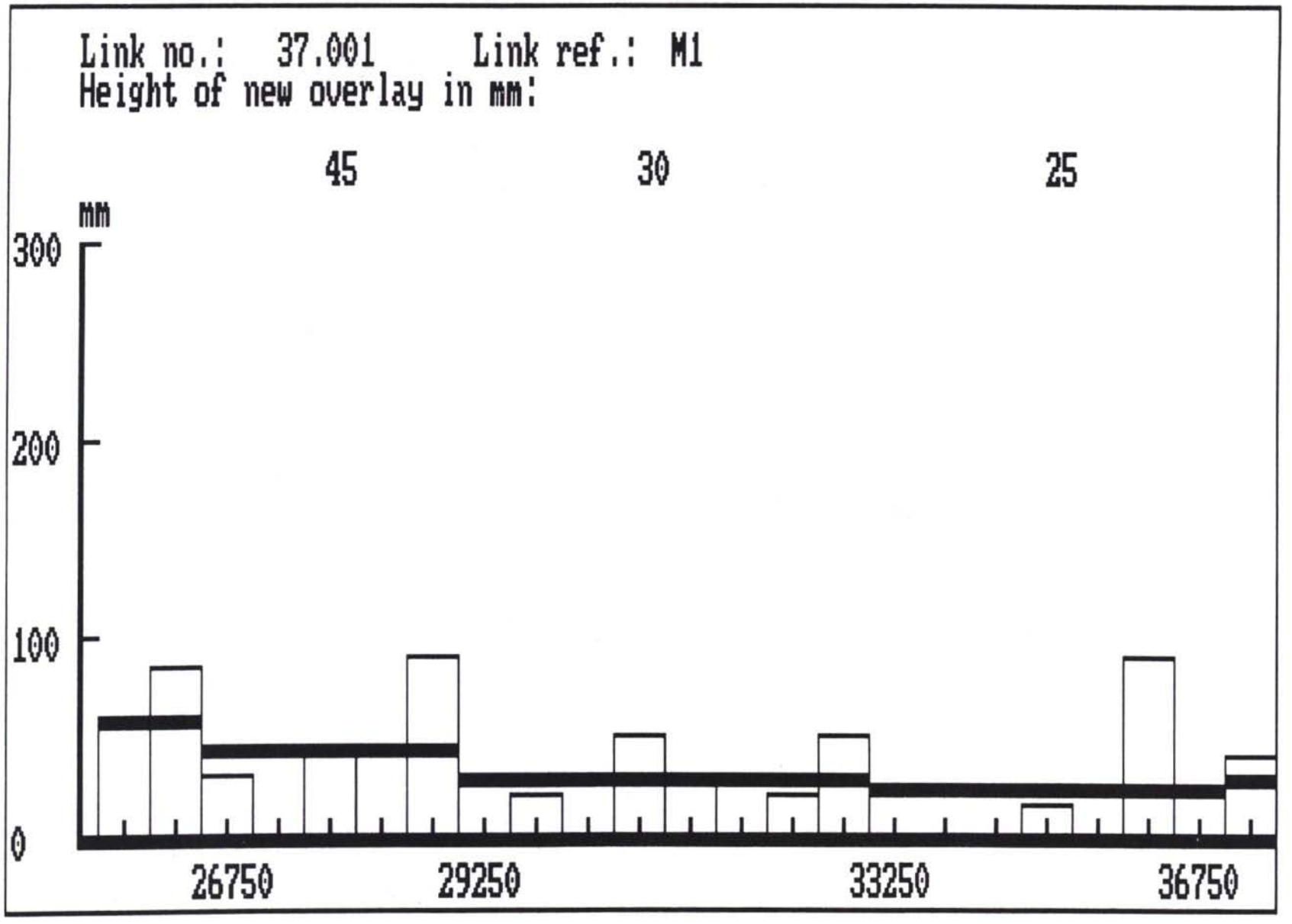
Mea. date: 1949 2

The classification is based on sections => 4 measurements.
For each section the overlay thickness is calculated as
verage + 33% of the standard deviation.
The stated layer thickness must be considered as instructive, as there might be material or technical reasons why another layer thickness than the here stated should be carried out, especially in connection with thin overlay thicknesses.

Section	Overlay Thickness in mm	<--------Life--------> before years	after years	extra tons
0 - 3250	25	11	15	433
3250 - 6750	75	4	15	278
6750 - 8750	60	5	15	248
8750 - 16500	20	14	15	650
16500 - 19250	85	4	15	418
19250 - 24750	40	12	15	1098
24750 - 26750	60	5	15	155
26750 - 29250	45	8	15	278
29250 - 33250	30	10	15	248
33250 - 36750	25	14	15	402
36750 - 41500	30	10	15	340
41500 - 43750	80	5	15	495
43750 - 47500	35	11	15	650
47500 - 49750	55	7	15	309
49750 - 54750	15	14	15	557
54750 - 59250	85	2	15	278
59250 - 62750	35	12	15	495
62750 - 66750	70	5	15	526
66750 - 70750	85	4	15	557
70750 - 73750	55	5	15	0
73750 - 78250	85	6	15	959
78250 - 80000	110	10	15	495


Link no.: 37.001 Link ref.: M1
Height of new overlay in mm:
25
75
60
20
mm
300
200
100
0
0
3250
6750
8750


Link no.: 37.001 Link ref.: M1
Height of new overlay in mm:
85
40
60
mm
300
200
100
0
16500
19250
24750


Link no.: 37.001 Link ref.: M1
Height of new overlay in mm:
45
30
25
mm
300
200
100
0
26750
29250
33250
36750

ROAD EVALUATION REPORT

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Client: TACIS

Sec. no.: 0001

Link no.: 37.001

A/S PHØNIX
P. P. C

Design date: 06-11-1997

Link ref.: M4 Mea. date: 970416 2
Start at: ALYAT
Surface: ASF

Calculation parameters:

Load radius	150 mm
Contact pressure	0.70 MPa
Poisson's ratio	0.35
Annual traf. growth	6.0 %
Design temperature	30 C
Design period	15 years
S. kor. factor	1.00

Signature index:

B=Block cracking	R=Rutting
A=Alligator cracking	O=No remarks
C=other cracking	S=Surface defect
P=Potholes	H=Future design
D=Deformation	X=Local def. only
Y=General defect	Z=Reconstruction area
T=Temperature taken	

* - after remarks indicates that the point has been calculated as a 2-layer system and that the thickness and E-values of 1st and 2nd layer are the same when calculating the new overlay needed in the actual point, the calculation is done for a 3-layer system

E-value of new asphalt layer < 100 mm MPa: 2000
E-value of new asphalt layer > 100 mm MPa: 3000

Point	Remarks		E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
0/R		*	4534	4903	0	245	3	20	110	250	0	4405000	0
500/L			2371	177	0	66	1	0	110	250	0	4405000	120
1000/R		*	6767	7317	0	353	3	20	110	250	0	4405000	0
1500/L			10421	171	0	114	2	6	110	250	0	4405000	30
2000/			1974	1514	0	119	3	20	110	250	0	4405000	0
2500/L			7218	604	0	66	3	12	110	250	0	4405000	10
3000/R			10150	634	0	91	3	20	110	250	0	4405000	0
3500/L	K	*	1371	1728	0	133	3	20	110	250	0	4405000	0
4000/R			7786	644	0	109	2	20	110	250	0	4405000	0
4500/L			5741	512	0	76	3	10	110	250	0	4405000	20
5000/R		*	3605	3898	0	198	3	20	110	250	0	4405000	0
5500/L			2352	783	0	84	3	9	110	250	0	4405000	30
6000/R			5946	237	0	97	2	4	110	250	0	4405000	50
6500/L	K	*	2354	2968	0	100	3	20	110	250	0	4405000	0
7000/R			5124	77	0	91	2	0	110	250	0	4405000	130
7500/L			7685	1590	0	114	3	20	110	250	0	4405000	0
8000/R		*	4158	4496	0	224	3	20	110	250	0	4405000	0
8500/L			11771	653	0	93	3	20	110	250	0	4405000	0
9000/R		*	1447	1564	0	86	3	17	110	250	0	4405000	0
9500/L			9505	2985	0	166	3	20	110	250	0	4405000	0
10000/R		*	4016	4342	0	190	3	20	110	250	0	4405000	0
10500/L		*	2355	2969	0	123	3	20	110	250	0	4405000	0
11000/R			11189	846	0	103	3	20	110	250	0	4405000	0
11500/L		*	2380	3000	0	158	3	20	110	250	0	4405000	0
12000/R		*	3406	3683	0	177	3	20	110	250	0	4405000	0
12500/L			11772	862	0	116	3	20	110	250	0	4405000	0

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
13000/R	*	3182	3441	0	147	3	20	110	250	0	4405000	0
13500/L	*	4603	4518	0	189	3	20	110	250	0	4405000	0
14000/R	*	3209	3470	0	145	3	20	110	250	0	4405000	0
14500/L	*	3358	3296	0	162	3	20	110	250	0	4405000	0
15000/R	*	2665	2882	0	106	3	20	110	250	0	4405000	0
15500/L	*	5052	4959	0	264	3	20	110	250	0	4405000	0
16000/R	*	2113	2285	0	72	3	20	110	250	0	4405000	0
16500/L		9751	243	0	55	3	5	110	250	0	4405000	45
17000/R		1036	427	0	66	3	1	110	250	0	4405000	105
17500/L		14735	980	0	94	3	20	110	250	0	4405000	0
18000/R	*	2774	3000	0	103	3	20	110	250	0	4405000	0
18500/L		12202	538	0	107	2	20	110	250	0	4405000	0
19000/R		14789	1115	0	97	3	20	110	250	0	4405000	0
19500/L	*	2371	2327	0	102	3	20	110	250	0	4405000	0
20000/R	*	4833	5226	0	174	3	20	110	250	0	4405000	0
20500/L	*	2593	2545	0	83	3	20	110	250	0	4405000	0
21000/R	*	2851	3083	0	145	3	20	110	250	0	4405000	0
21500/L	*	1958	1921	0	109	3	20	110	250	0	4405000	0
22000/R		14048	1092	0	102	3	20	110	250	0	4405000	0
22500/L		12002	915	0	94	3	20	110	250	0	4405000	0
23000/R	*	3666	3965	0	135	3	20	110	250	0	4405000	0
23500/L	*	3779	3709	0	120	3	20	110	250	0	4405000	0
24000/R		11687	792	0	115	3	20	110	250	0	4405000	0
24500/L		14158	3582	0	127	3	20	110	250	0	4405000	0
25000/R	*	4749	5135	0	185	3	20	110	250	0	4405000	0
25500/L	*	3300	3239	0	123	3	20	110	250	0	4405000	0
26000/R	*	5988	6475	0	206	3	20	110	250	0	4405000	0
26500/L	*	2089	2050	0	89	3	20	110	250	0	4405000	0
27000/R		10867	1099	0	96	3	20	110	250	0	4405000	0
27500/L		6002	775	0	91	3	20	110	250	0	4405000	0
28000/R	*	4412	4770	0	178	3	20	110	250	0	4405000	0
28500/L		2287	639	0	95	3	9	110	250	0	4405000	30
29000/R		4344	2141	0	119	3	20	110	250	0	4405000	0
29500/L		2211	2216	0	151	3	20	110	250	0	4405000	0
30000/R	*	5428	5869	0	187	3	20	110	250	0	4405000	0
30500/L		14725	439	0	75	3	20	110	250	0	4405000	0
31000/R		8447	693	0	89	3	20	110	250	0	4405000	0
31500/L		7250	534	0	73	3	13	110	250	0	4405000	10
32000/R	*	3246	3510	0	150	3	20	110	250	0	4405000	0
32500/L		9860	4013	0	210	3	20	110	250	0	4405000	0
33000/R		14795	883	0	179	2	20	110	250	0	4405000	0
33500/L	*	1926	1890	0	144	3	20	110	250	0	4405000	0
34000/R		933	6007	0	307	3	20	110	250	0	4405000	0
34500/L	*	2754	2703	0	179	3	20	110	250	0	4405000	0
35000/R		5452	310	0	113	2	5	110	250	0	4405000	40
35500/L		8552	536	0	100	2	20	110	250	0	4405000	0
36000/R		4691	33	0	112	2	0	110	250	0	4405000	195
36500/L		9577	794	0	138	2	20	110	250	0	4405000	0
37500/L		4114	166	0	108	2	1	110	250	0	4405000	90
38000/R		13522	1052	0	174	2	20	110	250	0	4405000	0
38500/L		14906	893	0	156	2	20	110	250	0	4405000	0
39000/R	*	2424	2424	0	210	3	20	110	250	0	4405000	0
39500/L	*	2644	2596	0	138	3	20	110	250	0	4405000	0
40000/R		7724	185	0	227	2	4	110	250	0	4405000	45
40500/L		6073	2751	0	240	3	20	110	250	0	4405000	0
41000/R		5025	750	0	128	2	20	110	250	0	4405000	0
41500/L		3021	54	0	113	2	0	110	250	0	4405000	180
42000/R		3530	152	0	79	1	1	110	250	0	4405000	100

ROAD EVALUATION REPORT

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Client: tacis

Sec. no.: 0001

Link no.: 0001

A/S PHØNIX
P. P. C

Design date: 06-11-1997

Link ref.: m4 Mea. date: 970413 2
Start at: gazi mammad
Surface: asf

Calculation parameters:

Load radius	150 mm
Contact pressure	0.70 MPa
Poisson's ratio	0.35
Annual traf. growth	6.0 %
Design temperature	25 C
Design period	15 years
S. kor. factor	1.00

Signature index:

B=Block cracking	R=Rutting
A=Alligator cracking	O=No remarks
C=other cracking	S=Surface defect
P=Potholes	H=Future design
D=Deformation	X=Local def. only
Y=General defect	Z=Reconstruction area
T=Temperature taken	

* - after remarks indicates that the point has been calculated as a 2-layer system and that the thickness and E-values of 1st and 2nd layer are the same when calculating the new overlay needed in the actual point, the calculation is done for a 3-layer system

E-value of new asphalt layer < 100 mm MPa: 2000
E-value of new asphalt layer > 100 mm MPa: 3000

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
0/R		9554	449	0	127	2	20	110	250	0	4405000	0
500/L		6143	450	0	128	2	11	110	250	0	4405000	15
1000/R		14059	710	0	150	2	20	110	250	0	4405000	0
1500/L	*	3000	3000	0	198	3	20	110	250	0	4405000	0
2000/R		12075	561	0	177	2	20	110	250	0	4405000	0
2500/L	*	3852	3852	0	285	3	20	110	250	0	4405000	0
3000/R	*	5438	5706	0	70	3	20	110	250	0	4405000	0
3500/L		11353	608	0	121	2	20	110	250	0	4405000	0
4000/R		4884	361	0	141	2	5	110	250	0	4405000	40
4500/L		7064	318	0	78	2	8	110	250	0	4405000	30
5000/R		5309	234	0	162	2	3	110	250	0	4405000	55
5500/L		11862	976	0	135	2	20	110	250	0	4405000	0
6000/R		4345	151	0	90	2	1	110	250	0	4405000	90
6500/L	*	2298	3041	0	255	3	20	110	250	0	4405000	0
7000/R		5526	319	0	71	2	5	110	250	0	4405000	50
7500/L	*	2032	2690	0	129	3	20	110	250	0	4405000	0
8000/R		7281	40	0	59	2	0	110	250	0	4405000	160
8500/L	*	2178	2883	0	160	3	20	110	250	0	4405000	0
9000/R		4165	50	0	82	2	0	110	250	0	4405000	175
9500/L	*	2328	3081	0	176	3	20	110	250	0	4405000	0
10000/R		8413	433	0	70	3	12	110	250	0	4405000	15
10500/L		5743	749	0	111	3	20	110	250	0	4405000	0
11000/R		2928	311	0	81	2	3	110	250	0	4405000	70
11500/1	*	1737	2299	0	115	3	20	110	250	0	4405000	0
12000/R		8704	523	0	105	2	20	110	250	0	4405000	0
12500/L		8161	420	0	124	2	15	110	250	0	4405000	5

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
13000/R		11998	703	0	97	3	20	110	250	0	4405000	0
13500/L	*	2503	3313	0	176	3	20	110	250	0	4405000	0
14000/R		5000	183	0	40	3	1	110	250	0	4405000	125
14500/L	*	2800	3706	0	248	3	20	110	250	0	4405000	0
15000/R		10871	208	0	76	2	8	110	250	0	4405000	20
15500/L	*	1797	2378	0	124	3	20	110	250	0	4405000	0
16000/R		4051	345	0	69	2	4	110	250	0	4405000	65
16500/L	*	2205	2919	0	189	3	20	110	250	0	4405000	0
17000/R		8895	1505	0	138	3	20	110	250	0	4405000	0
17500/L		10947	531	0	82	3	20	110	250	0	4405000	0
18000/R		14566	739	0	112	3	20	110	250	0	4405000	0
18500/L	*	1551	2053	0	106	3	20	110	250	0	4405000	0
19000/R	*	3003	3151	0	187	3	20	110	250	0	4405000	0
19500/L		6555	506	0	78	3	12	110	250	0	4405000	10
20000/R	*	2089	2192	0	95	3	20	110	250	0	4405000	0
20500/L	*	2077	2749	0	143	3	20	110	250	0	4405000	0
21000/R		7703	532	0	125	2	20	110	250	0	4405000	0
21500/L	*	2062	2729	0	168	3	20	110	250	0	4405000	0
22000/R		8183	1284	0	173	2	20	110	250	0	4405000	0
22500/L		14690	495	0	143	2	20	110	250	0	4405000	0
23000/R		5979	535	0	99	2	15	110	250	0	4405000	5
23500/L		12756	504	0	79	3	20	110	250	0	4405000	0
24000/R		5709	363	0	99	2	7	110	250	0	4405000	30
24500/L	*	2371	3138	0	183	3	20	110	250	0	4405000	0
25000/R		12882	395	0	-83	3	20	110	250	0	4405000	0
25500/L		7305	647	0	86	3	20	110	250	0	4405000	0
26000/R		7981	609	0	100	2	20	110	250	0	4405000	0
26500/L		1522	439	0	41	3	1	110	250	0	4405000	140
27000/R		2189	232	0	50	3	1	110	250	0	4405000	135
27500/L		14290	360	0	86	3	20	110	250	0	4405000	0
28000/R		2929	311	0	72	2	3	110	250	0	4405000	80
28500/L		5081	293	0	96	2	4	110	250	0	4405000	45
29000/R		3698	333	0	85	2	3	110	250	0	4405000	50
29500/L	*	2267	3000	0	195	3	20	110	250	0	4405000	0
30000/R		7296	401	0	75	3	11	110	250	0	4405000	15
30500/L	*	1592	2107	0	108	3	20	110	250	0	4405000	0
31000/R	*	1578	1656	0	79	3	17	110	250	0	4405000	0
31500/L		14764	657	0	133	2	20	110	250	0	4405000	0
32000/R		6377	398	0	78	2	10	110	250	0	4405000	20
32500/L	*	771	1021	0	160	2	15	110	250	0	4405000	5
33000/R	k	1299	141	0	38	1	0	110	250	0	4405000	195
33500/L		6783	424	0	107	2	12	110	250	0	4405000	10
34000/R		6377	349	0	84	2	8	110	250	0	4405000	25
34500/L		4816	431	0	121	2	7	110	250	0	4405000	25
35000/R		2105	237	0	52	3	1	110	250	0	4405000	130
35500/L		3563	54	0	79	2	0	110	250	0	4405000	170
36000/R		4041	12	0	1250	2	0	110	250	0	4405000	295
36500/L		3566	472	0	82	3	7	110	250	0	4405000	40
37000/R		8169	445	0	89	2	16	110	250	0	4405000	0
37500/L		1857	280	0	57	3	1	110	250	0	4405000	125
38000/R		7324	1070	0	133	3	20	110	250	0	4405000	0
38500/L		4544	549	0	84	3	11	110	250	0	4405000	20
39000/R		57	414	0	133	2	1	110	250	0	4405000	105
39000/L		3620	561	0	94	2	11	110	250	0	4405000	20
40000/R		12966	801	0	131	2	20	110	250	0	4405000	0
40500/L		4337	417	0	94	2	6	110	250	0	4405000	25
41000/R	R *	4294	4065	0	101	3	20	110	250	0	4405000	0
41500/L		2837	400	0	69	3	3	110	250	0	4405000	75
42000/R		7558	546	0	108	2	20	110	250	0	4405000	0
42500/L		3392	434	0	119	2	6	110	250	0	4405000	35

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
43000/R		11003	472	0	126	2	20	110	250	0	4405000	0
43500/L		8557	406	0	87	2	15	110	250	0	4405000	0
44000/R		257	417	0	57	3	0	110	250	0	4405000	135
44500/L		354	740	0	84	3	3	110	250	0	4405000	75
45000/R		9065	451	0	81	3	17	110	250	0	4405000	0
45500/L		5325	423	0	78	3	8	110	250	0	4405000	30
46000/R		3103	289	0	64	2	2	110	250	0	4405000	95
46500/L		1575	34	0	40	1	0	110	250	0	4405000	235
47000/R	K *	1260	1193	0	75	3	8	110	250	0	4405000	30
47500/L		2001	33	0	59	1	0	110	250	0	4405000	230
48000/R		5456	239	0	68	2	3	110	250	0	4405000	65
48500/L	*	939	1461	0	174	3	20	110	250	0	4405000	0
49000/R		8082	491	0	80	3	16	110	250	0	4405000	0
49500/L	*	1381	2149	0	94	3	20	110	250	0	4405000	0
50000/R		5904	351	0	73	3	7	110	250	0	4405000	40
50500/L		9121	565	0	79	3	20	110	250	0	4405000	0
51000/R		11640	403	0	86	3	20	110	250	0	4405000	0
51500/L		11986	314	0	88	2	17	110	250	0	4405000	0
52000/R	*	2653	2511	0	113	3	20	110	250	0	4405000	0
52500/L		3951	365	0	65	3	4	110	250	0	4405000	70
53000/R	*	2419	2290	0	110	3	20	110	250	0	4405000	0
53500/L	*	1907	2966	0	177	3	20	110	250	0	4405000	0
54000/R	*	2143	2029	0	96	3	20	110	250	0	4405000	0
54500/L		9087	475	0	86	3	19	110	250	0	4405000	0
55000/R		8739	526	0	109	2	20	110	250	0	4405000	0
55500/L		2500	62	0	71	1	0	110	250	0	4405000	175
56000/R		3945	403	0	81	2	6	110	250	0	4405000	45
56500/L		1332	211	0	54	2	0	110	250	0	4405000	145
57000/R		11387	633	0	112	2	20	110	250	0	4405000	0
58000/R	*	3250	3077	0	147	3	20	110	250	0	4405000	0
59000/R	*	4262	4035	0	213	3	20	110	250	0	4405000	0
59500/L		3870	503	0	106	2	9	110	250	0	4405000	20
60000/R		11123	559	0	85	3	20	110	250	0	4405000	0
60500/L		9372	307	0	89	2	11	110	250	0	4405000	10
61000/R		7199	433	0	86	2	13	110	250	0	4405000	5
61500/L	*	1714	2666	0	105	3	20	110	250	0	4405000	0
62000/R	*	2727	2581	0	143	3	20	110	250	0	4405000	0
62500/L		8394	57	0	86	2	0	110	250	0	4405000	120
63000/R		3169	300	0	62	2	2	110	250	0	4405000	95
63500/L		2654	274	0	72	2	2	110	250	0	4405000	90
64000/R		11854	418	0	90	3	20	110	250	0	4405000	0
64500/L		11098	759	0	120	2	20	110	250	0	4405000	0
65000/R	*	2599	2460	0	161	3	20	110	250	0	4405000	0
65500/L		2060	301	0	58	3	1	110	250	0	4405000	115
66000/R	*	3169	3000	0	144	3	20	110	250	0	4405000	0
66500/L		14430	809	0	201	2	20	110	250	0	4405000	0
67000/R	*	2526	2391	0	122	3	20	110	250	0	4405000	0
67500/L	*	1928	3000	0	141	3	20	110	250	0	4405000	0
68000/R	*	2816	2666	0	110	3	20	110	250	0	4405000	0
68500/L	*	1508	2347	0	117	3	20	110	250	0	4405000	0
69000/R		9643	785	0	105	3	20	110	250	0	4405000	0
69500/L		2345	349	0	48	3	1	110	250	0	4405000	125
70000/R	*	3785	3583	0	222	3	20	110	250	0	4405000	0
70500/L		3557	333	0	57	3	2	110	250	0	4405000	95
71000/R	*	3209	3038	0	197	3	20	110	250	0	4405000	0
71500/L		7701	286	0	63	3	6	110	250	0	4405000	45
72000/R		14049	618	0	129	2	20	110	250	0	4405000	0
72500/L		1137	12	0	80	1	0	110	250	0	4405000	300
73000/R	*	3169	3000	0	148	3	20	110	250	0	4405000	0
73500/L		6624	418	0	80	2	11	110	250	0	4405000	15

Point	Remarks	E1	E2	E3	Esub	Critical	Estimated	Ex.layer			Estimated	New
		MPa	Mpa	MPa	MPa	layer	life	H1	H2	H3	traffic	overlay
							years	mm	mm	mm	8.16 t	mm
74000/R	*	3169	3000	0	186	3	20	110	250	0	4405000	0
74500/L		1749	68	0	68	1	0	110	250	0	4405000	180
75000/R	*	2607	2468	0	154	3	20	110	250	0	4405000	0
75500/L		3652	348	0	71	2	3	110	250	0	4405000	65
76000/R		13814	735	0	158	2	20	110	250	0	4405000	0
76500/L		12580	531	0	135	2	20	110	250	0	4405000	0
77000/R	*	3646	3451	0	195	3	20	110	250	0	4405000	0
77500/L		4882	556	0	168	2	15	110	250	0	4405000	0
78000/R	*	3169	3000	0	196	3	20	110	250	0	4405000	0
78500/L		3133	239	0	155	2	1	110	250	0	4405000	85
79000/R	*	1904	1802	0	111	3	20	110	250	0	4405000	0
79500/L		9994	682	0	108	3	20	110	250	0	4405000	0
80000/R	*	3547	3358	0	222	3	20	110	250	0	4405000	0
80500/L		9946	827	0	112	3	20	110	250	0	4405000	0
81000/R	*	2042	1933	0	103	3	20	110	250	0	4405000	0
81500/L		4222	498	0	129	2	10	110	250	0	4405000	15
82000/R	*	2667	2524	0	147	3	20	110	250	0	4405000	0
82500/L	*	2609	4059	0	254	3	20	110	250	0	4405000	0
83000/R		273	2768	0	247	3	20	110	250	0	4405000	0
83500/L		5863	13	0	66	2	0	110	250	0	4405000	285

ROAD EVALUATION REPORT

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Client: TACIS

Sec. no.: 0001

Link no.: 37.001

A/S PHØNIX
P. P. C

Design date: 06-11-1997

Link ref.: M4 Mea. date: 970417 2
Start at: KYURDAMIR
Surface: ASF

Calculation parameters:

Load radius	150 mm
ontact pressure	0.70 MPa
Poisson's ratio	0.35
Annual traf. growth	6.0 %
Design temperature	30 C
Design period	15 years
S. kor. factor	1.00

Signature index:

B=Block cracking	R=Rutting
A=Alligator cracking	O=No remarks
C=other cracking	S=Surface defect
P=Potholes	H=Future design
D=Deformation	X=Local def. only
Y=General defect	Z=Reconstruction area
T=Temperature taken	

* - after remarks indicates that the point has been calculated as a 2-layer system and that the thickness and E-values of 1st and 2nd layer are the same when calculating the new overlay needed in the actual point, the calculation is done for a 3-layer system

E-value of new asphalt layer < 100 mm MPa: 2000
E-value of new asphalt layer > 100 mm MPa: 3000

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
0/R		12622	990	0	107	3	20	110	250	0	4562100	0
0/L		10782	617	0	159	2	20	110	250	0	4562100	0
500/L		7327	752	0	165	2	20	110	250	0	4562100	0
.000/R	*	6485	6609	0	205	3	20	110	250	0	4562100	0
1500/L	K	9552	802	0	172	2	20	110	250	0	4562100	0
2000/R		3191	2212	0	134	3	20	110	250	0	4562100	0
2500/L		4657	968	0	122	3	20	110	250	0	4562100	0
3000/R	*	4613	4701	0	172	3	20	110	250	0	4562100	0
3500/L		5435	1311	0	199	2	20	110	250	0	4562100	0
4000/R		13662	929	0	96	3	20	110	250	0	4562100	0
4500/L		10798	884	0	150	2	20	110	250	0	4562100	0
5000/R	*	2474	2522	0	102	3	20	110	250	0	4562100	0
5500/L	*	1788	2396	0	108	3	20	110	250	0	4562100	0
6000/R		13219	4115	0	139	3	20	110	250	0	4562100	0
6500/L		7608	1688	0	176	3	20	110	250	0	4562100	0
7000/R	*	3098	3157	0	150	3	20	110	250	0	4562100	0
7500/L	R	3466	1487	0	172	2	20	110	250	0	4562100	0
8000/R		8933	1406	0	114	3	20	110	250	0	4562100	0
8500/L		10906	789	0	137	2	20	110	250	0	4562100	0
9000/R		3377	1347	0	96	3	20	110	250	0	4562100	0
9500/L		5071	423	0	145	2	7	110	250	0	4562100	30
10000/R		11000	711	0	97	3	20	110	250	0	4562100	0
10500/L		4749	1237	0	136	3	20	110	250	0	4562100	0
11000/R		2134	3119	0	99	3	20	110	250	0	4562100	0
11500/L	R	4935	535	0	96	3	14	110	250	0	4562100	10
12000/R		3226	300	0	97	2	2	110	250	0	4562100	60

ROAD EVALUATION REPORT

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Client: TACIS

Sec. no.: 0001

Link no.: 37.001

A/S PHØNIX
P. P. C

Design date: 06-11-1997

Link ref.: M4 Mea. date: 970416 2
Start at: ALYAT
Surface: ASF

Calculation parameters:

Load radius	150 mm
Contact pressure	0.70 MPa
Poisson's ratio	0.35
Annual traf. growth	6.0 %
Design temperature	30 C
Design period	15 years
S. kor. factor	1.00

Signature index:

B=Block cracking	R=Rutting
A=Alligator cracking	O=No remarks
C=other cracking	S=Surface defect
P=Potholes	H=Future design
D=Deformation	X=Local def. only
Y=General defect	Z=Reconstruction area
T=Temperature taken	

* - after remarks indicates that the point has been calculated as a 2-layer system and that the thickness and E-values of 1st and 2nd layer are the same when calculating the new overlay needed in the actual point, the calculation is done for a 3-layer system

E-value of new asphalt layer < 100 mm MPa: 2000
E-value of new asphalt layer > 100 mm MPa: 3000

Point	Remarks		E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
0/R		*	4534	4903	0	245	3	20	110	250	0	4405000	0
500/L			2371	177	0	66	1	0	110	250	0	4405000	120
1000/R		*	6767	7317	0	353	3	20	110	250	0	4405000	0
1500/L			10421	171	0	114	2	6	110	250	0	4405000	30
2000/			1974	1514	0	119	3	20	110	250	0	4405000	0
2500/L			7218	604	0	66	3	12	110	250	0	4405000	10
3000/R			10150	634	0	91	3	20	110	250	0	4405000	0
3500/L	K	*	1371	1728	0	133	3	20	110	250	0	4405000	0
4000/R			7786	644	0	109	2	20	110	250	0	4405000	0
4500/L			5741	512	0	76	3	10	110	250	0	4405000	20
5000/R		*	3605	3898	0	198	3	20	110	250	0	4405000	0
5500/L			2352	783	0	84	3	9	110	250	0	4405000	30
6000/R			5946	237	0	97	2	4	110	250	0	4405000	50
6500/L	K	*	2354	2968	0	100	3	20	110	250	0	4405000	0
7000/R			5124	77	0	91	2	0	110	250	0	4405000	130
7500/L			7685	1590	0	114	3	20	110	250	0	4405000	0
8000/R		*	4158	4496	0	224	3	20	110	250	0	4405000	0
8500/L			11771	653	0	93	3	20	110	250	0	4405000	0
9000/R		*	1447	1564	0	86	3	17	110	250	0	4405000	0
9500/L			9505	2985	0	166	3	20	110	250	0	4405000	0
10000/R		*	4016	4342	0	190	3	20	110	250	0	4405000	0
10500/L		*	2355	2969	0	123	3	20	110	250	0	4405000	0
11000/R			11189	846	0	103	3	20	110	250	0	4405000	0
11500/L		*	2380	3000	0	158	3	20	110	250	0	4405000	0
12000/R		*	3406	3683	0	177	3	20	110	250	0	4405000	0
12500/L			11772	862	0	116	3	20	110	250	0	4405000	0

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
13000/R	*	3182	3441	0	147	3	20	110	250	0	4405000	0
13500/L	*	4603	4518	0	189	3	20	110	250	0	4405000	0
14000/R	*	3209	3470	0	145	3	20	110	250	0	4405000	0
14500/L	*	3358	3296	0	162	3	20	110	250	0	4405000	0
15000/R	*	2665	2882	0	106	3	20	110	250	0	4405000	0
15500/L	*	5052	4959	0	264	3	20	110	250	0	4405000	0
16000/R	*	2113	2285	0	72	3	20	110	250	0	4405000	0
16500/L		9751	243	0	55	3	5	110	250	0	4405000	45
17000/R		1036	427	0	66	3	1	110	250	0	4405000	105
17500/L		14735	980	0	94	3	20	110	250	0	4405000	0
18000/R	*	2774	3000	0	103	3	20	110	250	0	4405000	0
18500/L		12202	538	0	107	2	20	110	250	0	4405000	0
19000/R		14789	1115	0	97	3	20	110	250	0	4405000	0
19500/L	*	2371	2327	0	102	3	20	110	250	0	4405000	0
20000/R	*	4833	5226	0	174	3	20	110	250	0	4405000	0
20500/L	*	2593	2545	0	83	3	20	110	250	0	4405000	0
21000/R	*	2851	3083	0	145	3	20	110	250	0	4405000	0
21500/L	*	1958	1921	0	109	3	20	110	250	0	4405000	0
22000/R		14048	1092	0	102	3	20	110	250	0	4405000	0
22500/L		12002	915	0	94	3	20	110	250	0	4405000	0
23000/R	*	3666	3965	0	135	3	20	110	250	0	4405000	0
23500/L	*	3779	3709	0	120	3	20	110	250	0	4405000	0
24000/R		11687	792	0	115	3	20	110	250	0	4405000	0
24500/L		14158	3582	0	127	3	20	110	250	0	4405000	0
25000/R	*	4749	5135	0	185	3	20	110	250	0	4405000	0
25500/L	*	3300	3239	0	123	3	20	110	250	0	4405000	0
26000/R	*	5988	6475	0	206	3	20	110	250	0	4405000	0
26500/L	*	2089	2050	0	89	3	20	110	250	0	4405000	0
27000/R		10867	1099	0	96	3	20	110	250	0	4405000	0
27500/L		6002	775	0	91	3	20	110	250	0	4405000	0
28000/R	*	4412	4770	0	178	3	20	110	250	0	4405000	0
28500/L		2287	639	0	95	3	9	110	250	0	4405000	30
29000/R		4344	2141	0	119	3	20	110	250	0	4405000	0
29500/L		2211	2216	0	151	3	20	110	250	0	4405000	0
30000/R	*	5428	5869	0	187	3	20	110	250	0	4405000	0
30500/L		14725	439	0	75	3	20	110	250	0	4405000	0
31000/R		8447	693	0	89	3	20	110	250	0	4405000	0
31500/L		7250	534	0	73	3	13	110	250	0	4405000	10
32000/R	*	3246	3510	0	150	3	20	110	250	0	4405000	0
32500/L		9860	4013	0	210	3	20	110	250	0	4405000	0
33000/R		14795	883	0	179	2	20	110	250	0	4405000	0
33500/L	*	1926	1890	0	144	3	20	110	250	0	4405000	0
34000/R		933	6007	0	307	3	20	110	250	0	4405000	0
34500/L	*	2754	2703	0	179	3	20	110	250	0	4405000	0
35000/R		5452	310	0	113	2	5	110	250	0	4405000	40
35500/L		8552	536	0	100	2	20	110	250	0	4405000	0
36000/R		4691	33	0	112	2	0	110	250	0	4405000	195
36500/L		9577	794	0	138	2	20	110	250	0	4405000	0
37500/L		4114	166	0	108	2	1	110	250	0	4405000	90
38000/R		13522	1052	0	174	2	20	110	250	0	4405000	0
38500/L		14906	893	0	156	2	20	110	250	0	4405000	0
39000/R	*	2424	2424	0	210	3	20	110	250	0	4405000	0
39500/L	*	2644	2596	0	138	3	20	110	250	0	4405000	0
40000/R		7724	185	0	227	2	4	110	250	0	4405000	45
40500/L		6073	2751	0	240	3	20	110	250	0	4405000	0
41000/R		5025	750	0	128	2	20	110	250	0	4405000	0
41500/L		3021	54	0	113	2	0	110	250	0	4405000	180
42000/R		3530	152	0	79	1	1	110	250	0	4405000	100

ROAD EVALUATION REPORT

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Client: tacis

Sec. no.: 0001

Link no.: 0001

A/S PHØNIX
P. P. C

Design date: 06-11-1997

Link ref.: m4 Mea. date: 970413 2
Start at: gazi mammad
Surface: asf

Calculation parameters:

Load radius	150 mm
Contact pressure	0.70 MPa
Poisson's ratio	0.35
Annual traf. growth	6.0 %
Design temperature	25 C
Design period	15 years
S. kor. factor	1.00

Signature index:

B=Block cracking	R=Rutting
A=Alligator cracking	O=No remarks
C=other cracking	S=Surface defect
P=Potholes	H=Future design
D=Deformation	X=Local def. only
Y=General defect	Z=Reconstruction area
T=Temperature taken	

* - after remarks indicates that the point has been calculated as a 2-layer system and that the thickness and E-values of 1st and 2nd layer are the same when calculating the new overlay needed in the actual point, the calculation is done for a 3-layer system

E-value of new asphalt layer < 100 mm MPa: 2000
E-value of new asphalt layer > 100 mm MPa: 3000

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
0/R		9554	449	0	127	2	20	110	250	0	4405000	0
500/L		6143	450	0	128	2	11	110	250	0	4405000	15
1000/R		14059	710	0	150	2	20	110	250	0	4405000	0
1500/L	*	3000	3000	0	198	3	20	110	250	0	4405000	0
2000/R		12075	561	0	177	2	20	110	250	0	4405000	0
2500/L	*	3852	3852	0	285	3	20	110	250	0	4405000	0
3000/R	*	5438	5706	0	70	3	20	110	250	0	4405000	0
3500/L		11353	608	0	121	2	20	110	250	0	4405000	0
4000/R		4884	361	0	141	2	5	110	250	0	4405000	40
4500/L		7064	318	0	78	2	8	110	250	0	4405000	30
5000/R		5309	234	0	162	2	3	110	250	0	4405000	55
5500/L		11862	976	0	135	2	20	110	250	0	4405000	0
6000/R		4345	151	0	90	2	1	110	250	0	4405000	90
6500/L	*	2298	3041	0	255	3	20	110	250	0	4405000	0
7000/R		5526	319	0	71	2	5	110	250	0	4405000	50
7500/L	*	2032	2690	0	129	3	20	110	250	0	4405000	0
8000/R		7281	40	0	59	2	0	110	250	0	4405000	160
8500/L	*	2178	2883	0	160	3	20	110	250	0	4405000	0
9000/R		4165	50	0	82	2	0	110	250	0	4405000	175
9500/L	*	2328	3081	0	176	3	20	110	250	0	4405000	0
10000/R		8413	433	0	70	3	12	110	250	0	4405000	15
10500/L		5743	749	0	111	3	20	110	250	0	4405000	0
11000/R		2928	311	0	81	2	3	110	250	0	4405000	70
11500/l	*	1737	2299	0	115	3	20	110	250	0	4405000	0
12000/R		8704	523	0	105	2	20	110	250	0	4405000	0
12500/L		8161	420	0	124	2	15	110	250	0	4405000	5

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
13000/R		11998	703	0	97	3	20	110	250	0	4405000	0
13500/L	*	2503	3313	0	176	3	20	110	250	0	4405000	0
14000/R		5000	183	0	40	3	1	110	250	0	4405000	125
14500/L	*	2800	3706	0	248	3	20	110	250	0	4405000	0
15000/R		10871	208	0	76	2	8	110	250	0	4405000	20
15500/L	*	1797	2378	0	124	3	20	110	250	0	4405000	0
16000/R		4051	345	0	69	2	4	110	250	0	4405000	65
16500/L	*	2205	2919	0	189	3	20	110	250	0	4405000	0
17000/R		8895	1505	0	138	3	20	110	250	0	4405000	0
17500/L		10947	531	0	82	3	20	110	250	0	4405000	0
18000/R		14566	739	0	112	3	20	110	250	0	4405000	0
18500/L	*	1551	2053	0	106	3	20	110	250	0	4405000	0
19000/R	*	3003	3151	0	187	3	20	110	250	0	4405000	0
19500/L		6555	506	0	78	3	12	110	250	0	4405000	10
20000/R	*	2089	2192	0	95	3	20	110	250	0	4405000	0
20500/L	*	2077	2749	0	143	3	20	110	250	0	4405000	0
21000/R		7703	532	0	125	2	20	110	250	0	4405000	0
21500/L	*	2062	2729	0	168	3	20	110	250	0	4405000	0
22000/R		8183	1284	0	173	2	20	110	250	0	4405000	0
22500/L		14690	495	0	143	2	20	110	250	0	4405000	0
23000/R		5979	535	0	99	2	15	110	250	0	4405000	5
23500/L		12756	504	0	79	3	20	110	250	0	4405000	0
24000/R		5709	363	0	99	2	7	110	250	0	4405000	30
24500/L	*	2371	3138	0	183	3	20	110	250	0	4405000	0
25000/R		12882	395	0	83	3	20	110	250	0	4405000	0
25500/L		7305	647	0	86	3	20	110	250	0	4405000	0
26000/R		7981	609	0	100	2	20	110	250	0	4405000	0
26500/L		1522	439	0	41	3	1	110	250	0	4405000	140
27000/R		2189	232	0	50	3	1	110	250	0	4405000	135
27500/L		14290	360	0	86	3	20	110	250	0	4405000	0
28000/R		2929	311	0	72	2	3	110	250	0	4405000	80
28500/L		5081	293	0	96	2	4	110	250	0	4405000	45
29000/R		3698	333	0	85	2	3	110	250	0	4405000	50
29500/L	*	2267	3000	0	195	3	20	110	250	0	4405000	0
30000/R		7296	401	0	75	3	11	110	250	0	4405000	15
30500/L	*	1592	2107	0	108	3	20	110	250	0	4405000	0
31000/R	*	1578	1656	0	79	3	17	110	250	0	4405000	0
31500/L		14764	657	0	133	2	20	110	250	0	4405000	0
32000/R		6377	398	0	78	2	10	110	250	0	4405000	20
32500/L	*	771	1021	0	160	2	15	110	250	0	4405000	5
33000/R	k	1299	141	0	38	1	0	110	250	0	4405000	195
33500/L		6783	424	0	107	2	12	110	250	0	4405000	10
34000/R		6377	349	0	84	2	8	110	250	0	4405000	25
34500/L		4816	431	0	121	2	7	110	250	0	4405000	25
35000/R		2105	237	0	52	3	1	110	250	0	4405000	130
35500/L		3563	54	0	79	2	0	110	250	0	4405000	170
36000/R		4041	12	0	1250	2	0	110	250	0	4405000	295
36500/L		3566	472	0	82	3	7	110	250	0	4405000	40
37000/R		8169	445	0	89	2	16	110	250	0	4405000	0
37500/L		1857	280	0	57	3	1	110	250	0	4405000	125
38000/R		7324	1070	0	133	3	20	110	250	0	4405000	0
38500/L		4544	549	0	84	3	11	110	250	0	4405000	20
39000/R		57	414	0	133	2	1	110	250	0	4405000	105
39000/L		3620	561	0	94	2	11	110	250	0	4405000	20
40000/R		12966	801	0	131	2	20	110	250	0	4405000	0
40500/L		4337	417	0	94	2	6	110	250	0	4405000	25
41000/R	R *	4294	4065	0	101	3	20	110	250	0	4405000	0
41500/L		2837	400	0	69	3	3	110	250	0	4405000	75
42000/R		7558	546	0	108	2	20	110	250	0	4405000	0
42500/L		3392	434	0	119	2	6	110	250	0	4405000	35

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
43000/R		11003	472	0	126	2	20	110	250	0	4405000	0
43500/L		8557	406	0	87	2	15	110	250	0	4405000	0
44000/R		257	417	0	57	3	0	110	250	0	4405000	135
44500/L		354	740	0	84	3	3	110	250	0	4405000	75
45000/R		9065	451	0	81	3	17	110	250	0	4405000	0
45500/L		5325	423	0	78	3	8	110	250	0	4405000	30
46000/R		3103	289	0	64	2	2	110	250	0	4405000	95
46500/L		1575	34	0	40	1	0	110	250	0	4405000	235
47000/R	K *	1260	1193	0	75	3	8	110	250	0	4405000	30
47500/L		2001	33	0	59	1	0	110	250	0	4405000	230
48000/R		5456	239	0	68	2	3	110	250	0	4405000	65
48500/L	*	939	1461	0	174	3	20	110	250	0	4405000	0
49000/R		8082	491	0	80	3	16	110	250	0	4405000	0
49500/L	*	1381	2149	0	94	3	20	110	250	0	4405000	0
50000/R		5904	351	0	73	3	7	110	250	0	4405000	40
50500/L		9121	565	0	79	3	20	110	250	0	4405000	0
51000/R		11640	403	0	86	3	20	110	250	0	4405000	0
51500/L		11986	314	0	88	2	17	110	250	0	4405000	0
52000/R	*	2653	2511	0	113	3	20	110	250	0	4405000	0
52500/L		3951	365	0	65	3	4	110	250	0	4405000	70
53000/R	*	2419	2290	0	110	3	20	110	250	0	4405000	0
53500/L	*	1907	2966	0	177	3	20	110	250	0	4405000	0
54000/R	*	2143	2029	0	96	3	20	110	250	0	4405000	0
54500/L		9087	475	0	86	3	19	110	250	0	4405000	0
55000/R		8739	526	0	109	2	20	110	250	0	4405000	0
55500/L		2500	62	0	71	1	0	110	250	0	4405000	175
56000/R		3945	403	0	81	2	6	110	250	0	4405000	45
56500/L		1332	211	0	54	2	0	110	250	0	4405000	145
57000/R		11387	633	0	112	2	20	110	250	0	4405000	0
58000/R	*	3250	3077	0	147	3	20	110	250	0	4405000	0
59000/R	*	4262	4035	0	213	3	20	110	250	0	4405000	0
59500/L		3870	503	0	106	2	9	110	250	0	4405000	20
60000/R		11123	559	0	85	3	20	110	250	0	4405000	0
60500/L		9372	307	0	89	2	11	110	250	0	4405000	10
61000/R		7199	433	0	86	2	13	110	250	0	4405000	5
61500/L	*	1714	2666	0	105	3	20	110	250	0	4405000	0
62000/R	*	2727	2581	0	143	3	20	110	250	0	4405000	0
62500/L		8394	57	0	86	2	0	110	250	0	4405000	120
63000/R		3169	300	0	62	2	2	110	250	0	4405000	95
63500/L		2654	274	0	72	2	2	110	250	0	4405000	90
64000/R		11854	418	0	90	3	20	110	250	0	4405000	0
64500/L		11098	759	0	120	2	20	110	250	0	4405000	0
65000/R	*	2599	2460	0	161	3	20	110	250	0	4405000	0
65500/L		2060	301	0	58	3	1	110	250	0	4405000	115
66000/R	*	3169	3000	0	144	3	20	110	250	0	4405000	0
66500/L		14430	809	0	201	2	20	110	250	0	4405000	0
67000/R	*	2526	2391	0	122	3	20	110	250	0	4405000	0
67500/L	*	1928	3000	0	141	3	20	110	250	0	4405000	0
68000/R	*	2816	2666	0	110	3	20	110	250	0	4405000	0
68500/L	*	1508	2347	0	117	3	20	110	250	0	4405000	0
69000/R		9643	785	0	105	3	20	110	250	0	4405000	0
69500/L		2345	349	0	48	3	1	110	250	0	4405000	125
70000/R	*	3785	3583	0	222	3	20	110	250	0	4405000	0
70500/L		3557	333	0	57	3	2	110	250	0	4405000	95
71000/R	*	3209	3038	0	197	3	20	110	250	0	4405000	0
71500/L		7701	286	0	63	3	6	110	250	0	4405000	45
72000/R		14049	618	0	129	2	20	110	250	0	4405000	0
72500/L		1137	12	0	80	1	0	110	250	0	4405000	300
73000/R	*	3169	3000	0	148	3	20	110	250	0	4405000	0
73500/L		6624	418	0	80	2	11	110	250	0	4405000	15

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
74000/R	*	3169	3000	0	186	3	20	110	250	0	4405000	0
74500/L		1749	68	0	68	1	0	110	250	0	4405000	180
75000/R	*	2607	2468	0	154	3	20	110	250	0	4405000	0
75500/L		3652	348	0	71	2	3	110	250	0	4405000	65
76000/R		13814	735	0	158	2	20	110	250	0	4405000	0
76500/L		12580	531	0	135	2	20	110	250	0	4405000	0
77000/R	*	3646	3451	0	195	3	20	110	250	0	4405000	0
77500/L		4882	556	0	168	2	15	110	250	0	4405000	0
78000/R	*	3169	3000	0	196	3	20	110	250	0	4405000	0
78500/L		3133	239	0	155	2	1	110	250	0	4405000	85
79000/R	*	1904	1802	0	111	3	20	110	250	0	4405000	0
79500/L		9994	682	0	108	3	20	110	250	0	4405000	0
80000/R	*	3547	3358	0	222	3	20	110	250	0	4405000	0
80500/L		9946	827	0	112	3	20	110	250	0	4405000	0
81000/R	*	2042	1933	0	103	3	20	110	250	0	4405000	0
81500/L		4222	498	0	129	2	10	110	250	0	4405000	15
82000/R	*	2667	2524	0	147	3	20	110	250	0	4405000	0
82500/L	*	2609	4059	0	254	3	20	110	250	0	4405000	0
83000/R		273	2768	0	247	3	20	110	250	0	4405000	0
83500/L		5863	13	0	66	2	0	110	250	0	4405000	285

ROAD EVALUATION REPORT

Client: TACIS

Sec. no.: 0001

Link no.: 37.001

A/S PHØNIX

P. P. C

Design date: 06-11-1997

Link ref.: M4 Mea. date: 970417 2

Start at: KYURDAMIR

Surface: ASF

Calculation parameters:

Load radius 150 mm

ontact pressure 0.70 MPa

Poisson's ratio 0.35

Annual traf. growth 6.0 %

Design temperature 30 C

Design period 15 years

S. kor. factor 1.00

Signature index:

B=Block cracking R=Rutting

A=Alligator cracking O=No remarks

C=other cracking S=Surface defect

P=Potholes H=Future design

D=Deformation X=Local def. only

Y=General defect Z=Reconstruction area

T=Temperature taken

* - after remarks indicates that the point has been calculated as a 2-layer system and that the thickness and E-values of 1st and 2nd layer are the same when calculating the new overlay needed in the actual point, the calculation is done for a 3-layer system

E-value of new asphalt layer < 100 mm MPa: 2000

E-value of new asphalt layer > 100 mm MPa: 3000

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
0/R		12622	990	0	107	3	20	110	250	0	4562100	0
0/L		10782	617	0	159	2	20	110	250	0	4562100	0
500/L		7327	752	0	165	2	20	110	250	0	4562100	0
.000/R	*	6485	6609	0	205	3	20	110	250	0	4562100	0
1500/L	K	9552	802	0	172	2	20	110	250	0	4562100	0
2000/R		3191	2212	0	134	3	20	110	250	0	4562100	0
2500/L		4657	968	0	122	3	20	110	250	0	4562100	0
3000/R	*	4613	4701	0	172	3	20	110	250	0	4562100	0
3500/L		5435	1311	0	199	2	20	110	250	0	4562100	0
4000/R		13662	929	0	96	3	20	110	250	0	4562100	0
4500/L		10798	884	0	150	2	20	110	250	0	4562100	0
5000/R	*	2474	2522	0	102	3	20	110	250	0	4562100	0
5500/L	*	1788	2396	0	108	3	20	110	250	0	4562100	0
6000/R		13219	4115	0	139	3	20	110	250	0	4562100	0
6500/L		7608	1688	0	176	3	20	110	250	0	4562100	0
7000/R	*	3098	3157	0	150	3	20	110	250	0	4562100	0
7500/L	R	3466	1487	0	172	2	20	110	250	0	4562100	0
8000/R		8933	1406	0	114	3	20	110	250	0	4562100	0
8500/L		10906	789	0	137	2	20	110	250	0	4562100	0
9000/R		3377	1347	0	96	3	20	110	250	0	4562100	0
9500/L		5071	423	0	145	2	7	110	250	0	4562100	30
10000/R		11000	711	0	97	3	20	110	250	0	4562100	0
10500/L		4749	1237	0	136	3	20	110	250	0	4562100	0
11000/R		2134	3119	0	99	3	20	110	250	0	4562100	0
11500/L	R	4935	535	0	96	3	14	110	250	0	4562100	10
12000/R		3226	300	0	97	2	2	110	250	0	4562100	60

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
12500/L		6867	543	0	206	2	18	110	250	0	4562100	0
3000/R		11693	1626	0	103	3	20	110	250	0	4562100	0
13500/L	*	2887	3869	0	337	3	20	110	250	0	4562100	0
14000/R		6962	1684	0	94	3	20	110	250	0	4562100	0
14500/L		10178	865	0	155	2	20	110	250	0	4562100	0
15000/R	*	3600	3669	0	118	3	20	110	250	0	4562100	0
15500/L		6898	605	0	196	2	20	110	250	0	4562100	0
16000/R		2049	643	0	91	3	7	110	250	0	4562100	40
16500/L	*	2184	2927	0	213	3	20	110	250	0	4562100	0
17000/R		866	886	0	63	3	3	110	250	0	4562100	75
17500/L		7510	626	0	181	2	20	110	250	0	4562100	0
18000/R		2284	1604	0	85	3	20	110	250	0	4562100	0
18500/L		10786	843	0	171	2	20	110	250	0	4562100	0
19000/R	R	1905	1459	0	91	3	20	110	250	0	4562100	0
19500/L		8212	2280	0	123	3	20	110	250	0	4562100	0
20000/R		931	881	0	79	3	5	110	250	0	4562100	55
20500/L		9452	708	0	138	2	20	110	250	0	4562100	0
21000/R		1458	2549	0	96	3	20	110	250	0	4562100	0
21500/L		1332	1606	0	150	3	20	110	250	0	4562100	0
22000/R		4444	2026	0	96	3	20	110	250	0	4562100	0
22500/L		9488	1774	0	128	3	20	110	250	0	4562100	0
23000/R	R *	2944	3000	0	126	3	20	110	250	0	4562100	0
23500/L		11335	786	0	97	3	20	110	250	0	4562100	0
24000/R		1163	2356	0	154	3	20	110	250	0	4562100	0
24500/L	*	2680	3592	0	136	3	20	110	250	0	4562100	0
25000/R		675	6628	0	199	3	20	110	250	0	4562100	0
25500/L	*	2340	3135	0	151	3	20	110	250	0	4562100	0
26000/R		891	5134	0	163	3	20	110	250	0	4562100	0
26500/L	R *	3248	4353	0	197	3	20	110	250	0	4562100	0
27000/R		4027	1262	0	229	2	20	110	250	0	4562100	0
27500/L		12708	988	0	112	3	20	110	250	0	4562100	0
28000/R		2089	3994	0	107	3	20	110	250	0	4562100	0
28500/L	*	2953	3957	0	165	3	20	110	250	0	4562100	0
29000/R		1441	2459	0	151	3	20	110	250	0	4562100	0
29500/L	*	3253	4359	0	156	3	20	110	250	0	4562100	0
30000/R		1186	6163	0	188	3	20	110	250	0	4562100	0
30500/L		5792	360	0	130	2	7	110	250	0	4562100	30
31000/R		2658	3660	0	188	3	20	110	250	0	4562100	0
31500/L	K *	2971	3981	0	146	3	20	110	250	0	4562100	0
32000/R		1313	5969	0	188	3	20	110	250	0	4562100	0
32500/L		11484	765	0	136	2	20	110	250	0	4562100	0
33000/R	34000	2570	3129	0	212	3	20	110	250	0	4562100	0
33500/L	R *	2302	3085	0	171	3	20	110	250	0	4562100	0
34000/R		2691	2338	0	174	3	20	110	250	0	4562100	0
34500/L		6258	630	0	79	3	14	110	250	0	4562100	5
35000/R		660	3178	0	173	3	20	110	250	0	4562100	0
35500/L	*	3301	4423	0	163	3	20	110	250	0	4562100	0
36000/R		3153	1180	0	160	2	20	110	250	0	4562100	0
36500/L	*	2389	3201	0	115	3	20	110	250	0	4562100	0
37000/R	*	3386	3451	0	207	3	20	110	250	0	4562100	0
37500/L		14362	1098	0	99	3	20	110	250	0	4562100	0
38000/R		949	4603	0	133	3	20	110	250	0	4562100	0
38500/L	R *	2215	2968	0	149	3	20	110	250	0	4562100	0
39000/R		2436	3893	0	145	3	20	110	250	0	4562100	0
39500/L		9177	2387	0	166	3	20	110	250	0	4562100	0
40000/R		2306	1115	0	90	3	15	110	250	0	4562100	0
40500/L	*	3607	4834	0	131	3	20	110	250	0	4562100	0
41000/R	R	2089	859	0	96	3	11	110	250	0	4562100	15
41500/L	R	12724	807	0	130	2	20	110	250	0	4562100	0
42000/R	R *	2638	2689	0	159	3	20	110	250	0	4562100	0

Point	Remarks	E1	E2	E3	Esub	Critical	Estimated	Ex.layer			Estimated	New
		MPa	Mpa	MPa	MPa	layer	life	H1	H2	H3	traffic	overlay
							years	mm	mm	mm	8.16 t	mm
42500/L	*	2423	3246	0	130	3	20	110	250	0	4562100	0
3000/R		2886	2634	0	124	3	20	110	250	0	4562100	0
43500/L		11186	771	0	93	3	20	110	250	0	4562100	0
44000/R		3394	2138	0	107	3	20	110	250	0	4562100	0
44500/L	*	4355	5837	0	287	3	20	110	250	0	4562100	0
45000/R		2460	4215	0	212	3	20	110	250	0	4562100	0
45500/L	*	2239	3000	0	212	3	20	110	250	0	4562100	0
46000/R		4493	2257	0	192	3	20	110	250	0	4562100	0
47000/R		1129	1974	0	214	3	20	110	250	0	4562100	0
47500/L	*	2239	3000	0	114	3	20	110	250	0	4562100	0
48000/L		14216	3236	0	181	3	20	110	250	0	4562100	0

ROAD EVALUATION REPORT

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Client: TACIS

Sec. no.: 0001

Link no.: 37.001

A/S PHØNIX

P. P. C

Design date: 06-11-1997

Link ref.: M4 Mea. date: 970417 2

Start at: UJAR

Surface: ASF

Calculation parameters:

Load radius	150 mm
Contact pressure	0.70 MPa
Poisson's ratio	0.35
Annual traf. growth	6.0 %
Design temperature	30 C
Design period	15 years
S. kor. factor	1.00

Signature index:

B=Block cracking	R=Rutting
A=Alligator cracking	O=No remarks
C=other cracking	S=Surface defect
P=Potholes	H=Future design
D=Deformation	X=Local def. only
Y=General defect	Z=Reconstruction area
T=Temperature taken	

* - after remarks indicates that the point has been calculated as a 2-layer system and that the thickness and E-values of 1st and 2nd layer are the same when calculating the new overlay needed in the actual point, the calculation is done for a 3-layer system

E-value of new asphalt layer < 100 mm MPa: 2000

E-value of new asphalt layer > 100 mm MPa: 3000

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
1000/R		9337	1278	0	124	3	20	110	250	0	3653100	0
1500/L		2153	2156	0	214	3	20	110	250	0	3653100	0
2000/R		2463	2026	0	98	3	20	110	250	0	3653100	0
2500/L		1100	1747	0	106	3	20	110	250	0	3653100	0
3000/R		1532	1751	0	62	3	14	110	250	0	3653100	5
3500/L		6809	793	0	99	3	20	110	250	0	3653100	0
4000/R		4021	2061	0	98	3	20	110	250	0	3653100	0
4500/L		9035	749	0	75	3	20	110	250	0	3653100	0
5000/R	R	4732	2096	0	102	3	20	110	250	0	3653100	0
5500/L		6597	1379	0	88	3	20	110	250	0	3653100	0
6000/R	*	5735	5789	0	275	3	20	110	250	0	3653100	0
6500/L		2692	2092	0	84	3	20	110	250	0	3653100	0
7000/R		6326	4005	0	138	3	20	110	250	0	3653100	0
7500/L	*	3334	4013	0	133	3	20	110	250	0	3653100	0
8000/R	*	3640	3674	0	171	3	20	110	250	0	3653100	0
8500/L	*	4754	5722	0	236	3	20	110	250	0	3653100	0
9000/R	*	2770	2796	0	82	3	20	110	250	0	3653100	0
9500/L		2824	599	0	106	2	11	110	250	0	3653100	15
10000/R	*	2324	2346	0	135	3	20	110	250	0	3653100	0
10500/L		11186	924	0	125	3	20	110	250	0	3653100	0
11000/R		1168	1061	0	93	3	12	110	250	0	3653100	15
11500/L		3074	1491	0	77	3	20	110	250	0	3653100	0
12000/R		3856	1812	0	183	3	20	110	250	0	3653100	0
12500/L		6849	2184	0	93	3	20	110	250	0	3653100	0
13000/R		994	1512	0	100	3	20	110	250	0	3653100	0
13500/L		7025	1951	0	144	3	20	110	250	0	3653100	0

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
14000/R		1487	1275	0	80	3	14	110	250	0	3653100	5
'500/L		3822	1594	0	148	3	20	110	250	0	3653100	0
.5500/L	*	3026	3642	0	205	3	20	110	250	0	3653100	0
16000/R		3670	2270	0	113	3	20	110	250	0	3653100	0
16500/L	*	2602	3132	0	126	3	20	110	250	0	3653100	0
17000/R		2746	2507	0	128	3	20	110	250	0	3653100	0
17500/L		7496	2677	0	156	3	20	110	250	0	3653100	0
18000/R		1527	5083	0	196	3	20	110	250	0	3653100	0
18500/L		5469	2264	0	183	3	20	110	250	0	3653100	0
19000/R		2349	328	0	49	3	2	110	250	0	3653100	115
19500/L		9543	916	0	169	2	20	110	250	0	3653100	0
20000/R		3596	404	0	84	2	7	110	250	0	3653100	35
20500/L	*	2492	3000	0	149	3	20	110	250	0	3653100	0
21000/R		3266	1575	0	172	3	20	110	250	0	3653100	0
21500/L		1574	1539	0	95	3	20	110	250	0	3653100	0
22000/R	R *	4443	4485	0	264	3	20	110	250	0	3653100	0
22500/L		1073	3771	0	179	3	20	110	250	0	3653100	0
23000/R		1132	409	0	76	2	2	110	250	0	3653100	85
23500/L	*	1350	1625	0	183	3	20	110	250	0	3653100	0
24000/R		2467	1001	0	83	3	15	110	250	0	3653100	0
4500/L		4674	1230	0	127	3	20	110	250	0	3653100	0
25000/R		1315	1557	0	73	3	15	110	250	0	3653100	0
25500/L		909	641	0	89	3	5	110	250	0	3653100	55
26000/R		3254	300	0	78	2	3	110	250	0	3653100	60
26500/L		1591	961	0	53	3	5	110	250	0	3653100	60
27000/R		2206	3041	0	177	3	20	110	250	0	3653100	0
27500/L		1530	385	0	61	3	2	110	250	0	3653100	100
28000/R		2830	1919	0	147	3	20	110	250	0	3653100	0
28500/L		3920	1159	0	118	3	20	110	250	0	3653100	0
29000/R		2767	3234	0	171	3	20	110	250	0	3653100	0
29500/L		4828	2508	0	176	3	20	110	250	0	3653100	0
30000/R	*	2972	3000	0	140	3	20	110	250	0	3653100	0
30500/L		3848	1873	0	139	3	20	110	250	0	3653100	0
31000/R		2928	1730	0	236	2	20	110	250	0	3653100	0
31500/L		4008	796	0	104	3	20	110	250	0	3653100	0
32000/R		4869	2769	0	164	3	20	110	250	0	3653100	0
32500/L		3715	3282	0	474	2	20	110	250	0	3653100	0
33000/R		2665	3257	0	104	3	20	110	250	0	3653100	0
33500/L		1335	1363	0	134	3	20	110	250	0	3653100	0
4000/R		2411	1396	0	125	3	20	110	250	0	3653100	0
34500/L		3134	1562	0	79	3	20	110	250	0	3653100	0
35000/R		4544	851	0	192	2	20	110	250	0	3653100	0
35500/L		1483	1496	0	96	3	20	110	250	0	3653100	0
36000/R		2358	2528	0	84	3	20	110	250	0	3653100	0
36500/L		3943	1161	0	86	3	20	110	250	0	3653100	0
37000/R	K	1662	603	0	83	3	6	110	250	0	3653100	50
37500/L		5435	1606	0	112	3	20	110	250	0	3653100	0
38000/R		2035	1574	0	98	3	20	110	250	0	3653100	0
38500/L		1820	697	0	93	3	9	110	250	0	3653100	25
39000/R		3396	1042	0	164	2	20	110	250	0	3653100	0
39500/L		3711	940	0	98	3	20	110	250	0	3653100	0
40000/R		2190	419	0	76	2	4	110	250	0	3653100	65
40500/L		1165	2720	0	118	3	20	110	250	0	3653100	0
41000/R		2859	2440	0	186	3	20	110	250	0	3653100	0
41500/L		4706	2585	0	130	3	20	110	250	0	3653100	0
42000/R		4248	521	0	83	3	11	110	250	0	3653100	15
42500/L		9975	942	0	256	2	20	110	250	0	3653100	0
43000/R		1176	416	0	83	2	2	110	250	0	3653100	75
43500/L		6410	1446	0	105	3	20	110	250	0	3653100	0
44000/R	R	4029	2294	0	180	3	20	110	250	0	3653100	0

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
44500/L	*	2616	3149	0	182	3	20	110	250	0	3653100	0
5000/R		1054	1087	0	134	3	20	110	250	0	3653100	0
45500/L	*	2173	2616	0	157	3	20	110	250	0	3653100	0
46500/L		1088	73	0	161	1	0	110	250	0	3653100	180
53500/L		1758	123	0	57	1	0	110	250	0	3653100	140
54000/R		2523	189	0	91	1	1	110	250	0	3653100	100
54500/L		4938	437	0	97	2	10	110	250	0	3653100	20
55000/R		4290	100	0	103	2	1	110	250	0	3653100	115
56000/R		942	499	0	193	2	3	110	250	0	3653100	65
56500/L		1565	724	0	157	2	10	110	250	0	3653100	20
57000/R		4559	429	0	213	2	8	110	250	0	3653100	15
57500/L		3858	1433	0	201	2	20	110	250	0	3653100	0
58000/R		960	5345	0	166	3	20	110	250	0	3653100	0
58500/L		1904	2747	0	174	3	20	110	250	0	3653100	0
59000/R		876	1749	0	191	3	20	110	250	0	3653100	0
59500/L		14935	531	0	139	2	20	110	250	0	3653100	0
60000/R		1961	634	0	137	2	9	110	250	0	3653100	25
60500/L		4710	2678	0	147	3	20	110	250	0	3653100	0
61000/R		1451	1030	0	109	3	18	110	250	0	3653100	0
61500/L		3917	354	0	258	2	5	110	250	0	3653100	35

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
13000/R		7064	3996	0	306	3	20	110	250	0	3653100	0
13500/L		6904	540	0	221	2	20	110	250	0	3653100	0
14000/R	R	3240	834	0	157	2	20	110	250	0	3653100	0
14500/L		1392	312	0	152	2	1	110	250	0	3653100	80
15000/R		1160	665	0	140	2	7	110	250	0	3653100	35
15500/L		2206	450	0	121	2	5	110	250	0	3653100	45
16000/R		2490	275	0	175	2	2	110	250	0	3653100	70
16500/L		2852	1109	0	330	2	20	110	250	0	3653100	0
17000/R		2376	293	0	124	2	2	110	250	0	3653100	65
17500/L		2217	886	0	128	2	20	110	250	0	3653100	0
18000/R		10413	831	0	106	3	20	110	250	0	3653100	0
18500/L		1821	1862	0	64	3	19	110	250	0	3653100	0
19000/R		8874	1566	0	82	3	20	110	250	0	3653100	0
19500/L		2708	1071	0	94	3	20	110	250	0	3653100	0
20000/R		14613	1301	0	104	3	20	110	250	0	3653100	0
20500/L		6202	3989	0	85	3	20	110	250	0	3653100	0
21000/R		3507	2360	0	63	3	20	110	250	0	3653100	0
22000/R		6064	3109	0	100	3	20	110	250	0	3653100	0
22500/L		6186	1348	0	78	3	20	110	250	0	3653100	0
23000/R	*	2271	2703	0	110	3	20	110	250	0	3653100	0
23500/L		14189	841	0	82	3	20	110	250	0	3653100	0
24000/R		2468	2371	0	72	3	20	110	250	0	3653100	0
25000/R	*	5071	6036	0	257	3	20	110	250	0	3653100	0
25500/L	*	2868	3414	0	112	3	20	110	250	0	3653100	0
26000/R		4726	1637	0	240	2	20	110	250	0	3653100	0
26500/L		2552	1986	0	126	3	20	110	250	0	3653100	0
27000/R		4768	147	0	646	2	1	110	250	0	3653100	80
27500/L		3455	1187	0	221	2	20	110	250	0	3653100	0
28000/R		2205	398	0	263	2	4	110	250	0	3653100	55
28500/L		4159	299	0	441	2	4	110	250	0	3653100	50
29000/R		3717	380	0	244	2	6	110	250	0	3653100	35
29500/L		1307	2716	0	154	3	20	110	250	0	3653100	0
30000/R		3424	159	0	380	2	1	110	250	0	3653100	95
30500/L		3068	381	0	176	2	5	110	250	0	3653100	40
31000/R		5199	1877	0	192	3	20	110	250	0	3653100	0
31500/L		1896	221	0	176	2	1	110	250	0	3653100	90
32000/R		4652	1698	0	496	2	20	110	250	0	3653100	0
32500/L		827	855	0	327	2	11	110	250	0	3653100	20
33000/R		5286	519	0	288	2	14	110	250	0	3653100	5
33500/L		12510	1093	0	177	2	20	110	250	0	3653100	0
34000/R		2819	1558	0	354	2	20	110	250	0	3653100	0
34500/L	R *	2633	3134	0	323	3	20	110	250	0	3653100	0
35000/R		3130	510	0	226	2	9	110	250	0	3653100	20
35500/L		1696	525	0	155	2	5	110	250	0	3653100	45
36000/R		4494	598	0	143	2	19	110	250	0	3653100	0
36500/L		5553	1934	0	319	2	20	110	250	0	3653100	0
37000/R		5967	569	0	187	2	20	110	250	0	3653100	0
37500/L		3667	306	0	186	2	3	110	250	0	3653100	55
38000/R		6381	1768	0	164	3	20	110	250	0	3653100	0
38500/L		8895	263	0	358	2	10	110	250	0	3653100	15
39000/R		4283	148	0	322	2	1	110	250	0	3653100	85
39500/L		4041	333	0	154	2	4	110	250	0	3653100	45
40000/R		4402	267	0	216	2	3	110	250	0	3653100	55
40500/L		5746	424	0	219	2	11	110	250	0	3653100	15
41000/R		3697	283	0	192	2	3	110	250	0	3653100	60
41500/L		3635	219	0	189	2	2	110	250	0	3653100	75
42000/R		2551	250	0	167	2	1	110	250	0	3653100	75
42500/L		1618	182	0	155	2	1	110	250	0	3653100	115
43000/R		3029	346	0	89	2	4	110	250	0	3653100	50

ROAD EVALUATION REPORT

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Client: TACIS

Sec. no.: 0001

Link no.: 37.001

A/S PHØNIX

P. P. C

Design date: 06-11-1997

Link ref.: M1 Mea. date: 970419 2

Start at: BY PASS GANJA

Surface: ASF

Calculation parameters:

Load radius 150 mm

Contact pressure 0.70 MPa

Poisson's ratio 0.35

Annual traf. growth 6.0 %

Design temperature 30 C

Design period 15 years

S. kor. factor 1.00

Signature index:

B=Block cracking R=Rutting

A=Alligator cracking O=No remarks

C=other cracking S=Surface defect

P=Potholes H=Future design

D=Deformation X=Local def. only

Y=General defect Z=Reconstruction area

T=Temperature taken

* - after remarks indicates that the point has been calculated as a 2-layer system and that the thickness and E-values of 1st and 2nd layer are the same when calculating the new overlay needed in the actual point, the calculation is done for a 3-layer system

E-value of new asphalt layer < 100 mm MPa: 2000

E-value of new asphalt layer > 100 mm MPa: 3000

Point	Remarks		E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
0/R	R		4077	125	0	77	2	0	80	250	0	3810300	135
500/L			3371	642	0	74	3	4	80	250	0	3810300	60
1000/R	R	*	1132	1154	0	55	3	3	80	250	0	3810300	80
1500/L		*	964	982	0	282	2	12	80	250	0	3810300	20
2000/R			13426	385	0	190	2	8	80	250	0	3810300	20
2500/L			4625	360	0	108	2	2	80	250	0	3810300	65
3000/R			7215	549	0	217	2	8	80	250	0	3810300	25
3500/L			11291	196	0	280	2	2	80	250	0	3810300	60
4000/R			10052	76	0	442	2	0	80	250	0	3810300	125
4500/L			11777	207	0	281	2	2	80	250	0	3810300	55
5000/R			6925	86	0	478	2	0	80	250	0	3810300	140
5500/L			4001	153	0	68	2	0	80	250	0	3810300	125
6000/R			8185	167	0	323	2	1	80	250	0	3810300	85
6500/L			10568	267	0	326	2	3	80	250	0	3810300	50
7000/R		*	1111	1132	0	230	2	18	80	250	0	3810300	0
7500/L	R		4621	389	0	460	2	2	80	250	0	3810300	60
8000/R			9613	149	0	395	2	1	80	250	0	3810300	85
8500/L			5269	92	0	95	2	0	80	250	0	3810300	145
9000/R			11044	321	0	324	2	4	80	250	0	3810300	40
9500/L			8455	91	0	217	2	0	80	250	0	3810300	125
10000/R			9896	110	0	312	2	0	80	250	0	3810300	105
10500/L			4014	174	0	86	2	0	80	250	0	3810300	115
11000/R			4959	163	0	223	2	0	80	250	0	3810300	110
11500/L			530	217	0	30	3	0	80	250	0	3810300	215
12000/R			9365	673	0	264	2	15	80	250	0	3810300	0
12500/L			1069	1003	0	102	3	7	80	250	0	3810300	35

ROAD EVALUATION REPORT

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Client: TACIS

Sec. no.: 0001

Link no.: 37.001

A/S PHØNIX
P. P. C

Design date: 06-11-1997

Link ref.: M1 Mea. date: 17/04/92
Start at: MINGECHEVIR
Surface: ASF

Calculation parameters:
Load radius 150 mm
Contact pressure 0.70 MPa
Poisson's ratio 0.35
Annual traf. growth 6.0 %
Design temperature 30 C
Design period 15 years
S. kor. factor 1.00

Signature index:
B=Block cracking R=Rutting
A=Alligator cracking O=No remarks
C=other cracking S=Surface defect
P=Potholes H=Future design
D=Deformation X=Local def. only
Y=General defect Z=Reconstruction area
T=Temperature taken

* - after remarks indicates that the point has been calculated as a 2-layer system and that the thickness and E-values of 1st and 2nd layer are the same when calculating the new overlay needed in the actual point, the calculation is done for a 3-layer system

E-value of new asphalt layer < 100 mm MPa: 2000
E-value of new asphalt layer > 100 mm MPa: 3000

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
0/R	*	2817	2871	0	195	3	20	110	250	0	3653100	0
500/L		1664	945	0	142	2	20	110	250	0	3653100	0
1000/R		4453	379	0	167	2	6	110	250	0	3653100	30
1500/L		1841	187	0	115	2	1	110	250	0	3653100	110
2000/R		638	76	0	55	1	0	110	250	0	3653100	185
2500/L		1347	255	0	77	2	1	110	250	0	3653100	100
3000/R		1077	122	0	86	1	0	110	250	0	3653100	145
3500/L		2036	861	0	134	2	19	110	250	0	3653100	0
4000/R		1425	3561	0	172	3	20	110	250	0	3653100	0
4500/R		704	1157	0	158	2	20	110	250	0	3653100	0
5000/R		511	555	0	168	2	3	110	250	0	3653100	65
5500/L	*	3667	3737	0	207	3	20	110	250	0	3653100	0
6000/R		2873	470	0	180	2	7	110	250	0	3653100	30
6500/L		2581	2117	0	141	3	20	110	250	0	3653100	0
7000/R	K	1393	220	0	163	2	1	110	250	0	3653100	100
7500/L		804	151	0	143	2	0	110	250	0	3653100	140
8000/R	*	1430	1457	0	207	2	20	110	250	0	3653100	0
8500/L		1415	324	0	257	2	1	110	250	0	3653100	80
9000/R	R	2655	290	0	199	2	2	110	250	0	3653100	65
9500/L		1365	635	0	238	2	7	110	250	0	3653100	35
10000/R		1951	1133	0	162	2	20	110	250	0	3653100	0
10500/L		3611	375	0	265	2	6	110	250	0	3653100	35
11000/R		1164	369	0	211	2	2	110	250	0	3653100	80
11500/L		1272	613	0	100	2	6	110	250	0	3653100	40
12000/R		1430	486	0	196	2	4	110	250	0	3653100	55
12500/L		1158	1721	0	171	3	20	110	250	0	3653100	0

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
13000/R		4684	322	0	110	2	2	80	250	0	3810300	80
`500/L		3755	272	0	263	2	1	80	250	0	3810300	100
▲4000/R		3226	300	0	183	2	1	80	250	0	3810300	90
14500/L		4462	1037	0	183	2	20	80	250	0	3810300	0
15000/R		7528	267	0	235	2	2	80	250	0	3810300	70
15500/L	K	3490	82	0	122	2	0	80	250	0	3810300	170
16000/R		602	2252	0	166	3	20	80	250	0	3810300	0
16500/L		4382	243	0	152	2	1	80	250	0	3810300	100
17000/R	*	774	789	0	597	2	6	80	250	0	3810300	50
17500/L		876	1486	0	488	2	20	80	250	0	3810300	0
18000/R		1839	102	0	86	1	0	80	250	0	3810300	170
18500/L		9708	195	0	306	2	1	80	250	0	3810300	70
19000/R		4817	475	0	115	2	4	80	250	0	3810300	45
19500/L	*	691	691	0	400	2	4	80	250	0	3810300	65
20000/R		4061	20	0	285	2	0	80	250	0	3810300	275
20500/L		5362	72	0	316	2	0	80	250	0	3810300	160
21000/R		11208	126	0	164	2	1	80	250	0	3810300	85
21500/L	R	9148	297	0	174	2	3	80	250	0	3810300	55
22000/R		4598	69	0	239	2	0	80	250	0	3810300	170
22500/L		5967	92	0	266	2	0	80	250	0	3810300	140
3000/R	*	1662	1662	0	156	3	20	80	250	0	3810300	0
23500/L		10013	176	0	200	2	1	80	250	0	3810300	75
24000/R		6017	157	0	152	2	0	80	250	0	3810300	105
24500/L		6931	104	0	194	2	0	80	250	0	3810300	125
25000/R		7003	115	0	256	2	0	80	250	0	3810300	120
25500/L		13700	114	0	263	2	1	80	250	0	3810300	80
26000/R		11573	59	0	241	2	0	80	250	0	3810300	135
26500/L		8190	76	0	242	2	0	80	250	0	3810300	135
27000/R		11552	314	0	226	2	4	80	250	0	3810300	40
27500/L		6861	359	0	139	2	3	80	250	0	3810300	55
28000/R	*	790	790	0	164	2	6	80	250	0	3810300	50
28500/L	R	8480	201	0	198	2	1	80	250	0	3810300	75
29000/R	*	598	598	0	222	2	2	80	250	0	3810300	80
29500/L	R	6551	115	0	177	2	0	80	250	0	3810300	120
30000/R		10295	175	0	211	2	1	80	250	0	3810300	70
30500/L		9576	183	0	146	2	1	80	250	0	3810300	75
31000/R	*	1020	1020	0	138	3	12	80	250	0	3810300	15
31500/L	*	859	859	0	107	3	5	80	250	0	3810300	45
32000/R	*	1170	1170	0	129	3	14	80	250	0	3810300	5
12500/L	R	5388	425	0	106	2	3	80	250	0	3810300	50
33000/R		4703	142	0	118	2	0	80	250	0	3810300	125
33500/L		7132	156	0	138	2	1	80	250	0	3810300	100
34000/R		3609	239	0	124	2	1	80	250	0	3810300	105
34500/L		9016	65	0	208	2	0	80	250	0	3810300	145
35000/R		7071	83	0	145	2	0	80	250	0	3810300	140

