6th symposium on pavement surface characteristics

SURF 2008

Research on Sustainable Paving / Surfacing for Low Volume Roads in Vietnam

by

Robert Petts, global Transport Knowledge Partnership (gTKP)
Dr Jasper Cook, OtB Engineering Ltd
David Salter, South East Asia Community Access Programme (SEACAP)

rob@intech-consult.demon.co.uk
www.gtkp.com
info@otbeng.com or otb_hanoi@fpt.vn
www.otbeng.com
davidsalter@online.com.kh
www.seacap-info.org

Portorož, Slovenia

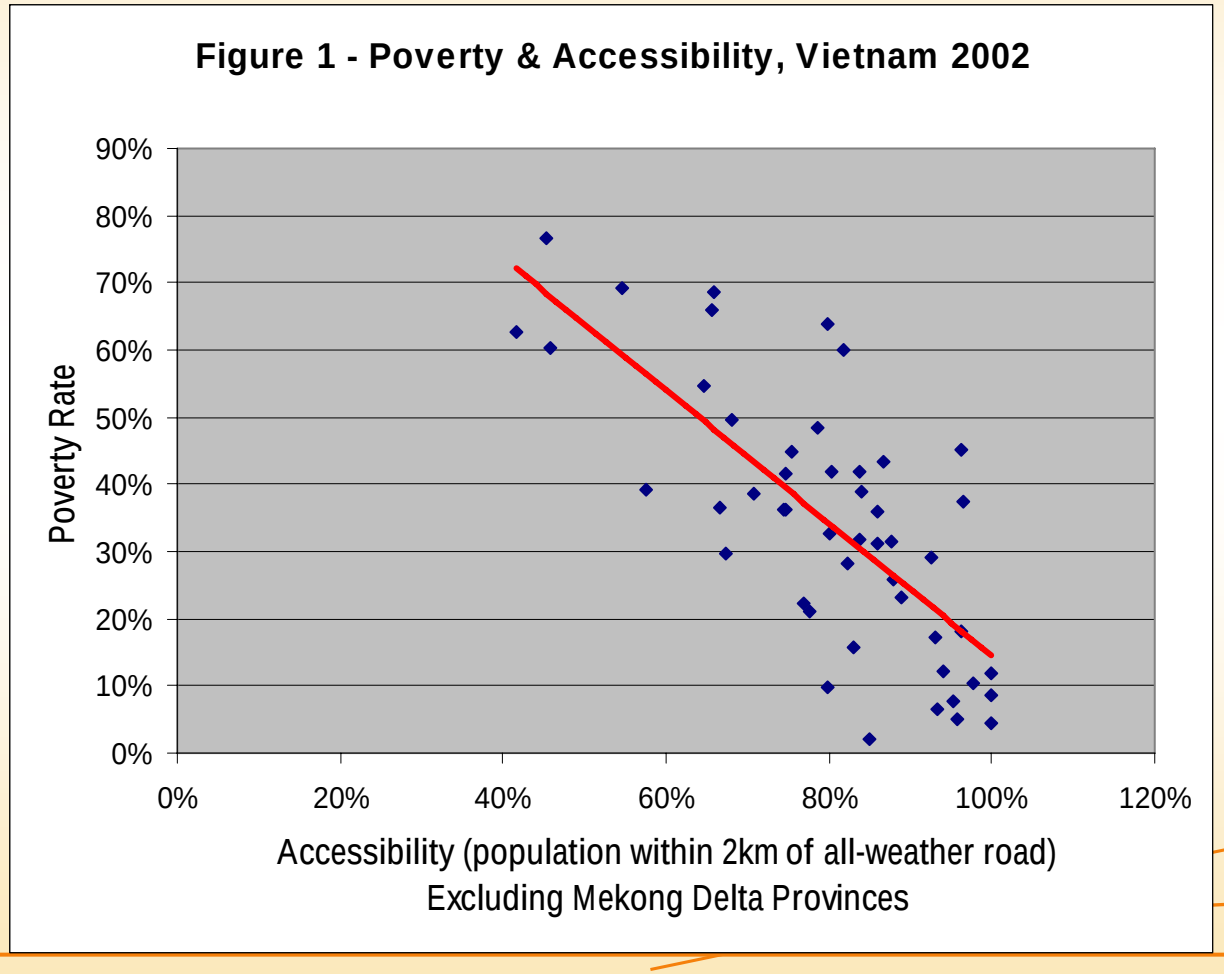
The Message

- There has been an unsustainable reliance on low-initial-cost gravel roads to solve the access problems of poor rural communities in Vietnam. Surface material losses are high and proper maintenance has rarely been achieved.
