

Editorial

WELCOME TO the second edition of *Transport* which is produced by the Transport Research Laboratory (TRL) on behalf of the Overseas Development Administration (ODA). This edition contains a list of all current transport related projects under ODA's Technology Development and Research (TDR) programme. ODA are currently funding 26 projects in total, covering the TDR Theme Objectives outlined in the first edition. Many of the projects involve a range of professional expertise, including sociologists, environmentalists and economists, as well as specialist engineers. ODA regard this multidisciplinary approach as essential in order to promote longer term sustainability.

One of ODA's Theme Objectives for the transport sector is T1, *Reduce accidents and increase road safety in rural and urban areas*, and six of the current TDR projects directly relate to this theme. A recent ODA-funded study showed that of the half million deaths from road accidents world-wide each year, about three quarters occur in the developing world. Whereas in Western Europe the number of persons killed over the last seventeen years or so has decreased by about 25 per cent, in African countries there has been a 300 per cent increase, and in Asian countries, a 200 per cent increase. The estimated cost of all road accidents taking place in developing countries is about US\$36 billion per annum.

Road safety is now being tackled by ODA and international lending agencies, such as the World Bank and the Asian Development Bank, by incorporating safety components into highway and urban sector projects. In all of this work, multidisciplinary teams of engineers, behavioural scientists, traffic police, vehicle safety specialists etc. are working closely with local institutions in order to build up longer term sustainability in this field.

Transport would be pleased to hear from readers with views, ideas and comments on this or any other topic.

*Cover photograph:
Typical overloaded two-wheelers in New Delhi, India.*

Any views expressed are those of the Editor and the individual contributors and not necessarily those of ODA

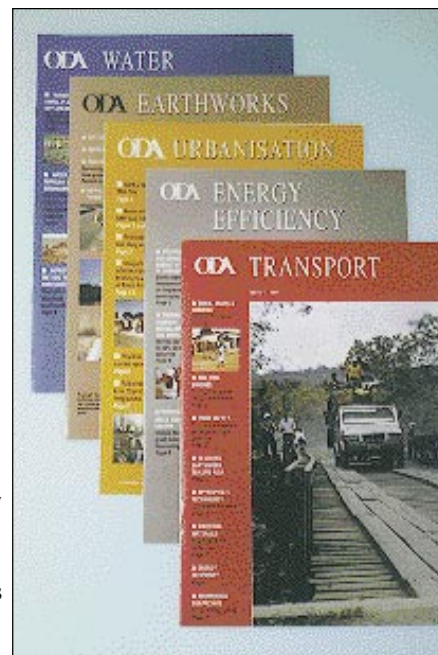
The new ODA Newsletters

The first issue of the new family of newsletters, Transport, Water, Earthworks (Geoscience), Energy Efficiency and Urbanisation, commissioned by the Engineering Division of the Overseas Development Administration (ODA), was produced at the end of 1995. Their purpose is to inform about current developments in the different sectors and to focus on the work supported by ODA's Technology, Development and Research (TDR) programme.

First reactions to the new style newsletters, which are provided free of charge by ODA, have been favourable with numerous enquiries received for information and reports.

Different organisations have been commissioned to produce the newsletters in May and November each year and articles relevant to several themes may be reproduced in more than one newsletter, at the editor's discretion.

Application for copy or for submission of articles should be made to the relevant editor, whose details are given on the back page.



Diary of Forthcoming Events

August 1996

COMPRAIL 96: Computer Aided Design, Manufacture and Operation in the Railway and Other Advanced Mass Transit Systems, 21-23 August, Berlin.

Organiser: Wessex Institute of Technology, UK
Tel: +44 (0) 1703 293223 Fax: +44 (0) 1703 292853
E-mail: cmi@uk.ac.rl.ib

September 1996

Roads 96 - Joint 18th ARRB Conference and Transit NZ Land Transport Symposium, 2-6 September, Christchurch, New Zealand.

Organiser: Hee Wee Tan/Margaret Holdsworth
Tel: +61 3 9881 1555 Fax: +61 3 9887 8104

24th European Transport Forum,

2-6 September, London.

