His Majesty's Government of Nepal
Ministry of Works and Transportation
Department of Roads

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HMIS News

A NEWSLETTER FROM THE PLANNING BRANCH

RMRP

RMP: Bio - Engineering Component

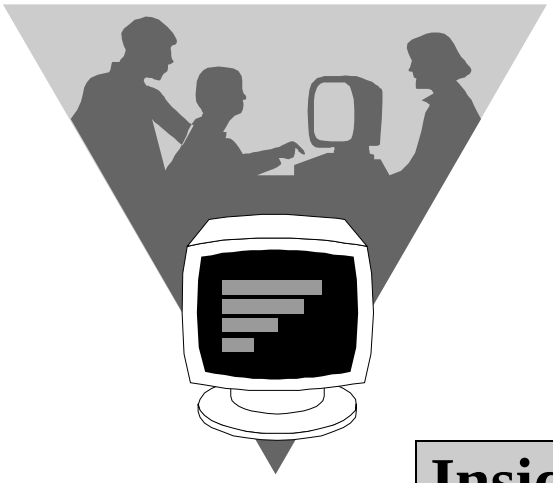
The Geo-Environmental Unit (GEU) is a cell within the Planning Branch of DOR. It came from the original Environmental Section of the former Design Section.

The Unit has a brief to:

- plan and implement bio-engineering operations through the Deppartment's Maintenance Divisions and Projects;
- provide a geotechnical support service; and
- undertake environmental assessment of road projects.

Bio-engineering is supported by the Overseas Development Administration (ODA) institution-strengthening Road Maintenance Project (RMP)

(cont'd in page 4)



The Highway Management Information System(HMIS) is located in the Planning Section of the DOR.
The HMIS manager is Dr. Nabin Kazi Pradhan.
*You can reach us by phone or by fax at number **221.771** or you can visit us in our office on the first floor of Babar Mahal.*
Mail can be send to:
DOR-HMIS
POBox 2623
Kathmandu.

RMRP

ROAD MAINTENANCE AND REHABILITATION PROJECT

An Introduction

Road Maintenance & Rehabilitation Project is the first ever major project taken up by DoR at estimated cost of $ 81.1 million including 50.5 million IDA loan and assistance from SDC(Swiss), ODA(UK), and UNDP. The project was launched on 23rd August 1994 and shall be completed by December 1998.

This is a unique project initiated to address shortcomings in development like maintenance, planning, monitoring, technical and quality audit, material study, quality control, training, road safety, decentralisation, institutional development, plant management, Environmental aspect, private sector etc.

Project Objective

The main objective of the project is to put the National Strategic Road Network in a maintainable condition and to build DoR capability for the same.

Project Description

The main components of the project comes under four basic heading

1. Policy
2. Institutional Development
3. Maintenance and Rehabilitation Programme
4. Miscellaneous Programmes of consulting services

Policy **component** include

1. Development of Road Maintenance funding Mechanism by introduction of a revolving fund to be financed from toll tax, central government revenues & credit resources, and increasing budgetary allocation for periodic emergency

(Contined in page 3)

A GLANCE AT THE PROPOSED

Inside this issue:

Pavement Management System

Sound pavement management involves response management in dealing with emergencies and management for control to make best use of available resources. The fundamental difference between response and control is that management for control involves planning and the use of reliable information. Given the absence of reliable information on the road network in the past, it is probably true to say that DoR has previously adopted a mainly responsive approach to management of the road network. This has resulted in a lower level of service to the road user and reduced output efficiency from the human and financial resources available to the Department.

When a road has been constructed, there are essentially three broad ***strategies*** open to the Department for managing the pavement:

I. The application of planned maintenance comprising interdependent routine, recurrent and periodic maintenance activities. By deferring the need for the more costly activities of rehabilitation and reconstruction and by keeping vehicle operating costs to a minimum, planned maintenance can be considered the optimal strategy in purely economic terms. However, this strategy can only be applied effectively to roads in a maintainable condition.

II. The provision of minimal ad-hoc routine an recurrent maintenance activities followed by rehabilitation of the pavement when it reaches a poor condition. As the annualised cost of rehabilitation is 3 -4 times the cost of the foregone maintenance, this is clearly not a cost effective strategy.