- A new approach is required, using a ‘menu’ of more durable, low cost, low maintenance, local-resource-based surfaces, using gravel only where appropriate.
- The paper presents the findings of recent LVRR research in Vietnam.

The Presentation

- Poverty is linked to Poor Road Access
- The Limitations of traditional ‘Gravel’ use
- Alternative Surface Options ➔ Reduced Maintenance & more sustainable
- Trials outcomes & recommendations

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 rural communities globally 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 used for rural access roads

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

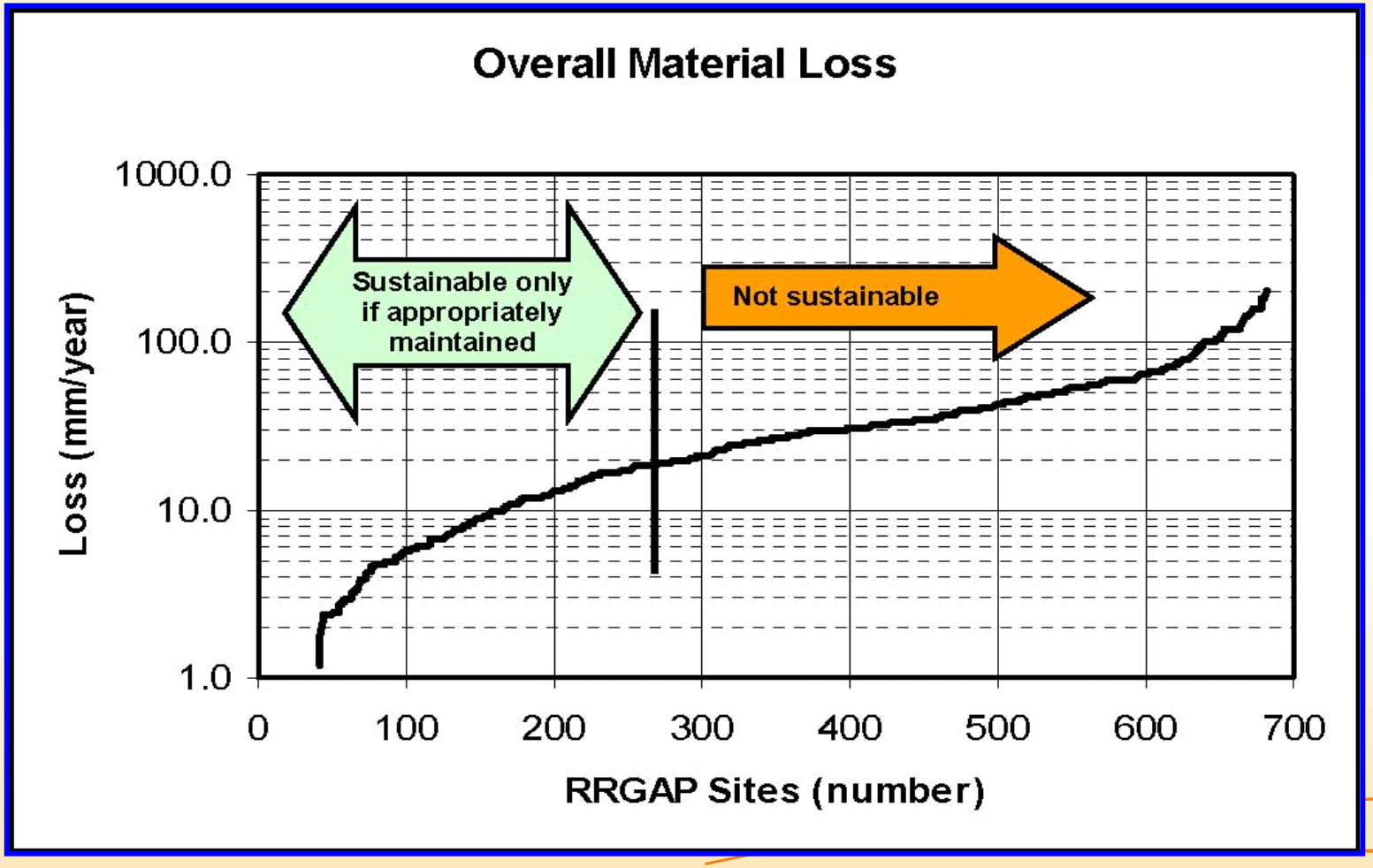
However, they are expensive to maintain (In SEA, typically up to US$1,600/km/year)

