DEVELOPING ROAD SAFETY SCREENING AND APPRAISAL TOOL FOR WORLD BANK PROJECTS

Transport Global Practice

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Motivation for developing a new tool

• What the Bank stands for in Road Safety?
• Integrating economic cost-benefit analysis
• Project-level safety efficiency analysis
• Model relevant to LMIC environment (rural, inter-urban, urban)
• Burden on data collection, time, expertise and cost of evaluation
Purpose of the Tool

Lack of an appropriate Road Safety Efficiency Tool to use during WB project appraisal

Ex-ante outcome assessment (with & without project) with traffic growth and operating speeds

Support meeting the new ESF requirements
Diagnostic to evaluate project design early on
Meet WBG threshold for safety performance

Fits the broader set of assessment tools for evaluating multi-sectoral risk factors
Where does the Tool fit in project cycle?

<table>
<thead>
<tr>
<th>Road Infrastructure Safety Management stage</th>
<th>Procedure/Tool</th>
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| Planning and Design                        | • Road Safety Impact Assessment  
• Efficiency Assessment Tools  
• Road Safety Audit |
| Construction and Pre-Opening               | • Road Safety Audit |
| Normal Operation                            | • Road Network Operation  
• Safety Performance Indicators  
• Network Safety Ranking |
| Maintenance and Renewal                    | • Road Network Operation  
• Road Safety Inspection  
• Road Assessment Program |
| Error Correction and Hazard Elimination    | • High Risk Sites  
• Road Safety Inspection  
• Road Assessment Program  
• In-depth investigation |
| Major upgrading and renewal                | • Road Safety Impact Assessment  
• Efficiency Assessment Tools |

Source: adapted from Persia et al., 2016
Package of Infrastructure Safety Management Tools

- Road Safety Impact Assessment (RIA)
- Road Safety Audit (RSA)
- Road Safety Inspection (RSI)
- Black Spot Management (BSM)
- Network Safety Management (NSM)

Preventive Strategies:
- New Schemes

Reactive Strategies:
- Existing Roads
Steps in using the new WB screening process (RSSAT)

Identifying homogenous sections on project roads (segment + intersection)

Enter baseline crash data (fatalities/serious injuries) by road-user types

Enter physical characteristics of the homogenous section (cross-sectional profile)

Enter operating speed and traffic flow information (AADT)

Enter traffic flow information about non-motorized users

RSSAT is pre-filled with research-based CMF values and factors for speed and traffic flow risk factors (each road type & road user)
Outputs from the Tool

Change in fatalities (project design vs. baseline condition) – each road user group

Absolute road safety metrics – fatalities/km, fatalities/veh-km driven

Cost benefit (20 year period) – adjusted for AADT growth
Overview of the Tool

Inputs

- Pedestrian, bicyclists and motorcyclists flow
- Traffic data
- Crash data
- GDP per capita and growth
- Road designs attributes

Processing

- Road Safety Risk
- Road Safety Benefit
- Project Safety Impact (PSI)

Outputs

Excel-based Tool: User Input-Output with locked model parameters
Overview of the Tool

Vehicle Occupant  |  Motorcyclist  |  Pedestrian  |  Bicyclist

Baseline condition  ↔  Project design

Physical Attribute CMFs

X

Operating speed

X

Traffic volume (and NMT flow)

=

Relative change in fatalities

→

Cost benefit
Managing projects to deliver road safety results

- Use the Tool early with designs in preliminary stage – negotiation and budget discussion with client
- Not use as pass/fail checklist, diagnose the issues iteratively to maximize the opportunity for improvement
- Not a substitute for audit or inspection process
- First priority on changing the road cross-section design and features
- Focus on separated facilities for vulnerable road users
- The second iteration of model improvement should focus on speed management (design change, warnings etc.)
- Beyond RSSAT, to further improve focus on non-engineering measures (enforcement, vehicle standards, post-crash, risk factors)
Conclusion

• Tool still under internal development – pilot testing phase

• Team would be happy to test the Tool on planning/design stage projects (with available data)

• Opportunities to improve the model using available research data (applicability to LMIC environment)
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