ADVOCATING THE NON–MOTORISED TRANSPORT AGENDA

APPROACH TO TYPICAL NMT ROAD SAFETY INVESTIGATION

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24 May 2017
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- NMT road safety study approach
- NMT road safety study process
THE NEED FOR NMT SAFETY STUDIES
Is there is need for NMT safety studies?
In this photo there are at least four road users:
1. Two drivers
2. Two pedestrians

Road safety studies traditionally consider:
1. The road/road environment
2. The road user (humans)
3. The vehicle
1. Driver of the vehicle from which the photo was taken
2. Pedestrian
3. Vehicle
4. Pedestrian
No street lights!

Vehicle

Pedestrian
Pedestrian
Is there is need for NMT safety studies?

Yes, definitely!
The lack of safe NMT infrastructure often lead to complex situations where there is a high risk of a fatality, if any of the road users make a mistake or act unpredictable.
NMT safety in context
2013 Household travel survey - Main mode of transport of Households

Source: Transport series volume I: Profile of on-motorised transport users (In-depth analysis of the National Household Travel Survey date), 2013

306 000 (2.2%) households use NMT.
2013 Household travel survey - Main mode of transport of Workers

30.8% Train
7.6% Car/bakkie/truck driver
7.6% Car/bakkie/truck passenger
5.0% Walking all the way
26.5% Bicycle
22.2% Bus
7.6% Taxi
0.2% Other
1.1% Animal drawn transport

2.9 mil. (22.2%) workers use NMT.

% of workers who walk all the way to their educational institution

Source: Transport series volume I: Profile of on-motorised transport users (In-depth analysis of the National Household Travel Survey date), 2013
2013 Household travel survey - Main mode of transport of learners

Source: Transport series volume I: Profile of on-motorised transport users (In-depth analysis of the National Household Travel Survey data), 2013

- 12,7 mil. (63,5%) learners use NMT.
- 2,7 mil. learners walk all the way for 30 to 60 minutes.
- 0,7 mil. learners walk more than 60 minutes.

More than 60 minutes

Source: Transport series volume I: Profile of on-motorised transport users (In-depth analysis of the National Household Travel Survey data), 2013
South African Road Fatalities - 2016

Fatalities per road user class - 2016

- Drivers: 25.6%
- Passengers: 32.7%
- Pedestrians: 38.4%
- Cyclists: 3.2%
- Unknown: 0.0%

NMT – 41.6%.

In 2016:
- 11 767 total crashes.
- 14 071 fatalities.

No of fatalities:
- 5 410 pedestrians.
- 451 cyclists.

Contributing factors to road fatalities - 2016

- Human Factors: 77.5%
- Vehicle Factors: 6.0%
- Road & Environmental Factors: 16.5%

Source: RTMC Road Traffic Report 1 January to 31 December 2016.
South African Road Fatalities - 2016

Causes of fatalities related to human factors - 2016

- U-turn: 1.1%
- Turned in front of oncoming traffic: 2.4%
- Speed too high for circumstances: 14.1%
- Overtook across barrier line: 1.5%
- Overtook in face of oncoming traffic: 6.9%
- Jay-walking pedestrian: 38.8%
- Intoxicated pedestrian with...: 1.8%
- Intoxicated driver with liquor/drink...: 3.6%
- Intoxicated cyclist with liquor/drink...: 0.1%
- Hit and run: 18.5%
- Followed vehicle too closely: 1.9%
- Fatigue: driver falling asleep: 2.2%
- Disregard for yield sign: 0.3%
- Disregard for stop sign: 2.2%
- Disregard for red traffic lights: 1.5%
- Cell phone holding/usage: 0.3%

Source: RTMC Road Traffic Report 1 January to 31 December 2016.
South African Road Fatalities - 2016

Causes of fatalities related to road and environmental factors - 2016

Source: RTMC Road Traffic Report 1 January to 31 December 2016.
Vehicle speed and NMT safety

The human body can withstand impacts at speeds at which a person can run!

Likelihood of a fatality for road users increases exponentially with speed.
Summary

Road authorities and engineers cannot ignore NMT as an important mode of transport in its own right.

There is a need to:

- provide well-designed NMT infrastructure which integrates with public transport services.
- develop a safer road environment that allows NMT users their fair share of the available road space.
NMT SAFETY STUDY APPROACH
Humans drive, walk, cycle etc.:
• In the road environment;
• Influenced by:
  o Education related to the use of the road system;
  o Information from the road environment; and
  o Enforcement of road rules.
➢ Perception of safety and crash risk.
• Humans as a (varying) limited ability to process information during a potential crash situation.
• Need to promote and design:
  o Safer vehicles;
  o Forgiving roads and roadsides;
  o Appropriate (safer) speeds.
  o Given that human body can sustain limited physical force.