A Km of gravel road typically looses 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?*

RRGAP – Survey Gravel Loss on 700 sites

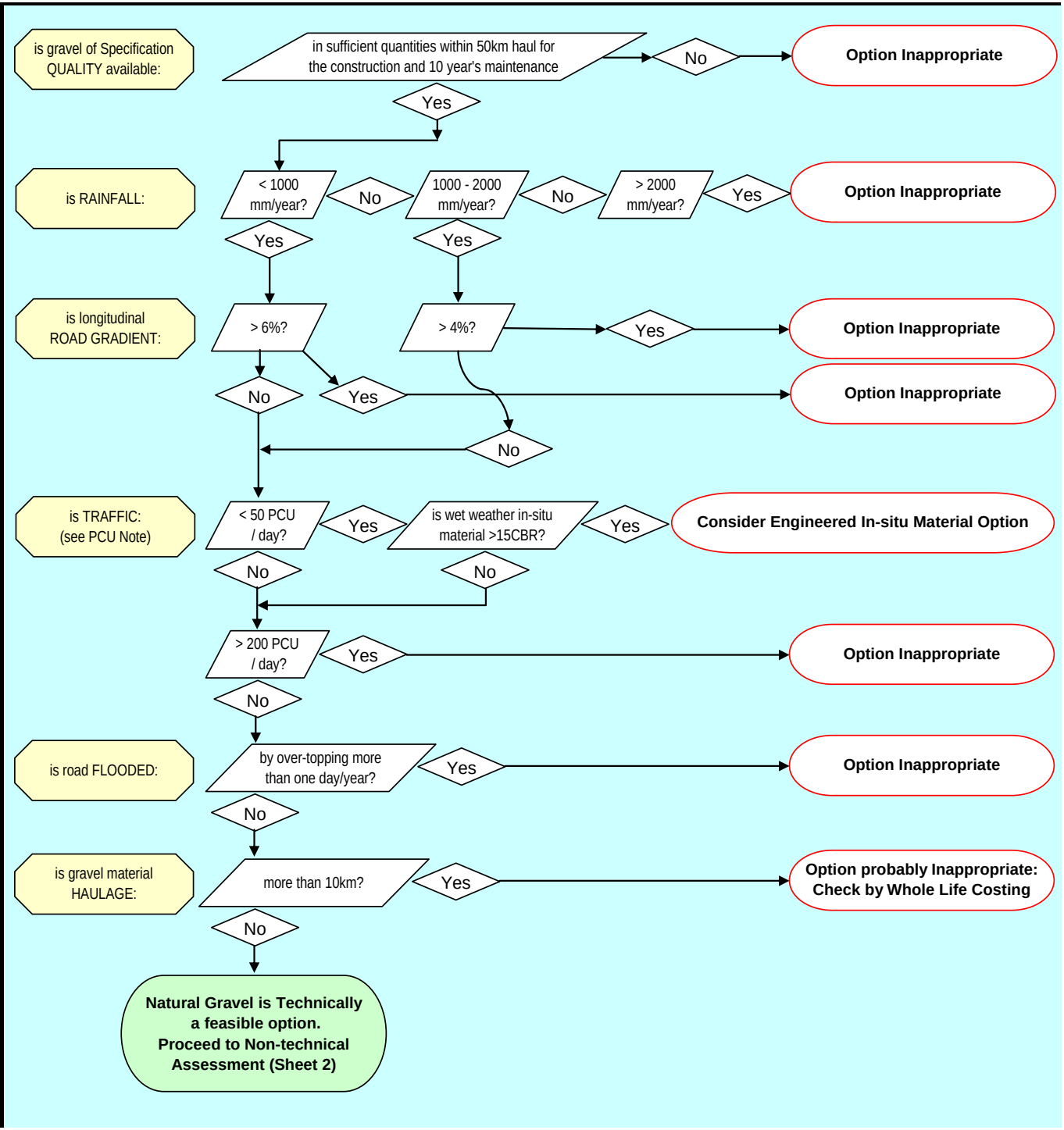


Gravel Surface should not be used where:

- Gravel quality is poor *(it should meet local durability, grading and plasticity specifications/recommendations)*
- Gravel deposits are limited/environmentally sensitive
- Haul distances are long *(suggest cost analysis for haulage >10km)*
- Rainfall is very high *(>2m/year)*, or dry season dust problems
