



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

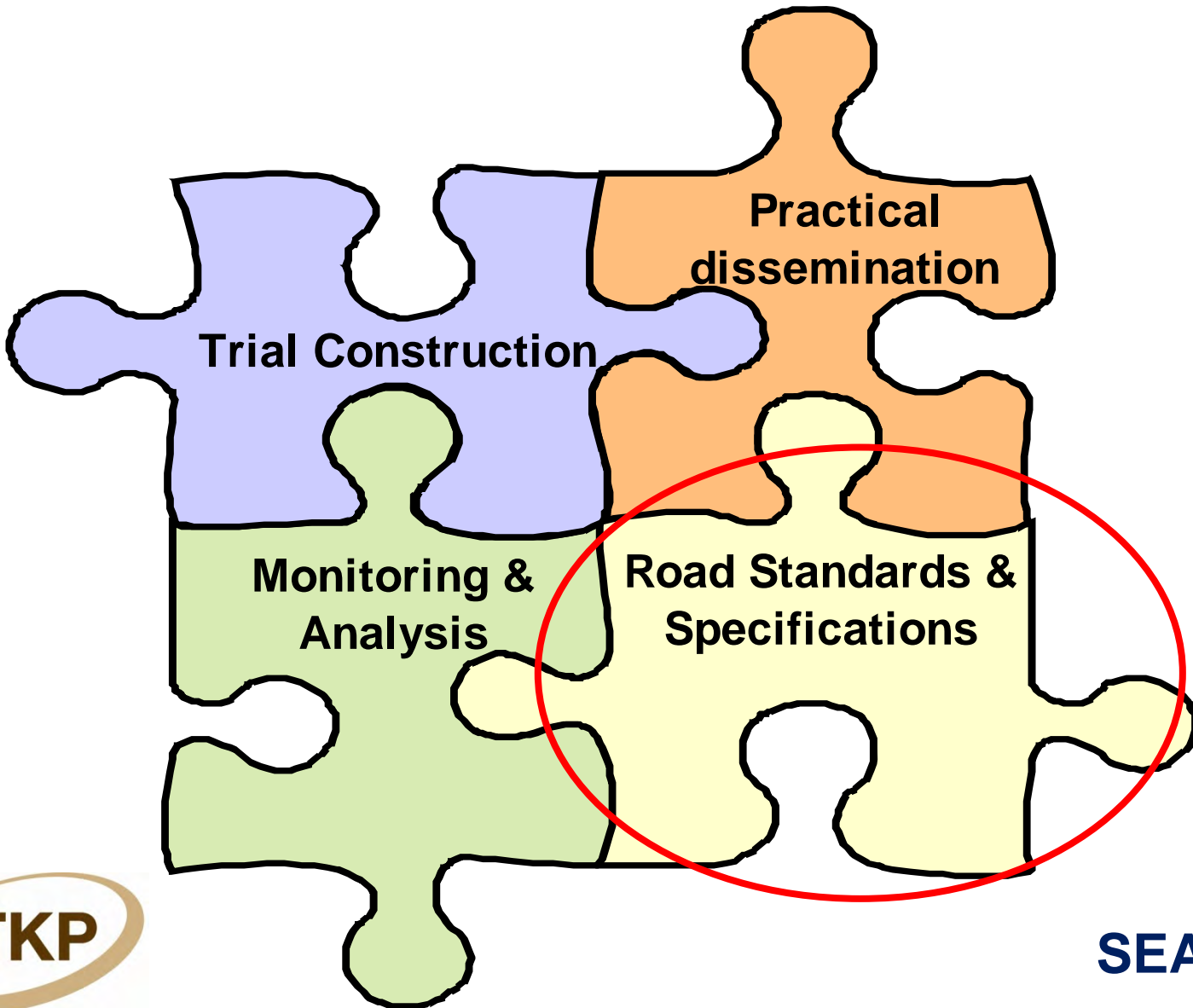
A DFID funded programme the goals of which are:

- ❑ 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



SEACAP

Road Research Delivery



The Appropriate LVRR Sequence

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

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

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.



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

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)

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.

