

International Seminar On Sustainable Access and Local Resource Solutions

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Appropriate Economic Appraisal for Rural Unsealed Road Upgrading (Application of LCS research in Cambodia)



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Why Need to Upgrade Low Volume Unsealed Roads to Higher standard?

- Gravel or Natural Surfaced Roads need timely maintenance – rarely achieved
- Before it becomes too late and more expensive
- Gravel supply for a construction or maintenance for a road usually damages haul routes
- Good quality, nearby sources first use and exhausted Haul distance is increasing and cost of future intervention too.
- With increase of haul distance, more and more roads are at risk of damaging by overloading from further road investments



Why Need to Upgrade Low Volume Unsealed Roads to Higher standard?

Social problem (\$?)

Dust => Health problem



Poor visibility => Accident



When Should Low Volume Unsealed Roads be upgraded to a Higher standard?

Source

The World Bank Surfacing Alternatives for Unsealed Rural Roads

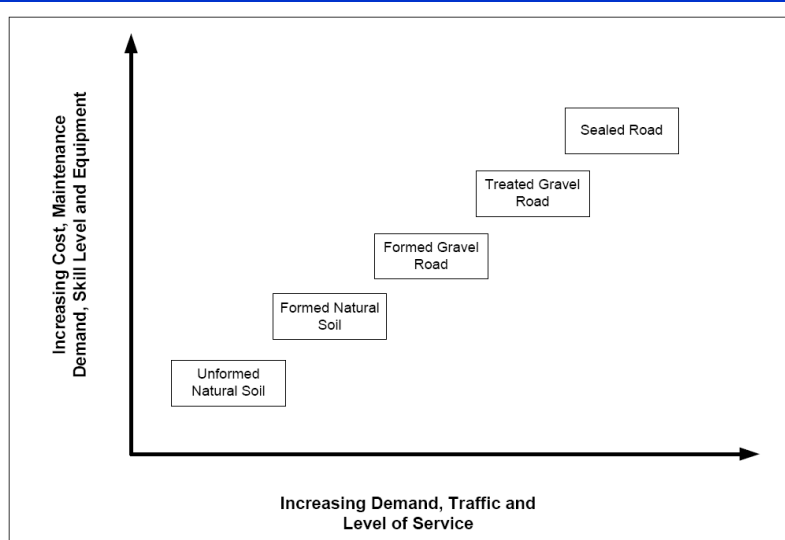
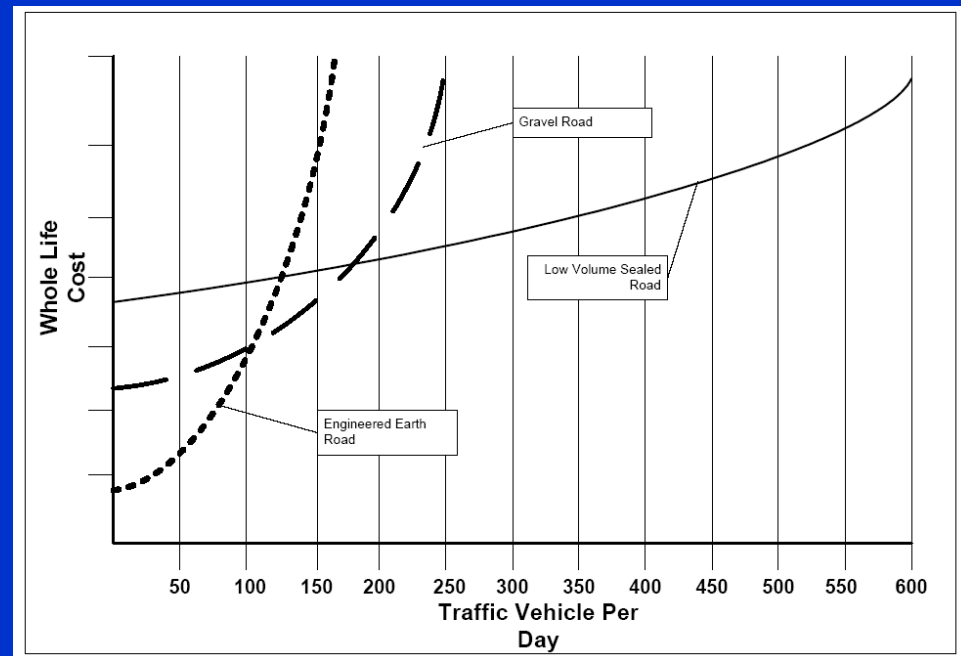