- Traffic levels are high *(more than 200 motor vehicles/day)*
- Longitudinal Gradients > 6% *(>4% if rainfall >1 metre/year)*
- Sub-grade is weak or soaked (flood risk)
- Compaction & thickness cannot be assured *(bad quality control)*
- Camber and side Drainage are not provided, or
- Adequate maintenance is not provided *(on say >50% of network)*

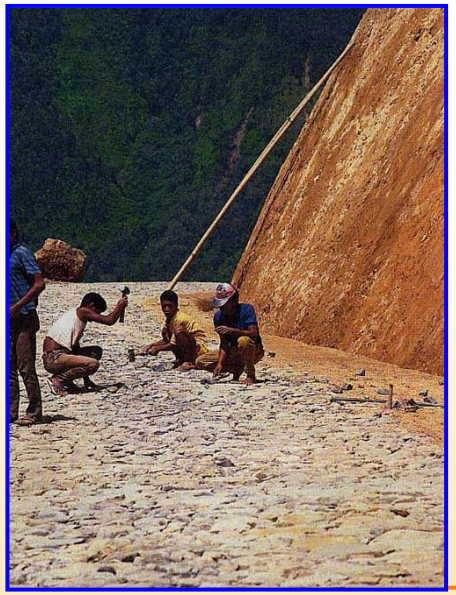
Proposed new Gravel use guidelines

ENGINEERING ASSESSMENT



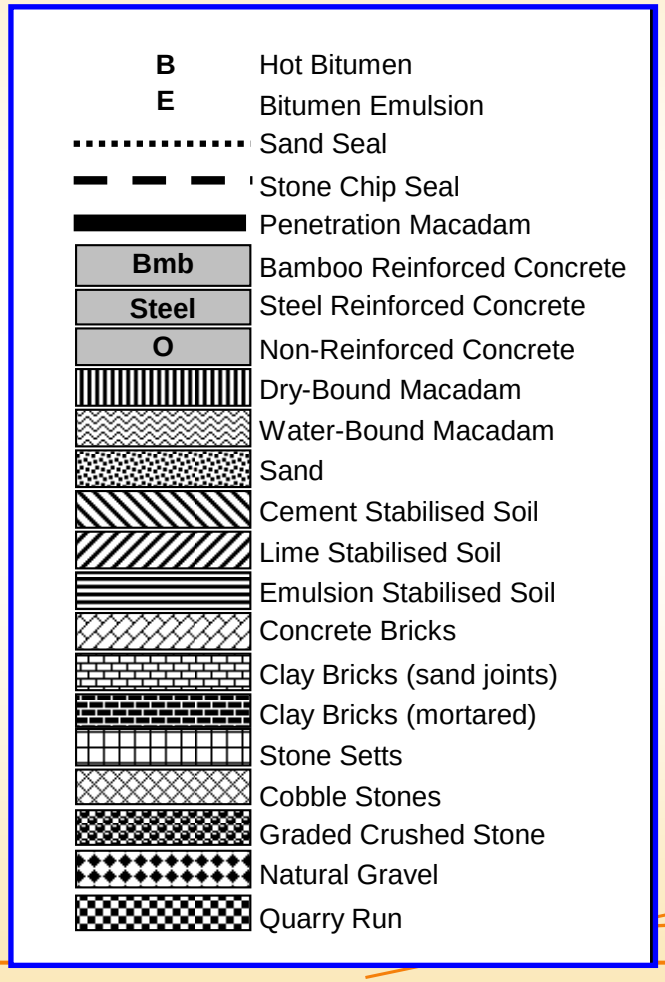
There are many PROVEN Alternative Surface Options using:

