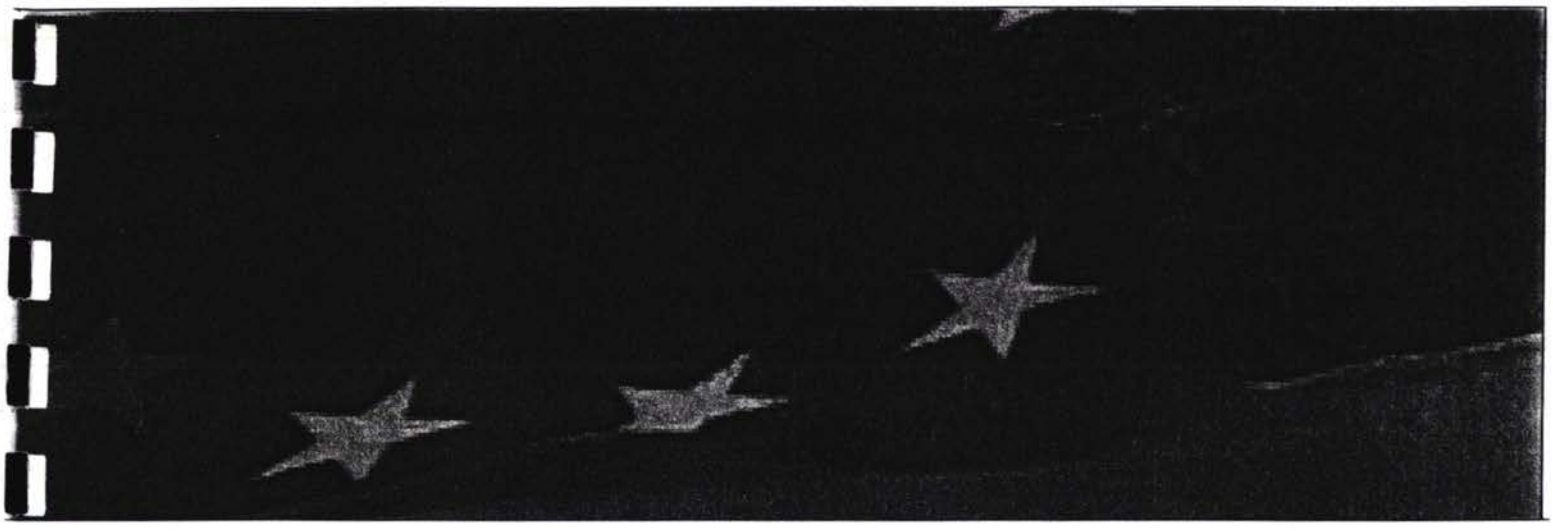

Tacis Regional 2000 Traceca Programme

Rehabilitation of Caucasian Highways

Azerbaijan Georgia and Armenia

First Progress Report

(REVISED VERSION)

January – July, 2003

July 27, 2003

EUROPEAID CO-OPERATION OFFICE

This Project is funded by the European Union

A technical Support Project By Louis Berger SA

Report Cover Page

Project Title	Rehabilitation of Caucasian Highways Azerbaijan, Georgia and Armenia	
Project Number	EUROPEAID/113179/C/SV/MULTI	
	Local Operator	EC Consultant
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Date of Report	July 27, 2003
Reporting Period	January – July , 2003
Author of Report	Kakhraman Zukhurov Acting Team Leader (EC Service Contractor's)

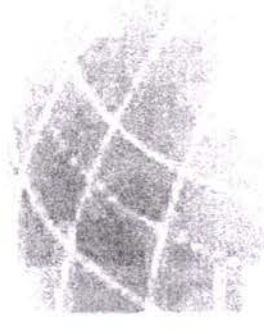
Azerbaijan	Mr. Javid Gurbanov		
Georgia	Mr. Boris Saralidze		
Armenia	Mr. A. Bakhtamyan		
EC Delegation			
TACIS Bureau (Task Manager)			
	Name	***Signature***	*Date*

1 PROJECT SYNOPSIS

Project Title	Rehabilitation of Caucasian Highways Azerbaijan Georgia and Armenia
Project Number	EUROPEAID/113179/C/SV/MULTI
Country	Azerbaijan Armenia Georgia

Wider Project Objectives	The wider objectives are to support the Republics to catch up with their serious backlogs in road maintenance, and to cope with growing Local, and international transport. These include the following • The improvement and provision of a better level of service for the travelling public on route corridors; • To reduce costs in road transportation; • To arrest deterioration of pavements by timely intervention; • To reduce costs for road rehabilitation and maintenance; • To strengthen the national road construction and maintenance capabilities through transfer of technology.
Specific Project Objectives	The specific project objectives are to provide consultancy services for three Beneficiaries. These all being the State departments of Roads in their respective Countries namely Azerbaijan, Georgia and Armenia.
	Azerbaijan: In Azerbaijan there are four subcomponents of the project a) Review of Designs and Tender Documents; b) Supervision of Construction of the WB (IDA) financed road sections under the Azerbaijan Highway Project; c) Assistance to the joint Project Implementation Unit (PIU) for the World Bank and the EBRD roads projects; d) Technical supervision of the TACIS project: construction of two bridges / Gasan Su Chay and Shemkir. Duration estimated 24 months.
	Georgia: In Georgia the main objective is the developing of a Pre-Feasibility Study for modernization of the existing Poti-Tbilisi-Red Bridge road under the standard of the international motorway passing by larger inhabited areas. Determining the deadline for road carrying capacity, based on the dynamics of traffic volume growth at sections of the existing road, and modernizations periods, technical and economic study and comparison of the modernization alternative with the alternative of construction of international motorway (to a SNiP Category I). Also an exchange of technical expertise Duration estimated 10 months, in conjunction with the project in Armenia.

	Armenia: The Project in Armenia covers the investigations, designs, preparation of contract drawings, cost estimates and Tender Documents for 3 tunnels on the road from Vanadzor to the Georgian Border. Also an exchange of technical expertise. Duration estimated 10 months in conjunction with the project in Georgia.
Planned Outputs	**Azerbaijan** Assistance to the PIU such that they become an experienced unit and fully conversant with the procedures of all the International Funding Institutions (IFI). Supervision of six contracts such that they are all finished in accordance with the International standards and within the programmed time and in accordance with the budget.
	Georgia The production of a Pre-Feasibility study for the road improvements to the Poti to Red Bridge Road. This study will identify areas of roads that require rehabilitation or reconstruction. The study will also highlight the need to protect land reserves for new road alignment. The aim being to assist the Government of Georgia to obtain funding from IFI's.
	Armenia To study the situation regarding the state of the three tunnels and make proposals for the rehabilitation and then to produce all the necessary designs, drawings and Tender Documents.



Project Activities

The Project is set up in the form of separate components all of which form the main basis of the proposed project activities. These are enumerated in the table below.

Component	Location	Services
Component 1	**Azerbaijan**	Design Reviews, Construction Supervision and Assistance to the Project Implementation Unit in Azerbaijan
Sub-component 1.1		Review of the Design and Contract Documents
Sub-component 1.2		Construction Supervision on Lot 1 from Ganja to Shemkir and Lots 1-4 from Shemkir to Gazakh Road
Sub-component 1.3		Technical assistance to the PIU
Sub-component 1.4		Technical supervision of the Tacis project "Reconstruction of two bridges Gasan Su Chay and Shemkir"
Component 2	**Georgia**	Pre-Feasibility study of modernisation of Poti-Tbilisi-Red Bridge Road in Georgia
Component 3	**Armenia**	Design and Preparation of Tender Documents for three Tunnels on the road from Vanadzor to the Georgian Border in Armenia
Project Starting Date		Contract signed 25th November 2002 Team Leader Mobilised 19th January 2003 Resident Engineer mobilised 19th February Highway Engineer mobilised on June 17
Project Duration	2 Years	

2. SUMMARY OF THE PROJECT ACTIVITIES FROM THE START

2.1 INTRODUCTION

The Contract was signed on 25th November 2002. The Team Leader arrived in Baku on 19th January 2003 accompanied by the Project Director. Revised Inception report was produced in April and comments of project partners were attended by June. Project Team Leader has resigned from the project and LBSA Project Coordinator has been replacing him from June 10 up to date.

2.2 COMPONENT 1: DESIGN REVIEWS, CONSTRUCTION SUPERVISION AND ASSISTANCE TO THE PROJECT IMPLEMENTATION UNIT IN AZERBAIJAN

Sub-component 1.1 Reviews of the Design and Contract Documents

By the time of the start of consulting services, two out of six contracts for civil works have already been tendered and contracts awarded. Thus, consultant had no possibility to review documents before tenders. Reviews of contract documents have been taking place during the execution of the contracts. For example, design reviews for two bridges (re-designed by the contractor) are under the completion stage. Designs for Ganja to Gazakh road section have to be improved. Designs and tender documents for Lots 1 – 4 of Shemkir – Gazakh Road Section were requested from the PIU for reviews and the PIU is currently preparing set of documents for consultant's reviews. Status of the sub-component: works are ongoing.

Sub-component 1.2 Construction Supervision of Ganja to Gazakh Road

Civil works contract for Ganja-Shemkir Road Section have started. However, Design (survey) discrepancies have been found and the client (RoadTransService Department) is requested to provide the proper designs to continue civil works. Currently, Consultant is preparing proposal to the client in finding the proper solution in execution of the contract. Tenders for the road section Shemkir to Gazakh (in 4 contract lots) are on the stage of the advertisement. Status of the sub-component: works are ongoing.

Sub-component 1.3 Assistance to the PIU

PIU staff schedule and its members have been approved by the World Bank and Consultant prepared and got approved the PIU budget. Consultant (LBSA) has been providing day-to-day assistance to the PIU, including equipping the PIU, providing salaries, providing a training session on implementation of internationally funded projects.

Sub-component 1.4 Technical supervision of the Tacis project "Reconstruction of two bridges Gasan Su Chay and Shamkir"

Formally, works not started yet. However, contractor continues works on the site and its yard. Works are being done on contractor's own risks, since contract designs have not been yet formally approved by the consultant and GOSSTROY (state committee for construction and architecture). Contractor's work program has not been submitted to Construction Supervision consultant yet.

2.3 COMPONENT 2: PRE-FEASIBILITY STUDY OF MODERNISATION OF POTI-TBILISI-RED BRIDGE ROAD IN GEORGIA

Works started with arrival of LBSA highway engineer to Tbilisi on June 17. Road Traffic counts were carried out for 5 major points along the road. Sub-consultancy agreement has been concluded with Transdorproject. Works now are under the progress.

2.4 COMPONENT 3: DESIGN AND PREPARATION OF TENDER DOCUMENTS FOR THREE TUNNELS ON THE ROAD FROM VANADZOR TO THE GEORGIAN BORDER IN ARMENIA

Works started in May, 2003. Two technical reports have been produced: Site investigations report and Geotechnical Report. Topographic Surveys completed and construction plans are being developed.

3. SUMMARY OF PROJECT PLANNING FOR THE REMINDER OF THE PROJECT

3.1 PROJECT'S DURATION AND TIMING

The Contract duration is 24 months from the date of contract signing (contract was signed on 25th November 2002). Since the practical day-to-day work on the project has started with the Team Leader's arrival in Baku on 19th January 2003, LBSA proposes to define January 15 of 2003 as the project's start date and January 15, 2005 as a project's completion date. However, there have been delays explained below, which are affecting the project's completion date. Estimated project completion date due to delays has been assessed in section 5 of this report.

3.2 PROJECT PLANNING FOR COMPONENT 1: DESIGN REVIEWS, CONSTRUCTION SUPERVISION AND ASSISTANCE TO THE PROJECT IMPLEMENTATION UNIT IN AZERBAIJAN

Sub-component 1.1 Reviews of the Design and Contract Documents

Reviews of contract documents have been taking place during the execution of the two contracts: "Rehabilitation of Ganja-Shemkir Road" and "Reconstruction of two Bridges". Design reviews for two bridges (re-designed by the contractor) are under the completion stage and expected to be finalized in *the second week of August.* Designs for Ganja to Shemkir road section have to be improved due to discrepancies in survey data. Although Transdorservices is kindly requested to provide correct designs, LBSA is currently undertaking topographical surveys jointly with Contractor to overcome the arisen issues *by August 15 2003.* The tender documents for Lots 1 – 4 of Shemkir – Gazakh Road Section was requested from the PIU for reviews and the PIU submitted documentation for 2 lots in July, and is currently preparing the remaining set of documents for consultant's reviews. Design and contract document reviews for Lots 1-4 are expected *to be completed by September 2003.*

Sub-component 1.2 Construction Supervision of Ganja to Gazakh Road

Civil works contract for Ganja-Shemkir Road Section is behind the schedule and completion date most likely will be affected by Design (survey) discrepancies have been found. Despite of delays, *civil works for lot 1 are expected to be completed in 2004.* Tenders for the road section Shemkir to Gazakh (in 4 contract lots) are on the stage of advertisement. Tendering is behind of the original schedule and remaining *contracts are expected to be awarded in IV Quarter of 2003.* Completion of Civil works for Shemkir to Gazakh Road is obviously going to be beyond the project completion date for about 6 months, as described in detail in section 5 of this report.

Sub-component 1.3 Assistance to the PIU

Consultant (LBSA) has been providing day-to-day assistance to the PIU, including equipping the PIU, providing salaries, providing a training session on implementation of internationally funded projects. LBSA will continue assistance as required by the ToR until the project completion date.

Sub-component 1.4 Technical supervision of the Tacis project "Reconstruction of two bridges Gasan Su Chay and Shemkir"

Contractor's work program has not been submitted to Construction Supervision consultant yet. *Contractor intends to complete works in the IV quarter of 2003.* Designs, work program has to be submitted as soon as possible to enable supervision consultant to perform its duties as required.

3.3 PLANNING FOR COMPONENT 2: PRE-FEASIBILITY STUDY OF MODERNISATION OF POTI- TBILISI-RED BRIDGE ROAD IN GEORGIA

Works started with arrival of LBSA highway engineer to Tbilisi on June 17. Inception Report is due in August, Progress Report in October, *Draft final Report in December and Final Report in April 2004.*

3.4 PLANNING FOR COMPONENT 3: DESIGN AND PREPARATION OF TENDER DOCUMENTS FOR THREE TUNNELS ON THE ROAD FROM VANADZOR TO THE GEORGIAN BORDER IN ARMENIA

Works started in May, 2003. Inception Report is due in July, Draft final report in January 2004. Two technical reports have been produced so far, covering partly purpose of the inception report. Inception report in required format is planned to be *submitted by the fist week of August.*

4. PROJECT PROGRESS IN REPORTING PERIOD

4.1 LBSA Project Progress Management visit

The project has been visited by LBSA Project Director, Mr. Signor in July 13-20 in order to perform project's progress review and undertake necessary actions to provide smooth implementation of Consultancy Services. Mr. Signor has attended important meetings at the MoT in order to complete identification of the new arrangements concerning the project partner and the client in Azerbaijan. Mr. Signor took part in the project's progress monitoring process conducted by Tacic Monitor, Mr. Tomike Gotsiridze, who arrived to Baku for project reviews on July 14. This helped to receive monitor's valuable recommendations on improvement of the 6th month Project progress report.

4.2 Tacis Monitoring on Project's progress

LBSA has carefully studied comments of the Monitor provided on the project Inception Report. Comments were discussed with Mr. Gotsiridze in Tbilisi Tacis monitoring office, during Acting Project Manager's mission to Georgian Component. Monitoring of Azerbaijan Component was conducted in July in Baku. As results, valuable conclusions were made to improve project performance and the project reporting. For example, it was agreed that Project components should be reviewed in terms of unification of understanding of project's specific objectives. Thus, the updated definition of components was proposed and used in this report. Three Components were proposed by location of activities: Azerbaijan, Georgia and Armenia. LBSA has decided to exclude components of Overall Project management and Training and Technology transfer as separate Components, since planned activities under these former Components have actually become part of Components 1, 2 and 3 (Azerbaijan, Georgia and Armenia).

