Effective Use of Natural Resources in Rural Infrastructure Development

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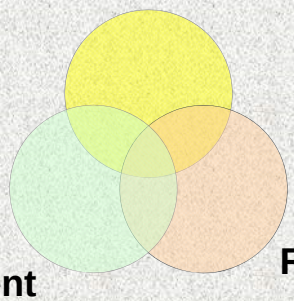
SEACAP 19

Presentation

- **Sustainable Roads**
- **Appropriate materials use**
- **SEACAP 19 Pilot materials database**

Available Materials



Road Environment

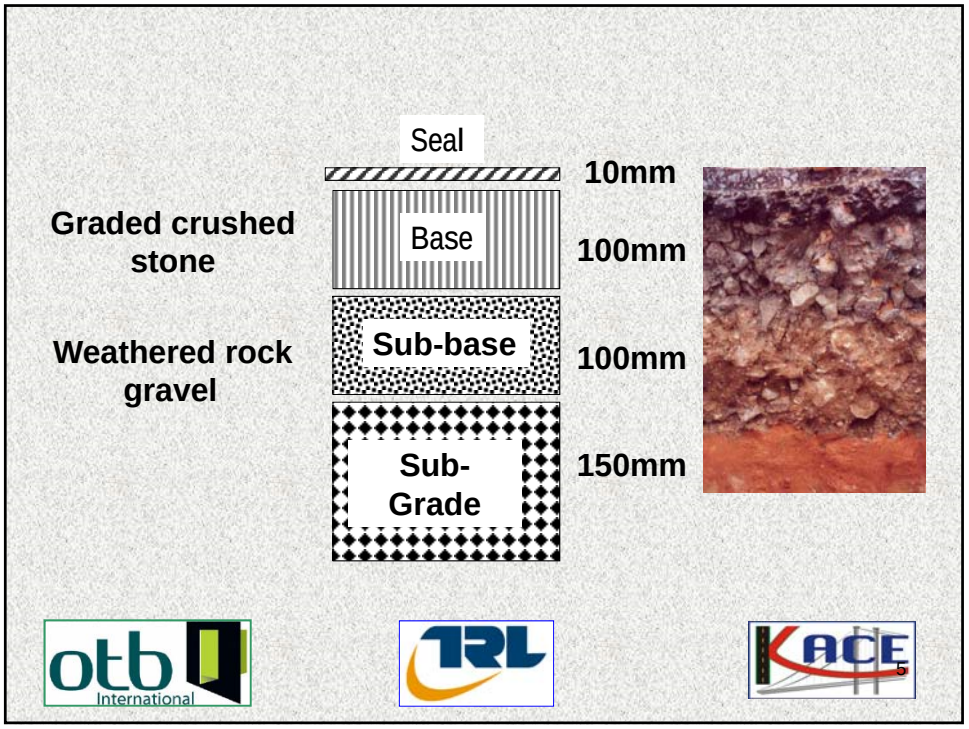
Road Task

SUSTAINABLE RURAL ROADS

Sustainable Road Construction

A key objective in sustainable rural road construction is to best match the available construction material to its function in the road.

This relies greatly on the appropriate use of local construction materials.



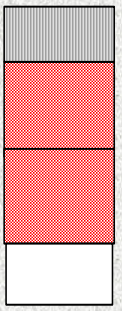
Locally Available Materials

Use of local materials is essential where reserves are limited or of marginal quality, as they may be in certain rural areas of Cambodia.

That means that specifications and designs must be suited to local materials.

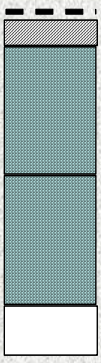
Good Natural Gravel Available

	Thickness mm
Emulsion sand seal	
Crushed stone armouring	70
Natural gravel, CBR >30%	100
Natural gravel, CBR >30%	100



Lack of Good Aggregate

	Thickness mm
Emulsion sand & stone chip seals	20
Lime stabilised soil, CBR 65%	150
Lime stabilised soil, CBR 30%	150



Appropriate Use

It is important to use materials relevant to their role in the road, that is, to ensure that they are neither sub-standard nor wastefully above the standards demanded by their engineering task.