- Stone
- Bitumen
- Concrete
- Brick



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

Range of Material Options trialed



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Trial Locations

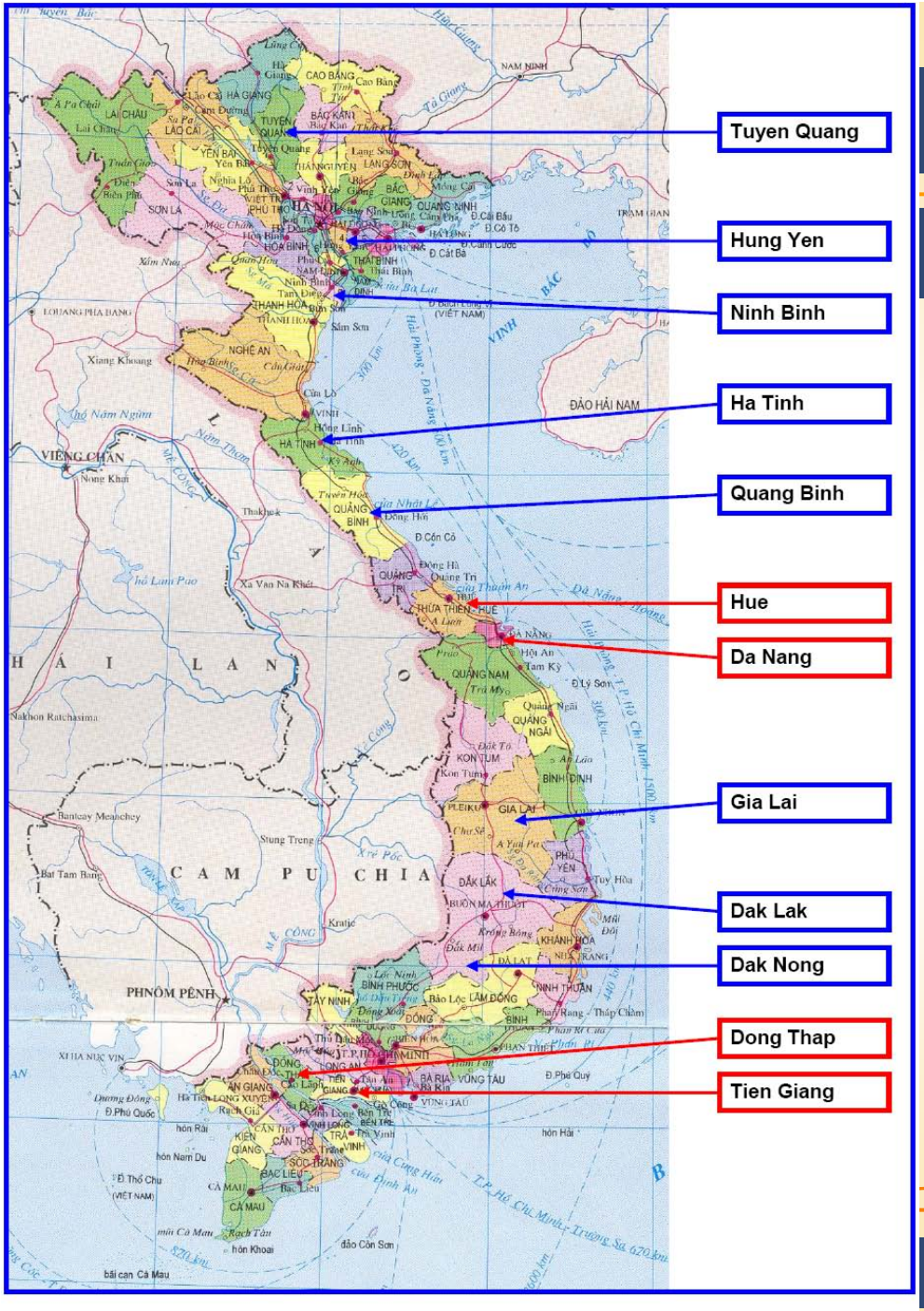
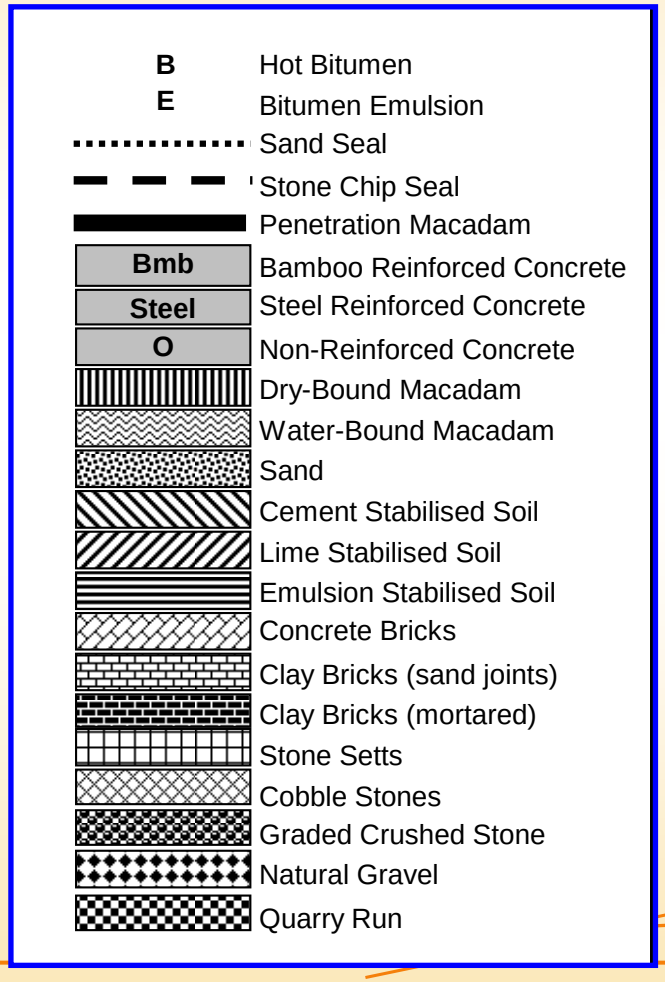


