

January 2009: Contents

- Chairman's Message
- TRB 2009 SimSub Meeting Agenda
- Task group Reports
- Simulation-Related Activities of the Sponsor Committees
- Announcements and Calls for Papers
- Industry Update
- Mid-year Activities
- Technical Articles
- Preliminary Guidance on the Role of Simulation in the 2010 HCM
- 2009 Sessions and Meetings of Interest to the Traffic Simulation Community

Newsletter

January 2009

Please visit our web site at:
<http://www.tft.pdx.edu/simsub.htm>

Chairman's Message

A happy and prosperous new year to all!

This was a very active year for the traffic modeling and simulation community. There were several activities including conferences, mid-year meetings, etc. that encouraged presentations and discussions on topics of interest to our members. Several of our members were at the center of those activities. You should find this issue of the newsletter to be to be very informative because we have tried to capture the essential features and outcomes of each of the events.

The Annual Workshop Task Group has put together another excellent program for the Sunday Workshop, which will focus on "The role of simulation in the 2010 HCM." This topic will draw a big crowd and you should try to attend if your schedule permits.

We are a very diverse group and we need occasional turnover in our leadership to maintain our energy and to stay on the forefront of our profession. With that in mind, I have decided that this will be my last year as the SimSub chair. I have tried to leave some room on the agenda for an open discussion of where we are heading and how our leadership should be configured and rotated.

I appreciate the support and hard work from all who have contributed to our productivity.

Thanks
Ken Courage

TRB 2009 SimSub Meeting Agenda

Monday 7:30-9:30 PM: Marriott Washington B3

Introductions

Sponsor Committee Chair Remarks

Discussion of task group reports presented in the newsletter

- Annual Workshop (Brief synopsis and discussion of future topics)
- Newsletter
- Research Needs and Resources
- Simulation Application Summaries
- Calibration, Verification and Validation
- Liaison and Outreach
- Awards

NGSIM Update

FHWA Update

Summary and discussion of 2008 midyear activities

Review of the subcommittee purpose, scope and future leadership

New business

- Other New initiatives
- Mid-year meeting for 2009?

Task Group Reports

Here are the reports submitted by each of the task groups:

Annual Workshop Task Group

Submitted by John Halkias and James Colyar, FHWA

This task group is responsible for the organization and presentation of an annual workshop on traffic simulation, historically held on the Sunday afternoon of the TRB annual meeting.

The Workshop on Simulation will be held on Sunday from 1:30 to 4:30 PM in the Shoreham Palladian, as Session 156 of the 2009 TRB Meeting. The theme will be “The Role of Simulation in the 2010 HCM.”

The 2010 Update to the Highway Capacity Manual (HCM) will include significantly more detail and guidance on the application of simulation models than the current 2000 HCM. A sample of the topics that will be included in the 2010 HCM are when to select a simulation model for analysis, guidelines for the application of simulation models, differences between simulation models and the HCM, and using performance measures from simulation models. Everyone that directly uses, or uses the results of, the HCM and/or simulation models will be interested in this workshop. The workshop will include a “sneak peek” of the guidance planned to be included in the 2010 HCM and a variety of perspectives on how simulation should be addressed in the HCM. This workshop provides a great opportunity for your opinion to be heard as well.

Editor’s Note: a summary of the Part I presentation on preliminary guidance for the use of simulation in the 2010 HCM is presented in Attachment 1 at the end of this newsletter.

Research Needs and Resources Task Group

Submitted by Mohammed Hadi, hadim@fiu.edu

The goal of the Research Needs and Resources Task Group is to provide support to research in the area of surface transportation system simulation and to facilitate the use of the results from this research to advance the state-of-the-art and state-of-the-practice in transportation system simulation modeling. Since the formation of SimSub, the Task Group has produced a number of products including the identification and ranking of traffic simulation research challenges and producing a white paper that addresses the need for a data repository to support traffic simulation research and development.

During the past year, members of the task group worked with other members and friends of the TRB Traffic Flow Theory (TFT) Committee on writing research problem statements for research problems that were identified by the TFT committee. These statements are currently posted on the TRB on-line Research Needs Statements (RNS) web site. Some of these statements are in the area of transportation system simulation and are of interest to SimSub members. The Research Needs and Resources Task Group is currently identifying additional tasks to accomplish in the next few months to support accomplishing the task group objectives.

Workshop 156: The Role of Simulation in the 2010 HCM

Sunday, 1:30 PM - 4:30 PM, Shoreham Palladian

Part I: Preview of the HCM 2010 (35 min total)

1. Brief review of the HCM 2010 development project (15 min)
2. Preliminary guidance for the use of simulation in the HCM 2010 (20 min)

Part II: TRB Sponsor Committee Perspectives (70 min total)

3. Highway Capacity and Quality of Service (HCQS) Committee perspectives (15 min)
4. Traffic Signal Systems Committee perspectives (15 min)
5. Freeway Operations Committee perspectives (15 min)
6. Traffic Flow Theory Committee perspectives (15 min)
7. Open discussion (10 min)

Part III: Stakeholder Perspectives (60 min total)

8. Developer #1 perspectives (How does the proposed guidance affect software developers?) (10 min)
9. Developer #2 perspectives (10 min)
10. FHWA perspectives (10 min)
11. User #1 (public sector) perspectives (How does the proposed guidance affect users of the HCM and/or simulation models?) (10 min)
12. User #2 (private sector) perspectives (10 min)
13. Open discussion (10 min)

Simulation Application Summaries Task Group

This Task Group is responsible for compiling and publishing a comprehensive summary of significant applications of microscopic traffic simulation models. We have finalized a survey form and posted on the SimSub subcommittee website.

No report was submitted. It appears that there is insufficient interest in this activity to warrant pursuing it in the future.

Liaison and Outreach Task Group

No report submitted

Newsletter Task Group

Submitted by Ken Courage, kcourage@ufl.edu

This task group will post a newsletter to its web site in advance of each meeting to inform members and others of items of interest to the simulation community. This issue of the newsletter constitutes the task group report.

We welcome your comments on this issue and ideas for future issues, either at the meeting or by email.

Awards Task Group

Submitte by Tom Rioux, rioux@mail.utexas.edu

The Awards Task Group is composed of Tom Rioux, David Gibson, and Tomer Toledo. A call for nominations for the Lifetime/Pioneer Achievement Award has been made. The Chairman has been communicating with the Chairman of the sponsoring committees of the Joint Subcommittee on Traffic Simulation to establish nomination procedures for the Best Paper Award.

We hope to be able to present both awards at the annual SimSub meeting

Calibration, Verification and Validation Task Group

Submitted by Ray Benekohal

The Calibration, Verification and Validation Task Group will meet on Sunday from 4:30pm to 6:00pm, in the Embassy Room in the Marriot Hotel. The preliminary agenda for the meeting is:

- Introduction
- Feedback from members on CVV's initial write-up
- Finalize CVV goals and tasks
- Short term and long term goals
- Planning future activities
- Others

Please note that the meeting time and location will NOT show-up in the Final TRB Program

2009 Annual TRB Meeting Sessions and Meetings of Interest to the Traffic Simulation Community

A table summarizing the meetings, workshops and sessions of interest to the traffic modeling and simulation community is presented in Attachment 2 at the end of this newsletter.

Simulation-Related Activities of the Sponsor Committees

Highway Capacity & Quality of Service Committee AHB40

The Committee will meet in the Marriott Wilson B&C Rooms Monday, 8:00-Noon.

The Simulation Applications Subcommittee will meet in Marriott Taft, Sunday, 8:00 –9:30 AM. The subcommittee objective is “To develop HCM guidance on the application of traffic simulation tools.”

Freeway Operations Committee AHB20

The Full Committee will meet in the Marriott Wilson B & C Rooms Tuesday, 8:00 AM-Noon and in Washington B3 7:30-930 PM.