Organiser: PTRC

Tel: +44 (0)181 741 1516 Fax: +44 (0)181 741 5993
E-mail: PTRC@cityscape.co.uk

PIARC International Seminar on Bridge Engineering and Management in Asian Countries,

10-13 September, Jakarta.

Contact: Dr. Pantana Rantetoding.
Tel: +62 22 7802052 Fax: +62 22 7802726

October 1996

CityTrans/Intertraffic China '96,

16-19 October, Beijing.

Contact: William Lim.
Tel: +65 297 2822 Fax: +65 292 7577
Email: mpconven@singnet.com.sg

Second National Conference on Women's Travel Issues,

October 24-25, Baltimore, USA.

Contact: Dr. Sandi Rosenbloom
Tel: +1 508 623 1223 Fax: +1 520 623 1705
Email: rosenblo@aruba.ccit.arizona.edu

2nd International Conference on Asian Road Safety Evaluation and Priorities,

28-31 October, Beijing.

Organiser: Public Works Research Institute
Tel: +81 298 64 2211 Fax: +81 298 64 2148

International Bicycle Conference,

28 October-1 November, Fremantle, Australia.

Organiser: Promaco Conventions Pty Ltd
Tel: +61 9 364 8311 Fax: +61 9 316 1453
E-mail: promaco@cleo.murdoch.edu.au

November 1996

IRF Asia & Pacific Regional Meeting on The Role of Transportation in Economic Development,

17-22 November, Taipei.

Contact: IRF Asia-Pacific Regional Organizing Committee. Tel/Fax: +886 2 3629162

Intertraffic Middle East 96,

24-26 November 1996, Dubai.

Contact: Michiel V.R. Raasveld, Dubai RAI
P.O. Box 9225, Dubai, United Arab Emirates.

January 1997

Transport Research Board 76th Annual Meeting

12-16 January, Washington DC.

Contact: Rosa Allen Tel: +1 202 334 2935
Fax: +1 202 334 2299 Email: RAllen@nas.edu

The importance of transport services in improving rural accessibility

Cranfield
UNIVERSITY

Academics and donors have long argued that building roads in rural areas promotes development through improved access to markets; health and educational facilities; the generation of alternative income sources; and better information flows. The assumption being that the supply of transport services, such as freight and passenger movement, would naturally follow new road construction. As a result, little attention was paid to the mechanism by which these essential transport services would be provided. Consequently, rural transport services in developing countries have often been unreliable and prohibitively expensive.

To address some of these issues, a three year ODA funded research programme at Silsoe College was established in 1993. Surveys were conducted in Thailand, Sri Lanka, Pakistan, Ghana and Zimbabwe using "participatory techniques of rapid rural appraisal". The research findings suggest that transport services in the African countries studied were less reliable and more expensive than those provided in Asian countries. For example, transport charges for the movement of agricultural produce were typically between 2 and 5 times higher in the African countries.



A power tiller being used for agricultural transport

It is apparent that low vehicle numbers and vehicle diversity are a major factor in explaining high transport charges in Africa. This leads to operational inefficiency and unreliable services. The findings suggest that an efficient rural transport system requires a smooth transition from human and animal powered vehicles to simple motorised and then to conventional motorised vehicles. In some parts of Africa there is a large gap in vehicle choice between headloading and conventional transport vehicles.

A computer based diagnostic system has been

developed to aid in the selection of appropriate transport vehicles and to make recommendations on interventions to improve the efficiency of rural transport systems. This allows an integrated approach to the provision of transport services and planning of rural roads.

For further information contact:

Dr Peter Crossley, School of Agriculture, Food and Environment, Cranfield University. Fax: +44 (0)1525 863366

ODA Project Reference R6239

"Rural Transport Research Programmes in Sub-Saharan Africa" Theme Objective T3

Rehabilitating concrete pavements

In the Philippines and other developing countries with a tradition of building roads with Portland cement concrete, there is now a considerable network of ageing roads needing rehabilitation.

