ADB Transport Forum 2010
Pathways to Sustainable Transport

Low Cost Surfacing and Pavements
South East Asia

Dr Jasper Cook
OtB Engineering LLP

jcook@otbeng.com
This presentation is based on the outcomes of Low Volume Rural Road (LVRR) practical research in Vietnam, Lao and Cambodia since 2001.

Over 200km of trial pavements (140km in Vietnam) with 150 monitored sections (100-200m)

This work funded by DfID, World Bank and ADB is continuing in Vietnam under the World Bank RTP3 programme.
Strategic Outcomes

In the highly variable road environments of S E Asia unsealed gravel surfacing is not sustainable either in engineering or in economic terms.

There are now proven regional alternatives to unsealed gravel surfacing that are sustainable in engineering and economic terms.
LVRR Sustainability Issues

Task based – that they suit the road function and its traffic (people as well as the vehicles)

Local resource based and compatible with the engineers who design the roads, the contractors who construct them, the communities that maintain them and the available construction materials.

Economically sustainable – they must not exhaust the provincial and district budgets or place excessive maintenance burdens on local communities.
Taking Account of the Road Environment is Essential

- Appropriate Pavement Design
- Hydrology
- Terrain
- Sub-Grade
- The Green Environment
- Climate
- Road Safety Regime
- Construction Materials
- Construction Regime
- Maintenance Regime
- Traffic Axle Loads
Loss of access = social, economic and environmental impact
## Whole-life Asset Costing

<table>
<thead>
<tr>
<th>Class</th>
<th>A1</th>
<th>Region</th>
<th>North region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axle Load</td>
<td>6T</td>
<td>Gradient condition</td>
<td>4-6%</td>
</tr>
<tr>
<td>Subgrade</td>
<td>7% CBR</td>
<td>Annual rainfall:</td>
<td>&gt;2000mm</td>
</tr>
<tr>
<td>Terrain</td>
<td>High Hill</td>
<td>Flood condition:</td>
<td>Annual but small</td>
</tr>
<tr>
<td>Option</td>
<td></td>
<td>WLC: NPV</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td>Total cost (Yrs 1-10)</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sealed Armoured Gravel</td>
<td>3.1xG</td>
<td>4.5xG</td>
<td></td>
</tr>
<tr>
<td>Unsealed Gravel</td>
<td>G</td>
<td>6xG</td>
<td></td>
</tr>
<tr>
<td>Sealed Dry Bound Macadam</td>
<td>4xG</td>
<td>4.4xG</td>
<td></td>
</tr>
<tr>
<td>Sealed Gravel</td>
<td>2xG</td>
<td>5xG</td>
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</tbody>
</table>
Environmentally Optimised Design: EOD
Knowledge Gap at the “Front Line” of LVRR Engineering

Recent work has confirmed that there is a critical shortfall in the application of recent LVRR research at provincial level and below.

At the same time there is still a need to disseminate outside the Engineering Box at policy and strategic decision making levels.
The Low-volume Road Surfacing Guideline – (LRSG)

A detailed global guide to best practice for LVRR pavements is not a practicable approach. The strategy adopted for the LRSG is to draft a clear and practical web-based framework to be used by road practitioners for the development of best practice within their specific region of interest.
The LRSG Framework
Guideline currently in preparation

**LRSG DOCUMENT**

**Key Issues**
- Road Environments
- Road Task
- Classification
- Standards
- Specifications
- Materials
- Life Cycle Costs
- Pavement Options
- Design Catalogue
- EOD

**gTKP Document Library**
- Details
- Figures
- Tables
- Examples
The LRSG Knowledge Base

The guideline will encompass the lessons from the design, construction, supervision and monitoring of a range of surface and paving types trialled and investigated in the Cambodia, Laos and Vietnam SEACAP projects, together with the knowledge compiled in other relevant programmes outside S E Asia.
The Whole Life Asset Cycle

- Problem or Need Identification
- Feasability Study (PED)
- Final Engineering Design (FED)
- Rehabilitation Assessment
- Maintenance
- Construction
Phased Approach to Pavement Selection and Design

Phase I
Selection of appropriate general pavement type or types

Phase II
Detailed design of selected option
Mainstreaming research into sustainable infrastructure through effective transfer of knowledge

But Additional broad-based support is essential

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