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Design & Cost Implications

In road construction the location of natural materials is generally a specific task for each project.

This uncertainty regarding the location and nature of acceptable materials, usually leads to uncertainty in design and higher costs.

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The Pilot Materials Database

A National Road Materials Database (NRDM) can play a key role in the dissemination of information on local materials and indicate their most appropriate use. Hence the development of a Pilot Road Materials Database (PRDM) within the current SEACAP 19 project in Cambodia

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SEACAP 19:Task 7

This Task is concerned with establishing a methodology for assembling and managing a database of naturally occurring Cambodian road construction materials**.**

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PRMD Principles

- The database would comprise number of related tables of files
- Database would be quarry-based
- Trialled from a representative selection quarries
- Laboratory testing
- GIS capability within the database
- Links with the existing databases

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Six Related Tables

- Location –quarry locations & environments
- Material –available materials at the quarries
- Product –quarry products
- Sample –materials samples taken for testing
- TestingResultSoil –materials tests on soil samples
- TestingResultStone –materials tests on rock/stone samples

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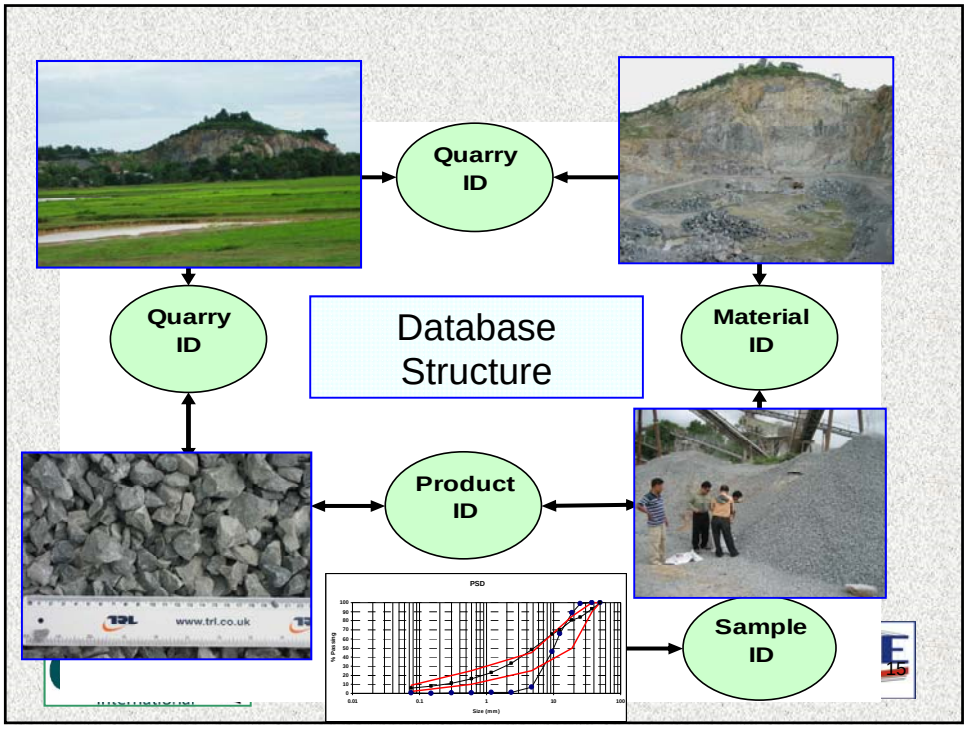