ROAD EVALUATION REPORT

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Client: TACIS

Sec. no.: 0001

Link no.: 37.001

A/S PHØNIX
P. P. C

Design date: 06-11-1997

Link ref.: M1 Mea. date: 1849 2
Start at: GANJA (BYPASS)
Surface: ASF

Calculation parameters:

Load radius	150 mm
Contact pressure	0.70 MPa
Poisson's ratio	0.35
Annual traf. growth	6.0 %
Design temperature	30 C
Design period	15 years
S. kor. factor	1.00

Signature index:

B=Block cracking	R=Rutting
A=Alligator cracking	O=No remarks
C=other cracking	S=Surface defect
P=Potholes	H=Future design
D=Deformation	X=Local def. only
Y=General defect	Z=Reconstruction area
T=Temperature taken	

* - after remarks indicates that the point has been calculated as a 2-layer system and that the thickness and E-values of 1st and 2nd layer are the same when calculating the new overlay needed in the actual point, the calculation is done for a 3-layer system

E-value of new asphalt layer < 100 mm MPa: 2000
E-value of new asphalt layer > 100 mm MPa: 3000

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
0/R		14669	2085	0	104	3	20	80	250	0	3810300	0
1000/R		906	3295	0	152	3	20	80	250	0	3810300	0
2000/R		7042	340	0	233	2	3	80	250	0	3810300	60
3000/R	*	987	1025	0	371	2	13	80	250	0	3810300	15
3500/L		12450	69	0	208	2	0	80	250	0	3810300	120
4000/R	*	2277	2366	0	191	3	20	80	250	0	3810300	0
4500/L	*	593	871	0	174	2	7	80	250	0	3810300	45
5000/R		4198	243	0	456	2	1	80	250	0	3810300	100
5500/L	*	556	817	0	211	2	6	80	250	0	3810300	50
6000/R		2433	626	0	99	2	5	80	250	0	3810300	50
6500/L		12209	164	0	361	2	2	80	250	0	3810300	65
7000/R		6667	518	0	113	2	6	80	250	0	3810300	35
7500/L	*	923	1356	0	163	3	20	80	250	0	3810300	0
8000/R	*	780	810	0	98	3	4	80	250	0	3810300	60
8500/L	*	325	478	0	242	2	1	80	250	0	3810300	100
9000/R		686	2129	0	100	3	18	80	250	0	3810300	0
9500/L		3467	1139	0	127	3	20	80	250	0	3810300	0
10000/R		5703	1417	0	168	2	20	80	250	0	3810300	0
10500/L	*	601	883	0	275	2	8	80	250	0	3810300	40
11000/R		9833	1735	0	163	3	20	80	250	0	3810300	0
11500/L	*	1138	1673	0	163	3	20	80	250	0	3810300	0
12000/R		4183	323	0	113	2	1	80	250	0	3810300	75
12500/L		11649	525	0	111	2	12	80	250	0	3810300	10
13000/R		12545	905	0	91	3	20	80	250	0	3810300	0
13500/L		11707	1069	0	146	2	20	80	250	0	3810300	0
14000/R		13786	972	0	88	3	20	80	250	0	3810300	0

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
14500/L	*	2244	3298	0	192	3	20	80	250	0	3810300	0
5000/R		1553	1273	0	67	3	6	80	250	0	3810300	50
15500/L	*	1068	1570	0	249	2	20	80	250	0	3810300	0
16000/R	*	1312	1363	0	110	3	14	80	250	0	3810300	5
17000/R		4466	127	0	141	2	0	80	250	0	3810300	130
17500/L	*	608	894	0	76	3	3	80	250	0	3810300	80
18000/R		885	921	0	169	2	9	80	250	0	3810300	30
18500/L	*	1659	2438	0	99	3	20	80	250	0	3810300	0
19000/R	*	415	432	0	95	2	1	80	250	0	3810300	105
19500/L	R *	1489	2188	0	103	3	20	80	250	0	3810300	0
20000/R	*	1607	1669	0	101	3	18	80	250	0	3810300	0
20500/L		5470	2226	0	151	3	20	80	250	0	3810300	0
21000/R	*	522	542	0	79	3	1	80	250	0	3810300	105
22000/R	*	1531	1591	0	122	3	20	80	250	0	3810300	0
22500/L	*	1092	1605	0	89	3	11	80	250	0	3810300	20
23500/L	*	1921	2823	0	191	3	20	80	250	0	3810300	0
24000/R		3927	354	0	49	3	1	80	250	0	3810300	120
24500/L	*	1815	2668	0	75	3	20	80	250	0	3810300	0
25000/R	*	736	765	0	102	3	4	80	250	0	3810300	60
25500/L	*	1600	2352	0	129	3	20	80	250	0	3810300	0
5000/R	*	1034	1075	0	76	3	5	80	250	0	3810300	60
26500/L		4604	299	0	157	2	1	80	250	0	3810300	85
27000/R	*	1208	1256	0	92	3	8	80	250	0	3810300	30
27500/L	*	2261	3323	0	125	3	20	80	250	0	3810300	0
28000/R		6459	494	0	86	2	5	80	250	0	3810300	40
28500/L		14069	726	0	157	2	20	80	250	0	3810300	0
29000/R	*	508	528	0	157	2	2	80	250	0	3810300	90
29500/L	*	2248	3305	0	207	3	20	80	250	0	3810300	0
30000/R		7741	573	0	101	2	9	80	250	0	3810300	20
30500/L	*	1951	2867	0	87	3	20	80	250	0	3810300	0
31000/R	*	1065	1107	0	82	3	6	80	250	0	3810300	50
31500/L		9622	608	0	70	3	8	80	250	0	3810300	30
32000/R		5212	1955	0	65	3	20	80	250	0	3810300	0
32500/L		3836	1641	0	55	3	10	80	250	0	3810300	20
33000/R	*	978	1016	0	88	3	5	80	250	0	3810300	50
33500/L	K-R	11624	1025	0	82	3	20	80	250	0	3810300	0
34000/R	*	2887	3000	0	129	3	20	80	250	0	3810300	0
34500/L		162	14204	0	70	3	20	80	250	0	3810300	0
35000/R		1305	1611	0	85	3	11	80	250	0	3810300	15
35500/L	*	1556	2287	0	130	3	20	80	250	0	3810300	0
36000/R	*	822	854	0	66	3	2	80	250	0	3810300	90
36500/L	*	935	1375	0	275	2	20	80	250	0	3810300	0
37000/R		11046	316	0	116	2	4	80	250	0	3810300	40
37500/L	*	1074	1578	0	130	3	20	80	250	0	3810300	0
38000/R	*	1291	1341	0	83	3	8	80	250	0	3810300	35
38500/L	*	676	994	0	163	2	11	80	250	0	3810300	25
39000/R		5716	974	0	195	2	20	80	250	0	3810300	0
39500/L		183	13424	0	91	3	20	80	250	0	3810300	0
40000/R		6779	211	0	93	2	1	80	250	0	3810300	85
40500/L		8224	2338	0	132	3	20	80	250	0	3810300	0
41000/R		818	2030	0	70	3	9	80	250	0	3810300	25
42000/R		4343	1085	0	68	3	9	80	250	0	3810300	30
42500/L		437	9706	0	83	3	20	80	250	0	3810300	0
43000/R		1271	745	0	90	3	4	80	250	0	3810300	60
43500/L		905	239	0	56	2	0	80	250	0	3810300	160
44000/R	*	4137	4298	0	132	3	20	80	250	0	3810300	0
44500/L		2807	1242	0	98	3	15	80	250	0	3810300	0
45000/R		4560	399	0	56	3	2	80	250	0	3810300	105
46000/R		1255	1757	0	61	3	7	80	250	0	3810300	40
46500/L		140	4517	0	69	3	20	80	250	0	3810300	0

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
47000/R	*	3721	3866	0	112	3	20	80	250	0	3810300	0
48000/R		7855	744	0	74	3	10	80	250	0	3810300	20
48500/L	*	634	931	0	161	2	9	80	250	0	3810300	35
49000/R		5504	169	0	152	2	1	80	250	0	3810300	105
49500/L	*	1588	2334	0	105	3	20	80	250	0	3810300	0
50000/R		12226	627	0	78	3	14	80	250	0	3810300	5
50500/L	*	2238	3289	0	131	3	20	80	250	0	3810300	0
51000/R	*	2468	3039	0	146	3	20	80	250	0	3810300	0
51500/L	*	1959	2879	0	93	3	20	80	250	0	3810300	0
52000/R	*	514	633	0	101	3	2	80	250	0	3810300	75
53000/R		3849	1402	0	131	3	20	80	250	0	3810300	0
53500/L	*	3085	4535	0	134	3	20	80	250	0	3810300	0
54000/R	*	1632	2010	0	104	3	20	80	250	0	3810300	0
54500/L	*	1734	2548	0	149	3	20	80	250	0	3810300	0
55000/R		3009	365	0	223	2	1	80	250	0	3810300	80
56000/R		917	689	0	196	2	4	80	250	0	3810300	65
56500/L	*	349	513	0	89	3	1	80	250	0	3810300	100
57000/R	*	847	1044	0	73	3	4	80	250	0	3810300	70
57500/L	*	2805	4123	0	122	3	20	80	250	0	3810300	0
58500/L	*	440	646	0	148	2	3	80	250	0	3810300	75
59000/R	*	236	290	0	102	2	0	80	250	0	3810300	130
59500/L		6108	2752	0	132	3	20	80	250	0	3810300	0
60500/L	*	2372	3486	0	102	3	20	80	250	0	3810300	0
61000/R	*	299	368	0	129	2	0	80	250	0	3810300	115
61500/L	*	2272	3340	0	223	3	20	80	250	0	3810300	0
62000/R	*	1035	1275	0	105	3	10	80	250	0	3810300	20
62500/L	*	1716	2522	0	142	3	20	80	250	0	3810300	0
63000/R		6106	317	0	59	2	2	80	250	0	3810300	95
63500/L	*	1844	2710	0	139	3	20	80	250	0	3810300	0
64000/R	*	771	949	0	114	3	7	80	250	0	3810300	35
64500/L		7681	338	0	152	2	3	80	250	0	3810300	55
65000/R	*	635	781	0	110	3	4	80	250	0	3810300	55
65500/L		3382	186	0	66	2	0	80	250	0	3810300	130
66000/R	*	842	1036	0	78	3	4	80	250	0	3810300	65
66500/L		11429	1884	0	98	3	20	80	250	0	3810300	0
67000/R	*	467	575	0	128	2	2	80	250	0	3810300	85
67500/L		2333	1235	0	98	3	13	80	250	0	3810300	10
68000/R		14833	48	0	252	2	0	80	250	0	3810300	135
68500/L	*	429	516	0	128	2	1	80	250	0	3810300	95
69000/R	*	459	565	0	112	2	2	80	250	0	3810300	85
69500/L		2126	927	0	164	2	12	80	250	0	3810300	15
70000/R	*	1750	2155	0	122	3	20	80	250	0	3810300	0
70500/L	*	264	317	0	173	2	0	80	250	0	3810300	125
71000/R		14805	175	0	108	2	2	80	250	0	3810300	50
71500/L	*	616	742	0	114	3	4	80	250	0	3810300	60
72000/R		2149	2274	0	80	3	20	80	250	0	3810300	0
72500/L	*	659	794	0	95	3	3	80	250	0	3810300	65
73000/R	K *	1138	1401	0	106	3	13	80	250	0	3810300	10
73500/L	*	601	723	0	94	3	3	80	250	0	3810300	75
74000/R	*	1019	1255	0	153	3	20	80	250	0	3810300	0
74500/L	*	1592	1917	0	158	3	20	80	250	0	3810300	0
75000/R	*	372	458	0	112	2	1	80	250	0	3810300	105
75500/L		5196	240	0	114	2	1	80	250	0	3810300	90
76000/R	R *	1432	1764	0	102	3	20	80	250	0	3810300	0
76500/L		13732	205	0	99	2	3	80	250	0	3810300	50
77000/R	*	355	438	0	70	3	1	80	250	0	3810300	125
77500/L		12179	21	0	71	2	0	80	250	0	3810300	200
78000/R	*	1817	2238	0	114	3	20	80	250	0	3810300	0
78500/L	*	1294	1557	0	142	3	20	80	250	0	3810300	0
79000/R		7078	1713	0	86	3	20	80	250	0	3810300	0

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
80000/R		760	31	0	99	1	0	80	250	0	3810300	270
)500/L	*	1444	1738	0	74	3	11	80	250	0	3810300	20

ROAD EVALUATION REPORT

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Client: TACIS

Sec. no.: 0001

Link no.: 37.001

A/S PHØNIX
P. P. C

Design date: 06-11-1997

Link ref.: M1 Mea. date: 2049 2
Start at: BORDER
Surface: ASF

Calculation parameters:

Load radius	150 mm
Contact pressure	0.70 MPa
Poisson's ratio	0.35
Annual traf. growth	6.0 %
Design temperature	30 C
Design period	15 years
S. kor. factor	1.00

Signature index:

B=Block cracking	R=Rutting
A=Alligator cracking	O=No remarks
C=other cracking	S=Surface defect
P=Potholes	H=Future design
D=Deformation	X=Local def. only
Y=General defect	Z=Reconstruction area
T=Temperature taken	

* - after remarks indicates that the point has been calculated as a 2-layer system and that the thickness and E-values of 1st and 2nd layer are the same when calculating the new overlay needed in the actual point, the calculation is done for a 3-layer system

E-value of new asphalt layer < 100 mm MPa: 2000
E-value of new asphalt layer > 100 mm MPa: 3000

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
500/L	*	407	502	0	80	3	1	80	250	0	3428000	105
1000/R	*	509	815	0	105	3	4	80	250	0	3428000	55
1500/L		6782	391	0	137	2	4	80	250	0	3428000	50
2000/R		580	4582	0	193	3	20	80	250	0	3428000	0
2500/L		13597	722	0	77	3	18	80	250	0	3428000	0
3000/R	*	992	1590	0	106	3	16	80	250	0	3428000	0
3500/L	*	700	862	0	73	3	3	80	250	0	3428000	80
4000/R	*	1698	2722	0	96	3	20	80	250	0	3428000	0
4500/L	*	751	925	0	100	3	6	80	250	0	3428000	45
5000/R		12025	3485	0	209	3	20	80	250	0	3428000	0
5500/L	*	1273	1568	0	112	3	20	80	250	0	3428000	0
6000/R	*	182	292	0	187	2	0	80	250	0	3428000	125
6500/L	*	883	1087	0	69	3	4	80	250	0	3428000	65
7000/R		3203	679	0	188	2	7	80	250	0	3428000	30
7500/L	*	610	751	0	115	3	5	80	250	0	3428000	55
8000/R		9780	463	0	82	2	8	80	250	0	3428000	20
8500/L		13710	319	0	73	2	6	80	250	0	3428000	30
9000/R		7521	682	0	64	3	8	80	250	0	3428000	35
9500/L	*	1593	1962	0	139	3	20	80	250	0	3428000	0
10000/R		5557	596	0	144	2	8	80	250	0	3428000	25
10500/L	*	852	1050	0	173	2	16	80	250	0	3428000	0
11000/R		7651	186	0	109	2	1	80	250	0	3428000	80
11500/L		14772	1136	0	142	2	20	80	250	0	3428000	0
12000/R	*	1822	2920	0	171	3	20	80	250	0	3428000	0
12500/L		5365	299	0	46	3	1	80	250	0	3428000	115
13000/R	*	967	1550	0	98	3	13	80	250	0	3428000	10

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
13500/L	*	520	640	0	186	2	3	80	250	0	3428000	70
14000/R	*	607	972	0	181	2	12	80	250	0	3428000	25
14500/L	*	780	960	0	175	2	12	80	250	0	3428000	20
15000/R	*	747	1196	0	231	2	20	80	250	0	3428000	0
15500/L	*	528	650	0	127	2	3	80	250	0	3428000	70
16000/R		592	2144	0	247	3	20	80	250	0	3428000	0
16500/L	*	872	1074	0	192	2	17	80	250	0	3428000	0
17000/R		6505	466	0	188	2	5	80	250	0	3428000	40
17500/L		10893	307	0	93	2	4	80	250	0	3428000	40
18500/L		8366	248	0	88	2	2	80	250	0	3428000	65
19000/R	*	714	1144	0	105	3	8	80	250	0	3428000	30
19500/L	*	1093	1346	0	148	3	20	80	250	0	3428000	0
20000/R	*	387	620	0	92	3	2	80	250	0	3428000	80
20500/L	*	1806	2224	0	202	3	20	80	250	0	3428000	0
21000/R	*	498	799	0	99	3	4	80	250	0	3428000	60
21500/L		1926	50	0	36	1	0	80	250	0	3428000	220
22000/R		7677	1518	0	140	3	20	80	250	0	3428000	0
22500/L	*	259	319	0	96	2	0	80	250	0	3428000	120
23000/R	*	654	1048	0	165	2	15	80	250	0	3428000	5
23500/L	*	1402	1727	0	170	3	20	80	250	0	3428000	0
24000/R	*	1558	2496	0	109	3	20	80	250	0	3428000	0
24500/L	*	2682	3303	0	192	3	20	80	250	0	3428000	0
25000/R		13890	842	0	109	3	20	80	250	0	3428000	0
25500/L		6366	199	0	93	2	1	80	250	0	3428000	85
26000/R		891	1299	0	360	2	20	80	250	0	3428000	0
26500/L		8548	343	0	213	2	4	80	250	0	3428000	45
27000/R		10269	813	0	165	2	20	80	250	0	3428000	0
27500/L	*	681	839	0	175	2	8	80	250	0	3428000	40
28000/R	*	412	661	0	114	2	3	80	250	0	3428000	70
28500/L		9999	526	0	104	2	11	80	250	0	3428000	15
29000/R		4800	558	0	125	2	6	80	250	0	3428000	30
29500/L	*	658	811	0	78	3	3	80	250	0	3428000	75
30000/R	*	418	671	0	263	2	4	80	250	0	3428000	70
30500/L	*	843	1039	0	103	3	7	80	250	0	3428000	35
31000/R		8842	78	0	90	2	0	80	250	0	3428000	130
31500/L	*	915	1127	0	141	3	15	80	250	0	3428000	0
32000/R	*	614	927	0	154	2	10	80	250	0	3428000	30
32500/L		6529	1358	0	103	3	20	80	250	0	3428000	0
33000/R		5558	681	0	132	2	11	80	250	0	3428000	15
33500/L	*	1353	1666	0	150	3	20	80	250	0	3428000	0
34000/R	*	857	1295	0	144	3	20	80	250	0	3428000	0
34500/L		308	10893	0	140	3	20	80	250	0	3428000	0
35000/R	*	1724	2606	0	208	3	20	80	250	0	3428000	0
35500/L	*	3177	3912	0	132	3	20	80	250	0	3428000	0
36000/R	*	2384	3603	0	89	3	20	80	250	0	3428000	0
36500/L	*	1143	1408	0	62	3	6	80	250	0	3428000	50
37000/R		7763	1535	0	141	3	20	80	250	0	3428000	0
37500/L		3970	421	0	68	2	3	80	250	0	3428000	80
38000/R	*	1230	1859	0	111	3	20	80	250	0	3428000	0
38500/L	*	5015	6176	0	234	3	20	80	250	0	3428000	0
39000/R		2781	89	0	116	1	0	80	250	0	3428000	170
39500/L		7832	358	0	100	2	4	80	250	0	3428000	45
40000/R		7800	636	0	90	2	13	80	250	0	3428000	10
40500/L	*	1365	1681	0	226	3	20	80	250	0	3428000	0
41000/R	*	864	1306	0	80	3	7	80	250	0	3428000	40
41500/L		6338	1006	0	162	2	20	80	250	0	3428000	0
42000/R	*	1349	2040	0	160	3	20	80	250	0	3428000	0
42500/L	*	593	730	0	79	3	2	80	250	0	3428000	80
43500/L	*	1005	1237	0	78	3	7	80	250	0	3428000	40
44000/R		14359	769	0	184	2	20	80	250	0	3428000	0

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
44500/L	*	826	1017	0	254	2	14	80	250	0	3428000	10
5000/R	*	2260	3417	0	482	3	20	80	250	0	3428000	0
.6000/R		8077	578	0	294	2	10	80	250	0	3428000	15

ALYAT-GEORGIAN BORDER ROAD: BEARING CAPACITY RESULTS pr. POINT 1997

SECTION NO. 1 ALYAT TO GAZI-MAMMAD

chainage/lane	remarks	E1	E2	E subg.	Cr.layer	est.life	H1	H2	est.traffic	overlay	SNSG	a(l)*h(l)	a(l)*h(l)	SNC	A(l)*H(l)	SNC
[m]		[Mpa]	[Mpa]	[Mpa]		[Years]	[mm]	[mm]	[S. A.]	[mm]		E1	E2	before str.	str. layer	after str.
0/R	*	4534	4903	245	3	20	110	250	4405000	0	2,12	49,50	35,00	5,45	0,00	5,45
500/L		2371	177	66	1	0	110	250	4405000	120	1,03	43,24	20,69	3,55	52,20	5,61
1000/R	*	6767	7317	353	3	20	110	250	4405000	0	2,19	49,50	35,00	5,52	0,00	5,52
1500/L		10421	171	114	2	6	110	250	4405000	30	1,65	49,50	19,96	4,39	13,05	4,90
2000/		1974	1514	119	3	20	110	250	4405000	0	1,69	39,65	35,00	4,63	0,00	4,63
2500/L		7218	604	66	3	12	110	250	4405000	10	1,03	49,50	35,00	4,36	4,35	4,53
3000/R		10150	634	91	3	20	110	250	4405000	0	1,42	49,50	35,00	4,75	0,00	4,75
3500/L	K *	1371	1728	133	3	20	110	250	4405000	0	1,78	32,50	35,00	4,44	0,00	4,44
4000/R		7786	644	109	2	20	110	250	4405000	0	1,61	49,50	35,00	4,94	0,00	4,94
4500/L		5741	512	76	3	10	110	250	4405000	20	1,21	49,50	35,00	4,54	8,70	4,88
5000/R	*	3605	3898	198	3	20	110	250	4405000	0	2,04	49,50	35,00	5,37	0,00	5,37
5500/L		2352	783	84	3	9	110	250	4405000	30	1,33	43,08	35,00	4,41	13,05	4,92
6000/R		5946	237	97	2	4	110	250	4405000	50	1,49	49,50	26,85	4,50	21,75	5,36
6500/L	K *	2354	2968	100	3	20	110	250	4405000	0	1,52	43,10	35,00	4,60	0,00	4,60
7000/R		5124	77	91	2	0	110	250	4405000	130	1,42	49,50	3,13	3,50	56,55	5,72
7500/L		7685	1590	114	3	20	110	250	4405000	0	1,65	49,50	35,00	4,98	0,00	4,98
8000/R	*	4158	4496	224	3	20	110	250	4405000	0	2,09	49,50	35,00	5,42	0,00	5,42
8500/L		11771	653	93	3	20	110	250	4405000	0	1,45	49,50	35,00	4,77	0,00	4,77
9000/R	*	1447	1564	86	3	17	110	250	4405000	0	1,36	33,56	35,00	4,06	0,00	4,06
9500/L		9505	2985	166	3	20	110	250	4405000	0	1,94	49,50	35,00	5,27	0,00	5,27
10000/R	*	4016	4342	190	3	20	110	250	4405000	0	2,02	49,50	35,00	5,35	0,00	5,35
10500/L	*	2355	2969	123	3	20	110	250	4405000	0	1,72	43,11	35,00	4,79	0,00	4,79
11000/R		11189	846	103	3	20	110	250	4405000	0	1,55	49,50	35,00	4,88	0,00	4,88
11500/L	*	2380	3000	158	3	20	110	250	4405000	0	1,91	43,32	35,00	4,99	0,00	4,99
12000/R	*	3406	3683	177	3	20	110	250	4405000	0	1,98	49,50	35,00	5,31	0,00	5,31
12500/L		11772	862	116	3	20	110	250	4405000	0	1,66	49,50	35,00	4,99	0,00	4,99
13000/R	*	3182	3441	147	3	20	110	250	4405000	0	1,86	49,01	35,00	5,17	0,00	5,17
13500/L	*	4603	4518	189	3	20	110	250	4405000	0	2,01	49,50	35,00	5,34	0,00	5,34
14000/R	*	3209	3470	145	3	20	110	250	4405000	0	1,85	49,17	35,00	5,16	0,00	5,16

14500/L	*	3358	3296	162	3	20	110	250	4405000	0	1,92	49,50	35,00	5,25	0,00	5,25
15000/R	*	2665	2882	106	3	20	110	250	4405000	0	1,58	45,53	35,00	4,75	0,00	4,75
15500/L	*	5052	4959	264	3	20	110	250	4405000	0	2,15	49,50	35,00	5,48	0,00	5,48
16000/R	*	2113	2285	72	3	20	110	250	4405000	0	1,14	40,98	35,00	4,14	0,00	4,14
16500/L		9751	243	55	3	5	110	250	4405000	45	0,77	49,50	27,38	3,80	19,58	4,57
17000/R		1036	427	66	3	1	110	250	4405000	105	1,03	27,01	35,00	3,47	45,68	5,27
17500/L		14735	980	94	3	20	110	250	4405000	0	1,46	49,50	35,00	4,79	0,00	4,79
18000/R	*	2774	3000	103	3	20	110	250	4405000	0	1,55	46,32	35,00	4,76	0,00	4,76
18500/L		12202	538	107	2	20	110	250	4405000	0	1,59	49,50	35,00	4,92	0,00	4,92
19000/R		14789	1115	97	3	20	110	250	4405000	0	1,49	49,50	35,00	4,82	0,00	4,82
19500/L	*	2371	2327	102	3	20	110	250	4405000	0	1,54	43,24	35,00	4,62	0,00	4,62
20000/R	*	4833	5226	174	3	20	110	250	4405000	0	1,97	49,50	35,00	5,30	0,00	5,30
20500/L	*	2593	2545	83	3	20	110	250	4405000	0	1,32	45,00	35,00	4,47	0,00	4,47
21000/R	*	2851	3083	145	3	20	110	250	4405000	0	1,85	46,86	35,00	5,07	0,00	5,07
21500/L	*	1958	1921	109	3	20	110	250	4405000	0	1,61	39,49	35,00	4,54	0,00	4,54
22000/R		14048	1092	102	3	20	110	250	4405000	0	1,54	49,50	35,00	4,87	0,00	4,87
22500/L		12002	915	94	3	20	110	250	4405000	0	1,46	49,50	35,00	4,79	0,00	4,79
23000/R	*	3666	3965	135	3	20	110	250	4405000	0	1,79	49,50	35,00	5,12	0,00	5,12
23500/L	*	3779	3709	120	3	20	110	250	4405000	0	1,70	49,50	35,00	5,02	0,00	5,02
24000/R		11687	792	115	3	20	110	250	4405000	0	1,66	49,50	35,00	4,99	0,00	4,99
24500/L		14158	3582	127	3	20	110	250	4405000	0	1,74	49,50	35,00	5,07	0,00	5,07
25000/R	*	4749	5135	185	3	20	110	250	4405000	0	2,00	49,50	35,00	5,33	0,00	5,33
25500/L	*	3300	3239	123	3	20	110	250	4405000	0	1,72	49,50	35,00	5,05	0,00	5,05
26000/R	*	5988	6475	206	3	20	110	250	4405000	0	2,06	49,50	35,00	5,39	0,00	5,39
26500/L	*	2089	2050	89	3	20	110	250	4405000	0	1,40	40,76	35,00	4,38	0,00	4,38
27000/R		10867	1099	96	3	20	110	250	4405000	0	1,48	49,50	35,00	4,81	0,00	4,81
27500/L		6002	775	91	3	20	110	250	4405000	0	1,42	49,50	35,00	4,75	0,00	4,75
28000/R	*	4412	4770	178	3	20	110	250	4405000	0	1,98	49,50	35,00	5,31	0,00	5,31
28500/L		2287	639	95	3	9	110	250	4405000	30	1,47	42,53	35,00	4,52	13,05	5,04
29000/R		4344	2141	119	3	20	110	250	4405000	0	1,69	49,50	35,00	5,02	0,00	5,02
29500/L		2211	2216	151	3	20	110	250	4405000	0	1,88	41,87	35,00	4,91	0,00	4,91
30000/R	*	5428	5869	187	3	20	110	250	4405000	0	2,01	49,50	35,00	5,34	0,00	5,34
30500/L		14725	439	75	3	20	110	250	4405000	0	1,20	49,50	35,00	4,52	0,00	4,52
31000/R		8447	693	89	3	20	110	250	4405000	0	1,40	49,50	35,00	4,73	0,00	4,73
31500/L		7250	534	73	3	13	110	250	4405000	10	1,16	49,50	35,00	4,49	4,35	4,66
32000/R	*	3246	3510	150	3	20	110	250	4405000	0	1,87	49,40	35,00	5,20	0,00	5,20

