

Providing Sustainable Access through road works techniques suitable for Small & Medium Enterprises

by

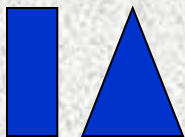
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The Message

- ❑ There is an ‘unhealthy’ and unsustainable reliance on gravel roads to solve the access problems of poor rural communities
- ❑ A new approach is required, using a ‘menu’ of more durable, low cost, local resource based surfaces, and even engineered natural surfaces. Using gravel only where appropriate.
- ❑ These techniques are ideal for use by SMEs.

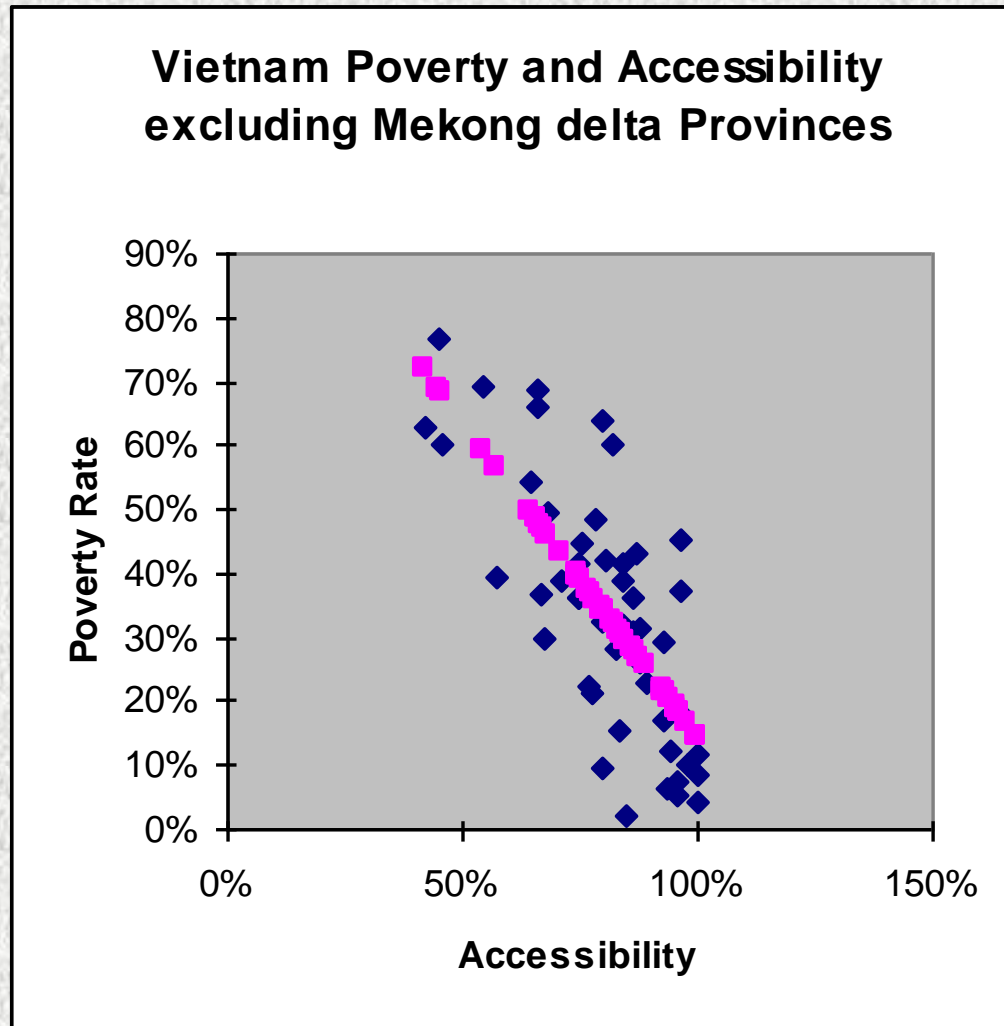


Presentation Contents

- ❑ **Poverty is linked to Poor Road Access**
- ❑ **The Limitations of traditional 'Gravel' use**
- ❑ **Alternative Surface Options**
- ❑ **Suitability for Small & Medium Enterprises**



Poverty is linked to Poor Access



Poverty is linked to Poor Access



Rural Economic and Social development needs commercial, educational, health and infrastructure initiatives that rely on **GOOD PERMANENT ACCESS**.

Unfortunately, Poor Access for millions in ASEAN communities limits the effectiveness of these initiatives, because of:

- ❑ unreliable travel or impassability, especially in the rains,
- ❑ high unit transport costs for goods, services & people.

Investment is discouraged by poor access.