4.3 Acting Team Leader's Project management mission to Armenia and Georgia

Acting Team Leader performed project management mission to Armenia and Georgia from July 1st to July 7, 2003. During the mission project's progress has been reviewed at the partner organizations and management meetings carried out with LBSA sub-consultants. Mission has helped to analyse project achievements and to program further project activities.

4.4 Project Achievements in comparison with planned results

4.4.1 PROGRESS ON COMPONENT 1: DESIGN REVIEWS, CONSTRUCTION SUPERVISION AND ASSISTANCE TO THE PROJECT IMPLEMENTATION UNIT IN AZERBAIJAN

Administrative changes: new project partner for Azerbaijan Component

Progress of project works on Azerbaijan Component has experienced changes in the in project's administrative bodies – project partners. Presidential Decree of June 10 has liquidated state Concern Azeravtoyol and transferred the road sector's organizations into the responsibility of the Ministry of Transportation (MoT) of Azerbaijan. Unofficial translation of Presidential Decree is attached in the Annex 1. LBSA Team had meetings with the new management of the Road Sector and addressed the letter to the MoT with request to provide clarifications in defining representatives of the Client and confirming Supervision Consultant for civil works contract. MoT management held a meeting, inviting concerned Traceca officials, Tacis Monitors, Contractors and Consultant. MoT issued appropriate letters to Traceca office and to Consultant appointing authorised representatives

of the Client (Mr. Javid Gurbanov) and confirming authority of Consultant (LBSA) and PIU in implementation of the civil works. Letters are attached in the Annex 1.

Progress on Sub-component 1.1 Reviews of the Design and Contract Documents

In consultant's Proposal "Reviews of Designs" were planned for the first 4 weeks of the project. However, the project had its own pace of implementation, different from the schedule reflected in the ToR. For example, two out of six contract packages were tendered and awarded. Thus, Consultant performed design reviews during the execution of the project. Reviews of contract documents have been taking place during the execution of the two contracts: "Rehabilitation of Ganja-Shemkir Road" and "Reconstruction of two Bridges".

Design reviews for two bridges (re-designed by the contractor) are under the completion stage and expected to be finalized in *the second week of August.* Consultant's Expatriate Bridge Engineer Ms. Eleni was fielded in April 30th. Ms. Eleni has produced Draft Design Review Report. Ms. Eleni requested (in June) the Design Developer – Azerkopru to provide comments to her observations (Project Specific Recommendations are attached in the Annex 2). Team Leader and Resident Engineer have discussed necessity of attending Bridge Engineer's comments during the Meeting on June 20 which took place in Azerkopru's head office. However, comments have not been attended yet by the Design developer. LBSA Team intends to hire a local Bridge Engineer to complete the review, and demand satisfactory cooperation of the Design developer in design Reviews. Besides of the Consultant's reviews, appropriate technical reviews and approval of the State Committee for Architecture and Construction (GOSSTROY) is required as per local engineering practices. These reviews are currently under the progress.

Designs for Ganja to Shemkir road section have to be improved due to discrepancies in survey data. Survey data was found incorrect in coordinates and elevations. Surveys of existing ground levels showed that errors vary incoherently up to 75 cm in the first 7 kilometres of the road. From km 7 to km 21 survey data has more or less constant error in elevations. As per consultant's rough estimates, following existing ground levels with no corrections to projected longitudinal profile would lead up to extra 35-40,000 cubic meters of earth works. Civil Works Contractor – Turan addressed (in June 9) its letter notifying Azeravtoyol with existing survey discrepancies and requiring provisions of proper design drawings to execute the civil works. The technical meeting was held (June 20) in Mr. Garaisaev's office, and decision was taken with participation of Contractor and Supervision Consultant on corrections to designs. However, decisions taken in that meeting were interpreted by Consultant and Contractor in different ways and Turan issued a letter of July 8 notifying that decisions of the Technical Meeting of June 20 were not properly understood. The Client – Transdorservice Department (Mr. Javid Gurbanov) issued instructive letter of July 14, requesting Consultant jointly with Contractor to prepare corrections to designs and submit them for Client's approval. Projected longitudinal profile was proposed to modify with no increase in bill of quantities. LBSA is currently undertaking topographical surveys jointly with Contractor to overcome the arisen issues *by August 15 2003.* LBSA is contractually not responsible for re-designing of road sections, but for the project's progress LBSA expressed its readiness to help to Client to overcome of arisen situation. LBSA expects that Transdorsservice would provide its design engineer to take part in design corrections as well as to take formal responsibility for design corrections.

The tender documents for Lots 1 – 4 of Shemkir – Gazakh Road Section was requested from the PIU for reviews and the documentation for 2 lots were received in July. PIU is currently preparing the remaining set of documents for consultant's reviews. Design and contract document reviews for Lots 1-4 are expected *to be completed by September 2003.*

Sub-component 1.2 Construction Supervision of Ganja to Gazakh Road

Civil works contract for Ganja-Shemkir Road Section has started. However, Design (survey) discrepancies have been found and appropriate measures are being taken as described above.

Dealing with design discrepancies may eventually affect the civil works completion date. The project data is briefly presented in the table below and for more detailed information the Quarterly progress report is produced by Resident Engineer and distributed to the Client (Transdorservice), Traceca Baku Office and to the World Bank.

Table 4.1 Civil Works Progress Data

Works Contract CW 2002-1	
Works Tender Opened	14th May 2002
Contract Awarded Article 33.2	30th December 2002 by IDA
Letter of Acceptance Issued 33.1	24th March 2003
Contract Agreement Signed Article 33.3	April 9, 2003
Tender Amount	28,749,462,180.50 AZM
Contract Amount Article 15.3	29,903,403,179.00 AZM
Contract Start Date	21st April 2003
Contract Completion Date	21st July 2004
Works Programme received	18th April 2003
Last revision of Works programme	30th April 2003
Value of Works to date	3,501,084,057.00 AZM
Variations	Nil
Advance Payment Received	5,980,680,936.00 AZM
Repayments made	0%
Delays	Nil
Claims	Nil
Time elapsed to date	71
Time remaining to date	387

Contracts CW 2003-1 to CW 2003-4 Rehabilitation and upgrading of Shemkir – Gazakh Road sections

Tenders are not invited to date. The PIU has prepared tendering schedule as presented below.

Table 4.2 Tendering Schedule

Works	**Dates**
The agreement of Tender's documents with the W.B	Till 30th June 2003
Setting up the Tender's Commission	Till 30th of June 2003
Tenders' statement in the local and foreign newspapers	
The distribution of the statements to the embassies	1st July 2003
Selling of Tender's document to the Claimants	2nd July 2003
The latest date of the submitting by the Claimants the Tender's Proposals to the Corporation	2nd July 2003
Investigating the Tender's Proposals, the agreement of The Estimate Calculation with W.B. and M.C. with a period (60 days)	20th of August 2003
The signing of the Contractor's Contract. 28 day later after record.	Till 18th November

Tendering is a bit behind of proposed above schedule, nevertheless, contracts are expected to be signed in IV quarter or by the end of 2003.

Sub-component 1.3 Assistance to the PIU

PIU staff schedule and its members have been approved by the World Bank and Consultant followed the approved PIU budget in funding operations. According to the Terms of reference the PIU should consist of four key staff. These being:

a) A Highway Engineer, to act as the director;
b) A financial specialist;
c) A procurement specialist;
d) A translator.

Consultant have been providing day-to-day assistance to the PIU, including equipping the PIU, providing salaries, providing a training session on implementation of internationally funded projects. Training session materials are attached in the Annex 3.

The PIU has requested the Consultant to organise English training courses focusing in road terminology for the PIU staff and Local Engineers. Consultant intends to provide such training using available operational funds for training and operations based on hiring English language teacher or sending PIU members to British Council approved courses offered in Baku. Consultant also requested the PIU to provide a status of EBRD project in order to follow up with further assistance if required.

Sub-component 1.4 Technical supervision of the Tacis project "Reconstruction of two bridges Gasan Su Chay and Shemkir"

Formally, works not started yet. However, contractor continues works on the site and its yard. Works are being done on contractor's own risks, since contract designs have not been formally approved by the consultant and GOSSTROY (state committee for construction and architecture). *Contractor's work program has not been submitted to Construction supervision consultant yet.*

The project data is briefly presented in the table below and for more detailed information the Quarterly progress report is produced by Resident Engineer and distributed to the Client (Transdorservice), Traceca Baku Office and to the World Bank.

Table 4.3 Project Data

Works Contract Euroaid/112944/C/W/AZ	
Works Tender Opened	
Contract Awarded	27th December 2002
Contract Agreement Signed	27th December 2002
Tender Amount	€1,424,017.80
Contract Amount	€1,424,017.80
Contract Start Date	10th March 2003
Contract Completion Date	4th November 2003
Works Programme received	No
Planned Works to date	Mobilisation 50%
Works complete to date	Mobilisation 50%
Value of Works to date	€0.00
Variations revised bridge design at Contractors cost	Nil
Advance Payment Received	284803.56
Repayments made	0%
Delays	Work not start yet
Claims	Letter of intention – extension of time
Time elapsed to date	116 days
Time remaining	122 days

4.4.2 PROGRESS ON COMPONENT 2: PRE-FEASIBILITY STUDY OF MODERNISATION OF POTI- TBILISI-RED BRIDGE ROAD IN GEORGIA

Works started with arrival of LBSA highway engineer to Tbilisi on June 17. Road Traffic counts were carried out for 5 major points along the road. Sub-consultancy agreement has been concluded with Transdorproject. According to the Consultant's plan, the report will be presented in the following contents:

Table 4.4 Contents of the Pre-feasibility Study Report

Volume	**I**	Explanatory note and tables of main works
Volume	**II**	Drawings and photos
Volume	**III**	Road transport economics
Volume	**IV**	Conclusions and recommendations

The ToR pre-determines that existing road and alternatives should be compared at the motorway standards. LBSA intends to consider two alternatives:

- The first alternative will be improvement of the existing road to motorway standard.
- The second alternative will try to avoid all settlements (using a new alignment).

For both alternatives cost estimates and economic costs will be calculated.

The ToR requires that the cost estimates must be accurate to within ±10%. Since the main layout will be carried out on map of the scale of 1: 50,000, it seems that this requirement will not be achievable. We propose to try to be accurate within ±20%, due to restrictions related to scales of available maps.

More detailed information about project's progress will be presented in the Inception Report for Georgian Component by August 15, 2003.

4.4.3 COMPONENT 3: DESIGN AND PREPARATION OF TENDER DOCUMENTS FOR THREE TUNNELS ON THE ROAD FROM VANADZOR TO THE GEORGIAN BORDER IN ARMENIA

Works started in May, 2003. Two technical reports have been produced: Site investigations report and Geotechnical Report. Topographic Surveys completed and construction plans are being developed.

Site investigations report provided conclusions on the type of interventions for rehabilitation of tunnels as described below:

Tunnel 1 (km 25+460): we recommend an extensive rehabilitation of the transport tunnel #1, while maintaining the existing clearance, as well as the radius of the horizontal curve. Rehabilitation will cover carriageway, drainage, lighting, lining, ventilation and fire protection improvements.
Tunnel 2 (km 31+200): we recommend an extensive rehabilitation of the transport tunnel #2, increasing clearance in height by lowering the carriageway. Improvements to drainage system, lighting and decorative lining of the tunnel are also proposed for better safety and easy maintenance.
Tunnel 3 (km 31+910): we recommend an extensive rehabilitation of the transport tunnel #1, while maintaining the existing clearance, as well as the radius of the horizontal curve. Rehabilitation will cover drainage, lighting, ventilation and fire protection improvements.

4.5 DEVIATIONS FROM ORIGINAL PLANNING AND REASONS

Deviations from original planning are occurring in design reviews, construction supervision of Ganja – Gazakh road rehabilitation, and Construction of two bridges. Reasons for these deviations are explained well in the section 4.4.1.

Components in Armenia and Georgia have started in May and June respectively. The delay, in comparison with originally planned start (January, as per original schedule stated in LBSA proposal – the first month of the project), has occurred due to better convenience for field investigations and studies in mountainous conditions.

4.6 SPECIFIC ACTION NEEDED FROM THE LOCAL AUTHORITIES – INCLUDING THE COORDINATING UNIT CONCERNED – AND/OR THE EUROPEAN COMMISSION

Actually, specific actions from the local authorities, Regional Traceca Coordinating unit and EU are being provided to overcome of problems arisen during the project implementation. For example, the EU project manager promptly responded to expected design changes in Construction of Two Bridges and problem was discussed and decision taken without long delays. MoT of Azerbaijan undertook quick action in identification of responsibilities, preventing additional delays in the project implementation in Azerbaijan Component, occurred due to liquidation of Azeravtoyol. Dortransservice, successor of Azeravtoyl, undertook measures to overcome the design discrepancies and issued instructive letter to Supervision Consultant promptly. Regional Traceca office have been providing close assistance in implementation of the project and especially in implementation of Construction of two bridges, organizing technical meetings with Azerkorpu contractor.

However, the project will need the following actions from Project partners in the nearest time:

Component 1: Azerbaijan

Supervision consultant is working on corrections to designs as per Dortransservice's letter of July 14. LBSA is working on corrections, although it is formally not responsible for re-designing road sections. Thus, LBSA is currently discussing with PIU and Dortransservice about involvement of their Design Engineer to attend the works at the completion stage and take formal responsibility for re-designing the road sections performing check ups and confirming new projected alignments. LBSA is ready to assist by all means available at supervision consultant's disposal, including preparation of proposed new vertical alignment and appropriate contract variation order to Client if required. Consultant hopes to overcome of the problem by August 15.

Concerning Reconstruction of two Bridges, Supervision Consultant hopes that Azercorpu (contractor) will observe its contractual obligations by submitting works program, following construction specifications as required (including establishment of the testing facilities at the site, equipping the field office etc).

Component 2: Georgia

LBSA is currently finishing Inception Report with details of further work on the feasibility studies. Consultant expects that Project partner and EU provide their comments on the recommendations of consultant for performing studies for two alternative options: *motorway on a new alignment and upgrading of the existing road up to motorway standards* (two alternative options). Since accuracy for cost estimates is not achievable within +-10% using 1:50,000 scale maps, Consultant suggests approving accuracy at +-20%.

Component 3: Armenia

LBSA is about to submit Inception Report. However, the Technical Report on Tunnel Investigations is ready, where consultant presents the main rehabilitation options by each tunnel. There is a need to review the conclusions of the Technical report and approve the main scope of work proposed for rehabilitation (draft technical report is attached in Annex 4).