Safer travel, with alert road users, making the correct choices with regard to the use of the roadway.

Source: RTMC SARSAM (2012), from Austroads.
Scope of NMT Safety Studies

Given complex environment, the scope of NMT safety studies can therefore not only be NMT behavior and facilities.

NMT safety studies must consider all:
- Transport infrastructure
- Road users (motorised and non motorised)
- Road environment with in the road reserve
- Road environment adjacent to the road reserve.
Key aspects to consider for NMT safety studies

- The solution is not found in a guideline document
- Speed (differentials)
- Driver’s sight at potential conflict points.
- Ability of NMT user and driver to make eye contact.
- Visibility of NMT road users at all times (day, night, adverse weather)
- Communication from the road environment of potential hazardous locations.
- Minimisation of conflict points between vehicles and NMT.
- Appropriate infrastructure to encourage/guide road users (driver's/NMT users) to act in a predictable manner.
REQUIREMENTS FOR NMT SAFETY STUDIES
RTMC Road Safety Audit Process

RTMC recommends that the normal road safety audit process should be followed for road safety appraisals:

- Should include and assessment of crash data.
- A qualitative assessment of remedial measures.
Work breakdown structure for typical NMT Study

TYPICAL STRUCTURE OF A NMT STUDY

WBS-1
Project Inception

WBS-2
Data Collection

WBS-2.1
Collation of Road Accident Statistics

WBS-2.2
Site Investigations

WBS-2.3
Traffic Surveys (pedestrian and vehicle counts, speed surveys)

WBS-3
Data Processing and Analysis

WBS-3.1
Road Safety Analysis

WBS-3.2
Other requirements:
- Capacity analyses
- Review of accesses
- Etc.

WBS-4
Road Safety Review and Recommendations

WBS-5
Liaison (Meetings)

WBS-6
Reporting and Project Close-Out

REQUIREMENTS FOR NMT SAFETY STUDIES
### WBS 1: Project inception

- **Appropriate safety team**
- **Confirm the scope of work**
- **Discuss the proposed methodology and the way forward**
- **Collect any relevant background information**
  - Design reports/drawings
  - Past road safety studies
  - Available traffic count data
  - Access register
  - Complaints/request from the public
- **Contact details of the stakeholders**
WBS 2: Data Collection

Data collection - Purpose:

To gather sufficient information on the:

- Road environment
- Road users (vehicles and humans)
- Road infrastructure
- Road crashes

To be able to contextualise and understand the road safety risks.

I.e. collection sufficient data to understand what the road safety risks are.
### WBS 2-1: Data Collection – Crash Data

**Collision/crash data and information:**

Unfortunately good quality crash data is hard to come by.

Source data from:

- Road authority’s incident management system
- Local/provincial traffic police’s accident database
- Local police station’s Vehicle Accident Report Book
- Road authority’s route manager/incident response teams

Anecdotal information regarding crashes can be obtained from:

- Local business owners
- Councillors or community leaders
- Officials from the local authority
WBS 2-1: Data Collection – Crash Data

Obtain data from road authority’s incident management system.

Example: Good quality crash data from IMS
WBS 2-2: Site Investigations

The site visit provides the opportunity to:

To meet with relevant local role players who may be able to provide context and background:
- *Existing traffic operation and road safety issues*
- *Future infrastructure and land use planning*

Collect site-specific data and observe existing operating conditions and characteristics

Traffic police
- SAPS
- Route manager
- Community liaison officer
- Local authority
- *Engineering department*
- *Land use panning*
- *Community safety*
- Community leaders
WBS 2-2: Site Investigations

Site visit activities:

Site/route inspection:
- All relevant peak periods
  - AM, PM and off-peak
  - Night time
  - Weekends
- If entire route cannot be assessed in one peak period, then observations on consecutive days area required.

On site observations:
- Road infrastructure - alignment, sight distance, road markings & signs, street lights
- Public transport infrastructure
- NMT infrastructure
- Land use
- Road user activity – desire lines, peak flows
- Traffic operations
- Traffic signal operations
## WBS 2-3: Traffic surveys

Traffic surveys might be required to quantify the current vehicle and NMT volumes.

