

Challenges faced by Transportation Planners in Modeling

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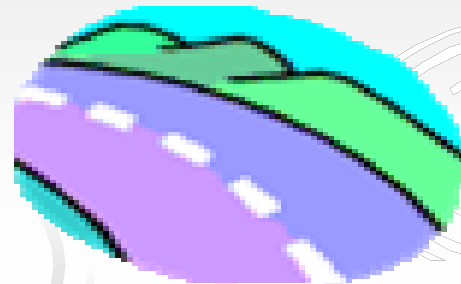
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***Ontario EMME/2 Users Meeting
Region of Peel
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Overview

- *Introduction*
- *Need for forecasting intersection turning movements*
- *Methods and techniques currently employed*
- *Role of macro and micro-simulation models*
- *Challenges in forecasting turning movements*
- *Interactive presentation and discussion*
 - ❖ *Participation from all highly encouraged*
 - ❖ *We want to learn from you!*



Introduction

- ***Traffic forecasting for intersections i.e. turning movements are needed for:***
 - ❖ ***Transportation studies***
 - ❖ ***Traffic operational analysis***
 - ❖ ***Environmental assessment studies***
 - ❖ ***Secondary plan studies***
 - ❖ ***Intersection design/improvement program***
 - ❖ ***Traffic impact studies***



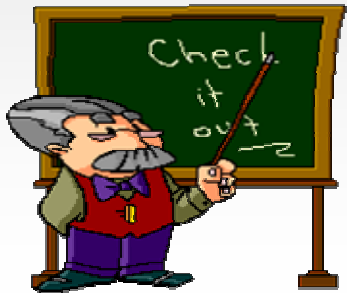
Preparing forecasts

- *Developing an accurate forecast is an art as well as science*
- *Some of the steps involved in forecasting are:*
 - ❖ *Check for previous forecasts*
 - ❖ *Compile historical data i.e. intersection counts, cordon counts and AADTs*
 - ❖ *Review air-photographs*
 - ❖ *Review land use data*
 - ❖ *Review committed road improvements*
 - ❖ *Review Regional model for the area*
- *Validating traffic forecasts with intersection counts, cordon counts and AADTs*



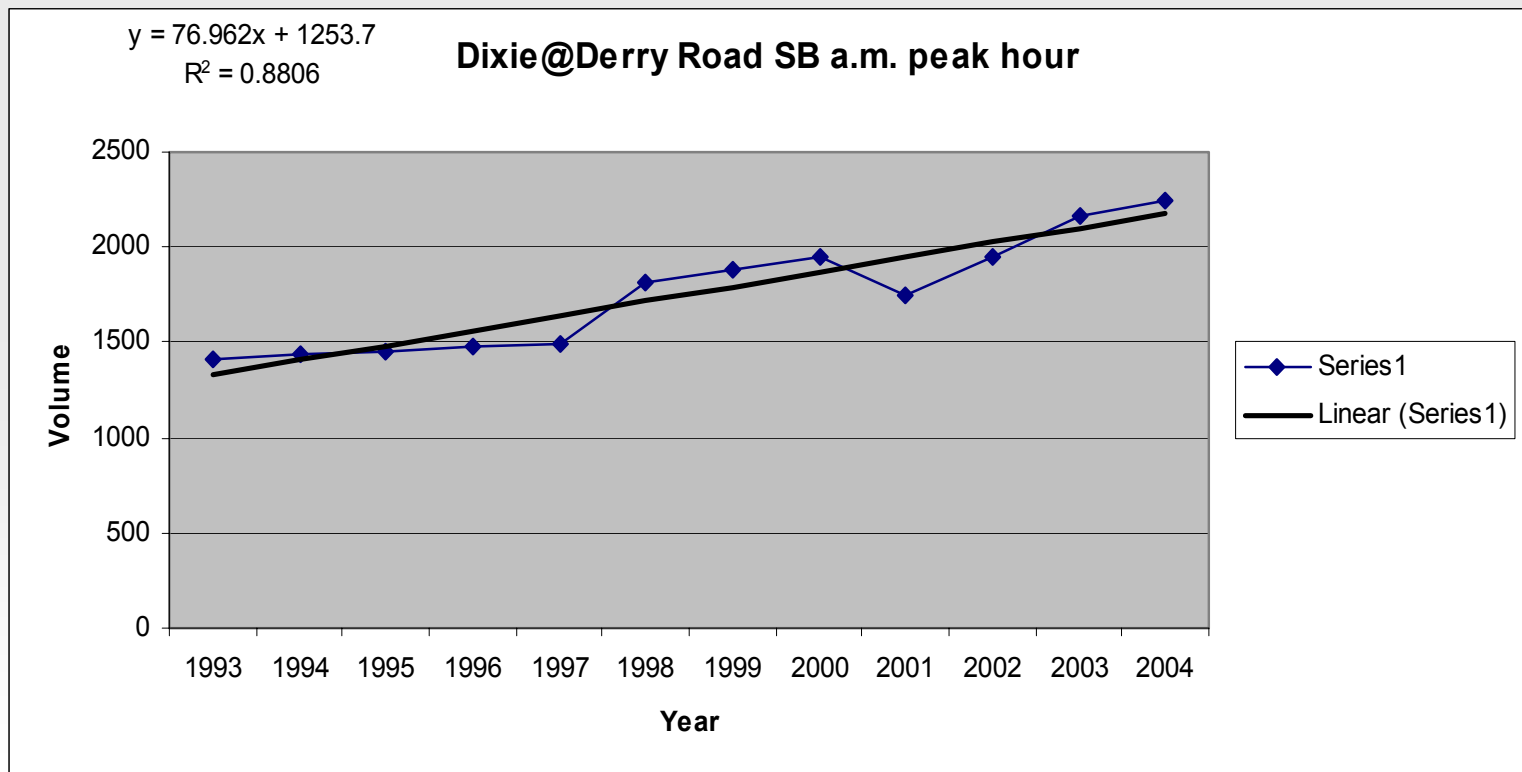
Forecasting methods for turning movements

