

# 20<sup>th</sup> International Emme Users' Conference

Montreal, October 18 to 20, 2006



## CALL FOR PAPERS

### Traffic model system and emission calculations of the Helsinki Metropolitan Area Council

Title of the paper

Timo Elolähde

Helsinki Metropolitan Area Council (YTV), Transport

Main Author

Organization

P.O. Box 521, FIN-00521 Helsinki

Address

Suite / floor

Helsinki

Finland

City

Province/State – Country – Postal/Zip Code

+358 9 1561 371

+358 9 1561 416

Telephone

Fax

timo.elolahde@ytv.fi

e-Mail

**Names & Organization of co-author(s)**

### **BIOGRAPHICAL SUMMARY FOR MAIN AUTHOR** (100 words mini-CV)

Mr. Timo Elolähde studied operation research and transport engineering at Helsinki University of Technology. He took a master's degree in 1986 and has worked as a planner at the Transport Department of the Helsinki Metropolitan Area Council (YTV) since 1987. He has been the main user of Emme/2 in YTV since 1988.

Mr. Elolähde takes part in planning and analyzing of traffic surveys as well as developing and using traffic models. He is responsible for the development of the traffic model system of YTV Transport.

### **AUDIOVISUAL SUPPORT NEEDED**

(A PC with Office XP, a projector, and a microphone will be provided. Please mention any other needs.)

## **ABSTRACT** (500 words)

YTV's Transport Department calculates traffic volumes and average speeds using traffic models which have been estimated with Alogit program in the Laboratory of Transportation Engineering of the Helsinki University of Technology. The models are based on travel survey data from autumn 2000.

The model system used is a four-step model which consists of trip generation, destination choice, mode choice and route choice models. The results are trip matrices for different modes (car, public transit or walking+cycling). There is a feedback in the model.

Model system is coded in Emme/2 macros. Some of the macros are written with a SAS program. A FORTRAN program is used to collect a summary of the main results from the scalar list.

The structure of all models (except school trip models) is the same. In order to make several models possible, the macros are made quite general which means e.g. that there are no constants in the model formulas but numbers of Emme/2 scalars. If some variable is not included in the model, its coefficient is zero.

The auto trip matrices for morning peak, evening peak and average daytime hours are forecasted using traffic models. Vehicle trip matrices for ten weekday hours, seven Saturday hours and seven Sunday hours are calculated of the three hourly matrices using regression models. The regression models have been estimated using volume counts on four cordon lines.

There are only two sets of transit lines, i.e. morning peak and daytime lines in the transit system model. Regression models are used to get transit volumes for other hours of the weekdays, Saturdays and Sundays.

Sulphur dioxide, carbon dioxide, carbon monoxide, nitrogen oxides, hydrocarbon and particle emissions are calculated using volumes and average speeds on links. All emission factors are functions of average speed. Neither accelerations or decelerations, nor variations of speed are taken into account separately but they are all included in the average speed on the link.

There are emission factor functions for 14 different vehicle types depending e.g. on whether there is a catalytic converter in a car or a trailer attached to a lorry. There are separate emission factor functions for diesel cars and vans as well. The EU regulations are taken into account so that the emission factors for 2025 are smaller than those for the year 2000. In addition, emission factors of diesel and gas buses depend on average speed.

Auto assignment has produced volumes and average speeds for each link for the above mentioned 10+7+7 or 24 hours. They are used when calculating the emissions. The average shares of different vehicle types of total volumes are the same in the whole region. Emissions for other hours of the week (i.e. 14 weekday, 17 Saturday and 17 Sunday hours) are calculated from those 24 hours using copying or interpolation.

Public transit emissions are calculated using transit volumes and average speeds for morning peak and daytime on each link.

The emissions caused by electricity production for tramways and heavy rail as well as emissions from vehicles in tunnel sections are included in total emissions but not in dispersion calculations.

**Please send the completed form to the attention of:**

***Pierre Tremblay,***

**Fax: +1 (514) 864-1765**

**eMail: *pierre.tremblay@mtq.gouv.qc.ca***

**Reserved zone**

Reception date:     /

N°: