

Editorial

WELCOME to the Fourth edition of *Transport*, produced by the Transport Research Laboratory (TRL) on behalf of the Department for International Development (DFID) which replaced the Overseas Development Administration (ODA) on 2 May 1997.

This edition aims to highlight the third theme objective for the Transport Sector (T3), with articles on DFID's rural transport research programme, animal cart technology, urban travel behaviour and the role of the International Forum on Rural Transport and Development. This edition also presents a complete list of DFID funded research projects under the Technology Development and Research (TDR) initiative.

The objective of Theme T3 is to: "Improve the availability of cost-effective transport for the rural and urban poor, including public transport and non-motorised modes". It is primarily concerned with sustainable urban and rural transport.

Poor rural accessibility not only hinders economic growth but has important social consequences and solutions cannot be confined to increased provision of roads. There is often a severe lack of transport services and although the deregulation of transport services in urban areas has been studied, little is known about the effects of liberalisation of rural services.

Where vehicle ownership and diversity are low there is a strong case for the promotion of alternative vehicle modes. Rural infrastructure, including paths, tracks and roads, requires appropriate design, construction and maintenance guidelines. Conventional economic analysis is generally inappropriate because traffic flows are low and hence the benefits are difficult to quantify.

In urban and peri-urban areas where many of the poor live, transport expenditure consumes a large proportion of family household budgets with low income families spending up to 20% of their incomes on essential travel, usually by diverse public transport modes.

The purpose of the DFID Newsletter is to provide information on the Transport sub sector and disseminate research findings to relevant organisations and individuals both in the developed and developing world.

The editor would be pleased to hear from readers with views, ideas and comments. For more detailed or technical information on any of the TDR projects, please contact the relevant project manager listed. Contact addresses are on the back page.

The International Forum for Rural Transport and Development

The International Forum for Rural Transport and Development (IFRTD) was set up in 1993 to promote an alternative approach to rural transport that meets the needs of rural people in developing countries.

This alternative approach means focusing outside the conventional reliance on roads and motorised transport, since many people in rural areas lack access to roads and cannot afford motorised transport. The Forum promotes the introduction of intermediate means of transport, the expansion of appropriate rural transport services and the improvement of local transport infrastructure such as paths and tracks. It advocates an integrated approach to rural transport problems that takes into account choices between making transport interventions and reducing transport needs by upgrading services and facilities.

The work of the IFRTD is supported by a number of donors including the Swiss Development

Corporation (SDC), the International Labour Organisation (ILO), the Norwegian Agency for International Development (NORAD), the Swedish International Development Authority (SIDA), the Intermediate Technology Development Group (ITDG) and the Commonwealth Foundation. DFID participates in the Forum's Advisory Committee and is co-funding an inter-regional research programme on gender and transport.

The Forum's activities include the setting up of National Forum groups in several countries, publication of a newsletter, research programmes, workshops and seminars. For further information about the Forum and its activities, see its page on the World Wide Web, or contact:

IFRTD Secretariat
Tel: +44 (0)171 278 3670
email: ifrtd@gp.apc.org
http://www.gp.apc.org/ifrtd

Diary of Forthcoming Events

June 1997

Course: Roads and Transport in Developing Countries

30 June - 11 July 1997, Wokingham, Berkshire, UK
Organised by: TRL
Contact: Linda Parsley, Overseas Centre, TRL.
Fax: +44 (0)1344 770719

September 1997

Seminar: Saving Lives: Policies & Programmes for Road Safety & Accident Prevention. (ref 970740).