- ***Methods based on historical data***
 - ❖ ***Regression analysis***
- ***Growth factor techniques***
- ***NCHRP method***
- ***Van Zuylen method***
- ***Spreadsheet software (e.g. Turns5A, Turnw)***
- ***Use of Regional travel forecasting model***
- ***Use of micro-simulation models e.g. INTEGRATION, PARAMICS, VISSUM, etc.***



Regression analysis

- *Methods based on historical data i.e. requires turning movement data*
- *Higher the correlation, better is the projection*



Turning movement forecasting methods


➤ Growth factor techniques

- ❖ Requires existing turning movement counts***
- ❖ Future year growth factors***
- ❖ Moderately easy application***

➤ NCHRP method

- ❖ Ratio method***
- ❖ Difference method***
- ❖ Iterative method***

➤ Van Zuylen method

- ❖ Iterative balancing of possible turning movement based on initial estimate of turning proportions***
 - ❖ Applied by Hauer et al in Toronto for 145 intersections (TRB 795)***
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Software programs

- ***Several software programs are available such as:***
 - ❖ ***Turns5A (Transportation Engineering Inc. & Greiner, Inc)***
 - ❖ ***Turnw (Dowling Inc.)***
- ***The programs allow users to enter existing year counts and specify simple growth***
- ***The programs will interpolate or extrapolate and provide reasonable data and results***
- ***Most programs assist in efficient implementation of intersection balancing methods***