The traditional method of treating these roads is to neglect them until the ride becomes severely impaired and then to break out the old concrete and replace it with new. Frequently these repairs are over relatively small areas and are carried out using the minimum of equipment. The resulting repair is of poor quality and fails relatively quickly.

An ODA-funded research programme between TRL and the Philippine Department of Highways has been designed to improve this situation by addressing the problem of concrete quality, using indigenous materials, and investigating alternative methods of rehabilitation.

Concrete mix designs are being prepared and evaluated in the laboratory and trials are being constructed using concrete overlays. Even badly damaged concrete pavements have a valuable residual bearing capacity, as is borne out by the fact that they continue to carry heavily laden lorries. In order to utilise this, the old pavement needs to be retained and another layer constructed over it to restore the ride and increase the pavement strength.

To be successful, the overlay needs to be

separated from the old pavement, otherwise cracks and joints may reflect through the new overlay and cause early failure. A number of unbound fine materials and bituminous bound materials have been used in small scale trials, together with the "crack and seat" method. As a result of these, full scale trials have been designed, using the most successful methods. These trials, covering approximately five kilometres of old concrete, are due to be constructed later in 1996.

In addition to these controlled experiments, measurements are also to be made on other reconstruction and rehabilitation projects. These will also provide information on both the relative costs of the techniques used and eventually, the expected service lives under different traffic loading. Handbooks will be produced describing the various successful techniques and institutional strengthening of both the Ministry and local contractors achieved through training activities.

For further information contact: John Parry, Overseas Centre, TRL
Fax: +44 (0)1344 770719

ODA Project Reference R5602

"PC Concrete Pavements"

Theme Objective T2



Making concrete from local materials

GIFFORD and Partners are preparing a Manual of Concrete Design suitable for use with the materials and techniques available in developing countries. Local materials are often of low quality and their performance in practice may be unrecorded. Allowance must therefore be made when proportioning and designing concrete mixes. However, designs are invariably to the requirements of British or American Standards which were developed for use under different conditions, and their imposition to concrete made from local materials can pose problems. Moreover, the environment in regions such as the Gulf is very aggressive and especially durable concrete is required.

The Manual will provide guidelines on how to proportion mixes and make good concrete from a variety of local materials. In doing this, it is necessary to recognise the need for compromise in order to specify outputs that can be achieved. The Manual will be in two parts: a more detailed version for the office and a 'pocket book' covering everyday activities, to be used on site.

For further information contact: Dr G P Tilly, Gifford and Partners
Fax: +44 (0)1703 813462



International Study of Highway Development and Management Tools

HDM-4

Improving investment decisions in the future and making the best use of scarce resources for the benefit of the greatest number of people is as vital for the transport sector as for other sectors. An international study has been designed to address this problem, funded by ODA, the Asian Development Bank, the World Bank, the Swedish National Highway Administration and the Federacion Interamericano del Cemento (FICEM), with other organisations providing staff and resources to assist in various aspects of the work.

The objective of the study is to develop a much improved and expanded version of the World Bank's HDM-3 (Highway Design and Maintenance Standards Model), able to deal with a wider range of pavement structures including concrete roads. It will also include traffic congestion effects, non-motorised transport, road safety, environmental considerations and energy efficiency.

ODA's contribution has been, and continues to be, central to the study. Indeed, the initial field studies carried out by TRL in the early 1970's which led to the first operational versions of HDM and RTIM (Road Transport Investment Model) were funded jointly by ODA and the World Bank, and since that time ODA has continued to support research in this area.

The software for the model is being developed, under an ODA project, by a team based at the University of Birmingham which acts as a focus for all the satellite studies, with a secretariat which

coordinates inputs and disseminates the results of the studies for international review. An International Steering Committee chaired by the World Bank manages the project, and information concerning progress, and news of forthcoming events such as workshops and conferences, is issued regularly by the Birmingham secretariat.

Phase 2 has now been planned and approved, with emphasis on (a) testing and validation, (b) dissemination and training, and (c) research and development on selected topics requiring further investigation. Documentation will also be updated to ensure a product that is appropriate for release to the user community. In the second half of 1996, pre-release versions of the HDM-4 software and analysis framework will be shared with a limited number of potential users for a programme of thorough field-testing and feedback prior to full release in 1997.