The Freeway Simulation Subcommittee will meet in the Marriott Taylor Room on Sunday, 5:00-6:00 PM. The current interest of the subcommittee is *sustainability*. :

Sustainability is the overarching principle that is engulfing most types of engineering and operations practice and research. Congestion and energy consumption reductions are large components of sustainability. These, in turn, are affected by freeway and traffic operations. AHB20(2) is embarking on an effort to establish sustainability parameters and requirements for freeway and traffic simulation models including vehicle fleet parameters, fuel consumption parameters, and modules capturing real time pricing and demand shifts in response to fuel, toll and congestion levels. The current sustainability topics of interest include:

- Green mobility policies and incentives:
- HOT lanes,
- Tax credits for electric vehicles,
- Light rail
- Signal coordination,
- Corridor-wide ramp metering,
- Variable speed limits,
- Peak hour shoulder lanes,
- Hybrid car
- Parking cash out
- Location choice (e.g., close to work or school)

HCQS Traffic Simulation Applications Subcommittee January 11, 8 AM – Marriott (Taft Room)

Introductions

Attendee introductions
Membership/roster circulation
Review meeting objectives and finalize agenda

Discussion Items

Review of 2008 Mid-Year Meeting and TRB 2008 Discussions
NCHRP 3-85 Activities
FHWA Activities
Coordination with SimSub
Input on Draft HCM2010 Chapters

- Chapter 6: Analysis Tools
- Simulation Guidance in Other Chapters

Sunday Workshop: The Role of Simulation in the 2010 HCM - Group Input

Other Topic Areas (Brainstorming from 2008 TRB)

- Interaction between different facility types
- Integration of planning and simulation models
- Consistency between capacity estimates for uninterrupted flow and simulation

Input for Full Committee Meeting (Monday AM)

The Committee will sponsor Session 537, Freeway Operations, in Marriott Salon 2 on Tuesday, 2:30 PM–5:00 PM

Traffic Signal Systems Committee AHB25

The Traffic Signal Systems Committee will meet in the Marriott Wilson B & C Rooms, Monday, 1:30 PM to 5:30 PM

The Simulation Subcommittee meeting information is not available at this time

The Committee will sponsor Session 419, Assessing Performance of Traffic Signal Systems M - Delaware A Tuesday, 8:00 AM–9:45 AM

Traffic Flow Theory Committee AHB45

The Traffic Flow Theory Committee will meet on Tuesday 1:30 to 5:30 PM in Marriott Washington B3. This committee hosts the joint simulation subcommittee (SimSub) and therefore has not formed its own simulation subcommittee. The Committee: will sponsor the following sessions that deal with traffic simulation

- Session 601 Oscillations in Congested Traffic: Observations and Estimation in Marriott Thurgood Marshall North, Tuesday, 7:30 – 9:30 PM.
- Session 672: Advances in Traffic Flow Theory and Applications in Marriott Salon 2, Wednesday, 9:30 AM–12:00 Noon
- Session 673: Cellular Transmission and Traffic Simulation: Models and Applications in Marriott Salon 2, Wednesday, 9:30 AM–12:00 Noon

Other User Group News

The New Zealand Modelling User Group

Submitted by Andrew Mein

The **New Zealand Modelling User Group (NZMUGS)** is affiliated with The Institution of Professional Engineers New Zealand (IPENZ) Transportation Group and is dedicated to promote the interests of modelling within the transportation industry in New Zealand. It is the intention that the group will represent all aspects of modelling including static/ deterministic, micro-simulation, wide-area/ strategic modelling, passenger transport modelling as well as emerging areas as pedestrian and accessibility modelling. The inaugural NZMUGS Conference was held in October 2008. This conference provided a significant opportunity for researchers, engineers, modelers and other practitioners in the transportation modeling fraternity to discuss current developments with macroscopic, static/ deterministic, micro-simulation, wide-area/ strategic modeling, passenger transport modeling as well as emerging areas such as pedestrian and accessibility modeling.

Thursday morning began with the official formation of the New Zealand Modeling User Group and involved the appointment of a committee tasked with taking the group forward. This was followed with presentations and discussion sessions dealing with Strategic modeling. On Friday, the conference embraced micro-simulation modeling with examples of work undertaken, simulation standards and the peer review process with discussion sessions.

Announcements and Calls for Papers

PTV Vision® User Group Meeting

PTV America's Annual PTV Vision User Group meeting will be held Thursday and Friday, April 30th-May 1st, 2009, at the historic Governor Hotel in Portland, OR. The PTV Vision user group event features presentations by PTV Vision experts and includes sessions on new developments and software applications. Over 80 participants attended last year from research, public agencies, and consultants throughout North America.

Call for papers: send a one-page or less abstract of your related PTV Vision project or research to usersgroup@ptvamerica.com before February 16th, 2009. More information at: <http://www.ptvamerica.com/usergroup.html>

2nd ISFO.

The Second International Symposium on Freeway and Tollway Operations will take place at the Hyatt Regency Waikiki in Honolulu, Hawaii between June 21 and 24, 2009. In addition to the Freeway Operations Committee (AHB20), the meeting is sponsored by the Committee on Highway Capacity and Quality of Service (AHB40), the HOV Committee (AHB35), the Traffic Control Devices Committee (AHB50), the FHWA Traffic Management Center Pooled Fund Study, the International Bridge, Tunnel and Turnpike Association (IBTTA) and Holland's Rijkswaterstaat (ministry of transport.) Several sessions for presentations on traffic simulation are planned.

A student paper competition is part of this Symposium. The competition requires a paper of up to 5,000 words with exhibits counting for 250 words each, and on a subject relevant to the Symposium. The top five entries win a \$2,000 travel award to attend the 2nd ISFO. First, second and third papers win an additional \$1,000, \$500 and \$250 cash award, respectively.

The Symposium's website is at <http://2isfo.eng.hawaii.edu>. The first cycle of abstract reviews was completed with 60 approved presentations. The next and final cycle of abstracts and student papers are due February 1, 2009. Presenter registration is \$400. For more information, email 2.isfo.hawaii@gmail.com

PTV Vision® Scientific Award 2009

PTV AG invites researchers from all over the world to enter their groundbreaking ideas in a bid for the second PTV Vision Scientific Award. The award is given to reward outstanding accomplishment in research using the transportation planning tools VISUM or VISSIM.

Closing date for applications is April 15th, 2009. More information at: <http://www.ptv-vision.com/traffic/scientific-award-2009/>

Industry News

VISSIM 5.10

PTV is pleased to announce the latest release of VISSIM 5.10. The latest version includes a new social force pedestrian model that realistically simulates interactions between pedestrians, objects (e.g., located in the sidewalk, interior/exterior walls, etc.), and vehicle flows. This new pedestrian model supports multiple levels, area based measurements, and allows the VISSIM user to control interaction through unlimited behavior parameter settings.

The behavior model for pedestrians is based on the so called Social Force Model originally developed by Helbing and Molnar in the 1990s. This is a space-continuous model that matches up well with VISSIM's models for vehicular traffic. The model was calibrated using several sources of empirical data from field measurements and from controlled experiments (see www.ped-net.org for some of these datasets). It also reproduces bottleneck capacities for directed flow and contraflow situations well.

The integration of the behavior model was accomplished by extending VISSIM's network editor for area based pedestrian infrastructure. Areas can represent walkable space, obstacles, stairs, measurements, counters, routing areas etc. Additionally, pedestrian specific evaluations like FRUIN' LOS have been implemented.

An important aspect is the mutual interaction of vehicles and pedestrians. Since both are simulated in the same software, true interaction is possible, i.e. vehicles react on cars and cars on pedestrians. VISSIM's standard network elements for controlling interactions, i.e. signals, conflict areas and priority rules, have been extended to work with the new pedestrian logic

The focus of applications will be the assessment of transport infrastructure where vehicular and pedestrian traffic meet, such as public transport stations or the road network around places which attract lots of pedestrians. The first commercial projects undertaken with the new VISSIM module include e.g. the simulation of North Melbourne Station in Melbourne, Australia, or the flow of visitors from the football stadium to the bus station in Mainz, Germany.

VISSIM 5.1 continues to enhance the ring-barrier controller (RBC) introduced in VISSIM 5.0. This industry standard controller can model nearly all controller configurations in North America, and now supports advanced queue detection, detector mapping with other VISSIM controllers, and phase conflict matrix. The RBC also supports comprehensive operations for both transit signal priority and preemption.

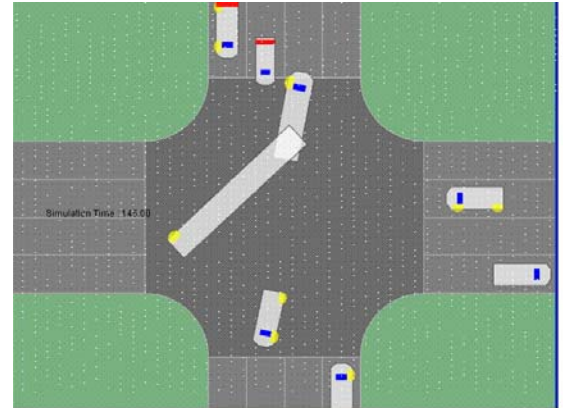
Finally, VISSIM 5.1 is multi-threaded to reduce simulation run times by taking advantage of multi-core and multi-processor computers!

Customers with active maintenance are eligible for the free upgrade to VISSIM 5.1. More information at: <http://www.ptv-vision.com/traffic/software-system-solutions/vissim/> or contact Peter Vortisch (peter.vortisch@ptv.de).