III. The provision of minimal routine and recurrent maintenance activities only until such time as the road becomes totally unserviceable and full pavement reconstruction is necessary. As the cost of reconstruction is three times the cost of rehabilitation, this strategy is extremely costly for all roads with the exception of those with minimal traffic. Applying this strategy effectively amounts to a policy of disinvestment in the road network.

As mentioned earlier the strategy of the planned maintenance will, in most cases, produce the optimum result. However, given the present limits on DoR capacity and maintenance funding, it is clear that the Department can not implement planned maintenance on the whole of the Strategic Network. While the aim of DoR should be to move from the present application of Strategy(II) to Strategy (I), this must be a gradual process. A start must therefore be made on establishing road priorities for planned maintenance for which a global rather than a project approach to pavement management and the road network is essential.

There are two basic ***approaches*** that can be taken when applying a pavement management strategy comprising planned maintenance:

I. The ***Cyclic Approach*** - in which pavement actions are undertaken at fixed intervals on any particular stretch of road. This approach comprises a relatively straight forward management exercise with predictable workload and funding but often produces a less than optimal (but still economic) result. It is therefore suited to roads where the principle agents of pavement deterioration are climate and the environment rather than traffic.

II. The ***Intervention Approach*** - where pavement actions are taken, as far as possible, in direct response to present levels of pavement deterioration. The application of an intervention approach is a difficult management exercise and produce s a variable annual workload and, consequently, variable resource and funding needs. Moreover, for effective planning using this approach, a comprehensive database of pavement performance overtime is essential in order to determine the historical trends.

The cyclic Approach is the preferable approach to planned maintenance for Nepal at the present time. In applying this approach, the principle to be adopted is that maintenance actions implemented a few months early are still economic while those applied "*half-a-day*" late are ineffective and
therefore a poor use of funds. However, regardless of the approach adopted, it is essential that regular feed back is obtained on the efficacy of the maintenance actions so that any necessary adjustment of the actions can be made.

The Cyclic Approach to the organisation of routine maintenance involves the establishment of control sections, definition of activities, allocation and optimisation of Resources and prioritisation of the Control Sections.

The Network Level, Operation Level and Project Level are essentially the three interdependent ***management levels*** in DoR at which pavement management should be applied. Effective pavement management starts at Network Level. At this level, pavement management is the responsibility of the DoR Planning Branch and the emphasis is placed on medium-term planning and global management of the Strategic network. The first job of the Planning Branch is to allocate priorities to the roads in the Network. These should be based on strategic importance and traffic levels and should ideally be related to a National development plan prepared by the NPC and a Transport Investment Plan which is the responsibility of MOWT. If the best use is to be made of the available resources, the level of pavemnt treeatment should not be uniform across the Network but must be related to the level of service required. The setting of road priorities therrefore provides the basis for establishing a medium-term Road Investment Plan. This plan will take the form of 3 year and 5 year rolling programmes of construction and rehabilitation, together with a global resealing programme for bitumen roads.

Pavement management at Operations Level is the responsibility of the DoR Maintenance Branch and is principally concerned with the detailed planning and implementation of maintenance activities in the field. The maintenance Branch staff in DoR Headquarters have an overall co-ordination and supervisory role while Regions and Divisions are responsible for the day- to-day planning, organisation and implementation of maintenance activities in their areas. The regions should prepare annual programmes for regravelling unsurfaced roads and, as soon as a local capacity for resealing work has been developed, the Regions should also take-over responsibility for the preparation of cyclic resealing programmes on bitumen roads from the Planning Branch. In general, these programmes will be based on the road priorities established by the planning branch. The role of the Divisions is to ensure that an appropriate level of service is provided by the network to the road user and to achieve this, division staff need an intimate knowledge of the roads in their division and the traffic on these roads. with this information and the agreed road priorities, it is the job of the divisions to undertake the detailed management and implementation of backlog, ad-hoc and planned maintenance activities. The resulting working programmes should be in keeping with the capacity of the Division and make the best use of the resources available to the division.

For the time being, reconstruction and rehabilitation of sections of the strategic Network should be carried out by DoR as projects.

