

**E U R O P E A N U N I O N - T A C I S**

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

**T R A D E A N D T R A N S P O R T S E C T O R S**

**IMPLEMENTATION OF PAVEMENT MANAGEMENT SYSTEMS**

**PROJECT NO.: TELREG 9305**

**P R O G R E S S R E P O R T N O . 1**

**FOR THE PROJECT PERIOD JANUARY TO JUNE 1996**

**JULY 1996**

**KOCKS CONSULT GMBH  
Consulting Engineers  
Koblenz / Germany**

**in association with**

**TECNECON, Economic  
and Transport Consultants  
London / U. K.**

**PHØNIX  
Pavement Consultants  
Vejen / Denmark**

**E U R O P E A N U N I O N - T A C I S**

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

**T R A D E A N D T R A N S P O R T S E C T O R S**

**IMPLEMENTATION OF PAVEMENT MANAGEMENT SYSTEMS**

**PROJECT NO.: TELREG 9305**

**P R O G R E S S R E P O R T N O . 1**

**FOR THE PROJECT PERIOD JANUARY TO JUNE 1996**

**JULY 1996**

**KOCKS CONSULT GMBH  
Consulting Engineers  
Koblenz / Germany**

**in association with**

**TECNECON, Economic  
and Transport Consultants  
London / U. K.**

**PHØNIX  
Pavement Consultants  
Vejen / Denmark**

Kocks Consult GmbH - P. O. Box 10 60 - 56010 Koblenz - FRG

The European Commission  
Directorate General I A  
External Relations  
Takis IA/C/7  
88, rue d'Arlon

B-1040 Brussels

Ref:

243/Wei-ns/977

Head Office Koblenz

Stegemannstraße 32 - 38  
56068 Koblenz

Phone: xx (49 261) 13 02-0

Telefax: xx (49 261) 13 02-15 2

Cable: KOCON

Koblenz

15.08.1996

Dear Madam/Sir,

**TRACECA Project: Implementation of Pavement Management Systems**  
**Project Number: TELREG9305**  
**Progress Report No. 1**

---

We take pleasure in submitting to you the progress report no. 1 for the period January to June 1996. The report is submitted in six copies, five bound and one loose leaf. A copy has been forwarded by E-Mail to the Tacis Coordinating Units in the eight recipient states as well as to the Tacis Monitoring & Evaluation Central Asia in Almaty.

The Russian version is presently under translation and will be submitted together with the diskette as soon as completed.

Yours faithfully

KOCKS CONSULT GMBH  
Consulting Engineers

i. A.



Ulrich Willems

Copies to: Tacis CU, all 8 recipient states

REPORT COVER PAGES

Project Title	: Traceca Project - Implementation of Pavement Management Systems
Project Number	: TELREG 9305
Country	: The Southern Republics of the CIS and Georgia

Local Operator	EC Consultant
----------------	---------------

Name	: Concern <b>UZAVTOYUL</b>	KOCKS CONSULT GMBH Consulting Engineers
Address	: 68 'a' Pushkin Street 700000 Tashkent UZBEKISTAN	Stegemannstraße 32 - 38 56068 Koblenz GERMANY
Tel. number	: (3712) 682526 and 361595	xx49 - 261 - 1302-0 (operat.) xx49 - 261 - 1302-143 (direct)
Fax number	: (37 12) 682711	xx49 - 261 - 1302 - 152
Telex number	: --	862807
Contact person	: Vohid Normatovich Azamov	Werner P. Weiler
Signatures	:	

Name	: Ministry of Transport (KYRGYZDORTRANSPROJEKT)	KOCKS CONSULT GMBH Consulting Engineers
Address	: 42 Isanov Street Bishkek 720079 KYRGYZ REPUBLIC	
Tel. number	: (3312) 216674	
Fax number	: (3312) 213667	
Telex number	: --	
Contact person	: Akunov Kuwan Akunowitsch	
Signatures	:	

## COVER PAGE 2

Local Operator	EC Consultant
----------------	---------------

Name	: Ministry of Transport & Communications, Department of Highways (DoH), Joint-stock company KAZDORNII (K)	KOCKS CONSULT GMBH Consulting Engineers
Address	: 9 Emtsov Street Almaty, 480061 KAZAKHSTAN	
Tel. number	: (3272) 324769 (DoH) or 400447 (K)	
Fax number	: (3272) 324449 (DoH) or 400819 (K)	
Telex number	: --	
Contact person	: Amangeldy N. Yelgonov (DoH) Oleg A. Krasikov (K)	
Signatures	:	

Name	: Ministry of Economy, Department of Transport and Communication (DoT&C) State Concern AZERAVTOYOL (A)	KOCKS CONSULT GMBH Consulting Engineers
Address	: 72 A, Hadjihekov Street 370010 Baku AZERBAIJAN	
Tel. number	: (8922) 939569	
Fax number	: (8922) 930045	
Telex number	: 142272 YOL	
Contact person	: Iqram M. Sadykhow (DoT&C) Jusuf Nurusov (A)	
Signatures	:	

Local Operator	EC Consultant
----------------	---------------

Name	: Concern Turkmenautoellari	KOCKS CONSULT GMBH Consulting Engineers
Address	: 744000 Ashgabat TURKMENISTAN	
Tel. number	: (3632) 245487	
Fax number	: (3632) 255379 and 511678	
Telex number	: --	
Contact person	: Vladimir Volodin	
Signatures	:	

Name	: State Concern of Roads, SAKAVTOGSA	KOCKS CONSULT GMBH Consulting Engineers
Address	: 29a Gagarin Street 380060 Tbilisi GEORGIAN REPUBLIC	
Tel. number	: 376604	
Fax number	: 376458	
Telex number	: 212189	
Contact person	: Tariel Mdiwnishvili	
Signatures	:	

COVER PAGE 4

Local Operator	EC Consultant
----------------	---------------

Name	: Ministry of Transport (MoT) Armenian Road Directorate (ARD)	KOCKS CONSULT GMBH Consulting Engineers
Address	: Jreriwan ARMENIA	
Tel. number	: (3742) 586601	
Fax number	: (3742) 151876 or 151830	
Telex number	: 212189	
Contact person	: Nikolai Elarian (MoT) Mr. Hakopjan (ARD)	
Signatures	:	

Name	: We have contacted the TACIS Co-ordinating Unit in	
Address	: Tadjikistan and requested to identify the local operator.	
Tel. number	: As soon as identified we will contact the local operator for	
Fax number	: commencement.	
Telex number	:	
Contact person	:	
Signatures	:	

COVER PAGE 5

Date of report : 31 July 1996

Reporting period : 21.12.1995 to 30.06.1996

Author of report: U. Willems, Project Team Leader (Kocks Consult GmbH)

EC Co-ordinating Unit			
	(name)	(signature)	(date)
EC Delegation			
	(name)	(signature)	(date)
TACIS Bureau (Task Manager)			
	(name)	(signature)	(date)



TABLE OF CONTENTS

	<u>Page</u>
<u>1. PROJECT SYNOPSIS</u>	2
<u>2. SUMMARY OF PROJECT PROGRESS SINCE START</u>	4
2.1 Commencement of Services	4
2.2 Activities and Project Progress	4
<u>3. SUMMARY OF PROJECT PLANNING FOR THE REMAINDER OF THE PROJECT</u>	5
<u>4. PROJECT PROGRESS IN REPORTING PERIOD</u>	6
4.1 Introduction	6
4.2 Mobilisation	6
4.3 Activities during the Reporting Period January to June 1996	7
4.4 Tables	11
<u>5. PROJECT PLANNING FOR NEXT REPORTING PERIOD</u>	21
5.1 Planned Activities	21
5.2 Tables	22
 <u>APPENDIX</u>	
- Form for Origin/Destination Survey (Uzbekistan)	
- Form for Classified Counts of Trucks (Kazakhstan)	
- Table with Guidelines for Visual Road Inspection	

## 1. PROJECT SYNOPSIS

Project Title	: Traceca Project - Implementation of Pavement Management Systems
Project Number	: TELREG 9305
Country	: The Southern Republics of the CIS and Georgia

Project objective[s] : The project aims to introduce Regional roads maintenance authorities to the latest Western pavement management techniques. It is to promote a reduction in road maintenance backlogs. The focus of this project will be on international transit routes with the specific objectives under the three main headings.

### *Technical*

- Establishment of database
  - road and bridge conditions
  - traffic intensity/axle-loadings
  - forecasts of future traffic
- Formulation, testing and refining technical pavement maintenance strategies. Establishment of Pavement Management Systems in each Regional state
- Implementation of local authorities in Western road and bridge maintenance techniques and specifications as well as road safety standards
- Review of roads design standards

### *Economic*

Expand the resources available for road maintenance by:

- demonstrating the real costs of road utilisation, by users who at present pay little, and thus reinforce arguments for recurrent collections of revenue by charges (taxes) on users
- Description and economic analysis of road maintenance projects and programmes susceptible to attract IFI interest.

### *Transfer of Technology*

Local personnel will be involved in all project tasks and trained in the techniques introduced with the aim to continue the activities after completion of the project.

- Planned outputs :
- Mobilization and commencement of services
  - Study of existing reports and available road data
  - Preparation/procurement of equipment
  - Introduction of equipment to counterparts of the recipient States
  - Field works and data collection including on-the-job training of counterparts
  - Provision of hardware and software for the Pavement Management System (PMS) and Bridge Management System (BMS) and training
  - Seminars about bitumen bound products and road safety aspects.