TEXAS Model

Tom Rioux of Rioux Engineering announces the availability of the TEXAS Model for Intersection Traffic Version 6.00. This version is the result of a FHWA SBIR Phase II project involving 47 tasks to enhance the TEXAS Model. The source code is distributed under the terms of the GNU General Public License as published by the Free Software Foundation. The TEXAS Model source code, documentation, and executables for X86 Windows and X86 Linux are available at no cost at:
http://groups.yahoo.com/group/TEXAS_Model
http://groups.yahoo.com/group/TEXAS_Model_Documentation1
http://groups.yahoo.com/group/TEXAS_Model_Documentation2
http://groups.yahoo.com/group/TEXAS_Model_Documentation3

This screen capture illustrates the articulation of vehicles in the model.



McTrans

TSIS-CORSIM version 6.1 was released in November 2008. Version 6.1 offers a variety of new features including 9-lane intersection approaches, left-hand drive, emergency vehicles, improved vehicle movement logic, and an alternate user-interface called TSIS Next.

Mid-Year Technical Activities

This was a very active year for the traffic modeling and simulation community. There were several activities including conferences, mid-year meetings, etc. that encouraged presentations and discussions on topics of interest to our members. Several of our members were at the center of those activities.

The next few pages summarize the major activities for 2008, including:

- Mid-year Meeting: Highway Capacity and Quality of Service Committee
- Mid-year Meeting: Freeway Operations Committee
- Mid-year Meeting: Traffic Signal Systems Committee
- Greenshields 75 Symposium
- Workshop on Traffic Modeling: Traffic Behavior and Simulation
- Third International Symposium of Transport Simulation 2008 (ISTS08)
- AATT 2008: 10th International Conference on Applications of Advanced Technologies in Transportation

Mid-year Activities: Highway Capacity and Quality of Service

Submitted by Loren Bloomberg

The 2008 Midyear Meeting of the Committee on Highway Capacity and Quality of Service (AHB 40) was held from July 27-30, 2008 in Newport Beach, CA. The focus of the meeting was addressing key issues related to the Year 2010 *Highway Capacity Manual*. Workshops on overarching issues and quality of service were held. Also, the committee held a joint lunch meeting with the local Institute of Transportation Engineers (ITE) sections on "Looking Ahead to the 2010 Highway Capacity Manual." Presentations included an overview of the 2010 HCM, technical presentation on new methodologies, and an open discussion with the group.

The Traffic Simulation Applications subcommittee conducted its meeting on Tuesday, July 30. Approximately 20 members and friends participated.

An ongoing area of focus for the subcommittee is a series of motions approved at the 2008 TRB meeting, with goals for the HCM to include:

- Guidance to model developers to promote consistent and accurate reporting of measures of effectiveness (MOEs) for highway capacity analysis.
- A recommended list of MOEs
- Language discouraging the use of HCM level of service threshold tables based on MOEs from other traffic analysis tools that are inconsistent with HCM definitions
- Language addressing the need for models to include clear documentation of the assumptions used to handle and report vehicle queues.
- A discussion of the randomness inherent in the results of stochastic traffic simulation models.



Attendees at the joint HCQS/ITE lunch session

Another important activity for the subcommittee is NCHRP 3-85; Ken Courage provided an updated on ongoing activities. The original focus of NCHRP 3-85 was to produce a final report that included three draft chapters. This strategy was developed before the initiation of NCHRP 3-92 and the development of the approach for the HCM chapter. Ken showed the revised NCHRP 3-85 plan. *(Editors Note: This figure is included in Attachment 1 at the end of the newsletter)*

Chapter-specific simulation guidance will be included in the HCM2010. These will go in a section titled "Alternative Tool Guidance" in the Volume 2 and 3 chapters. Some material will also go in Volumes 1 and 4, depending on the available space.

The "Alternative Tool Guidance" is expected to include the following:

- Strengths of the HCM Procedure
- Limitations that Might Be Addressed by Alternative Tools
- Additional Features and Measures Available from Alternative Tools.
- Development of HCM-Compatible Performance Measures Using Alternative Tools
- Conceptual Differences Preclude Direct Comparison of Results
- Adjustment of Simulation Parameters to the HCM Parameters
- Step by Step Instructions for Applying Alternative Tools (Might move to Volume 1)
- Sample Calculations Illustrating Alternative Tool Applications (Probably in Volume 4)
- Appendix Material (Definitely in Volume 4)

John Halkias provided an update on FHWA Activities. He indicated that a new study will be posted soon – a report on how different tools report different MOEs (based on work by Rick Dowling). Another study to be posted compares actual performance versus tool prediction. There are two additional studies underway: one on tools for identifying bottlenecks, and another on tools for predicting benefits of HOV/HOT lanes. Finally, John noted that the CORSIM guide is now online.

Mid-year Activities: Freeway Operations Committee

Submitted by Panos Prevedouros

A subcommittee subset of nine people met in Ft. Lauderdale during the FTOC 2008 conference of the Freeway operations committee. Various issues were vetted over more than two hours. Someone called it a cathartic experience since a lot of issues were aired.

We started from the undervaluation of traffic microsimulation in current large project planning and design:

- Multimillion dollar cost projects are planned, designed and constructed and both agents and developers don't want to spend 1% to calibrate and simulate a traffic operation model.
- Travel demand forecast: Agencies want to know what will happen in 20 years and fail to simulate existing conditions and the benefit upon project completion.
- The goal should be to integrate operational analysis into the mindset of planning and design. The recommended practice should be Planning→Design→Testing Traffic Operations →Feedback to planning and design until issues are resolved.
- One of the problems is the lack of data which make microsimulation both time-consuming and expensive. ITS databases can help with rapid data acquisition.
- Origin-Destination data are critical and largely non-existent. This seems like a worthwhile endeavor for GPS-tracking (e.g., INRIX) and cell phone-tracking (e.g., AirSage) companies.

Then we moved to actual model usage:

- Many users need advice on how to calibrate models in congested conditions.
- They need to use longer time periods with fluctuating demands but some deploy simulation for the HCM-based peak hour. The model should run over a broad time period that cover the peak period but starts and ends with normal loads of traffic.
- They need to use large geographic areas. Boundaries must include all bottlenecks and important destinations, otherwise the effects of weaving and secondary or hidden bottlenecks are lost.
- Calibration of odd driver behavior is difficult or impractical and typically non-transferable. An example is the various manifestations of the "touron" (tourist+moron.)
- ITS centers and their data aid in model calibration as long as detailed volume, speed and occupancy data are archived.
- This is easier said than done. Database management is an issue, e.g., there are 50 million lines of sensor data from two days in Ft. Lauderdale, FL.

And we concluded with some thoughts leading to the institutionalization of microsimulation in projects with large expected impacts to traffic operations:

- Move from "my model is better than yours" to the widespread and standardized used of microsimulation.
- Two avenues were suggested, the HCM 2010 edition, and the NEPA process (FHWA, FTA, EPA).
- EPA Mobile 6 is required for pollution estimates for NEPA process projects. However,
 - Microsimulation can give better emission MOES
 - FHWA environmental section needs to work with EPA to adopt microsimulation
 - But groups such as Sierra Club and Outdoor Circle will likely sue on the basis of model transparency and model consistency
 - Because Mobile 6 is verifiable and reproducible with identical dataset
 - But different model users using a current powerful microsimulator with the same dataset are likely to model differently, adjust parameters differently and produce different results
- Standardization requires Interoperability among models with verifiable model structure and parameters, and reproducible results from a single dataset.

Some suggested items for research include the following:

- Headway distribution enrichment is needed for model improvement.
- A pooled fund study is recommended to generate Volume 4 of the Traffic Analysis Tools for all popular models (only CORSIM is available now.)
- Exploratory research is needed on the feasibility of mandating computer microsimulation traffic analysis for all projects subject to NEPA review.

Mid-year Activities: Traffic Signal Systems Committee

Traffic Simulation Subcommittee: Sunday, July 20, 2008 – Marriott Livonia, Michigan

Submitted by Doug Gettman

Short Presentations

1. **Alex Stevanovic, University of Utah** presented recent research on optimizing signal timings of software-in-the-loop traffic controller using genetic algorithms. This tool is denoted VISGAOST. Several case studies were presented in Park City, UT; Detroit, MI; and Albany, NY indicating the ability of the GA tool to substantially improve timing performance in VISSIM. Notably the tool updates the timings in the SILS controller (ASC/3) automatically and evaluates the performance until convergence is achieved.
2. **Monty Abbas, Virginia Tech** presented recent research on Cabinet-in-the-loop simulation. This system not only puts hardware controller in the loop, but replaces a “Controller interface Device” with an entire traffic control cabinet system. The research is intended to assist in the development of algorithms for improved dilemma-zone operation. A field data collection system is being deployed to capture vehicles in dilemma zones and identify red-light running behaviors under standard and enhanced controller operation.