As previously noted, management for control is an essential feature of pavement management and requires reliable data on which objective decisions can be made and implemented. In the case of pavement management for the Strstegic Network in Nepal we need to have data covering five elements:

- the inventories of the roads comprising the network;
- the pavement deterioration proces and a means of defining and measuring in the field;
- traffic levels and composition on the roads comprising the network;
- the relative costs of reconstruction, rehabilitation and planned maintenance activities on the network(Road Agency costs);
- the costs to road users of using ther network(vehicle operating costs).

The DoR has installed in the planning Branch, and is continuing to develop, a Highway Management Informations System (HMIS) which is now capable of providing Network Level data/information for each of the five data elements. The development of operational level database is under way.

Hence by implementing pavement management system DoR hopes to keep National Strategic Road Network in maintainable condition and at the same time reduce the overall transportation cost.

RMRP - AN INTRODUCTION (***Cont''d from page 1***)

& routine maintenance of strategic road network from present 3% to 15% total road sector budget allocation and road sector budget shall not increase $70 million in the project period.

2. Improvement of sectoaral planning by introducing 3 yr Rolling Plan with updating & reviewing such plan each year and preparation of Priority Investment Plan for 10 years which shall be the basis for 9th five year plan to be used by Natural Planning Commission (NPC).

Institutional Development **component** include

1. Strengthening of Divisional & DDC's capabilities to maintenance works by introduction of Strengthen Maintenance Division(SMD's) in 14 division at the rate of 3 divisions per year to cover 30 district during the project period, establishment of District Road Development Unit (DRDU) and a Pilot Lasor Based Road Rehabilitation & Maintenance project (PLRP).
2. Trainings:

⇒ to meet immediate need of the projects

- for DoR & DDC staffs
- local contractors training in cyclic maintenance, contract bidding procedure, operation of periodic maintenance (ODA,SDC), and limited training for contractors on road rehabilitation works,

⇒ To meet long term need

- on the job training , study visit etc.(SDC, ODA, support to DoR)
- Mechanic & operator training (ODA)
- to meet DDC need by established of labor based training school at Butwal (IDA).

3. Establishment of proposed units in DoR i.e.

- Road Sector Skill Development Unit (RSSDU) to manage road sector training for the project (SDC)
- Geo-environment Unit to establish sound road side support practice & build Bio-engineering capability estiblishment of Units as off shoot of the projects.
- Bridge Unit to establish system for making & maintaining bridge on strategic road network,
- Traffic Engineering & safety Unit (TESU)to make traffic study & safety regulation
- Monitoring & Evaluation Unit to enchance monitoring & evaluation capability in DoR projects.

4. Specialist advisors' input like the ODA Advisors on Cyclic Maintenance, Bridge management, & Bio-engineering, Plant management, Road Safety and SDC Advisor on training, SMD Technical Advisor and IDA Specialist for Karnali Bridge Maintenance.

Maintenance and Rehabilitation Programme include

1. Backlog periodic Maintenance of 661 km road and bridges(IDA) in Central, Western, Mid-Western & Far-Western region ,and 350 km cyclic resealing training contracts(14 packages, ODA)
2. Rehabilitation and overlays programme of 437 km strategic road network(IDA);
3. Routine Maintenance programme by contract to be extended to 14 divisions in the project period(HMG, SDC technical input)
4. Pilot Labour based District Road Rehabilitation and Maintenance of 140 km district road in four selected districts to be executed by Ministry of Local Development(MLD) using labor base technology.

Miscellaneous programme include consultency Services like

1. Road construction and maintenance Material Study running under Quality Control Unit
2. Operational Audit of Maintenance practices(not yet started under IDA fund)
3. Field Implementation Advisors(FIA) for periodic maintenance practices (IDA) running under periodic maintenance.
4. Priority investment plan(PIP), presently running under MEU.
5. Road Maintenance Information System: identify, procure & instal software pakages to be co-ordinated by Maintenance & Rehabilitation co-ordination Unit(MRCU).

Sub-projects based on funding Agents

(A) Sub Project 1 : Road Maintenance and Rehabilitation Project, Credit No. 2578 NEP financed by the World Bank (IDA)

(B) Sub Project 2 : Road Maintenance Project (RMP) financed by Overseas Development Administration (ODA/UK)

(C) Sub Project 3 : Partial Institutional Support (RMRP) financed by Swiss Development Co-operation (SDC)

(D) Sub Project 4 : Technical Assistance for Pilot Labour Based District Road Rehabilitation Project financed by UNDP.