Quarry ID
Quarry ID
Database Structure
Material ID
Product ID
Sample ID
PSD
www.trl.co.uk
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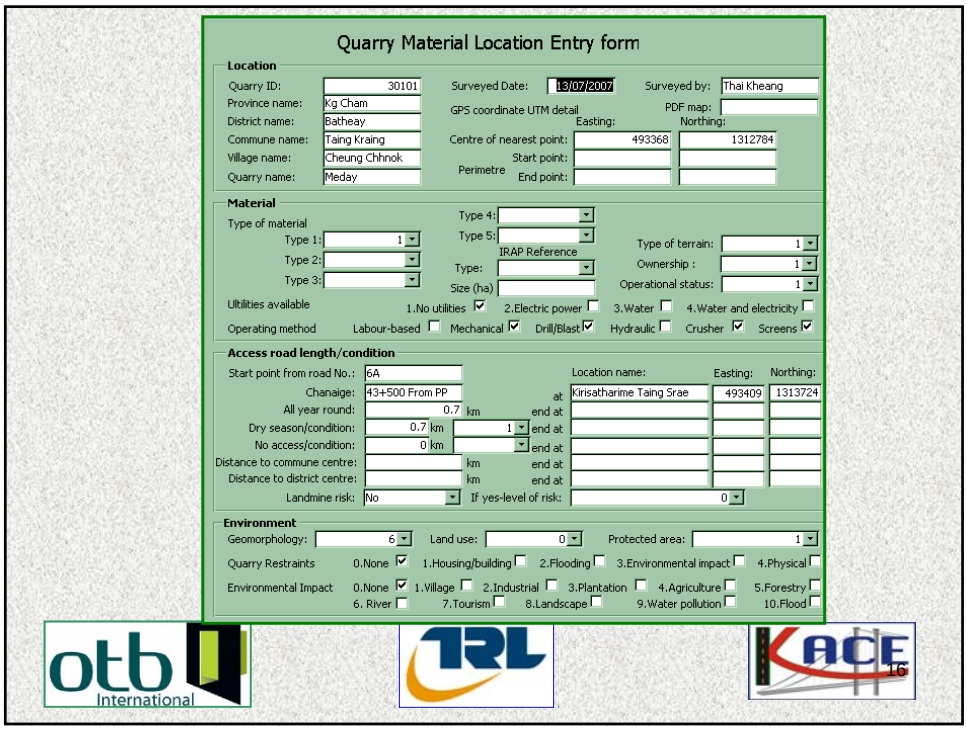
Quarry Material Location Entry form
Location
Quarry ID: 30101
Province name: Kg Cham
District name: Batheay
Commune name: Taing Kraing
Village name: Cheung Chhnok
Quarry name: Meday
Surveyed Date: 13/07/2007
Surveyed by: Thai Kheang
GPS coordinate UTM detail
PDF map:
Easting: 493368
Northing: 1312784
Centre of nearest point:
Perimetre Start point:
End point:
Material
Type of material
Type 1: 1
Type 2:
Type 3:
Type 4:
Type 5:
IRAP Reference
Type:
Size (ha)
Type of terrain: 1
Ownership : 1
Operational status: 1
Utilities available
1.No utilities 2.Electric power 3.Water 4.Water and electricity
Operating method
Labour-based Mechanical Drill/Blast Hydraulic Crusher Screens
Access road length/condition
Start point from road No.: 6A
Chanaige: 43+500 From PP
All year round: 0.7 km
Dry season/condition: 0.7 km 1
No access/condition: 0 km
Distance to commune centre:
Distance to district centre:
Landmine risk: No
Location name: Easting: Northing:
at Kirisatharime Taing Srae 493409 1313724
end at
Environment
Geomorphology: 6
Land use: 0
Protected area: 1
Quarry Restraints
0.None 1.Housing/building 2.Flooding 3.Environmental impact 4.Physical
Environmental Impact
0.None 1.Village 2.Industrial 3.Plantation 4.Agriculture 5.Forestry
6. River 7.Tourism 8.Landscape 9.Water pollution 10.Flood
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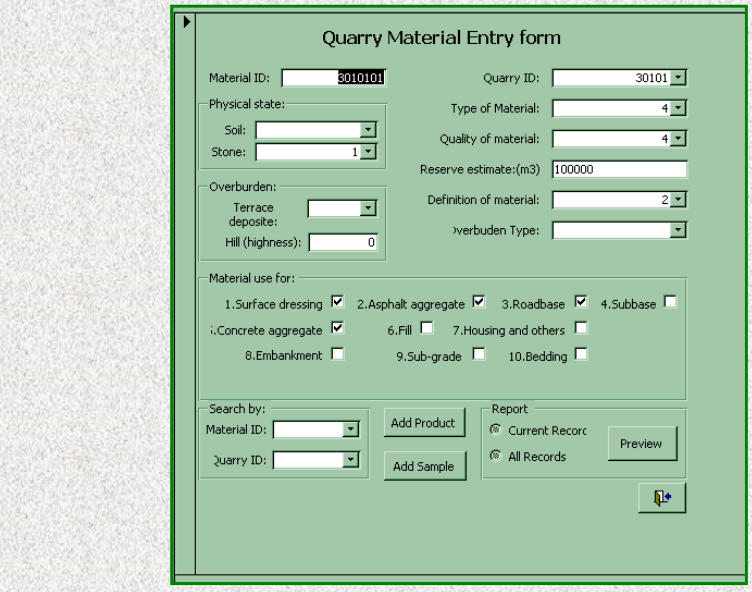