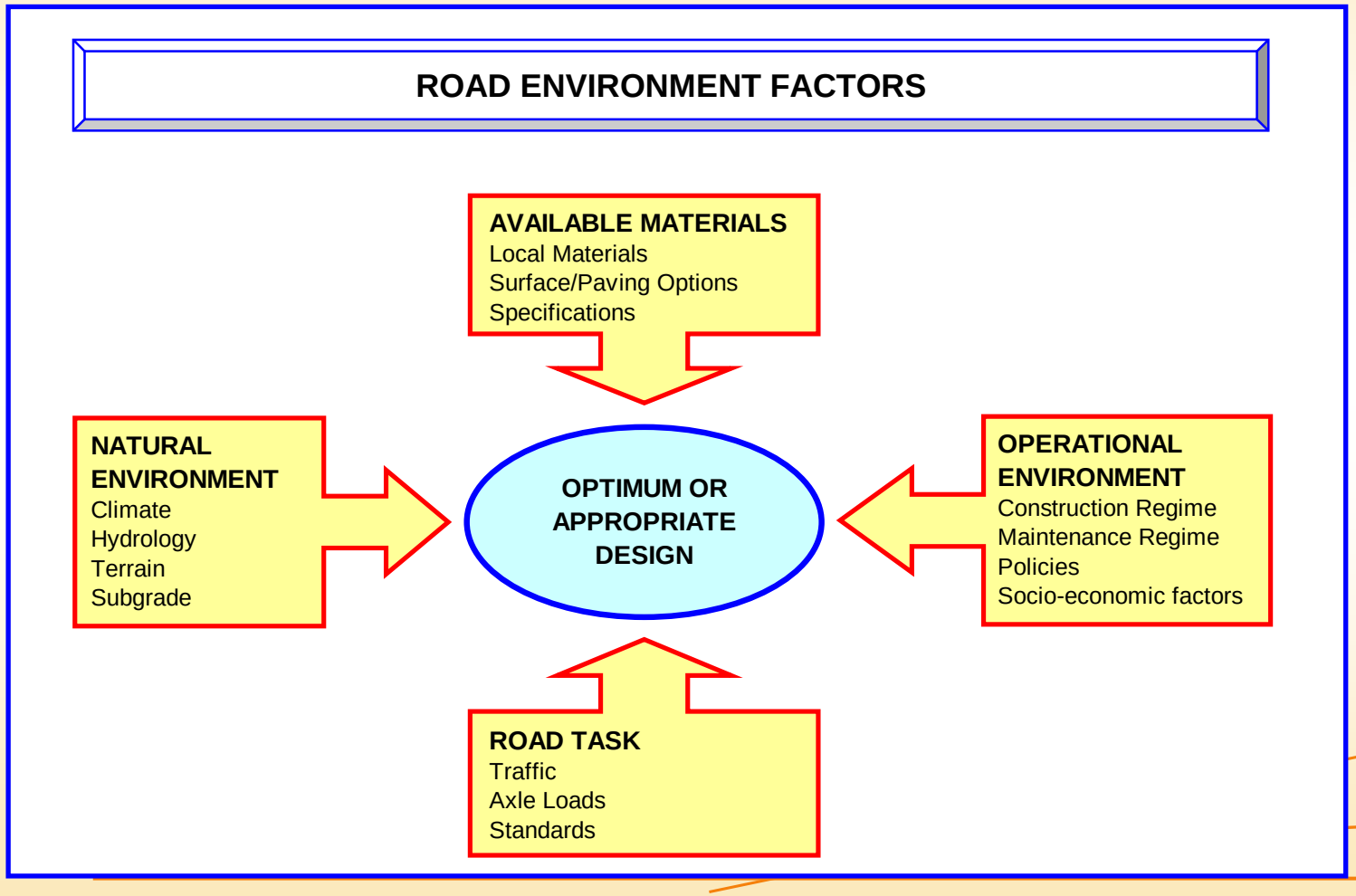
Figure 1.1: RRST-I and RRST-II Provinces