- Project activities :
- Project Preparation
  - Co-ordinating meetings with TACIS CU, Brussels
  - Mobilization of Consultant's staff and equipment
  - Commencement meetings with the TACIS CU and the recipient institutions in Tashkent/Uzbekistan, Almaty/Kazakhstan, Bishkek/Kyrgyzstan, Baku/Azerbaijan and Ashgabat/Turkmenistan
  - Arrangement of logistics (accommodation, office, garage for equipment, transport)
  - Seminars for introduction of the equipment
  - Collection and evaluation of road surface and road pavement condition data together with counterparts (on-the-job training)
  - Provision of computers and preliminary program system for PMS
  - Collection of transport economic, road use cost data through accessing existing data bases and additional surveys under the current project
  - Seminars on bitumen bound materials and related technology: discussion about existing situation, necessary improvements (e. g. pavement design) and proposal for new technologies (e. g. recycling)
  - Seminars on road safety aspect (road geometry, signalisation, winter maintenance).

Project starting date: 20 December 1995, delayed to 12 March 1996 due to winter conditions

Project duration : 12 months

## 2. SUMMARY OF PROJECT PROGRESS SINCE START

### 2.1 Commencement of Services

Under the terms of the Contract, the Consultant shall commence the implementation of the tasks within two weeks from the effective date of the contract. The effective date of the Contract was 7 December 1995 and the planned starting date for the provision of the consultancy services was 20 December 1995.

As described in the Consultant's Inception Report of February 1996 the commencement of the consultancy services was delayed to middle of March 1996 due to the cold winter weather in the southern CIS states. Even Uzbekistan and Turkmenistan, the low lying countries had extended periods of frost and snow, Kazakhstan experienced an extreme cold winter, and so were the mountainous countries Kyrgyztan and Tadjikistan. However, preparations for the start of the services were carried out by personnel planning, contacting the recipient states' project representatives, obtaining visa, preparation/procurement of equipment etc.

On 13 March 1996 the Consultant's staff arrived in the project area, set up the logistics and commenced with the activities of the field works for road condition survey, pavement deflection measurement and pavement survey which are key activities to be done prior to evaluation, data entry, assessments etc. A second/additional group of specialists commenced in the Caucasus area middle of April 1996.

### 2.2 Activities and Project Progress

During the present reporting period consultancy services were provided in Uzbekistan, Kyrgyztan, Azerbaijan and Kazakhstan. All activities were carried out together with the counterparts of the respective recipient states as on-the-job training in addition to seminars and class room training:

#### ***Field Works and Data Collection***

- seminars for introduction of the equipment
- translations of equipment description into Russian
- preparation of forms and guidelines for the data collection
- collection and evaluation of road surface and road pavement condition data using the equipment provided under the Project

#### ***Computers and Programm Systems***

- The programm system proposed for the TRACECA Project was further optimized in order to provide the latest state of art. Test runs were carried out and translation into Russian continued.
- first sets of computer equipment were delivered to the recipient states

#### ***Transport Economics and Road Use Cost Aspects***

- available reports were studied
- collection of traffic data
- axle load surveys
- estimation of traffic growth
- collection of data for estimation of vehicle operating cost
- collection of information on expenditure on road maintenance and rehabilitation

#### ***Seminars***

- bitumen bound product
- road safety aspects

### 3. SUMMARY OF PROJECT PLANNING FOR THE REMAINDER OF THE PROJECT

During the present reporting period consultancy services were provided in Uzbekistan, Kyrgyzstan, Azerbaijan and Kazakhstan. For the next reporting period the activities will commence in the other recipient states in Central Asia

- Turkmenistan
- Tadjikistan

and the Caucasus area

- Georgia
- Armenia

The activities for the next reporting period will include:

- (i) Field works and data collection for roads and highways will be continued and completed respectively.
- (ii) As far as not delivered during the present reporting period all eight recipient countries will receive the computer equipment as well as the RoSy-PMS/BMS programme system.
- (iii) Training of counterparts in the use of equipment, for collection of road condition data and the preparation of data base will continue and will commence for collection of bridge condition data and the use of the PMS/BMS programme system.
- (iv) Data collection, estimation of traffic growth and calculation of vehicle operating cost for the transport economics and road use cost will continue.
- (v) Seminars will be continued for bitumen bound materials and related technology as well as for road safety aspects.

## 4. PROJECT PROGRESS IN REPORTING PERIOD

### 4.1 Introduction

As described above as well as in the Consultant's Inception Report of February 1996 the commencement of the services for the Project was considerably delayed due to unfavourable weather conditions in the project area. All necessary preparations were done and as soon as the weather condition allowed the activities for the first project phase, the field works and data collection phase, commenced with the arrival of the of the Consultant's personnel in Tashkent/Uzbekistan in middle of March 1996. All efforts were made to catch up the lost time and a second/additional group of specialists commenced in the Caucasus area middle of April 1996.

The project described in this report and the other TRACECA projects running at the same time as other duties and responsibilities put a high workload on the counterpart departments in the recipient countries. It should be mentioned that for the Consultant's activities carried out during the progress period in the states of Uzbekistan, Kyrgyz Republic, Kazakhstan and Azerbaijan the respective administration made available the required number of counterpart staff and furthermore a big and highly interested audience participated in the various seminars held up to date.

The Tacis Co-ordinating Units (TCU) assisted wherever possible the Consultant and the Project respectively which is gratefully noted with special thanks to the extraordinary help received from the TCU in Bishkek/Kyrgyzstan.

### 4.2 Mobilisation

#### *Personnel*

The Consultant's personnel in the project area during the progress period included:

Project Manager	Werner P. Weiler	KOCKS CONSULT GMBH
Team Leader	Ulrich Willems	KOCKS CONSULT GMBH
Transport Economist	Robert A. Smith	TECNECON
FWD/PMS Engineer	Kimo Karini	Phønix PC
PMS/FWD Engineer	Klaus V. Nielsen	Phønix PC
Asphalt Specialist	Hans U. Zimmermann	KOCKS CONSULT GMBH
Engineering Co-ordinator	Johann Rogalski	KOCKS CONSULT GMBH
Highway Engineer and Team Leader for the additional Group	Carsten Griese	KOCKS CONSULT GMBH

#### *Equipment for Field Works*

The following equipment was sent to the project area and used for the field works:

- Falling Weight Deflectometer (FWD)
- axle weight bridge incl. dunning pads for weighing up to triple axle trucks
- Bump Integrator Unit
- MERLIN
- longitudinal sensor (tripmeter)
- various small measuring devices and office equipment

### *Transportation*

At the beginning of the field works activities transportation was provided through car rental only. From end of April locally acquired transport was used to commute between and in the states. Vehicles for the field works and data collection respectively were rented through local contracts from the respective recipient department.

## **4.3 Activities during the Reporting Period January to June 1996**

### *Preparation and Commencement*

As described above the commencement of the consultancy services were delayed to middle of March 1996 due to the cold winter weather in the southern CIS states.

For the purposes of the first phase of this project, the field works and data collection phase, the roads are required to be inspected, condition surveys and inventories need to be taken, and pavement deflection measurements and pavement surveys are required which are key activities to be done prior to evaluation, data entry, assessments etc. For this tasks, the road surface needs to be free of snow and ice, and there must not be any frost in the ground. Deflection measurements can effectively be carried out when ground temperatures are above + 5°C. This effectively prevented the services to commence until winter conditions were over.

However, preparations for the start of the services were carried out by the following:

- personnel planning
- contacting the recipient countries' project representatives (RCPR)
- contacting the TACIS CU offices with the request to issue letters of invitation for the project personnel to obtain visa
- preparation of equipment
- procurement of equipment
- visit of the project area to investigate working (weather) condition
- visits of RCPR for introduction and time planning.

On 12 March 1996 the first group of the Consultant's specialists departed from Europe and arrived the following day in Tashkent / Uzbekistan. Further specialists followed a few days later. Time consuming procedures for customs clearing of the air-freighted equipment as well as for police registration of the personnel hampered the progress initially.

### ***TRACECA Roads***

The basis for the Consultant's activities are the TRACECA roads as shown on the colour printed TRACECA map (THE SILK ROAD FOR THE 21st CENTURY).

During the course of the Project requests for additional roads of important international routes were made by members of the recipient institutions. The Consultant's team investigated/studied those additional roads as well as alternatives to the TRACECA roads.

- (i) Uzbekistan  
An alternative to the M 39 Samarkand - Guzar was investigated from Samarkand on the A 380 and A 378 via Karsi to Guzar
- (ii) Kyrgyzstan  
The international road link to China concerning the A 365 Bishkek - Issyk Kul - Naryn - Torugatt was investigated.
- (iii) Kazakhstan  
Coming on the M 39 from Tashkent the at Merke (shortly before the Kyrgyz border) branching of A 359, which forms a by-pass of Kyrgyzstan for traffic directly going to Almaty, was investigated.

### ***Field Works and Data Collection***

Prior to the activities of the data collection seminars for introduction of the equipment were held attended by the counterparts as well as interested participants of other departments and institutes. For the various equipment it was demonstrated

- how to set it up / to install it
- how to start it
- how and which data are collected
- and how to record data.

The demonstration was followed by intensive discussion about existing/previous and demonstrated data collection procedures, demonstrating/explaining further details of the equipment, etc.

Translations into Russian were prepared describing the equipment and its use as demonstrated in the seminar

- axle weigh bridge
- Phoenix Falling Weight Deflectometer (FWD)
- quick start and stop for FWD
- bump integrator
- MERLIN.

Forms and guidelines for the data collection were prepared, introduced to the counterparts and used in the actual field works. Samples of

- Origin/destination survey of international truck movements (Russian/English version prepared for Uzbekistan)
- Classified counts of trucks >3 tons (Russian/English version for Kazakhstan)
- Values and guidelines (road roughness/road unevenness) for visual road inspection of paved roads

are attached in the APPENDIX.

