



global Transport Knowledge Partnership

Southeast Asia Community Access Partnership SEACAP

LOW VOLUME ROADS WORKSHOP
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APPROPRIATE STANDARDS FOR RURAL ROADS

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Presentation Content

This presentation focuses on key aspects of the classification and standards appropriate to Low Volume Rural Roads (LVRRS) in S E Asia.

It is based on recent experiences with DfID funded SEACAP projects in Lao and Cambodia.



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South East Asia Community Access Programme

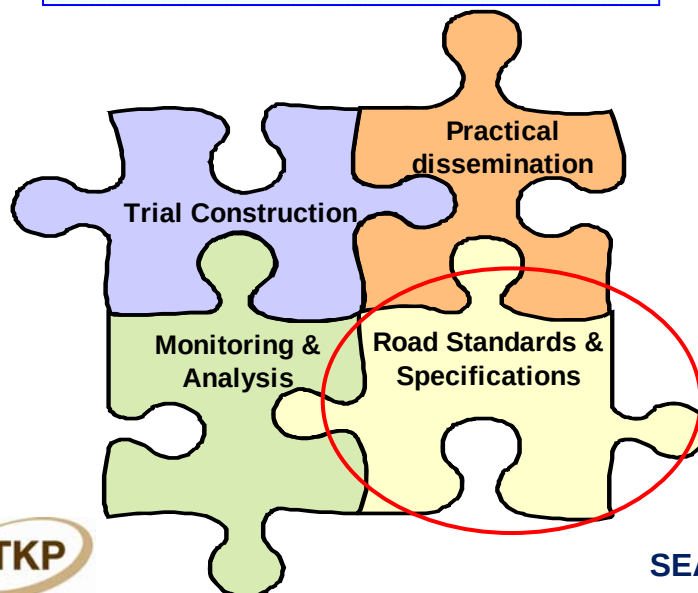
A DFID funded programme the goals of which are:

- ❑ To help and support developing countries make the optimal decisions on providing rural access to remote poor communities
- ❑ To improve sustainability and affordability of rural access to poor countries
- ❑ Create opportunities for pro-poor growth and poverty alleviation



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Road Research Delivery



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The Appropriate LVRR Sequence

- ❑ **NEED**
- ❑ **TASK**
- ❑ **CLASSIFICATION**
- ❑ **GEOMETRIC STANDARDS**
- ❑ **SPECIFICATIONS**
- ❑ **DESIGN**
- ❑ **CONSTRUCTION**
- ❑ **MAINTENANCE**



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Need and Task- Lao

- ❑ In Lao proposed poverty-targeted rural infrastructure improvements will require around 10,000km of either upgraded or new construction.
- ❑ If funds are to be spent cost efficiently on a sustainable network then it is essential that rural roads are designed and built to appropriate standards and with achievable technical specifications



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MEETING THE CHALLENGE

- **Appropriate Standards and Specifications:**

Local roads need to be designed and built within a nationally accepted system of appropriate standards and specifications – not varied for each Donor

- **Sustainable local roads:**

Design and construction should be appropriate to the road function; available funding; and local resources.

- **Maintenance:**

The constructed roads must be capable of maintenance within available budgets and resources.



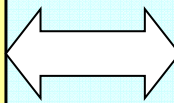
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Key Elements of a Working Package

LOW VOLUME RURAL ROAD (LVRR) STANDARDS

LVRR
Classification
and
Geometric
Standards



LVRR
Standard
Specifications
and Pavement
Options

Commentary/Guidance Document



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BASIC CRITERIA

- ❑ Standards need to meet road task requirements (Task-based)
- ❑ Standards compatible with available material, human and construction resources (Resource-based)
- ❑ Standards appropriate to the road environment (Environmentally optimised)



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What is a “Standard”?

For each road classification the standard is the minimum that is considered acceptable. Higher standards can be selected if required but not lower standards.

Exception – mountainous terrain where there is often no choice but to reduce standards