2-11 Sept. 1997, TRL & Newcastle Upon Tyne, UK
Contact: Promotions Manager, International Seminars, The British Council (Oxford)
Tel: +44 (0)1865 316636,
Fax: +44 (0)1865 557368/516590

Course: Road Rehabilitation & Maintenance

15 Sept - 10 Oct 1997, Swaziland
Contact: Tim Newman, Crown Agents. Tel: +44 (0)181 643 3311, Fax +44 (0)181 770 0479.

October 1997

PIARC British National Congress
DFID Study Tour 28 Oct - 3 Nov 1997, UK.
Congress, 5 - 7 Nov 1997, Manchester, UK.
Contact : Colin Goodwillie, PIARC Secretariat.
Tel: +44 (0)171 921 4349, Fax: +44 (0)171 921 4505

December 1997

Training programme on Managing and Financing Rural Transport
(Sponsored by DFID and the World Bank)
1-11 December 1997, Washington DC, USA
Contact : Linda Parsley or Simon Ellis, Overseas Centre, TRL Fax: +44 (0)1344 770719

January 1998

77th Transportation Research Board (TRB) Annual Meeting

11-15 January 1998, Washington DC, USA
Contact: Angelia Summons. Tel: +1 202 334 2934, Fax: +1 202 334 2003

NEW TRL EMAIL ADDRESS

A new Email address is now available for general enquiries to TRL Overseas Centre:

Email: International_Enquiries@trl.co.uk

Individuals can still be contacted directly.

INTERNET

The text of all the DFID newsletters is available on the Internet on the DFIDWorld Wide Web Home Page. At present they are listed under Publications but will in future be located under Research.

The address is :
<http://www.oneworld.org/oda>

Rural transport in sub-Saharan Africa

The sparse population and low incomes typical of rural areas in many developing countries often lead to difficulties in providing and maintaining transport infrastructure.

Sub-Saharan Africa, where rural transport problems are particularly acute is the focus of a DFID funded project into improved transport planning methods and guidelines. The project is managed by IT Transport, with inputs from TRL and Silsoe College, and aims to extend or adapt traditional planning methods to become more appropriate for low-volume roads, footpaths and tracks. It has four main components, briefly described below:

- Most village transport takes place on footpaths or tracks where simple improvements can bring significant benefits to villages. However footpaths and tracks are not "narrow roads" and road building techniques cannot be transferred directly. IT Transport have carried out field investigations in Tanzania to assess the benefits of footpath improvements. It is hoped to develop simple guidelines on the formulation and design of projects involving path and track improvement.

- Field surveys in Tanzania, concentrating on earth roads and tracks, identified the effects of poor initial construction standards, minimal maintenance, high rainfall levels and, in some cases, inappropriate traffic types. Silsoe College have measured the degree of rut formation caused by a range of vehicle tyres carrying various loads when operated on a reproducible soil profile representing a fairly soft earth road. It is now possible to calculate a total cost figure for each combination of vehicles and infrastructure. A computer model has been produced and calibrated, which should assist planners in evaluating alternative vehicle-infrastructure-maintenance regimes.

- In sub-Saharan Africa, labour-based methods are often more economic than conventional equipment-based methods for the rehabilitation and maintenance of low volume roads. Cost comparisons are often difficult, with much of the data being more than a decade old. An up-to-date comparison of construction costs is being carried out by IT Transport in Ghana where comparable feeder roads are being built using labour-based and equipment-based contractors. The aim is to



Seasonal access problems on an earth road in Tanzania

develop appraisal tools to allow rapid assessment of the relative cost-effectiveness of these methods.

- Conventional road appraisal methodologies use road surface roughness as the main indicator of road access condition. However, research and experience suggests that seasonal road closure is a key determinant of overall transport costs. TRL is investigating appraisal techniques which involve appropriate road access indicators.

*For further information contact: Gary Taylor, IT Transport,
Tel: +44 (0) 1235 833753
DFID Project Reference R6239 "Rural Transport Research Programme:
Sub-Saharan Africa"
Theme Objective T3*



Low-cost animal carts

Animal traction is a well established technology in many countries but in others it has yet to realise its enormous potential for low cost transport. One of the main impediments to the greater use of animal carts remains the cost and difficulty of cart manufacture. The Development Technology Unit (DTU) at Warwick University has been working on cart design since 1990 and is now managing a DFID funded project in Kenya and Uganda (building on work performed in Nigeria in



Trials of new donkey saddle and harness in Kenya

the early 1990s) aimed at improving animal cart design for manufacture.