HCM and Simulation discussion

Gettman led a guided discussion related to the issues of traffic signal systems in relation to the incorporation of simulation into the HCM. The group identified a number of issues that are important to be addressed. In particular the group identified the need for discussion of SILS and why accurate controller modeling is relevant to capacity analysis. In addition, the group felt that guidance on simulation application is extremely important since the quality of analysis varies widely from analyst to analyst. DOTs need some “checklist” of activities that they can point to verify when a consultant turns in a capacity analysis study. A summary of this discussion, with enhancements provided by an ad-hoc subcommittee of volunteers (Eddie Curtis, FHWA; Ed Smaglik, NAU; Grant Zammit, FHWA; Stacie Phillips, KHA; Steven Click, Tennessee Tech; Monty Abbas, VT; Brian Park, UVA; Susan Langdon, Savant Group; Steve Stramsak, MDOT) will be provided under separate cover.

Quick Hits / News

1. TEXAS model is now available for download. All source code, executables, and analysis programs are available for free. TEXAS has been updated and improved over the last 3 years under two SBIR projects. Improvements include the ability to model CICAS-type capabilities for vehicles to have accidents; emergency vehicle movements and reaction to emergency vehicles, direct integration of the SSAM application; improvements to the NEMA controller model to incorporate most common modern features; improvements to lane changing; controller interface device support; and adding a Java application for running all of the application modules and performing statistical analysis of results.
2. The ALPS (Advanced Landside Performance Simulation) model (Kimley-Horn & Associates) is being improved in Fall 2008 to include more accurate modeling of transit priority operations for LRT/BRT for projects in Houston, TX and Miami, FL. KHA has used the model for airport landside operations analysis (pedestrians, transit, parking, passenger vehicles, rail systems, etc.) since 1985.
3. The Surrogate Safety Assessment Model (SSAM) is now available from FHWA for free, including executable software and source code. SSAM provides safety analysis of simulations by computing measures of severity of conflicts in simulation models. Statistical analysis and visualization maps are provided by the tool. SSAM is supported by exporting trajectory data from VISSIM, Paramics, TEXAS, and AIMSUN.
4. University of Arizona has performed some recent analysis of ramp metering operations using NIATT CIDII and VISSIM. Analysis has found some challenges of CIDs to work correctly using ramp metering software in the loop rather than controller hardware in the loop. University of Idaho is looking at improvements to the CIDII to address the issues.

Greenshields 75 Symposium

Woods Hole, Massachusetts, July 8-10, 2008, in conjunction with the summer meeting of the Traffic Flow Theory Committee

The theme of the Greenshields Symposium is "Celebrating 75 years of the Fundamental Diagram." The main topics included: historical appreciation of traffic flow theory founders, recent developments and influence on current practice, impact of technological developments, e.g., real-time measurements, remote sensing, etc. The program included a workshop that focused on assessing the current status of traffic flow theory, identifying gaps in knowledge and developing research topics to address areas that need improvement or where we have insufficient experience.

The program began with four invited presentations that addressed the history and development of various aspects of traffic modeling:

- Foundations of Traffic Flow Theory I: Greenshields' Legacy - Highway Traffic (Reinhart Kuehne)
- Foundations of Traffic Flow Theory II: Greenshields' Legacy - Urban Streets (Nathan Gartner)
- Foundations of Traffic Flow Theory III: Treiterer's Legacy - Measurements and Characteristics (Rahim Benekohal)
- Foundations of Traffic Flow Theory IV: Modern Approaches to Traffic Flow Modeling the Three-phase Theory (Boris Kerner)

The next two days were devoted to presentation and discussion of papers in four technical sessions:

- Technical Session A: The Fundamental Diagram: From Theory to Practice
- Technical Session B: Measurements and Characteristics of Traffic Flow
- Technical Session C: Empirical Observations of Traffic Flow Characteristics
- Technical Session D: Simulation and Calibration of Traffic Flow Models



Symposium Organizers: Reinhart Kuehne and Nathan Gartner

The symposium ended with a panel discussion on "Perspectives on Traffic Flow Theory: Beyond Greenshields." The panelists included H. Mahmassani (moderator), R. Bertini, C. Buisson, N. Gartner, S. Hoogendoorn, B. Kerner, and R. Kuehne



Workshop on Traffic Modeling: Traffic Behavior and Simulation

University of Technology, Graz, Austria, June 30 to July 02, 2008

The objectives of this workshop were to bring together the foremost experts, modelers, software developers and users to (1) assess the future needs for traffic models, (2) review the states of the art and practice and (3) identify directions for further research and model development. The workshop followed a series of workshops previously being held in Sedona, AZ (2005), Sitges, Spain (2003) and Tuscon, AZ (2001).

The three-day workshop included several invited plenary talks remarking on the state of the art and practice. Software presentations and breakout sessions explored themes related to traffic modeling and identified directions for further research and development. The presentations and discussions focused on the following topics:

- Driver behavior modeling
- Driver strategic route-choice decision making
- Calibration and validation of model
- Modular architectures for simulation systems (micro-macro modeling)
- Simulation modeling in design and optimization
- Simulation modeling in evacuation management
- Simulation modeling with vehicle-infrastructure communication
- Needs and requirements of users and other stakeholders

Breakout groups were formed to address three topics of critical interest to the traffic modeling and simulation community.

Each group was asked to structure their discussions around the following questions:

1. Why is this topic important?
2. Where are we now?
3. Where do we want to be?
4. What are the issues and challenges?
5. What should we do next?

Each group was identified by a legendary pass in the mountainous terrain of Austria. The full group reports are included in the conference proceedings. Their recommendations on what we should do next are summarized here:

Group Semmering: Requirements on Core Models for Human Driver Behavior

Moderator: **Nagui Rouphail**

Recorder: **Jim Dale**

- Improve connectivity with other disciplines including better collaboration among agencies – (USDOT, EPA, NIH, NSF) that may influence development of behavioural models
- More information on lateral behaviour
 - heterogeneous traffic, non-lane based roadways,
 - lane changing – word is still out on NGSIM lane changing models
- Consideration of multimodal (pedestrians, bicycles, etc.) interactions
- Behavioural models that address user reaction to information
- Acquiring high resolution microscopic data (e.g., acceleration and grade profiles for environmental analyses)



Group Brenner: Requirements on Microsimulation for Real-time Applications and Traffic Management

Moderator: **Vassili Alexiadis**

Recorder: **David Lucas**

- Quality and quantity of data sources
 - Need open-source data repository/archive using standardized formats for data and its collection to provide comprehensive data sets
 - Quality control and validation
- Properly calibrated and validated models
 - Techniques for online calibration and validation
 - Explore alternative models (e.g., state-based, human factors, ...)
- Dynamic estimation of origin-destination patterns
 - Explore new methodologies for gathering network loading data (e.g., cellular data, GPS, VII, ...)
- Feedback, taking into account travelers' actual responses
 - Incorporate route-, mode-, time of travel- and destination-shift, induced/foregone demand, and changes in traveler behavior



Group Schober: Requirements for Congestion Pricing

Moderator: **Raj Ghaman**

Recorder: **Doug Gettmann**

What should we do next?

- FHWA could undertake “congestion pricing SIM” project to develop tools and capabilities for congestion pricing.
- Develop specific strategies to mitigating public outcry. Such as subsidies for lower social-economic groups.
- Outreach is necessary – any pricing strategies that are affecting.
- Research on optimization of strategies.
- Research on traveller reactions to pricing strategies.
- Rigorous fundamental quantitative analysis and share that with everyone to sell the approach.
- Why not try to make an experiment where people get “play money” and see how that would spend their budget. The area to test needs to be relatively large. A full metropolitan area. If it is limited to just a small area, it gets huge opposition.
- Need a session at the next meeting on congestion pricing models. We are not going to be relevant as a group if we do not approach this.
- Do a review of congestion pricing reports, studies, models, etc. – literature scan.
- Need to generate simulation results that indicate that there are positive B/C in doing the congestion pricing



Sponsoring Organizations

- Federal Highway Administration, Office of Operations, Research, and Development
- TRB Committee on Traffic Flow Theory
- TRB Committee on Highway Capacity and Quality of Service

Program Chair

Dr. Martin Fellendorf, Graz University of Technology

Co-Chair

Dr. Pitu Mirchandani, University of Arizona

Third International Symposium of Transport Simulation 2008 (ISTS08)

Submitted by Majid Sarvi

Following the success of the two International Symposiums of Transport Simulation which were held in Japan and Switzerland, Monash University hosted the third symposium from 6th-8th of August, 2008 in Australia. The symposium brought together leading engineers and scientists in the transport simulation field worldwide. The ISTS series focuses on the latest advanced research on modeling and applications of transport simulation, including simulation of vehicle movements, dynamic simulation of traffic flow on transport networks, pedestrian simulations in urban areas, and freight simulations. The ISTS series is the main gathering for the world's transportation and traffic academics and practitioners, and those who are interested in contributing to or gaining a deeper understanding of the transport simulation field.

The ISTS08 attracted more than 70 delegates from 23 countries. A total of 34 papers were selected for the final program which was selected from 113 papers submitted.