FORM 4.1 : PROJECT PROGRESS REPORT

Project title : **Rehabilitation of Caucasian Highways**	Project number : **Europeaid/113179/C/SV/MULTI**	Country : Azerbaijan, Georgia, Armenia	Page : 1 of 4
Planning period : January 2003 – June 2003	Prepared on : July 27, 2003	EC Consultant : LBSA	

Project objectives : Component 1: Supervision of six civil works contracts, assistance to PIU, Component 2: Pre-Feasibility Studies, Component 3: Design and Tender Documents for three tunnels

No	ACTIVITIES IMPLEMENTED	TIME FRAME 2003 Months						INPUTS							
								PERSONNEL EC CONSULTANT		COUNTERPART		EQUIPMENT AND MATERIAL		OTHER	
		1	2	3	4	5	6	Planned	Utilised	Planned	Utilised	Planned	Utilised	Planned	Utilised
1	Component 1: Azerbaijan														
1.1	Subcomponent 1.1: Review of the design and tender documents							35	14.53	97	8	n/a	n/a	n/a	n/a
1.1.1	**Road Ganja – Gazakh:** **Lot 1 Ganja-Shemkir 2002-1** **Lot 1 Shemkir-Road Station** **Lot 2 Road Station-Tovuz** **Lot 3 Tovus-Road Station** **Lot 4 Road Station Gazakh**		Not started yet for lots 1,2,3,4												
1.1.2	**Reconstruction of Two Bridges**														
1.2	Subcomponent 1.2 Construction Supervision Ganja – Gazakh Road							220	91	2420	72	n/a	n/a	n/a	n/a
1.2.1	**Lot 1 Ganja-Shemkir**														
1.2.1.1	**Mobilisation of Consultant**														
1.2.1.2	**Pre-construction advisory services**														
1.2.1.3	**Construction supervision**														
1.2.1.4	**Progress reports**		X	X	X	X	X								

1.2.1.5 1.2.2 1.2.3 1.2.4 1.2.5	Final Acceptance Lot 1 Shemkir-Road Station Lot 2 Road Station-Tovuz Lot 3 Tovus-Road Station Lot 4 Road Station Gazakh	Not started yet								
1.3	Subcomponent 1.3: Assistance to the PIU in implementation of the World Bank and EBRD projects		(440)	(120)	22	0	Euro 20,000	Euro 18.755	n/a	n/a
1.3.1	Set-up of organisation and structure of the PIU									
1.3.2	Review suitable management procedures and systems									
1.3.3	Advise and assist the PIU in the management and implementation of the project									
1.3.4	Advise and assist the PIU to develop and operate procedures and expertise in the financial administration of Contracts									
1.3.5	Provide assistance and liaison to the management of Azeravtoyol and the EBRD and World Bank, as may be necessary									
1.3.6	Provide Administrative support for the PIU, in the form of salaries and payroll cost, office equipment, supplies and running costs, training, and transport		10	4						
1.4	Sub-component 1.4: Technical Supervision of the TACIS Project: "Construction of two bridges: Gasan Su Cay and Shemkir		(220)	(91)	704	28	n/a	n/a	n/a	n/a

1.4.1 1.4.2 1.4.3 1.4.4 1.4.5 1.4.6 1.4.7 1.4.8 1.4.9	Mobilisation of the Bridge Design Engineer Review of the Design and Tender/Contract Documents Technical meeting on the Reviewed Contract Documents Provide the EU and Azeravtoyol with an overall performance schedule Technical Supervision of the Contract Inspections and Control Issue Acceptance Certificates Prepare Financial Documents Prepare Reports on Project Progress		x	x	x	x	x								
2	Component 2: Georgia Pre-feasibility Study for modernization of Poti-Tbilisi-Red Bridge Road							132	11	1518	0	n/a	n/a	n/a	n/a
2.1 2.2 2.3 2.4 2.5 2.6 2.7	Data Collection and Surveys Develop Technical Specifications Perform Environmental Assessment Assessment of Economic Costs Perform Economic Analysis Determining Cost Estimates Technical Reporting														
3	Component 3: Armenia Design and Tender Documents for three tunnels on the road from Vanadzor to the Georgian Border							(146)	(11) 14.318	1342	358	n/a	n/a	n/a	n/a

3.1	Field Investigations														
3.2	Design works														
3.3	Determination of Excavation works														
3.4	Technical description of Construction and Engineering Process														
3.5	Cost estimates														
3.6	Preparation of the Tender documents														
3.7	Reporting						x								
						TOTAL		1203	254.8	6103	466	Euro 20,000	Euro 18,755	n/a	n/a

FORM 4.2: RESOURCE UTILISATION REPORT

Project title : **Rehabilitation of Caucasian Highways**		Project number : **Europeaid/113179/C/SV/MULTI**		Country: Azerbaijan, Georgia, Armenia	Page : 1 of 2
Planning period January – June 30, 2003		Prepared on : July 27, 2003		EC Consultant: LBSA	
Project objectives					
RESOURCES/INPUTS	TOTAL PLANNED	PERIOD PLANNED	PERIOD REALISED	TOTAL REALISED	AVAILABLE FOR REMAINDER
PERSONNEL **International Experts:** *Long Term:* Team Leader Resident Engineer Highway Engineer *Short Term:* Short term Experts **Sub-Total International** **Local Long and Short Term Experts** Senior Junior Sub Total Local	 440 440 220 103 1203 3310 2793 6103	 120 91 11 32.8 254.8 236 230 466	 120 91 11 32.8 254.8 236 230 466	 120 91 11 32.8 254.8 236 230 466	 320 349 209 70.2 948.2 3074 2563 5637
Sub-total	7306	720.8	720.8	720.8	6585.2
EQUIPMENT AND MATERIAL	Euro 20,000	Euro 20,000	Euro 18,755	Euro 18,755	Euro 1,245
Sub-total					

FORM 4.3 OUTPUT PERFOMANCE REPORT

Project title : **Rehabilitation of Caucasian Highways**	Project nr : **Europeaid/113179/C/SV/MULTI**	Country : Azerbaijan, Georgia, Armenia	Page: 1 of 3
Prepared on : July 27, 2003		EC Consultant: LBSA	
Output results	Deviation original plan + or - %	Reason for deviation	Comments on constrains & assumptions
Component 1: Azerbaijan			
Subcomponent 1.1: Review of the design and tender documents	Behind the schedule for 6 months		
Road Ganja – Gazakh:	ongoing		
Lot 1 Ganja-Shemkir 2002-1	Behind the schedule	Survey discrepancies	Redesigning alignment
Lot 1 Shemkir-Road Station	Behind the schedule	Documents submitted in July ,2003	
Lot 2 Road Station-Tovuz	Behind the schedule	Documents submitted in July ,2003	Has to be completed in September
Lot 3 Tovus-Road Station	Behind the schedule	Documents submitted in July 23,2003	
Lot 4 Road Station Gazakh	Behind the schedule	Documents submitted in July 23,2003	
Reconstruction of Two Bridges	Behind the schedule for 6 months	Redesigning at the original contract documents	Consultant's comments are still not attended by design developer
Subcomponent 1.2 Construction Supervision Ganja – Gazakh Road			
Lot 1 Ganja-Shemkir			
Mobilisation of Consultant	Complete		
Pre-construction advisory services	Complete		
Construction supervision Progress reports	Ongoing, delays expected	Survey discrepancies	Redesigning is going on
Final Acceptance	n/a	n/a	n/a
Lot 1 Shemkir-Road Station	Behind the schedule	Not tendered yet	Contract should be signed IV Quarter of 2003
Lot 2 Road Station-Tovuz	Behind the schedule	Not tendered yet	
Lot 3 Tovus-Road Station	Behind the schedule	Not tendered yet	

Lot 4 Road Station Gazakh	Behind the schedule	Not tendered yet	
Subcomponent 1.3: Assistance to the PIU in implementation of the World Bank and EBRD projects	Ongoing		No comments
Set-up of organisation and structure of the PIU	Ongoing		No comments
Review suitable management procedures and systems	Ongoing		No comments
Advise and assist the PIU in the management and implementation of the project	Ongoing		No comments
Advise and assist the PIU to develop and operate procedures and expertise in the financial administration of Contracts	Ongoing		No comments
Provide assistance and liaison to the management of Azeravtoyol and the EBRD and World Bank, as may be necessary	Ongoing		No comments
Provide Administrative support for the PIU, in the form of salaries and payroll cost, office equipment, supplies and running costs, training, and transport	Ongoing		No comments
Sub-component 1.4: Technical Supervision of the TACIS Project: "Construction of two bridges: Gasan Su Cay and Shemkir	Behind the schedule	Design not approved yet, workplan not submitted yet	Design review comments should be attended and designs should be approved at Gosstroy
Mobilisation of the Bridge Design Engineer	Complete		No comments
Review of the Design and Tender/Contract Documents	Comments issued, Approval is behind the schedule		No comments
Technical meeting on the Reviewed Contract Documents	Complete		
Provide the EU and Azeravtoyol with an overall performance schedule	Behind the schedule	Design not approved yet	Comments on design should be followed
Technical Supervision of the Contract	Behind the schedule	Design not approved yet	Gosstoy approval is required

Inspections and Control	Behind the schedule	Design not approved yet	Gosstoy approval is required
Issue Acceptance Certificates	Behind the schedule	Design not approved yet	Gosstoy approval is required
Prepare Financial Documents	Behind the schedule	Design not approved yet	Gosstoy approval is required
Prepare Reports on Project Progress	Ongoing		No comments
Component 2: Pre-feasibility Study for modernization of Poti-Tbilisi-Red Bridge Road in Georgia	Ongoing		No comments
Data Collection and Surveys	Ongoing		No comments
Develop Technical Specifications	Ongoing		No comments
Perform Environmental Assessment	On target		No comments
Assessment of Economic Costs	On target		No comments
Perform Economic Analysis	On target		No comments
Determining Cost Estimates	On target		No comments
Technical Reporting	On target		No comments
Component 3: Design and Tender Documents for three tunnels on the road from Vanadzor to the Georgian Border in Armenia	Ongoing		No comments
Field Investigations	Complete		No comments
Design works	Ongoing		No comments
Determination of Excavation works	On target		No comments
Technical description of Construction	On target		No comments
and Engineering Process	On target		No comments
Cost estimates	On target		No comments
Preparation of the Tender documents	On target		No comments
Reporting	Ongoing		No comments

5. PROJECT PLANNING FOR THE NEXT REPORTING PERIOD.

5.1 The next reporting period

Next reporting period is July 2003 – December 2003. This section of the report is presenting LBSA's plans for the next reporting period.

5.2 Important observations for the project success

COMPONENT 1: DESIGN REVIEWS, CONSTRUCTION SUPERVISION AND ASSISTANCE TO THE PROJECT IMPLEMENTATION UNIT IN AZERBAIJAN

Sub-component 1.1 Reviews of the Design and Contract Documents

While preparing this report, PIU has submitted the Tender Documents for all remaining road section from Shemkir to Gazakh (Lots 1, 2, 3, and 4). Reviews of contract documents will be important to provide early notices to the Client about any inconsistency in Designs. It will also be important to check geotechnical survey data, selectively for general appropriateness.

Concerning Construction of two bridges (Gasan Su cay and Shemkir), design developer should attend the consultant's comments before passing designs for Gosstroy's revision and approval.

Sub-component 1.2 Construction Supervision of Ganja to Gazakh Road

Civil works contract for Ganja-Shemkir Road Section is behind the schedule and completion date most likely will be affected by Design (survey) discrepancies have been found. Despite of delays, *civil works for lot 1 are expected to be completed in 2004.* Tenders for the road section Shemkir to Gazakh (in 4 contract lots) are on the stage of advertisement. Tendering is behind of the original schedule and remaining *contracts are expected to be awarded in IV Quarter of 2003.* Completion of Civil works for Shemkir to Gazakh Road is obviously going to be beyond the project completion date for about 5 months. The table 4.2 above provides schedule of tendering proposed by PIU and approved by the World Bank. However, this schedule is currently a bit behind as well. In the case that tendering strictly follows the proposed schedule, civil works completion date is going to be behind for about 5 months, taking into account 18 months for implementation of civil works, estimated in the Engineering Report (part of tender documents). LBSA has assessed the impact of the delay on required staff resources and presented in the **Table 5.1 Forecast of impact of delays to required staffing resources (Component 1)**. This table also proposes to unify/change positions required based on actual supervision needs. LBSA also recommends unifying classification of short term and long terming local experts, since for project's interests, LBSA intends to hire long term experts to perform the short term assignments, due to their better knowledge of the project. This unification does not affect the fees, since there is no difference in daily rates for local Long term and Short term experts (the difference is in Senior and Junior staff). By another words, LBSA proposes to cancel classification of local experts to short term and long term experts (throughout of all project components), and just keep classification of senior and junior experts for local experts. Another proposal for consideration is related to days of work per month. In order to ensure coverage of contractor's daily activities by proper supervision, LBSA introduced 6 work days per week schedule for local experts, instead of originally proposed 5 days per week schedule. The impact of delays on requirements

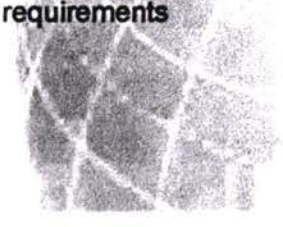


Table 5.1 Forecast of impact of delays to staffing resources requirements (Component 1)

Item	Month			F	M	A	M	J	J	A	S	O	N	D	2003	Extra	J	F	M	A	M	J	J	A	S	O	N	D	2004	Extra
	Item			1	2	3	4	5	6	7	8	9	10	11			12	13	14	15	16	17	18	19	20	21	22	23		
	Days in a month			28	31	30	31	30	31	31	30	31	30	31	334		31	29	31	30	31	30	31	31	30	31	30	31	366	
	Work days, including Saturdays			23	26	26	27	25	27	26	26	27	25	27	285		27	24	27	26	27	26	27	26	26	26	26	27	315	
		Original as per contract	Proposed (for the contract period)																											
Sub-Component 1.1 Review of Design and Tender Documents																														
.1.1'	Assistant Resident Engineer	22	37							27	10																			
.1.2	CAD Engineer	15	0																											
.1.3	Highway Engineer	10	0																											
.1.4	Pavement Engineer	10	0																											
.1.5'	Geotechnical Engineer	10	20							20																				
.1.6'	Bridge Engineer	10	20							20																				
.1.7'	Surveyor	10	20							20																				
.1.8	Safety Engineer	10	0																											
	Sub Total for 1.1	97	97																											
	Including:																													
	Senior	97	97																											
	Junior	0	0																											
Sub-Component 1.2: Construction Supervision of the Ganja - Gazakh Road																														
1.2.1	Assistant Resident Engineer	440	440				12	25	0	21	26	27	25	27	163	-57	2	24	27	26	27	26	27	26	26	26	14	277	0
1.2.2	Soils (material) Engineer	440	440				7	7	26	26	27	25	27		145	-75	27	4	27	26	27	26	27	26	26	26	26	27	295	0
1.2.3	Engineer	440	440				7	7	26	26	27	25	27		145	-75	7	24	27	26	27	26	27	26	26	26	26	27	295	0
1.2.4	Quantity surveyor	440	440							26	26	27	25	27	131	-89	27	24	27	26	27	26	27	26	26	26	26	21	309	0
.2.5'	Surveyor (same person for positions 1.4.4 and 1.1.7)	340	340				9	20	20	20	20	20	20	0	129	-41	27	0	18	18	18	20	20	20	10	20	20	20	211	0
1.2.6	Bridge Engineer (same person for position 1.4.1)	100	100				3	6	6	6	6	6	6	0	39	-11			0	7	7	7	7	7	7	7	6	6	61	0
.2.7'	Safety Engineer (same person for positions 1.2.8 and 1.4.2)	110	110							7	7	7	6	6	33	-22		7	7	7	7	7	7	7	7	7	7	77	0
1.2.8	Environmental Engineer (same person for positions 1.2.7 and 1.4.2)	110	110							7	7	7	6	6	33	-22		7	7	7	7	7	7	7	7	7	7	77	0
	Sub Total for 1.2	2420	2420																											
	Including:																													
	Senior	1210	1210																											
	Junior	1210	1210																											
Sub-component 1.3: Assistance to the PIU																														
Sub-component 1.4: Technical Supervision of the TACIS Project - construction of two bridges																														
.4.1'	Assistant Resident Engineer	340	340				9	19	21	20	20	21	19	0	129	-41	20	20	0	20	20	20	20	20	20	11	20	20	211	0
1.4.2	Material Engineer (same person for positions 1.2.8 and 1.2.7)	220	220							13	13	13	13	14	66	-44		14	14	14	14	14	14	14	14	14	14	154	0
1.4.3	Foundation Engineer	44	44							22	22				44	0														
1.4.4	Surveyor (same person for position 1.2.5 and 1.1.7)	100	100				3	5	5	6	6	6	6	6	43	-7			7	6	7	6	6	6		6	6	7	57	0
	Sub Total for 1.3	704	704																											
	Including:																													
	Senior	352	352																											
	Junior	352	352																											
	Total Local staff for Component 1: Azerbaijan	3124	3124																											
	Including																													
	Senior	1562	1562																											
	Junior	1562	1562																											
Impact on the Expatriate Staff requirements																														
	Resident Engineer	440	440		9	19	22	20	21	22	22	22	22	11	190	-30	8	22	22	22	22	22	22	22	22	22	22	22	250	0
	Total for expatriate staff	440	440																											

Sub-component 1.3 Assistance to the PIU

Consultant (LBSA) has been providing day-to-day assistance to the PIU, including equipping the PIU, providing salaries, providing a training session on implementation of internationally funded projects. LBSA will continue assistance as required by the ToR until the project completion date. The PIU as well as LBSA team should have a normal working office as soon as possible. LBSA team and PIU has moved to temporary office with the limited space, due to renovation works taking place in the Dortransservice's main building. Renovation works are going at a very high pace and certainly, the PIU and LBSA team will have better working conditions soon. However, there is a good side of moving to limited office space. Due to closer location of offices and tightness, communication between PIU and LBSA team was substantially extended. Consultant intends to help PIU in development of the EBRD financed project as well, as part of the TOR requirements. Thus, Consultant requested PIU to prepare a latest status report and describe required assistance from LBSA for the EBRD project. As per the PIU's official request for training needs, English training courses, focused on road terminology will be organized for PIU members and local experts working in the construction field. The main focus of the assistance to the PIU will be in Tendering and day-to-day contract management and administration.