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The Research Output

- A working pilot system for collecting, storing, managing and reporting information on the location and nature of construction materials sources.
- A defined procedure for developing this pilot system into a National Materials Database or Information System.
- Documentation to support 1 and 2 above.

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The research undertaken under SEACAP for the Pilot Materials Database will allow the construction of a National Road Materials Database and hence the more effective use of Cambodia's natural resources in its infrastructure development

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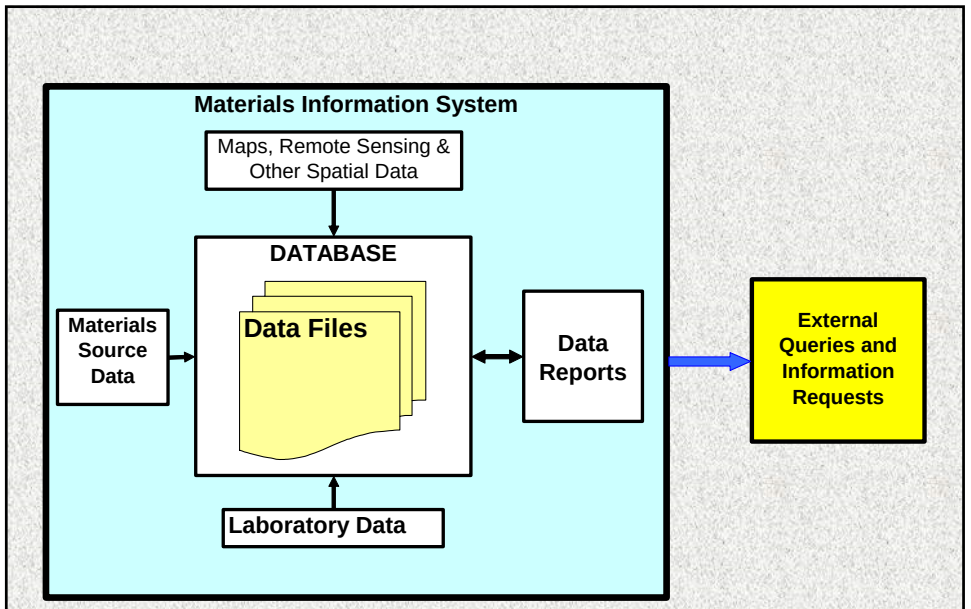

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Stakeholders	Expectations
Local Communities	Better planning of local extractions, more effective safeguards on environmental damage,
Ministries	Data available on the location, properties and costs of materials; more accurate cost planning; more effective use of diminishing resources
Local Research Institutions	Transfer of technology on the procedures for materials location and practical data management.
Donors	Better information for the assessment of road schemes and more accurate cost estimates.

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Requirements

- **Political Will**: The must be a clear commitment at Ministerial
- **Institutional Capacity**: Capacity to manage the database.
- **Technical Capability**: There must be adequate engineers, technicians and IT specialists
- **Financial Commitment**: There has to be an established budget

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