915

32500/L		9860	4013	210	3	20	110	250	4405000	0	2,07	49,50	35,00	5,39	0,00	5,39
33000/R		14795	883	179	2	20	110	250	4405000	0	1,98	49,50	35,00	5,31	0,00	5,31
33500/L	*	1926	1890	144	3	20	110	250	4405000	0	1,84	39,17	35,00	4,76	0,00	4,76
34000/R		933	6007	307	3	20	110	250	4405000	0	2,18	24,96	35,00	4,54	0,00	4,54
34500/L	*	2754	2703	179	3	20	110	250	4405000	0	1,98	46,18	35,00	5,18	0,00	5,18
35000/R		5452	310	113	2	5	110	250	4405000	40	1,64	49,50	32,52	4,87	17,40	5,56
35500/L		8552	536	100	2	20	110	250	4405000	0	1,52	49,50	35,00	4,85	0,00	4,85
36000/R		4691	33	112	2	0	110	250	4405000	195	1,63	49,50	-14,75	3,00	84,83	6,34
36500/L		9577	794	138	2	20	110	250	4405000	0	1,81	49,50	35,00	5,14	0,00	5,14
37500/L		4114	166	108	2	1	110	250	4405000	90	1,60	49,50	19,34	4,31	39,15	5,85
38000/R		13522	1052	174	2	20	110	250	4405000	0	1,97	49,50	35,00	5,30	0,00	5,30
38500/L		14906	893	156	2	20	110	250	4405000	0	1,90	49,50	35,00	5,23	0,00	5,23
39000/R	*	2424	2424	210	3	20	110	250	4405000	0	2,07	43,67	35,00	5,17	0,00	5,17
39500/L	*	2644	2596	138	3	20	110	250	4405000	0	1,81	45,38	35,00	4,98	0,00	4,98
40000/R		7724	185	227	2	4	110	250	4405000	45	2,10	49,50	21,62	4,90	19,58	5,67
40500/L		6073	2751	240	3	20	110	250	4405000	0	2,12	49,50	35,00	5,45	0,00	5,45
41000/R		5025	750	128	2	20	110	250	4405000	0	1,75	49,50	35,00	5,08	0,00	5,08
41500/L		3021	54	113	2	0	110	250	4405000	180	1,64	47,99	-4,36	3,36	78,31	6,45
42000/R		3530	152	79	1	1	110	250	4405000	100	1,26	49,50	17,48	3,90	43,50	5,61

ALYAT-GEORGIAN BORDER ROAD: BEARING CAPACITY RESULTS pr. POINT 1997

SECTION NO. 2 GAZI-MAMMAD TO KURDAMIR

chainage/lane	remarks	E1	E2	E subg.	Cr.layer	est.life	H1	H2	est.traffic	overlay	SNSG	a(I)*h(I)	a(I)*h(I)	SNC	A(I)*H(I)	SNC
[m]		[Mpa]	[Mpa]	[Mpa]		[Years]	[mm]	[mm]	[S. A.]	[mm]		E1	E2	before str.	str. layer	after str.
0/R		9554	449	127	2	20	110	250	4405000	0	1,74	49,50	35,00	5,07	0,00	5,07
500/L		6143	450	128	2	11	110	250	4405000	15	1,75	49,50	35,00	5,08	6,53	5,34
1000/R		14059	710	150	2	20	110	250	4405000	0	1,87	49,50	35,00	5,20	0,00	5,20
1500/L	*	3000	3000	198	3	20	110	250	4405000	0	2,04	47,85	35,00	5,30	0,00	5,30
2000/R		12075	561	177	2	20	110	250	4405000	0	1,98	49,50	35,00	5,31	0,00	5,31
2500/L	*	3852	3852	285	3	20	110	250	4405000	0	2,16	49,50	35,00	5,49	0,00	5,49
3000/R	*	5438	5706	70	3	20	110	250	4405000	0	1,11	49,50	35,00	4,44	0,00	4,44
3500/L		11353	608	121	2	20	110	250	4405000	0	1,70	49,50	35,00	5,03	0,00	5,03
4000/R		4884	361	141	2	5	110	250	4405000	40	1,83	49,50	35,00	5,16	17,40	5,84
4500/L		7064	318	78	2	8	110	250	4405000	30	1,24	49,50	33,05	4,50	13,05	5,01
5000/R		5309	234	162	2	3	110	250	4405000	55	1,92	49,50	26,58	4,92	23,93	5,86
5500/L		11862	976	135	2	20	110	250	4405000	0	1,79	49,50	35,00	5,12	0,00	5,12
6000/R		4345	151	90	2	1	110	250	4405000	90	1,41	49,50	17,34	4,04	39,15	5,59
6500/L	*	2298	3041	255	3	20	110	250	4405000	0	2,14	42,63	35,00	5,20	0,00	5,20
7000/R		5526	319	71	2	5	110	250	4405000	50	1,13	49,50	33,12	4,38	21,75	5,24
7500/L	*	2032	2690	129	3	20	110	250	4405000	0	1,76	40,22	35,00	4,72	0,00	4,72
8000/R		7281	40	59	2	0	110	250	4405000	160	0,87	49,50	-10,69	2,40	69,61	5,15
8500/L	*	2178	2883	160	3	20	110	250	4405000	0	1,92	41,58	35,00	4,93	0,00	4,93
9000/R		4165	50	82	2	0	110	250	4405000	175	1,30	49,50	-5,98	3,02	76,13	6,02
9500/L	*	2328	3081	176	3	20	110	250	4405000	0	1,98	42,88	35,00	5,04	0,00	5,04
10000/R		8413	433	70	3	12	110	250	4405000	15	1,11	49,50	35,00	4,44	6,53	4,69
10500/L		5743	749	111	3	20	110	250	4405000	0	1,62	49,50	35,00	4,95	0,00	4,95
11000/R		2928	311	81	2	3	110	250	4405000	70	1,29	47,38	32,58	4,44	30,45	5,64
11500/l	*	1737	2299	115	3	20	110	250	4405000	0	1,66	37,14	35,00	4,50	0,00	4,50
12000/R		8704	523	105	2	20	110	250	4405000	0	1,57	49,50	35,00	4,90	0,00	4,90
12500/L		8161	420	124	2	15	110	250	4405000	5	1,72	49,50	35,00	5,05	2,18	5,14
13000/R		11998	703	97	3	20	110	250	4405000	0	1,49	49,50	35,00	4,82	0,00	4,82
13500/L	*	2503	3313	176	3	20	110	250	4405000	0	1,98	44,30	35,00	5,10	0,00	5,10

14000/R		5000	183	40	3	1	110	250	4405000	125	0,26	49,50	21,40	3,05	54,38	5,19
14500/L	*	2800	3706	248	3	20	110	250	4405000	0	2,13	46,50	35,00	5,34	0,00	5,34
15000/R		10871	208	76	2	8	110	250	4405000	20	1,21	49,50	24,10	4,11	8,70	4,45
15500/L	*	1797	2378	124	3	20	110	250	4405000	0	1,72	37,81	35,00	4,59	0,00	4,59
16000/R		4051	345	69	2	4	110	250	4405000	65	1,09	49,50	34,77	4,41	28,28	5,52
16500/L	*	2205	2919	189	3	20	110	250	4405000	0	2,01	41,82	35,00	5,04	0,00	5,04
17000/R		8895	1505	138	3	20	110	250	4405000	0	1,81	49,50	35,00	5,14	0,00	5,14
17500/L		10947	531	82	3	20	110	250	4405000	0	1,30	49,50	35,00	4,63	0,00	4,63
18000/R		14566	739	112	3	20	110	250	4405000	0	1,63	49,50	35,00	4,96	0,00	4,96
18500/L	*	1551	2053	106	3	20	110	250	4405000	0	1,58	34,92	35,00	4,33	0,00	4,33
19000/R	*	3003	3151	187	3	20	110	250	4405000	0	2,01	47,87	35,00	5,27	0,00	5,27
19500/L		6555	506	78	3	12	110	250	4405000	10	1,24	49,50	35,00	4,57	4,35	4,74
20000/R	*	2089	2192	95	3	20	110	250	4405000	0	1,47	40,76	35,00	4,45	0,00	4,45
20500/L	*	2077	2749	143	3	20	110	250	4405000	0	1,84	40,65	35,00	4,82	0,00	4,82
21000/R		7703	532	125	2	20	110	250	4405000	0	1,73	49,50	35,00	5,06	0,00	5,06
21500/L	*	2062	2729	168	3	20	110	250	4405000	0	1,95	40,50	35,00	4,92	0,00	4,92
22000/R		8183	1284	173	2	20	110	250	4405000	0	1,96	49,50	35,00	5,29	0,00	5,29
22500/L		14690	495	143	2	20	110	250	4405000	0	1,84	49,50	35,00	5,17	0,00	5,17
23000/R		5979	535	99	2	15	110	250	4405000	5	1,51	49,50	35,00	4,84	2,18	4,93
23500/L		12756	504	79	3	20	110	250	4405000	0	1,26	49,50	35,00	4,59	0,00	4,59
24000/R		5709	363	99	2	7	110	250	4405000	30	1,51	49,50	35,00	4,84	13,05	5,35
24500/L	*	2371	3138	183	3	20	110	250	4405000	0	2,00	43,24	35,00	5,08	0,00	5,08
25000/R		12882	395	83	3	20	110	250	4405000	0	1,32	49,50	35,00	4,65	0,00	4,65
25500/L		7305	647	86	3	20	110	250	4405000	0	1,36	49,50	35,00	4,69	0,00	4,69
26000/R		7981	609	100	2	20	110	250	4405000	0	1,52	49,50	35,00	4,85	0,00	4,85
26500/L		1522	439	41	3	1	110	250	4405000	140	0,30	34,55	35,00	3,04	60,90	5,44
27000/R		2189	232	50	3	1	110	250	4405000	135	0,63	41,68	26,40	3,31	58,73	5,62
27500/L		14290	360	86	3	20	110	250	4405000	0	1,36	49,50	35,00	4,69	0,00	4,69
28000/R		2929	311	72	2	3	110	250	4405000	80	1,14	47,38	32,58	4,29	34,80	5,67
28500/L		5081	293	96	2	4	110	250	4405000	45	1,48	49,50	31,33	4,66	19,58	5,44
29000/R		3698	333	85	2	3	110	250	4405000	50	1,35	49,50	34,03	4,64	21,75	5,49
29500/L	*	2267	3000	195	3	20	110	250	4405000	0	2,03	42,36	35,00	5,08	0,00	5,08
30000/R		7296	401	75	3	11	110	250	4405000	15	1,20	49,50	35,00	4,52	6,53	4,78
30500/L	*	1592	2107	108	3	20	110	250	4405000	0	1,60	35,43	35,00	4,37	0,00	4,37
31000/R	*	1578	1656	79	3	17	110	250	4405000	0	1,26	35,26	35,00	4,03	0,00	4,03
31500/L		14764	657	133	2	20	110	250	4405000	0	1,78	49,50	35,00	5,11	0,00	5,11

32000/R		6377	398	78	2	10	110	250	4405000	20	1,24	49,50	35,00	4,57	8,70	4,92
32500/L	*	771	1021	160	2	15	110	250	4405000	5	1,92	21,22	35,00	4,13	2,18	4,22
33000/R	k	1299	141	38	1	0	110	250	4405000	195	0,17	31,45	15,89	2,03	84,83	5,37
33500/L		6783	424	107	2	12	110	250	4405000	10	1,59	49,50	35,00	4,92	4,35	5,09
34000/R		6377	349	84	2	8	110	250	4405000	25	1,33	49,50	35,00	4,66	10,88	5,09
34500/L		4816	431	121	2	7	110	250	4405000	25	1,70	49,50	35,00	5,03	10,88	5,46
35000/R		2105	237	52	3	1	110	250	4405000	130	0,69	40,91	26,85	3,36	56,55	5,58
35500/L		3563	54	79	2	0	110	250	4405000	170	1,26	49,50	-4,36	3,04	73,96	5,95
36000/R		4041	12	1250	2	0	110	250	4405000	295	1,62	49,50	-36,09	2,14	128,34	7,20
36500/L		3566	472	82	3	7	110	250	4405000	40	1,30	49,50	35,00	4,63	17,40	5,32
37000/R		8169	445	89	2	16	110	250	4405000	0	1,40	49,50	35,00	4,73	0,00	4,73
37500/L		1857	280	57	3	1	110	250	4405000	125	0,82	38,45	30,37	3,54	54,38	5,68
38000/R		7324	1070	133	3	20	110	250	4405000	0	1,78	49,50	35,00	5,11	0,00	5,11
38500/L		4544	549	84	3	11	110	250	4405000	20	1,33	49,50	35,00	4,66	8,70	5,00
39000/R		57	414	133	2	1	110	250	4405000	105	1,78	-29,84	35,00	1,99	45,68	3,78
39000/L		3620	561	94	2	11	110	250	4405000	20	1,46	49,50	35,00	4,79	8,70	5,13
40000/R		12966	801	131	2	20	110	250	4405000	0	1,77	49,50	35,00	5,10	0,00	5,10
40500/L		4337	417	94	2	6	110	250	4405000	25	1,46	49,50	35,00	4,79	10,88	5,21
41000/R	R *	4294	4065	101	3	20	110	250	4405000	0	1,53	49,50	35,00	4,86	0,00	4,86
41500/L		2837	400	69	3	3	110	250	4405000	75	1,09	46,76	35,00	4,31	32,63	5,60
42000/R		7558	546	108	2	20	110	250	4405000	0	1,60	49,50	35,00	4,93	0,00	4,93
42500/L		3392	434	119	2	6	110	250	4405000	35	1,69	49,50	35,00	5,02	15,23	5,62
43000/R		11003	472	126	2	20	110	250	4405000	0	1,74	49,50	35,00	5,07	0,00	5,07
43500/L		8557	406	87	2	15	110	250	4405000	0	1,37	49,50	35,00	4,70	0,00	4,70
44000/R		257	417	57	3	0	110	250	4405000	135	0,82	-0,31	35,00	2,19	58,73	4,50
44500/L		354	740	84	3	3	110	250	4405000	75	1,33	5,96	35,00	2,95	32,63	4,23
45000/R		9065	451	81	3	17	110	250	4405000	0	1,29	49,50	35,00	4,62	0,00	4,62
45500/L		5325	423	78	3	8	110	250	4405000	30	1,24	49,50	35,00	4,57	13,05	5,09
46000/R		3103	289	64	2	2	110	250	4405000	95	0,99	48,52	31,04	4,12	41,33	5,75
46500/L		1575	34	40	1	0	110	250	4405000	235	0,26	35,22	-14,12	1,09	102,23	5,12
47000/R	K *	1260	1193	75	3	8	110	250	4405000	30	1,20	30,85	35,00	3,79	13,05	4,30
47500/L		2001	33	59	1	0	110	250	4405000	230	0,87	39,92	-14,75	1,87	100,06	5,81
48000/R		5456	239	68	2	3	110	250	4405000	65	1,07	49,50	27,03	4,08	28,28	5,20
48500/L	*	939	1461	174	3	20	110	250	4405000	0	1,97	25,09	35,00	4,34	0,00	4,34
49000/R		8082	491	80	3	16	110	250	4405000	0	1,27	49,50	35,00	4,60	0,00	4,60
49500/L	*	1381	2149	94	3	20	110	250	4405000	0	1,46	32,65	35,00	4,12	0,00	4,12

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50000/R		5904	351	73	3	7	110	250	4405000	40	1,16	49,50	35,00	4,49	17,40	5,18
50500/L		9121	565	79	3	20	110	250	4405000	0	1,26	49,50	35,00	4,59	0,00	4,59
51000/R		11640	403	86	3	20	110	250	4405000	0	1,36	49,50	35,00	4,69	0,00	4,69
51500/L		11986	314	88	2	17	110	250	4405000	0	1,38	49,50	32,79	4,63	0,00	4,63
52000/R	*	2653	2511	113	3	20	110	250	4405000	0	1,64	45,44	35,00	4,81	0,00	4,81
52500/L		3951	365	65	3	4	110	250	4405000	70	1,01	49,50	35,00	4,34	30,45	5,54
53000/R	*	2419	2290	110	3	20	110	250	4405000	0	1,62	43,63	35,00	4,71	0,00	4,71
53500/L	*	1907	2966	177	3	20	110	250	4405000	0	1,98	38,97	35,00	4,89	0,00	4,89
54000/R	*	2143	2029	96	3	20	110	250	4405000	0	1,48	41,26	35,00	4,48	0,00	4,48
54500/L		9087	475	86	3	19	110	250	4405000	0	1,36	49,50	35,00	4,69	0,00	4,69
55000/R		8739	526	109	2	20	110	250	4405000	0	1,61	49,50	35,00	4,94	0,00	4,94
55500/L		2500	62	71	1	0	110	250	4405000	175	1,13	44,28	-1,44	2,81	76,13	5,81
56000/R		3945	403	81	2	6	110	250	4405000	45	1,29	49,50	35,00	4,62	19,58	5,39
56500/L		1332	211	54	2	0	110	250	4405000	145	0,74	31,94	24,40	2,96	63,08	5,45
57000/R		11387	633	112	2	20	110	250	4405000	0	1,63	49,50	35,00	4,96	0,00	4,96
58000/R	*	3250	3077	147	3	20	110	250	4405000	0	1,86	49,42	35,00	5,18	0,00	5,18
59000/R	*	4262	4035	213	3	20	110	250	4405000	0	2,07	49,50	35,00	5,40	0,00	5,40
59500/L		3870	503	106	2	9	110	250	4405000	20	1,58	49,50	35,00	4,91	8,70	5,25
60000/R		11123	559	85	3	20	110	250	4405000	0	1,35	49,50	35,00	4,67	0,00	4,67
60500/L		9372	307	89	2	11	110	250	4405000	10	1,40	49,50	32,31	4,62	4,35	4,79
61000/R		7199	433	86	2	13	110	250	4405000	5	1,36	49,50	35,00	4,69	2,18	4,77
61500/L	*	1714	2666	105	3	20	110	250	4405000	0	1,57	36,88	35,00	4,40	0,00	4,40
62000/R	*	2727	2581	143	3	20	110	250	4405000	0	1,84	45,98	35,00	5,03	0,00	5,03
62500/L		8394	57	86	2	0	110	250	4405000	120	1,36	49,50	-3,22	3,18	52,20	5,24
63000/R		3169	300	62	2	2	110	250	4405000	95	0,94	48,93	31,82	4,13	41,33	5,75
63500/L		2654	274	72	2	2	110	250	4405000	90	1,14	45,45	29,91	4,11	39,15	5,66
64000/R		11854	418	90	3	20	110	250	4405000	0	1,41	49,50	35,00	4,74	0,00	4,74
64500/L		11098	759	120	2	20	110	250	4405000	0	1,70	49,50	35,00	5,02	0,00	5,02
65000/R	*	2599	2460	161	3	20	110	250	4405000	0	1,92	45,04	35,00	5,07	0,00	5,07
65500/L		2060	301	58	3	1	110	250	4405000	115	0,85	40,49	31,90	3,70	50,03	5,67
66000/R	*	3169	3000	144	3	20	110	250	4405000	0	1,84	48,93	35,00	5,15	0,00	5,15
66500/L		14430	809	201	2	20	110	250	4405000	0	2,05	49,50	35,00	5,37	0,00	5,37
67000/R	*	2526	2391	122	3	20	110	250	4405000	0	1,71	44,48	35,00	4,84	0,00	4,84
67500/L	*	1928	3000	141	3	20	110	250	4405000	0	1,83	39,19	35,00	4,75	0,00	4,75
68000/R	*	2816	2666	110	3	20	110	250	4405000	0	1,62	46,61	35,00	4,83	0,00	4,83
68500/L	*	1508	2347	117	3	20	110	250	4405000	0	1,67	34,37	35,00	4,41	0,00	4,41

69000/R		9643	785	105	3	20	110	250	4405000	0	1,57	49,50	35,00	4,90	0,00	4,90
69500/L		2345	349	48	3	1	110	250	4405000	125	0,56	43,03	35,00	3,64	54,38	5,78
70000/R	*	3785	3583	222	3	20	110	250	4405000	0	2,09	49,50	35,00	5,42	0,00	5,42
70500/L		3557	333	57	3	2	110	250	4405000	95	0,82	49,50	34,03	4,11	41,33	5,74
71000/R	*	3209	3038	197	3	20	110	250	4405000	0	2,04	49,17	35,00	5,35	0,00	5,35
71500/L		7701	286	63	3	6	110	250	4405000	45	0,97	49,50	30,82	4,13	19,58	4,90
72000/R		14049	618	129	2	20	110	250	4405000	0	1,76	49,50	35,00	5,09	0,00	5,09
72500/L		1137	12	80	1	0	110	250	4405000	300	1,27	28,84	-36,09	0,99	130,51	6,13
73000/R	*	3169	3000	148	3	20	110	250	4405000	0	1,86	48,93	35,00	5,17	0,00	5,17
73500/L		6624	418	80	2	11	110	250	4405000	15	1,27	49,50	35,00	4,60	6,53	4,86
74000/R	*	3169	3000	186	3	20	110	250	4405000	0	2,01	48,93	35,00	5,31	0,00	5,31
74500/L		1749	68	68	1	0	110	250	4405000	180	1,07	37,28	0,51	2,56	78,31	5,64
75000/R	*	2607	2468	154	3	20	110	250	4405000	0	1,89	45,10	35,00	5,05	0,00	5,05
75500/L		3652	348	71	2	3	110	250	4405000	65	1,13	49,50	34,96	4,45	28,28	5,57
76000/R		13814	735	158	2	20	110	250	4405000	0	1,91	49,50	35,00	5,24	0,00	5,24
76500/L		12580	531	135	2	20	110	250	4405000	0	1,79	49,50	35,00	5,12	0,00	5,12
77000/R	*	3646	3451	195	3	20	110	250	4405000	0	2,03	49,50	35,00	5,36	0,00	5,36
77500/L		4882	556	168	2	15	110	250	4405000	0	1,95	49,50	35,00	5,28	0,00	5,28
78000/R	*	3169	3000	196	3	20	110	250	4405000	0	2,03	48,93	35,00	5,34	0,00	5,34
78500/L		3133	239	155	2	1	110	250	4405000	85	1,89	48,70	27,03	4,88	36,98	6,34
79000/R	*	1904	1802	111	3	20	110	250	4405000	0	1,62	38,94	35,00	4,54	0,00	4,54
79500/L		9994	682	108	3	20	110	250	4405000	0	1,60	49,50	35,00	4,93	0,00	4,93
80000/R	*	3547	3358	222	3	20	110	250	4405000	0	2,09	49,50	35,00	5,42	0,00	5,42
80500/L		9946	827	112	3	20	110	250	4405000	0	1,63	49,50	35,00	4,96	0,00	4,96
81000/R	*	2042	1933	103	3	20	110	250	4405000	0	1,55	40,31	35,00	4,52	0,00	4,52
81500/L		4222	498	129	2	10	110	250	4405000	15	1,76	49,50	35,00	5,09	6,53	5,34
82000/R	*	2667	2524	147	3	20	110	250	4405000	0	1,86	45,55	35,00	5,03	0,00	5,03
82500/L	*	2609	4059	254	3	20	110	250	4405000	0	2,14	45,12	35,00	5,29	0,00	5,29
83000/R		273	2768	247	3	20	110	250	4405000	0	2,13	0,87	35,00	3,54	0,00	3,54
83500/L		5863	13	66	2	0	110	250	4405000	285	1,03	49,50	-34,40	1,62	123,98	6,51