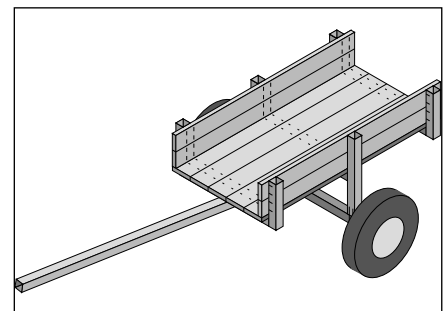
The underlying themes of the DTU's approach are accessibility and advanced simplicity using locally available materials, local craftsmen and without the need for special tooling (ie designs which are highly developed to be very simple, quick to build and cost-effective). Using DTU designs, cart bodies can be built in less than one day and the complete cart in two days or less.

Quality of harnessing is crucial to the performance of animal carts. Oxen can be acceptably harnessed using yokes, but donkeys require something better so special sawback saddles (similar to pack saddles) are being investigated.

Different types of axle and bearings are also being tested as the currently used scrap automotive axles are not always reliable or cost effective.

Although current DTU designs are significantly cheaper and much easier to make than existing

designs, there is still scope for further cost reduction. Scrap wheels, tyres and inner tubes can be extremely expensive overseas (sometimes approaching half the cost of new components in industrialised countries), so wheel and tyre alternatives are being investigated as part of this project.



DTU ox cart design

*For further information contact: Dr Colin Oram, Development Technology Unit, University of Warwick.
Tel: +44 (0) 1203 523135
DFID Project Reference R6475
"Low cost animal cart technology"
Theme Objective: T3*

Promoting local materials for road construction

Natural gravels are an abundant source of road building materials but do not always meet the quality requirements for roadbases and are frequently rejected in favour of expensive alternatives such as crushed stone.

However, these alternatives are often not locally available and the transportation of large quantities in heavy vehicles is expensive and consequently large financial and environmental benefits can be achieved if local materials can be used with confidence.

TRL is currently undertaking four projects under the DFID funded TDR programme to promote an understanding of the engineering properties of local materials so that they can be used effectively for road construction. Field studies are being conducted in countries of the Southern Africa Development Community (SADC). Collectively, the projects aim to increase awareness and confidence in the use of different materials to encourage their application.

Unbound granular materials

The successful use of low-grade materials largely depends upon the moisture conditions established in the road. The project involves advanced tri-axial laboratory testing at TRL in order to examine the behaviour of unbound granular materials under various moisture and stress regimes which replicate conditions under the road. Results from the studies should be applicable to other developing countries and also to Europe where the appropriate use of low-grade materials offers similar large benefits to the construction industry. In recognition of the wider significance of the subject, this project is co-funded by the UK Department of Transport.

Natural gravels for road building

By studying the regionally dominant material types, this project aims to extend the use of natural gravels in roads by defining new limits beyond current specifications. The use of low-grade natural gravels in developing countries is most beneficial to roads with low traffic volumes in regions of dry climate. The project is being undertaken throughout the SADC region of southern Africa where such conditions exist.

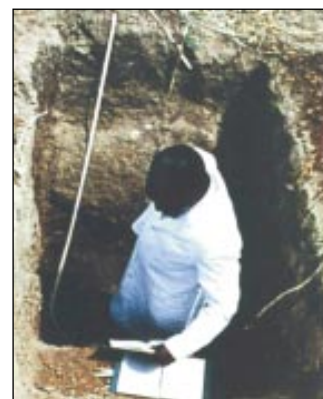
The studies are showing that consideration of the road structure as a whole is needed. In order to predict the performance of these low grade materials, many other parameters must be taken into consideration including the road shoulder width and whether it is sealed, local topography and drainage pattern.



Low grade lateritic gravel roadbase in Zimbabwe

Environment and road building

Many rural communities may suffer from the adverse effects of new road construction. This project addresses the problems associated with borrow-pits that remain along the road-line after construction materials have been extracted. Surveys in Zimbabwe and Malawi have shown that over 80% of borrow-pits are not reinstated correctly, which can leave agricultural land barren and hazardous. Working with the local construction industry and soil scientists, TRL is examining the processes required to reinstate the land in a cost effective manner that is beneficial to the roadside communities`.