Additionally a practitioner's session was held to attract practitioners who were involved in using simulation for practical projects where there was a strong innovation dimension. The next ISTS symposium will be held in 2010 with further information to be released by early 2009 at (<http://civil.eng.monash.edu.au/conferences/ists08>).

AATT 2008: 10th International Conference on Applications of Advanced Technologies in Transportation

Athens, Greece, 27-31 May 2008

The Applications of Advanced Technologies in Transportation (AATT 2008) Conference series provided a unique stage for sharing and exchanging research ideas, engineering practice and creating synergies between research and practice. The main objectives of the 10th AATT were to discuss and showcase advanced technologies, advanced equipment, advanced skills and new materials. The Conference covered applications of advanced technologies in all modes and systems (highway transportation, water transportation, railway transportation and air transportation). The Keynote address was given by Prof. Kumares Sinha from Purdue University (Photo at the right).



Several papers of interest to the traffic modeling and simulation community were presented and discussed. The topics focused on:

- Soft Computing, Data Mining and Analysis
- Travel Behavior
- Simulation and Modeling
- Traffic Theory, Flow and Control
- Statistical and Econometric Modeling
- Optimization and Control
- Artificial Intelligence and Novel Computing

Technical Articles Submitted for This Newsletter Edition

Anyone can submit a technical article for the newsletter. The only requirement is that the content be non commercial and of interest to the traffic simulation community.

Editor's Note:

A three page limit normally applies to technical articles. Because we received only one submittal for this edition, we have included the entire 7 page document. We hope to receive enough material in the future to allow us to reinstate the three page limit.

Controlling Emissions by Queue Relocation

JCT Signals Symposium, September 2008

Malcolm Neill

Pete Sykes

SIAS Limited

37 Manor Place, Edinburgh EH3 7EB, Tel: 0131 225 7900, Fax: 0131 225 9229

www.sias.com

INTRODUCTION

Cupar is a small market town in Fife with significant traffic congestion. To help alleviate this, SIAS Limited (SIAS) was commissioned in 2007 to report on the effects of several proposed changes to the road transport network, primarily concerning signal control. One problem to be addressed was the high level of emissions in the centre of the town. The proposed solution was to relocate the queue of traffic at a set of signals and reduce emissions in one critical area characterised by a narrow street and tall buildings.

The innovative solution was tested in microsimulation and found to successfully relocate the site of the emissions to one where they were more likely to disperse. This project was rare in that the evaluation was not made on the conventional measures of journey time and vehicle operating costs savings, i.e. increased amenity to drivers, but instead it was assessed on the reduced level of emissions in a critical area.

CLEANER VEHICLES

Vehicle emissions are currently a problem of global significance. Climate change is discussed in the scientific press, the popular press and on radio and TV on an almost daily basis. Respiratory health issues are also of major concern. Road vehicles are held responsible for many of the emissions which are considered to be the cause of these problems and action is being taken worldwide.

In practical terms this translates into efforts to change the vehicle fleet by legislating for cleaner vehicles and by pro-actively taxing those with higher emissions to get them off the road. Efforts are working to reduce emissions overall, but the transport sector emissions continue to stay high {1. *Green Car Congress*}.

While global efforts are considered vital for the long term future, Planners are regularly presented with short term problems in local areas. Waiting for the national fleet characteristics to react to changes in the tax regime and the wide adoption of new technology such as electric or hybrid vehicles is not an adequate solution to pressing local issues. The EU imposes air quality targets to be fulfilled in a much shorter time scale.

One example of where these targets were not being met was on Bonnygate, the main street in Cupar, a small town in Fife

CUPAR

In 2007 SIAS was commissioned by Fife Council to evaluate the outcomes of various proposed changes to the existing signals in Cupar which had been installed in 2000 and are due for review. To facilitate this, an S-Paramics model was used to test several options which included removing signals at some junctions; while relocating pedestrian crossings, adding signals at a currently un-signalised junction, implementing active signal control with MOVA. Finally, a proposal was tested to build a roundabout to the east of the town to replace a major signalised junction.

CONTROLLING EMISSIONS BY QUEUE RELOCATION

A total of nine options were identified. Five flow scenarios were also identified representing the base flows and a 20% increase in the three major flows through Cupar. Some of the scenarios were also tested with incidents programmed into the model to stress test the various control options under abnormal conditions.

Five options were thought to be capable of rapid implementation and so were tested with 2007 vehicle demands to evaluate the immediate benefits. One of these tests focussed on the problem of emissions levels in the centre of the town on Bonnygate.

BONNYGATE

Bonnygate is a narrow section of road with relatively tall buildings each side. It is in the centre of the town and tends to have a high pedestrian density as it is also the main shopping street. Levels of Carbon Monoxide, PM10 and Nitrous Oxides are unacceptable as the tall buildings trap these vehicle emissions and prevent dispersion.

Eastbound vehicles on Bonnygate currently queue at the signals at the Crossgate junction. Idling at red lights adds to the pollution problem, as there are more vehicles for a longer time contributing to emissions at ground level. As nothing can be done about the tall buildings, removing the waiting vehicles from the area is one possible solution to the problem.

Relocation of queueing traffic from the Crossgate junction signals to west of Lady Wynd by altering an existing pedestrian crossing was investigated. This crossing lies just west of Lady Wynd and halts traffic travelling east before it enters Bonnygate. The signals at this crossing were re-timed such that the eastbound traffic is now held at the crossing on every cycle. When it is released to progress through Bonnygate, it is presented with a green phase as it arrives at the Crossgate Junction and does not queue in Bonnygate.

Westbound traffic leaving the Crossgate signals and progressing through Bonnygate would be stopped at the pedestrian crossing at Lady Wynd if it was a simple crossing. The problems of emissions in Bonnygate would then have simply been reassigned from the eastbound traffic to the westbound. The pedestrian crossing was redesigned with a central island and, while the eastbound traffic is stopped on every cycle, the westbound is only stopped if there is pedestrian demand and so the problem of queueing in Bonnygate is reduced.

The buildings to the west of Lady Wynd are smaller than those in Bonnygate and also the street and the pavements are much wider. While no explicit dispersion modelling was undertaken, a qualitative assessment was used to determine that the problem of the build up of emissions would be reduced in that area as dispersion would be more rapid than it would be in the urban canyon in Bonnygate.

Figure 1 shows a map of the area. It also shows eastbound vehicles queueing in Bonnygate and the wider area near Lady Wynd looking east towards Bonnygate.



Figure 1 : Cupar: Bonnygate

The role of modelling in the assessment of the effect of this queue relocation was to identify if there would be any change to vehicle journey times through Cupar and to quantify the changes in localised emissions on Bonnygate.

EMISSIONS MODELLING

Conventionally the main user benefits in the assessment of road improvement schemes come from the travel time and vehicle operating cost savings {2. Cragg}. A “traditional” transport scheme would increase capacity in one or more parts of the road network to alleviate congestion and measure the resulting savings in journey times. The amenity provided to the travelling public is the measure used to determine the relative success of the scheme.

In this case the change to the road system is not intended to benefit the motorist or the bus passenger. It is intended to benefit the pedestrians, the local residents, the shop and business owners in Bonnygate and their customers.

The ability to measure this benefit lies in quantifying the location and volume of emissions.

CONTROLLING EMISSIONS BY QUEUE RELOCATION

Emissions levels can be evaluated in microsimulation in four ways:

- Using the average journey time and distance over all trips for a given OD pair. This method is used by *TUBA* {3. *TUBA*}.
- Using the journey time and distance for individual trips and aggregating them. This method is used by *PEARS* in “calculated” mode for vehicle operating costs {4. *PEARS*}.
- Using the average speeds and vehicle density recorded on individual links. This method is described in *DMRB* Vol. 11 {5. *DMRB*}.
- Using second by second speeds and accelerations of individual vehicles. This method is used by *PEARS* in “simulated” mode for vehicle operating costs.

Each method adds detail to the evaluation and gives a more precise and more localised answer. Using the average time and distance for a journey and multiplying it by the number of journeys per day is the same methodology as applied by traditional assignment models. It may result in a poor assessment as, for example, a journey undertaken at a peak time may result in high emissions due to congestion. The same journey in a off peak period may also result in high emissions due to the much faster speed, but the mean of these two high emission trips may well be closer to the optimum speed for fuel efficiency resulting in a prediction of lower emissions.

PEARS, in calculated mode, aggregates individual journey times and distances, thus avoiding the problems inherent in the average journey time approach. *PEARS* is mandated for use in Scotland on certain types of project.

In Cupar the evaluation was performed at individual link level. This is described in *DMRB* Vol. 11 and uses the average speeds on each link for a number of vehicle types. This was adequate to quantify emissions at a sufficiently detailed level to evaluate the effect of relocating the queue while still remaining within the application of *DMRB* guidelines.

RESULTS

Two sets of results were derived from the modelling exercise. One was to assess the journey times on the trips passing through the changed area; the other was to assess the change in emissions in the Bonnygate area.

