Analysing traffic conflicts – comparing the Swedish Traffic Conflict Technique and the Dutch Objective Conflict Technique for Operation and Research (DOCTOR)

ICTCT, Karlsruhe, 16 October 2014

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Interplay mechanisms behind SIN effects?

Critical situation - the available space for manoeuvre is less than needed for normal reaction (Van der Horst & Kraay, 1986)

Conflict - critical situation in which two (or more) road users approach each other in such manner that a collision is imminent and a realistic probability of personal injury or material damage is present if their course and speed remain unchanged

DOCTOR - Dutch Objective Conflict Technique for Operation and Research
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- Conflict severity determined by:
  - Time-To-Collision (<1.5 s) / Post-Encroachment Time (<1 s)
  - Potential consequences (vulnerability, speed)

- Severity levels: 1 (light) – 5 (very serious)

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Swedish Traffic Conflict Technique *(Hydén, 1987)*

- Only situations with collision course

- Relevant road user – the one taking an evasive action first
Swedish TCT

- Conflict severity defined by:
  - Time-to-Accident (TA) – TTC when the evasive action starts
  - Conflicting speed (CS) – speed of the relevant road user at the moment evasive action starts

Based on BRAKING as the primary evasive manoeuvre.

[Graph showing speed vs. time to accident with categories for non-serious and serious conflicts.]
Selection of situations

- 2 steps – raw filtering by students & final expert judgement

- Semi-automated tool for speed and time measurements

- 47 conflicts from 2 weeks of video (same intersection in Norway)

- 3 main types:
  - Cyclist against red (any directions - 13)
  - Cyclist straight – MV right (same direction – 18)
  - Cyclist straight, MV left (opposite directions – 13)

- 3 conflicts excluded (not fully seen)
Selection of situations
Significant correlation:
Spearman’s rho = .669, p < 0.05
Lessons

- Two techniques agree very well on which situations are relevant for safety analysis
- Two techniques generally agree on severity ranking of the situations
- Understanding of the process!!!
- Both techniques involve subjective judgement of the observer
  - With automation, more objective criteria required
- More accurate measurements from video often “surprise” the expert – e.g. what is perceived as a collision course is actually not

Lessons

- Limited area seen by camera has implications – e.g. the start of evasive action is not seen
- Swedish TCT is very sensitive to who takes the first evasive action - particularly problematic in VRU conflicts
- DOCTOR accounts better for VRU problems – again through subjective “consequences”
Lessons

- Cyclists use swerving much more often to resolve a conflict – classification based on braking assumption gives weird results

Lessons

- Frequency of severe conflicts is low – same problem as accident data
- Validation (long term observations)!!!
- What is defined as traffic safety: number of accidents and/or comfort (avoidance of specific locations)?