Soil profiling in Malawi borrow pit

Materials database for the SADC region

The appropriate use of natural materials for road building relies on knowledge of the geology, distribution and engineering properties of the most common regional material types. The project aims to collate this information, including the application and subsequent performance of the materials within road structures, into a materials database for the SADC region. The study is a development of a geotechnical databank established by the Zimbabwe Department of State Roads. The databank greatly improves engineers access to information and has led to a substantial reduction in the intensity of field investigations needed before construction.

For further information contact Mick O'Connell, TRL. Email: moconnell@trl.co.uk or Tony Greening, TRL. Email: INET[Tony@trl.uz.zw]

DFID Project References: R5605 (Unbound granular materials); R6020 (Natural gravels for road building); R6021 (Environment and road building) R6022 (Materials database for the SADC region).

Theme Objective G4



1997 PIARC British National Congress : DFID Study Tour

A study tour on development issues has been organised by DFID in association with the 1997 British National Congress. The study tour will take place in the week before the Congress and will include

- a two-day seminar/workshop on "The needs of Developing Country Transport Research Customers", to be held at TRL, Crowthorne.

The seminar has been developed by Committee C3 and British PIARC for delegates from developing countries, countries in transition, Committee C3 members and selected UK, EU and World Bank delegates. (28 - 29 October 1997).

- a two day course at the University of Birmingham on the new HDM-4 model (strategic uses). For decision makers in developing countries,

countries in transition and donor countries and aimed at senior staff considering whether to adopt HDM-4. (30 -31 October 1997)

For further information contact Colin Goodwillie, PIARC British National Committee Tel: +44 (0)171 921 4349, Fax: +44 (0)171 921 4505

Travel behaviour in urban households

Many cities of the developing world have rapid population growth coupled with limited finances available for investment in urban infrastructure which has led to severe transport and mobility constraints. These problems are exacerbated by locating the low income community on city fringes where land is available but employment opportunities are scarce thereby generating substantial demand for low cost travel to workplaces and other amenities. Low income housing has frequently developed in such areas which are inadequately served by public transport services. Inevitably, this has an effect on the quality of life of residents in terms of accessibility to employment and amenities essential for sustainable economic and social development.

In 1994 British Aid funded the TRL to undertake a three year research programme to investigate the influence of household income and gender on travel



behaviour. The results from India and Ghana suggest that women are more dependant than men on public transport services and walking and hence, are most affected by inadequate public transport provision. Even when personal vehicles are available in a household, cultural traditions appear to constrain the use of such vehicles by women though attitudes are changing.

The results of the study provide policy makers with an improved understanding of urban travel behaviour and constraints and will enable the

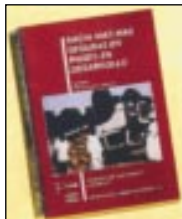
formulation of better transport developmental projects in the future. This should lead to improved mobility and accessibility to the entire transport network for low income households and particularly women in the developing world.

For further information contact Dave Maunder, Overseas Centre, TRL
Email: dmaunder@trl.co.uk

DFID Project Reference R6019:
"Planning for women and transport"
Theme Objective T3



Spanish version of TRL safety manual launched in Chile



The Chilean National Commission for Road Safety held the launch of the Spanish version of the TRL guide "Towards safer roads in developing countries" in Santiago last November. The guide was first published by the TRL in 1991 in conjunction with Ross Silcock funded under the British Aid programme. The translation and production of the Spanish version was funded by the Chilean National Commission for Road Safety.

The guide draws together over 20 years of experience and practice in developing countries by UK researchers and consultants. The manual has proved to be highly successful and over 7000 copies of the English version have been distributed to more than 130 countries. It has been adopted by the World Bank as a road safety reference for highway projects.

The Spanish version is not yet widely available having been published for specific use in Chile. International funding is now being sought to enable further printing and distribution throughout Latin America.