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ALYAT-GEORGIAN BORDER ROAD: BEARING CAPACITY RESULTS pr. POINT 1997

SECTION NO. 3 KYURDAMIR to UJAR

chainage/lane	remarks	E1	E2	E subg.	Cr.layer	est.life	H1	H2	est.traffic	overlay	SNSG	a(l)*h(l)	a(l)*h(l)	SNC	A(l)*H(l)	SNC
[m]		[Mpa]	[Mpa]	[Mpa]		[Years]	[mm]	[mm]	[S. A.]	[mm]		E1	E2	before str.	str. layer	after str.
0/R		12622	990	107	3	20	110	250	4562100	0	1,59	49,50	35,00	4,92	0,00	4,92
0/L		10782	617	159	2	20	110	250	4562100	0	1,91	49,50	35,00	5,24	0,00	5,24
500/L		7327	752	165	2	20	110	250	4562100	0	1,94	49,50	35,00	5,27	0,00	5,27
1000/R	*	6485	6609	205	3	20	110	250	4562100	0	2,05	49,50	35,00	5,38	0,00	5,38
1500/L	K	9552	802	172	2	20	110	250	4562100	0	1,96	49,50	35,00	5,29	0,00	5,29
2000/R		3191	2212	134	3	20	110	250	4562100	0	1,79	49,06	35,00	5,10	0,00	5,10
2500/L		4657	968	122	3	20	110	250	4562100	0	1,71	49,50	35,00	5,04	0,00	5,04
3000/R	*	4613	4701	172	3	20	110	250	4562100	0	1,96	49,50	35,00	5,29	0,00	5,29
3500/L		5435	1311	199	2	20	110	250	4562100	0	2,04	49,50	35,00	5,37	0,00	5,37
4000/R		13662	929	96	3	20	110	250	4562100	0	1,48	49,50	35,00	4,81	0,00	4,81
4500/L		10798	884	150	2	20	110	250	4562100	0	1,87	49,50	35,00	5,20	0,00	5,20
5000/R	*	2474	2522	102	3	20	110	250	4562100	0	1,54	44,08	35,00	4,66	0,00	4,66
5500/L	*	1788	2396	108	3	20	110	250	4562100	0	1,60	37,71	35,00	4,46	0,00	4,46
6000/R		13219	4115	139	3	20	110	250	4562100	0	1,82	49,50	35,00	5,15	0,00	5,15
6500/L		7608	1688	176	3	20	110	250	4562100	0	1,98	49,50	35,00	5,30	0,00	5,30
7000/R	*	3098	3157	150	3	20	110	250	4562100	0	1,87	48,48	35,00	5,16	0,00	5,16
7500/L	R	3466	1487	172	2	20	110	250	4562100	0	1,96	49,50	35,00	5,29	0,00	5,29
8000/R		8933	1406	114	3	20	110	250	4562100	0	1,65	49,50	35,00	4,98	0,00	4,98
8500/L		10906	789	137	2	20	110	250	4562100	0	1,80	49,50	35,00	5,13	0,00	5,13
9000/R		3377	1347	96	3	20	110	250	4562100	0	1,48	49,50	35,00	4,81	0,00	4,81
9500/L		5071	423	145	2	7	110	250	4562100	30	1,85	49,50	35,00	5,18	13,05	5,69
10000/R		11000	711	97	3	20	110	250	4562100	0	1,49	49,50	35,00	4,82	0,00	4,82
10500/L		4749	1237	136	3	20	110	250	4562100	0	1,80	49,50	35,00	5,13	0,00	5,13
11000/R		2134	3119	99	3	20	110	250	4562100	0	1,51	41,18	35,00	4,51	0,00	4,51
11500/L	R	4935	535	96	3	14	110	250	4562100	10	1,48	49,50	35,00	4,81	4,35	4,98
12000/R		3226	300	97	2	2	110	250	4562100	60	1,49	49,28	31,82	4,69	26,10	5,71
12500/L		6867	543	206	2	18	110	250	4562100	0	2,06	49,50	35,00	5,39	0,00	5,39
13000/R		11693	1626	103	3	20	110	250	4562100	0	1,55	49,50	35,00	4,88	0,00	4,88
13500/L	*	2887	3869	337	3	20	110	250	4562100	0	2,19	47,10	35,00	5,42	0,00	5,42

14000/R		6962	1684	94	3	20	110	250	4562100	0	1,46	49,50	35,00	4,79	0,00	4,79
14500/L		10178	865	155	2	20	110	250	4562100	0	1,89	49,50	35,00	5,22	0,00	5,22
15000/R	*	3600	3669	118	3	20	110	250	4562100	0	1,68	49,50	35,00	5,01	0,00	5,01
15500/L		6898	605	196	2	20	110	250	4562100	0	2,03	49,50	35,00	5,36	0,00	5,36
16000/R		2049	643	91	3	7	110	250	4562100	40	1,42	40,38	35,00	4,39	17,40	5,08
16500/L	*	2184	2927	213	3	20	110	250	4562100	0	2,07	41,63	35,00	5,09	0,00	5,09
17000/R		866	886	63	3	3	110	250	4562100	75	0,97	23,50	35,00	3,27	32,63	4,56
17500/L		7510	626	181	2	20	110	250	4562100	0	1,99	49,50	35,00	5,32	0,00	5,32
18000/R		2284	1604	85	3	20	110	250	4562100	0	1,35	42,51	35,00	4,40	0,00	4,40
18500/L		10786	843	171	2	20	110	250	4562100	0	1,96	49,50	35,00	5,29	0,00	5,29
19000/R	R	1905	1459	91	3	20	110	250	4562100	0	1,42	38,95	35,00	4,34	0,00	4,34
19500/L		8212	2280	123	3	20	110	250	4562100	0	1,72	49,50	35,00	5,05	0,00	5,05
20000/R		931	881	79	3	5	110	250	4562100	55	1,26	24,92	35,00	3,62	23,93	4,56
20500/L		9452	708	138	2	20	110	250	4562100	0	1,81	49,50	35,00	5,14	0,00	5,14
21000/R		1458	2549	96	3	20	110	250	4562100	0	1,48	33,71	35,00	4,19	0,00	4,19
21500/L		1332	1606	150	3	20	110	250	4562100	0	1,87	31,94	35,00	4,51	0,00	4,51
22000/R		4444	2026	96	3	20	110	250	4562100	0	1,48	49,50	35,00	4,81	0,00	4,81
22500/L		9488	1774	128	3	20	110	250	4562100	0	1,75	49,50	35,00	5,08	0,00	5,08
23000/R	R *	2944	3000	126	3	20	110	250	4562100	0	1,74	47,48	35,00	4,99	0,00	4,99
23500/L		11335	786	97	3	20	110	250	4562100	0	1,49	49,50	35,00	4,82	0,00	4,82
24000/R		1163	2356	154	3	20	110	250	4562100	0	1,89	29,28	35,00	4,42	0,00	4,42
24500/L	*	2680	3592	136	3	20	110	250	4562100	0	1,80	45,64	35,00	4,98	0,00	4,98
25000/R		675	6628	199	3	20	110	250	4562100	0	2,04	18,61	35,00	4,15	0,00	4,15
25500/L	*	2340	3135	151	3	20	110	250	4562100	0	1,88	42,98	35,00	4,95	0,00	4,95
26000/R		891	5134	163	3	20	110	250	4562100	0	1,93	24,06	35,00	4,25	0,00	4,25
26500/L	R *	3248	4353	197	3	20	110	250	4562100	0	2,04	49,41	35,00	5,36	0,00	5,36
27000/R		4027	1262	229	2	20	110	250	4562100	0	2,10	49,50	35,00	5,43	0,00	5,43
27500/L		12708	988	112	3	20	110	250	4562100	0	1,63	49,50	35,00	4,96	0,00	4,96
28000/R		2089	3994	107	3	20	110	250	4562100	0	1,59	40,76	35,00	4,57	0,00	4,57
28500/L	*	2953	3957	165	3	20	110	250	4562100	0	1,94	47,54	35,00	5,19	0,00	5,19
29000/R		1441	2459	151	3	20	110	250	4562100	0	1,88	33,48	35,00	4,57	0,00	4,57
29500/L	*	3253	4359	156	3	20	110	250	4562100	0	1,90	49,44	35,00	5,23	0,00	5,23
30000/R		1186	6163	188	3	20	110	250	4562100	0	2,01	29,66	35,00	4,56	0,00	4,56
30500/L		5792	360	130	2	7	110	250	4562100	30	1,76	49,50	35,00	5,09	13,05	5,61
31000/R		2658	3660	188	3	20	110	250	4562100	0	2,01	45,48	35,00	5,18	0,00	5,18
31500/L	K *	2971	3981	146	3	20	110	250	4562100	0	1,85	47,66	35,00	5,11	0,00	5,11

32000/R		1313	5969	188	3	20	110	250	4562100	0	2,01	31,66	35,00	4,64	0,00	4,64
32500/L		11484	765	136	2	20	110	250	4562100	0	1,80	49,50	35,00	5,13	0,00	5,13
33000/R	34000	2570	3129	212	3	20	110	250	4562100	0	2,07	44,82	35,00	5,21	0,00	5,21
33500/L	R *	2302	3085	171	3	20	110	250	4562100	0	1,96	42,66	35,00	5,02	0,00	5,02
34000/R		2691	2338	174	3	20	110	250	4562100	0	1,97	45,72	35,00	5,15	0,00	5,15
34500/L		6258	630	79	3	14	110	250	4562100	5	1,26	49,50	35,00	4,59	2,18	4,67
35000/R		660	3178	173	3	20	110	250	4562100	0	1,96	18,17	35,00	4,06	0,00	4,06
35500/L	*	3301	4423	163	3	20	110	250	4562100	0	1,93	49,50	35,00	5,26	0,00	5,26
36000/R		3153	1180	160	2	20	110	250	4562100	0	1,92	48,83	35,00	5,22	0,00	5,22
36500/L	*	2389	3201	115	3	20	110	250	4562100	0	1,66	43,39	35,00	4,75	0,00	4,75
37000/R	*	3386	3451	207	3	20	110	250	4562100	0	2,06	49,50	35,00	5,39	0,00	5,39
37500/L		14362	1098	99	3	20	110	250	4562100	0	1,51	49,50	35,00	4,84	0,00	4,84
38000/R		949	4603	133	3	20	110	250	4562100	0	1,78	25,29	35,00	4,16	0,00	4,16
38500/L	R *	2215	2968	149	3	20	110	250	4562100	0	1,87	41,91	35,00	4,90	0,00	4,90
39000/R		2436	3893	145	3	20	110	250	4562100	0	1,85	43,77	35,00	4,95	0,00	4,95
39500/L		9177	2387	166	3	20	110	250	4562100	0	1,94	49,50	35,00	5,27	0,00	5,27
40000/R		2306	1115	90	3	15	110	250	4562100	0	1,41	42,70	35,00	4,47	0,00	4,47
40500/L	*	3607	4834	131	3	20	110	250	4562100	0	1,77	49,50	35,00	5,10	0,00	5,10
41000/R	R	2089	859	96	3	11	110	250	4562100	15	1,48	40,76	35,00	4,46	6,53	4,72
41500/L	R	12724	807	130	2	20	110	250	4562100	0	1,76	49,50	35,00	5,09	0,00	5,09
42000/R	R *	2638	2689	159	3	20	110	250	4562100	0	1,91	45,33	35,00	5,08	0,00	5,08
42500/L	*	2423	3246	130	3	20	110	250	4562100	0	1,76	43,67	35,00	4,86	0,00	4,86
43000/R		2886	2634	124	3	20	110	250	4562100	0	1,72	47,09	35,00	4,96	0,00	4,96
43500/L		11186	771	93	3	20	110	250	4562100	0	1,45	49,50	35,00	4,77	0,00	4,77
44000/R		3394	2138	107	3	20	110	250	4562100	0	1,59	49,50	35,00	4,92	0,00	4,92
44500/L	*	4355	5837	287	3	20	110	250	4562100	0	2,17	49,50	35,00	5,50	0,00	5,50
45000/R		2460	4215	212	3	20	110	250	4562100	0	2,07	43,96	35,00	5,18	0,00	5,18
45500/L	*	2239	3000	212	3	20	110	250	4562100	0	2,07	42,12	35,00	5,11	0,00	5,11
46000/R		4493	2257	192	3	20	110	250	4562100	0	2,02	49,50	35,00	5,35	0,00	5,35
47000/R		1129	1974	214	3	20	110	250	4562100	0	2,07	28,70	35,00	4,58	0,00	4,58
47500/L	*	2239	3000	114	3	20	110	250	4562100	0	1,65	42,12	35,00	4,69	0,00	4,69
48000/L		14216	3236	181	3	20	110	250	4562100	0	1,99	49,50	35,00	5,32	0,00	5,32

ALYAT-GEORGIAN BORDER ROAD: BEARING CAPACITY RESULTS pr. POINT 1997

SECTION NO. 4 UJAR to MINGACHEUR

chainage/lane	remarks	E1	E2	E subg.	Cr.layer	est.life	H1	H2	est.traffic	overlay	SNSG	a(l)*h(l)	a(l)*h(l)	SNC	A(l)*H(l)	SNC
[m]		[Mpa]	[Mpa]	[Mpa]		[Years]	[mm]	[mm]	[S. A.]	[mm]		E1	E2	before str.	str. layer	after str.
1000/R		9337	1278	124	3	20	110	250	3653100	0	1,72	49,50	35,00	5,05	0,00	5,05
1500/L		2153	2156	214	3	20	110	250	3653100	0	2,07	41,35	35,00	5,08	0,00	5,08
2000/R		2463	2026	98	3	20	110	250	3653100	0	1,50	43,99	35,00	4,61	0,00	4,61
2500/L		1100	1747	106	3	20	110	250	3653100	0	1,58	28,19	35,00	4,07	0,00	4,07
3000/R		1532	1751	62	3	14	110	250	3653100	5	0,94	34,68	35,00	3,69	2,18	3,77
3500/L		6809	793	99	3	20	110	250	3653100	0	1,51	49,50	35,00	4,84	0,00	4,84
4000/R		4021	2061	98	3	20	110	250	3653100	0	1,50	49,50	35,00	4,83	0,00	4,83
4500/L		9035	749	75	3	20	110	250	3653100	0	1,20	49,50	35,00	4,52	0,00	4,52
5000/R	R	4732	2096	102	3	20	110	250	3653100	0	1,54	49,50	35,00	4,87	0,00	4,87
5500/L		6597	1379	88	3	20	110	250	3653100	0	1,38	49,50	35,00	4,71	0,00	4,71
6000/R	*	5735	5789	275	3	20	110	250	3653100	0	2,16	49,50	35,00	5,49	0,00	5,49
6500/L		2692	2092	84	3	20	110	250	3653100	0	1,33	45,73	35,00	4,51	0,00	4,51
7000/R		6326	4005	138	3	20	110	250	3653100	0	1,81	49,50	35,00	5,14	0,00	5,14
7500/L	*	3334	4013	133	3	20	110	250	3653100	0	1,78	49,50	35,00	5,11	0,00	5,11
8000/R	*	3640	3674	171	3	20	110	250	3653100	0	1,96	49,50	35,00	5,29	0,00	5,29
8500/L	*	4754	5722	236	3	20	110	250	3653100	0	2,11	49,50	35,00	5,44	0,00	5,44
9000/R	*	2770	2796	82	3	20	110	250	3653100	0	1,30	46,29	35,00	4,51	0,00	4,51
9500/L		2824	599	106	2	11	110	250	3653100	15	1,58	46,67	35,00	4,80	6,53	5,05
10000/R	*	2324	2346	135	3	20	110	250	3653100	0	1,79	42,85	35,00	4,86	0,00	4,86
10500/L		11186	924	125	3	20	110	250	3653100	0	1,73	49,50	35,00	5,06	0,00	5,06
11000/R		1168	1061	93	3	12	110	250	3653100	15	1,45	29,36	35,00	3,98	6,53	4,24
11500/L		3074	1491	77	3	20	110	250	3653100	0	1,23	48,33	35,00	4,51	0,00	4,51
12000/R		3856	1812	183	3	20	110	250	3653100	0	2,00	49,50	35,00	5,33	0,00	5,33
12500/L		6849	2184	93	3	20	110	250	3653100	0	1,45	49,50	35,00	4,77	0,00	4,77
13000/R		994	1512	100	3	20	110	250	3653100	0	1,52	26,20	35,00	3,93	0,00	3,93
13500/L		7025	1951	144	3	20	110	250	3653100	0	1,84	49,50	35,00	5,17	0,00	5,17
14000/R		1487	1275	80	3	14	110	250	3653100	5	1,27	34,10	35,00	4,00	2,18	4,08
14500/L		3822	1594	148	3	20	110	250	3653100	0	1,86	49,50	35,00	5,19	0,00	5,19
15500/L	*	3026	3642	205	3	20	110	250	3653100	0	2,05	48,02	35,00	5,33	0,00	5,33

16000/R		3670	2270	113	3	20	110	250	3653100	0	1,64	49,50	35,00	4,97	0,00	4,97
16500/L	*	2602	3132	126	3	20	110	250	3653100	0	1,74	45,06	35,00	4,89	0,00	4,89
17000/R		2746	2507	128	3	20	110	250	3653100	0	1,75	46,12	35,00	4,95	0,00	4,95
17500/L		7496	2677	156	3	20	110	250	3653100	0	1,90	49,50	35,00	5,23	0,00	5,23
18000/R		1527	5083	196	3	20	110	250	3653100	0	2,03	34,62	35,00	4,78	0,00	4,78
18500/L		5469	2264	183	3	20	110	250	3653100	0	2,00	49,50	35,00	5,33	0,00	5,33
19000/R		2349	328	49	3	2	110	250	3653100	115	0,59	43,06	33,71	3,62	50,03	5,59
19500/L		9543	916	169	2	20	110	250	3653100	0	1,95	49,50	35,00	5,28	0,00	5,28
20000/R		3596	404	84	2	7	110	250	3653100	35	1,33	49,50	35,00	4,66	15,23	5,26
20500/L	*	2492	3000	149	3	20	110	250	3653100	0	1,87	44,22	35,00	4,99	0,00	4,99
21000/R		3266	1575	172	3	20	110	250	3653100	0	1,96	49,50	35,00	5,29	0,00	5,29
21500/L		1574	1539	95	3	20	110	250	3653100	0	1,47	35,21	35,00	4,23	0,00	4,23
22000/R	R *	4443	4485	264	3	20	110	250	3653100	0	2,15	49,50	35,00	5,48	0,00	5,48
22500/L		1073	3771	179	3	20	110	250	3653100	0	1,98	27,70	35,00	4,46	0,00	4,46
23000/R		1132	409	76	2	2	110	250	3653100	85	1,21	28,75	35,00	3,72	36,98	5,18
23500/L	*	1350	1625	183	3	20	110	250	3653100	0	2,00	32,20	35,00	4,64	0,00	4,64
24000/R		2467	1001	83	3	15	110	250	3653100	0	1,32	44,02	35,00	4,43	0,00	4,43
24500/L		4674	1230	127	3	20	110	250	3653100	0	1,74	49,50	35,00	5,07	0,00	5,07
25000/R		1315	1557	73	3	15	110	250	3653100	0	1,16	31,69	35,00	3,79	0,00	3,79
25500/L		909	641	89	3	5	110	250	3653100	55	1,40	24,45	35,00	3,74	23,93	4,68
26000/R		3254	300	78	2	3	110	250	3653100	60	1,24	49,45	31,82	4,45	26,10	5,47
26500/L		1591	961	53	3	5	110	250	3653100	60	0,72	35,42	35,00	3,49	26,10	4,52
27000/R		2206	3041	177	3	20	110	250	3653100	0	1,98	41,83	35,00	5,01	0,00	5,01
27500/L		1530	385	61	3	2	110	250	3653100	100	0,92	34,65	35,00	3,67	43,50	5,38
28000/R		2830	1919	147	3	20	110	250	3653100	0	1,86	46,71	35,00	5,08	0,00	5,08
28500/L		3920	1159	118	3	20	110	250	3653100	0	1,68	49,50	35,00	5,01	0,00	5,01
29000/R		2767	3234	171	3	20	110	250	3653100	0	1,96	46,27	35,00	5,16	0,00	5,16
29500/L		4828	2508	176	3	20	110	250	3653100	0	1,98	49,50	35,00	5,30	0,00	5,30
30000/R	*	2972	3000	140	3	20	110	250	3653100	0	1,82	47,67	35,00	5,08	0,00	5,08
30500/L		3848	1873	139	3	20	110	250	3653100	0	1,82	49,50	35,00	5,15	0,00	5,15
31000/R		2928	1730	236	2	20	110	250	3653100	0	2,11	47,38	35,00	5,36	0,00	5,36
31500/L		4008	796	104	3	20	110	250	3653100	0	1,56	49,50	35,00	4,89	0,00	4,89
32000/R		4869	2769	164	3	20	110	250	3653100	0	1,93	49,50	35,00	5,26	0,00	5,26
32500/L		3715	3282	474	2	20	110	250	3653100	0	2,17	49,50	35,00	5,50	0,00	5,50
33000/R		2665	3257	104	3	20	110	250	3653100	0	1,56	45,53	35,00	4,73	0,00	4,73
33500/L		1335	1363	134	3	20	110	250	3653100	0	1,79	31,98	35,00	4,43	0,00	4,43

34000/R		2411	1396	125	3	20	110	250	3653100	0	1,73	43,57	35,00	4,83	0,00	4,83
34500/L		3134	1562	79	3	20	110	250	3653100	0	1,26	48,71	35,00	4,56	0,00	4,56
35000/R		4544	851	192	2	20	110	250	3653100	0	2,02	49,50	35,00	5,35	0,00	5,35
35500/L		1483	1496	96	3	20	110	250	3653100	0	1,48	34,04	35,00	4,20	0,00	4,20
36000/R		2358	2528	84	3	20	110	250	3653100	0	1,33	43,13	35,00	4,41	0,00	4,41
36500/L		3943	1161	86	3	20	110	250	3653100	0	1,36	49,50	35,00	4,69	0,00	4,69
37000/R	K	1662	603	83	3	6	110	250	3653100	50	1,32	36,28	35,00	4,13	21,75	4,98
37500/L		5435	1606	112	3	20	110	250	3653100	0	1,63	49,50	35,00	4,96	0,00	4,96
38000/R		2035	1574	98	3	20	110	250	3653100	0	1,50	40,25	35,00	4,47	0,00	4,47
38500/L		1820	697	93	3	9	110	250	3653100	25	1,45	38,06	35,00	4,32	10,88	4,75
39000/R		3396	1042	164	2	20	110	250	3653100	0	1,93	49,50	35,00	5,26	0,00	5,26
39500/L		3711	940	98	3	20	110	250	3653100	0	1,50	49,50	35,00	4,83	0,00	4,83
40000/R		2190	419	76	2	4	110	250	3653100	65	1,21	41,68	35,00	4,23	28,28	5,35
40500/L		1165	2720	118	3	20	110	250	3653100	0	1,68	29,31	35,00	4,21	0,00	4,21
41000/R		2859	2440	186	3	20	110	250	3653100	0	2,01	46,91	35,00	5,23	0,00	5,23
41500/L		4706	2585	130	3	20	110	250	3653100	0	1,76	49,50	35,00	5,09	0,00	5,09
42000/R		4248	521	83	3	11	110	250	3653100	15	1,32	49,50	35,00	4,65	6,53	4,90
42500/L		9975	942	256	2	20	110	250	3653100	0	2,14	49,50	35,00	5,47	0,00	5,47
43000/R		1176	416	83	2	2	110	250	3653100	75	1,32	29,50	35,00	3,86	32,63	5,14
43500/L		6410	1446	105	3	20	110	250	3653100	0	1,57	49,50	35,00	4,90	0,00	4,90
44000/R	R	4029	2294	180	3	20	110	250	3653100	0	1,99	49,50	35,00	5,32	0,00	5,32
44500/L	*	2616	3149	182	3	20	110	250	3653100	0	1,99	45,17	35,00	5,15	0,00	5,15
45000/R		1054	1087	134	3	20	110	250	3653100	0	1,79	27,35	35,00	4,24	0,00	4,24
45500/L	*	2173	2616	157	3	20	110	250	3653100	0	1,90	41,53	35,00	4,92	0,00	4,92
46500/L		1088	73	161	1	0	110	250	3653100	180	1,92	27,97	2,00	3,10	78,31	6,19
53500/L		1758	123	57	1	0	110	250	3653100	140	0,82	37,38	13,01	2,81	60,90	5,21
54000/R		2523	189	91	1	1	110	250	3653100	100	1,42	44,46	22,08	4,04	43,50	5,76
54500/L		4938	437	97	2	10	110	250	3653100	20	1,49	49,50	35,00	4,82	8,70	5,16
55000/R		4290	100	103	2	1	110	250	3653100	115	1,55	49,50	8,64	3,84	50,03	5,81
56000/R		942	499	193	2	3	110	250	3653100	65	2,03	25,15	35,00	4,40	28,28	5,51
56500/L		1565	724	157	2	10	110	250	3653100	20	1,90	35,10	35,00	4,67	8,70	5,01
57000/R		4559	429	213	2	8	110	250	3653100	15	2,07	49,50	35,00	5,40	6,53	5,66
57500/L		3858	1433	201	2	20	110	250	3653100	0	2,05	49,50	35,00	5,37	0,00	5,37
58000/R		960	5345	166	3	20	110	250	3653100	0	1,94	25,52	35,00	4,32	0,00	4,32
58500/L		1904	2747	174	3	20	110	250	3653100	0	1,97	38,94	35,00	4,88	0,00	4,88
59000/R		876	1749	191	3	20	110	250	3653100	0	2,02	23,72	35,00	4,33	0,00	4,33

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59500/L		14935	531	139	2	20	110	250	3653100	0	1,82	49,50	35,00	5,15	0,00	5,15
60000/R		1961	634	137	2	9	110	250	3653100	25	1,80	39,52	35,00	4,74	10,88	5,17
60500/L		4710	2678	147	3	20	110	250	3653100	0	1,86	49,50	35,00	5,19	0,00	5,19
61000/R		1451	1030	109	3	18	110	250	3653100	0	1,61	33,62	35,00	4,31	0,00	4,31
61500/L		3917	354	258	2	5	110	250	3653100	35	2,14	49,50	35,00	5,47	15,23	6,07

ALYAT-GEORGIAN BORDER ROAD: BEARING CAPACITY RESULTS pr. POINT 1997

SECTION NO. 5 MINGACHEUR TO GJANDZA

chainage/lane	remarks	E1	E2	E subg.	Cr.layer	est.life	H1	H2	est.traffic	overlay	SNSG	a(l)*h(l)	a(l)*h(l)	SNC	A(l)*H(l)	SNC
[m]		[Mpa]	[Mpa]	[Mpa]		[Years]	[mm]	[mm]	[S. A.]	[mm]		E1	E2	before str.	str. layer	after str.
0/R	*	2817	2871	195	3	20	110	250	3653100	0	2,03	46,62	35,00	5,25	0,00	5,25
500/L		1664	945	142	2	20	110	250	3653100	0	1,83	36,30	35,00	4,64	0,00	4,64
1000/R		4453	379	167	2	6	110	250	3653100	30	1,94	49,50	35,00	5,27	13,05	5,79
1500/L		1841	187	115	2	1	110	250	3653100	110	1,66	38,28	21,85	4,03	47,85	5,91
2000/R		638	76	55	1	0	110	250	3653100	185	0,77	17,51	2,85	1,57	80,48	4,74
2500/L		1347	255	77	2	1	110	250	3653100	100	1,23	32,16	28,40	3,61	43,50	5,33
3000/R		1077	122	86	1	0	110	250	3653100	145	1,36	27,77	12,84	2,96	63,08	5,44
3500/L		2036	861	134	2	19	110	250	3653100	0	1,79	40,26	35,00	4,75	0,00	4,75
4000/R		1425	3561	172	3	20	110	250	3653100	0	1,96	33,26	35,00	4,65	0,00	4,65
4500/R		704	1157	158	2	20	110	250	3653100	0	1,91	19,44	35,00	4,05	0,00	4,05
5000/R		511	555	168	2	3	110	250	3653100	65	1,95	13,16	35,00	3,84	28,28	4,96
5500/L	*	3667	3737	207	3	20	110	250	3653100	0	2,06	49,50	35,00	5,39	0,00	5,39
6000/R		2873	470	180	2	7	110	250	3653100	30	1,99	47,01	35,00	5,22	13,05	5,73
6500/L		2581	2117	141	3	20	110	250	3653100	0	1,83	44,90	35,00	4,98	0,00	4,98
7000/R	K	1393	220	163	2	1	110	250	3653100	100	1,93	32,82	25,28	4,22	43,50	5,93
7500/L		804	151	143	2	0	110	250	3653100	140	1,84	22,04	17,34	3,39	60,90	5,79
8000/R	*	1430	1457	207	2	20	110	250	3653100	0	2,06	33,33	35,00	4,75	0,00	4,75
8500/L		1415	324	257	2	1	110	250	3653100	80	2,14	33,12	33,45	4,76	34,80	6,13
9000/R	R	2655	290	199	2	2	110	250	3653100	65	2,04	45,46	31,11	5,06	28,28	6,17
9500/L		1365	635	238	2	7	110	250	3653100	35	2,11	32,42	35,00	4,77	15,23	5,37
10000/R		1951	1133	162	2	20	110	250	3653100	0	1,92	39,42	35,00	4,86	0,00	4,86
10500/L		3611	375	265	2	6	110	250	3653100	35	2,15	49,50	35,00	5,48	15,23	6,08
11000/R		1164	369	211	2	2	110	250	3653100	80	2,07	29,30	35,00	4,60	34,80	5,97
11500/L		1272	613	100	2	6	110	250	3653100	40	1,52	31,03	35,00	4,12	17,40	4,81
12000/R		1430	486	196	2	4	110	250	3653100	55	2,03	33,33	35,00	4,73	23,93	5,67
12500/L		1158	1721	171	3	20	110	250	3653100	0	1,96	29,19	35,00	4,49	0,00	4,49
13000/R		7064	3996	306	3	20	110	250	3653100	0	2,18	49,50	35,00	5,51	0,00	5,51
13500/L		6904	540	221	2	20	110	250	3653100	0	2,09	49,50	35,00	5,42	0,00	5,42
14000/R	R	3240	834	157	2	20	110	250	3653100	0	1,90	49,36	35,00	5,23	0,00	5,23

