Improving Road Safety for North Eastern State Roads of India – A Case Study

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Key figures of North Eastern States Road Project

- Total area of the region is about 2,55,168 Sq. Km and characterised by bio-diversity, rich precipitation and high seismicity.
- Road Transport dominates domestic transport. Hilly to Mountainous terrain with poor road condition leads to high accident rates.
- Total project cost $430 million (including contingencies, interest during construction and other charges) with 70% ADB assistance ($300 million).
- Implemented will be at three phase programme:
  - Tranche 1: 284 km
  - Tranche 2: 371 km
  - Tranche 3: 452 km
General photographs of the road covered

- Non existence of Bituminous surface
- Worn off bituminous surface
- Land slide prone stretch
- Highly distressed pavement / shoulder
Road considered for present study

- Tranche 2 Road (Champhai – Khawbung 68 km)
- Tranche 2 Road (Tupul – Kasom Khullen 123.3 km)
- Tranche 2 Road (Rumtek Jn of NH 31A – Sang 24.30 km)
- Tranche Road 3 (Mawshynrut – Hahim (Assam border 36.80 km)
Location plan
(Champhai–Khawbung)
Location plan

(Tupul – Kasom Khullen)
Location plan
(Rumtek Jn of NH 31A – Sang)
Location Plan
(Mawshynrut – Hahim (Assam border))
Outline

Background technical issues

- An integrated technical approach to road safety problems

- Other Road safety issues on NESRIP roads
  - Driver behaviour
  - Children
    - Measures for altering driver behaviour

- Ancillary issues
  - RSA walk-over inspections
An integrated approach to road safety problems

- AASHTO's NCHRP Report 500
  - AASHTO's Strategic Highway Safety Plan
  - Integrated actions
  - 22 key emphasis areas
  - Implementation guide - NCHRP Report 500
  - 23 volumes, completed in March, 2009
Emphasis areas in general
(crash scenarios and contributing factors)

1. Aggressive Driving
2. Crashes involving Unlicensed Drivers
3. Collisions with Trees in Hazardous Locations
4. Head-On Collisions
5. Unsignalised Intersection Collisions
6. Run-Off-Road Crashes
7. Crashes on Horizontal Curves
8. Collisions involving Utility Poles
9. Crashes involving Older Drivers
10. Collisions involving Pedestrians
11. Increasing Seat Belt Use
# Road infrastructure safety management

<table>
<thead>
<tr>
<th>New Schemes</th>
<th>Existing Roads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Safety Impact Assessment</td>
<td>Black Spot Management</td>
</tr>
<tr>
<td>(RIA)</td>
<td>Network Safety Management</td>
</tr>
<tr>
<td>Road Safety Audit</td>
<td>(BSM)</td>
</tr>
<tr>
<td>(RSA)</td>
<td>(NSM)</td>
</tr>
<tr>
<td>Road Safety Inspection</td>
<td>Pro-Active</td>
</tr>
<tr>
<td>(RSI)</td>
<td>(Prevention)</td>
</tr>
<tr>
<td>Re-Active</td>
<td>(Cure)</td>
</tr>
</tbody>
</table>

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Black spots observed during study
Poor Road Geometrics
very poor pavement condition
In sufficient formation width
Geometrically deficient intersection

B.T Road junction to Zokhawthar (Burma border)

Km 70: Khawbung junction with road to North Vanlanphai
Landslide prone stretches

Km 25.0 Landslide area Champhai – Khawbung

Slip Zone (Rumtek Jn of NH 31A – Sang)
Structurally inadequate / poor condition of CD structures

Existing narrow minor bridge prone to submergence by about 50 cm

Partially choked Pipe Culvert

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Lack of road protection work

Damaged retaining wall and pipe culvert without parapet wall

Rock on Both Side of project road at Km. 18.70 (Mawshynrut – Hahim)
Lack of traffic safety features

Damaged retaining wall and pipe culvert without parapet wall

Road passing through built up areas (Tupul – Kasom khullen)
Submergence area

Water flows over the pavement at km 10 Rumtek Jn of NH 31A – Sang

Km 1 Champhai – Khawlumng road
Tree avenues / unplanned utilities on carriageway
Peoples ignorance on safety

Road junction at Yairipok (Tupul – Kasam khullen road)

Roadside quarrying at km 26 by PWD at Champhai – Khawbung road
Technical Proposals to address road safety issues

- **Improvement of Geometrics**
  - Easing of horizontal curves / gradient
  - Widening is proposed to the extent possible by hill side cutting
  - Land acquisition avoided extent possible
  - Realignment of stretches / raising of submergence zone above HFL

- **Formation Width**
  - Pavement width of 6.9m (5.5 m + 0.5 m widening at curves less than 300m. radius + 0.9m paved shoulder on hill side.)
  - Formation width 7.8m (6.9m pavement + 0.9m unpaved shoulder on valley side)
  - Formation cut will be 8.7m(7.8m. formation width + 0.9 m drain)

- **Proposals on CD structures / Bridges**
  - Narrow and inadequate culvers are proposed for reconstruction
  - Bridges in good conditions proposed for retain / others reconstruction / few new proposals
Technical Proposals to address road safety issues …contd

- **Proposals on drainage**
  - lined drains are proposed all along the hill side between the shoulder edge and the toe of hill cut.

- **Proposals on road protection**
  - Retaining wall / Breast wall / Parapet / Edge Stones / Delineators

- **Junctions / Intersections**
  - Designed with peak hour traffic and according to IRC guidelines (IRC:SP 41)

- **Bus Bays**
  - Bus bays are proposed according to the discussion with local PWDs

- **Traffic Signs**
  - Retro reflective traffic signs are provided along the road sections as per IRC guideline
Road safety issues

Drivers behaviour

Conclusion

• Regulatory measurement for overtaking / over loading
• Where speed limitation is crucial, use speed breakers
• Drivers education / training specifically for hill road section
Children are most vulnerable to traffic

Conclusion:

- Road safety awareness campaigns and road user education campaigns should target the adult population of habitations.
- Where child playing areas border the road, the provision of a physical barrier should be provided to stop the random movement of a child onto the road.
Measures for altering drivers behaviour

- Hazard signs
- Directional sight boards
RSA – walkover inspections
Conclusions – Basic principles

- Include items on traffic generation potential and multi-connectivity identification in the RIA and RSA checklists
- Identify crash barrier sites as part of the RSA and RSI processes
- Include walk-over surveys as part of the RSA process
- Improve the standard design for road geometrics / CD structure, with particular regard to
  - protection,
  - Hydraulic capacity and
  - Provide full width as required
- Manage vehicle speed by
  - implementing the guidelines for the provision of speed breakers
Conclusions – Basic principles

- provide better information to drivers at critical locations by
  - using hazard markers at all culvert headwalls,
  - at any obstruction in the shoulder
  - using directional sight boards at sharp curves and bends
  - installing signs and markings at main road intersections
- provide a required design road way at all times by
  - maintaining the integrity of the shoulder (level, shape and condition), and
  - ensuring that batter slopes are not steeper than 2H:1V and are protected by stone pitching or turfing where necessary
- protect children in habitations by providing
  - low stone walls or physical barriers where child play areas are immediately adjacent to the road
Thank you,

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