For further information contact: Dr H R Kerali, Project Co-ordinator, International Study of HDM, School of Civil Engineering, The University of Birmingham. Fax +44 (0)121 4143675. Email: kerali@bham.ac.uk

*ODA Project Reference R5463
"International Road Investment Appraisal Study"
Theme Objective T2*



THE UNIVERSITY OF BIRMINGHAM

The MART initiative

AT THE end of 1995 the Management of Appropriate Road Technology (MART) initiative joined with the International Labour Office (ILO) to sponsor a workshop in Zimbabwe on the promotion of labour-based road contracting, which was attended by 30 international specialists. The outcome was a framework document entitled *Towards guidelines for labour-based contracting*, which will be issued as MART Working Paper No. 1.

MART is also linking with the World Road Association (PIARC), which is seeking to increase its impact on the needs of developing countries including training and the improved use of local resources in road maintenance and rehabilitation. Robert Petts, MART Project Manager, has been elected to PIARC Committee C3 (Technological Exchanges and Development) and Derek Miles, MART Project Director, to Committee C6 (Road Management).

The new link with the World Road Association will help to ensure that the majority of developing countries have access to the results of the MART initiative.

For further information contact Derek Miles, Director, Institute of Development Engineering, Loughborough University. Fax: +44 (0) 1509 211079

*ODA Project Reference R6238
"Management of Appropriate Road Technology"
Theme Objective T2*

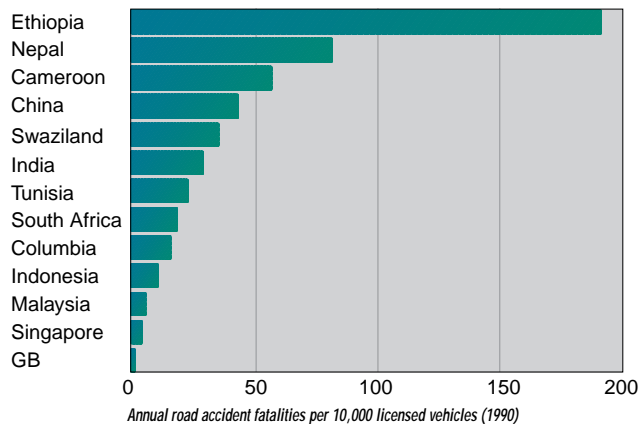


Socio-economic costs of road accidents

The Ross Silcock Consultancy, in conjunction with TRL, are examining on behalf of ODA, the socio-economic costs of road accidents throughout the developing world. This entails discovering which sectors of society are most affected by road accidents, and the economic cost to the country in terms of lost production. Within the continents of South America, Africa and Asia, surveys have been conducted in hospitals in a number of developing countries to collect data.

In order to identify the magnitude of the road accident problem in developing countries, use has been made of published material from a variety of sources (UN demographic yearbook, International Road Federation (IRF) handbooks etc.). Existing information indicates that about three-quarters of the annual 500,000 road accident deaths occur in the developing world, and that out of the global road accident cost of around US\$230 billion, the cost to developing countries is estimated to be US\$36 billion. As has been shown with previous analyses, some developing countries have very high road accident fatality rates, for example, Ethiopia has over 150, and Nepal over 70 deaths for every 10,000 licensed vehicles. Conversely, countries of Northern Europe, e.g Great Britain, Norway and Sweden, have less than 2 deaths per 10,000 licensed vehicles.

For further information contact: Caroline Ghee, Ross Silcock Partnership. Fax: +44 (0)191 261 8340



*ODA Project Reference R6237
"Socio Economic Costs of Road Accidents"
Theme Objective T1*



Research on freight operations in Africa

Under ODA's Technology Development and Research programme, Mott MacDonald and TRL were awarded a contract to study ways in which freight transport costs can be reduced in African countries. This follows earlier research by TRL and others which indicated that long distance freight operating costs in some African countries were between four to six times higher than in countries of Asia.



