



Uganda Road Safety Performance Review

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Principles of Road Safety Engineering and Audits

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Purpose of Presentation

- To discuss fundamentals of Road Safety Engineering –With reference to Uganda RSPR
- To provide basics of accident investigation and prevention
- To provide an overview of accident data analysis processes
- To provide basics of Road Safety Audits and background to Road Safety Manual Presentation



Accident Investigation and Prevention

The basics:

- Road Accidents:
 - Act of God, collision, crash or an incident?
- Accident causation: three factors (TRL Research):
 - Driver behavior (95%),
 - Vehicle factors (18.5%);
 - Highway factors (5.5%)
- Recording Accidents
- STATS 19. (Fatal, Serious and slight injury)
- Road Death Investigation Manual



Road Safety Engineering

Accident reduction

- High number of accidents of a similar type indicate a problem related to the road
- Accidents of this type will continue unless problem is treated
- Making changes to the road environment can change driver behavior and reduce accidents

Accident prevention (Prevention is better than cure)

- Change behavior
- Change attitudes
- Improve vehicle safety
- Road safety Audit



Statistical Techniques in Road Safety Engineering

Poisson Test

- Used to check sudden increase in accidents
- Calculate long term averages
- Based on comparison with long term data
- Poisson test used to obtain probability of getting latest year's data purely due to random fluctuation
- Gives direct results
- Works for any accident type
- No controls required



Statistical Techniques in Road Safety Engineering – Cont'd

Comparative testing (Chi-squared test)

- Used to compare characteristics at problem site with local or national data
- Typically used for:
 - ✓ dark/light;
 - ✓ wet/dry;
 - ✓ before/after [e.g a scheme has been introduced and accidents reduced – is reduction statistically significant]?
- Suitable comparative data required



Road Safety Audits

Aim of the session

- To describe procedures for carrying out Road Safety Audits
- Road Safety Audit Manual Uganda (2004)



What is Road Safety Audit?

A process for checking the safety of new schemes on roads (both new construction and maintenance)

- carried out systematically
- based on sound safety principles
- from the Road users' point



Aims of Road Safety Audit

- To ensure all highway schemes operate as safely as practicable
- To minimise accident numbers and severity (not necessarily the same thing)
- To consider the safety of all users especially vulnerable road users
- To improve the awareness of road safety design practices by design, construction and maintenance staff.



Road safety Audit is Not

- An opportunity to redesign a scheme
- A technical check
- A design standards check



Road Safety Audit- History (Uganda)

- Road Safety Audit manual issued in 2004 by the Ministry of Works, Housing and Communications prepared by Transport Research Laboratory UK.
- *Road safety audit is a systematic and formal process of checking the safety aspects of road schemes before they are built. The objective is to identify potential safety problems, so that, where possible, the design can be changed to eliminate or reduce them. The audit is carried out by trained and experienced auditors who are independent of the scheme designers.*
- Road safety auditing follows the principle of “prevention is better than cure”. An audit conducted at the planning or design stage allows a line on a plan to be changed, which is much cheaper than having to alter asphalt or concrete once the scheme has been built.



Limitations of Design Standards and International Consultants

- Standards do not guarantee safety although conformity with standards and guidance (such as the Ministry's Road Design Manual) will help make the design safe, there will inevitably be many situations that are not covered by the standards.
- Foreign consultants tend not to take full account of the local operating environment
 - Priority given to safety issues – consultants vary in their attitude to safety – there are still some whom believe there is no need to consider safety explicitly, or who take the view that Uganda cannot afford to pay for a high standard of safety



What to Audit?

- Difference between Road Safety Audit and Road Safety Assessment
- Road Safety Audit Manual (Uganda guidance)
- On trunk Roads and motorways safety audits are mandatory and on local roads safety audits are recommended as good practice.
- Major highway schemes
- Traffic management schemes
- Maintenance schemes



When to Audit?

- Feasibility stage
- Stage 1-completion of preliminary design
- Stage 2-completion of detailed design
- Stage 1/2 combined for minor schemes
- Stage 3-completion of construction /prior to opening to traffic
- stage 3A substantial completion
- Stage 3B open to traffic



When to Audit? – cont'd

- Stage 4-monitoring 1 and 3 years after opening
- Continuous check during first year
- Accident analysis after 3 years
- Interim audits
- Carried out during design process
- Written in the same format as stage 1-3 Audits



Who should carry out Audits?

- Independent of the design team
- At least two people
- Safety engineering expertise very important
- New Standard very specific in terms of training and experience
- Others-highway/Road Safety officer/police/Specialist/Maintenance.
- **THE ROAD SAFETY TEAM LEADER MUST HOLD A CERTIFICATE OF COMPETENCE**



Skills Required

- The standards require road safety engineering experience and training
- Other skills useful
- Knowledge of design standards
- Knowledge of current road safety



How to do Road Safety Audits



The Road safety Audit task

- Examine scheme details and other information
- Role play as different road users
- Check lists
- Control data/ standards
- Produce reports



What to look for

- Mistakes
- How all road users will cope at all times and in all conditions
- Interaction between design elements
- Opportunities to include accidents reducing elements



Carrying out stage 1 and 2 Audits

- Brief look at plans to understand scheme concept
- Audit team visits the site-takes photographs
- Detailed examination of plans and other information by each team member independently
- Discussion between team members
- (use check list to ensure nothing overlooked)
- Check control data standards if necessary
- Agree draft report/produce final report



Carrying out stage 3 Audits

- Audit team visits the site with police/ maintenance representatives
- Drive/walk/cycle the scheme as necessary
- Check comments made at stage 2
- Take notes and photographs
- Discuss points before leaving site
- Audit team visits site when dark
- Agree draft report/produce final report



Stage 4 Audit Monitoring

- Accident monitoring 1 and 3 years after opening
- Location of accidents
- Accidents with common factors
- Accident rates
- More emphasis on monitoring in new standards



Format of safety Audit

- list audit team members and others involved
- List safety issues-problems followed by recommendations starting the safety problem as clearly as possible
- List all plans and other information examined
- sign and date the report



Resources

- Allow sufficient time for the process (10 days to complete the Audit)
- Small schemes 1-2 person days
- Large Schemes 4-5 person days



What if we get it wrong

- If an auditor misses something is he/she legally liable?
- Could be if negligence can be shown, but unlikely if procedures have been followed
- Do you have a procedure? Are you following it?
- Liability for the overall scheme still lies with the designer/client
- Those new to audits should check with legal departments



Conclusions

- Most incidents/collisions are preventable
- Road Safety Audits are important in preventing accidents
- The accident situation in the developing world is getting worse but simple measures can save lives
- Are you playing your roles
- Do we value our driving licences?!
- How easy is it to get a Driving Licence?
- Prevention is better than cure



Thank you

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