SEACAP 3.02 and 31

Mainstreaming and trialling low volume rural road standards and specifications
Two separate projects:

SEACAP 3.02: LVRR manual

SEACAP 31: Site trials
Recap of key issues:

SEACAP 3

Developing and mainstreaming LVRR standards
1. Appropriate standards – depend upon conditions:
   
   Materials
   Terrain
   Gradient
   Risk of flooding
   Funding
   Rainfall & climate
   Community involvement
   Subgrade
   Health and safety impact
   Access needs
   Green environment
   Construction and maint’ capacity
   Traffic, incl. NMTs & pedestrians

   “Environmentally Optimised Design”
   (Task within Environment)
2. Design varies as the conditions vary:
   * from one road to another
   * along a road

**Variable longitudinal design**
3. Improve priority sections if funds are insufficient

Prioritisation according to:
* Safety
* Passability, etc

**Spot improvements**  (criteria: see later)

(water crossing, hills, villages, flooding, etc)
Stream crossing
Low, wet, impassable

Gravel source

Slippery, eroded, impassable

No people

Village - people

Existing road
Embankment + culvert

Whole length improvement

Chip seal
DB Macadam
Natural gravel
Sub-grade

Natural Gravel

Sub-grade
Spot improvement

Chip seal
DB Macadam 100
Natural gravel 100
Sub-grade

Culvert

Unimproved
4. Target roads:
   * Low traffic – volume, width, axle load
   * Length – c. 5 km
5. Outputs

Part I Road classification
   Geometric standards

Part II Pavement and surfacing options
   Specifications
   Design guidance

Part III Guidance document
Next steps for mainstreaming:

LVRR Manual to present guidance in a site usable style
…………………………..SC3.02

Site trials of the LVRR standards and specifications
…………………………..SC31

Separate projects but run as a single project
SC3.02: LVRR Manual

* July-November 2008
* Review of relevant manuals
* Reworking of LVRR standards and specifications into format for a manual
* Drafting of manual
* Workshop in August to discuss manual with LRD and SEACAP – approved
* Completion in November
LVRR Manual

1. Design process for road in poor condition
   1. Assess budget
   2. Assess traffic
      5 traffic categories (NMT, 3W, Kolao, Isuzu, large)
      Is traffic within LVRR envelope?
      Traffic group – low or medium?
   3. Assess terrain
   4. Select cross section and geometry
      Based upon traffic, terrain and surface
      Exceptions from geometric standards
   5. Look up annual rainfall
   6. Assess local materials
LVRR Manual

1. Design process for road in poor condition

7. Assess construction and maintenance capacity
   Technical ability, resources and maintenance system

8. Survey and analyse the road
   Identify uniform sections – gradient, condition, village, etc
   Measurements – camber, width, etc
   Assess condition – slippery, dusty, impassable, etc
   Assign priority criteria – prioritised spot improvements
   Additional surveys – DCPs, test pits, etc
LVRR Manual

1. Design process for road in poor condition

9. Select and design improvements
   Condition-improvement table
   Pavement and surfacing selection guidance

10. Estimate costs

11. Prioritise the improvements
   Prioritisation guidance – reducing costs

12. Prepare contract documents
LVRR Standards - Road Survey Form

<table>
<thead>
<tr>
<th>Chainage</th>
<th>Road name</th>
<th>Province</th>
<th>Survey start point</th>
<th>District</th>
<th>Date</th>
<th>Surveyor</th>
</tr>
</thead>
</table>

- **Change of uniform section**
- **Road type**: track, earth road, gravel, surfaced
- **Section**: flat, cut, embank, sidelong
- **Water course**
- **Water crossing structure missing**
- **Gradient (%)**
- **Vertical profile**
- **Plan view**
- **Village**
- **Cleanliness**: Carriageway width (m), Shoulder width (m), Freeway when flooded (m)
- **Surface conditions**: Slippery when wet, Dusty when dry, Surface in poor condition, Drainage in poor condition, Flooding (annual, occasional, never)
- **Safety concerns**: Unstable slope, Unstable slope above a village, Accident due to dust
- **Environmental concerns**: Cross section below standard, Geometry below standard, Surface below standard, Pavement below standard
- **Supporting information**: Surface material, pavement material, subgrade soil, samples, test pits, DCP tests, material sources, villages, landmarks, water course measurements, tight curves, sharp crests or dips, reduced sight distance, unstable slopes, safety concerns, environmental concerns, flooding frequency