Figure 2 shows the journey time comparison. The times were measured along a path going east through Bonnygate and the Crossgate signals. As the microsimulation is a Monte-Carlo simulation, i.e. every run is different in much the same way that every day on the real road network is different, several runs were made of the base model and the design model. The mean of the journey time broken down by time of day as found and the 95% confidence intervals plotted around this mean. The confidence intervals show the range in which we expect the mean to lie. When comparing the ranges, if we find they overlap we can state that the change has had no statistically significant effect on the journey time. If they do not overlap then we deduce that there has been a change. In this case the mean journey times are close and the confidence intervals show a significant overlap and we can deduce that there has been no net disbenefit to drivers.

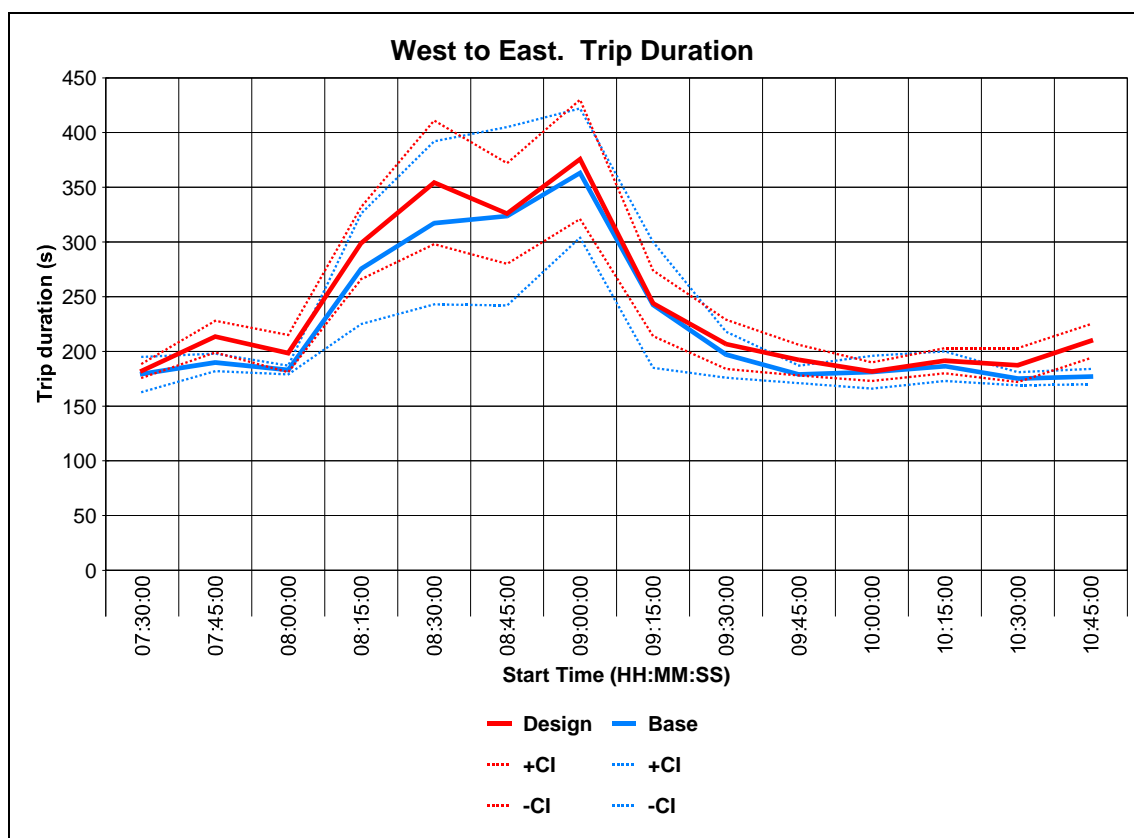


Figure 2 : Journey time West to East

Figure 3 is a plot of cumulative journey time by journey distance. It shows where the delays are incurred in the journey and clearly shows that while the delay is incurred earlier in the trip, the overall time taken is similar.

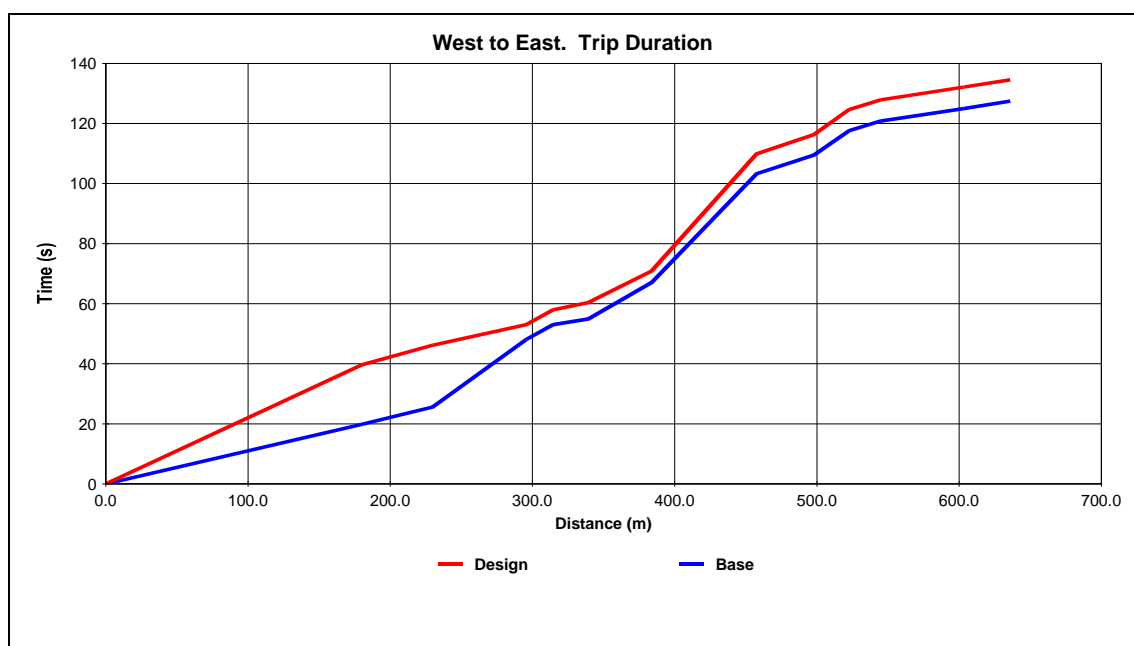


Figure 3 : Journey time by Distance.

CONTROLLING EMISSIONS BY QUEUE RELOCATION

Table 1 shows the change in emissions in the Bonnygate area due to the queue relocation. Figures 4 and 5 are two snapshots of the S-Paramics model showing the emissions in 3D view before and after the change. The location and the volume of emissions are clear to see.

Table 1 : Changes in Emissions in Bonnygate.

	AM 08:00 – 09:00	PM 16:30 – 17:30
Carbon Monoxide	-26.2%	-28.4%
Hydrocarbons	-25.9%	-26.1%
Nitrogen Oxide	-16.6%	-17.0%
PM10	-20.5%	-23.4%