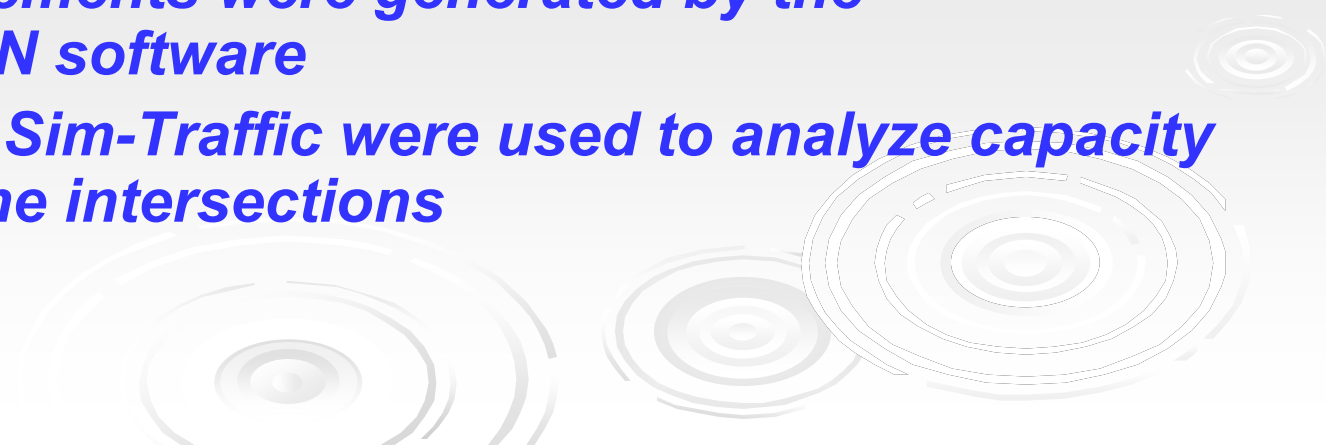


Use of Regional travel demand forecasting model

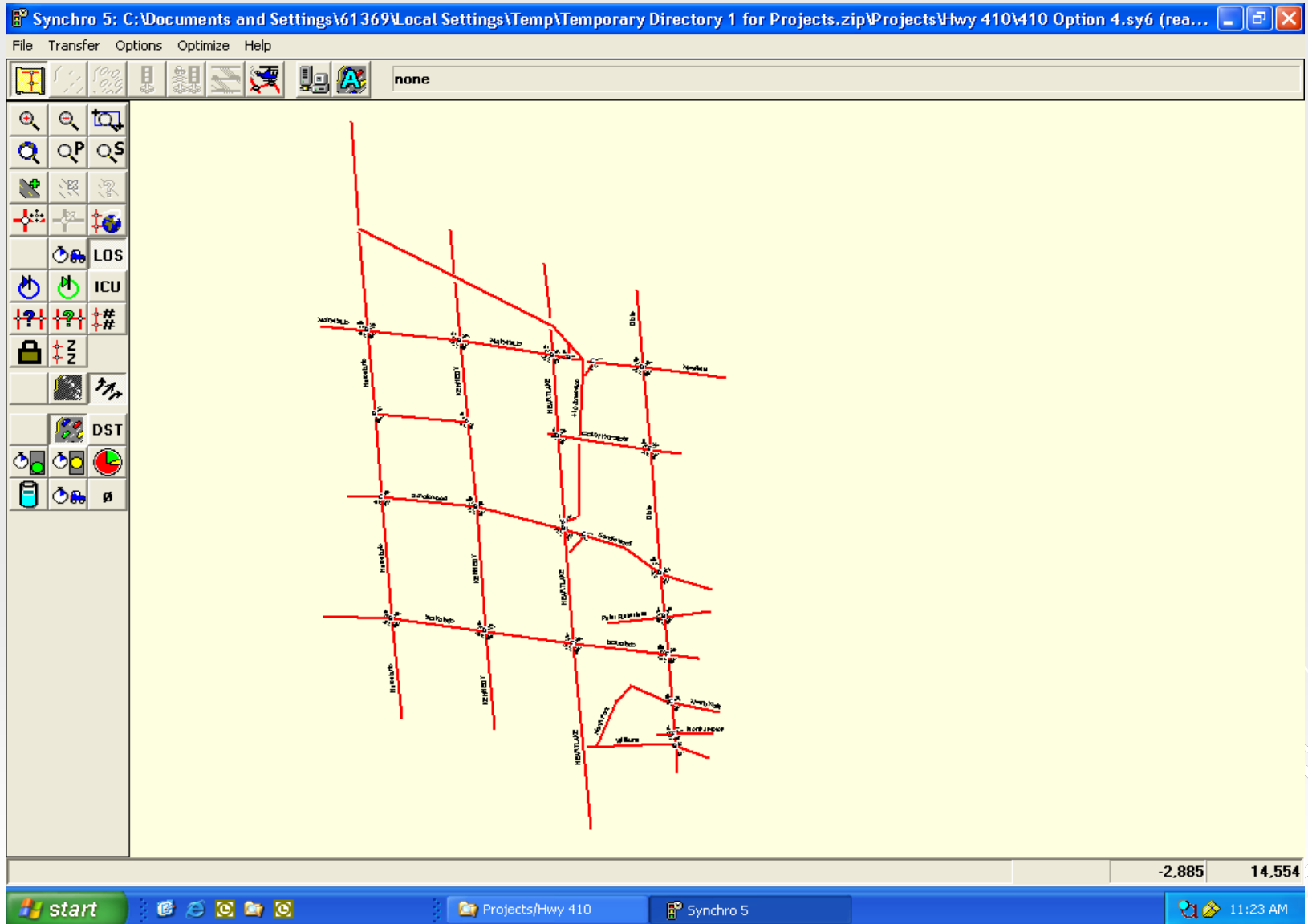
- ***Several municipalities have developed Regional travel demand forecasting models using Emme/2***
- ***The current and future development could be accounted for in the travel forecasts***
- ***The travel forecasts are available for :***
 - ❖ ***Base year (e.g. 2001)***
 - ❖ ***Future years (e.g. 2011, 2021 and 2031)***
- ***The data could be extrapolated to obtain growth percentages***
- ***Turning movements could be generated from the future growth percentages in several different ways***

Use of micro-simulation software

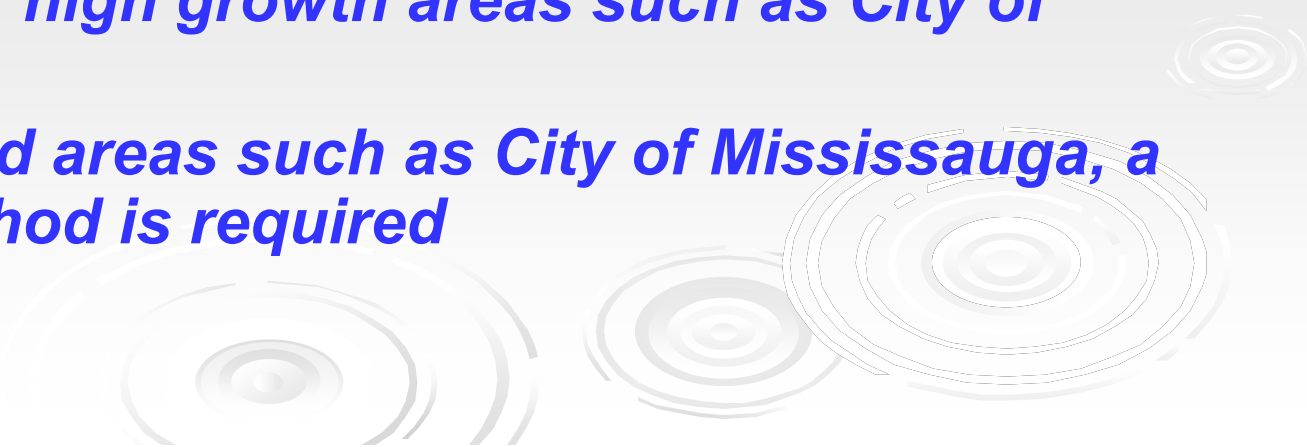
- ***Micro-simulation software such as INTEGRATION, PARAMICS, and VISSUM can be used in conjunction with Emme/2 Software***
- ***At the Region of Peel, we have used Emme/2, INTEGRATION, Synchro and Sim-Traffic for analyzing Highway 410 extension from Bovaird Drive to Hwy. 10***
- ***Sub-area network and traversal matrix was developed from the Region of Peel model and this was entered in to the INTEGRATON software***
- ***Turning movements were generated by the INTEGRATION software***
- ***Synchro and Sim-Traffic were used to analyze capacity and LOS at the intersections***



Highway 410 extension analysis



Challenges of traffic forecasting

- ***For studies such as Environmental Assessments, we need future traffic projections for 5, 10, 15, 20 and 25 years***
 - ***Projections based on historical data are good for short-term forecasting but not for longer-term forecasting***
 - ***Most methods are old and needs to be updated due to progress in computer technology***
 - ***Turning movements forecasts poses a big challenge especially for high growth areas such as City of Brampton***
 - ***For developed areas such as City of Mississauga, a different method is required***
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Challenges of traffic forecasting

- ***Most Regional models provide good forecasts at the screen-line level but not on individual road or intersection level***
- ***The level of road network details in Regional models is generally limited***
- ***Most Regional models in the GTA are morning peak period (except Region of Halton) – whereas we need traffic projections for:***
 - ❖ ***Morning***
 - ❖ ***Evening***
 - ❖ ***Off-peak period***



Challenges of traffic forecasting

- **Forecasting truck traffic is also a major challenge**
- **Emme/2 can provide good projections on a link level, but not at intersection level**
- **Micro-simulation software such as INTEGRATION, PARAMICS, VISSUM require more time in calibration and validation**
- **Requires development of a good sub-area model and its subsequent validation**
- **Selection of software is a challenge - which software is better for turning movement projections?**





Thank you

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