### Uniform section criteria
- **Gradient (0-1, 2-5, 6-10, >10)**
- **Road type**
- **Width**
- **Village**
- **Risk of flooding**
- **Overall condition**
- **Water course**

### Priority criteria

<table>
<thead>
<tr>
<th>Uniform section criteria</th>
<th>Priority criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gradient (0-1, 2-5, 6-10, &gt;10)</td>
<td>1 Very high risk of injury</td>
</tr>
<tr>
<td>Road type</td>
<td>2 Impassable in dry</td>
</tr>
<tr>
<td>Width</td>
<td>3 Impassable in wet and dry</td>
</tr>
<tr>
<td>Village</td>
<td>4 Moderate risk of injury</td>
</tr>
<tr>
<td>Risk of flooding</td>
<td>5 Likely to deteriorate</td>
</tr>
<tr>
<td>Overall condition</td>
<td>6 Unhealthy (dust, etc)</td>
</tr>
<tr>
<td>Water course</td>
<td>7 Drainage below standard</td>
</tr>
<tr>
<td>Safety concerns</td>
<td>8 Risk of erosion or landslip</td>
</tr>
<tr>
<td>Steep unprotected drop</td>
<td>9 Risk of environmental damage</td>
</tr>
<tr>
<td>Slippery hill</td>
<td>10 Slight risk of injury</td>
</tr>
<tr>
<td>Motorised traffic near people</td>
<td>11 Cross section below standard</td>
</tr>
<tr>
<td>Narrow road</td>
<td>12 Geometry below standard</td>
</tr>
<tr>
<td>Accident due to dust</td>
<td>13 Surface below standard</td>
</tr>
<tr>
<td>Poor visibility - curve or crest</td>
<td>14 Pavement below standard</td>
</tr>
</tbody>
</table>

LVRR Manual – survey form
LVRR Manual – Priority criteria:

1. Very high risk of injury
2. Impassable in dry
3. Impassable in wet and dry
4. Moderate risk of injury
5. Likely to deteriorate
6. Unhealthy
7. Drainage below standard
8. Risk of erosion or landslip
9. Risk of environmental damage
10. Slight risk of injury
11. Cross section below standard
12. Geometry below standard
13. Surface below standard
14. Pavement below standard
LVRR Manual

2. Design process for a new road
   Differences:
   * More flexibility on alignment
   * Unable to use condition to assess a road

3. Appendices
   Design charts from standards (traffic and subgrade)
   Guidance on shoulders, safety, slope protection, etc

4. Example calculations – traffic, pavement design

Trials → Completion → Translation
SC31: Trials – Design and Construction

Trial of LVRR Manual
Trial of LVRR Standards and Specifications
Training

* Samphan Road, Phongsali Province
* LSRSP III road improvement and gravelling contract
* Currently has been opened over 30 km – not full width
* 54 km – focus on the first 10 km
* Additional pavement improvements – c. 2 km in total
Manual trials

Initial site visit in June 2008

Week 1 – early September
4 days of trialling and training
Given by LTEC and TRL

Attendees
- DPWT Phongsali
- OPWT Khoa, Samphan, Bountai
- LRD

Contractor
Site supervisor
National University of Lao

Week 2 to follow
Manual trials – week 1

Day 1: Explanation of the manual
  Discussion
  Preparation for survey

Day 2: Survey of 10 km of Samphan Road in groups

Day 3: Identifying sections for improvement
  Selecting improvements for sections
  Preparation of group presentations

Day 4: Group presentations
  Discussions
  Group selection of improvements
  Discussion of manual

Lots of interest in the concepts, the trials and the manual
Group selection of improvements

Focus on:

Villages
Steep sections
  (health and safety)

(unable to focus on poor condition or passability)
Caveats about the trial use of the manual on Samphan Road

* Road is long and is likely to attract higher and heavier traffic

* Unable to use condition as an indicator

* Need to measure gradients accurately

* Restriction to pavement improvements
Manual trials – week 2

Need for road to be fully widened and formed ready for gravel
Delays due to rain and landslides
Soaked CBR tests carried out

Week 2 is planned – same participants:
1. Discussion of pavement standards and design methods
2. Site visit
   Confirm gradients
   DCP tests & comparison with soaked CBRs
3. Design work
4. Finalisation of design
After week 2:

LVRR Standards and Specifications trials

Construction of trial improvements
Supervision and training
Monitoring

Demonstration of spot improvements
Improved low volume rural access
Sustainability

This phase or next phase?