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14500/L		1392	312	152	2	1	110	250	3653100	80	1,88	32,80	32,65	4,46	34,80	5,83
15000/R		1160	665	140	2	7	110	250	3653100	35	1,82	29,23	35,00	4,35	15,23	4,95
15500/L		2206	450	121	2	5	110	250	3653100	45	1,70	41,83	35,00	4,73	19,58	5,50
16000/R		2490	275	175	2	2	110	250	3653100	70	1,97	44,20	29,99	4,89	30,45	6,09
16500/L		2852	1109	330	2	20	110	250	3653100	0	2,19	46,86	35,00	5,41	0,00	5,41
17000/R		2376	293	124	2	2	110	250	3653100	65	1,72	43,28	31,33	4,66	28,28	5,78
17500/L		2217	886	128	2	20	110	250	3653100	0	1,75	41,93	35,00	4,78	0,00	4,78
18000/R		10413	831	106	3	20	110	250	3653100	0	1,58	49,50	35,00	4,91	0,00	4,91
18500/L		1821	1862	64	3	19	110	250	3653100	0	0,99	38,07	35,00	3,87	0,00	3,87
19000/R		8874	1566	82	3	20	110	250	3653100	0	1,30	49,50	35,00	4,63	0,00	4,63
19500/L		2708	1071	94	3	20	110	250	3653100	0	1,46	45,85	35,00	4,64	0,00	4,64
20000/R		14613	1301	104	3	20	110	250	3653100	0	1,56	49,50	35,00	4,89	0,00	4,89
20500/L		6202	3989	85	3	20	110	250	3653100	0	1,35	49,50	35,00	4,67	0,00	4,67
21000/R		3507	2360	63	3	20	110	250	3653100	0	0,97	49,50	35,00	4,30	0,00	4,30
22000/R		6064	3109	100	3	20	110	250	3653100	0	1,52	49,50	35,00	4,85	0,00	4,85
22500/L		6186	1348	78	3	20	110	250	3653100	0	1,24	49,50	35,00	4,57	0,00	4,57
23000/R	*	2271	2703	110	3	20	110	250	3653100	0	1,62	42,40	35,00	4,67	0,00	4,67
23500/L		14189	841	82	3	20	110	250	3653100	0	1,30	49,50	35,00	4,63	0,00	4,63
24000/R		2468	2371	72	3	20	110	250	3653100	0	1,14	44,03	35,00	4,26	0,00	4,26
25000/R	*	5071	6036	257	3	20	110	250	3653100	0	2,14	49,50	35,00	5,47	0,00	5,47
25500/L	*	2868	3414	112	3	20	110	250	3653100	0	1,63	46,97	35,00	4,86	0,00	4,86
26000/R		4726	1637	240	2	20	110	250	3653100	0	2,12	49,50	35,00	5,45	0,00	5,45
26500/L		2552	1986	126	3	20	110	250	3653100	0	1,74	44,68	35,00	4,88	0,00	4,88
27000/R		4768	147	646	2	1	110	250	3653100	80	2,07	49,50	16,77	4,68	34,80	6,05
27500/L		3455	1187	221	2	20	110	250	3653100	0	2,09	49,50	35,00	5,42	0,00	5,42
28000/R		2205	398	263	2	4	110	250	3653100	55	2,15	41,82	35,00	5,17	23,93	6,11
28500/L		4159	299	441	2	4	110	250	3653100	50	2,18	49,50	31,75	5,38	21,75	6,24
29000/R		3717	380	244	2	6	110	250	3653100	35	2,12	49,50	35,00	5,45	15,23	6,05
29500/L		1307	2716	154	3	20	110	250	3653100	0	1,89	31,57	35,00	4,51	0,00	4,51
30000/R		3424	159	380	2	1	110	250	3653100	95	2,19	49,50	18,43	4,87	41,33	6,50
30500/L		3068	381	176	2	5	110	250	3653100	40	1,98	48,29	35,00	5,26	17,40	5,94
31000/R		5199	1877	192	3	20	110	250	3653100	0	2,02	49,50	35,00	5,35	0,00	5,35
31500/L		1896	221	176	2	1	110	250	3653100	90	1,98	38,86	25,38	4,51	39,15	6,05
32000/R		4652	1698	496	2	20	110	250	3653100	0	2,16	49,50	35,00	5,49	0,00	5,49
32500/L		827	855	327	2	11	110	250	3653100	20	2,19	22,60	35,00	4,45	8,70	4,80
33000/R		5286	519	288	2	14	110	250	3653100	5	2,17	49,50	35,00	5,50	2,18	5,58

33500/L		12510	1093	177	2	20	110	250	3653100	0	1,98	49,50	35,00	5,31	0,00	5,31
34000/R		2819	1558	354	2	20	110	250	3653100	0	2,19	46,63	35,00	5,41	0,00	5,41
34500/L	R *	2633	3134	323	3	20	110	250	3653100	0	2,18	45,30	35,00	5,35	0,00	5,35
35000/R		3130	510	226	2	9	110	250	3653100	20	2,10	48,69	35,00	5,39	8,70	5,74
35500/L		1696	525	155	2	5	110	250	3653100	45	1,89	36,67	35,00	4,72	19,58	5,49
36000/R		4494	598	143	2	19	110	250	3653100	0	1,84	49,50	35,00	5,17	0,00	5,17
36500/L		5553	1934	319	2	20	110	250	3653100	0	2,18	49,50	35,00	5,51	0,00	5,51
37000/R		5967	569	187	2	20	110	250	3653100	0	2,01	49,50	35,00	5,34	0,00	5,34
37500/L		3667	306	186	2	3	110	250	3653100	55	2,01	49,50	32,24	5,23	23,93	6,17
38000/R		6381	1768	164	3	20	110	250	3653100	0	1,93	49,50	35,00	5,26	0,00	5,26
38500/L		8895	263	358	2	10	110	250	3653100	15	2,19	49,50	29,05	5,29	6,53	5,54
39000/R		4283	148	322	2	1	110	250	3653100	85	2,18	49,50	16,92	4,80	36,98	6,26
39500/L		4041	333	154	2	4	110	250	3653100	45	1,89	49,50	34,03	5,18	19,58	5,95
40000/R		4402	267	216	2	3	110	250	3653100	55	2,08	49,50	29,37	5,19	23,93	6,13
40500/L		5746	424	219	2	11	110	250	3653100	15	2,08	49,50	35,00	5,41	6,53	5,67
41000/R		3697	283	192	2	3	110	250	3653100	60	2,02	49,50	30,59	5,18	26,10	6,21
41500/L		3635	219	189	2	2	110	250	3653100	75	2,01	49,50	25,18	4,96	32,63	6,24
42000/R		2551	250	167	2	1	110	250	3653100	75	1,94	44,68	27,98	4,81	32,63	6,09
42500/L		1618	182	155	2	1	110	250	3653100	115	1,89	35,75	21,28	4,14	50,03	6,11
43000/R		3029	346	89	2	4	110	250	3653100	50	1,40	48,04	34,83	4,66	21,75	5,52

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ALYAT-GEORGIAN BORDER ROAD: BEARING CAPACITY RESULTS pr. POINT 1997

SECTION NO. 6 START OF GJANDZA BYPASS TO END OF GJANDZA BYPASS

chainage/lane	remarks	E1	E2	E subg.	Cr.layer	est.life	H1	H2	est.traffic	overlay	SNSG	a(l)*h(l)	a(l)*h(l)	SNC	A(l)*H(l)	SNC
[m]		[Mpa]	[Mpa]	[Mpa]		[Years]	[mm]	[mm]	[S. A.]	[mm]		E1	E2	before str.	str. layer	after str.
0/R	R	4077	125	77	2	0	80	250	3810300	135	1,23	39,18	13,35	3,30	58,73	5,61
500/L		3371	642	74	3	4	80	250	3810300	60	1,18	36,46	35,00	3,99	26,10	5,02
1000/R	R *	1132	1154	55	3	3	80	250	3810300	80	0,77	20,91	35,00	2,97	34,80	4,35
1500/L	*	964	982	282	2	12	80	250	3810300	20	2,16	18,62	35,00	4,27	8,70	4,62
2000/R		13426	385	190	2	8	80	250	3810300	20	2,02	49,50	35,00	5,35	8,70	5,69
2500/L		4625	360	108	2	2	80	250	3810300	65	1,60	40,97	35,00	4,59	28,28	5,71
3000/R		7215	549	217	2	8	80	250	3810300	25	2,08	47,31	35,00	5,32	10,88	5,75
3500/L		11291	196	280	2	2	80	250	3810300	60	2,16	49,50	22,84	5,01	26,10	6,04
4000/R		10052	76	442	2	0	80	250	3810300	125	2,18	49,50	2,85	4,24	54,38	6,38
4500/L		11777	207	281	2	2	80	250	3810300	55	2,16	49,50	24,00	5,06	23,93	6,00
5000/R		6925	86	478	2	0	80	250	3810300	140	2,17	46,73	5,46	4,22	60,90	6,62
5500/L		4001	153	68	2	0	80	250	3810300	125	1,07	38,91	17,62	3,30	54,38	5,44
6000/R		8185	167	323	2	1	80	250	3810300	85	2,18	49,11	19,46	4,89	36,98	6,34
6500/L		10568	267	326	2	3	80	250	3810300	50	2,19	49,50	29,37	5,29	21,75	6,15
7000/R	*	1111	1132	230	2	18	80	250	3810300	0	2,10	20,64	35,00	4,29	0,00	4,29
7500/L	R	4621	389	460	2	2	80	250	3810300	60	2,17	40,96	35,00	5,17	26,10	6,19
8000/R		9613	149	395	2	1	80	250	3810300	85	2,19	49,50	17,06	4,81	36,98	6,27
8500/L		5269	92	95	2	0	80	250	3810300	145	1,47	42,83	6,88	3,43	63,08	5,91
9000/R		11044	321	324	2	4	80	250	3810300	40	2,18	49,50	33,25	5,44	17,40	6,13
9500/L		8455	91	217	2	0	80	250	3810300	125	2,08	49,50	6,65	4,29	54,38	6,43
10000/R		9896	110	312	2	0	80	250	3810300	105	2,18	49,50	10,66	4,55	45,68	6,35
10500/L		4014	174	86	2	0	80	250	3810300	115	1,36	38,95	20,33	3,69	50,03	5,67
11000/R		4959	163	223	2	0	80	250	3810300	110	2,09	41,97	18,95	4,49	47,85	6,38
11500/L		530	217	30	3	0	80	250	3810300	215	-0,27	10,09	24,99	1,11	93,53	4,79
12000/R		9365	673	264	2	15	80	250	3810300	0	2,15	49,50	35,00	5,48	0,00	5,48
12500/L		1069	1003	102	3	7	80	250	3810300	35	1,54	20,09	35,00	3,71	15,23	4,31
13000/R		4684	322	110	2	2	80	250	3810300	80	1,62	41,15	33,32	4,55	34,80	5,92
13500/L		3755	272	263	2	1	80	250	3810300	100	2,15	38,00	29,76	4,82	43,50	6,53
14000/R		3226	300	183	2	1	80	250	3810300	90	2,00	35,84	31,82	4,66	39,15	6,21

14500/L		4462	1037	183	2	20	80	250	3810300	0	2,00	40,46	35,00	4,97	0,00	4,97
15000/R		7528	267	235	2	2	80	250	3810300	70	2,11	47,92	29,37	5,16	30,45	6,36
15500/L	K	3490	82	122	2	0	80	250	3810300	170	1,71	36,96	4,46	3,34	73,96	6,26
16000/R		602	2252	166	3	20	80	250	3810300	0	1,94	11,91	35,00	3,79	0,00	3,79
16500/L		4382	243	152	2	1	80	250	3810300	100	1,88	40,20	27,38	4,54	43,50	6,26
17000/R	*	774	789	597	2	6	80	250	3810300	50	2,10	15,49	35,00	4,09	21,75	4,95
17500/L		876	1486	488	2	20	80	250	3810300	0	2,16	17,25	35,00	4,22	0,00	4,22
18000/R		1839	102	86	1	0	80	250	3810300	170	1,36	27,83	9,06	2,81	73,96	5,73
18500/L		9708	195	306	2	1	80	250	3810300	70	2,18	49,50	22,74	5,02	30,45	6,22
19000/R		4817	475	115	2	4	80	250	3810300	45	1,66	41,55	35,00	4,67	19,58	5,44
19500/L	*	691	691	400	2	4	80	250	3810300	65	2,19	13,87	35,00	4,11	28,28	5,23
20000/R		4061	20	285	2	0	80	250	3810300	275	2,16	39,12	-25,32	2,71	119,63	7,42
20500/L		5362	72	316	2	0	80	250	3810300	160	2,18	43,08	1,71	3,95	69,61	6,69
21000/R		11208	126	164	2	1	80	250	3810300	85	1,93	49,50	13,52	4,42	36,98	5,87
21500/L	R	9148	297	174	2	3	80	250	3810300	55	1,97	49,50	31,61	5,16	23,93	6,11
22000/R		4598	69	239	2	0	80	250	3810300	170	2,12	40,89	0,81	3,76	73,96	6,67
22500/L		5967	92	266	2	0	80	250	3810300	140	2,15	44,61	6,88	4,18	60,90	6,58
23000/R	*	1662	1662	156	3	20	80	250	3810300	0	1,90	26,38	35,00	4,32	0,00	4,32
23500/L		10013	176	200	2	1	80	250	3810300	75	2,04	49,50	20,57	4,80	32,63	6,09
24000/R		6017	157	152	2	0	80	250	3810300	105	1,88	44,72	18,16	4,36	45,68	6,16
24500/L		6931	104	194	2	0	80	250	3810300	125	2,03	46,74	9,47	4,24	54,38	6,39
25000/R		7003	115	256	2	0	80	250	3810300	120	2,14	46,89	11,59	4,44	52,20	6,50
25500/L		13700	114	263	2	1	80	250	3810300	80	2,15	49,50	11,41	4,55	34,80	5,92
26000/R		11573	59	241	2	0	80	250	3810300	135	2,12	49,50	-2,49	3,97	58,73	6,29
26500/L		8190	76	242	2	0	80	250	3810300	135	2,12	49,12	2,85	4,17	58,73	6,48
27000/R		11552	314	226	2	4	80	250	3810300	40	2,10	49,50	32,79	5,34	17,40	6,02
27500/L		6861	359	139	2	3	80	250	3810300	55	1,82	46,60	35,00	5,03	23,93	5,97
28000/R	*	790	790	164	2	6	80	250	3810300	50	1,93	15,78	35,00	3,93	21,75	4,79
28500/L	R	8480	201	198	2	1	80	250	3810300	75	2,04	49,50	23,37	4,91	32,63	6,19
29000/R	*	598	598	222	2	2	80	250	3810300	80	2,09	11,81	35,00	3,93	34,80	5,30
29500/L	R	6551	115	177	2	0	80	250	3810300	120	1,98	45,94	11,59	4,24	52,20	6,30
30000/R		10295	175	211	2	1	80	250	3810300	70	2,07	49,50	20,45	4,82	30,45	6,02
30500/L		9576	183	146	2	1	80	250	3810300	75	1,85	49,50	21,40	4,65	32,63	5,93
31000/R	*	1020	1020	138	3	12	80	250	3810300	15	1,81	19,42	35,00	3,95	6,53	4,21
31500/L	*	859	859	107	3	5	80	250	3810300	45	1,59	16,97	35,00	3,64	19,58	4,41
32000/R	*	1170	1170	129	3	14	80	250	3810300	5	1,76	21,38	35,00	3,98	2,18	4,06

32500/L	R	5388	425	106	2	3	80	250	3810300	50	1,58	43,15	35,00	4,66	21,75	5,52
33000/R		4703	142	118	2	0	80	250	3810300	125	1,68	41,21	16,04	3,94	54,38	6,08
33500/L		7132	156	138	2	1	80	250	3810300	100	1,81	47,15	18,03	4,38	43,50	6,09
34000/R		3609	239	124	2	1	80	250	3810300	105	1,72	37,44	27,03	4,26	45,68	6,06
34500/L		9016	65	208	2	0	80	250	3810300	145	2,06	49,50	-0,45	3,99	63,08	6,48
35000/R		7071	83	145	2	0	80	250	3810300	140	1,85	47,03	4,71	3,89	60,90	6,29

ALYAT-GEORGIAN BORDER ROAD: BEARING CAPACITY RESULTS pr. POINT 1997

SECTION NO. 7 END OF GJANDZA BYPASS TO AKSTAFA

chainage/lane	remarks	E1	E2	E subg.	Cr.layer	est.life	H1	H2	est.traffic	overlay	SNSG	a(l)*h(l)	a(l)*h(l)	SNC	A(l)*H(l)	SNC
[m]		[Mpa]	[Mpa]	[Mpa]		[Years]	[mm]	[mm]	[S. A.]	[mm]		E1	E2	before str.	str. layer	after str.
0/R		14669	2085	104	3	20	80	250	3810300	0	1,56	49,50	35,00	4,89	0,00	4,89
1000/R		906	3295	152	3	20	80	250	3810300	0	1,88	17,73	35,00	3,96	0,00	3,96
2000/R		7042	340	233	2	3	80	250	3810300	60	2,11	46,97	34,47	5,32	26,10	6,34
3000/R	*	987	1025	371	2	13	80	250	3810300	15	2,19	18,95	35,00	4,32	6,53	4,57
3500/L		12450	69	208	2	0	80	250	3810300	120	2,06	49,50	0,81	4,04	52,20	6,10
4000/R	*	2277	2366	191	3	20	80	250	3810300	0	2,02	30,87	35,00	4,62	0,00	4,62
4500/L	*	593	871	174	2	7	80	250	3810300	45	1,97	11,69	35,00	3,81	19,58	4,58
5000/R		4198	243	456	2	1	80	250	3810300	100	2,17	39,59	27,38	4,81	43,50	6,53
5500/L	*	556	817	211	2	6	80	250	3810300	50	2,07	10,77	35,00	3,87	21,75	4,73
6000/R		2433	626	99	2	5	80	250	3810300	50	1,51	31,82	35,00	4,14	21,75	5,00
6500/L		12209	164	361	2	2	80	250	3810300	65	2,19	49,50	19,08	4,89	28,28	6,01
7000/R		6667	518	113	2	6	80	250	3810300	35	1,64	46,19	35,00	4,84	15,23	5,44
7500/L	*	923	1356	163	3	20	80	250	3810300	0	1,93	18,00	35,00	4,02	0,00	4,02
8000/R	*	780	810	98	3	4	80	250	3810300	60	1,50	15,60	35,00	3,49	26,10	4,52
8500/L	*	325	478	242	2	1	80	250	3810300	100	2,12	3,12	35,00	3,62	43,50	5,34
9000/R		686	2129	100	3	18	80	250	3810300	0	1,52	13,77	35,00	3,44	0,00	3,44
9500/L		3467	1139	127	3	20	80	250	3810300	0	1,74	36,87	35,00	4,58	0,00	4,58
10000/R		5703	1417	168	2	20	80	250	3810300	0	1,95	43,96	35,00	5,06	0,00	5,06
10500/L	*	601	883	275	2	8	80	250	3810300	40	2,16	11,88	35,00	4,00	17,40	4,69
11000/R		9833	1735	163	3	20	80	250	3810300	0	1,93	49,50	35,00	5,26	0,00	5,26
11500/L	*	1138	1673	163	3	20	80	250	3810300	0	1,93	20,98	35,00	4,13	0,00	4,13
12000/R		4183	323	113	2	1	80	250	3810300	75	1,64	39,54	33,38	4,51	32,63	5,80
12500/L		11649	525	111	2	12	80	250	3810300	10	1,62	49,50	35,00	4,95	4,35	5,12
13000/R		12545	905	91	3	20	80	250	3810300	0	1,42	49,50	35,00	4,75	0,00	4,75
13500/L		11707	1069	146	2	20	80	250	3810300	0	1,85	49,50	35,00	5,18	0,00	5,18
14000/R		13786	972	88	3	20	80	250	3810300	0	1,38	49,50	35,00	4,71	0,00	4,71
14500/L	*	2244	3298	192	3	20	80	250	3810300	0	2,02	30,66	35,00	4,61	0,00	4,61
15000/R		1553	1273	67	3	6	80	250	3810300	50	1,05	25,42	35,00	3,43	21,75	4,29
15500/L	*	1068	1570	249	2	20	80	250	3810300	0	2,13	20,08	35,00	4,30	0,00	4,30

16000/R	*	1312	1363	110	3	14	80	250	3810300	5	1,62	23,01	35,00	3,90	2,18	3,99
17000/R		4466	127	141	2	0	80	250	3810300	130	1,83	40,47	13,69	3,96	56,55	6,19
17500/L	*	608	894	76	3	3	80	250	3810300	80	1,21	12,05	35,00	3,07	34,80	4,44
18000/R		885	921	169	2	9	80	250	3810300	30	1,95	17,40	35,00	4,02	13,05	4,53
18500/L	*	1659	2438	99	3	20	80	250	3810300	0	1,51	26,36	35,00	3,93	0,00	3,93
19000/R	*	415	432	95	2	1	80	250	3810300	105	1,47	6,60	35,00	3,11	45,68	4,91
19500/L	R *	1489	2188	103	3	20	80	250	3810300	0	1,55	24,82	35,00	3,91	0,00	3,91
20000/R	*	1607	1669	101	3	18	80	250	3810300	0	1,53	25,90	35,00	3,93	0,00	3,93
20500/L		5470	2226	151	3	20	80	250	3810300	0	1,88	43,37	35,00	4,96	0,00	4,96
21000/R	*	522	542	79	3	1	80	250	3810300	105	1,26	9,87	35,00	3,03	45,68	4,83
22000/R	*	1531	1591	122	3	20	80	250	3810300	0	1,71	25,21	35,00	4,08	0,00	4,08
22500/L	*	1092	1605	89	3	11	80	250	3810300	20	1,40	20,40	35,00	3,58	8,70	3,92
23500/L	*	1921	2823	191	3	20	80	250	3810300	0	2,02	28,45	35,00	4,52	0,00	4,52
24000/R		3927	354	49	3	1	80	250	3810300	120	0,59	38,64	35,00	3,50	52,20	5,55
24500/L	*	1815	2668	75	3	20	80	250	3810300	0	1,20	27,64	35,00	3,66	0,00	3,66
25000/R	*	736	765	102	3	4	80	250	3810300	60	1,54	14,77	35,00	3,50	26,10	4,53
25500/L	*	1600	2352	129	3	20	80	250	3810300	0	1,76	25,84	35,00	4,15	0,00	4,15
26000/R	*	1034	1075	76	3	5	80	250	3810300	60	1,21	19,62	35,00	3,36	26,10	4,39
26500/L		4604	299	157	2	1	80	250	3810300	85	1,90	40,91	31,75	4,77	36,98	6,22
27000/R	*	1208	1256	92	3	8	80	250	3810300	30	1,43	21,83	35,00	3,67	13,05	4,19
27500/L	*	2261	3323	125	3	20	80	250	3810300	0	1,73	30,77	35,00	4,32	0,00	4,32
28000/R		6459	494	86	2	5	80	250	3810300	40	1,36	45,74	35,00	4,54	17,40	5,23
28500/L		14069	726	157	2	20	80	250	3810300	0	1,90	49,50	35,00	5,23	0,00	5,23
29000/R	*	508	528	157	2	2	80	250	3810300	90	1,90	9,49	35,00	3,66	39,15	5,20
29500/L	*	2248	3305	207	3	20	80	250	3810300	0	2,06	30,69	35,00	4,65	0,00	4,65
30000/R		7741	573	101	2	9	80	250	3810300	20	1,53	48,32	35,00	4,81	8,70	5,16
30500/L	*	1951	2867	87	3	20	80	250	3810300	0	1,37	28,67	35,00	3,88	0,00	3,88
31000/R	*	1065	1107	82	3	6	80	250	3810300	50	1,30	20,04	35,00	3,47	21,75	4,33
31500/L		9622	608	70	3	8	80	250	3810300	30	1,11	49,50	35,00	4,44	13,05	4,95
32000/R		5212	1955	65	3	20	80	250	3810300	0	1,01	42,68	35,00	4,07	0,00	4,07
32500/L		3836	1641	55	3	10	80	250	3810300	20	0,77	38,31	35,00	3,66	8,70	4,00
33000/R	*	978	1016	88	3	5	80	250	3810300	50	1,38	18,82	35,00	3,51	21,75	4,36
33500/L	K-R	11624	1025	82	3	20	80	250	3810300	0	1,30	49,50	35,00	4,63	0,00	4,63
34000/R	*	2887	3000	129	3	20	80	250	3810300	0	1,76	34,26	35,00	4,49	0,00	4,49
34500/L		162	14204	70	3	20	80	250	3810300	0	1,11	-6,81	35,00	2,22	0,00	2,22
35000/R		1305	1611	85	3	11	80	250	3810300	15	1,35	22,94	35,00	3,63	6,53	3,89