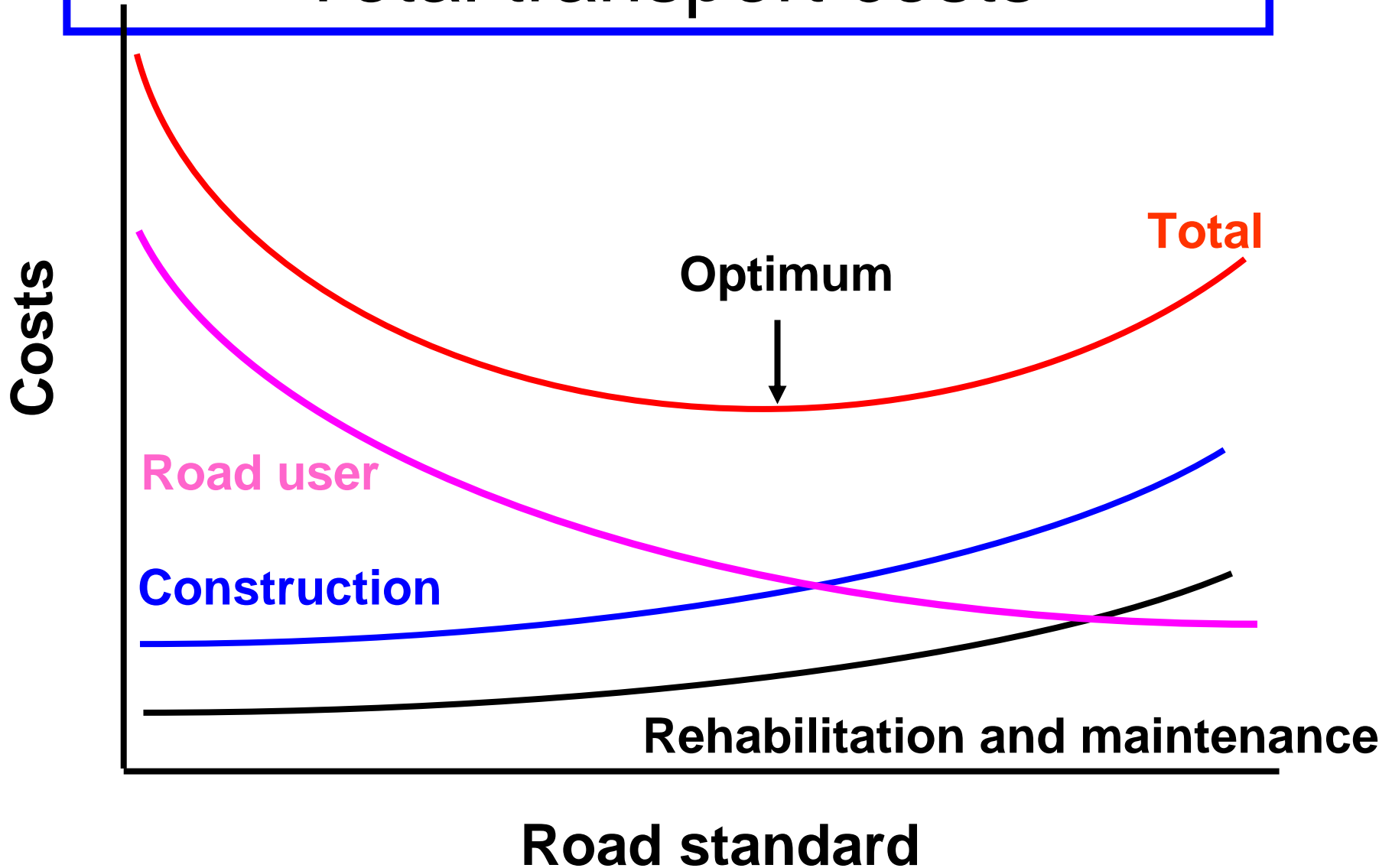
Exception – mountainous terrain where there is often no choice but to reduce standards