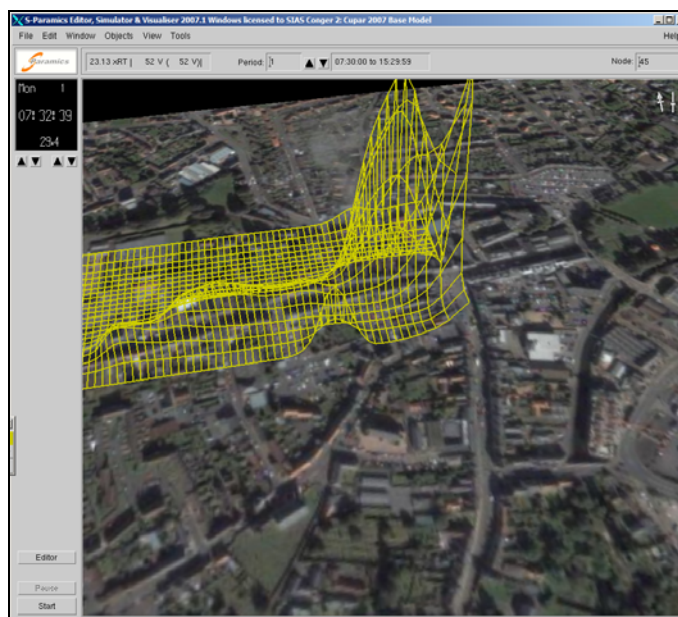


Figure 4 : Emissions on Bonnygate, near Crossgate Junction

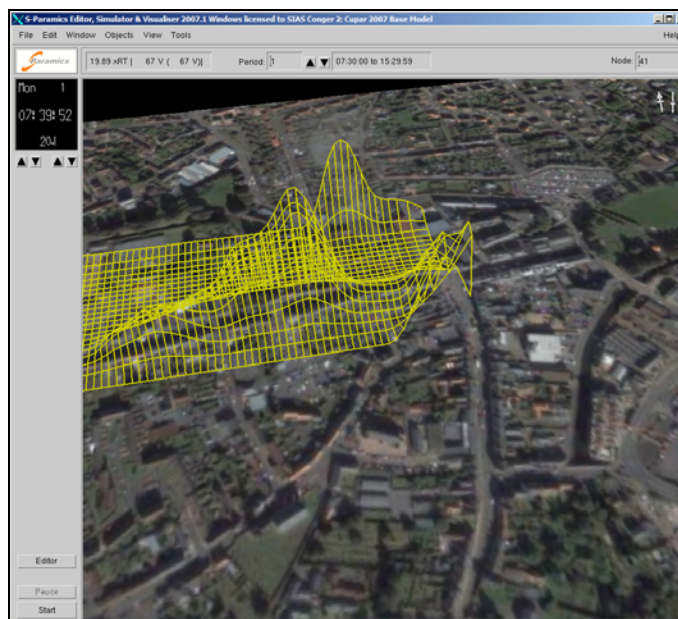


Figure 5 : Emissions relocated to West of Lady Wynd

CONCLUSION

This innovative project focused on the amenity for residents, businesses and on health issues rather than on the traditional measures of time saving benefits for drivers. The results from this modelling exercise were considered so persuasive that after the modelling report was delivered in April 2008, the scheme was due to be implemented in August 2008

REFERENCES

1. Total GHG Emissions in Europe Drop 7.9% Between 1990 and 2005; Transport Sector Sees 26% Increase
<http://www.greencarcongress.com/2008/02/total-ghg-emiss.html#more> (Accessed 21 Jul 2008)
2. Presentation at SIAS user group October 2007. CD available from Paramics@sias.com
3. *TUBA User manual*, V 1.7a
<http://www.dft.gov.uk/pgr/economics/software/tuba/tubausermanual> (Accessed 21 Jul 2008)
4. PEARS (Program for Economic Assessment of Road Schemes)
www.scot-tag.org.uk (Accessed 21 Jul 2008)
5. *DMRB* Volume 11: Environmental assessment.
<http://www.standardsforhighways.co.uk/dmr/vol11> (Accessed 21 Jul 2008)

Attachment 1

Summary of the Proposed Guidance for the use of Alternative Tools in the 2010 HCM

(Preliminary Summary of the Part I Presentation for the 2009 TRB Sunday Simulation Workshop)

This document summarizes the organization of the proposed guidance for the use of alternative tools to be presented in the 2010 edition of the HCM. The proposed 2010 HCM structure involves a set of three separately bound volumes and a fourth volume that will be entirely electronic. Exhibit 1 shows how each of the guidance topics will fit into the 2010 HCM Structure.

Volume 1: Concepts

As the title suggests, this volume will deal with traffic analysis concepts as they relate to the HCM. It will be a bound volume, as opposed to a loose-leaf format to provide an enduring and authoritative reference. There will be nine chapters. The following chapters will contain material on alternative tools:

Chapter 6: Analysis Tools

Among other things, this chapter will contain most of the general guidance developed by NCHRP Project 3-85 on the use of alternative tools. Topics include:

- *Appropriate use of Alternative Tools*: Presents a detailed list of conditions under which it might be appropriate to apply alternative tools in addition to or instead of the HCM.
- *Application Framework for Alternative Tools*: This is a new section that recognizes the fact that alternative tools have been used for many years to provide decision support and that not all of their applications have any particular requirement for HCM compatibility. Therefore HCM compatibility is not a universal requirement or desire. The guidance is addressed specifically to analysts who are seeking some degree of compatibility with the HCM procedures through the use of alternative tools.
- *Application Guidelines for Simulation Tools*: Based on a highly abridged version of the general simulation guidelines presented in the Traffic Analysis Toolbox and other references.

Chapter 7: Interpreting and Presenting Results

Among other things, this chapter will contain the following additional guidance topics from NCHRP Project 3-85:

- *Performance Measures from Alternative Tools*: Based on the work on performance measures from alternative tools performed by Dowling [2]. This material will be augmented by the project findings.
- *Use of Vehicle Trajectory Analysis in Comparing Performance Measures*: We have revised this section substantially in response to Panel comments. The trajectory-based definitions of delay have been presented in more detail and each of the determinants of delay has been discussed. We have de-emphasized the simplistic HCM definition and have reoriented it to emphasize the fact that it creates a delay definition that other tools should strive to replicate.
- *Stochastic Aspects of Simulation Analysis*: In response to a Committee resolution to the effect that the 2010 Highway Capacity Manual should include a discussion of the randomness inherent in the results of traffic simulation models and recommendations for dealing with this aspect of traffic simulation.

Chapter 8: Policy Considerations

Among other things, this chapter will contain a section on traffic analysis tool selection criteria from NCHRP Project 3-85. The guidance presented here will suggest the minimum requirements to which a traffic analysis tool should conform for use in highway capacity analysis

Chapter 9: Glossary & Symbols

Some terms related to alternative tools will be added to the glossary

Volume 2: Uninterrupted Flow and Volume 3: Interrupted Flow

These two volumes will be published in loose-leaf format. Together they will cover the material presented in Part III of the HCM 2000. Each facility (e.g., signalized intersections) will be covered in a separate chapter. Each procedural chapter with potential applications for alternative tools will contain a section (probably close to the end of the chapter) with the heading “*Guidance for the Use of Alternative Traffic Analysis Tools*.” This section will present succinct guidance, with liberal references to other documents such as the final report, the *Toolbox*, etc. The organization of the material will be the same for all procedural chapters and will conform to the following outline insofar as practical. The alternative tool guidance for each procedural chapter has been developed around the following outline:

Strengths of the HCM Procedure

The section starts by explaining the strong points of the HCM procedure that justify its use as the default traffic analysis tool.

Limitations of the HCM Procedures that Might Be Addressed by Alternative Tools

Each chapter will contain a table describing the identified limitations of the HCM procedure and an assessment of the potential of alternative tools to overcome these limitations. Follow up narrative will identify the most common types of applications in which alternative tools are typically employed

Additional Features and Performance Measures Available from Alternative Tools

Alternative tools typically report a more comprehensive set of performance measures than the HCM procedures. The additional measures for each chapter will be described in this section.

Development of HCM-Compatible Performance Measures Using Alternative Tools

In some cases the performance measures produced by alternative tools are based on different definitions than those with similar terminology in the HCM. Guidance will be given here on how to recognize the differences and what, if any adjustments can be made to improve compatibility. When direct comparison with HCM-based measures is not meaningful, guidance will be provided on how the alternative tools can be used to produce relative measures that may be used to compare alternative design treatments. The basic experiments carried out under the NCHRP project will be the main source of information for this material.

Conceptual Differences between the HCM and Simulation Modeling that Preclude Direct Comparison of Results

Even when the HCM performance measure definitions are compatible with those of an alternative tool, direct comparisons may still not be meaningful because differences in the computational methodology may be expected to lead to different results. For example, random arrivals at a signalized intersection are treated entirely differently by analytical and simulation tools. Most analysts are unaware of the difference and are at a loss to explain why HCM delays can differ considerably from simulated delays with the same input data. The literature is full of studies that have found such inexplicable differences. The basic experiments carried out under this project will also be the main source of information for this material.

Adjustment of Simulation Parameters to the HCM Parameters

Some adjustments will generally be required before an alternative tool can be used effectively to supplement or replace an HCM procedure. For example, the parameters that determine the capacity of a signalized approach (e.g., steady state headway and startup lost time) should be adjusted to ensure that the simulated approach capacities match the HCM values. One exception to this rule is the case when HCM limitations prevent credible computations of capacity (e.g., short turn lane spillover).

This section should indicate for each chapter the most important simulation parameters that should be fine tuned to put alternative tools on a “level playing field” with the HCM.

Step by Step Instructions for Applying Alternative Tools

Many of the steps required to conduct highway capacity analyses with alternative tools are common to all procedural chapters and will therefore be covered in the “Application Framework” section of the General Guidance. Steps that are specific to a particular chapter will be covered here.

Sample Calculations Illustrating Alternative Tool Applications

Sample calculations from the HCM 2000 will be used to illustrate the use of alternative tools. In their current form, all of the sample calculations demonstrate appropriate uses of the HCM procedures. The use alternative tools will be demonstrated by introducing conditions that exceed HCM limitations.

The sample calculations are intended to illustrate the proper use of alternative tools. Therefore they will adhere to the principles and other guidance presented earlier in this section. Each of the sample calculations will begin with a determination of the necessity to use an alternative tool, based on an identified limitation of the HCM procedure. Each case may, where appropriate, include a discussion of common “workarounds” (i.e., planning approximations) that have been used to extend the HCM procedures beyond their limitations. Note, however, that the development of such workarounds is not within the scope of this project.