Truck waiting to unload at the Cotton Marketing Board in Zimbabwe

Throughout Africa there are currently about three million trucks and total expenditure on road freight transport is in the region of US\$40 billion per year (equivalent to about 11 per cent of total GNP). Hence a possible saving in freight costs of about 10 per cent could be worth a considerable US\$4 billion per annum.

Detailed studies are now being undertaken in Tanzania to help formulate policies which will reduce the cost of freight operations. For comparative purposes similar studies are also being undertaken in Indonesia where results obtained should

strengthen information on freight operations in Asia. African countries will be able to make use of the lessons learnt from this study, and hopefully reduce freight transport costs, thus improving the efficiency of the industry.

For further information contact: Robert Mansfield, Mott MacDonald
Fax: +44 (0)1962 863224

ODA Project Reference R6240
"Reducing the Cost of Freight in Africa"
Theme Objective T4



Urban Transport Adviser in Ghana

For the last 2 years Phil Fouracre of the Overseas Centre, TRL, has been working as an Urban Transport Adviser to the Ministry of Transport and Communication, Ghana. He is presently funded by the World Bank as part of an urban sector loan but ODA is funding a parallel research project on the development of an urban transport database which is hoped will be of use as an input to a Geographical Information System (GIS).

The advisory work, which continues for a further 12 months, is mainly concerned with road rehabilitation, traffic management and policy development

with an important emphasis on the needs of the urban poor and the role of non-motorised transport. As part of this project it is anticipated that a network of cycleways will be built, together with access roads, into some of the poorer residential areas of Accra.

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



Phil Fouracre



Road safety in the ESCAP Region

THE UNITED Nations Economic and Social Commission for Asia and the Pacific (ESCAP) has almost 60 member countries ranging from Armenia and Iran in the west, to Tonga in the Pacific. Differences between members are more than just geographical; the region contains some of the poorest countries in the world (e.g. Nepal) as well as some of the richest (e.g. Japan). Population of members ranges from just a few thousand in many of the Pacific Islands, to the huge populations of China and India.

ESCAP has commissioned the Ross Silcock consultancy in conjunction with TRL to review the road safety situation in the Region. This involves both an analysis of existing data and the use of a detailed questionnaire sent to each of the member countries.



ESCAP: A region with considerable road safety problems

Preliminary analyses have concentrated on published data and have highlighted the extent of the road accident situation within the Region. Further analyses will concentrate on the questionnaire data, and it is hoped that this will reveal key elements of the road safety problem. The findings will enable policy makers in the Region to make sound investments in road safety and thereby minimise some of the costs of road accidents (currently around US\$60 billion per annum in the ESCAP Region).

For further information contact: Caroline Ghee, Ross Silcock Partnership.
Fax: +44 (0)191 261 834



Sustaining development in Vietnam

Highway Investment and Maintenance

Last year the Scott Wilson Kirkpatrick consultancy was awarded a contract by ODA to carry out an 18-month study on Highway Investment and Maintenance for National and Provincial roads in Vietnam. The local coordinating organisation in Vietnam is the Ministry of Transport and Communications, but with the Vietnamese Roads Administration and Vietnamese Transport Institute also playing important roles. The main objectives of the study are to:

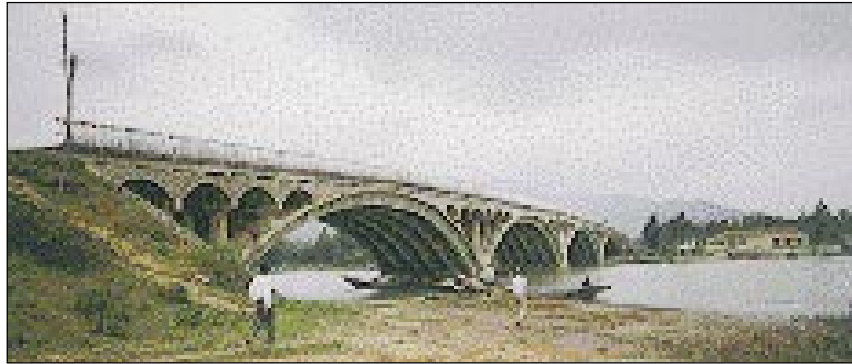
- recommend a 10-year programme of road, bridge and ferry investments and maintenance
- estimate the appropriate budget needs for road maintenance and administration
- determine the optimum balance between investments and maintenance on the basis of assessed expenditure priorities under alternative multi-period budget scenarios.