Road surface and road pavement condition data were collected and evaluated using the above described equipment:

- calibration of equipment
- visual road inspection
- roughness measurements
- FWD measurements
- measurement of thickness of pavement layers



### ***Computers and Programm Systems***

The project includes the supply of hardware and software for the Pavement Management System (PMS) and the Bridge Maintenance System (BMS). The programm system proposed for the TRACECA Project, the Phoenix - RoSy - PMS/BMS, was adapted to Windows '95 and received components of HDM IV (economy/VOCs) in order to provide the latest state of art. Test runs were carried out and translation into Russian continued. For the requirements during the reporting period a preliminary programm version RoSy - database was used to introduce and train data bases.

Computer equipment, one set for each of the recipient states, comprises:

- DELL computer (Pentium 133) with colour monitor
- HP Laser Jet 5P printer
- Power source unit (UPS 7001)
- Windows 95 Russian version installed on computer plus installation disks and manuals

### ***Institutional Requirements***

Meetings with the recipient institutions were held to discuss the organisational and administrative requirements for the PMS/BMS (Pavement and Bridge Maintenance Systems) as for example:

- system of data collection
- maintaining a centralized data base

The Consultant was informed by the recipient institutions in Uzbekistan and Kyrgyzstan that with regard to the requirements of an effective road/bridge maintenance and in connection with the new PMS/BMS of the TRACECA Project decisions on a high level were made to reorganize/reinforce the responsible institutions. In Kazakhstan a functioning system of data collection and a computerized data base was encountered.

### ***Transport Economics and Road Use Cost Aspects***

Before commencement of the field works for data collection available reports were studied to familiarize with background economic data of the recipient states as well as documents produced for TACIS and other international organizations:

- Kyrgyzstan, Feasibility Study of the Rehabilitation of the Bishkek - Osh Road
- Kazakhstan, Feasibility Study of the Asian Development Bank Road Rehabilitation Project
- Azerbaijan, Prefeasibility Study of the Baku-Ashtara Road
- Central Asia Outline Transport Strategy
- Russia, Ukraine, Kazakhstan and Belarus - Roads and Road Transport Study
- Armenia, Armenia Highway Survey
- Turkmenistan, Turkmenistan Road Rehabilitation Project

The data collection has covered the following:

- Traffic data
- Axle load surveys
- Traffic growth data
- Input data for the analysis of vehicle operating costs
- Information on trends in expenditure on road maintenance and rehabilitation
- Road network conditions and road use costs

Traffic data, the results of classified volume counts on the main international and republican roads, have been collected and analysed. This traffic data covers a wide sample of road links required to evaluate the utilisation of the total main road networks in the respective countries.

The classification of truck types used in the classified volume counts undertaken in the study countries is based on gross vehicle weight rather than axle configuration. The classification of truck traffic by vehicle type therefore has to be changed to an axle configuration basis to be usable in HDM-III based analyses. This modification is being based on the results of the Consultants' Moving Observer Traffic Counts which have been carried out on main road links and have proved to be an accurate reflection of traffic levels when compared with the results of the official classified volume counts on specific road links.

Details of vehicle registrations by vehicle type have been collected. However, the vehicle classification system used in vehicle registration statistics collected by the traffic police is different from the vehicle classification system used in traffic surveys.

Axle load surveys of two days duration (from 9 to 22 hours) have been carried out at selected locations. The results of the axle load surveys recently undertaken as part of the aforementioned Feasibility Study in Kyrgyzstan have also been analysed. The results of the axle load surveys undertaken so far show that traffic loading is significantly lower than is usual in Western Europe or North America.

To estimate the traffic growth all available records from historical traffic counts have been analysed. These show that traffic levels have declined significantly during the 1990s reflecting the sharp contraction in economic activity during the past five years. A number of long term traffic forecasts produced before the break-up of the former Soviet Union have also been studied. The Consultant will make use of the traffic forecasts to be produced by the TRACECA Regional Traffic Forecasting Project if these become available within the schedule of this current project.

The vehicle operating cost (VOC) estimates produced in the various consultants' reports mentioned above are all based on the use of the Vehicle Operating Cost Sub-Model of the World-Bank's Highway Design and Maintenance Model (HDM-III). The same model is being used in this project and the field work has mainly involved updating the vehicle operating cost input data. The available data on accidents may not be adequate for a detailed quantification of accident costs and assumptions have to be done since additional surveys and analysis is beyond the scope of this project.

Information has been collected on the recent levels of expenditure on highway maintenance and rehabilitation. There has been a sharp drop in such expenditure in real terms since the early 1990s and in no case does it now approach required levels. This confirms the Consultants' findings in Turkmenistan last year.

As part of the road use costs and financing part of the project it is necessary to have a breakdown of road network condition by pavement type, pavement strength and traffic range. Since existing data on road pavement characteristics are hardly available network condition estimates will be based on the available data on pavement type, design standard and traffic. The estimates of network wide road use costs will be based on a short cut methodology suggested by the World Bank on the basis of the results of numerous pavement rehabilitation strategy analyses undertaken using the HDM-III model.

### ***Seminars***

Besides the aforementioned seminars for the introduction of equipment seminars were held and site visits were carried out concerning

- Bitumen bound products comprising the main items
  - Materials: existing situation of bitumen, aggregates, asphalt production and necessary improvements
  - Pavement designs: existing design standards for asphalt concrete (AC) pavements, European and North American standards/design methods
  - Quality control, soils & material laboratory requirements
  - Rehabilitation/reinforcement/strengthening of AC pavements, pavement placing techniques and equipment
  - Recycling techniques and equipment for AC
  
- road safety aspects comprising the main items
  - road geometry: horizontal and vertical alignment, cross section (road/lane width), junctions/intersections
  - signalisation: traffic signs, road marking
  - winter maintenance
  - public promotion/information programmes

### **4.4 Tables**

The achieved progress in the states under the Project is summarised in the tables below. All activities were carried out as on-the-job training by the counterparts together with the Consultant's specialists and/or on individual tasks after training.

12  
**PROJECT PROGRESS REPORT**

Project title: Traceca Project - Implementation of Pavement Management Systems	Project number: TELREG 9305	Country: The Southern Republics of the CIS and Georgia	Form 2.2, Page: 1
Planning period: 01/1996 - 06/1996 start delayed to 3/1996 due to winter conditions	Prepared on: 07/1996	EC Consultant: KOCKS CONSULT GMBH, Koblenz / Germany	

Project objectives: **Implementation of Pavement and Bridge Management Systems**

No	ACTIVITIES IMPLEMENTED	TIME FRAME 1996 (for the project period January 1996 to June 1996)						INPUTS							
		Months						PERSONNEL EC Consultant		PERSONNEL Counterpart		EQUIPMENT AND MATERIAL		OTHER	
		1	2	3	4	5	6	Planned	Utilised	Planned	Utilised	Planned	Utilised	Planned	Utilised
	<b>Region: Central Asia State 1, Uzbekistan</b>														
1.	<b>Commencement Meeting</b>		X	X				1 week	1 week						
2.	<b>Logistics, Data Collection</b>														
2.1	Arranging local expertise, office, etc.			X				0.5 wks	0.5 wks						
2.2	Review existing data bases			X X				1 week	1 week	2 weeks	2 weeks				
3.	<b>Road Network Location</b>			X				0.5 wks	0.5 wks	0.5 wks	0.5 wks				
4.	<b>Road Cond.Survey+Standard Def</b>														
4.1	Rough. measurement+ cond. survey				X X X X	X		4 weeks	4 weeks	3 weeks	4 weeks	Bump Intergrator Tripmeter, Car	Bump Intergrator Tripmeter, Car, MERLIN		
4.2	Establish existing design standards					X		1 week	1 week	--	1 week				
5.	<b>Traffic Survey + Evaluation</b>														
5.1	Analysis of existing traffic data			X X				1 week	1 week	2 weeks	2 weeks				
5.2	Traffic survey + axle weighing				X			0.5 wks	0.5 wks	1 week	1 week	Axle Weighbrid.	Axle Weighbrid.		
5.3	Traffic forecast					X		1.5 wks	1 week						
6.	<b>FWD Survey + Evaluation</b>											FWD	FWD		
6.1	Select representative road sections			X				0.5 wks	0.5 wks	0.5 wks	0.5 wks				
6.2	Measure + store FWD survey data				X X X			1 week	3 weeks	1 week	2 weeks				
6.3	Pavement analysis					X X		0.5 wks	1 week	0.5 wks	0.5 wks				
7.	<b>Maintenance Strategy</b>														
7.1	Establish exist. maintenance proced.				X			0.5 wks	0.5 wks	0.5 wks	0.5 wks				
7.2	Propose maintenance strategy					X		0.5 wks	0.5 wks	0.5 wks	0.5 wks				
8.	<b>Road + Usage Costing</b>														
8.1	Evaluate maintenance costs					X		0.2 wks	0.2 wks	1 week	1 week				
9.	<b>VOC's (HDM)</b>														
9.1	Vehicle classification to suit HDM				X			0.5 wks	0.5 wks	1 week	1 week				
9.2	Economic + financial cost of VOC's				X X X			1.5 wks	2.0 wks	2 weeks	1 week				
9.3	Calculation of VOC's					X		0.2 wks	0.2 wks						
13.	<b>PMS Model Optimisation</b>				X			0.5 wks	0.5 wks						
14.	<b>Training + Seminars</b>											Teaching mat.	Teaching mat.		
14.1	Seminar bit. bound products tech.					X X		1 week	1.5 wks	1 week	1.5 wks				
14.2	Seminar road safety					X		0.2 wks	0.2 wks	0.2 wks	0.2 wks				
		<b>TOTAL</b>						18.4	20.6	16.7	19.2				