For further information contact Brian Hills, TRL,
email: bhills@trl.co.uk

Ross Silcock wins major award for road safety work

Specialist road safety consultants Ross Silcock, who have recently completed with TRL a study funded under the British Aid programme into the socio-economic costs of accidents in developing countries and who worked closely with TRL to produce the highly acclaimed manual "Towards safer roads in developing countries", have been awarded one of the highest accolades in British consultancy, namely

"CONSULTANCY FIRM OF THE YEAR (SMALL FIRMS) 1996".

This prestigious award, presented annually by the British Consultancy Bureau was presented to Ross Silcock for the excellence of its road safety work in Fiji and for "outstanding contributions to the country worked in and to British export earnings". Ross Silcock, one of TRL's closest collaborators in road safety projects, have provided advice on road safety in over 25 countries around the world.

For further information contact Dr Alan Ross,
Ross Silcock Ltd, Tel: +44 (0) 191 261 8101
email: 101776.3126@compuserve.com

Rural Transport training programme

A training programme on Managing and Financing Rural Transport is being organised by the TRL in Washington DC, USA in December this year, supported by both the World Bank and the Department for International Development (DFID, formerly ODA). Aimed at senior officials from government ministries and road agencies, the programme is intended to disseminate relevant information on sustainable solutions to the management, planning and financing of rural infrastructure and transport services, taking environmental implications into account.

The aim is to encourage the sharing of experience between participants as well as between participants and speakers through discussions and plenary sessions. Presenters will include transport professionals and international experts.

The programme will cover both infrastructure and services and include financing and resource mobilisation, designated and undesignated roads, the off-road transport burden, institutions, planning and implementation, environmental issues and mitigation plans.

For further information contact Linda Parsley or Simon Ellis,
Overseas Centre, TRL, Tel: +44 (0) 1344 770551/770552.
E-mail lparsley/sellis@trl.co.uk

Current TDR Projects

Sponsored by DFID

Key:

- New Projects (including description)
- Existing Projects (see previous newsletters for descriptions)

THEME T1

■ Accident recording, investigation and evaluation systems (R6883) **TRL: Mr C J Baguley**

UK support and in country training provided for existing and new users of MAAP for sustainability in the least advanced countries. Training to develop accident investigation skills. Under reporting to be investigated using hospital records.

■ Safety and road worthiness: assessing urban and rural public transport (R6888) **TRL: Mr T C Pearce**
Assess the scale of the problem resulting from accidents and the effect of varying maintenance practices on bus fleets' roadworthiness. Role of vehicle usage and design in bus accidents will be studied and recommendations developed for safer travel.

■ Road safety education in developing country schools and communities (R6890) **TRL: Mr I Sayer**
Development of road safety education materials and teaching methods that bring about improved road safety knowledge and attitudes by young road users in schools and community groups in developing countries.

■ Cost and safety design of rural roads in developing countries (R6891) **TRL: Mr C J Baguley**
Aspects of rural highway design identified that optimise costs and safety; detailed design manual drafted; lookup tables relevant to models such as HDM generated. Manual published and in country seminars conducted.

■ Road safety development and evaluation of engineering countermeasures (R5614) **TRL: Mr C J Baguley**

■ Accident data collection and analysis: sub-Saharan Africa (R6028) **TRL: Mr R Gorrell**

■ Road safety development and evaluation of educational programmes (R6029) **TRL: Mr I A Sayer**

■ Pedestrian accidents/ vulnerability in developing countries (R6236) **WS Atkins International: Dr F Kamali**

THEME T2

■ Low cost structures for rural roads: A field manual (R6851)

Loughborough University: **Mr D W J Miles**
Preparation of a practical field manual to encourage local engineers and contractors to utilise local labour, skills and materials more effectively in the construction of low cost and readily maintainable structures on rural and urban roads.

■ Improved vehicle maintenance cost relationships (R6885) **TRL: Mr J L Hine**

Fundamentally new vehicle maintenance cost relationships will be developed for use in the road investment model HDM4. These relationships will enhance the applicability and transfer of the model for world wide use.