Volume 4: Applications Guide

The introduction of Volume 4 as a virtual document represents a significant departure from previous editions of the HCM. This recommendation was made in recognition of the growth in the body of knowledge, and the size limitations of a paper document. Volume 4 will contain three parts:

1. Supplemental examples that are too detailed to include in the procedural chapters of Volumes 2 and 3
2. The case studies currently presented in the Highway Capacity Manual Applications Guide (HCMAG), supplemented by a simulation based case study prepared by NCHRP Project 3-85.
3. A reference library containing works related to the general subject of highway capacity analysis. The final report for NCHRP Project 3-85 will be included in the reference library.

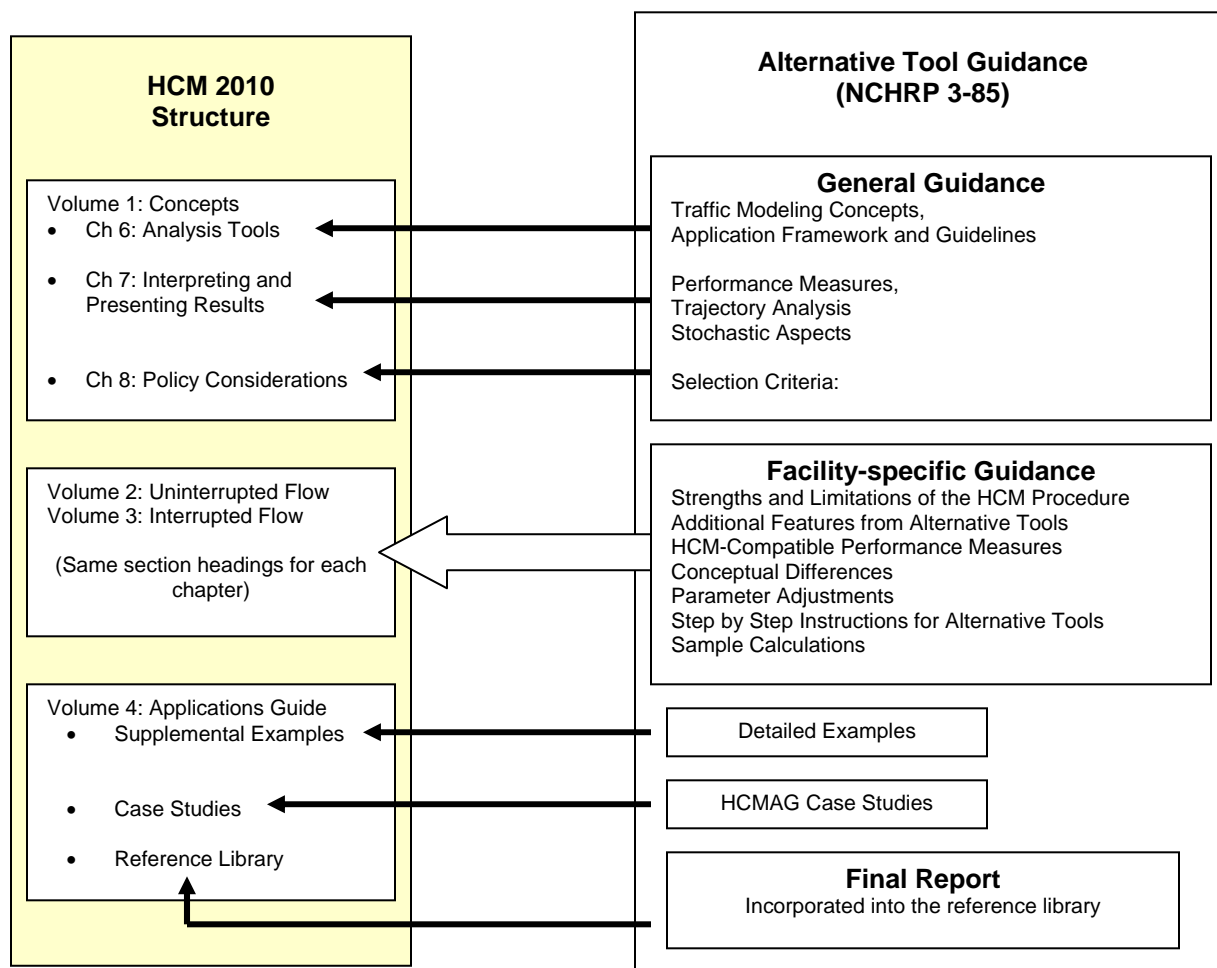


Exhibit 1: NCHRP Project 3-85 alternative tool guidance in the 2010 HCM

Attachment 2

2009 Sessions and Meetings of Interest to the Traffic Simulation Community

No.	Sponsor	Function Title	Location	Time
	AHB40	Traffic Simulation and Applications Subcommittee, AHB40(1.2)	M - Taft	Sunday, 8:00 AM–9:30 AM
121	ADB30	Overview of Dynamic Traffic Assignment Model Guidelines	H - Thoroughbred	Sunday, 9:00 AM–12:00 PM
130	AHB50	Doctoral Student Research in Transportation Operations and Traffic Control	M - Washington B5	Sunday, 9:00 AM–12:30 PM
156	AHB45	Role of Simulation in 2010 Highway Capacity Manual	S - Palladian	Sunday, 1:30 PM–4:30 PM
	AHB20	Freeway Simulation Subcommittee, AHB20(2)	M - Taylor	Sunday, 5:00 PM–6:00 PM
232	ADB30	Traffic Assignment and Routing Models in Networks	H - Georgetown West	Monday, 8:00 AM–9:45 AM
245	ANB20	Road Safety Evaluations: Part 1 (Part 2, Session 608)	M - Salon 2	Monday, 9:30 AM–12:00 PM
278	ADB50	Modeling Applications: Microscopic View	H - Monroe East	Monday, 10:15 AM–12:00 PM
279	ADB30	Origin-Destination Estimation and Traffic Modeling in Networks	H - Georgetown West	Monday, 10:15 AM–12:00 PM
325	ABJ95	Visualization and Simulation Tools and Applications	M - Salon 2	Monday, 2:30 PM–5:00 PM
339	ADB40	Travel Demand Forecasting Innovations	H - International Center	Monday, 2:30 PM–5:00 PM
	AHB45	Traffic Simulation Models Joint Subcommittee of AHB45, AHB40, AHB25, AHB20	M - Washington B3	Monday, 7:30 PM–9:30 PM
387	AHB15	Integration, Deployment, and Maintenance of Intelligent Transportation Systems	M - Salon 2	Monday, 7:30 PM–9:30 PM
388	AHB15	Applications of Intelligent Transportation Systems: Monitoring and Managing Traffic	M - Salon 2	Monday, 7:30 PM–9:30 PM
418	AHD10	Application of Contracts, Gaming Simulation, and Information Management Systems to Highway Maintenance	M - Maryland B	Tuesday, 8:00 AM–9:45 AM
419	AHB25	Assessing Performance of Traffic Signal Systems	M - Delaware A	Tuesday, 8:00 AM–9:45 AM
454	AHB40	Highway Capacity for Freeways and Arterial Facilities	M - Salon 2	Tuesday, 9:30 AM–12:00 PM
461	AHB35	Recent Research Results for High-Occupancy-Vehicle Lanes and Managed Lanes	M - Salon 2	Tuesday, 9:30 AM–12:00 PM
472	AHB25	New Approach to Traffic Signal Timing Education and Training: Mobile Signal Timing Training	M - Delaware A	Tuesday, 10:15 AM–12:00 PM
537	AHB20	Freeway Operations	M - Salon 2	Tuesday, 2:30 PM–5:00 PM
608	ANB20	Road Safety Evaluations, Part 2 (Part 1, Session 245)	M - Salon 2	Tuesday, 7:30 PM–9:30 PM
671	AHB25	Advances in Signal Timing, Optimization, and Management	M - Salon 2	Wednesday, 9:30 AM–12:00 PM
672	AHB45	Advances in Traffic Flow Theory and Applications	M - Salon 2	Wednesday, 9:30 AM–12:00 PM

673	AHB45	Cellular Transmission and Traffic Simulation: Models and Applications	M - Salon 2	Wednesday, 9:30 AM–12:00 PM
680	ANB10	Evacuation Simulation, Modeling, and Optimization	H - International Center	Wednesday, 9:30 AM–12:00 PM
749	ADB30	Network Modeling Innovations	H - International Center	Wednesday, 2:30 PM–5:00 PM
782	ANB75T	Roundabout Research: Crashes, Design, and Traffic Control	M - Thurgood Marshall North	Thursday, 8:00 AM–9:45 AM
785	ADB30	Disaster Evacuation and Other Applications of Network Models	H - Jefferson West	Thursday, 8:00 AM–9:45 AM