13  
**PROJECT PROGRESS REPORT**

Project title: Traceca Project - Implementation of Pavement Management Systems	Project number: TELREG 9305	Country: The Southern Republics of the CIS and Georgia	Form 2.2, Page: 2
Planning period: 01/1996 - 06/1996 start delayed to 3/1996 due to winter conditions	Prepared on: 07/1996	EC Consultant: KOCKS CONSULT GMBH, Koblenz / Germany	

Project objectives: <b>Implementation of Pavement and Bridge Management Systems</b>															
No	ACTIVITIES IMPLEMENTED	TIME FRAME 1996 (for the project period January 1996 to June 1996)						INPUTS							
		Months						PERSONNEL EC Consultant		PERSONNEL Counterpart		EQUIPMENT AND MATERIAL		OTHER	
		1	2	3	4	5	6	Planned	Utilised	Planned	Utilised	Planned	Utilised	Planned	Utilised
	<b>Region: Central Asia</b>														
	<b>State 2, Kyrgyz Republic</b>														
15.	Commencement Meeting			X	X			1 week	1 week						
16.	Logistics, Data Collection														
16.1	Arranging local expertize, office, etc.					X		0.5 wks	0.5 wks						
16.2	Review existing data bases					X X		1 week	1 week	2 weeks	2 weeks				
17.	Road Network Location					X		0.5 wks	0.5 wks	0.5 wks	0.5 wks				
18.	Road Cond.Survey+Standard Def														
18.1	Rough. measurement+ cond. survey					X X X X		4 weeks	4 weeks	3 weeks	3.5 wks	Bump Intergrator Tripmeter, Car	Bump Intergrator Tripmeter, Car, MERLIN		
18.2	Establish existing design standards					X		1 week	1 week	--	1 week				
19.	Traffic Survey + Evaluation														
19.1	Analysis of existing traffic data					X X		1 week	1 week	2 weeks	2 weeks				
19.2	Traffic survey + axle weighing					X		0.5 wks	0.5 wks	1 week	1 week	Axle Weighbrid.	Axle Weighbrid.		
19.3	Traffic forecast						X	1.5 wks	0.5 wks						
20.	FWD Survey + Evaluation														
20.1	Select representative road sections					X		0.5 wks	0.5 wks	0.5 wks	0.5 wks	FWD Computer, Printer, Ancill.	FWD Computer, Printer, Ancill.		
20.2	Measure + store FWD survey data					X X		1 week	2 weeks	1 week	2 weeks				
20.3	Pavement analysis						X	0.5 wks	0.5 wks	0.5 wks	1 week				
21.	Maintenance Strategy														
21.1	Establish exist. maintenance proced.						X	0.5 wks	0.5 wks	0.5 wks	1 week				
21.2	Propose maintenance strategy						X	0.5 wks	0.5 wks	0.5 wks	0.5 wks				
22.	Road + Usage Costing														
22.1	Evaluate maintenance costs					X		0.2 wks	0.2 wks	1 week	1 week				
23.	VOC's (HDM)														
23.1	Vehicle classification to suit HDM					X		0.5 wks	0.5 wks	1 week	1 week				
23.2	Economic + financial cost of VOC's					X X		1.5 wks	1.5 wks	2 weeks	2.5 wks				
27.	PMS Model Optimisation						X	0.5 wks	0.5 wks						
28.	Training + Seminars														
28.1	Seminar bit. bound products tech.						X	1 week	1 week	1 week	1 week	Teaching mat.	Teaching mat.		
28.2	Seminar road safety						X	0.2 wks	0.2 wks	0.2 wks	0.2 wks				
<b>TOTAL</b>								17.9	17.9	17.2	21.2				

**PROJECT PROGRESS REPORT**

Project title: Traceca Project - Implementation of Pavement Management Systems	Project number: TELREG 9305	Country: The Southern Republics of the CIS and Georgia	Form 2.2, Page: 3
Planning period: 01/1996 - 06/1996 start delayed to 3/1996 due to winter conditions	Prepared on: 07/1996	EC Consultant: KOCKS CONSULT GMBH, Koblenz / Germany	

Project objectives: **Implementation of Pavement and Bridge Management Systems**

No	ACTIVITIES IMPLEMENTED	TIME FRAME 1996 (for the project period January 1996 to June 1996)						INPUTS							
		Months						PERSONNEL EC Consultant		PERSONNEL Counterpart		EQUIPMENT AND MATERIAL		OTHER	
		1	2	3	4	5	6	Planned	Utilised	Planned	Utilised	Planned	Utilised	Planned	Utilised
	<b>Region: Central Asia</b>														
	<b>State 3, Kazakhstan</b>														
29.	Commencement Meeting		X	X		X		1 week	1 week						
30.	Logistics, Data Collection														
30.1	Arranging local expertize, office, etc.					X		0.5 wks	0.5 wks						
30.2	Review existing data bases					X	X X	1 week	1 week	2 weeks	3 weeks				
31.	Road Network Location						X	0.5 wks	0.5 wks	0.5 wks	0.5 wks				
32.	Road Cond.Survey+Standard Def						X X X	3 weeks	3 weeks	2.5 wks	2.5 wks	Bump Intergrator Tripmeter, Car	Bump Intergrator Tripmeter, Car, MERLIN		
32.1	Rough. measurement+ cond. survey						X	0.5 wks	0.5 wks	--	0.5 wks				
32.2	Establish existing design standards						X	0.5 wks	0.5 wks						
33.	Traffic Survey + Evaluation						X X X	1 week	1 week	2 weeks	2 weeks				
33.1	Analysis of existing traffic data					X	X X	0.5 wks	0.5 wks	1 week	1 week	Axle Weighbrid.	Axle Weighbrid.		
33.2	Traffic survey + axle weighing						X	1.5 wks	1.5 wks						
33.3	Traffic forecast						X	1.5 wks	1.5 wks						
34.	FWD Survey + Evaluation						X X X	0.5 wks	0.5 wks	0.5 wks	0.5 wks	FWD Computer, Printer, Ancill.	FWD Computer, Printer, Ancill.		
34.1	Select representative road sections						X X	1 week	2 weeks	1 week	2 weeks				
34.2	Measure + store FWD survey data						X	0.5 wks	0.5 wks	0.5 wks	1 week				
34.3	Pavement analysis						X	0.5 wks	0.5 wks	0.5 wks	1 week				
35.	Maintenance Strategy						X	0.5 wks	0.5 wks	0.5 wks	0.5 wks				
35.1	Establish exist. maintenance proceed.						X	0.5 wks	0.5 wks	0.5 wks	0.5 wks				
35.2	Propose maintenance strategy						X	0.5 wks	0.5 wks	0.5 wks	0.5 wks				
36.	Road + Usage Costing						X	0.2 wks	0.2 wks	1 week	1 week				
36.1	Evaluate maintenance costs						X	0.2 wks	0.2 wks	1 week	1 week				
37.	VOC's (HDM)						X X	0.5 wks	0.5 wks	1 week	1 week				
37.1	Vehicle classification to suit HDM						X	1.5 wks	1.5 wks	2 weeks	2 weeks				
37.2	Economic + financial cost of VOC's						X	1.5 wks	1.5 wks	2 weeks	2 weeks				
42.	Training + Seminars						X	1 week	1 week	1 week	1 week	Teaching mat.	Teaching mat.		
42.1	Seminar bit. bound products tech.						X	1 week	1 week	1 week	1 week				
<b>TOTAL</b>								15.2	16.2	16.0	19.0				

15  
**PROJECT PROGRESS REPORT**

Project title: Traceca Project - Implementation of Pavement Management Systems		Project number: TELREG 9305		Country: The Southern Republics of the CIS and Georgia				Form 2.2, Page: 4							
Planning period: 01/1996 - 06/1996 start delayed to 3/1996 due to winter conditions		Prepared on: 07/1996		EC Consultant: KOCKS CONSULT GMBH, Koblenz / Germany											
Project objectives: <b>Implementation of Pavement and Bridge Management Systems</b>															
No	ACTIVITIES IMPLEMENTED	TIME FRAME 1996 (for the project period January 1996 to June 1996)						INPUTS							
		Months						PERSONNEL EC Consultant		PERSONNEL Counterpart		EQUIPMENT AND MATERIAL		OTHER	
		1	2	3	4	5	6	Planned	Utilised	Planned	Utilised	Planned	Utilised	Planned	Utilised
	<b>Region: Caucasus</b>														
	<b>State 1, Azerbaijan</b>														
71.	Commencement Meeting				X			1 week	1 week						
72.	Logistics, Data Collection				X			0.5 wks	0.5 wks						
72.1	Arranging local expertise, office, etc.				X			1 week	1 week	2 weeks	2 weeks				
72.2	Review existing data bases				X	X									
73.	Road Network Location				X			0.5 wks	0.5 wks	0.5 wks	0.5 wks				
74.	Road Cond.Survey+Standard Def				X	X X		4 weeks	2 weeks	3 weeks	2 weeks	Bump Intergrator Tripmeter	Bump Intergrator Tripmeter		
74.1	Rough. measurement+ cond. survey				X	X X		1 week	1 week	--	1 week				
74.2	Establish existing design standards				X	X									
75.	Traffic Survey + Evaluation					X X		1 week	1 week	2 weeks	2 weeks				
75.1	Analysis of existing traffic data					X X									
81.	Road + Usage Costing					X		0.2 wks	0.2 wks	1 week	1 week				
81.1	Evaluate maintenance costs					X									
	<b>State 2, Georgia</b>														
85.	Commencement Meeting					X		1 week	0.5 wks						
<b>TOTAL</b>								10.2	7.7	8.5	8.5				