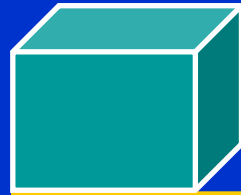
Figure 5.1: Upgrading Steps of Unsealed Roads

Economic Analysis for Upgrading Unsealed road to Surfaced Roads (Based on Paper "Paving the Way for Rural Development & Poverty Reduction" by Gourley, Greening, Jones & Petts

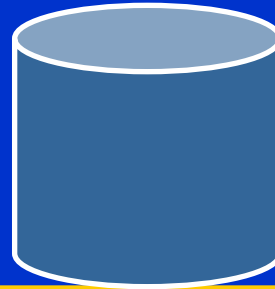


How to Economically Justify an Upgrading Investment?

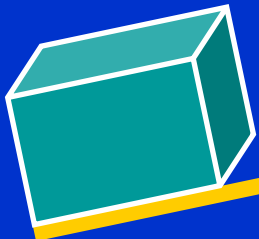
Expense



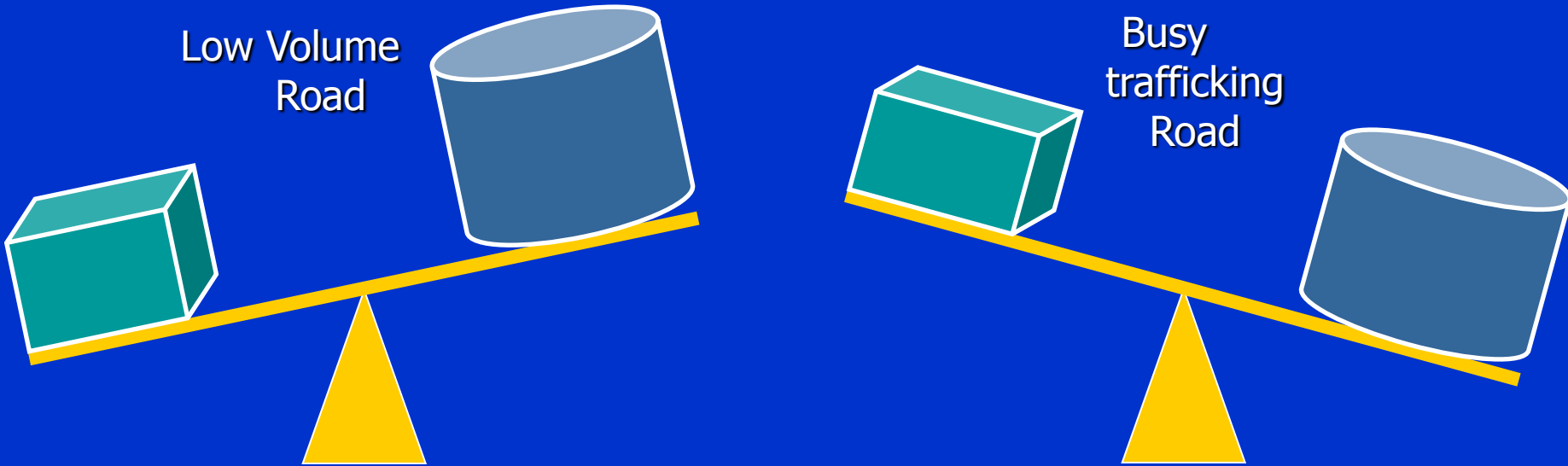
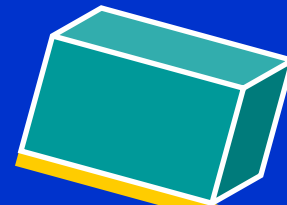
Benefit



Low Volume Road



Busy trafficking Road



Expense due to Inconsistent Standards between Unpaved and Paved Roads

MRD Standard

Class	Composition of ADT	Width of Carriageway
A	100 ~ 200	6 metre
B	50 ~ 100	5 metre
C	0 ~ 50	4 metre



MPW&T Standards

Lane Width

Design Standard	Lane Width (m)
R6/U6	3.50
R5/U5	3.50
R4/U4	3.25
R3/U3	3.00
R2/U2	2.75
R1/U1	(5.00)

Shoulder Width (Rural area)

Design Standard	Useable Shoulder Width (m)		
	Flat Terrain	Rolling Terrain	Mountains Terrain
R6/U6	3.00	3.00	2.50
R5/U5	3.00	3.00	2.50
R4/U4	3.00	3.00	2.00
R3/U3	2.50	2.50	2.00
R2/U2	2.00	2.00	1.50
R1/U1	1.50	1.50	1.50