Sub-component 1.4 Technical supervision of the Tacis project "Reconstruction of two bridges Gasan Su Chay and Shamkir"

Contractor's work program has not been submitted to Construction Supervision consultant yet. *Contractor intends to complete works in the IV quarter of 2003.* Designs, work program has to be submitted as soon as possible to enable supervision consultant to perform its duties as required. This sub-component is progressing very slowly. Some progress was seen lately after a number of management meetings held at the Traceca Regional office, contractors and consultant's offices as well as at the site. The first aim is to complete the Gosstroy's approval along with attending recommendations of design reviews.

Consultant is expecting work program of contractor, and it must be provided as soon as possible.

Planning for component 1 is presented in the Form **5.1 Plan of operations for the next period.**

COMPONENT 2: PRE-FEASIBILITY STUDY OF MODERNISATION OF POTI- TBILISI-RED BRIDGE ROAD IN GEORGIA

Works started with arrival of LBSA highway engineer to Tbilisi on June 17. Inception Report is due in August, Progress Report in October, *Draft final Report in December and Final Report in April 2004.*

Planning for Component 2 is presented in the Table **5.1 Plan of operations for the next period.**

COMPONENT 3: DESIGN AND PREPARATION OF TENDER DOCUMENTS FOR THREE TUNNELS ON THE ROAD FROM VANADZOR TO THE GEORGIAN BORDER IN ARMENIA

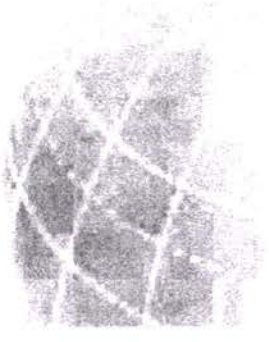
Works started in May, 2003. Inception Report is due in July, Draft final report in January 2004. Two technical reports have been produced so far, covering partly purpose of the inception report. Inception report in required format is planned to be *submitted by the fist week of August.*

Planning for Component 3 is presented in the Form **5.1 Plan of operations for the next period.**

5.3 Proposals for adjustment of overall planning and their consequences.

As it is described in the section 5.2 there is a delay in sub-component 1.1, which is expected in implementation of construction supervision on Ganja – Gazakh road rehabilitation. Impact of the delay to required staffing resources is provided in the table 5.1.

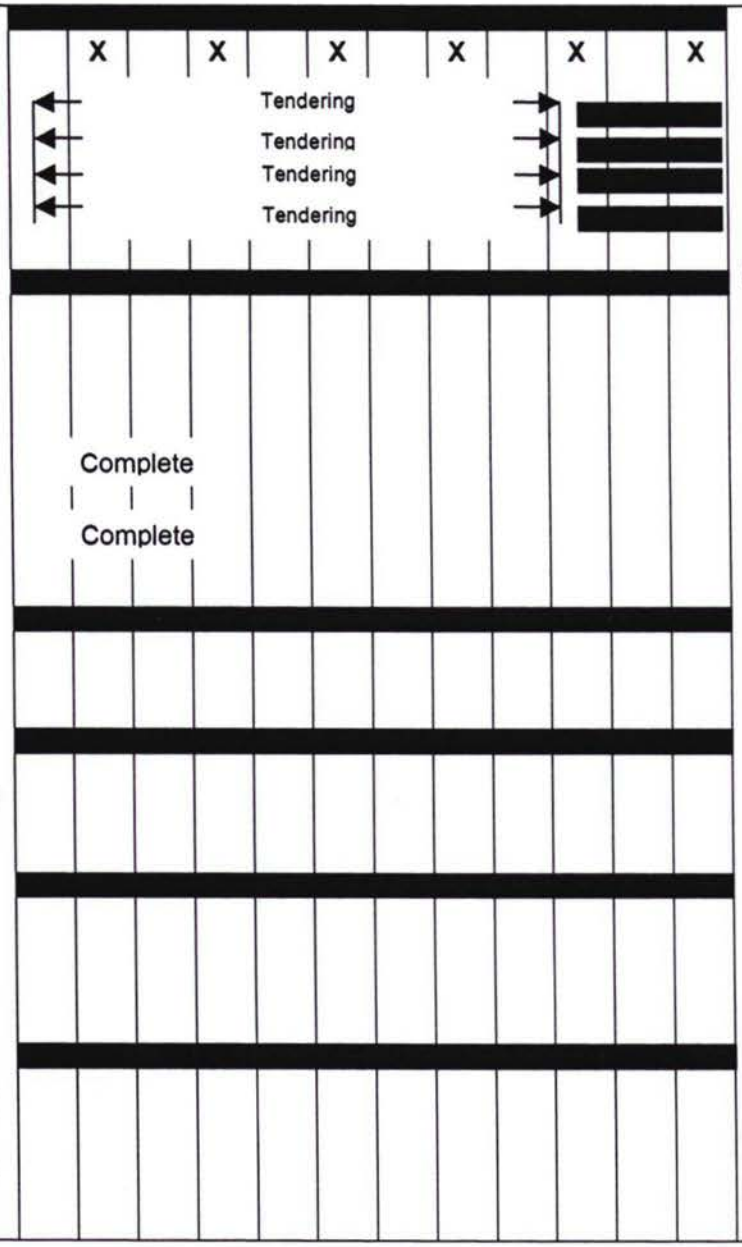
Start date of Works on Component 2 Georgia and Component 3 Armenia, in June and May respectively, does not effect to the overall project implementation. Being 10 months long, these components will be finalised within the service contract period (24 months).



FORM 5.1 : PLAN OF OPERATIONS FOR THE NEXT PERIOD (Work programme)

Project title : **Rehabilitation of Caucasian Highways**	Project number : **Europraid/113179/C/SV/MULTI**	Country : Azerbaijan, Georgia, Armenia	Page : 1 of 4
Planning period : July 2003 – Dec 2003	Prepared on : July 27, 2003	EC Consultant : LBSA	
Project objectives : Component 1: Supervision of six civil works contracts, assistance to PIU, Component 2: Pre-Feasibility Studies, Component 3: Design and Tender Documents for three tunnels			

No	ACTIVITIES IMPLEMENTED	TIME FRAME						INPUTS			
		2003 Months						PERSONNEL		EQUIPMENT AND MATERIAL	OTHER
		Jul	Aug	Sep	Oct	Nov	Dec	EC Consultant	Counterpart		
1	Component 1: Azerbaijan										
1.1	Subcomponent 1.1: Review of the design and tender documents							(110)	93	n/a	n/a
1.1.1	**Road Ganja – Gazakh:** **Lot 1 Ganja-Shemkir** 2002-1 **Lot 1 Shemkir-Road Station** **Lot 2 Road Station-Tovuz** **Lot 3 Tovus-Road Station** **Lot 4 Road Station Gazakh**										
1.1.2	**Reconstruction of Two Bridges**										
1.2	Subcomponent 1.2 Construction Supervision Ganja – Gazakh Road							(110)	610	n/a	n/a
1.2.1 1.2.1.1 1.2.1.2	**Lot 1 Ganja-Shemkir** **Mobilisation of Consultant** **Pre-construction advisory services**		Complete Complete								

1.2.1.3	Construction supervision				
1.2.1.4	Progress reports				
1.2.1.5	Final Acceptance				
1.2.2	Lot 1 Shemkir-Road Station				
1.2.3	Lot 2 Road Station-Tovuz				
1.2.4	Lot 3 Tovus-Road Station				
1.2.5	Lot 4 Road Station Gazakh				
1.3	Subcomponent 1.3: Assistance to the PIU in implementation of the World Bank and EBRD projects		(110)	22 (Training)	n/a
1.3.1	Set-up of organisation and structure of the PIU				
1.3.2	Review suitable management procedures and systems				
1.3.3	Advise and assist the PIU in the management and implementation of the project				
1.3.4	Advise and assist the PIU to develop and operate procedures and expertise in the financial administration of Contracts				
1.3.5	Provide assistance and liaison to the management of Azeravtoyol and the EBRD and World Bank, as may be necessary				
1.3.6	Provide Administrative support for the PIU, in the form of salaries and payroll cost, office equipment, supplies and running costs, training, and transport				

1.4	Sub-component 1.4: Technical Supervision of the TACIS Project: "Construction of two bridges: Gasan Su Cay and Shemkir	(110)	302	n/a	n/a
1.4.1	**Mobilisation of the Bridge Design Engineer**	Complete			
1.4.2	**Review of the Design and Tender/Contract Documents**				
1.4.3	**Technical meeting on the Reviewed Contract Documents**				
1.4.4	**Provide the EU and Azeravtoyol with an overall performance schedule**				
1.4.5	**Technical Supervision of the Contract**				
1.4.6	**Inspections and Control**				
1.4.7	**Issue Acceptance Certificates**	X			
1.4.8	**Prepare Financial Documents**				
1.4.9	**Prepare Reports on Project Progress**	X X X X X X			
2	Component 2: Pre-feasibility Study for modernization of Poti-Tbilisi-Red Bridge Road in Georgia	(144)	1200	n/a	n/a
2.1	**Data Collection and Surveys**				
2.2	**Develop Technical Specifications**				
2.3	**Perform Environmental Assessment**				

2.4	Assessment of Economic Costs																
2.5	Perform Economic Analysis																
2.6	Determining Cost Estimates																
2.7	Technical Reporting				X					X							
3	Component 3: Design and Tender Documents for three tunnels on the road from Vanadzor to the Georgian Border in Armenia													(144)	800	n/a	n/a
3.1	Field Investigations						Completed										
3.2	Design works																
3.3	Determination of Excavation works																
3.4	Technical description of Construction and Engineering Process																
3.5	Cost estimates																
3.6	Preparation of the Tender documents																
3.7	Reporting				X								X				
										TOTAL:				364	3087	n/a	n/a

ANNEX 1

About Approval of the Charter of the Ministry of Transport of Republic Azerbaijan

Decree of the President of Republic of Azerbaijan
(Unofficial translation from Azery language)

In order to provide activities of Ministry of Transport of Azerbaijan Republic I am issuing the following decree:

1. Approve the Charter of the Ministry of Transport of Republic of Azerbaijan (as attached).

2. Cabinet of Ministers is to:

   - Approve in 10 days time the number of employees working in the central office of the Ministry of Transport and Ministry's budget for 2003.
   - Prepare in one month time proposal on measures to be adopted to fit Normative Law Statements to this Decree and to submit them to the President of Azerbaijan Republic.
   - Prepare and submit to the President of Azerbaijan in a 3 months term a list of organizations of road-transport sector included into Ministry of Transport.
   - Settle all matters arising with connection to this decree.

3. Liquidate "AZERAVTONAGLIYYAT" SC ("Azeravtotransport") and "AZERAVTOYOL" SC of Azerbaijan Republic, and transfer all organizations, departments and other objects included into them to the Ministry of Transport.

4. Concerning the providing of execution of the Code of AR Trade Steamship-line "until formalized", words "Azerbaijan State Khazar Steamship-line" temporarily is to be deleted from the Item 1 of AR President's Decree N594 dated November 3, 2001.

5. Policy making power at Sea Ship-line site, as well as cooperation between UN International Marine Organizations and other International Marine Organizations, authority for supervision over the execution of international marine conventions on behalf of Azerbaijan Republic, shall be delegated to the Ministry of Transport.

6. Instruct Ministry of Foreign Affairs to send to UN International Marine Organizations a letter of notification that in accordance with Clause 5 of this decree, policy conducting at Sea Ship-line site, as well as cooperation between UN International Marine Organizations and other International Marine Organizations, authority for supervision over the execution of international marine conventions on behalf of Azerbaijan Republic, is delegated to Ministry of Transport of AR.

7. Decree N697 of President of AR dated April 21, 2001, on temporary transfer of authority of the Executive Body at Sea Ship-line site onto Azerbaijan State Khazar Steamship-line shall be considered as cancelled.

8. Ministry of Transport of AR is to:

- Create entities to perform activities of the liquidated organizations mentioned on clause 3 of this decree.

- Settle all matters arising with this Decree.

9. This Decree comes into force from the date of publication.

Heydar Aliyev
President of Azerbaijan Republic
Baku
June 10, 2003

AZERBAIJAN REPUBLIC MINISTRY OF TRANSPORT

501 / 5 – MoT **14 July, 2003**

Mr. Marc Graille
TRACECA Coordination
Group Team Leader

Dear Sirs,

In reply to the letter dated 08 July, 2003 of consultancy Louis Berger SA Firm Azerbaijan Republic Ministry of Transport brings to your notice the following issues:

By the decree, numbered 880 of the President of Azerbaijan, dated 10 June, 2001 "Azeravtoyol" State Concern had been abolished, and the enterprises, organizations and the extra supporting units of the company had been subordinated to the Ministry of Transportation. In this regard, Ministry of Transportation had been charged to organize a respectable executing agency with the purpose of the Working Activity of the former Company. RoadTransportService" Department of the Ministry of Transport was established by the order № 03 of June 23rd, 2003 of the Ministry of Transport. The recently established "Roadtransportservice" Department within the Ministry of Transport plays as a Client role within the framework of "Azerbaijan Highways Project, BIA Credit № 3517 AZ" which signed between World Bank International Development Association and Government of Azerbaijan in the date of 25 July, 2001.

The authorized person (on behalf of Client) for the Projects of Credit Contract is Mr. Javid Gurbanov, Chief of "Roadtransservice"Department.

We confirm to continue the working activity with its previous staff and upon duty obligations of Project Implementation Unit (PIU) that set up for "Azerbaijan Highways Project, BIA Credit № 3517 AZ" which signed between World Bank International Development Association and Government of Azerbaijan in the date of 25 July, 2001.

We confirm that Louis Berger Ltd. Consulting Company to carry on the activity as "Engineer", compliant with its FIDIC rules, selected as a Technical Supervisor for the promotion of the construction of "The Rehabilitation and Upgrading of the Road Section of Ganja -Gazakh"

Yours Faithfully,

Minister of Transport Ziya Mammadov

cc: Mr. K. Zukhurov
Acting Team Leader/ Project
Manager of "Rehabilitation
of Caucasian Highways" Project
Louis Berger Ltd
Consulting Company

cc: Contractor "Turan Hazinedaroglu"
And Oztash Ish Ortagligi

AZERBAIJAN REPUBLIC MINISTRY OF TRANSPORT

№ 16 / 02 – RTS **14 July, 2003**

Mr. K. Zukhurov
Acting Team Leader/ Project Manager of "Rehabilitation of Caucasian Highways" Project
Louis Berger Ltd
Consulting Company

Dear Mr. K. Zukhurov

We are writing to inform you that "RoadTransService" Department of Ministry of Transport brings to your notice in investigating the following issues which arisen from the letter dated 08 July, 2003 of the Project of "Rehabilitation and Upgrading of the Road Section of Ganja-Gazakh".