Financial Arrangement & *Agreement*

Financial sharing of the project by individual co-partners has been arranged as follows :

Source	Amount in various currencies	Equivalent in US$
IDA	36.6 million SDR	50.5 million US$
ODA	9.6 million Sterling Pound	12.4 million US$
SDC	4.3 million Swiss Francs	2.8 million US$
UNDP	1.0 million US$	1.0 million US$
HMGN	14.4 million US$	14.4 million US$
	Total :	81.1 million US$

Development Credit Agreement between HMGN and the World Bank for RMRP, Credit No. 2578 NEP was signed on 1st June, 1994 and credit became effective since 30th Sept., 1994. Letter of Exchange for RMP funded by ODA was made on 13 Dec., 1993. Like wise, an agreement between HMGN and SDC was signed on 15 Aug., 1994. And technical assistance agreement between HMGN and UNDP also has already been signed.

Monitoring System

Besides, IDA monitoring mission special DEE (Disaggregated Effectiveness Evaluation) technique of computer programmed monitoring system is introduced for monitoring progress of RMRP with the assistance of IDA

Organisation of RMRP

Though the project is well conceived but the Project Chief, required manpower & organisation were not visualised in advance except provision of one Project Co-ordinator each for Rehabilitation and Periodic Maintenance programme. Keeping in view of institutional development most of the required manpower have been met through the existing manpower & units. Organisation chart is being prepared & approved on September 1994(ref. chart in supplement) with DG as the RMRP Project Chief. DDG of the Foreign Co-operation Branch has been designated as the project programmer for operating special account and co-ordination with donors.

Conclusions

Though the project is very ambitious, it is very important project to achieve the DoR objectives and to build institutional development capability of DoR. With the start of the project some routine development towards direction of institutional development and creation of working environment by involving all DoR staff has been observed. The only thing needed is to make it sustainable

Letter to the Editor

This newsletter is being produced for the benefit and interest of DoR staff, as well as informing you of news and development relating to Highway Management Information System. It is also

a way for you to express your views or aspect about the proper management of the relevant data.

Write to us about anything you wish related with HMIS. Try to keep your letters short (less than 300 words) and to the point. In every issue of HMIS news we will publish the most interesting and relevant letters we receive at editor's discretion.

Address your letters to :
The HMIS manager
Planning Branch, Department of Roads
Babarmahal, KATHMANDU
G.P.O. Box 2623

RMRP : IDA Component

The present paper will provide a brief description of Sub project 1 (RMRP, Credit No. 2578 NEP).

1. Rehabilitation Component

Under this component approximately 300 Km. of National highway and 130 Km. of strategic Feeder Roads will be rehabilitated. Rehabilitation works will be procured in two phases through ICB and LCB contracts. Foreign Cooperation Branch DOR is responsible for this component.

Following Roads are included in the component :

Highway

Thankot - Naubise	16 Km.
Marsyangdi - Khairenitar	44 Km
Butwal - Tansen	41 Km
Naubise - Hetauda	107Km
Mugling - Narayanghat	36 Km
Tansen - Syangja	60 Km
	304 Km

Feeder Road

Tansen - Ridi - Tamghas	68 Km
Nepalgunj - Bagauda	50 Km
Birgunj - Kalaiya	15 Km
	133 Km

2. Periodic Maintenance Component

This component consists of approximately 350 Km of national highways and 311 Km of Feeder roads, spread over in four development regions as follows :

Development Region	*Highways*	*Feeder Road*
Central	117 Km	188 Km
Western	36 Km	66 Km
Mid Western	91 Km	57 Km
Far Western	106 Km	
Total	**350 Km**	**310 Km**

Maintenance Branch, DOR is responsible for this component.

3. Equipment Procurement

A fleet of equipment required for maintenance and rehabilitation program of this project will be procured under this heading. Mechanical Branch of DOR is responsible for this activity.