Traditionally Gravel is used for rural access roads

They are low (initial) cost and relatively easy to construct.

However, they are expensive to maintain (In Cambodia, typically **US\$1,600/km/year**)

Each Km of gravel road typically loses more than **70 cubic metres** of material **EACH YEAR** in South East Asia.

A range of constraints means that **maintenance is rarely carried out**, leading to impassability, or the need to repeatedly reconstruct.

.....**SENSIBLE?**

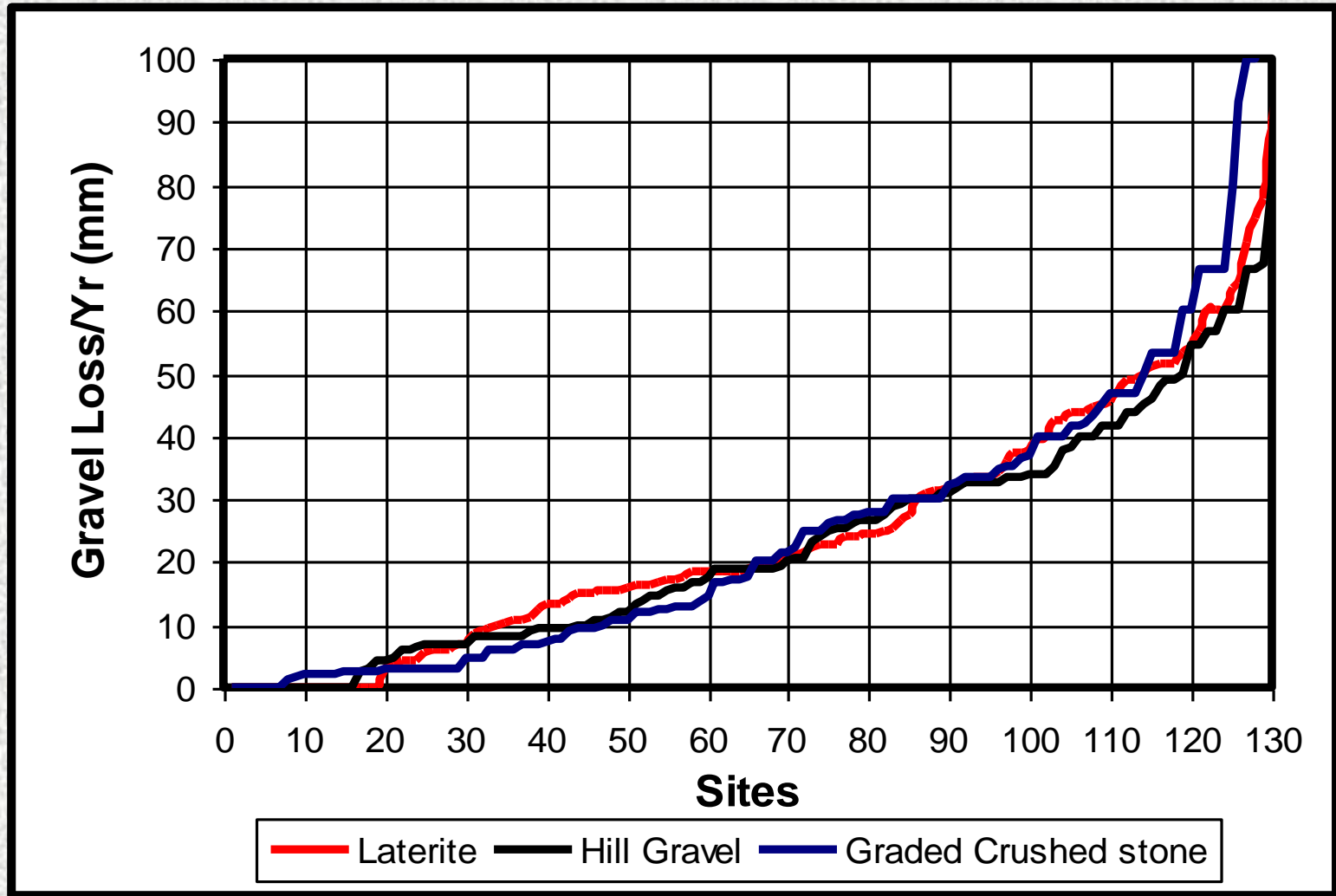


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RRGAP - Gravel Loss On Each Site



Gravel may **NOT** be appropriate, especially where -

- ❑ Gravel quality is poor
- ❑ Compaction & thickness cannot be assured
- ❑ Haul distances are long
- ❑ Rainfall is very high, or dry season dust problems
- ❑ Traffic levels are high
- ❑ Longitudinal Gradients (> 6% : medium rainfall)
- ❑ Adequate maintenance cannot be provided
- ❑ Sub-grade is weak or soaked (flood risk), or
- ❑ Gravel deposits are limited/environmentally sensitive

There are many PROVEN Alternative Surface Options using:

- Stone
- Bitumen
- Concrete
- Brick



They can have better Whole Life Cost and Local Resource Use attributes, & LESS MAINTENANCE.