1. In view of to liquidate the unsuitability to the actual condition of the Survey measurements on the workshop drawings complied in its previous version of the Project of "Rehabilitation and Upgrading of the Road Section of Ganja-Shemkir", the Consulting Engineer should be made applicable changes on the workshop drawings verifying the specified levels for a second time. The same changes on which, should not increased the price of the Contract Works. The changes should be made on the workshop drawings within a month and have to be approved by "Road Trans Service» Department. Make appropriate changes to the Contractor Work Schedule so as to provide the activity of the Contract Works in the specified period of time.
2. Recently we will submit the newly accepted Bidding time table, bidding documents and relevant workshop drawings on the Contracts of CW 2003-1, CW 2003 – 2, CW 2003 – 3, CW 2003-4, the Project of "Rehabilitation and Upgrading of the Road Section of Shemkir- Gazakh"
3. Being as the Contractor of the Project of "The Reconstruction of Hasansu and Shemkir Chay Bridges" funded by European Union, we would kindly request you to summarize all the discrepancies regarding to the Contract and submit to "Road Trans Service» Department for taking urgent action in settling the matter.

Yours Faithfully, **J. Gurbanov**

ANNEX 2

1.1 Table of Project Specific Recommendations

SHEMKIR SU CHAY BRIDGE
The submitted drawings were those for a 3x22,0 m span bridge with continuous deck.The deck comprises 12 precast R.C. 700mm high beams connected by a 200mm thick in-situ slab which is continuous over the piers. An in-situ beam of total height 900mm and width 1000mm is cast longitudinally between the beams at the position of the supports over the piers. The piers are formed by a bottom in situ wall of dimensions 8000x1400mm and height of 6300mm and 6000mm for each pier. Two prefabricated elliptical columns of dimensions 800x1000mm and height 7000mm are placed on the far ends of the walls. A prefabricated beam connects the top end of the columns and forms a plane for the support of the deck which is placed on bearings. The total height of the piers is about 13m. The foundation is piled with an in situ pile cap connecting already existing piles. The abutments are made of four prefabricated elliptical columns of dimensions 800x1000mm connected with a prefabricated beam of dimensions 1200x800mm. The deck is also there placed on bearings.
Recommendations
In the European practice for 22.0 m. span the usual height of the R.C. beams is about 1.5 times the height used in this analysis i.e. about 1.3 m. The simulation used in the analysis should be a grillage and not a slab (plate elements). This would lead to a while different concept of design.
Assumptions of the analysis should be included in the submission. A description of the model and the relevant assumptions should include specific references to A: INPUT • Type of model (i.e. grillage) • Sections used and section analysis for all (i.e. piers, beams, piles, deck) • Fixities (i.e. pinned, fixed etc.) B: OUTPUT: • Displacements
The in situ part of the deck at the support area is 1.0 m. long. The usual practice dictates the use of a compact part of about 1.5d on each side of the support which would lead to a length of 3d=3x0.9=2.7m in order to be able to undertake the shear at the support.

The European practice dictates the use of at least one transverse beam in the middle of the span for connection of the longitudinal beams
The length of the precast beams is 21.2m. The axial distance of the piers is 22.2m. On each pier there is a double row of bearings with dimensions 0.3x0.3m. placed at a distance of 0.35 m. from the axis of the pier. The result of the above is that the precast beam cannot be placed on the bearings before the casting of the in situ part of the deck. Please check and amend.
For the casting of the 20 cm thick in situ part of the deck temporary formwork should be used. The usual European practice is to place thin prefabricated slabs between the beams which will remain at place after the casting of the deck. Please explain in the method of statement what kind of formwork is going to be used.
The calculations should include an analysis of the main longitudinal beams for the construction and transportation stage.
Design calculations should include checks on the accuracy of the pier modelling. In the model presented the piers simulation includes only the prefabricated columns of height about 7.0m. ignoring the actual height of the piers which is about 13.0m. As a result the longitudinal displacements due to earthquake are very low. There is also no calculation of the reinforcement at the bottom of the pier walls.
Explain the method of construction of the shear key [antiseismic support (rest)] as shown in drawing 5 of 29 under the compact part of the deck
The prefabricated columns of the piers are placed at the edges of the pier wall. Due to high concentration of stresses this is a critical area. A calculation of the longitudinal reinforcement of the walls at this area should be included in the analysis
Designs should include details of the proposed type of bearings and joints on the drawings and provide the necessary documentation
Calculations for the wing walls should to be included in the analysis
Concurrent compaction on both sides of the abutment area is necessary. A note should be added on the drawings
Designs should check maximum percentages of reinforcement on all elements

Designs should check maximum deformations according to par. 1.43 of SNIP 2.05.03-84
Designs should include crack check according to par. 3.95 of SNIP 2.05.03-84

Based on the European practice some general comments would apply:

- Reinforcement bars of diameter 32 or 40mm are used for beam reinforcement. The crack control check might not be satisfactory
- Splicing and anchorage seems deficient
- Welding of reinforcement (not allowed in U.K)

GASAN SU CHAY

The submitted drawings were those for a 3x18,0 m span bridge.
The deck comprises 8 T-shaped precast beams connected with an in-situ infill. The piers are formed as portal frames two columns of 0,80x1,00 of height 7.3 and 8,0m and a connecting beam made of precast parts connected with an in situ concrete part.
The foundation is piled with an in situ pile cap connecting already existing piles.
Both abutments and piers precast parts connected with in situ concrete.

Recommendations

Assumptions of the analysis should be included in the submission. A description of the model and the relevant assumptions should include specific references to

A: INPUT

- Type of model (i.e. grillage)
- Sections used and section analysis for all (i.e. piers, beams, piles, deck)
- Fixities (i.e. pinned, fixed etc.)
- Loads
- Materials

B: OUTPUT:

- Displacements

The European practice dictates the use of at least one transverse beam in the middle of the span for connection of the longitudinal beams

Calculation of the footings should be included in the analysis. The existing piles should be ignored because they have been constructed 10 years ago and proper connection to the pile cap cannot be sure.

The calculations should include an analysis of the loadings considered in the design (self weight, additional dead, live load-vehicle, temperature, seismic load, etc.)

Decks should include adequate means for connection of the T-shaped beams, as outlined in the draft drawings by KOCKS. A min 20 cm thick slab is considered advisable.

Calculation of the reinforcement of the recess walls for the placement of the prefabricated columns should be included in the analysis.

The reinforcement of the prefabricated beams is not included in the drawings.

The connection of the safety barriers to the deck slab is not considered adequate.
The calculations should include an analysis of the main longitudinal beams for the construction and transportation stage.
Method statements / Proposals should be provided for, inter alia, concrete supply, reinforcement, transport of prefabricated elements, craneage, cube sampling and testing. Specific reference should be made to potential damage from transportation of the prefabricated beams
Designs should include pile analysis and retaining wall analysis where applicable.
Designs should include analysis of the approach slabs.
Concurrent compaction on both sides of the abutment area is necessary. A note should be added on the drawings
Designs should check maximum percentages of reinforcement on all elements
Designs should check maximum deformations according to par. 1.43 of SNIP 2.05.03-84
Designs should include crack check according to par. 3.95 of SNIP 2.05.03-84

Based on the European practice some general comments would apply:

- Reinforcement bars of diameter 32 or 40mm are used for beam reinforcement. The crack control check might not be satisfactory
- Splicing and anchorage seems deficient
- Welding of reinforcement (not allowed in U.K)

ANNEX 3

"Construction of Gasan Su Cay and Shamkir Cay Bridges"
EUROPEAID/113179/C/SV/MULTI

Seminar on the Contract Procedures held on 23rd May 2003 at PIU office.

LIST OF PARTICIPANTS

Mr G. Tremlett	***LBSA Project Manager/ Chairman (PM)***
Mr S. I. Dotchev	LBSA Project Manager's Representative
Mr A. Gojayev	PIU Director
Mr G. Safarov	PIU Procurement Expert
Mr R. Guliyev	PIU Accountant
Mr V. Ibragimov	"Azeravtoyol" SC Representative
Mr I. Jamalov	"Azeravtoyol" SC Representative
Mr Kamal Rahid	Resident Engineer for Alyat-Gazi-Mohammed Project
Mr Tolga Aksut	Project Manager for Alyat-Gazi-Mohammed Project

Notes for Seminar on the Contract Procedures

Introduction
Old Times when the rules were formed and Why
General rules of Contract and the formation of a Contract.
Contract Parties
Employer and Duties
Contractor and duties
Funding Agent
Engineer
Discussion on rules of General Contracts
Conditions of Contract
Anomalies in Contracts

Introduction

This Seminar is to discuss the basic rudiments of modern International construction methods. It will encompass the way rules came into being and discuss the roles of each party including the funding agent who actually sets aside the money for the procurement (euro babble) of the project. I will also discus the Conditions of Contract in a general way as the projects in Azerbaijan are subject to the World Bank Rules and / or the EC rules. Although I am an Advocate of FIDIC which is a very clear set of conditions even if the old 4th edition had become grossly untidy. For example it had no Clause 13.2 that was found at 66 and clause 65.8 was not related to Clause 65.1–6 in any way whatsoever.

Let us start with some definitions I will refer to the Contractor whose chief man on site is called a **Site Agent**.

The **Engineer** is also referred to as the Project Manager (as Engineer in FIDIC) but I will use the term Engineer to avoid confusion with the overall Project manager.

Like wise the Engineer's Representative has various titles but herein after he will be the **Resident Engineer** or RE

Old Times when the rules were formed and Why

Civil Engineering procedures have evolved over a period of more than 150 years. They are based on rules and guidelines set up from the 1820's onwards with such famous names as Stevenson Telford MacAdam and Brunnel.

In the early days of construction an Employer would seek out an Engineer by his reputation. The Employer would normally be the local town Municipality or a shipping owner or a similar such person or corporate body. The Employer in fact engaged an Engineer or employed him in the way a sick person would engage a doctor. The Engineer was a professional person and was independent of the Employer and worked for a fee. His credentials were not open to discussion as he was "employed on his reputation" and not as an Employee. One never questions the doctor although one still has to pay him as if one had employed him. The Employer or more correctly the client would give the Engineer a brief and explain what he would like to be built and could give him a budget cost. The Engineer would work in conjunction with the Client to produce a scheme and estimate of the cost and, if the client was agreeable to the design, the Engineer set out and hired a Contractor to build the Works. Whereas it was the duty of the Engineer to look after the best interests of his client he also had to ensure that the Client paid the Contractor who had been employed by the client on the advice of the Engineer. To be fair to all parties a set of rules was drawn up which set out all the duties of each party and also the action to be followed in the case of any party being unable to fulfil these rules. There is also an allowance for the "Employer" to be consulted regarding increased costs as he may be unable to meet the extra costs and would have to revise the Works to allow for the budget. As time goes by the rules are amended and standardised until the first General Conditions of Contract was published. Then over the years the law courts have become involved when the parties to a contract fall out. This has resulted in a number of major changes to the Conditions of Contract. Some particular changes that spring to mind are the case when a high court judge told an Engineer that as he had failed to note that the Contractors proposed method of works was doomed to failure and the project collapsed, therefore as The Engineer he was forced to pay for the damage and not the Contractor.

The Term Employer remains to this day. Unfortunately some Employers believe they control all the parties especially the Engineer.

General rules of Contract and the formation of a Contract.

A contract is defined as an agreement between two parties for each's mutual Benefit. It is governed by a set of rules, which are enforced in a civils project by an "independent referee" or Engineer. It is not a case of Master and Servant, so potential Employers should take note. The consideration or benefit that the Employer gains from the agreement is the completed project. The Consideration the Contractor obtains is money. It is a simple as that.

A contract is formed when a Tender, which is an offer to do the Works, is accepted by the "Employer". A Contract Agreement is an extra document that formalises any outstanding alterations and clarifications. Such as a delay between the Tender and the award means a clause is introduce to vary the price and a new rate may be applicable

to the foreign currency portion. New dates are also part of the agreement. A FIDIC contract does not require an agreement but one is always desirable.

Parties to a Contract

The Employer

Under the EC Conditions of Contract this is referred to as the Contracting Authority. Unfortunately experience suggests that this title will cause confusion. He is normally the party that wishes a project to be completed. He has many duties under a contract. He SHALL provide the site for the Contractor to work upon and he must allow the contractor to actually work on the site. He must not interfere in any way. He must not force staff on the contractor or have staff removed. It is true that the engineer may well have the power to remove staff from the site. However it is not obvious but he must have a sound reason for such action. He must be aware that the employee has rights under civil law and the Engineer will be liable if it is found by the judge that he acted vexaciously (in malice without just cause) this could lead to a claim against the Employer who would then counterclaim against the Engineer.

The Employer must also pay the Contractor as agreed under the terms of the contract or the contractor could be caused problems.
The Employer must never think he is the Employer ands the Engineer and Contractor are his Employee's.

The Contractor

Under all Conditions of Contract the Contractor is the Contractor. He is the party that offers to complete the Project for a consideration namely cash. Perhaps the only obvious party. He does have specific duties under the Contract.

The Funding Agency

In many cases these days an extra party has arisen in the body of the Funding agent. Each Employer will have a source of funds be it his own or from a loan. Even his own funds are subject to rules he will have concerning his own bank account. In the situation we are in there is a loan or even a donation to complete the works. In these situations there is another contract between the Government of the State and the IFI. This contract imposes strict restraints upon the Employer of which the Engineer is unaware. However I have seen these in the past and there is a point of International law that I would like to mention at this point. That is this contract is with the Ministry of Transport (as Employer) but if the Ministry of Railways or Finance cause delays then as a government contract the Employer is liable for the extra costs. This applies to the EC contracts as well when the Finance Unit or the Contracts units are at odds with each other the EC is still liable to pay when they are the Contracting Authority (Employer as in FIDIC)

The Project Implementation Unit PIU

Under World Bank rules a Project Implementation Unit Or PIU is set up. This unit is to taker care of the Governments position and is responsible for the day-to-day management of the project to quote the rules. Once again we have an anomaly as the PIU's I have experienced are all part of the Road Funds. The director of the Road fund controls them. The main function of the PIU is to ensure the certificated amount is paid.

They all tend to act as the Employers Representative in as much as it is there role to approve all Variations in the project. Unfortunately as an Engineer (with a capital "E") I find accountants have overrun everything and as such all Variations involve money so they are "in Control". In fact the point that is overlooked is that most variations occur as a result of a technical problem that should be resolved by Engineers. Thus in fact I am pleased that the PIU is always set up in the road funds.

The Engineer

He is the party who supervises the Works. Normally he will use his Representative to act on his behalf on the Site permanently hence the old Term Resident Engineer. This term has been recreated in FIDIC 1999. There are some important points to remember as the Employer often engages the RE but he is not an Employee. It is his duty to protect the best interests of the Employer, as he is his client. However, the Engineer is the sole referee as to the quality of the works and also as to the valuation of the works.

The Engineer is also the only person who can instruct the Contractor. The obvious question is why. The answer is that as the referee the Engineer must evaluate the works and the Employer must pay. The Engineer receives instructions from his client and has a duty to advise the client about any cost implications regarding the instructions. Having agreed to the situation the Engineer instructs the Contractor. As often happens in some countries the Employer asks the contractor to make a change and the contractor obliges. Then when the certificate is requested and there is a increase in price the Employer can refuse to pay as it was not confirmed by the Engineer who also cannot certify the payment as he did not order it. There can also be a question of quality that can be abused in this manner in which the contract specifies a ford ka and the client expects a Mercedes.

Anomalies in Contracts

There are a number of classic anomalies that occur in modern contracts and I would like to discus some especially as they refer to this part of the world.

Stopping the Contractor from Working

There is a wide spread belief that the Resident Engineer and his staff can stop the Contractor from working. This is absolutely untrue as there no clause that allows for this in deed there is a clause that covers compensation items and suspension of works is one such compensation item. Oh yes there is a suspension clause but that is for serious problems such as force majeure. Discuss. The way is to say to the contractor that the work he is engaged in is not up to specification and that the suggestion is that he stops and what he is doing and puts it right or he will not be paid and may have to remove a subsequent section of the works to put it right.

Independence of the Engineer

Another widespread belief is that the Engineer is supposed to be totally independent. This is also not strictly true as his main function is to look after the interest of his client. However, the Engineer is also solely responsible for ensuring the Contractor does the Works according to the Specification. Also the Engineer must ensure the Employer pays his valuation to the Contractor. There are safeguards for this as it is the Engineer's duty to keep the client informed as to all possible increases in the costs as the Employer can

reduce the scope of works if he is short of the extra funds. The Engineer is the intermediary and neither the Contractor nor the "Employer" should approach the other professionally.

