



Future Directions for Intersection Capacity Analysis in Canada



**Conversation Circle
CITE Annual Conference
June 2015**



**Moderated by
Jim Gough, P.Eng.**



Agenda

- Overview of intersection capacity analysis in Canada
- Education and training
- How to reflect Canadian parameters / experience?
- Software issues and evolution
- Future of intersection capacity and LOS
- Future directions for CITE (and TAC)



Today's Panellists

- Chris Blackwood, Mohawk College
- Margaret Briegmann, BA Consulting Group
- Nixon Chan. MMM Group
- Matt Davis, City of Toronto



Overview of Intersection

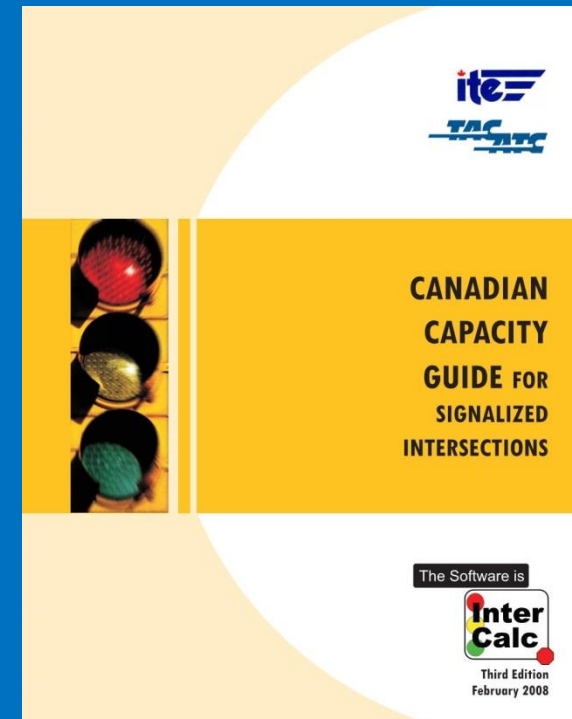
Capacity Analysis in Canada (1)

- Historically, the Highway Capacity Manual and Canadian Capacity Guide for Signalized Intersections were the dominant methodologies
- As analysis became more computerized, Synchro rose to become the tool used by the overwhelming majority
- There are issues associated with both HCM and Synchro
- *Are we to be limited to these choices, based on a methodology which may not be accurate?*
- *How much does that matter?*



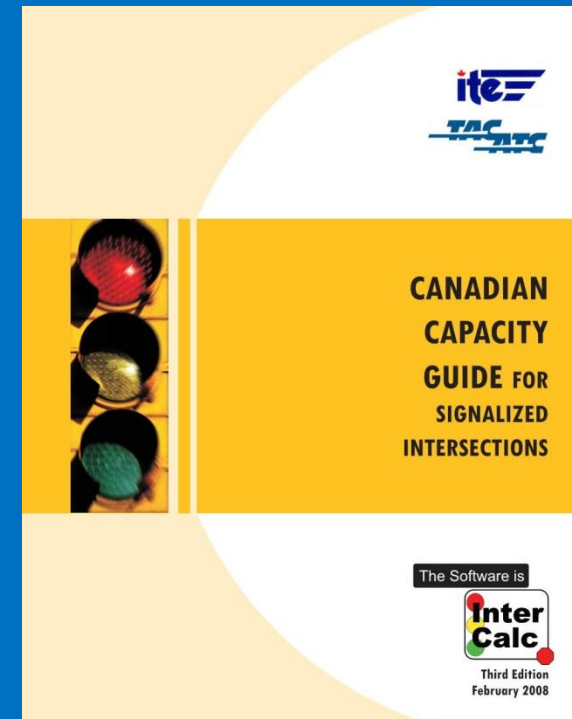
Why support the CCG?

- More accurate methodology, especially for left turns
- Canadian database
- Excellent teaching tool
 - A methodology that can be taught
 - Four worked examples
- Student competition
- Recognized by TAC as a national reference
- InterCalc software



Acceptance of the CCG

- Many municipalities in Ontario include the CCG methodology in their guidelines, and accept CCG and Intercalc software results in TIS work, either as a sensitivity/comparison to other methodologies, or as a standalone analysis.
- Commercial competition and lack of integration within transportation industry have left CCG marginalized





Education and Training

- Few universities / colleges teach intersection capacity analysis
 - As software becomes more complicated / more of a black box, more knowledgeable practitioners are needed
 - Cost implications of software for schools
 - Understanding of the traffic engineering concepts is being eroded
- *Is a loss of technical skill occurring?*
- *If so, what should be done about it?*
- *Is this contributing to the change in perceptions around LOS analysis?*
- *Is there an educational institution that could manage the CCG and continue to develop it?*



How to reflect Canadian parameters and experience?