TRL have assisted on various aspects of the project including pavement design, road safety, and problems associated with non-motorised transport, such as their integration with motorised forms.

For further information contact: Mr Lindsay Thomas,
Scott Wilson Kirkpatrick. Fax: +44 (0)1256 460582
Email: lmthomas@swk.europe.com

Scott Wilson Kirkpatrick

Bridge rehabilitation



A reinforced concrete arch bridge

Vietnam has one of the fastest growing economies in southeast Asia and there is an urgent need to upgrade its highway infrastructure to cope with the increasing traffic loading. Fifteen months ago the ODA commissioned Taywood Engineering, Babbie and TRL to establish and institutionally strengthen a Bridge Testing and Assessment Unit within the Vietnamese Ministry of Transport and Communications.

A Bridge Inspection and Management System has been established, and training in the UK and Vietnam provided for senior managers and engineers in bridge inspections, the use of the Bridge

Management System (BRIDGEMAN), and in the design of repairs and strengthening techniques. The consortium has held two Bridge Inspection Courses in Vietnam and training continues in the use of load testing of bridges.

A draft inspection and repair manual has been issued, in both Vietnamese and English, which it is hoped will form the basis of a detailed guidance note for bridge inspection in Vietnam in the future.

For further information contact:
Richard Woodward, Civil Engineering
(Bridges), TRL. Email: rwoodward@trl.co.uk



Book Reviews



Highway and traffic engineering in developing countries
Edited by Bent Thagesen
Published 1996 by E & FN Spon

This recently published book provides a 'one-stop shop' of information for all those working in the highways sub-sector in developing countries. It is written in 25 chapters, covering highway planning, traffic, geometric design, drainage, pavements, construction, maintenance and development assistance. The editor, who is Professor of Highway Engineering at the Danish Technical University, has drawn together contributions from a number of authors, who are known internationally in relevant fields. It provides a comprehensive textbook on the subject.

The book recognises that developing countries have different natural conditions to those of industrialised countries in temperate climates. Its coverage of traditional highway engineering subjects of planning, design and construction reflects this. Moreover, its focus reflects the fact that the institutional and financial situations are also likely to be very different in the countries of interest. It is refreshing to see subjects such as user behaviour and safety, maintenance management, development assistance, institutional strengthening and training covered. This sets the book apart from others on the subject.

The book draws heavily on TRL's research and publications funded under ODA's TDR programme, but has included additional material that is based on project experience from consultants and contractors working in the field. The result is a practical and authoritative text that will be of wide use to practitioners and students alike.

Reviewed by Richard Robinson, Independent Consultant.



Engineering in emergencies - A practical guide for relief workers
by Jan Davis and Robert Lambert
Published by IT Publications on behalf of RedR, 1995

The Foundation of RedR (Register of engineers for disaster relief) in the early 1980's was stimulated by the need for qualified, motivated engineers to work for relief agencies in disaster situations. Since its foundation, RedR has supplied engineers for several hundred assignments with over 20 agencies worldwide. Its profile has risen dramatically in the last 5 years following the plight of the Kurds in the aftermath of the Gulf war, and more recently the crisis in Rwanda.

The book, funded in part by the ODA for RedR, is aimed at engineers in disaster situations and covers all aspects of disaster relief work in which they may be involved. The early chapters discuss the various aspects common to disaster emergencies and the way in which the international relief agencies operate in response to such circumstances. The book therefore provides invaluable guidance to engineers who probably have little experience of providing humanitarian assistance in emergencies.

Moving through the various management and logistical issues, the authors then address technical aspects of disaster relief work. A major contribution of engineers comes in providing safe water and sanitation in situations where vast numbers of people exist in overcrowded areas with little infrastructure. Moreover, engineers are often required to ensure that access to camps is available and so chapters on roads, simple bridges and the planning of refugee camps are provided. The chapter on roads and bridges draws extensively on guidelines developed at TRL under ODA's TDR programme.