Factors affecting geometric standards

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

Total transport costs



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

Lao Design vehicles

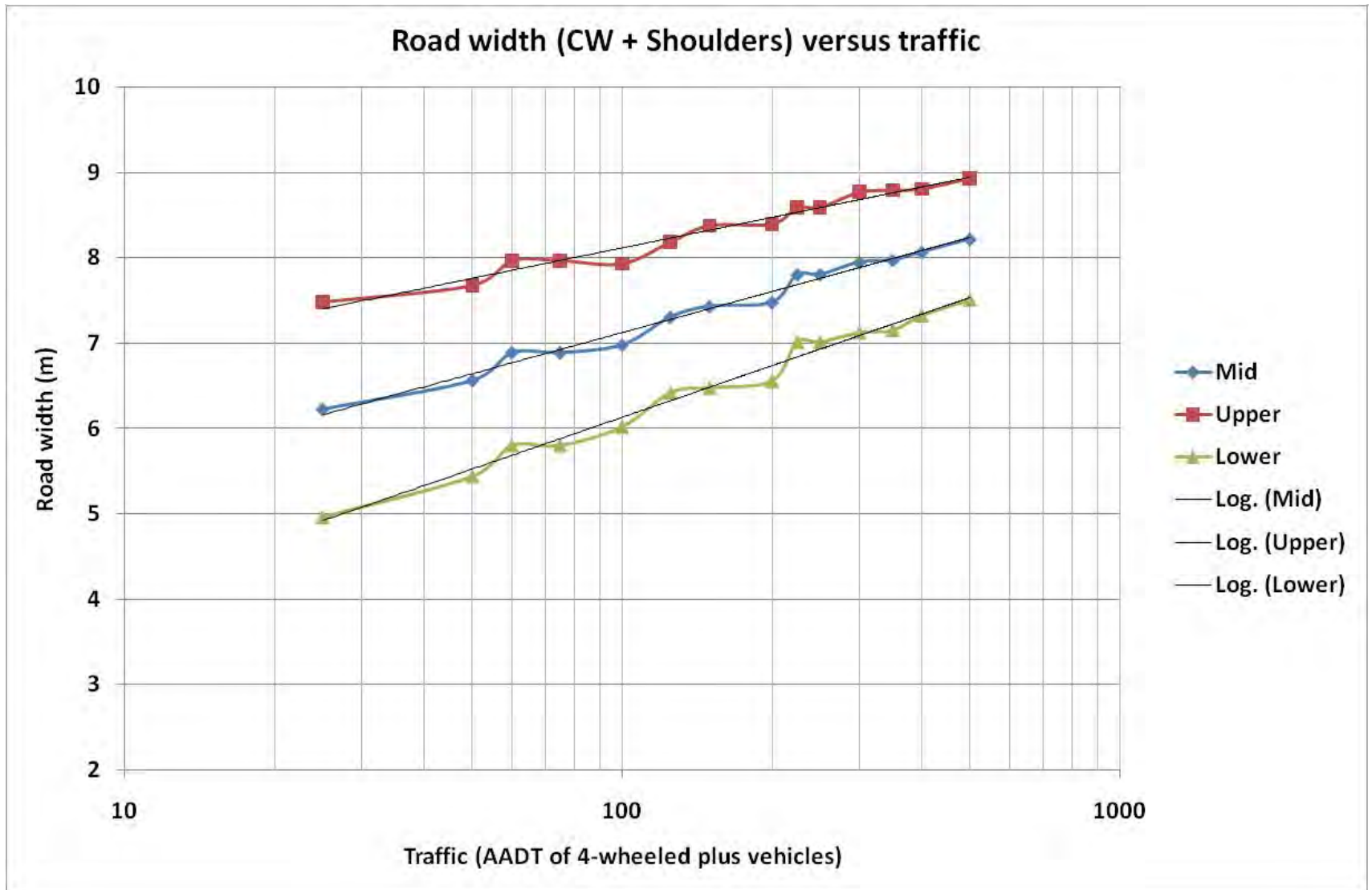


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Safety and land use