- American software does not reflect Canadian experience or parameters (e.g. saturation flow)
- *Does this matter?*
- *What do you need to be able to reflect Canadian practices and experience?*
- *Can we create a home for the CCG and other Canadian elements of practice, so that they survive and grow?*



Software issues

- Software continues to become more complicated and costly
- Little choice available: Synchro, HCS or Vistro
- *Do most practitioners understand the implications of the parameters they choose? Do they understand the outputs?*
- *How can we maintain an informed workforce?*
- *Is software becoming un-manageable for smaller municipalities, educational institutions and small consulting firms?*



Software evolution

- Software platforms / access are changing
 - Internet-based
- *Is there a market for different software access models within Canada? What opportunities does this offer?*



Evolving perspectives on LOS

- Some agencies are no longer using intersection LOS as a measure of system performance, or development impact:
 - Switch to measures such as additional volume driving or on other modes
- Others are using vehicular intersection LOS as one of a suite of measures, or are using multimodal LOS
- *Will this be purely a big-city phenomenon?*
- *Should CITE take a position on how intersection LOS is used?*



Future directions

- A home for CCG?
- Projects for CITE and TAC:
 - *Guide software development?*
 - *Guide further CCG evolution?*
 - *Develop software guidelines?*
 - *Training program?*
 - *Guidance on how to use intersection LOS?*
- Please join our monthly SimCap / CCG calls: email Jeff Walker – walkerje@mmm.ca



Contact Info

■ CITE representatives to TOMSC

- *Kelly Schmid*
- *Mark Merlo*
- *Shannon Noonan*
- *Greg O'Brien*

■ Additional CITE committee members:

- *Jim Gough, P.Eng. (goughj@mmm.ca)*
- *Dan Havercroft*
- *Margaret Briegmann*
- *Pedram Izadpanah*
- *Jeff Walker*
- *Matt Davis*
- *Nixon Chan*
- *Sean Nix*
- *Peter Ilias*
- *Dave Richardson*
- *Glen Holland*



What's New in the 3rd Edition of CCG?

- More user-friendly layout and text
- Four worked examples, covering a comprehensive range of basic conditions
- Updates on evolving topics - e.g. traffic responsive operation, transit priority, safety
- Expanded discussion on Level of Service
- Saturation flow data expanded with more regions represented, and time series data



Guide and Software are Available Online

- Download the Canadian Capacity Guide:
[*www.cite7.org/*](http://www.cite7.org/)
- Download a free InterCalc trial version:
www.intercalc.ca



Comparing CCG InterCalc to Synchro and HCM Software

- Level of Service:

InterCalc LOS is based on the v/c, rather than control delay –presents a more intuitive and definitive picture of the amount of available capacity independent of the time, user, location, etc.

- Left Inter-green:

A user-defined approach in InterCalc, rather than a fixed calculation that can under-report capacity in busy conditions.

- Saturation Flow Adjustments:












InterCalc draws upon a broad database, representing conditions across Canada (instead of general categories).

- Pedestrian Crossing Requirements

InterCalc uses inputted crossing distances (not a manual calculation / adjustment).

Comparing CCG InterCalc to Synchro and HCM Software

Queen Street at Chinguacousy Road in Brampton, Ontario

Approach	Movement	Lane Configuration	Volume (veh/h)	Delay in seconds (Volume to Capacity ratio)		
				CCG	HCS	Synchro
Southbound	Right		41	16 (0.06)	17 (0.07)	15 (0.06)
	Through		342	17 (0.24)	19 (0.28)	16 (0.24)
	Left		114	23 (0.42)	61 (0.77)	32 (0.74)
Westbound	Right		103	20 (0.16)	21 (0.21)	18 (0.17)
	Through		559	41 (0.85)	64 (0.94)	26 (0.77)
	Left		107	28 (0.46)	31 (0.5)	22 (0.42)
Northbound	Right		109	22 (0.19)	24 (0.25)	21 (0.21)
	Through		566	77 (0.96)	193 (1.07)	37 (0.89)
	Left		111	22 (0.18)	28 (0.38)	23 (0.32)
Eastbound	Right		51	24 (0.67)	28 (0.75)	18 (0.62)
	Through		493			
	Left		164	24 (0.53)	260 (1.07)	30 (0.78)
Overall				37 (0.83) LOS D	82.6 (1.13) LOS F	25 (N/A) LOS C



Movements with significantly different results