Reviewed by Chris Parkman, TRL.

ODA's Current TDR Projects

R5591 Transport Planning Road Investment Modelling

To improve the procedures for carrying out investment appraisal of road projects and to provide easily used tools for implementation.

R5594 Vehicles and the Environment; Air Pollution From Vehicles

Studies of methods to reduce the environmental impact of traffic including the development of vehicle inspection and testing to provide technical and policy guidelines.

R5602 PC Concrete Pavements

An experimental programme to improve the performance of Portland cement concrete pavements in the poorer developing countries through better design construction and maintenance and to develop suitable techniques for repair and rehabilitation

R5604 Arid Area Construction Techniques

To develop methods of construction in arid areas using soils and other engineering materials at low moisture content to reduce the requirements for water and thereby reducing road construction costs and conserving local water supplies.

R5605 Unbound Granular Materials

Developing methods for testing natural gravels in the developing world for new specifications to build low volume roads economically.

R5612 Bituminous Materials -

Their Improvement and Use for Road Building

To improve the design of premixed bituminous materials, bituminous surface treatments and other bituminous layers to better withstand the conditions of the tropics and thereby to reduce overall road network costs.

R5613 Road Safety Accident Data Collection and Analysis

To build up knowledge and understanding of the road accident situation in developing countries and monitor trends. Develop appropriate accident investigation systems and manuals for use by policy makers and road safety personnel.

R5614 Road Safety Development and Evaluation of Engineering Countermeasures

To build up knowledge and understanding of the role played by physical planning and geometric design factors in road accidents to develop and evaluate low-cost engineering improvements; and to produce guidelines and manuals for engineers and planners.

R6016 Traffic Signal Control Strategy

To develop guidelines on effective strategies for urban traffic control (UTC) in urban areas, with emphasis on function control, pedestrian facilities and priorities for public transport.

R6017 Traffic Database and Audit

To determine the effectiveness of relatively inexpensive traffic management and engineering techniques to improve traffic flow in cities in the developing world.

R6019 Planning For Women and Transport

The development, through research, of guidelines on the understanding and planning for the urban travel needs of women.

R6020 Natural Gravels for Road Building

Improved technologies for the use of natural gravels in road construction, including the use of cement or lime stabilisation for improved performance and lower life costs reduced construction costs and improved energy efficiency.

R6022 Materials Database for the SADC Region of Southern Africa

The development of a database of naturally occurring materials suitable for civil engineering within the SADC region to improve the efficiency and effectiveness of site investigations, feasibility studies, project design, construction environmental protection, and maintenance.

R6023 Rehabilitation of Roads with Bituminous Surfacing

To develop cost effective methods of rehabilitating roads displaying different types of deterioration in tropical climates and to develop appropriate specifications, methodologies and guidelines thereby providing the technology to reduce overall costs.

R6024 Road Network Management

The development of a set of practical guidelines for the management of paved road networks using modern road management techniques to reduce total transport costs.

R6025 Slope Maintenance and Protection

To minimise the destructive effects of instability on roadside slopes embankments and cuttings by developing a rational method of planning and programming slope maintenance and developing slope protection methods appropriate for tropical climates.

R6026 Environmental Impact of Road Construction

To specify and quantify the physical environmental damage caused by road construction in fragile terrains and to prepare guidelines for mitigation.

R6027 The Design of Stabilised Sub-bases for Very Heavy Traffic

To develop material specifications for stabilised sub-base layers suitable for roads in extreme tropical climates and with very high traffic loads to improve the performance of roads and reduce whole life costs.

R6028 Accident Data Collection and Analysis: Sub-Saharan Africa

To build up knowledge and understanding of the road accident situation in developing countries and monitor trends. Develop appropriate accident investigation systems and manuals for use by policy makers and road safety personnel.