MENU of Proven Rural Road Surface Options:

Number	Type of Surface	Cambodia/Vietnam	Laos Proposed?
1	Engineered Natural Surface		◆
2	Soil Stabilisation	◆	
3	Natural Gravel / Laterite	◆	◆
4	Water Bound Macadam		
5	Dry Bound Macadam	◆	
6	Crushed Stone Macadam	◆	
7	Hand Packed Stone		◆
8	Telford Paving		◆
9	Cobble Stones		
10	Stone Setts or Pavé		◆
11	Dressed Stone	◆	
12	Mortared Stone		◆
13	Stone Chippings		
14	Slurry Bound Macadam		
15	Bituminous Sand Seal	◆	◆
16	Bituminous Chip Seal	◆	◆
17	Slurry Seal		
18	Ottaseal		
19	Penetration Macadam (Bitumen)	◆	
20	Pre-Mix Macadam (Bitumen)		
21	Burnt Clay Brick	◆	
22	Concrete Brick	◆	◆
23	Un-reinforced Concrete		◆
24	Steel Reinforced Concrete	◆	◆
25	Bamboo Reinforced Concrete	◆	◆
26	Geo-cell Paving		◆

Some options of particular regional interest:

**Bamboo
Reinforced
Concrete**



**Cobble Stone
Paving**



**Clay bricks burnt
with Rice Husk**



The Use of Earth

Engineered Natural Surfaces (i.e. with maintained camber and drainage) have enormous potential for providing low cost basic access to many poor communities

However, we need to develop guidelines on the use of engineered earth roads based on:-

- **Soil type & strength**
- **Crossfall & drainage arrangements**
- **Rainfall characteristics**
- **Traffic (volumes and type)**
- **Maintenance arrangements**



Suitability for SMEs

- ❑ **Possibility to be based in the rural areas with low mobilization costs,**
- ❑ **Low capital and set-up requirements,**
- ❑ **Inter-sector flexibility; possibility to provide services to a range of sectors and clients,**
- ❑ **Good market entry point for small entrepreneurs,**
- ❑ **Possibility to use affordable simple equipment, either owned or hired,**
- ❑ **Possibility to use local labour skills such as carpentry and masonry,**

Suitability for SMEs (continued)

- ❑ **Less pressures for corrupt practices, as they are part of the local community,**
- ❑ **Less opportunities for HIV-Aids infections due to less imported labour into the community,**
- ❑ **More of the costs recycled into the local community in employment of local labour, local tools production, local transport, local materials and profits,**
- ❑ **Construction skills developed in the local community which can be utilized for maintenance and other activities,**
- ❑ **Low overhead costs.**

Constraints/Challenges that need to be tackled

- ❑ **Inadequate Government policy framework to support the SME sector for rural roads,**
- ❑ **Insufficient public awareness of the potential benefits of SME rural roadworks implementation,**
- ❑ **Lack of appropriate contract documentation, pre-qualification & bidding procedures, standards and specifications, financial and performance audit, dispute resolution for small scale works,**
- ❑ **Contract pre-qualification too demanding, for example 3 years experience of similar work,**
- ❑ **Contracting procedures and requirements usually (unnecessarily) demand heavy equipment holdings,**
- ❑ **Lack of access to capital or credit for equipment purchase or cashflow,**

Constraints/Challenges that need to be tackled

- ❑ Lack of opportunities to hire equipment,
- ❑ Poor contractors' capacity in costing and planning works,
- ❑ Inadequate access to low cost training and guidelines on small scale roadworks,
- ❑ Contract technical solutions are usually restricted to gravel and macadam surfaces,
- ❑ Lack of sustainable local funding for small rural road works contracts and maintenance,
- ❑ Lack of market and sustainable workload for SMEs,
- ❑ Lack of representation of SMEs (e.g. association),
- ❑ Poor transparency in award and payment for work,
- ❑ Late and/or non-transparent payments for locally funded work.

Further details:-

Full details of the research findings, documentation and guidelines for downloading are being made available on the DFID Transport Links website:-

www.transport-links.org

Project KaR 7782:

Low Cost, Labour Based Paved Roads for Poor Communities

AND

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