**RESOURCE UTILISATION REPORT**

Project title : Implementation of Pavement Management Systems		Project number : TELREG 9305		Country : The Southern Republics of the CIS and Georgia		Form 2.3, Page : 1	
Planning period : 01/1996 - 07/1996		Prepared on : 07/1996		EC Consultant : KOCKS CONSULT GMBH, Koblenz/Germany			
Project objectives : <b>Implementation of Pavement and Bridge Management Systems</b>							
RESOURCES/INPUTS	TOTAL PLANNED	PERIOD PLANNED	PERIOD REALISED	TOTAL REALISED	AVAILABLE FOR REMAINDER		
<b>PERSONNEL</b>							
Team-Leader	10.18 man-months	6.00 man-months (incl. additional group)	6.00 man-months (incl. additional group)	6.00 man-months	4.18 man-months		
Transport Economist	8.00 man-months	3.50 man months	3.50 man months	3.50 man months	4.50 man months		
FWD and PMS/BMS Specialists	9.82 man-months (7.27 months + 56 days)	4.00 man-months	4.00 man-months	4.00 man-months	5.82 man-months		
Engineering Coordinator	10.18 man-months	3.50 man months	3.50 man months	3.50 man months	6.68 man months		
Structural Engineer and Bridge Specialist	12.00 man-months (10.18 months + 40 days)	4.00 man-months	0 man months	0 man-months	12.00 man-months (10.18 months + 40 days)		
Asphalt Specialist	24 man-days	12 man-days	16 man-days	16 man-days	8 man-days		
Project Manager	20 man days	10 man days	10 man days	10 man days	10 man days		
PMS/BMS Home Office Support	24 man-days	12 man-days	12 man-days	12 man-days	12 man-days		
PMS/BMS Programmer Software	88 man-days	55 man-days	55 man-days	55 man-days	33 man-days		
Sub-total	50.18 man-months and 156 man-days	21.00 man-months and 89 man-days	17.00 man-months and 93 man-days	17.00 man-months and 93 man-days	33.18 man-months and 63 man-days		
<b>EQUIPMENT AND MATERIAL</b>							
Phoenix Falling Weight Deflectometer	1	1	1	1	0		
Portable Axle Weighbridge System	1	1	1	1	0		
Bump Integrator	1	1	2	2	0		
Tripmeter	1	1	2	2	0		
Personnel Computers incl. Ancillaries	8	3	3	3	5		
Laser Printers incl. Ancillaries	8	3	3	3	5		
Software „Windows 95“ package	8	3	3	3	5		
Software „RoSy - PMS/BMS“	8	0	0	0	8		
Sub-total	36	13	15	15	23		
<b>OTHER INPUTS</b>							
MERLIN	--	--	1	1	0		
Sub-total	--	--	1	1	0		
<b>TOTAL</b>							



**OUTPUT PERFORMANCE REPORT**

Project title : Traceca Project - Implementation of Pavement Management Systems		Project number: TELREG 9305	Country : The Southern Republics of the CIS and Georgia	Form 2.4, Page : 1
Prepared on: 07/1996		EC Consultant: KOCKS CONSULT GMBH, Koblenz/Germany		
Output results	Deviation original plan + or - %	Reason for deviation	Comment on constrains & assumptions	
<b>Region: Central Asia</b>				
<b>State 1, Uzbekistan</b>				
Pavement Condition Survey	- 30%	Roads in the southern part of the country will be investigated in 08 to 09/1996		
Assessment of Traffic	COMPLETED			
Economic Evaluation and VOC's	ON SCHEDULE			
Bridge Condition Survey	-100%	Field works will start in 08/1996		
Install and Adoption PMS + BMS	ON SCHEDULE			
Recommend Improvements	ON SCHEDULE			
Training and Seminars	+ 25%	Seminar on bitumen bound products and road safety aspects		
<b>Provision of PMS + BMS hardware and software</b>	<b>ON SCHEDULE</b>			
<b>State 2, Kyrgyz Republic</b>				
Pavement Condition Survey	COMPLETED			
Assessment of Traffic	COMPLETED			
Economic Evaluation and VOC's	ON SCHEDULE			
Bridge Condition Survey	-100%	Field works will start in 08/1996		
Install and Adoption PMS + BMS	ON SCHEDULE			
Recommend Improvements	ON SCHEDULE			
Training and Seminars	+ 25 %	Seminar on bitumen bound products and road safety aspects		
<b>Provision of PMS + BMS hardware and software</b>	<b>ON SCHEDULE</b>			

**OUTPUT PERFORMANCE REPORT**

Project title : Traceca Project - Implementation of Pavement Management Systems		Project number: TELREG 9305	Country : The Southern Republics of the CIS and Georgia	Form 2.4, Page : 2
Prepared on: 07/1996			EC Consultant: KOCKS CONSULT GMBH, Koblenz/Germany	
Output results	Deviation original plan + or - %	Reason for deviation	Comment on constrains & assumptions	
<b>Region: Central Asia</b>				
<b>State 3, Kazakhstan</b>				
Pavement Condition Survey	ON SCHEDULE	Field works will start in 08/1996		
Assessment of Traffic	ON SCHEDULE			
Economic Evaluation and VOC's	ON SCHEDULE			
Bridge Condition Survey	-100%			
Install and Adoption PMS + BMS	ON SCHEDULE			
Recommend Improvements	ON SCHEDULE			
Training and Seminars	+ 20 %	Seminar on bitumen bound products		
<b>Provision of PMS + BMS hardware and software</b>	ON SCHEDULE			
<b>State 4, Turkmenistan</b>				
Pavement Condition Survey	ON SCHEDULE			
Assessment of Traffic	ON SCHEDULE			
Economic Evaluation and VOC's	ON SCHEDULE			
Bridge Condition Survey	ON SCHEDULE			
Install and Adoption PMS + BMS	ON SCHEDULE			
Recommend Improvements	ON SCHEDULE			
Training and Seminars	ON SCHEDULE			
<b>Provision of PMS + BMS hardware and software</b>	ON SCHEDULE			



**OUTPUT PERFORMANCE REPORT**

Project title : Traceca Project - Implementation of Pavement Management Systems		Project number: TELREG 9305	Country : The Southern Republics of the CIS and Georgia	Form 2.4, Page : 4
Prepared on: 07/1996			EC Consultant: KOCKS CONSULT GMBH, Koblenz/Germany	
Output results	Deviation original plan + or - %	Reason for deviation	Comment on constrains & assumptions	
<b>Region: Caucasus</b>				
<b>State 2, Georgia</b>				
Pavement Condition Survey	ON SCHEDULE			
Assessment of Traffic	ON SCHEDULE			
Economic Evaluation and VOC's	ON SCHEDULE			
Bridge Condition Survey	ON SCHEDULE			
Install and Adoption PMS + BMS	ON SCHEDULE			
Recommend Improvements	ON SCHEDULE			
Training and Seminars	ON SCHEDULE			
<b>Provision of PMS + BMS hardware and software</b>	ON SCHEDULE			
<b>State 3, Armenia</b>				
Pavement Condition Survey	ON SCHEDULE			
Assessment of Traffic	ON SCHEDULE			
Economic Evaluation and VOC's	ON SCHEDULE			
Bridge Condition Survey	ON SCHEDULE			
Install and Adoption PMS + BMS	ON SCHEDULE			
Recommend Improvements	ON SCHEDULE			
Training and Seminars	ON SCHEDULE			
<b>Provision of PMS + BMS hardware and software</b>	ON SCHEDULE			

## 5. PROJECT PLANNING FOR NEXT REPORTING PERIOD

### 5.1 Planned Activities

During the present reporting period consultancy services were provided in the recipient states of Uzbekistan, Kyrgyzstan, Azerbaijan and Kazakhstan. For the next reporting period the Consultant will commence the activities in the other recipient states in Central Asia

- Turkmenistan
- Tadjikistan

and the Caucasus area

- Georgia
- Armenia

The activities for the field works and data collection for roads and highways, as described in the chapters above, will be continued and completed respectively comprising the main items

- seminars for introduction of the equipment
- collection and evaluation of road surface and road pavement condition data

As reported computer equipment and programme systems were delivered to some of the recipient countries. During the next reporting period all eight recipient countries will receive the computer equipment as well as the RoSy-PMS/BMS programme system.

Training of counterparts will continue as described in the chapters above comprising

- use of the equipment
- collection of road condition data
- preparation of data base

and will commence for

- collection of bridge condition data
- use of the PMS/BMS programme system

The Consultant's activities for the transport economics and road use cost will continue for the described activities

- data collection (traffic, axle loads)
- estimation of traffic growth
- calculation of vehicle operating cost (VOC)
- road use costs

Seminars will be continued for bitumen bound materials and related technology as well as for road safety aspects.

## 5.2 Tables

The proposed activities for the next progress period are shown for each of the eight recipient states in the tables below.

It should be mentioned that during the present progress period it has not been possible to commence the activities in Tadjikistan due to the unsafe situation in the country. Depending on the development in the country the Consultant may have to modify the programme shown in the tables below.