- ❑ 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

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

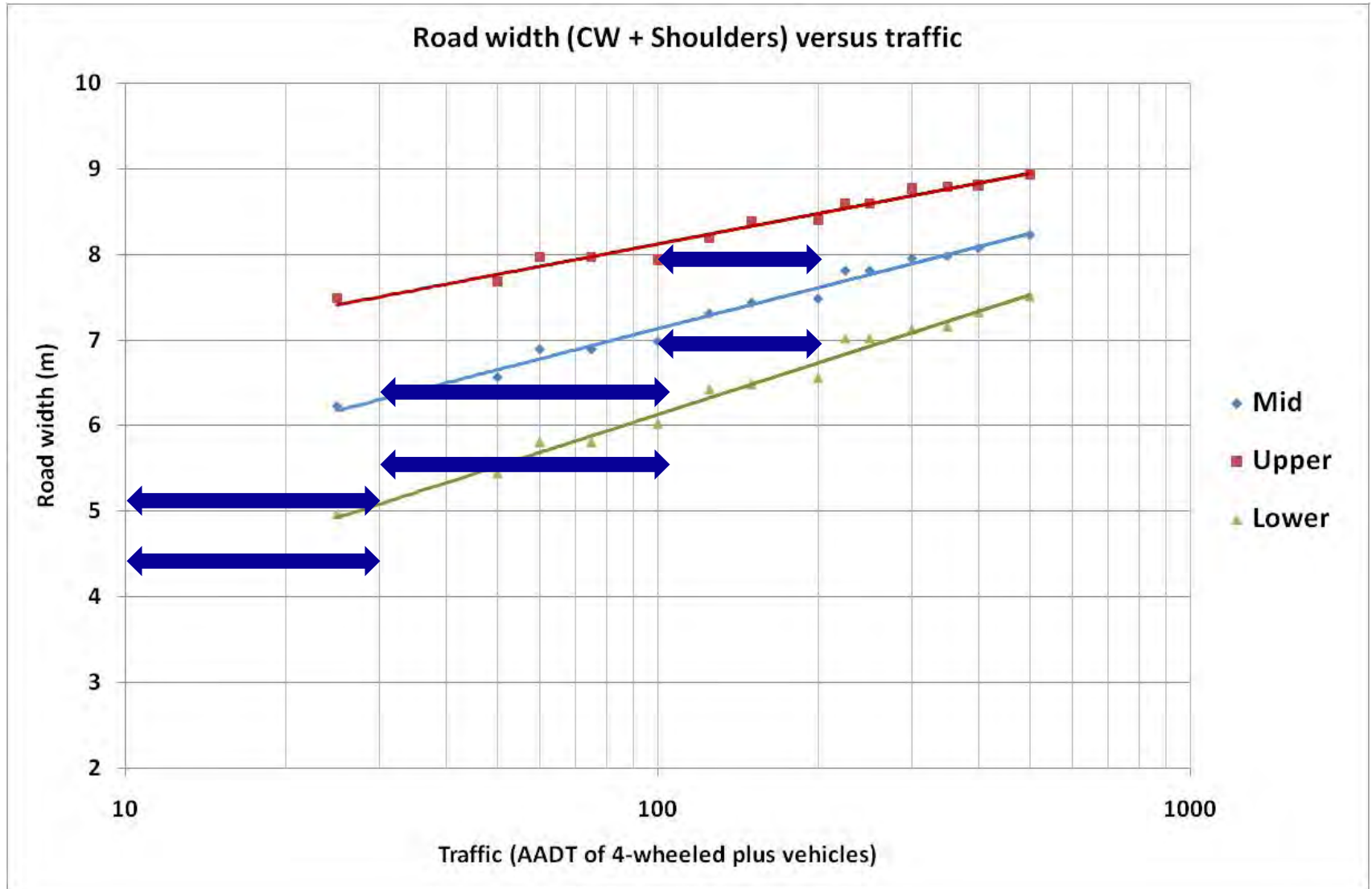
Smaller rural road vehicles



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**



Design speed (km/h) (Cambodia)