■ Promoting the use of lower cost marginal materials (R6887) **TRL: Mr M J O'Connell**
Guidelines promoting the use of low cost marginal materials in the road industry. Using existing research where possible these will identify suitable applications for the use of such materials and warn of the associated risks.

■ Transferring road maintenance into the private sector (R6889) **TRL: Mr C C Parkman**
Critical assessment of the extent and nature of the adoption of contract road maintenance procedures and the factors governing the successful transfer of road maintenance into the private sector, to inform agency policy.

■ Secondary compaction of bituminous materials (R6892) **TRL: Mr H R Smith**

Develop a method of assessing the susceptibility of bituminous mixes to secondary compaction under heavy traffic for use in the design of road surfacings which are more durable and resistant to plastic deformation.

■ Benefits of structured highway and earthwork maintenance (R6893) **TRL: Mr W Heath**
Assess the benefit of applying maintenance programmes based on a number of identified key factors that at present contribute to the poor maintenance of mountainous roads. Full scale trials will be monitored using TRL's ECAT techniques. Guidelines will be produced.

■ Road planning, funding and funds allocation (R6894) **TRL: Mr J L Hine**
Identify the main constraints preventing the efficient planning and funding of the road network, in particular procedural conflicts and institutional limitations. Innovative funding and management methods eg. DBFO and BOT will be explored.

■ Management guidelines and performance models for unpaved roads (R6895) **TRL: Mr T Toole**
Provide management guidelines on unpaved roads and motorable tracks for use by senior engineers and planners and new road performance models for incorporation into HDM4 aimed at improved access quality on rural roads and increased use of local resources.

■ Innovative compaction technology for low volume roads (R6896) **TRL: Mr P A K Greening**
Development of methods to improve compaction and performance of materials for low-volume, low-cost and labour based sealed roads.

■ Dense bituminous surfacing for developing countries: A guide (R6897) **TRL: Mr C R Jones**
Produce a guide describing the design and construction of dense bituminous surfacings in tropical climates. It will be targeted at engineers in the developing world and enable them to supervise the construction of improved surfacings.

■ Guidelines on the selection and use of road construction materials (R6898) **TRL: Mr M J O'Connell**
Production and dissemination of a new Overseas Road Note containing concise but comprehensive advice on the sampling and testing of granular materials and soils for the construction and rehabilitation of roads in the developing world.

■ Promoting the use of volcanic ash, a natural pozzolan (R6841) **TRL: Mr M J O'Connell**
Use of volcanic ash for the construction of major civil engineering works to alleviate the damage caused by recent volcanic eruptions, develop road and building technology and promote commercial ventures.

■ Appropriate and efficient maintenance of rural feeder roads (R6852) **Roughton International: Mr M J Carr**
An assessment and maintenance method will be developed for gravel rural feeder roads using simple, affordable, yet novel techniques. The result will promote appropriate technology and practice so maximising efficiency.

■ Transport planning road investment modelling (R5591) **TRL: Mr J L Hine**

■ Unpaved roads (R5599) **TRL: Mr T Toole**

■ PC concrete pavements (R5602) **TRL: Mr J Parry**

■ Rehabilitation design (R5610) **TRL: Mr H R Smith**

■ Bituminous materials - their improvement and use for road building (R5612) **TRL: Mr H R Smith**

■ Rehabilitation of roads with bituminous surfacings (R6023) **TRL: Mr C R Jones**

■ Environmental impact of road construction (R6026) **TRL: Mr C J Lawrence**

■ The design of stabilised sub-bases for very heavy traffic (R6027) **TRL: Mr M J O'Connell**

■ Management of appropriate road technology (R6238) **Loughborough University: Mr D W J Miles**

■ International study - highway development and management tools (R6472) **University of Birmingham: Dr H Kerali**

■ Longer life road surfacing using bitumen modifiers (R6473) **TRL: Mr H R Smith**

■ Recycling of bituminous road materials (R6474) **TRL: Mr H R Smith**

THEME T3

■ Gender issues in rural transport (R6854) **IFRTD: Ms P Fernando**
Through analysis of the impact of a range of interventions aims at developing practical guidelines for the incorporation of gender concerns into the planning, design and implementation of rural transport interventions.