**PLAN OF OPERATIONS FOR THE NEXT PERIOD (Work programme)**

Project title: Traceca Project - Implementation of Pavement Management Systems	Project number: TELREG 9305	Country: The Southern Republics of the CIS and Georgia	Form 1.6, Page: 1
Planning period: 07/1995 - 12/1996	Prepared on: 07/1996	EC Consultant: KOCKS CONSULT GMBH, Koblenz/Germany	

Project objectives: **Implementation of Pavement and Bridge Management Systems**

No	ACTIVITIES	TIME FRAME												INPUTS				
		1996 Months												PERSONNEL		EQUIPMENT AND MATERIAL	OTHER	
		6	7	8	9	10	11	12	EC Consultant	Counterpart								
<b>Region: Central Asia</b> <b>State 1, Uzbekistan</b>																		
6.	<b>FWD Survey + Evaluation</b>																	
6.2	Measure + store FWD survey data		X	X										1 week	1 week		computer, printer, ancill.	
6.3	Pavement analysis			X										0.5 weeks	0.5 weeks			
9.	<b>VOC's (HDM)</b>																	
9.3	Calculation of VOC's		X											1 week				
10.	<b>Bridge Cond. Survey+Stand.Def</b>																	
10.1	Collect bridge data				X									0.5 weeks	1 week			
10.2	Inspect bridges				X	X								2 weeks	3 weeks			
10.3	Establish existing bridge standard					X								0.5 weeks	1 week			
11.	<b>Bridge Maintenance Strategy</b>																	
11.1	Assess exist. maintenance methods					X								1 week	1 week			
11.2	Discussion of mainten. methods						X							0.5 weeks	0.5 weeks			
11.3	Evaluate maintenance + repair costs						X							0.5 weeks	0.5 weeks			
12.	<b>Adoption PMS + BMS</b>																	
12.1	Install the system					X								0.5 weeks	0.5 weeks			
12.2	Enter relevant data into PMS/BMS					X	X							1.5 weeks	1.5 weeks			
13.	<b>Model Optimization</b>						X	X						1 week	2 week			
14.	<b>Training + Seminars</b>																	
14.3	Training + Seminar PMS/BMS						X							1 week	1 week		teaching mat.	
14.4	Seminar bridge maintenance tech.						X							0.5 weeks	0.5 weeks			
<b>TOTAL</b>												12 weeks	14 weeks					

**PLAN OF OPERATIONS FOR THE NEXT PERIOD (Work programme)**

Project title: Traceca Project - Implementation of Pavement Management Systems	Project number: TELREG 9305	Country: The Southern Republics of the CIS and Georgia	Form 1.6, Page: 2
Planning period: 07/1995 - 12/1996	Prepared on: 07/1996	EC Consultant: KOCKS CONSULT GMBH, Koblenz/Germany	

Project objectives: **Implementation of Pavement and Bridge Management Systems**

No	ACTIVITIES	TIME FRAME										INPUTS				
		1996 Months										PERSONNEL		EQUIPMENT AND MATERIAL	OTHER	
		6	7	8	9	10	11	12	EC Consultant	Counterpart						
<b>Region: Central Asia</b> <b>State 2, Kyrgyz Republic</b>																
23.	<b>VOC's (HDM)</b>															
23.3	Calculation of VOC's		X						1 week							
24.	<b>Bridge Cond. Survey+Stand.Def</b>															
24.1	Collect bridge data			X					0.5 weeks	1 week						
24.2	Inspect bridges				X X				2 weeks	3 weeks						
24.3	Establish existing bridge standard				X				0.5 weeks	1 week						
25.	<b>Bridge Maintenance Strategy</b>															
25.1	Assess exist. maintenance methods				X				1 week	1 week						
25.2	Discussion of mainten. methods				X				0.5 weeks	0.5 weeks						
25.3	Evaluate maintenance + repair costs				X				0.5 weeks	0.5 weeks						
26.	<b>Adoption PMS + BMS</b>															
26.1	Install the system				X				0.5 weeks	0.5 weeks	PMS/BMS software					
26.2	Enter relevant data into PMS/BMS				X X				1.5 weeks	1.5 weeks						
27.	<b>Model Optimization</b>															
					X X				1 week	2 week						
28.	<b>Training + Seminars</b>															
28.3	Training + Seminar PMS/BMS				X				1 week	1 week	teaching mat.					
28.4	Seminar bridge maintenance tech.				X				0.5 weeks	0.5 weeks						
<b>TOTAL</b>									<b>10.5 weeks</b>	<b>12.5 weeks</b>						



**PLAN OF OPERATIONS FOR THE NEXT PERIOD (Work programme)**

Project title: Traceca Project - Implementation of Pavement Management Systems		Project number: TELREG 9305		Country: The Southern Republics of the CIS and Georgia			Form 1.6, Page: 3					
Planning period: 07/1995 - 12/1996		Prepared on: 07/1996		EC Consultant: KOCKS CONSULT GMBH, Koblenz/Germany								
Project objectives: <b>Implementation of Pavement and Bridge Management Systems</b>												
No	ACTIVITIES	TIME FRAME						INPUTS				
		1996 Months						PERSONNEL		EQUIPMENT AND MATERIAL	OTHER	
		6	7	8	9	10	11	12	EC Consultant	Counterpart		
	<b>Region: Central Asia</b>											
	<b>State 3, Kazakhstan</b>											
32.	<b>Road Cond. Survey+Stand. Def.</b>											
32.1	Rough. measurement+cond. survey		XX						1.5 weeks	1.5 weeks		
32.2	Establish existing design standards		X						0.5 weeks	0.5 weeks		
36.	<b>Road + usage Costing</b>											
36.1	Evaluate maintenance costs			X					0.8 weeks	1 week		
37.	<b>VOC's (HDM)</b>											
37.3	Calculation of VOC's		XX						1.5 weeks			
38.	<b>Bridge Cond. Survey+Stand. Def.</b>											
38.1	Collect bridge data				X				0.5 weeks	1 week		
38..2	Inspect bridges					XX			2 weeks	3 weeks		
38.3	Establish existing bridge stand.					X			0.5 weeks	1 week		
39.	<b>Bridge Maintenance Strategy</b>											
39.1	Assess exist. maintenance method					X			1 week	1 week		
39.2	Discussion of mainten. methods					X			0.5 weeks	0.5 weeks		
39.3	Evaluate maintenance + repair cost					X			0.5 weeks	0.5 weeks		
40.	<b>Adoption PMS + BMS</b>											
40.1	Install the system				X				0.5 weeks	0.5 weeks	PMS/BMS software	
40.2	Enter relevant data into PMS/BMS					XX			1.5 weeks	1.5 weeks		
41.	<b>Model Optimization</b>					X	X		1 week	2 weeks		
42.	<b>Training + Seminars</b>											
42.2	Seminar road safety				X				0.2 weeks	0.2 weeks	teaching mat.	
42.3	Training + Seminar PMS/BMS						X		1 week	1 week		
42.4	Seminar bridge maintenance tech.							X	0.5 weeks	0.5 weeks		
<b>TOTAL</b>									<b>14.0 weeks</b>	<b>15.7 weeks</b>		

**PLAN OF OPERATIONS FOR THE NEXT PERIOD (Work programme)**

Project title: Traceca Project - Implementation of Pavement Management Systems	Project number: TELREG 9305	Country: The Southern Republics of the CIS and Georgia	Form 1.6, Page: 4
Planning period: 07/1995 - 12/1996	Prepared on: 07/1996	EC Consultant: KOCKS CONSULT GMBH, Koblenz/Germany	

Project objectives: **Implementation of Pavement and Bridge Management Systems**

No	ACTIVITIES	TIME FRAME						INPUTS							
		1996 Months						PERSONNEL		EQUIPMENT AND MATERIAL	OTHER				
		6	7	8	9	10	11	12	EC Consultant			Counterpart			
<b>Region: Central Asia State 4, Turkmenistan</b>															
43.	Commencement Meeting		X									1 week			
44.	Logistics, Data Collection				X	X						1.5 weeks	2 weeks		
45.	Road Network Location				X							0.5 weeks	0.5 weeks		
46.	Road Cond. Survey+Stand.Def.				X	X	X	X				4 weeks	3 weeks	Bump Integrator, MERLIN, Tripmeter	
47.	Traffic Survey+ Evaluation				X	X	X					3 weeks	3 weeks	Weighbridge	
48.	FWD Survey + Evaluation					X	X					2 weeks	2 weeks	FWD, printer, computer	
49.	Maintenance Strategy							X				1 week	1 week		
50.	Road + usage Costing						X					1 week	1 week		
51.	VOC's (HDM)				X	X	X					3 weeks	3 weeks		
52.	Bridge Cond. Survey+Stand.Def								X	X	X	3 weeks	3 weeks		
53.	Bridge Maintenance Strategy								X	X		2 weeks	2 weeks		
54.	Adoption PMS + BMS								X	X		2 weeks	2 weeks	PMS/BMS software	
55.	Model Optimization								X	X		1 week	2 weeks		
56.	Training + Seminars								X	X	X	3 weeks	3 weeks	teaching mat.	
		<b>TOTAL</b>											28 weeks	28.5 weeks	

**PLAN OF OPERATIONS FOR THE NEXT PERIOD (Work programme)**

Project title: Traceca Project - Implementation of Pavement Management Systems	Project number: TELREG 9305	Country: The Southern Republics of the CIS and Georgia	Form 1.6, Page: 5
Planning period: 07/1995 - 12/1996	Prepared on: 07/1996	EC Consultant: KOCKS CONSULT GMBH, Koblenz/Germany	
Project objectives: <b>Implementation of Pavement and Bridge Management Systems</b>			

No	ACTIVITIES	TIME FRAME												INPUTS			
		1996 Months												PERSONNEL		EQUIPMENT AND MATERIAL	OTHER
		6	7	8	9	10	11	12	EC Consultant	Counterpart							
57.	Commencement Meeting								X					1 week			
58.	Logistics, Data Collection									X X				1.5 weeks	2 weeks		
59.	Road Network Location									X				0.5 weeks	0.5 weeks		
60.	Road Cond. Survey+Stand.Def.									X X	X X			4 weeks	3 weeks	Bum p Integrator, MERLIN, Tripmeter	
61.	Traffic Survey+ Evaluation									X X	X			3 weeks	3 weeks	Weighbridge	
62.	FWD Survey + Evaluation									X	X			2 weeks	2 weeks	FWD, printer, computer	
63.	Maintenance Strategy										X			1 week	1 week		
64.	Road + usage Costing									X				1 week	1 week		
65.	VOC's (HDM)									X X	X			3 weeks	3 weeks		
66.	Bridge Cond. Survey+Stand.Def										X	X X		3 weeks	3 weeks		
67.	Bridge Maintenance Strategy											X X		2 weeks	2 weeks		
68.	Adoption PMS + BMS											X X		2 weeks	2 weeks	PMS/BMS software	
69.	Model Optimization											X		1 week	2 weeks		
70.	Training + Seminars											X X	X	3 weeks	3 weeks	teaching mat.	
		<b>TOTAL</b>												<b>28 weeks</b>	<b>28.5 weeks</b>		