In spite of the above the Engineer does have some roles that are absolutely independent. He is the sole arbiter for quality and value of the works. The Employer must pay to the contactor money duly certified. Naturally both sides have recourse to higher legal means but the Employer would make the case against the Engineer. The Employer normally pays the Engineer's fees but does not employ him as if he was an employee. The best analogies I can have to explain this would be a say a soccer match do you realise that Mr. Ferguson pays the referee at Old Trafford and Mr. Venger those at Highbury. You may all pay your Doctor but you do not make his diagnosis for him do you and that is the same with an Engineer.

Law of the Contract

But the worst problems arise with what is commonly called the law of the land. Again this is a fallacy and some of the funding agencies must make more effort to stop "employers " using this excuse to harass contractors. If the law prevents the Employer from honouring a Condition of Contract then the Contract is void. **BUT** and it is a strong but the Employer must settle with the contractor as if he has terminated the Contract without due cause. This is often very expensive. There is always an agreement between the funding agent IDA EBRD or whatever and the Government receiving the loan. In this agreement there are clauses that insist that the Conditions of Contract as defined in the contracts must be used and that the works SHALL be supervised by Foreign experts often supplied free of charge by the EC. TACIS monitors should be aware of these agreements that are private. More often the "Employer" claims that the law says one thing but is unaware that in the agreement this topic is clarified. For example the Traceca Agreement states that the Languages shall be English and Russian, So any further translations are at the expense of the beneficiary. Also many items that are claimed as laws are actually old customs and procedures.

Maintenance Period

Another misconception as the term is in Fact **"Defects Liability Period"**. The Contractor is only liable for any repairs that are as result of poor workmanship. He is not liable to repaint white lines that have worn away under traffic use if the paint specified is only fit for one years service and he is not liable to repair damage caused by the Employer. In the case of a road the traffic using road is doing so at the risk of the Employer. The Employer can claim from the motorist but not the contractor.

Contractor's Design Obligations

Similarly is the term for working **drawings misused.** It would serve Employers well to realise that they are responsible for telling the Contractor what they want. It is the design Engineer that must resolve all the requirements. The common practice has come about no doubt as Contactors have been abused over the years. The source of the error is to found in antiquity. It was started when contractors requested using different bar diameters for a number of reasons and this included the fact that rebar is a real lump of metal with real dimensions and not a 2H pencil line on a piece of paper. I have seen 4 32mm dia bars at 150 centre to centre. Where did the designer expect the concrete to fit? Also civil engineers prepared steel drawings but shipbuilders or metal workers who

had a different form of working drawing fabricated sections of a structure. Hence working drawings were necessary. From these restrictive practices the poor old contractor has been imposed upon.

Here is yet another common misunderstanding. In the USSR system it was the Road Fund that **designed** the Road Fund that the project **built** the project and the Road Fund that **supervised** the project. Thus if the design was not fully complete the Road department just finished the design. Now under an International Contract the Designer "Engineer" must complete the design and then the Employer must hand the **complete** design to the Contractor.

Under FIDIC and the IDA Conditions of Contract it is clear that the Contractor has no design responsibilities **unless specified in the Contract.** Equally so does the EC set of conditions. However the EC set is written (badly) to cover a design and build project as well as a construction project.

In all cases the Contractor must prepare a set of plans for **Temporary works** to enable him to build the Permanent Works. In all contracts this is clearly explained. The problem arises, as too many people have not fully understood that **Temporary Works** is defined as part of the Contractors duties. **Works** are defined as both **Permanent** Works and **Temporary** Works but **Temporary Works** are clearly only **Temporary Works**. (Pause to sink in) It is only the Temporary Works that are the **Contractors Responsibility**.

Contractors are allowed to propose variations to the design but only minor points such as the arrangement of the reinforcement but he cannot replace a prestressed beam with a RC beam without a full agreement of the Employer. Then the Contractor should pay the design Engineer's fees to check the design.

Lump Sums and Price Breakdowns

This is another area that leads to confusion. Many people have the idea that the rules say, "the Contractor Shall provide a price Breakdown of any rate". This is correct but the phrase is taken out of context as there are words before this statement that include "if required and no punctuation.

There is a good reason for this full clause and it is often wise for the Engineer to make this request at the start of a project. However he really only needs to know how the Contractor has priced his works for three reasons.

1 The most important is to know the complete breakdown of the Contract in the basic units. These are Profit, Material costs, Fuel, construction Equipment Costs, Labour costs and the percentage for Overheads. A Typical breakdown would be

Labour	**15%**
Equipment	**17%**
Fuel	12%
Materials Aggregates Road stone	10%
Materials Aggregates Concrete	10%
Cement	3%
Bitumen	5%
Reinforcement	3%

Overheads	**15%**
Profit	10%
Total	**100%**

The logic for this is two fold as it assists with the price adjustment formula if used and also in the case of an extension of time granted to the Contractor as a "compensation event" it is an absolute guide to the assessment of the claim. If a contract is for $3,650,000 over a year then the main costs can be worked out as $10,000 per day. For a standing time delay the contractor is entitled to claim for Labour, Equipment and Overheads or from the table 47% or $4,700 per day. QED

2 In the event of a large Lump Sum Item such as provide a site laboratory and equip it and to include for the removal after the end of the contract. Here If the breakdown is 30% to provide and erect 50% to equip the lab and 20% to remove it then interim payments can be readily estimated without argument.

3 In the case of Major items and only major items a breakdown of the price can be used to assist with the preparation of new prices for related items that may arise as variations.

You will note from the above that I have not included small items. As for example if a Bill of Quantities was to include for the supply of a Distomat for the Engineer and the Contractor having include the price in the office equipment leaves it out. In this case the Contractor must provide one Distomat free of extra cost but the Employer cannot demand more than one at zero or at any figure the Contractor may have thrown in, as that would be a major variation in the quantities.

ANNEX 4

TECHNICAL REPORT

ON SURVEY OF TUNNELS

ROAD M−6 VANADZOR − ALAVERDI − GEORGIAN BRD.

KM 25+460 − KM 32+090

YEREVAN 2003

CONTENT

Table of contents

Introduction

The existing interstate highway M−6 Vanadzor−Alaverdi−Georgian border is located in the north of Armenia in a mountainous, heavily rugged region − in the basins of the Pambak and Debed rivers. The river had a major part in formation of the relief. The river made its way to the Kura river through a deep valley here and there transformed into a canyon. This made it possible to construct a railway and roads complex mountainous conditions that link the Republic of Armenia with Georgia.

The Pambak basin ends in several kilometers to the east of the town of Vanadzor, where the Pambak river turns to the north and flows through Bazum mountain range up to the Georgian border forming a deep canyon with parcels of small tapered out terraces.

It is called Debed at the confluence of the Dzoraget and Pambak rivers (km 32+260).

In the whole net of artificial structures on the road M−6 Vanadzor−Alaverdi−Georgian border, the three surveyed tunnels take the most important place and play a significant role in improvement of operational indices of road links in that particular mountainous terrain. The important role of all transportation tunnels is also conditioned upon the lack of bypasses and backup roads in vicinities.

The existing interstate highway M−6 Vanadzor−Alaverdi−Georgian border belongs to the III technical category of roads.

Traffic volume (vpd.) of various vehicles at the outlet portal (towards the increase of kilometerage) of the third tunnel is presented in the following table:

Passenger cars with carrying capacity <1.5 tons	Trucks with carrying capacity b/w 1.5−3.0 tons	Buses	Two−axle trucks with carrying capacity <3.0 tons	Six−wheel trucks	Eight− or ten−wheel trucks with trailer	Total
1671	110	84	31	33	18	1889

A search for technical documentation on exploited transportation tunnels was unsuccessful because of its nonexistence.

Special inspection and survey carried out according to the requirements specification (contract with "Louis Berger") included:

a) study of location of structures by layout and profile,

b) determination of the main dimensions of constructive elements and structures as a whole,

c) detection of the existence of specific exploitation facilities for tunnels (catchment and drainage facilities, electric lighting, ventilation, fire protection),

d) assessment of technical condition of the main bearing constructive components (lining, portal, natural arch of 2 liningless tunnels),

e) detection of defects on the main bearing constructive components, as well as exploitation facilities (if any).

Tunnels are considered to be the most crucial, complicated an expensive structure for transportation purposes designed for long−term service.

The main bearing structure of a tunnel – its lining – fastens the heading and takes all kinds of effective loads (tunnels NN1 and 3). Work conditions for tunnel lining are extremely difficult and quite diverse.

The main factors affecting exploitation and statical work conditions for tunnel lining are as follows:

External natural conditions (geological, hydrogeological and climatic conditions, seismic load).

Geometrical parameters and structural characteristics of tunnels (length, cross–section, layout, longitudinal profile; material and structure of lining, portals, niches; waterproofing, catchment and drainage structures).

Construction characteristics reflect the actual condition and outline of the tunnel compared to the designed one.

Operating condition of tunnels, heavy traffic impeded current maintenance of tunnels and did not allow for implementation of repair works on time.

The present technical report is prepared on the basis of special inspection and survey of three transportation tunnels located on the road of interstate significance: M–6 Vanadzor–Alaverdi–Georgian border, carried out by specialists of "Dorproject" Institute in May 2003.

The following documents are the main normative ones acting in the Republic of Armenia:

1. "Railway and Highway Tunnels" CNRA IV –11.05.04–97.
2. "Railway and Highway Tunnels" MCH 3.03–07–97.
3. "Highway Tunnels" Clearance to obstructions and equipment and machinery GOST 24451–80.
4. "Highways" CNRA IV – 11.05.02–99.

Tunnel N1

1.1. General information

Transportation tunnel 106.0 m long.

Beginning of the tunnel – km 25+460 m.

End of the tunnel – km 25+566 m.

Transportation tunnel serves for overcoming of high–altitude obstacle in the form of mountainside.

Clearance of the tunnel – alternating:

at the beginning of the tunnel Г–7.75 m,

in the middle of the tunnel Г–8.05 m.

Auxiliary sidewalk 1.2 m wide (including guard band) is situated to the left from kilometerage.

Guard band to the right from kilometerage has a variable width:

at the beginning of the tunnel – 0.6 m,

in the middle of the tunnel – 0.3 m.

There are no cameras and niches in the tunnel.

Rock pressure is taken up by tunnel lining. Axis of the lining has a smooth configuration and its form is similar to quadratic parabola where the walls are vertical.

At the entrance, the ceiling of the tunnel consists of precast reinforced–concrete slab and rib structures located horizontally on the section with a length of 11m and insignificant rock pressure.

It is allowed for various internal configuration of tunnel lining when rock pressure is changed abruptly.

1.2. Survey results

1.2.1. Layout and longitudinal profile

Tunnel is located on a horizontal curve with a radius of R175 m.

Tunnels have the following drawbacks on curves: a need for increase in the carriageway width and establishment of a turn in order to provide traffic safety; low visibility which is of great importance, particularly in case of oncoming traffic. However, the location of the tunnel on a curve was forced in that particular case.

Minimum radius of a horizontal curve in a road tunnel is adopted equal to R 250 m (CNRA IV – 11.05.04–97 p. 4.7). At the same time, a required visibility is provided for the given estimated speed of vehicles.

Thus, the radius of the horizontal curve does not comply with a requirement presented in CNRA.

Tunnel is located on longitudinal slope i=2.6 %.

When the length of a mountain tunnel is less than 300 m (CNRA IV – 11.05.04–97 pp. 4.8, 4.9), the longitudinal profile of the carriageway should be single–ended and provide natural ventilation of at least 3‰.

Maximum longitudinal slope in road tunnels should not exceed 40 %(CNRA IV – 11.05.04–97 p. 4.10).

Thus, the longitudinal slope complies with a requirement presented in CNRA.

Besides the above–mentioned additional provisions, the layout and longitudinal profile of tunnel sections of roads should meet the requirements of CNRA IV – 11.05.02 – 99 for open sections

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1.2.2. Cross–section of the tunnel

The form and dimensions of cross–section of a tunnel is defined by its purpose.

Cross–section of the tunnel should correspond to clearance to obstructions, the carriageway of which is variable:

at the beginning of the tunnel Г–7.75 m,

in the middle of the tunnel Г–8.05 m, which does not comply with a requirement of GOST 24451–80.

Height of the clearance along the centerline of the tunnel equals:

at the beginning of the tunnel H=5.5 m,

in the middle of the tunnel H=6.4 m.

Auxiliary sidewalk 1.2 m wide (including guard band) is situated to the left from kilometerage.

Guard band has a variable width:

at the beginning of the tunnel 0.6 m,

in the middle of the tunnel 0.3 m.

In the tunnel, pedestrian traffic volume is small <50 persons per day. At the same time, traffic capacity of the single−sided sidewalk with a width of 1 m reaches 1000 pedestrians per hour.

Elevation of the auxiliary sidewalk above the carriageway equals 0.2 m, which does not comply with a requirement of CNRA IV − 11.05.04−97 (p. 3.19).

1.2.3. Material and condition of the tunnel lining

The most crucial structure of the tunnel is its lining, the carrying capacity of which should correspond to the surrounding rock pressure, and the material of lining should ensure long service life.

The tunnel lining consists of vertical walls that smoothly connect with an upper arch. Invert is missing − friction in the feet of walls is enough to prevent shifts of walls inside excavation.

At the entrance, the lining consists of in−situ concrete vertical walls and reinforced−concrete slab (3 items) and rib (5 items) structures located horizontally on the section with a length of 11m.

Structure of the given lining of the near−portal section is in satisfactory condition.

Structure of the main section of tunnel lining made of in−situ concrete is in poor condition, especially the condition of the arch is very poor − there are revealed numerous signs of dumping of front−face area. Moisture from atmospheric precipitation penetrating into the tunnel conduces to emergence of a great number of micro−cracks in the arch of the lining. Moisture penetrates also through poor−quality junctures that were formed during construction of the upper arch of the lining.

Other defects in the form of destruction and segregation of laying of the lining, buckling and deformation, heavy leakage are not revealed during a detailed inspection.

Thus, there are no local deformations of the lining that require its reconstruction.

1.2.4. Portals and head walls

Portals of the tunnel designed for stability of frontal slopes and those of approach excavation which are more exposed to atmospheric impact are faced with trimmed stone. There are the same requirements for maintenance of portal as for tunnel lining and retaining walls.

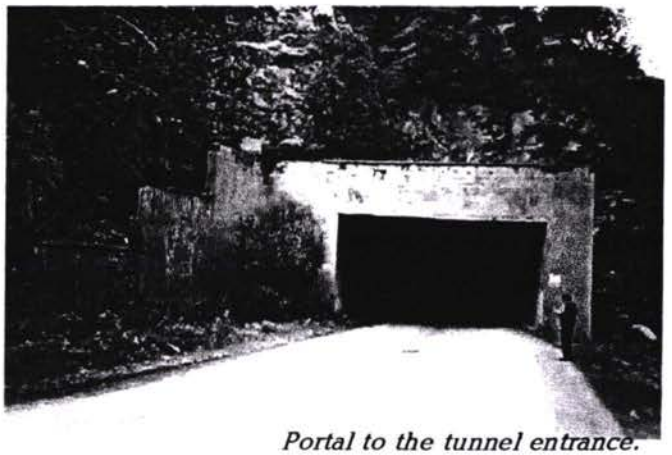
Trimmed facing stones of portals are destroyed and fallen down here and there.

A great number of hoods made of trimmed stone suffer the same fate.

On the facade side of portals, there are revealed numerous signs of water leakage, leaching cement mortar, and soiling which is a result of poor operation of over−tunnel drain pipe. It should always be maintained in a good working condition.

In pre−portal excavation with steep slopes, it is necessary to remove rocks threatening with their accidental collapse onto the road.

Tunnel does not have a U−turn area before portals for vehicles in case of emergency.



Portal to the tunnel entrance.

Portal from the tunnel exit.

In addition to the above mentioned, the following is required:
Vertical benchmarking of portals;
Installation of reference marks for the III class leveling;
Expansion joints of the road dressing on the surface of portals.