■ Rural transport services in sub-Saharan Africa enhancing the role of small and medium enterprises (R6882) **Cranfield University: Dr C P Crossley**
Enhance the contribution made by informal small industrial enterprises to the efficient provision of rural transport services that are vital to the economies of developing countries by identifying and reducing some key restraints.

■ Availability of rural transport services (R6884) **TRL: Mr S D Ellis**
Identify factors that inhibit the supply of rural transport services. Also investigate the sensitivity of demand to changes in the price of transport. The findings will enhance the capability of planners to improve the provision of rural transport services.

■ Barriers to the availability of cost-effective transport (R6886) **TRL: Mr G Gardner**
Provide a methodology for an Urban Transport Audit to rapidly assess a city's ability to introduce cost-effective transport systems. Determine where blockages are occurring that prevent the use of low cost appropriate traffic and safety measures.

■ Low-cost motorised ambulance service for rural communities (R6895) **IT Transport: Mr I Barwell**
To evaluate the viability of motorcycle-based ambulance services for rural communities and if found viable, to develop guidelines for setting up and operating the services.

■ Rural transport research programmes in sub-Saharan Africa (R6239) **IT Transport: Mr G A Taylor**

■ Low cost animal cart technology (R6475) **University of Warwick: Dr C E Oram**

■ Community participation in road maintenance (R6476) **IT Transport: Mr G A Taylor**

■ The establishment of small scale road transport contractors (R6477) **Intech Associates: Mr W William**

THEME T4

■ Increasing the efficiency of the road freight transport sector (R6883) **PTRC Education and Research Services: Ms A Fine**
To improve the Egyptian road freight sector. Identification of management best practices will be grouped into policy programmes with the aim of increasing the efficiency of this sector.

■ Road network management (R6024) **TRL: Mr T Toole**

■ Reducing the cost of freight in Africa (R6240) **Mott MacDonald: Mr R Mansfield / M Mallwork**

THEME E3

■ Development of environmental impacts and energy balance models for HDM4 (R6486) **University of Birmingham: Dr H Kerali**

THEME G1

■ Environment and roadbuilding (R6021) **TRL: Mr P A K Greening**

THEME G4

■ Unbound granular materials (R5605) **TRL: Mr M J O'Connell**

■ Natural gravels for road building (R6020) **TRL: Mr P A K Greening**

■ Materials database for the SADC region of Southern Africa (R6022) **TRL: Mr P A K Greening**

■ Manual of concrete design using local materials (R6235) **Gifford & Partners: Dr G P Tilly**

THEME U2

■ Urban mass transit (R5596) **TRL: Mr G Gardner**

■ Traffic database and audit (R6017) **TRL: Mr P Fouracre**

New TRL Overseas Road Notes



ORN 14 - Hydrological design manual for slope stability in the tropics.

Most slope failures in tropical soils are triggered by local rainfall leading to changes in the soil-water conditions. The objective of this manual is to provide advice on how to determine if these conditions are critical and if so how to measure them. The predictions of stability are based on a combined slope hydrology/ stability model developed at Bristol University through British Aid funded research. The results have been tested under field conditions and integrated with existing practice.

The main part of the manual consists of a series of 'Instructions', which are procedures to expand site investigations. These introduce new slope stability design charts, the use of the dimensionless resistance envelope and the measurement of



permeability and suction together with factors affecting the use of piezometers. The manual concludes with a section on data collection.