**PLAN OF OPERATIONS FOR THE NEXT PERIOD (Work programme)**

Project title: Traceca Project - Implementation of Pavement Management Systems	Project number: TELREG 9305	Country: The Southern Republics of the CIS and Georgia	Form 1.6, Page: 6
Planning period: 07/1995 - 12/1996	Prepared on: 07/1996	EC Consultant: KOCKS CONSULT GMBH, Koblenz/Germany	

Project objectives: **Implementation of Pavement and Bridge Management Systems**

No	ACTIVITIES	TIME FRAME												INPUTS			
		1996 Months												PERSONNEL		EQUIPMENT AND MATERIAL	OTHER
		6	7	8	9	10	11	12	EC Consultant	Counterpart							
	<b>Region: Caucasus</b>																
	<b>State 1, Azerbaijan</b>																
75.	<b>Traffic Survey+ Evaluation</b>																
75.2	Traffic survey + axle weighting		X										0.5 weeks	1 week	Weighbridge		
75.3	Traffic forecast			XX									1.5 weeks				
76.	<b>FWD Survey + Evaluation</b>																
76.2	Measure + store FWD survey data				X								1 week	1 week	FWD, printer, computer		
76.3	Pavement analysis				X								0.5 weeks	0.5 weeks			
77.	<b>Maintenance Strategy</b>																
77.2	Propose maintenance strategy				X								0.5 weeks	0.5 weeks			
78.	<b>Road + usage Costing</b>																
78.1	Evaluate maintenance costs		X										0.2 weeks	1 week			
79.	<b>VOC's (HDM)</b>																
79.1	Vehicle classification to suit HDM				X								0.5 weeks	1 week			
79.2	Economic + financial cost of VOC's				X								1.5 weeks	2 weeks			
79.3	Calculation of VOC's					X							1 week				
80.	<b>Bridge Cond. Survey+Stand.Def</b>																
80.1	Collect bridge data					X							0.5 weeks	1 week			
80.2	Inspect bridges					X	X						2 weeks	3 weeks			
80.3	Establish existing bridge stand.						X						0.5 weeks	1 week			
81.	<b>Bridge Maintenance Strategy</b>																
81.1	Assess exist. maintenance method							X					1 week	1 week			
81.2	Discussion of mainten. methods							X					0.5 weeks	0.5 weeks			
81.3	Evaluate maintenance + repair cost							X					0.5 weeks	0.5 weeks			
82.	<b>Adoption PMS + BMS</b>																
82.1	Install the system								X				0.5 weeks	0.5 weeks	PMS/BMS software		
82.2	Enter relevant data into PMS/BMS									XX			1.5 weeks	1.5 weeks			
83.	<b>Model Optimization</b>									XX			1 week	2 week			
84.	<b>Training + Seminars</b>																
84.1	Seminar bit. bound products tech.					X							1 week	1 week	teaching mat.		
84.3	Training + Seminar PMS/BMS									X			1 week	1 week			
84.4	Seminar bridge maintenance tech.									X			0.5 weeks	0.5 weeks			
		<b>TOTAL</b>												<b>18.7 weeks</b>	<b>19.5 weeks</b>		

**PLAN OF OPERATIONS FOR THE NEXT PERIOD (Work programme)**

Project title: Traceca Project - Implementation of Pavement Management Systems	Project number: TELREG 9305	Country: The Southern Republics of the CIS and Georgia	Form 1.6, Page: 7
Planning period: 07/1995 - 12/1996	Prepared on: 07/1996	EC Consultant: KOCKS CONSULT GMBH, Koblenz/Germany	

Project objectives: **Implementation of Pavement and Bridge Management Systems**

No	ACTIVITIES	TIME FRAME												INPUTS					
		1996 Months												PERSONNEL	EQUIPMENT AND MATERIAL	OTHER			
		6	7	8	9	10	11	12	EC Consultant	Counterpart									
<b>Region: Caucasus</b>																			
<b>State 2, Georgia</b>																			
86.	<b>Logistics, Data Collection</b>																		
86.1	Arranging local expertise, office, etc.		X											0.5 weeks	2 weeks				
86.2	Review existing data bases			XX										1 week	0.5 weeks				
87.	<b>Road Network Location</b>			X										0.5 weeks					
88.	<b>Road Cond. Survey+Stand. Def</b>																		
88.1	Rough. measurement+cond. survey			XX	XX									4 weeks	2 week		Bump Integrator, MERLIN, Tripmeter		
88.2	Establish existing design standards				X									1 week	1 week				
89.	<b>Traffic Survey+ Evaluation</b>																		
89.1	Analysis of existing traffic data			X	X									1 week	2 week		Weighbridge		
89.2	Traffic survey + axle weighting				X									0.5 weeks	1 week				
89.3	Traffic forecast				XX									1.5 weeks					
90.	<b>FWD Survey + Evaluation</b>																		
90.1	Select representative road sections				X									0.5 weeks	0.5 weeks		FWD, printer, computer		
90.2	Measure + store FWD survey data					X								1 week	1 week				
90.3	Pavement analysis						X							0.5 weeks	0.5 weeks				
91.	<b>Maintenance Strategy</b>																		
91.1	Establish exist.maintenance proceed				X									0.5 weeks	0.5 weeks				
91.2	Propose maintenance strategy					X								0.5 weeks	0.5 weeks				
92.	<b>Road + usage Costing</b>																		
92.1	Evaluate maintenance costs			X										0.2 weeks	1 week				
93.	<b>VOC's (HDM)</b>																		
93.1	Vehicle classification to suit HDM				X		X							0.5 weeks	1 week				
93.2	Economic + financial cost of VOC's				X		X							1.5 weeks	2 weeks				
93.3	Calculation of VOC's								X	X				1 week					
94.	<b>Bridge Cond. Survey+Stand.Def</b>								X	XX				3 weeks	3 weeks				
95.	<b>Bridge Maintenance Strategy</b>									XX				2 weeks	2 weeks				
96.	<b>Adoption PMS + BMS</b>																		
96.1	Install the system						X							0.5 weeks	0.5 weeks		PMS/BMS software		
96.2	Enter relevant data into PMS/BMS										XX			1.5 weeks	1.5 weeks				
97.	<b>Model Optimization</b>										XX			1 week	2 week				
98.	<b>Training + Seminars</b>																		
98.1	Seminar bit. bound products tech.				X									1 week	1 week		teaching mat.		
98.3	Training + Seminar PMS/BMS										X			1 week	1 week				
98.4	Seminar bridge maintenance tech.									X				0.5 weeks	0.5 weeks				
<b>TOTAL</b>													<b>26.7 weeks</b>	<b>27.0 weeks</b>					

**PLAN OF OPERATIONS FOR THE NEXT PERIOD (Work programme)**

Project title: Traceca Project - Implementation of Pavement Management Systems		Project number: TELREG 9305		Country: The Southern Republics of the CIS and Georgia			Form 1.6, Page: 8					
Planning period: 07/1995 - 12/1996		Prepared on: 07/1996		EC Consultant: KOCKS CONSULT GMBH, Koblenz/Germany								
Project objectives: <b>Implementation of Pavement and Bridge Management Systems</b>												
No	ACTIVITIES	TIME FRAME						INPUTS				
		1996 Months						PERSONNEL		EQUIPMENT AND MATERIAL	OTHER	
	<b>Region: Caucasus</b> <b>State 3, Armenia</b>	6	7	8	9	10	11	12	EC Consultant	Counterpart		
100.	<b>Logistics, Data Collection</b>											
100.1	Arranging local expertise, office, etc.			X					0.5 weeks			
100.2	Review existing data bases			X	X				1 week	2 weeks		
101.	<b>Road Network Location</b>				X				0.5 weeks	0.5 weeks		
102.	<b>Road Cond.Survey+Stand. Def</b>											
102.1	Rough. measurement+cond. survey				X X	X X			4 weeks	2 week	Bump Integrator, MERLIN, Tripmeter	
102.2	Establish existing design standards				X				1 week	1 week		
103.	<b>Traffic Survey+ Evaluation</b>										Weighbridge	
103.1	Analysis of existing traffic data				X X				1 week	2 week		
103.2	Traffic survey + axle weighting					X			0.5 weeks	1 week		
103.3	Traffic forecast						X X		1.5 weeks			
104.	<b>FWD Survey + Evaluation</b>										FWD, printer, computer	
104.1	Select representative road sections				X				0.5 weeks	0.5 weeks		
104.2	Measure + store FWD survey data					X			1 week	1 week		
104.3	Pavement analysis						X		0.5 weeks	0.5 weeks		
105.	<b>Maintenance Strategy</b>											
105.1	Establish exist.maintenance proceed				X				0.5 weeks	0.5 weeks		
105.2	Propose maintenance strategy					X			0.5 weeks	0.5 weeks		
106.	<b>Road + Usage Costing</b>											
106.1	Evaluate maintenance costs					X			0.2 weeks	1 week		
107.	<b>VOC's (HDM)</b>											
107.1	Vehicle classification to suit HDM				X	X			0.5 weeks	1 week		
107.2	Economic + financial cost of VOC's					X X			1.5 weeks	2 weeks		
107.3	Calculation of VOC's						X		1 week			
108.	<b>Bridge Cond. Survey+Stand.Def</b>							X X	3 weeks	3 weeks		
109.	<b>Bridge Maintenance Strategy</b>							X X	2 weeks	2 weeks		
110.	<b>Adoption PMS + BMS</b>										PMS/BMS software	
110.1	Install the system					X			0.5 weeks	0.5 weeks		
110.2	Enter relevant data into PMS/BMS								1.5 weeks	1.5 weeks		
111.	<b>Model Optimization</b>								1 week	2 week		
112.	<b>Training + Seminars</b>										teaching mat.	
112.1	Seminar bit. bound products tech.				X				1 week	1 week		
112.2	Seminar road safety					X			0.2 weeks	0.2 weeks		
112.3	Training + Seminar PMS/BMS							X	1.5 weeks	1.5 weeks		
112.4	Seminar bridge maintenance tech.							X	0.5 weeks	0.5 weeks		
<b>TOTAL</b>									<b>27.4</b>	<b>27.7</b>		