It should be constructed a drainage chute for removal of surface water from the frontal slope behind parapets.

It is necessary to provide removal of water away from tunnel, where water comes from near−portal excavation which is located on the upper side.

Details of the portal and tunnel

1.2.5. Carriageway

Carriageway of the tunnel is of fundamental type with double−layer asphalt−concrete and is in fair condition. Mainly, it complies with acting normative documents for open sections of roads built in black−spots.

Elevation of the auxiliary sidewalk and guard band above the carriageway equals 0.2 m, and does not comply with the requirement of CNRA IV − 11.05.04−97 (p. 3.19).

Paragraph 3.20 of the same CNRA requires:

„In road tunnels on the distance of at least 100 m from the portal, it is necessary to employ bright asphalt−concrete pavement, white tiles for facing or white−colored walls at least 1.4 m above an auxiliary passageway, or other technical solutions ensuring adaptation of drivers' sight. There should be applied dark−colored materials for facing of frontal surface of portals and walls of lean−tos.

1.2.6. Catchment and drainage facilities

Catchment and drainage facilities are missing in the tunnel.

To eliminate that particular drawback, it is required to construct a drainage of closed chute or collector type in the tunnel, outside the carriageway. Slope of the bottom of the chute or collector should be no less than 3

The chute or collector should have conduit pits with settling part (settlers) with a capacity of at least 0.04 m^3, after each 40 m.

The settlers should be available for periodic cleaning.

Estimated water level in the chute of the tunnel should be lower than the pavement.

Surface of near−portal upper zones for improvement of water flow should be designed with filling of holes with non−drainable soil.

In order to remove surface water from frontal slopes and upper near−portal zones, there should be constructed drainage chutes behind parapets.

Near−portal sections of the road should have drain pit that would prevent from water flow into the tunnel.

1.2.7. Electric lighting

Electric lighting is missing in the existing tunnel.

It should be designed for artificial lighting of the road tunnel in evening and daytime mode with an average horizontal illumination E_T=30 lux in accordance with table 6 in CNRA IV−11.05.04−97.

Lighting of the road tunnel in a daytime mode is not needed in accordance with a norm of average horizontal artificial illumination − table in CNRA IV − 11.05.04−97.

1.2.8. Ventilation

In the existing tunnel, there is natural ventilation that ensures exploitation in a normal regime where there is non−stop traffic with maximum permissible speed for traffic volume appropriate during "rush" hours''.

At the same time, maximum allowable carbon oxide concentration as an indicator of the whole set of exhaust gases in the transportation zone of the tunnel should be no more than 60 mg/m³, when the time of vehicles being in the tunnel is 5 minutes. Actual time of vehicles being in the tunnel is remarkably less.

Ventilation provides air transparency necessary by conditions of visibility in the tunnel where the index of light depression does not exceed 0.0075 l/m.

Estimated air temperature in the tunnel does not exceed maximum temperature of outside air.

In case of repair works in the tunnel, concentration of hazardous materials in air should not exceed maximum permissible concentration set by GOST 12.1.005.

1.2.9. Fire protection

The existing tunnel does not have fire towers with technical means for fire fighting.

The lack of fire towers with technical means for fire−fighting in tunnels the length of which is less than 600 m should be agreed with the State Engineering Supervision bodies in accordance with CNRA IV − 11.05.04−97.

In case of fire, first of all the burning vehicle must be removed from the tunnel and then the fire source should be extinguished outside the tunnel.

If it is impossible to remove the vehicle, fire should be localized and extinguished on the spot by implementing necessary fire−fighting measures.

In the process of carrying out rehabilitation (reconstruction) works, it is necessary to ensure fire safety of nearby forests.

1.3. Assessment of the technical condition

Taking into account the above−stated, the technical condition of exploited tunnel N1 is assessed as poor on the whole.

1.4. Conclusions and recommendations

Extensive rehabilitation of exploited transport tunnel N1 should provide for elimination of above−mentioned structural defects and fill currently missing special exploitation facilities.

It should be also noted that the clearance of the tunnel (Г−7.75÷8.05m), does not comply with the requirement of GOST 24451−80 "Road tunnels". Also, the radius of the horizontal curve does not comply with the requirement of CNRA IV−11.05.04−97.

In case if the tunnel clearance is brought into compliance with the requirement of GOST 24451−80, and also the radius of the horizontal curve is increased (if there is an appropriate requirements specification), it would be necessary not only extensive rehabilitation but also radical reconstruction of the tunnel as a whole including tunnel lining along it, as well as reconstruction of portals.

At the same time, it would be necessary to increase capital investments that are not expedient in conditions of current traffic volume.

***Conclusion:** we recommend an extensive rehabilitation of exploited transport tunnel N 1 while maintaining the existing clearance, as well as the radius of the horizontal curve.*

2. Tunnel N 2

2.1. General information

Transportation tunnel 276.0 m long.
Beginning of the tunnel – km 31+200 m, coincides with the end of a settlement – Dzoraget village.
End of the tunnel – km 31+ 476 m.
Transportation tunnel serves for overcoming of high–altitude obstacle in the form of mountainside.

Clearance of the tunnel – alternating:
at the beginning of the tunnel – Г – 7.4 m
in the middle of the tunnel – Г – 7.4 ÷ 8.5 m
at the end of the tunnel – Г – 7.7 m.

Auxiliary sidewalk 0.6 m wide is situated to the right towards increase of kilometers. There is no guard band. In the place of the guard band, there is a steel drain pipe with d=100 mm to the left from kilometerage.

There are no cameras and niches in the tunnel.

There is no artificial lining in the tunnel: it is without lining.

Rock pressure is taken by an arch formed during the construction of the tunnel in 1960s of the previous century..

The arch and walls of the tunnel are represented by strong basalt of 20 6VIII category. The arch and walls of the tunnel do not have even (smooth) outline. The volume of shortage is big.

The arch hardly resembles a quadratic parabola. At the same time, Walls are not vertical. 100 m before the beginning of the tunnel – on the right side towards kilometer increase – there is discovered through embrasure 6 m long and up to 2 m high. On the mentioned section, mountainside has a very little thickness (up to 1.5 m).

Tunnel needs in elimination of upper size overage.

2.2. Survey results

2.2.1. Layout and longitudinal profile

Tunnel is located on a horizontal curve the radius of which equals R 90 m. Minimum radius of a horizontal curve in a road tunnel is adopted equal to R 250 m.

Thus, the radius of the horizontal curve does not comply with the requirement of CNRA IV – 11. 05.04–97 p. 4.7

Tunnel is located on the single–ended longitudinal slope with i = 4.7 and does not meet a requirement of CNRA IV – 11. 05.04–97.

Besides the above–mentioned additional provisions, the layout and longitudinal profile of tunnel sections of roads should meet the requirements of CNRA IV – 11. 05.02–99 for open sections.

2.2.2. Cross−section of the tunnel

Cross−section of the tunnel should correspond to clearance to obstructions,, the carriageway of which is variable:

at the beginning of the tunnel − Г − 7.4 m

in the middle of the tunnel − Г − 7.4 ÷ 8.5 m

at the end of the tunnel − Г − 7.7 m, which does not comply with the requirement of GOST 24451−80.

Height of the clearance along the centerline of the tunnel equals:

at the beginning of the tunnel − H = 4.97 m

in the middle of the tunnel − H = 4.6 ÷ 5.4 m

at the end of the tunnel − H = 5.05 m, which also does not comply with the requirement of GOST 24451−80. (taking into account continuation of lowering of the upper outline of the arch).

Auxiliary sidewalk 0.6 m wide on the right side of kilometerage is in dilapidated and unusable condition..

Pedestrian traffic volume in the tunnel is not big < 50 pedestrians per day.

Elevation of the auxiliary sidewalk above the carriageway equals 0.2 m − does not comply with the requirement of CNRA IV − 11. 05.04.97.

Tunnel needs in elimination of upper size overage.

2.2.3. Material and condition of the tunnel lining

Artificial lining is missing along the tunnel, except on near−portal sections. The arch and walls of the tunnel which are formed by advancing with mining method present a single closed cut in strong basalt of 20 6VIII category. The tunnel liningless..

The arch and walls of the tunnel do not have even (smooth) outline.

The volume of shortage is big. The arch hardly resembles a quadratic parabola. At the same time, walls are not vertical. 100 m before the beginning of the tunnel − on the right side towards kilometer increase − there is discovered through embrasure 6 m long and up to 2 m high.

Moisture formed by atmospheric precipitation penetrates into the tunnel through a great number of micro−cracks, drops from the arch and flows down the walls.

The tunnel lining consists of vertical walls that smoothly connect with an upper arch. Material of near−portal sections of the lining is in−situ concrete.

Near−portal lining is in poor condition.

Lining of the near−portal section at the beginning of the tunnel.

2.2.4. Portals and head walls

The portals of the tunnel are massive and made of concrete. Frontal surfaces of portals are not faced.

On the facade side of portals, there are revealed numerous signs of water leakage, leaching cement mortar, and soiling which is a result of poor operation of over−tunnel drain pipe. It should always be maintained in a good working condition.

In pre−portal excavation at the exit of the tunnel with steep left−side slopes, it is necessary to remove rocks threatening with their accidental collapse onto the road.

Tunnel does not have a U−turn area before portals for vehicles in case of emergency.

Portal to the tunnel entrance

Portal from the tunnel exit

In addition to the above mentioned, the following is required:

Vertical benchmarking of portals,

Installation of reference marks for the III class leveling;

Expansion joints of the road dressing on the surface of portals.

It should be constructed a drainage chute for removal of surface water from the frontal slope behind parapets.

It is necessary to provide removal of water away from tunnel, where water comes from near−portal excavation which is located on the upper side

A detail of hillside at the exit from the tunnel

2.2.5. Carriageway

Carriageway of the tunnel is of fundamental type with double−layer asphalt−concrete and is in fair condition only on near−portal sections. On other sections of the tunnel, asphalt−concrete pavement is in extremely poor condition. Replacement of the road dressing is needed along the whole tunnel

It is necessary to use bright pavement in the tunnel covering the distance of at least 100 m from portals.

2.2.6. Catchment and drainage facilities

Catchment and drainage facilities are missing in the tunnel and drainage is not provided outside the structure.

To eliminate that structural particular drawback, it is required to construct a drainage of closed chute or collector type in the tunnel, outside the carriageway. Slope of the bottom of the chute or collector should be no less than 3 .

The chute or collector should have conduit pits with settling part (settlers) with a capacity of at least 0.04 m^3, after each 40 m.

The settlers should be available for periodic cleaning.

Estimated water level in the chute of the tunnel should be lower than the pavement.

Surface of near−portal upper zones for improvement of water flow should be designed with filling of holes with non−drainable soil.

Near−portal sections of the road should have drain pits that would prevent from water flow into the tunnel.

2.2.7. Electric lighting

Electric lighting is missing in the existing tunnel.

It should be provided for artificial lighting of the road tunnel in twenty−four−hour mode with an average horizontal illumination E_T=30 lux in accordance with table 6 in CNRA IV−11.05.04−97.

2.2.8. Ventilation

In the existing tunnel, there is natural ventilation that ensures exploitation in a normal regime where there is non−stop traffic with maximum permissible speed for traffic volume appropriate during "rush" hours''.

At the same time, maximum allowable carbon oxide concentration as an indicator of the whole set of exhaust gases in the transportation zone of the tunnel should be no more than 60 mg/m3, when the time of vehicles being in the tunnel is 5 minutes. Actual time of vehicles being in the tunnel is remarkably less.

Ventilation provides air transparency necessary by conditions of visibility in the tunnel where the index of light depression does not exceed 0.0075 1/m.

Estimated air temperature in the tunnel does not exceed maximum temperature of outside air.

In case of repair works in the tunnel, concentration of hazardous materials in air should not exceed maximum permissible concentration set by GOST 12.1.005

2.2.9. Fire protection

The existing tunnel does not have fire towers with technical means for fire fighting.

The lack of fire towers with technical means for fire−fighting in tunnels the length of which is less than 600 m should be agreed with the State Engineering Supervision bodies in accordance with CNRA IV − 11.05.04−97.

In case of fire, first of all the burning vehicle must be removed from the tunnel and then the fire source should be extinguished outside the tunnel.

If it is impossible to remove the vehicle, fire should be localized and extinguished on the spot by implementing necessary fire−fighting measures.

In the process of carrying out rehabilitation (reconstruction) works, it is necessary to ensure fire safety of nearby forests.

2.3. Assessment of technical condition

Taking into account the above−stated, the technical condition of exploited tunnel N2 is assessed as extremely poor on the whole.

2.4. Conclusions and recommendations

Extensive rehabilitation of exploited transport tunnel N2 should provide for elimination of above−mentioned structural defects and fill currently missing special exploitation facilities.

It should be also noted that the clearance of the tunnel (Г−7,4÷8.5m), height clearance (4.6÷5.4) does not comply with GOST 24451−80 "Road tunnels". The radius of the horizontal curve does not comply with the requirement of CNRA IV−11.05.04−97.

In case if the tunnel clearance is brought into compliance with the requirement of GOST 24451−80, as well as the radius of the horizontal curve is increased (if there is an appropriate requirements specification), it would be necessary not extensive rehabilitation but radical reconstruction of the tunnel as a whole, i.e. it would be required to design and construct a new tunnel.

At the same time, it would be necessary to increase capital investments that are not expedient in conditions of current traffic volume.

Conclusion: *we recommend an extensive rehabilitation of exploited transport tunnel N 2 while maintaining the existing clearance, as well as the radius of the horizontal curve.*

At the same time, it is necessary to bring height clearance of the tunnel into the compliance with GOST 24451−80. Increase in height clearance is possible by rock excavation from above or below. In order to reduce the cost of extensive rehabilitation of the tunnel, as well as to simplify the work technology, we recommend to maintain the existing rock arch and achieve the increase in height clearance (elimination of size overage) by lowering the carriageway. At the same time, we recommend not to provide for new bearing lining from artificial material (in−situ concrete). We recommend only light and bright decorative lining which does not take rock pressure and makes further exploitation easy.

3. Tunnel N3

3.1. General information

Transportation tunnel 180.0 m long.

Beginning of the tunnel – km 31+910 m.

End of the tunnel – km 32+090 m.

Transportation tunnel serves for overcoming of high–altitude obstacle in the form of mountainside.

Clearance of the tunnel – alternating:

At the beginning and in the middle of the tunnel Г–8 m,

at the end of the tunnel Г–7.9 m.

Auxiliary sidewalk 0.8 m is situated to the right towards increase of kilometers.

There is no guard band. In the place of the guard band, there is a steel drainpipe with d=100 mm to the left from kilometerage.

There are no cameras and niches in the tunnel.

Rock pressure is taken up by tunnel lining. Axis of the lining has a smooth configuration and its form is similar to quadratic parabola where the walls are vertical.

3.2. Survey results

3.2.1. Layout and longitudinal profile

Tunnel is located on a horizontal curve with a radius of R 550 m, – complies with the requirement of CNRA IV – 11.05.04–97.

Tunnel is located on the single–ended longitudinal slope with i=1.1%, – complies with the requirement of CNRA IV – 11.05.04–97.

Besides the above–mentioned additional provisions, the layout and longitudinal profile of tunnel sections of roads should meet the requirements of CNRA IV – 11. 05.02–99 for open sections

3.2.2. Cross–section of the tunnel

Cross–section of the tunnel should correspond to clearance to obstructions, the carriageway of which is variable:

at the beginning and in the middle of the tunnel Г–8 m,

at the end of the tunnel Г–7.9 m, and does not comply with the requirement of GOST 24451–80.

Height of the clearance along the centerline of the tunnel equals:

at the beginning and in the middle of the tunnel H=6.5 m,

at the end of the tunnel H=6.7 m.

Auxiliary sidewalk 0.8 m wide is in poor condition.

Pedestrian traffic volume in the tunnel is not big < 50 pedestrians per day.

Elevation of the auxiliary sidewalk above the carriageway equals 0.2 m, – does not comply with the requirement of CNRA IV – 11.05.04–97.