DFID Project Reference R506: "Terrain surveys and site investigation"
Theme Objective G5

For further information about these publications contact: Cliff Lawrance, Overseas Centre, TRL,
Email: CliffL@o.trl.co.uk

ORN 16 - Principles of low cost road engineering in mountainous regions,

with special reference to the Nepal Himalaya

The results of more than twenty years of research and practical experience of road construction and maintenance in mountainous regions are brought together in this publication. TRL has collaborated with consultants Scott Wilson Kirkpatrick to combine experience in overcoming the special engineering problems presented by an unstable, ever-changing mountainous environment, such as Nepal, 'Low cost' design philosophy implies some relaxation of road standard and normal design procedures. Occasional damage to the road must be expected, so the desire for a high road standard needs to be balanced against the costs of reinstatement. Design must be related to the landscape; aspects such as identifying the most stable route (relatively speaking!) and preserving natural drainage systems are vital.



ORN 16 concentrates on the principles behind design decisions and procedures demanded by the rigours of a mountainous environment. Emphasis is placed upon the risks associated with inappropriate design or poor construction practice, and upon techniques or procedures that are effective and safe. Nepal experiences natural disasters regularly and is a good proving ground for the techniques described. However, the principles are applicable in any unstable landscape.

DFID Project Reference R6026 "Environmental impact of road construction" Theme Objective T2



Health at the Crossroads - Transport Policy and Urban Health

Editors: T Fletcher & A J
McMichael

Published by J Wiley & Sons, 1997

The title of the book was chosen to imply that the future direction of transport policy should be influenced by increasing health concerns and that a choice needs to be made about the levels of transport-related health problems that can be tolerated. Aimed at public health care professionals, health researchers, transport policy makers and members of local and national governments, it contains a summary of papers presented at the Fifth Annual Public Health Forum held in April 1995 at the London School of Hygiene and Tropical Medicine. There are five main sections: pollution and health, traffic and injury, wider public health, city case studies and transport policies.

The British Aid programme co-sponsored the forum and the Rt Hon. the Baroness Chalker of Wallasey, provides a foreword to the publication in which she identifies the key areas where transport policy impacts on urban health. This issue is one of the subject areas which will be kept under constant review by the Department's, newly formed 'Urban Development Focus Group'.

Reviewed by Goff Jacobs, TRL

Book Reviews



Bio-engineering for effective road
maintenance in the Caribbean (LR 11).
by J Clark and J Hellin. Published by
Natural Resources Institute (NRI),
1996

Produced by NRI and funded under the British Aid programme the purpose of this handbook is to initiate and stimulate the development of routine bio-engineering activities which can help engineers to improve the effectiveness of their work in the road sector. In addition, many of the principles set out in this manual can be applied to other sectors where exposed soils and slopes need to be protected. This concise handbook focuses on eleven plant species found in the Caribbean region. There are four main sections. The first describes the species and their bio-engineering uses. The second shows how the plants can be incorporated into seven bio-engineering techniques for protecting slopes and gullies. The third describes propagation and nursery care and the fourth outlines case studies on Caribbean road projects where bio-engineering has been used. The layout and instructions in the handbook are very clear and well-presented.

Reviewed by Cliff Lawrance, TRL



Financing Road Maintenance:- a study
of organisational and financial condi-
tions for securing road assets in devel-
oping countries by Dr G Metschies.
Published by GTZ, 1996.

Concentrating on the well reported road maintenance crisis of sub-Saharan Africa, *Financing Road Maintenance* presents ideas for policy makers on how best to secure and disburse road finance. Prepared by the German Agency for Technical Co-operation (GTZ), the report includes extensive case studies from West and Central Africa and also draws heavily on recent initiatives in road management by the World Bank.

The report identifies the need for an effective organisational structure and promotes the use of an independent Roads Authority. It also suggests how finance should be secured and properly managed, describing how a Road Conservation Fund might be set up and funded, with particular focus on appropriate levels for fuel levies.

The report argues that the transport sector as a whole should be treated as a taxed economic sector, rather than as a subsidised social service. At times the translation is difficult to follow, but the ideas will be of interest to those responsible for road policy in the developing world.

Reviewed by Chris Parkman, TRL

Recent publications

BOOKS

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IYCB-1 Pricing and Bidding (1994). Handbook 97pp and Workbook 101pp (£14.85) (ILO)

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