APPENDIX

УЗАВТОЙУЛ/UZAVTOYUL

TRACECA (PMS) UZBEKISTAN

ОПРОС МЕЖДУНАРОДНОГО ГРУЗОВОГО ТРАНСПОРТА „ ОТКУДА / КУДА „  
ORIGIN / DESTINATION SURVEY OF INTERNATIONAL TRUCK MOVEMENTS

**МЕСТО (номер дороги ,км.,направление):**

.....  
LOCATION (Road No., Chainage, Direction)

**DATE / ДАТА:** .....

NUMBER / НОМЕР ОПРОСА:	.....
TRUCK TYPE / ТИП ТРАНСПОРТНОГО СРЕДСТВА	.....
Model / МОДЕЛЬ :	.....
No. of Axles / КОЛИЧЕСТВО ОСЕЙ :	.....
NATIONALITY OF VEHICLE / ГОС-НАЯ. ПРИНАДЛЕЖНОСТЬ:	.....
ORIGIN OF JOURNEY / ПУНКТ ОТПРАВЛЕНИЯ	.....
Country / СТРАНА:	.....
City or Location / АДРЕС:	.....
FINAL DESTINATION / ПУНКТ НАЗНАЧЕНИЯ	.....
Country / СТРАНА:	.....
City or Location / АДРЕС:	.....
INTERMEDIATE STOPS / ВРЕМЕННЫЕ ОСТАНОВКИ	.....
Border Crossings / ПРИ ПЕРЕСЕЧЕНИИ ГРАНИЦ:	.....
Others / ПРОЧИЕ:	.....

NUMBER / НОМЕР ОПРОСА:	.....
TRUCK TYPE / ТИП ТРАНСПОРТНОГО СРЕДСТВА	.....
Model / МОДЕЛЬ :	.....
No. of Axles / КОЛИЧЕСТВО ОСЕЙ :	.....
NATIONALITY OF VEHICLE / ГОС-НАЯ. ПРИНАДЛЕЖНОСТЬ:	.....
ORIGIN OF JOURNEY / ПУНКТ ОТПРАВЛЕНИЯ	.....
Country / СТРАНА:	.....
City or Location / АДРЕС:	.....
FINAL DESTINATION / ПУНКТ НАЗНАЧЕНИЯ	.....
Country / СТРАНА:	.....
City or Location / АДРЕС:	.....
INTERMEDIATE STOPS / ВРЕМЕННЫЕ ОСТАНОВКИ	.....
Border Crossings / ПРИ ПЕРЕСЕЧЕНИИ ГРАНИЦ:	.....
Others / ПРОЧИЕ:	.....



**МИНИСТЕРСТВО ТРАНСПОРТА И КОММУНИКАЦИЙ / MINISTRY OF TRANSPORT & COMMUNICATIONS**  
**Департамент автомобильных дорог (КАЗДОРНИИ) / Department of Roads (KAZDORNII)**

**TRASECA (PMS) REPUBLIC OF KAZAKHSTAN**

**КЛАССИФИКАЦИЯ ПО КОЛИЧЕСТВУ ОСЕЙ (> 3 т.)**  
**CLASSIFIED COUNTS OF TRUCKS > 3T**

**МЕСТО (НОМЕР ДОРОГИ, КМ., НАПРАВЛЕНИЯ):** .....

LOCATION (Road No., Chainage, Direction)

**DATE / ДАТА:** .....1996

**TIME (1HOUR) from to / ВРЕМЯ( 1 час ) : С.....ПО.....**

2-AXLE 2-ОСНЫЕ	NATIONAL ОТЕЧЕСВЕННЫЕ		TOTAL: ИТОГО :
	INTERNATIONAL МЕЖДУНАРОДНЫЕ		TOTAL: ИТОГО :
3-AXLE 3-ОСНЫЕ	NATIONAL ОТЕЧЕСВЕННЫЕ		TOTAL: ИТОГО :
	INTERNATIONAL МЕЖДУНАРОДНЫЕ		TOTAL: ИТОГО :
4-AXLE 4-ОСНЫЕ	NATIONAL ОТЕЧЕСВЕННЫЕ		TOTAL: ИТОГО :
	INTERNATIONAL МЕЖДУНАРОДНЫЕ		TOTAL: ИТОГО :
5-AXLE 5-ОСНЫЕ	NATIONAL ОТЕЧЕСВЕННЫЕ		TOTAL: ИТОГО :
	INTERNATIONAL МЕЖДУНАРОДНЫЕ		TOTAL: ИТОГО :
6-AXLE 6-ОСНЫЕ	NATIONAL ОТЕЧЕСВЕННЫЕ		TOTAL: ИТОГО :
	INTERNATIONAL МЕЖДУНАРОДНЫЕ		TOTAL: ИТОГО :

**TRACECA - IMPLEMENTATION OF PAVEMENT MANAGEMENT SYSTEMS**
**ROAD ROUGHNESS (ROAD UNEVENNESS)**
**VALUES AND GUIDELINES FOR VISUAL ROAD INSPECTION OF PAVED ROADS**

Description	IRI [ m/km ]	Road Condition Category	Road Condition Class
Ride comfortable at 100 km/h or above. Road unevenness barely perceptible at 80 km/h. No depressions, rutting, potholes, cracks or corrugations noticeable. Typical high quality asphalt concrete or high quality bituminous surface treatment.	4.0 <	very good	0
Ride comfortable up to 100 km/h. At 80 km/h moderately perceptible movements or large undulations may be felt. Very few defects of the road surface for class 1A: <ul style="list-style-type: none"> <li>- occasional depressions or large undulations</li> <li>- moderate corrugations</li> <li>- moderate rutting</li> <li>- shallow potholes (e.g. 5-15mm/3m or 10-20mm/5m or 10-20mm/5m with frequency 1-2 per 50m)</li> <li>- good quality patches (e.g. 1-2 per 50m)</li> </ul> and in addition for class 1B: <ul style="list-style-type: none"> <li>- occasional longitudinal cracks</li> <li>- occasional transverse cracks</li> </ul> <u>NOTE:</u> Road sections measured and/or classified in terms of roughness values as 'GOOD', but with severe rutting or pavement deformation should be downgraded to category 'FAIR'.	> 4.0 - 6.0	good	1A 1B
Ride comfortable up to 70 - 90 km/h, but with strongly perceptible movements and swaying. Usually associated with road surface defects for class 2A: <ul style="list-style-type: none"> <li>- frequent moderate and uneven depressions</li> <li>- pronounced undulations</li> <li>- pronounced corrugations</li> <li>- pronounced rutting</li> <li>- occasional potholes (e.g. 15-20mm/3m or 20-40mm per 5m with frequency 5-3 per 50m)</li> <li>- poor quality patches (e.g. 1-3 per 50m)</li> </ul> and in addition for class 2B: <ul style="list-style-type: none"> <li>- many longitudinal and/or transverse cracks</li> <li>- alligator cracking</li> </ul> <u>NOTE:</u> Road sections measured and/or classified in terms of roughness values as 'FAIR', but with severe rutting or pavement deformation should be downgraded to category 'POOR'.	> 6.0 - 8.5	fair	2A 2B

Description	IRI [ m/km ]	Road Condition Category	Road Condition Class
<p>Ride quite comfortable up to 50 - 60 km/h, except the worst, not possible to avoid driving across the defects of the road resulting in frequent sharp movements or swaying. Severe defects in the road surface:</p> <ul style="list-style-type: none"> <li>- frequent deep and uneven depressions</li> <li>- severe undulations</li> <li>- severe corrugations</li> <li>- deep rutting</li> <li>- frequent potholes (e.g. &gt;30mm/3m or &gt;60mm/5m with frequency 4-6 per 50m)</li> <li>- very poor quality patches (e.g. 5-3 per 50m)</li> <li>- severe cracking</li> </ul>	> 8.5 - 10.5	poor	3
<p>Necessary to reduce speed to 50 km/h or below, higher speeds would cause extreme discomfort. Disintegration of the road surface associated with many deep depressions or potholes, extreme corrugations or rutting, bad quality patches.</p>	> 10.5 - 12.0	bad	4
<p>Severely disintegrated road pavement allowing a speed of 30 km/h or below, higher speeds would possibly cause damage to the vehicle:</p> <ul style="list-style-type: none"> <li>- destroyed / failed road pavement</li> <li>- destroyed / failed road pavement repaired e.g. by bad quality patching resulting in an extreme uneven road surface causing wheel bounce</li> <li>- unpaved (gravel or earth) road with high roughness progression.</li> </ul>	> 12.0	very bad	5

Source: Consultants estimates based on TRL ( Transport Research Laboratory, U.K. ) Road Note 5 and on estimates of previous studies.