NOTE: () denotes the total two-way lane width

Additional Expense due to compliance with standards



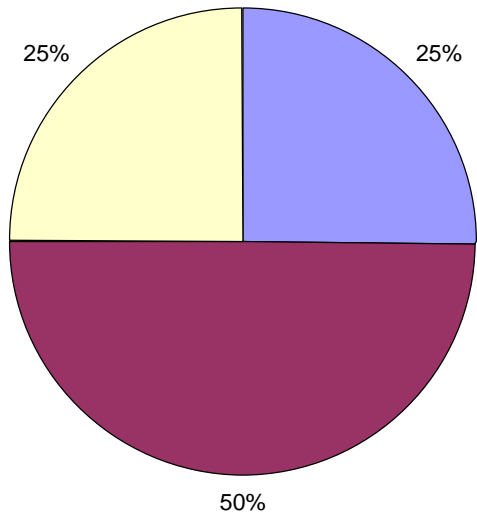
Structure required



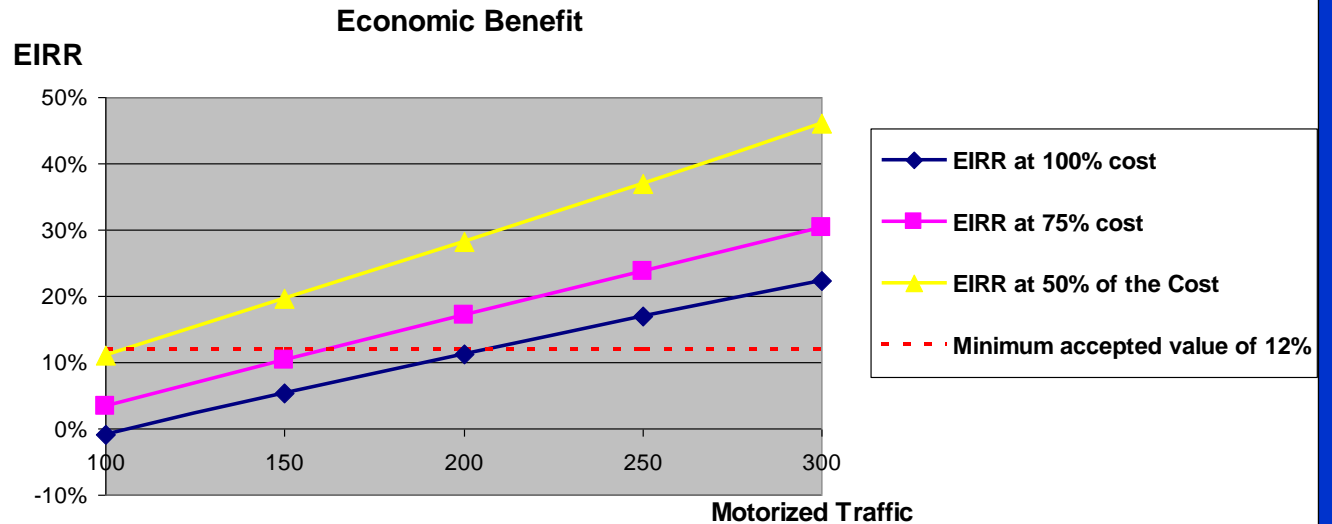
Road embankment level must be raised up at least 0.5 above high flood level



Might Need Widening



- Cost related to Improvement of road geometric standard and drainage condition
- Cost related to upgrading to Bituminous surfaced road
- Additional cost related to over-design due to risk of overloading



Maintenance

- Conventional Economic analysis assumes that maintenance will be carried out
- The reality is that this is rarely achieved in developing countries, especially for gravel roads, due to a range of constraints.
- It is currently difficult to model this reality and value the consequential loss of access
- Perhaps we should realistically incorporate the cost of ensuring necessary maintenance capacity building in each evaluation.

Other Issues



- The surfacing trial roads in Cambodia and Vietnam have witnessed considerable property investment alongside the newly surfaced (durable) roads
- Should this benefit be recognised in evaluation of upgrading options, and how?
- It is important to appreciate the incidence and effects of overloading – do we design for it or can we control it?

Conclusion/Issues to be addressed

- Economic benefits of unpaved road upgrading investment will depend on cost inputs that need to be carefully defined and separated from other costs in order to assess actual benefits.
- Issues of how to cost dust nuisance, health and safety, separating costs of meeting standards, Maintenance capability and likelihood, overloading and adjacent property investment are important to consider and deal with in an appropriate way



Thank You