

THOMAS J. KLEMENT, BSc MSc PEng

ROAD SAFETY EXPERT

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EDUCATION

Bachelor of Science (Civil Engineering): Imperial College of Science and Technology, University of London, England, 1971.
Master of Science (Concrete Structures and Technology): Imperial College of Science and Technology, University of London, England, 1972.

PROFESSIONAL STATUS

Professional Engineer, Association of Professional Engineers of Ontario, 1977.

PROFESSIONAL EXPERIENCE

MEA FORENSIC ENGINEERS AND SCIENTISTS

Senior Road Engineer, May 2012 – December 2018

Assessed and reported on several hundred, mostly municipal road crash sites for compliance with good safety practice. Specific areas of focus include d:

- o Road design, including geometry, sightlines and roadside safety;
- o Road signs, delineation and pavement markings;
- o Road network safety management;
- o Roadside hazard assessment
- o Road surface and sidewalk deficiencies;
- o Road drainage.
- o Road construction zone safety;
- o Road non-winter maintenance safety;

Also assessed in singular cases:

- o Crosswalk warrants;
- o Barriers, guide rails and crash cushions ;
- o Break-away bases for poles;
- o Pavement edge drop-offs;
- o Road / rail crossings.

ONTARIO MINISTRY OF TRANSPORTATION (MTO)

Senior Research Engineer, Materials Engineering and Research, Highway Standards Branch 1999 - 2012

Managed, conducted and initiated large-scale research projects to improve safety and road durability. The results of this work include a studded tire use implementation in Northern Ontario. Other major projects focused on:

- Pavement character and safety;
- Pavement friction testing and road surface monitoring ;
- Vehicle tire types and safety;
- The effect of new vehicle technology on pavement wear and damage;
- Permanent Raised Pavement Marker performance assessment;
- Key performance indicators for spring trafficking surface treated roads by the forest products industry.

Senior Research Engineer, Research and Development Branch 1994 – 1999

Designed, evaluated and initiated numerous roadside safety projects. Evaluated safety on construction projects, addressed work deficiencies and responded to contractor's change proposals. Enhanced road safety standards, such

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as the traversable culvert end grates. Developed a procedure to facilitate comparative road safety assessment of different safety-enhancing options and introduced these to MTO staff. Performed road safety reviews.

Specific projects included:

- Evaluated the safety features of the Design, Build and Operate proposals for Highway 407
- Resolved safety related issues associated with the PEO Highway 407 Safety Review
- Safety audits of Highway 407
- Commentary drive-through safety reviews of Hwy. 410 and 416
- Designed Hwy 407 pole, bridge pier and culvert protection
- Chaired the Ontario Provincial Standards (OPS) Products Management Committee

Manager, Highway Planning and Design, Engineering Standards Branch 1986 – 1994

Led the head-office MTO road planning and design team. Authored, maintained and enhanced highway design standards, policies and manuals, and provided direction when special circumstances required custom -solutions or greater detail was required. Reviewed safety standards and policies based on safety research on the interaction between drivers, vehicles and roads. Responsible for the approval of all roadside safety devices in Ontario. Served as an expert witness in Coroners Inquests. Major achievements included:

- Introduced numerous new design standards, polices and enhancements to the Geometric Design Standards for Ontario Highways Manual, Roadside Safety Manual and Contract Design, Estimating and Documentation (CDED) Manual
- Built the framework for Ontario Provincial Highway Roadside Safety Improvement Initiative
- Developed new guide rail end treatments, crash cushions, construction zone and truck-restraining barriers, including the Ontario Tall Wall concrete barrier
- Implemented paved shoulder and rumble strip policies
- Developed, organized and provided technical training programs on Highway Planning and Design
- Conducted safety audits and reviews of roads, intersections and interchanges
- Assessed adequacy of traffic signage, pavement markings and delineation counter-measures in constrained designs that could violate driver expectations
- Represented the MTO on American Association of State Highway and Transportation Officials (AASHTO) Highway Subcommittee on Design, Task Force for Roadside Safety.

Senior Systems Analyst, Computer Systems Branch 1978 – 1986:

Developed, enhanced and maintained an integrated series of highway design “expert” programs that incorporated MTO geometric standards into a software producing road design, including drawings, ready for designer review and interactive revisions.

COLE, SHERMAN AND ASSOCIATES CONSULTING ENGINEERS

Highway Design Engineer, 1976 – 1978

Designed the reconstructed Ontario King’s Highway 2 alignment, cross-section, intersection layout and sightlines, entrances layouts and drainage, under a senior engineer’s supervision.

W.C. FRENCH CONSTRUCTION (U.K.)

Contractor’s Site Engineer, 1974 – 1976

Surveyed and provided quality control on London’s six M-11 interchange flyovers.

HARRIS & SUTHERLADN CONSULTING AND STRUCTURAL ENGINEERS (U.K.)

Design Engineer, 1972 – 1974

Assisted in the design of concrete offshore oil production platforms.

SAFETY-RELATED PUBLICATIONS

Authored a large number of publications that contained practice syntheses and assessments of policy options with recommendations, such as on mandatory winter tire use in Ontario and thus were mostly designated for internal MTO use due to their sensitivity or on legal advice.

Authored Concrete Barrier Repair, Rehabilitation and Maintenance Manual, MTO, 2003 .

Principal author and final editor of the Road Safety Manual, MTO, 1993 .

Co-author of the Roadside Design Guide, Chapter 6 – Median Barriers, American Association of State Highway and Transportation Officials (AASHTO), 1996.

LECTURES AND PRESENTATIONS

Numerous road infrastructure safety internal presentations to MTO staff in Head Office and the five Regions.

1996 - Treatment of Roadside Hazards. OGRA -sponsored Municipal Materials and Technology Course.

1994 - Roadside Safety. Municipal Materials Update Course (sponsored by Municipal Engineers Association).

1994 - Roadside Safety. Region 3 AASHTO Subcommittee on Design Annual meeting.

1993 - Roadside Barrier course. Technical Accident Investigators and Reconstructionists (sponsored by the Provincial Police Academy).

1992 - Roadside Hazards. Ontario Good Roads Association (OGRA) and MEA Board of Directors.