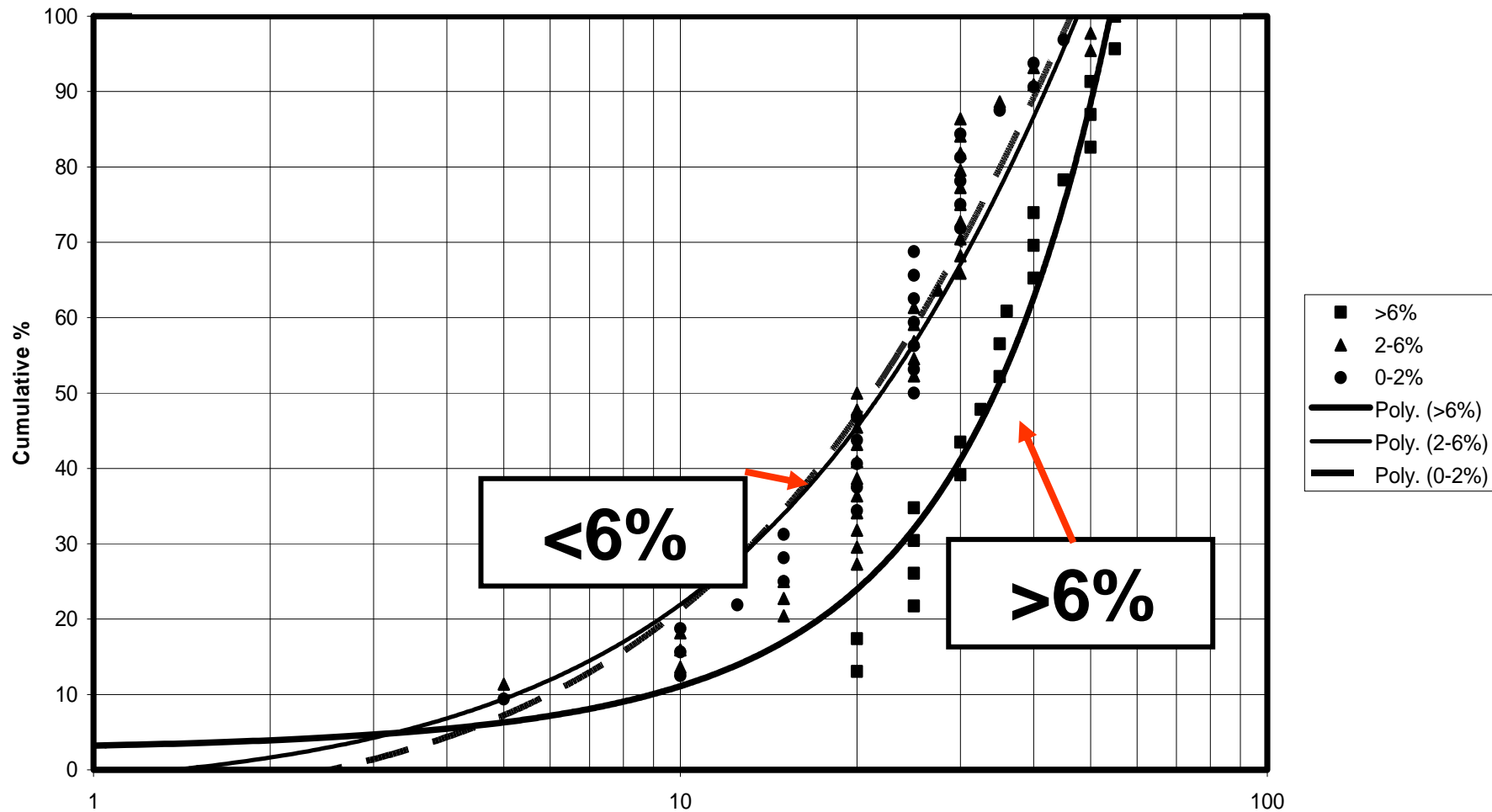
Classification	Flat	Rolling	Mountainous
Rural Road RR 1	60	50	40
Rural Road RR 2	50	40	30
Rural Road RR 3	50	40	30
Rural Road RR 4	50	40	30
Rural Road RR 5	30	30	20

Maximum gradient

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

Note maximum on gravel roads = 6%

Gradient and Gravel Loss: Lao



Gravel Loss mm/yr



The way forward


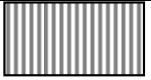
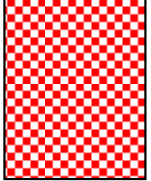
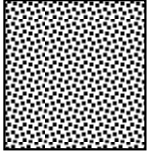

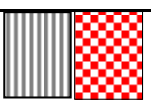



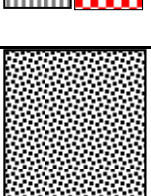
A working framework of effective LVRR Standards and Specifications in place within the public works departments that is :-

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

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

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.



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

