IMAGINE
Budapest Workshop

How to improve the accuracy of traffic model output

WP2 Workshop on Road traffic Modelling and the European Environmental Noise Directive

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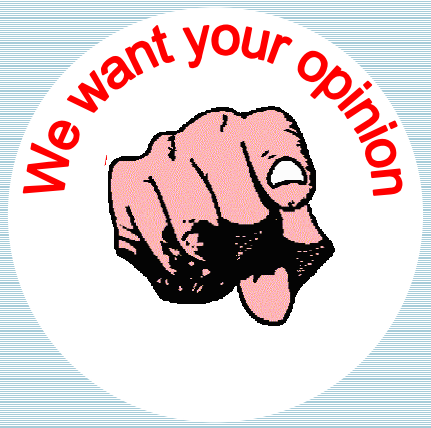
Improved Methods for the Assessment of the Generic Impact of Noise to the Environment
6th Framework Programme, Area 1.2.1, Policy-oriented research, contract number 503549

Objective

- Developing strategies to improve the accuracy of output of traffic models (flows, speeds, speed distributions, accelerations)
- Discuss aspects of traffic modelling important for noise mapping, to help traffic and noise modellers decide on which improvements of the traffic model are feasible
- Strategies will be tuned with GPG

Objective workshop

- Show general idea behind strategies
- Check with you whether:
  - we cover the most important problems encountered in noise mapping *and* noise action planning
  - Our approach to the strategies suits your questions



Possible situations and approaches

- 1. No model is available
  - use measurements or build model
  - (problem: how to develop an action plan?)
- 2. Model is available but has deficiencies
  - a) Circumvent model deficiencies
  - b) Solve model deficiencies
- 3. Model is (nearly) perfect
  - You're lucky – use this model!

- The focus of our strategies is on situations 2a and 2b.

Things to be aware of

- Traffic models vary in quality – aspects that are in theory no problem, can become a problem if inaccurate data has been used to fill the model
- Some problems can be hidden by clever calibration
- For action modelling: check if results are logical!

Strategy matrix – questions vs. tools

questions
(e.g. L_{DEN} in a specific street)

model available:

(e.g. static traffic model for morning peak hour
or
micro-simulation model for morning peak hour
or
static traffic model for 24 hour period)

strategies needed
(e.g. try to increase the number of time periods, especially for evening and night)

Subjects of strategies

- Improvements in demand model and assignment
  - socio-economic data
  - network representation
  - periods modelled
  - calibration and validation data
- Fleet composition
- Modelled speeds
- Low flow roads
- Intersection corrections (next presentation)

→ Strategies are in various stages of development

Demand model – socio-economic data

- Problem:
  - data is not available for the right year → inaccurate OD-table
- Strategy:
  - check feasibility of update of socio-economic data to desired year
  - update only OD-table (so that the assignment produces flows that match recent measurements)

Network representation

- Problem: accuracy of network representation
  - a) are the most important roads included?
  - b) is the network geographically accurate?
- Strategy:
  - a) update road network (if possible, use road (GIS) databases – these are becoming common)
  - b) if possible, use 'shape points'
- Low flow roads are discussed separately

Periods modelled

- Problem:
  - most traffic models focus on peak periods, some on entire day – few models will distinguish between day-evening-night
- Strategy:
  - if model can be run for peak period, it can be run for other periods – the problem is data

Periods modelled

- Difficulties:
  - in theory, data that are available for peak periods can be collected for other periods
  - however, in reality these data are not always permanently stored
  - Also:relative error can be large
  - all-or-nothing assignment is fine for evening and night (but not suitable in congested networks)

Calibration and validation data

- Problem:
  - Limited amount of data available
- Strategy:
  - additional data collection → much more possible these days, e.g. based on floating vehicle data, GSM phones, counts at traffic lights, digital cameras etc.

Traffic composition

- Problems:
  - most traffic demand models only distinguish one traffic type: the passenger car equivalent (pce)
  - most static and dynamic assignment models only assign pce's
- Strategy: it is possible to incorporate noisy traffic vehicles in the model
- Typical noisy vehicles:
  - heavy trucks
  - motorized two-wheelers

Traffic composition – MUC assignment

- Ideal situation:
  - OD-table containing multi user classes, traffic assignment is multi user class (MUC) based. User classes describe vehicle categories.
- If assignment and/or OD-table is not MUC, an estimation of vehicle distribution has to be made

Traffic composition – two-wheelers

- The effect of motorcycles and mopeds on the highly averaged L_{DEN} needs more research
- However, it is experienced that individual motorized two-wheelers cause annoyance.
- Strategies in two situations:
  - every-day two-wheeler traffic:if data is available, do all-or-nothing assignment
  - two-wheelers in recreational touring conditions: difficult to model, effect on Lden will probably very small

Modelled speeds

- Problem:
  - uncertainty about modelled speeds
- Strategy:
  - more speed measurements (to back up research and model calibration/outcomes)
  - do sensitivity analysis
  - more research into relationship between speeds and intensity/density

Low flow roads

- Problem:
  - inaccurate prediction of traffic on links of the lowest level
- Problems are caused by:
  - zones-and-connectors system
  - small numbers cause large (relative) errors
  - in most cases no measured traffic data for these types of road: calibration and validation not possible
  - too large zones: too much internal traffic.
  - too small zones: transport behaviour of a small group of people must be described, which requires a large amount of data (such as income, age, educational level, driver license possession)

Low flow roads - strategy

- Check if zonal scale is suitable. Zones should never overlap main roads, and should typically represent a neighbourhood
- Check if the connectors of the zone are connected to all intersections which have a feeder role for this zone
- The lengths of connectors of a single zone should represent the building density in the zone
- If this cannot be achieved, the model is not suitable for the low flow road predictions. In that case, there are two possibilities:
  - improve traffic model, adjust to above mentioned demands
  - make an estimation of traffic flows on low flow roads (we will look into methods to do that)