R6029 Road Safety Development and Evaluation of Educational Programmes

To reduce pedestrian accidents and injuries by developing and evaluating appropriate road safety education programmes based on local problem diagnosis.

R6235 Manual of Concrete Design Using Local Materials

To address problems caused when local materials are used in conjunction with North European standards. The manual will be based on recent research and will provide practical guidelines on how to achieve good quality concrete.

R6236 Pedestrian Accidents/ Vulnerability in Developing Countries

The identification of pedestrian accident rates and causes in developing countries and to recommend design procedures and road safety issues to address the high occurrence of pedestrian accidents.

R6237 Socio Economic Cost of Road Accidents

To assess, quantify and qualify the economic and social costs of road accidents.

R6238 Management of Appropriate Road Technology

Sustainable improvements in road construction and maintenance through the optimum use of local resources and skills, the effective use of the private sector and the application of good management practices in both contracting and employing organisations.

R6239 Rural Transport Research Programmes in Sub-Saharan Africa

This programme increases understanding of key transport problems contributing to and perpetuating rural poverty in sub-saharan Africa. Policy-makers and development planners will be better equipped to tackle these problems.

R6240 Reducing the Cost of Freight in Africa

Reduce the cost of transporting freight in Africa by undertaking a detailed comparison of the costs of moving freight in Africa and Asia.

For further information contact: Engineering Division, ODA

Recent publications

BOOKS

DAVIS, J and R LAMBERT (1995). *Engineering in Emergencies - A practical guide for relief workers*. Published by IT Publications on behalf of RedR, 1995. (IT Publications Ltd) ISBN 1-85339-222-7

MORRIS, M J (1995). *Earth Roads: A practical manual for the provision of access for agricultural and forestry projects in developing countries (2nd Edition)*. Published by Avebury, 1995. (Ashgate Publishing Ltd) ISBN 1-85628-989-3

THAGESEN, B (Editor) (1996). *Highway and traffic engineering in developing countries*. Published by E & F N Spon, 1996. (Chapman & Hall) ISBN 0-419-209530-6

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AERON-THOMAS, A and G D JACOBS (1995). *The relationship between accident rates and geometric design in developing countries*. *International Forum on Road Safety Research, Bangkok, Thailand, October 1995*. (PA3129/95) (TRL)

BAGULEY, C J and M SHAFII MUSTAFA (1995). *Engineering approaches to reversing a worsening road accident trend in Malaysia*. *International Forum on Road Safety Research, Bangkok, Thailand, October 1995*. (PA3090/95) (TRL)

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systems for traffic monitoring and planning. *United Nations Conference on Geographical Information Systems, Cairo, Egypt, December 1995*. (PA3104/95) (TRL)

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JACOBS, G D and C J BAGULEY (1995). *Towards a strategy for improving road safety in Developing Countries*. *International Seminar on Road Safety, BRTA, Dhaka, Bangladesh, October 1995*. (PA3089/95) (TRL)

MAUNDER, D A C and T C MBARA (1995). *The effects of Government participation on stage-bus performance in Harare, Zimbabwe*. *Journal of the Transportation Research Forum, Vol 34 No2, pp 59-79*. (PA3130/95) (TRL)

MBARA, T C, and D A C MAUNDER (1996). *The initial effects of introducing commuter omnibus services in Harare, Zimbabwe*. *CODATU VII Conference, New Delhi, India, February 1996*. (PA3107/95) (TRL)

RAO, P C and T C PEARCE (1996). *Black smoke emissions and fuel consumption*. *CODATU VII Conference, New Delhi, India, February 1996*. (PA3142/96) (TRL)

RUTTER, J C (1996). *Environmental criteria for the selection of mass transit options for developing cities*. *CODATU VII Conference, New Delhi, India, February 1996*. (PA3105/95) (TRL)

UMAR, R S, G M MACKAY and B L HILLS (1995). *Preliminary analysis of exclusive motorcycle lanes along the federal highway F02, Shah Alam, Malaysia*. *IATSS Research vol. 19 No 2*. 1995. (PA3136/96) (TRL)

For copies of the above publications, please contact the relevant organisation - indicated in brackets

Newsletter Editors

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