4. Institutional Development Component

a) Field Implementation Advisor (FIA)

In order to strengthen the existing capabilities of DOR's regional offices, divisions as well as maintenance branch in periodic maintenance activities, DOR has procured a consultancy services of Field Implementation Advisor, for four years period. This activity is being executed by the Maintenance Branch.

b) Priority Investment Plan (PIP)

The main objective of PIP is to prepare 10 years Road Master Plan for investment for new construction, upgrading and maintenance which shall form a basic for 9th five year plan of HMGN. Planning Br. is the executive agency of PIP.

c) Road Construction and Maintenance Material Study

The objective of this study is to review current practice and standards related to construction and maintenance materials and to propose and prepare materials inventory, material standards, technical manuals, testing procedures etc. Design Branch of DOR is responsible for the execution of this study.

d) **Mechanic Training**

In order to strengthen the training capabilities of mechanic training center of DOR, consultancy services from expatriate consultants (SMEC) has already been procured for four years period. Under this programme, the consultants will design and conduct various training programmes and recommend future direction of mechanics and operators training center. This programme is being executed by the Mechanical Branch, DOR.

e) **Environment Assessment**

A short term expatriate consultancy services will be procured for the development of an initial Environmental Evaluation and detailed guidelines for environmental impact management of roads and bridges. Planning Branch is responsible for this activity.

BIO-ENGINEERING COMPONENT..... (***Cont'd from page 1***)

Bio-engineering is the use of vegetation as an integral part of slope stabilisation in combination with other civil engineering structures. It does not replace any other works, although it can help reduce maintenance costs significantly. It can also be used as a form of environmental mitigation, but should not be used to rehabilitate careless engineering. Nor should it be confused with landscaping.

The GEU is building on the practical success of a number of construction and rehabilitation projects. In particular, previous operations on the Lamosangu-Jiri and Dharan-Dhankuta roads have shown the value and importance of bio-engineering as a low cost measure for slope stabilisation. GEU will extract from the accumulated experience, a series of information requirements such as guidelines (construction and maintenance), standard rate analysis norms, technical specifications and forms of contract.

Aims of the RMP Bio-Engineering Component

The RMP Bio-Engineering Component is working within the Department of Roads structure to support certain activities. The main activities are as follows.

1 Improvement of DOR's skills in bio-engineering.
2 Expansion of the capabilities of Nepalese consultants and contractors to apply bio-engineering in construction, rehabilitation and maintenance.
3 Support to DOR works programmes through Regions and Divisions.
4 Improvement of the planning and management of roads in interaction with other land uses.
5 Guidance on the application of bio-engineering techniques.
6 Determination of the long term management requirements for roadside vegetation.

DOR implementation of bio-engineering works

The RMP Bio-Engineering Component is assisting DOR in the establishment of new bio-engineering works, starting with a number of critical roads under DOR's maintenance remit. The specific roads covered, starting in FY 1994/95 were:

- Charali-Ilam (Ilam Division);
- Pokhara-Baglung (Pokhara Division);
- Syauli-Silgadhi (Bhatkanda Division).

Starting in FY 1995/96 are:

- Arniko Highway and Lamosangu-Jiri road (Charikot Division);
- Bhaktapur-Nagarkot (Sallaghari Division);
- Kathmandu-Trisuli (Ranipauwa Division);
- Nagdhunga-Naubise-Mugling-Narayanghat (Bharatpur Division);
- Mugling-Marsyangdi (Damauli Division);
- Dauney Hills, Nawalparasi (Butwal Division);
- Kohalpur-Surkhet (Birendranagar Division).

As well as producing a practical output of stabilised slopes, these roads are being used to identify and demonstrate the way in which DOR will carry out bio-engineering in the future. RMP is also assisting several project bio-engineering units to transfer their skills and operations effectively to the Department.

Another of the major aims is the multiplication of skills within both DOR and the private sector. A number of course components are being devised by specialist training advisers, and then a series of trainings will be held to achieve this. In the meantime, the GEU acts as a central information, training and advice cell within DOR, so that any Division or Project has access to these techniques.

1. The agreement is going to be signed with NEPECON for conducting the Road condition survey.
2. PIP project has presented Inception Report on Jan. 19th,1996
3. A Workshop was conducted by RSSDU to find out ways for improvement of working Environment.
4. TESU is reviewing the traffic signs and signals
5. Progress review of FY 1994/95 and the 1st trimester of 1995/96 has been done

ONGOING ACTIVITIES