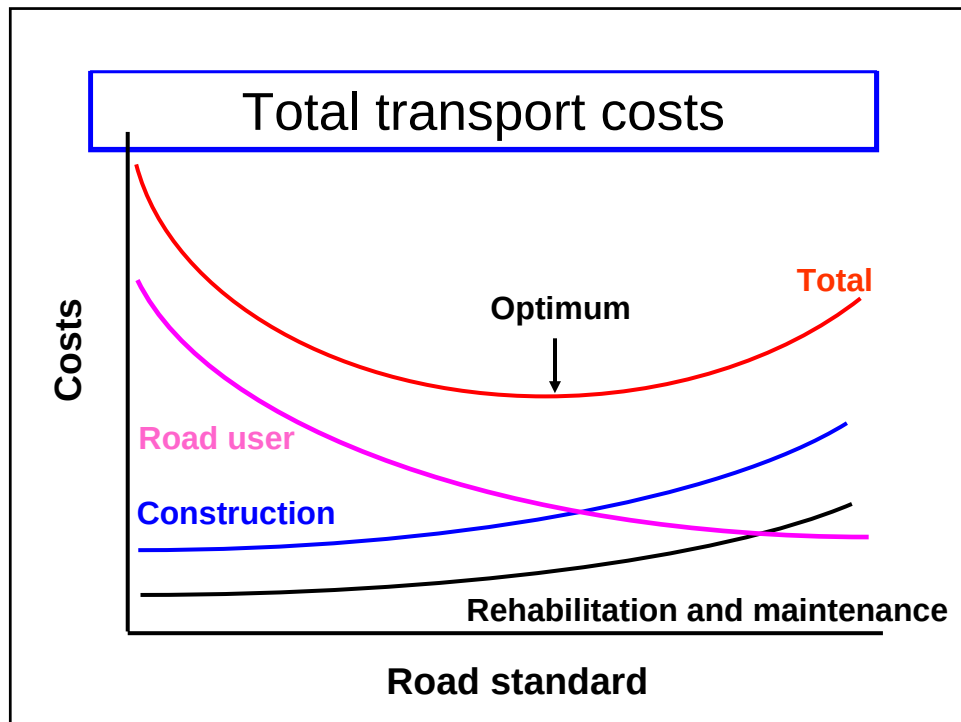
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Factors affecting geometric standards

- ❑ Cost
- ❑ Terrain
- ❑ Traffic
 - Volume
 - Composition
- ❑ Land use – through village or open country
- ❑ Safety
- ❑ Pavement type



Traffic

- ❑ Classification based on numbers of 2-axle vehicles (4-wheel) per day
- ❑ Standards should depend on the largest vehicles that the road is to carry on a regular basis (The “Design Vehicle”). If the vehicles are small, lower standards can be used

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Lao Design vehicles



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Safety and land use

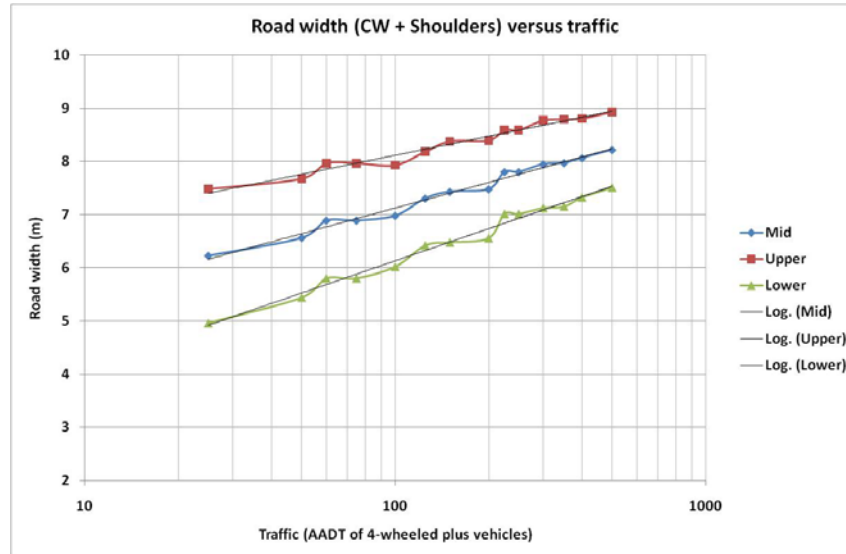
- ❑ Where required, safety features should be included
- ❑ Where pedestrian numbers are high (schools, markets, houses) the road standards need to be different (higher) to accommodate the activities and for safety



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Road width comparisons (CW + shoulder)



Non 2-axle vehicles

- ❑ To cater for the potentially large number of such vehicles plus motor bikes and bicycle the shoulders of the roads have been widened depending on the numbers.
- ❑ This is based on an effective 'passenger car units' calculation

Smaller rural road vehicles

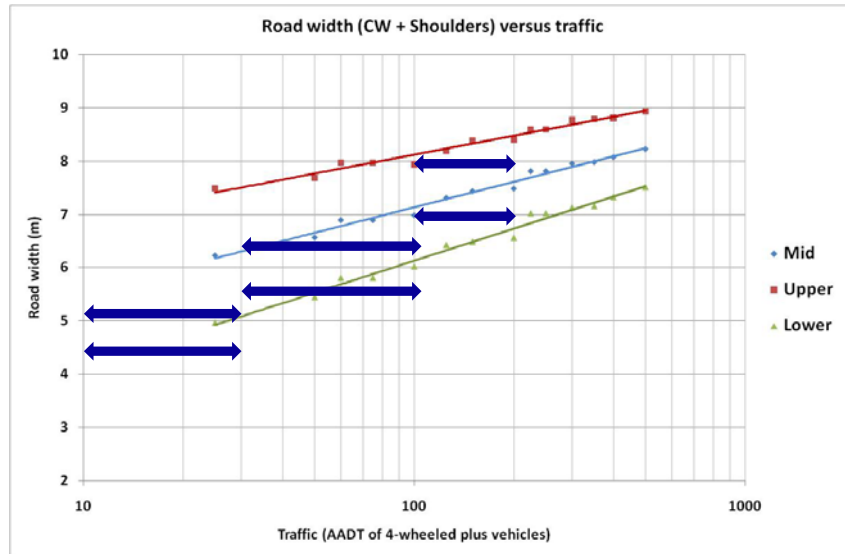


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Proposed classification for Cambodia