3.2.3. Material and condition of the tunnel lining

The tunnel lining consists of vertical walls that smoothly connect with an upper arch. Invert is missing.

Structure of the tunnel lining made of in−situ concrete is in poor condition, especially the condition of the arch is very poor − there are revealed numerous signs of dumping of front−face area.

Moisture from atmospheric precipitation penetrating into the tunnel has conduced to emergence of a great number of micro−cracks in the arch of the lining.

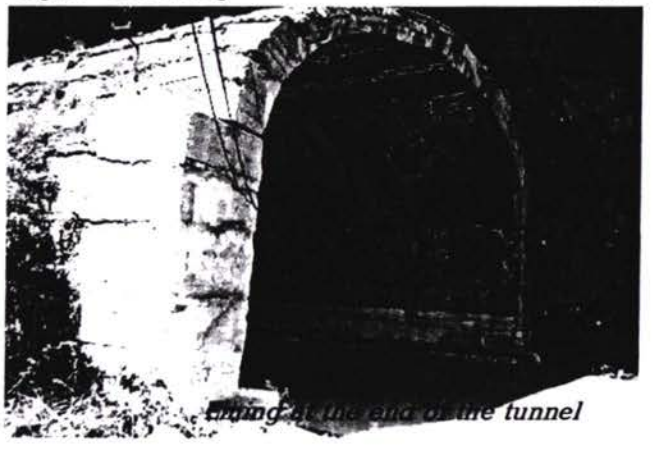
Moisture penetrates also through poor−quality junctures that were formed during construction of the upper arch of the lining.

Other defects in the form of destruction and segregation of laying of the lining, buckling and deformation, heavy leakage are not revealed during a detailed inspection.

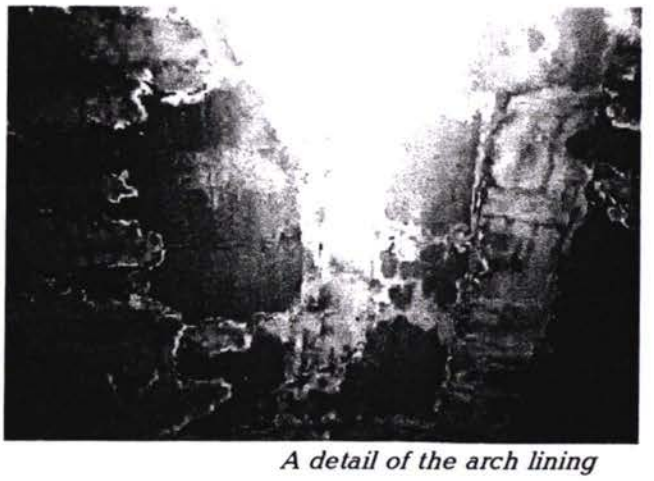
Thus, there are no local deformations of the lining that require its reconstruction.

Right−side lining

Left−side lining



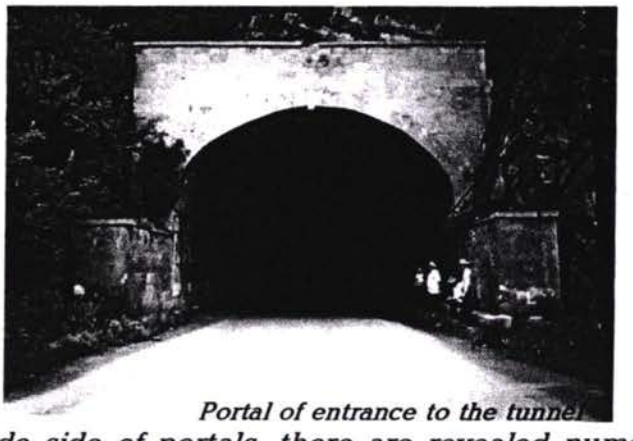
Lining at the end of the tunnel



A detail of the arch lining

3.2.4. Portal and head walls

Entry portal of the tunnel is massive faced with trimmed stone.

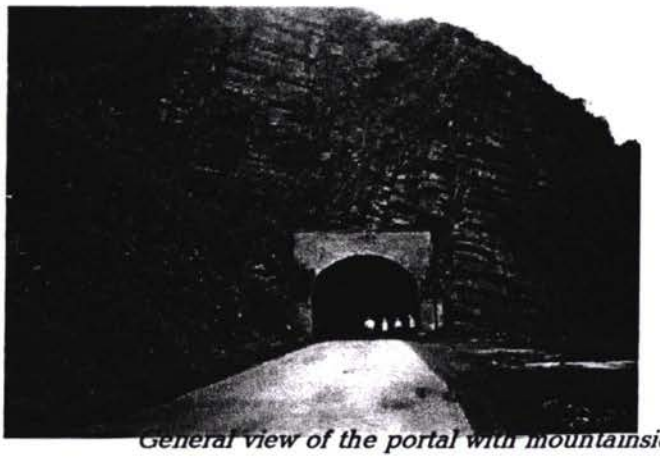


Portal of entrance to the tunnel

On the facade side of portals, there are revealed numerous signs of water leakage, leaching cement mortar, and soiling which is a result of poor operation of over−tunnel drain pipe.

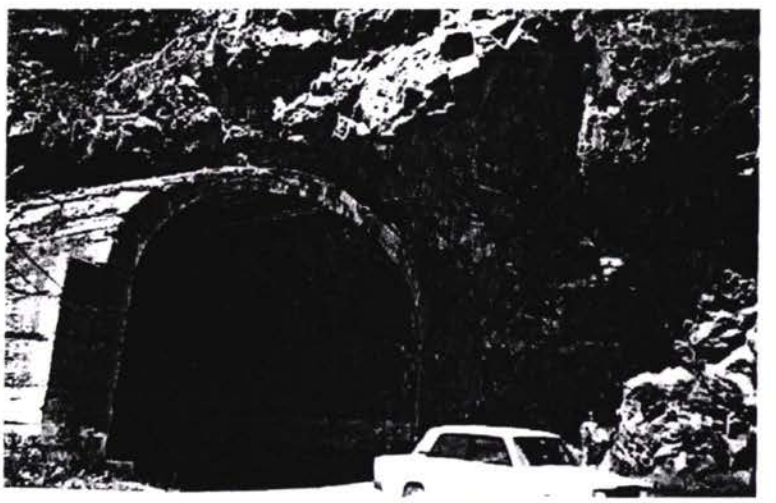
It should always be maintained in a good working condition.

Facing trimmed stones of hoods are missing here and there.

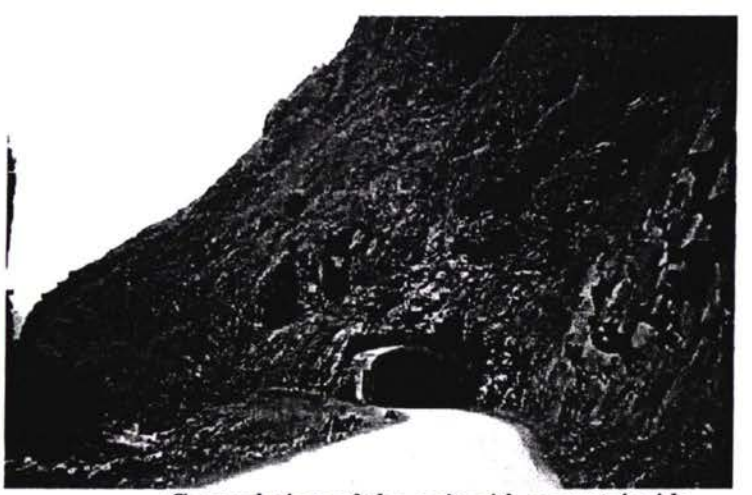


General view of the portal with mountainside.

At the exit, the tunnel ends with massive lining without portal with steep left−side slope. It is necessary to fill the lack in portal during extensive rehabilitation.



Exit from the tunnel



General view of the exit with mountainside

In pre−portal excavation at the entrance of the tunnel, as well as in the tunnel excavation at the exit, it is necessary to remove rocks threatening with their accidental collapse onto the road.

Tunnel does not have a U−turn area before portals and at the exit for vehicles in case of emergency.

In addition to the above mentioned, the following is required:

Vertical benchmarking of portals (the existing and new ones);

Installation of reference marks for the III class leveling;

Expansion joints of the road dressing on the surface of portals.

It should be constructed a drainage chute for removal of surface water from the frontal slope behind parapets.

3.2.5. Carriageway

Carriageway of the tunnel is of fundamental type with double−layer asphalt−concrete and is in fair condition. Mainly, it complies with acting normative documents for open sections of roads built in black−spots.

Elevation of the auxiliary sidewalk and guard band above the carriageway equals 0.2 m, and does not comply with the requirement of CNRA IV − 11.05.04−97.

In the tunnel, it is necessary to employ bright asphalt−concrete pavement, white tiles for facing or white−colored walls at least 1.4 m above an auxiliary passageway, or other technical solutions ensuring adaptation of drivers' sight.

There should be applied dark−colored materials for facing of frontal surface of portals and walls of lean−tos.

3.2.6. Catchment and drainage facilities

Catchment and drainage facilities are missing in the tunnel.

To eliminate that structural drawback, it is required to construct drainage of closed chute or collector type in the tunnel, outside the carriageway. The chute or collector should have conduit pits with settling part.

Surface of near−portal upper zones for improvement of water flow should be designed with filling of holes with non−drainable soil.

In order to remove surface water from frontal slopes and upper near−portal zones, there should be constructed drainage chutes behind parapets.

Near−portal sections of the road should have drain pit that would prevent from water flow into the tunnel.

3.2.7. Electric lighting

Electric lighting is missing in the existing tunnel.

It should be designed for artificial lighting of the road tunnel in evening and daytime mode with an average horizontal illumination E_T=30 lux in accordance with table 6 in CNRA IV−11.05.04−97.

Lighting of the road tunnel in a daytime mode is not needed in accordance with a norm of average horizontal artificial illumination − table in CNRA IV − 11.05.04−97.

3.2.8. Ventilation

In the existing tunnel, there is natural ventilation that ensures exploitation in a normal regime where there is non−stop traffic with maximum permissible speed for traffic volume appropriate during "rush" hours.

At the same time, maximum allowable carbon oxide concentration as an indicator of the whole set of exhaust gases in the transportation zone of the tunnel should be no more than 60 mg/m^3, when the time of vehicles being in the tunnel is 5 minutes. Actual time of vehicles being in the tunnel is remarkably less.

Ventilation provides air transparency necessary by conditions of visibility in the tunnel where the index of light depression does not exceed 0.0075 l/m.

Estimated air temperature in the tunnel does not exceed maximum temperature of outside air.

In case of repair works in the tunnel, concentration of hazardous materials in air should not exceed maximum permissible concentration set by GOST 12.1.005

3.2.9. Fire protection

The existing tunnel does not have fire towers with technical means for fire fighting.

The lack of fire towers with technical means for fire−fighting in tunnels the length of which is less than 600 m should be agreed with the State Engineering Supervision bodies in accordance with CNRA IV − 11.05.04−97.

In case of fire, first of all the burning vehicle must be removed from the tunnel and then the fire source should be extinguished outside the tunnel.

If it is impossible to remove the vehicle, fire should be localized and extinguished on the spot by implementing necessary fire−fighting measures.

In the process of carrying out rehabilitation (reconstruction) works, it is necessary to ensure fire safety of nearby forests.

3.3. Assessment of technical condition

Taking into account the above−stated, the technical condition of exploited tunnel N3 is assessed as poor on the whole.

3.4. Conclusions and recommendations

Extensive rehabilitation of exploited transport tunnel N3 should provide for elimination of above−mentioned structural defects and fill missing special exploitation facilities.

It should be also noted that the clearance of the tunnel (Г−7.9−8.0 m) does not comply with the requirement of GOST 24451−80 "Road tunnels".

Radius of horizontal curve is R 550m and complies with the requirement of CNRA IV − 11.05.04−97.

In case if the tunnel clearance is brought into compliance with the requirement of GOST 24451−80 (if there is an appropriate requirements specification), it would be necessary not only extensive rehabilitation but also radical reconstruction of the tunnel as a whole including tunnel lining along it, as well as reconstruction of entry portals.

At the same time, there would be need for significant increase in capital investments which are not expedient in conditions of current traffic volume.

***Conclusion**: we recommend an extensive rehabilitation of exploited transport tunnel N 3 while maintaining the existing clearance*

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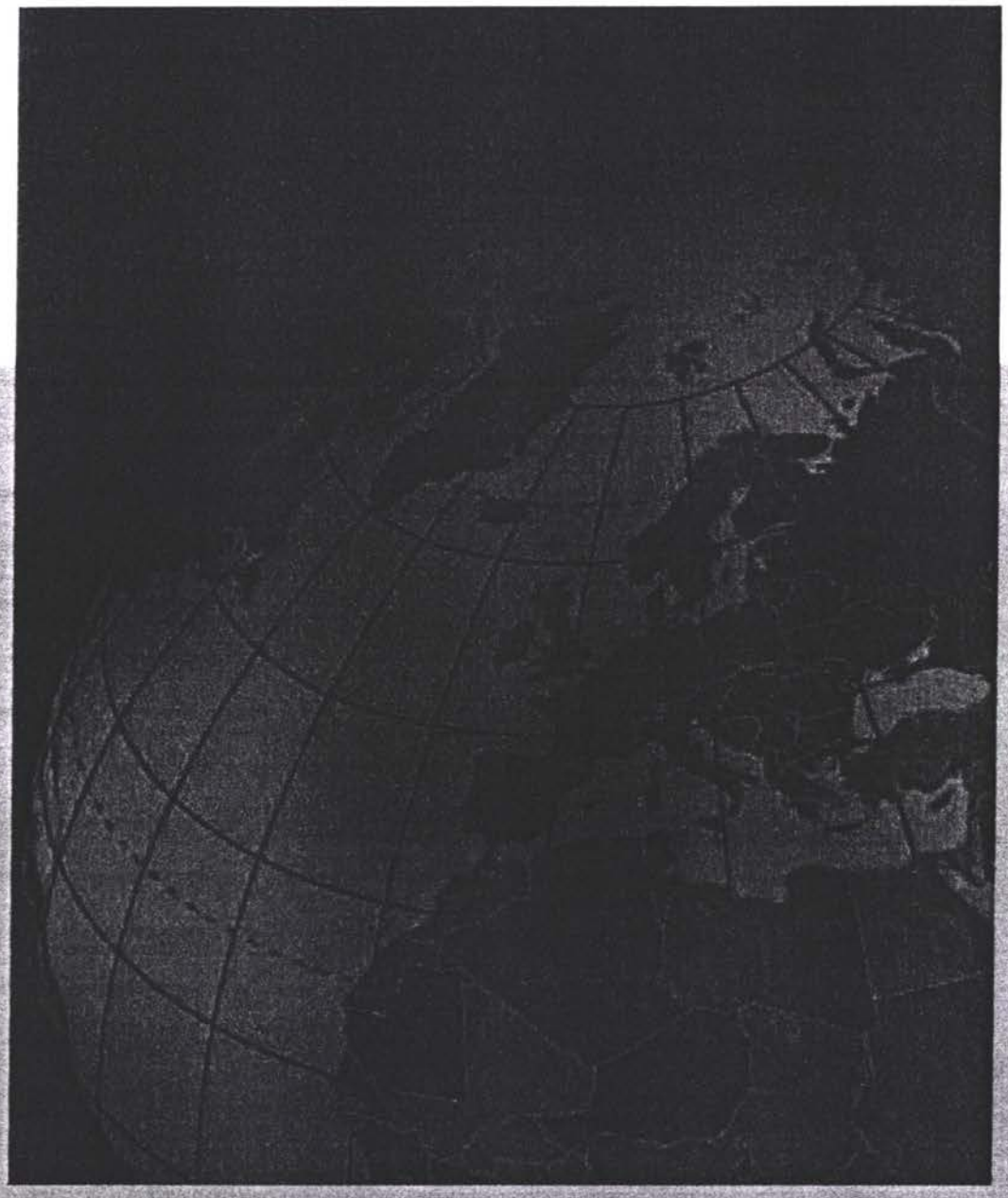

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