### Typical traffic surveys
- Classified vehicle counts
- NMT counts
- Speed surveys

### Other surveys
- Conflict studies
- Infrastructure condition surveys
### WBS 3: Data Processing and analyses

On completion of the data processing and analysis the audit team must:

1. **Understand what the current road safety problems are.**
2. **Should be able to summarise the problem in a few sentences.**
WBS 3: Data Processing and analyses

Example – Location of schools
WBS 3: Data Processing and analyses

Example – NMT Demand
WBS 3: Data Processing and analyses

Example – crashes (time of day)
WBS 3: Data Processing and analyses
WBS 3: Data Processing and analyses

Example – problem areas

1. Crossing from the void, no peace corps at this location. No formal pedestrian crossing.

2. No Peace corps at this intersection. It is signalised however and contains pedestrian signal heads that were working.

3. Children are dropped off at this location, this location is informal. Conflict between children and vehicles at the drop off area.

4. Children were observed walking through the filling station and cross at the indicated location.

5. Taxis hold in the median and also in the road through out the day and stopping infermally in the road. There appears to be a need for relocation of these taxis to a formal holding.

6. Children were observed crossing at this location. This is just after the bridge and the sight visibility might be poor.

Legend
- Lungisani Primary School
- Peace Corps
- Learner Movement paths
- Scholar Crossing locations (and direction)
- Safety Concerns
- School Accesses
- Formal Passages (NMT links)
WBS 3: Data Processing and analyses

Example – pedestrian movement
Example – existing pedestrian facilities
WBS 3: Data Processing and analyses

Example – existing road configuration
WBS 3: Data Processing and analyses

Example – existing lane markings
Example – existing road signs
WBS 3: Data Processing and analyses

Example – crash locations
NMT SAFETY STUDIES – REVIEW AND RECOMMENDATIONS
On completion of the analysis phase the road safety risk assessment should be conducted.

List and describe all road safety risk.

Conduct a risk assessment in line with the RTMC’s guidelines

Recommend remedial measures (including cost estimates)

Safety Study Report

Scope
Data collected
Overview of site visit
Problem definition
Road safety analysis
Risk assessment
Mitigating measures
Cost estimate
Recommendation
## WBS 4: Road Safety Review and Recommendations

### Typical road safety risk matrix

<table>
<thead>
<tr>
<th>Risk</th>
<th>Finding</th>
<th>Likelihood</th>
<th>Severity</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>No formalised pedestrian crossing infrastructure</td>
<td>Pedestrian walkways and kerb ramps have been provided to accommodate pedestrian movements, however, at the point at which pedestrians enter the walkway, no visible or formalised pedestrian crossing infrastructure has been provided i.e. in the form of road markings.</td>
<td>Probable</td>
<td>Serious</td>
<td>Intolerable</td>
</tr>
<tr>
<td>High speeds</td>
<td>The analysis of existing vehicle speeds indicates that the majority of drivers currently exceed the posted speed limit. This may be attributed to the fact that the current road environment does not communicate to drivers that they are entering an urban area.</td>
<td>Probable</td>
<td>Serious</td>
<td>Intolerable</td>
</tr>
<tr>
<td>Poor night time visibility</td>
<td>The lack of street lighting and the poor reflectivity of existing road markings, road signage and road studs make the roadway difficult to navigate at night and the pedestrians utilising the roadway can not be clearly seen.</td>
<td>Probable</td>
<td>Serious</td>
<td>Intolerable</td>
</tr>
<tr>
<td>Implementation of walkways and kerb ramps</td>
<td>In some areas walkways and kerbs have not been constructed as per the standard specifications i.e. kerb ramps are too steep, and the landing not sufficiently wide.</td>
<td>Occasional</td>
<td>Serious</td>
<td>High</td>
</tr>
<tr>
<td>Public transport provision</td>
<td>The existing public transport facilities are not being utilised. This may be attributed to the geometry of the</td>
<td>Occasional</td>
<td>Serious</td>
<td>High</td>
</tr>
</tbody>
</table>
WBS 3: Data Processing and analyses

Example – proposed solutions
WBS 3: Data Processing and analyses

Example – proposed solutions
CONCLUDING REMARKS
Concluding remarks

NMT road safety studies is critical to reducing the road fatalities on South African roads.

These studies should preferably be conducted before the commencement of any infrastructure upgrade project.

The studies must be conducted by multi disciplinary team.

Consider all elements of the road environment:

- NMT
- Drivers
- Road infrastructure
- Road side and road side planning
- Vehicle

Understand the problem is the most critical part of the investigation.

Remember the vulnerability of NMT road users – manage speed differentials, reduce conflict.
Useful Resources

Small Town and Rural Multimodal Networks

NMT FACILITY GUIDELINES, 2014
Policy and Legislation
Planning
Design and Operations

U.S. Department of Transportation
Federal Highway Administration