Portorož, Slovenia

Range of Material Options trialed



Factors that should influence surface/paving selection



Factors that should influence surface/paving selection

Final surfacing and paving selection should be based on a **Whole Life Costing** of feasible alternatives that make sustainable and environmentally acceptable use of the locally available resources. Realistic assessment of the likelihood of adequate maintenance should be an essential component of this process.

Local guidelines should be developed based on **Whole Life Costing** to facilitate local decision making.

Research into Practice

The Vietnam RRSR has yielded three key outcomes.

- The use of unimproved natural gravel as a universal rural road surfacing material has been proved to be unsustainable in over 60% of the situations in Vietnam.
- There are far more sustainable alternative technologies that can be used instead of gravel. This has led to a substantial change in the technical approaches used by the MoT on rural roads. Outcomes of the RRSR are now being incorporated into the third World Bank funded RTP project (US$ 150million), as well as other investment programmes in Vietnam.
- Guidelines are being produced for affordable, appropriate, sustainable use of local resources to deliver Rural Road solutions.

Further Information

There are two important dissemination forums supporting Low Traffic Volume Rural Roads (LVRR) knowledge in SEAsia:

global Transport Knowledge Partnership:

www.gtkp.com

SEACAP **Southeast Asia Community Access Partnership**:

www.seacap-info.org

Further information on the Vietnam and other LVRR research can be obtained from the above websites and the gTKP Rural Transport Theme Champion: rob.petts@gtkp.com , Jasper Cook: info@otbeng.com and David Salter (SEACAP): davidsalter@online.com.kh