35500/L	*	1556	2287	130	3	20	80	250	3810300	0	1,76	25,44	35,00	4,14	0,00	4,14
36000/R	*	822	854	66	3	2	80	250	3810300	90	1,03	16,35	35,00	3,05	39,15	4,60
36500/L	*	935	1375	275	2	20	80	250	3810300	0	2,16	18,18	35,00	4,25	0,00	4,25
37000/R		11046	316	116	2	4	80	250	3810300	40	1,66	49,50	32,92	4,91	17,40	5,60
37500/L	*	1074	1578	130	3	20	80	250	3810300	0	1,76	20,16	35,00	3,94	0,00	3,94
38000/R	*	1291	1341	83	3	8	80	250	3810300	35	1,32	22,78	35,00	3,59	15,23	4,19
38500/L	*	676	994	163	2	11	80	250	3810300	25	1,93	13,56	35,00	3,84	10,88	4,27
39000/R		5716	974	195	2	20	80	250	3810300	0	2,03	43,99	35,00	5,14	0,00	5,14
39500/L		183	13424	91	3	20	80	250	3810300	0	1,42	-5,07	35,00	2,60	0,00	2,60
40000/R		6779	211	93	2	1	80	250	3810300	85	1,45	46,42	24,40	4,24	36,98	5,69
40500/L		8224	2338	132	3	20	80	250	3810300	0	1,78	49,18	35,00	5,09	0,00	5,09
41000/R		818	2030	70	3	9	80	250	3810300	25	1,11	16,28	35,00	3,13	10,88	3,56
42000/R		4343	1085	68	3	9	80	250	3810300	30	1,07	40,08	35,00	4,03	13,05	4,54
42500/L		437	9706	83	3	20	80	250	3810300	0	1,32	7,34	35,00	2,99	0,00	2,99
43000/R		1271	745	90	3	4	80	250	3810300	60	1,41	22,56	35,00	3,68	26,10	4,71
43500/L		905	239	56	2	0	80	250	3810300	160	0,80	17,72	27,03	2,56	69,61	5,30
44000/R	*	4137	4298	132	3	20	80	250	3810300	0	1,78	39,38	35,00	4,71	0,00	4,71
44500/L		2807	1242	98	3	15	80	250	3810300	0	1,50	33,85	35,00	4,21	0,00	4,21
45000/R		4560	399	56	3	2	80	250	3810300	105	0,80	40,77	35,00	3,78	45,68	5,58
46000/R		1255	1757	61	3	7	80	250	3810300	40	0,92	22,38	35,00	3,18	17,40	3,87
46500/L		140	4517	69	3	20	80	250	3810300	0	1,09	-8,89	35,00	2,12	0,00	2,12
47000/R	*	3721	3866	112	3	20	80	250	3810300	0	1,63	37,87	35,00	4,50	0,00	4,50
48000/R		7855	744	74	3	10	80	250	3810300	20	1,18	48,52	35,00	4,47	8,70	4,81
48500/L	*	634	931	161	2	9	80	250	3810300	35	1,92	12,64	35,00	3,80	15,23	4,40
49000/R		5504	169	152	2	1	80	250	3810300	105	1,88	43,45	19,72	4,37	45,68	6,17
49500/L	*	1588	2334	105	3	20	80	250	3810300	0	1,57	25,73	35,00	3,96	0,00	3,96
50000/R		12226	627	78	3	14	80	250	3810300	5	1,24	49,50	35,00	4,57	2,18	4,66
50500/L	*	2238	3289	131	3	20	80	250	3810300	0	1,77	30,63	35,00	4,36	0,00	4,36
51000/R	*	2468	3039	146	3	20	80	250	3810300	0	1,85	32,02	35,00	4,49	0,00	4,49
51500/L	*	1959	2879	93	3	20	80	250	3810300	0	1,45	28,73	35,00	3,96	0,00	3,96
52000/R	*	514	633	101	3	2	80	250	3810300	75	1,53	9,65	35,00	3,29	32,63	4,58
53000/R		3849	1402	131	3	20	80	250	3810300	0	1,77	38,36	35,00	4,66	0,00	4,66
53500/L	*	3085	4535	134	3	20	80	250	3810300	0	1,79	35,20	35,00	4,55	0,00	4,55
54000/R	*	1632	2010	104	3	20	80	250	3810300	0	1,56	26,12	35,00	3,97	0,00	3,97
54500/L	*	1734	2548	149	3	20	80	250	3810300	0	1,87	26,99	35,00	4,31	0,00	4,31
55000/R		3009	365	223	2	1	80	250	3810300	80	2,09	34,85	35,00	4,84	34,80	6,21

56000/R		917	689	196	2	4	80	250	3810300	65	2,03	17,91	35,00	4,12	28,28	5,23
56500/L	*	349	513	89	3	1	80	250	3810300	100	1,40	4,13	35,00	2,94	43,50	4,65
57000/R	*	847	1044	73	3	4	80	250	3810300	70	1,16	16,77	35,00	3,20	30,45	4,40
57500/L	*	2805	4123	122	3	20	80	250	3810300	0	1,71	33,84	35,00	4,42	0,00	4,42
58500/L	*	440	646	148	2	3	80	250	3810300	75	1,86	7,44	35,00	3,53	32,63	4,82
59000/R	*	236	290	102	2	0	80	250	3810300	130	1,54	-1,44	31,11	2,71	56,55	4,94
59500/L		6108	2752	132	3	20	80	250	3810300	0	1,78	44,94	35,00	4,93	0,00	4,93
60500/L	*	2372	3486	102	3	20	80	250	3810300	0	1,54	31,45	35,00	4,16	0,00	4,16
61000/R	*	299	368	129	2	0	80	250	3810300	115	1,76	1,93	35,00	3,21	50,03	5,18
61500/L	*	2272	3340	223	3	20	80	250	3810300	0	2,09	30,84	35,00	4,68	0,00	4,68
62000/R	*	1035	1275	105	3	10	80	250	3810300	20	1,57	19,63	35,00	3,72	8,70	4,07
62500/L	*	1716	2522	142	3	20	80	250	3810300	0	1,83	26,84	35,00	4,27	0,00	4,27
63000/R		6106	317	59	2	2	80	250	3810300	95	0,87	44,93	32,99	3,94	41,33	5,57
63500/L	*	1844	2710	139	3	20	80	250	3810300	0	1,82	27,86	35,00	4,29	0,00	4,29
64000/R	*	771	949	114	3	7	80	250	3810300	35	1,65	15,43	35,00	3,64	15,23	4,24
64500/L		7681	338	152	2	3	80	250	3810300	55	1,88	48,21	34,34	5,13	23,93	6,08
65000/R	*	635	781	110	3	4	80	250	3810300	55	1,62	12,67	35,00	3,49	23,93	4,44
65500/L		3382	186	66	2	0	80	250	3810300	130	1,03	36,51	21,74	3,32	56,55	5,55
66000/R	*	842	1036	78	3	4	80	250	3810300	65	1,24	16,69	35,00	3,28	28,28	4,39
66500/L		11429	1884	98	3	20	80	250	3810300	0	1,50	49,50	35,00	4,83	0,00	4,83
67000/R	*	467	575	128	2	2	80	250	3810300	85	1,75	8,29	35,00	3,46	36,98	4,91
67500/L		2333	1235	98	3	13	80	250	3810300	10	1,50	31,22	35,00	4,11	4,35	4,28
68000/R		14833	48	252	2	0	80	250	3810300	135	2,13	49,50	-6,84	3,81	58,73	6,13
68500/L	*	429	516	128	2	1	80	250	3810300	95	1,75	7,08	35,00	3,41	41,33	5,04
69000/R	*	459	565	112	2	2	80	250	3810300	85	1,63	8,04	35,00	3,33	36,98	4,79
69500/L		2126	927	164	2	12	80	250	3810300	15	1,93	29,89	35,00	4,49	6,53	4,75
70000/R	*	1750	2155	122	3	20	80	250	3810300	0	1,71	27,12	35,00	4,16	0,00	4,16
70500/L	*	264	317	173	2	0	80	250	3810300	125	1,96	0,15	32,99	3,27	54,38	5,41
71000/R		14805	175	108	2	2	80	250	3810300	50	1,60	49,50	20,45	4,35	21,75	5,21
71500/L	*	616	742	114	3	4	80	250	3810300	60	1,65	12,23	35,00	3,51	26,10	4,54
72000/R		2149	2274	80	3	20	80	250	3810300	0	1,27	30,05	35,00	3,84	0,00	3,84
72500/L	*	659	794	95	3	3	80	250	3810300	65	1,47	13,20	35,00	3,37	28,28	4,48
73000/R	K *	1138	1401	106	3	13	80	250	3810300	10	1,58	20,98	35,00	3,79	4,35	3,96
73500/L	*	601	723	94	3	3	80	250	3810300	75	1,46	11,88	35,00	3,30	32,63	4,59
74000/R	*	1019	1255	153	3	20	80	250	3810300	0	1,89	19,41	35,00	4,03	0,00	4,03
74500/L	*	1592	1917	158	3	20	80	250	3810300	0	1,91	25,77	35,00	4,30	0,00	4,30

75000/R	*	372	458	112	2	1	80	250	3810300	105	1,63	5,04	35,00	3,21	45,68	5,01
75500/L		5196	240	114	2	1	80	250	3810300	90	1,65	42,63	27,12	4,40	39,15	5,94
76000/R	R *	1432	1764	102	3	20	80	250	3810300	0	1,54	24,26	35,00	3,88	0,00	3,88
76500/L		13732	205	99	2	3	80	250	3810300	50	1,51	49,50	23,79	4,40	21,75	5,26
77000/R	*	355	438	70	3	1	80	250	3810300	125	1,11	4,38	35,00	2,66	54,38	4,80
77500/L		12179	21	71	2	0	80	250	3810300	200	1,13	49,50	-24,29	2,12	87,01	5,55
78000/R	*	1817	2238	114	3	20	80	250	3810300	0	1,65	27,65	35,00	4,12	0,00	4,12
78500/L	*	1294	1557	142	3	20	80	250	3810300	0	1,83	22,82	35,00	4,11	0,00	4,11
79000/R		7078	1713	86	3	20	80	250	3810300	0	1,36	47,04	35,00	4,59	0,00	4,59
80000/R		760	31	99	1	0	80	250	3810300	270	1,51	15,23	-16,07	1,48	117,46	6,11
79500/L	*	1444	1738	74	3	11	80	250	3810300	20	1,18	24,38	35,00	3,52	8,70	3,86

ALYAT-GEORGIAN BORDER ROAD: BEARING CAPACITY RESULTS pr. POINT 1997

SECTION NO. 8 AKSTAFA TO THE GEORGIAN BORDER

chainage/lane	remarks	E1	E2	E subg.	Cr.layer	est.life	H1	H2	est.traffic	overlay	SNSG	a(l)*h(l)	a(l)*h(l)	SNC	A(l)*H(l)	SNC
[m]		[Mpa]	[Mpa]	[Mpa]		[Years]	[mm]	[mm]	[S. A.]	[mm]		E1	E2	before str.	str. layer	after str.
500/L	*	407	502	80	3	1	80	250	3428000	105	1,27	6,33	35,00	2,90	45,68	4,70
1000/R	*	509	815	105	3	4	80	250	3428000	55	1,57	9,51	35,00	3,32	23,93	4,27
1500/L		6782	391	137	2	4	80	250	3428000	50	1,80	46,43	35,00	5,01	21,75	5,87
2000/R		580	4582	193	3	20	80	250	3428000	0	2,03	11,38	35,00	3,85	0,00	3,85
2500/L		13597	722	77	3	18	80	250	3428000	0	1,23	49,50	35,00	4,56	0,00	4,56
3000/R	*	992	1590	106	3	16	80	250	3428000	0	1,58	19,03	35,00	3,71	0,00	3,71
3500/L	*	700	862	73	3	3	80	250	3428000	80	1,16	14,06	35,00	3,09	34,80	4,47
4000/R	*	1698	2722	96	3	20	80	250	3428000	0	1,48	26,69	35,00	3,91	0,00	3,91
4500/L	*	751	925	100	3	6	80	250	3428000	45	1,52	15,06	35,00	3,49	19,58	4,27
5000/R		12025	3485	209	3	20	80	250	3428000	0	2,06	49,50	35,00	5,39	0,00	5,39
5500/L	*	1273	1568	112	3	20	80	250	3428000	0	1,63	22,58	35,00	3,90	0,00	3,90
6000/R	*	182	292	187	2	0	80	250	3428000	125	2,01	-5,15	31,25	3,04	54,38	5,18
6500/L	*	883	1087	69	3	4	80	250	3428000	65	1,09	17,37	35,00	3,15	28,28	4,27
7000/R		3203	679	188	2	7	80	250	3428000	30	2,01	35,74	35,00	4,80	13,05	5,31
7500/L	*	610	751	115	3	5	80	250	3428000	55	1,66	12,09	35,00	3,51	23,93	4,46
8000/R		9780	463	82	2	8	80	250	3428000	20	1,30	49,50	35,00	4,63	8,70	4,98
8500/L		13710	319	73	2	6	80	250	3428000	30	1,16	49,50	33,12	4,42	13,05	4,93
9000/R		7521	682	64	3	8	80	250	3428000	35	0,99	47,91	35,00	4,25	15,23	4,85
9500/L	*	1593	1962	139	3	20	80	250	3428000	0	1,82	25,78	35,00	4,21	0,00	4,21
10000/R		5557	596	144	2	8	80	250	3428000	25	1,84	43,59	35,00	4,94	10,88	5,37
10500/L	*	852	1050	173	2	16	80	250	3428000	0	1,96	16,86	35,00	4,01	0,00	4,01
11000/R		7651	186	109	2	1	80	250	3428000	80	1,61	48,15	21,74	4,36	34,80	5,73
11500/L		14772	1136	142	2	20	80	250	3428000	0	1,83	49,50	35,00	5,16	0,00	5,16
12000/R	*	1822	2920	171	3	20	80	250	3428000	0	1,96	27,69	35,00	4,43	0,00	4,43
12500/L		5365	299	46	3	1	80	250	3428000	115	0,49	43,09	31,75	3,44	50,03	5,41
13000/R	*	967	1550	98	3	13	80	250	3428000	10	1,50	18,66	35,00	3,62	4,35	3,79
13500/L	*	520	640	186	2	3	80	250	3428000	70	2,01	9,82	35,00	3,77	30,45	4,97
14000/R	*	607	972	181	2	12	80	250	3428000	25	1,99	12,02	35,00	3,84	10,88	4,27
14500/L	*	780	960	175	2	12	80	250	3428000	20	1,97	15,60	35,00	3,97	8,70	4,31

15000/R	*	747	1196	231	2	20	80	250	3428000	0	2,10	14,98	35,00	4,07	0,00	4,07
15500/L	*	528	650	127	2	3	80	250	3428000	70	1,74	10,04	35,00	3,52	30,45	4,72
16000/R		592	2144	247	3	20	80	250	3428000	0	2,13	11,67	35,00	3,97	0,00	3,97
16500/L	*	872	1074	192	2	17	80	250	3428000	0	2,02	17,19	35,00	4,08	0,00	4,08
17000/R		6505	466	188	2	5	80	250	3428000	40	2,01	45,84	35,00	5,20	17,40	5,88
17500/L		10893	307	93	2	4	80	250	3428000	40	1,45	49,50	32,31	4,67	17,40	5,35
18500/L		8366	248	88	2	2	80	250	3428000	65	1,38	49,42	27,81	4,43	28,28	5,54
19000/R	*	714	1144	105	3	8	80	250	3428000	30	1,57	14,34	35,00	3,51	13,05	4,03
19500/L	*	1093	1346	148	3	20	80	250	3428000	0	1,86	20,41	35,00	4,05	0,00	4,05
20000/R	*	387	620	92	3	2	80	250	3428000	80	1,43	5,61	35,00	3,03	34,80	4,40
20500/L	*	1806	2224	202	3	20	80	250	3428000	0	2,05	27,57	35,00	4,51	0,00	4,51
21000/R	*	498	799	99	3	4	80	250	3428000	60	1,51	9,20	35,00	3,25	26,10	4,28
21500/L		1926	50	36	1	0	80	250	3428000	220	0,07	28,48	-5,98	0,96	95,71	4,73
22000/R		7677	1518	140	3	20	80	250	3428000	0	1,82	48,20	35,00	5,10	0,00	5,10
22500/L	*	259	319	96	2	0	80	250	3428000	120	1,48	-0,12	33,12	2,78	52,20	4,84
23000/R	*	654	1048	165	2	15	80	250	3428000	5	1,94	13,09	35,00	3,83	2,18	3,92
23500/L	*	1402	1727	170	3	20	80	250	3428000	0	1,95	23,96	35,00	4,28	0,00	4,28
24000/R	*	1558	2496	109	3	20	80	250	3428000	0	1,61	25,46	35,00	3,99	0,00	3,99
24500/L	*	2682	3303	192	3	20	80	250	3428000	0	2,02	33,21	35,00	4,71	0,00	4,71
25000/R		13890	842	109	3	20	80	250	3428000	0	1,61	49,50	35,00	4,94	0,00	4,94
25500/L		6366	199	93	2	1	80	250	3428000	85	1,45	45,53	23,16	4,15	36,98	5,61
26000/R		891	1299	360	2	20	80	250	3428000	0	2,19	17,50	35,00	4,26	0,00	4,26
26500/L		8548	343	213	2	4	80	250	3428000	45	2,07	49,50	34,65	5,39	19,58	6,16
27000/R		10269	813	165	2	20	80	250	3428000	0	1,94	49,50	35,00	5,27	0,00	5,27
27500/L	*	681	839	175	2	8	80	250	3428000	40	1,97	13,66	35,00	3,89	17,40	4,57
28000/R	*	412	661	114	2	3	80	250	3428000	70	1,65	6,50	35,00	3,28	30,45	4,48
28500/L		9999	526	104	2	11	80	250	3428000	15	1,56	49,50	35,00	4,89	6,53	5,15
29000/R		4800	558	125	2	6	80	250	3428000	30	1,73	41,50	35,00	4,74	13,05	5,26
29500/L	*	658	811	78	3	3	80	250	3428000	75	1,24	13,17	35,00	3,14	32,63	4,43
30000/R	*	418	671	263	2	4	80	250	3428000	70	2,15	6,71	35,00	3,79	30,45	4,99
30500/L	*	843	1039	103	3	7	80	250	3428000	35	1,55	16,71	35,00	3,59	15,23	4,19
31000/R		8842	78	90	2	0	80	250	3428000	130	1,41	49,50	3,40	3,49	56,55	5,72
31500/L	*	915	1127	141	3	15	80	250	3428000	0	1,83	17,87	35,00	3,91	0,00	3,91
32000/R	*	614	927	154	2	10	80	250	3428000	30	1,89	12,19	35,00	3,75	13,05	4,26
32500/L		6529	1358	103	3	20	80	250	3428000	0	1,55	45,89	35,00	4,74	0,00	4,74
33000/R		5558	681	132	2	11	80	250	3428000	15	1,78	43,59	35,00	4,87	6,53	5,13

33500/L	*	1353	1666	150	3	20	80	250	3428000	0	1,87	23,45	35,00	4,18	0,00	4,18
34000/R	*	857	1295	144	3	20	80	250	3428000	0	1,84	16,94	35,00	3,89	0,00	3,89
34500/L		308	10893	140	3	20	80	250	3428000	0	1,82	2,35	35,00	3,29	0,00	3,29
35000/R	*	1724	2606	208	3	20	80	250	3428000	0	2,06	26,91	35,00	4,50	0,00	4,50
35500/L	*	3177	3912	132	3	20	80	250	3428000	0	1,78	35,62	35,00	4,56	0,00	4,56
36000/R	*	2384	3603	89	3	20	80	250	3428000	0	1,40	31,53	35,00	4,02	0,00	4,02
36500/L	*	1143	1408	62	3	6	80	250	3428000	50	0,94	21,05	35,00	3,15	21,75	4,01
37000/R		7763	1535	141	3	20	80	250	3428000	0	1,83	48,36	35,00	5,11	0,00	5,11
37500/L		3970	421	68	2	3	80	250	3428000	80	1,07	38,80	35,00	3,98	34,80	5,35
38000/R	*	1230	1859	111	3	20	80	250	3428000	0	1,62	22,09	35,00	3,87	0,00	3,87
38500/L	*	5015	6176	234	3	20	80	250	3428000	0	2,11	42,13	35,00	5,15	0,00	5,15
39000/R		2781	89	116	1	0	80	250	3428000	170	1,66	33,72	6,19	3,24	73,96	6,15
39500/L		7832	358	100	2	4	80	250	3428000	45	1,52	48,48	35,00	4,81	19,58	5,58
40000/R		7800	636	90	2	13	80	250	3428000	10	1,41	48,42	35,00	4,70	4,35	4,87
40500/L	*	1365	1681	226	3	20	80	250	3428000	0	2,10	23,58	35,00	4,40	0,00	4,40
41000/R	*	864	1306	80	3	7	80	250	3428000	40	1,27	17,06	35,00	3,33	17,40	4,01
41500/L		6338	1006	162	2	20	80	250	3428000	0	1,92	45,47	35,00	5,09	0,00	5,09
42000/R	*	1349	2040	160	3	20	80	250	3428000	0	1,92	23,41	35,00	4,22	0,00	4,22
42500/L	*	593	730	79	3	2	80	250	3428000	80	1,26	11,69	35,00	3,10	34,80	4,47
43500/L	*	1005	1237	78	3	7	80	250	3428000	40	1,24	19,21	35,00	3,38	17,40	4,07
44000/R		14359	769	184	2	20	80	250	3428000	0	2,00	49,50	35,00	5,33	0,00	5,33
44500/L	*	826	1017	254	2	14	80	250	3428000	10	2,14	16,42	35,00	4,16	4,35	4,33
45000/R	*	2260	3417	482	3	20	80	250	3428000	0	2,16	30,76	35,00	4,76	0,00	4,76
46000/R		8077	578	294	2	10	80	250	3428000	15	2,17	48,92	35,00	5,48	6,53	5,73

BEARING CAPACITY OF EQUAL SECTIONS

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A/S PHØNIX
P. P. C

Client: turk

Sec. no.: 0001

Link no.: 0001

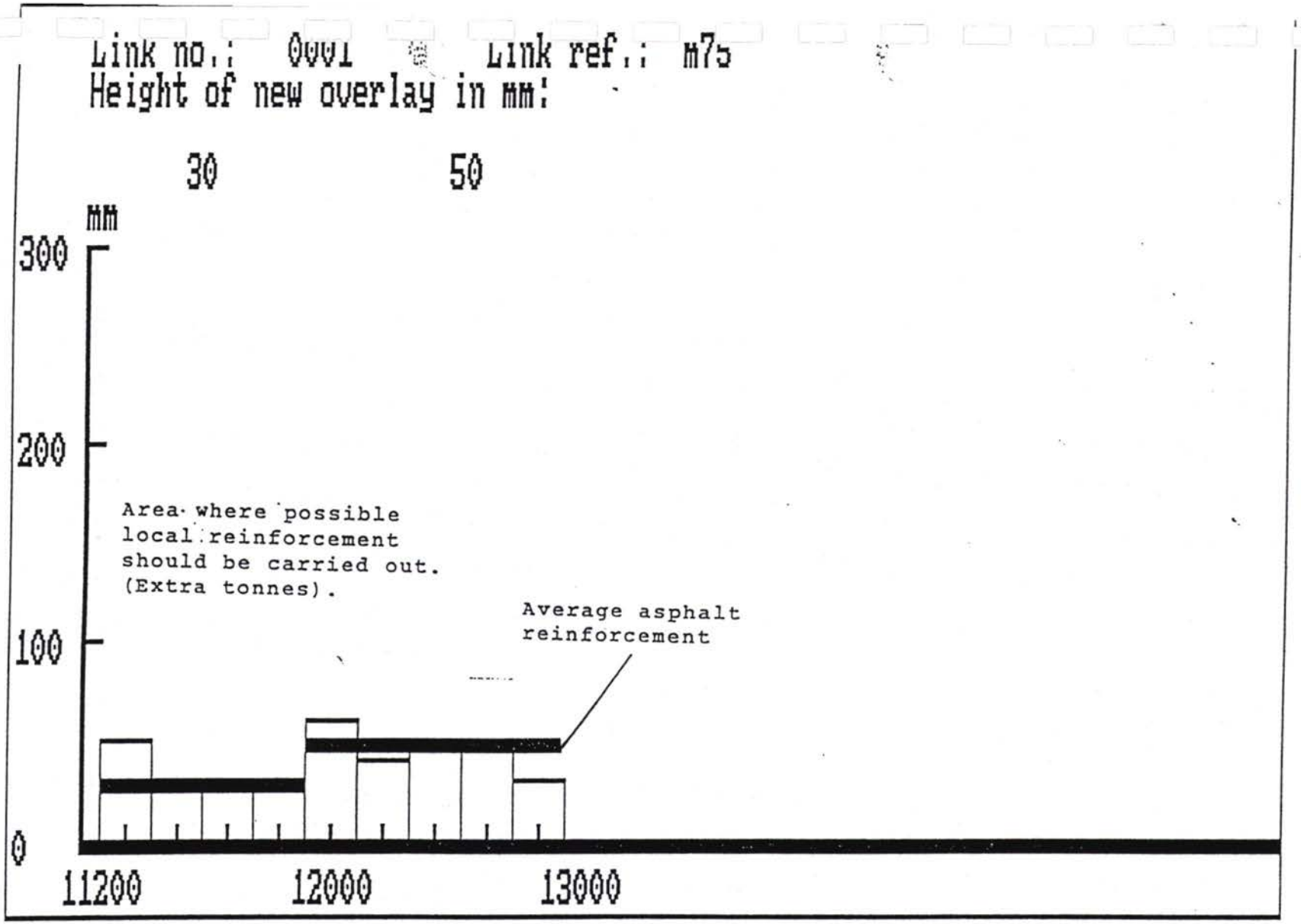
Design date: 04-03-1997

Link ref.: m75

Mea. date: 970116 2

The classification is based on sections => 4 measurements.
For each section the overlay thickness is calculated as
average + 33% of the standard deviation.
The stated layer thickness must be considered as instructive, as there might
be material or technical reasons why another layer thickness than the here
stated should be carried out, especially in connection with thin
overlay thicknesses.

Section	Overlay Thickness in mm	<--------Life--------> before years	after years	extra tons
11200 - 12000	30	5	15	30
12000 - 13000	50	2	15	0


Link no.: 0001
Link ref.: M75
Height of new overlay in mm:
30
50
mm
300
200
100
0
Area where possible local reinforcement should be carried out. (Extra tonnes).
Average asphalt reinforcement
11200
12000
13000

345

ROAD EVALUATION REPORT

A/S PHØNIX
P. P. C

Client: turk
Sec. no.: 0001
Link no.: 0001
Design date: 04-03-1997

Link ref.: m75
Start at: ask
Surface: asf
Mea. date: 970123 2

Calculation parameters:

Load radius	150 mm
Contact pressure	0.70 MPa
Poisson's ratio	0.35
Annual traf. growth	.01 %
Design temperature	30 C
Design period	15 years
S. kor. factor	1.00

Signature index:

B=Block cracking	R=Rutting
A=Alligator cracking	O=No remarks
C=other cracking	S=Surface defect
P=Potholes	H=Future design
D=Deformation	X=Local def. only
Y=General defect	Z=Reconstruction area
T=Temperature taken	

* - after remarks indicates that the point has been calculated as a 2-layer system and that the thickness and E-values of 1st and 2nd layer are the same when calculating the new overlay needed in the actual point, the calculation is done for a 3-layer system

E-value of new asphalt layer < 100 mm MPa: 3000
E-value of new asphalt layer > 100 mm MPa: 3000

Point	Remarks	E1 MPa	E2 Mpa	E3 MPa	Esub MPa	Critical layer	Estimated life years	Ex.layer H1 mm	H2 mm	H3 mm	Estimated traffic 8.16 t	New overlay mm
11300/l		1191	216	0	85	1	2	170	250	0	4005100	50
11500/r		5179	660	0	125	3	20	170	250	0	4005100	0
11700/l		1417	313	0	124	2	6	170	250	0	4005100	25
11900/r		290	584	0	135	2	4	170	250	0	4005100	30
12100/r		1007	209	0	85	1	1	170	250	0	4005100	60
12300/l		1246	273	0	114	2	4	170	250	0	4005100	40
12500/r		1244	211	0	87	1	2	170	250	0	4005100	50
12700/l		1366	199	0	117	1	2	170	250	0	4005100	50
12900/r		1406	282	0	106	2	5	170	250	0	4005100	30

E-value asphalt
E-value gravel
E-value sand
E-value subbase
Thickness asphalt
Thickness gravel
Thickness sand