Class	AADT of 4-wheeled vehicles	Width of running surface (m)	Sub class	PCUs of non 4-wheeled vehicles	Width of shoulders (m)	Total width (m)
RR 1	200 to 500	6.0	A	>300	1.5	9.0
		6.0	B	< 300	1.0	8.0
RR 2	100 to 200	5.0	A	> 300	1.5	8.0
		5.0	B	< 300	1.0	7.0
RR 3	30 to 100	3.5	A	> 300	1.5	6.5
		3.5	B	< 300	1.0	5.5
RR 4	5 to 30	3.0	A	> 300	1.0	5.0
		3.0	B	< 300	0.75	4.5
RR 5	< 5	2.5	A	>300	1.0	4.5
		2.5	B	<300	0.75	4.0

Proposals (Cambodia)



LVRR Classification for Lao

Parameter	Carriageway	Definition	
Classification	Widths: 2.5m 3.5m Function of Design Vehicle	Traffic lane	One
		Maximum 4-wheeled vehicles	150 per day
		Maximum axle load limit	4.5Tonnes for any vehicle
		Maximum vehicle width	2.3m

Key Issues

**The alternative 2.5
and 3.5m
carriageway widths**

**Variation of shoulder
width depending on
traffic mix**



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Design speed (km/h) (Cambodia)

Classification	Flat	Rolling	Mountainous
Rural Road RR 1	60	50	40
Rural Road RR 2	50	40	30
Rural Road RR 3	50	40	30
Rural Road RR 4	50	40	30
Rural Road RR 5	30	30	20



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Maximum gradient

- Flat 6%
- Rolling 8%
- Mountainous 10%
 - (short sections up to 15% allowed)

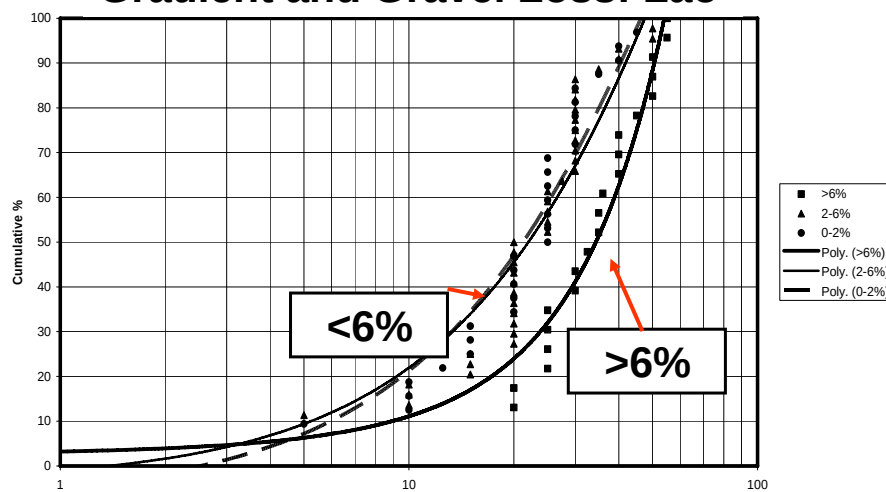
Note maximum on gravel roads = 6%



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Gradient and Gravel Loss: Lao



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The way forward

A working framework of effective LVRR Standards and Specifications in place within the public works departments that is :-

- ❑ Required on all programmes
- ❑ Fully adopted at provincial level
- ❑ Part of all LVRR Donor projects



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Design Matrix for Sealed LVRRs

Subgrade CBR%	Pavement Layer	Traffic Group A Layer (mm)	Traffic Group B Layer (mm)
2-3.9	Base Sub-Base Capping Layer	100 100 200	100 150 275
4-6.9	Base Sub-Base Capping Layer	100 100 100	100 150 175
7-10.9	Base Sub-Base Capping Layer	100 100 0	100 150 100
>11	Base Sub-Base Capping Layer	100 100 0	100 150 0

Typical Options: Lao

Sealed Armoured Gravel		Seal	DBST or Otta Seal
		Armour	50-70mm CSA
		Base/Sub-base	2@100mm gravel III
		Capping	As per Table 1
Quality Natural Gravel or Sealed Macadam		Seal	DBST or Otta Seal
		Base	100mm Gravel I-II or Macadam
		Sub-base	100-150mm Macadam or Gravel III
		Capping	As per Table 1



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OUTPUT SUMMARY

Clear and practical sequences of classification and standards associated with relevant pavement designs and specifications that are workable at province and district level.



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Finally – The Risk of Overloading

Rural roads are a **valuable asset** that require effective management in terms of ensuring that they **not subjected to tasks beyond their design capacity**.

Light or Low Volume Rural road Standards are introduced in response to specific tasks in terms of vehicle type, axle load and traffic capacity and hence a **Commune road cannot be expected to undertake the functions of a district or provincial road**

