



Khaled Hawash,
B.Sc. Eng., RSP1



Expert Summary

Khaled Hawash is a Senior Transportation Safety Specialist with TNS Group and has almost 24 years of experience in civil and transportation engineering. His experience includes work on at-grade railway crossings detailed safety assessments, roadside design, in-service road safety reviews, operational performance reviews (OPR), safety audits, condition assessment and prioritization, development of safety performance functions, network screening, before-after studies, statistical analysis, benefit-cost analysis, development of guidelines and manuals, environmental assessments, review of road maintenance activities, traffic impact studies, and traffic data management. Khaled is a certified by the Transportation Professional Certification Board as a Road Safety Professional Level 1.

Specialized Professional Competencies

- In-service road safety reviews
- Network Screening
- Traffic Data Management
- Guideline development
- Railway crossing safety reviews

Professional Experience

- True North Safety Group: 2023-present
- City of Hamilton: 2019-2023
- CIMA+: 2011-2019

Academic Background

- Transportation Engineering Technology, Mohawk College, Hamilton, 2012
- Bachelor of Science, Building and Construction Engineering, Iraq, 1998

Project Experience

Development of Safety Performance Function and Conducting Network Screening – Halton Region (2024)

Reviewed infrastructure, collision, and AADT. Developed SPFs for various collision types and severity for intersections and road sections. Conducted network screening using the Empirical Bayes (EB) method to identify intersections with potential for safety improvement.

AADT Production and Network Screening – York Region (2023)

Reviewed AADT generated for counted locations. Developed methodology and produced AADT for non-counted locations with historical counts. Identified locations with no counts and generated AADT for these locations using data from neighbouring counted locations. Conducted network screening using the Empirical Bayes (EB) method to identify intersections with potential for safety improvement.

Scarborough Subway Extension – Metrolinx (Strabag), 2023-present

Retained as the Traffic and Transit Quality Manager for the Scarborough Subway Extension project that will comprise the design and construction of 7.8 km of bored tunnel and associated structures from the existing terminal at Kennedy Station to the intersection of Sheppard and McCowan.

AADT Production – City of Hamilton (2023)

Reviewed AADT generated for counted locations. Developed methodology and produced AADT for non-counted locations with historical counts. Identified locations with no counts and generated AADT for these locations using data from neighbouring counted locations.

Development of Safety Performance Function and Conducting Network Screening – City of Niagara Falls (2023)

Reviewed infrastructure, collision, and AADT. Developed SPFs for various collision types and severity for intersections and road sections. Conducted network screening using the Empirical Bayes (EB) method to identify intersections with potential for safety improvement.

In-Service Road Safety Review of Two Traffic Circles and Five Intersections, City of Burlington, 2019

Conducted In-service Road Safety Reviews of two traffic circles in residential areas and five intersections in downtown Burlington. The tasks included, office review, detailed field investigation, development of countermeasures and an individual report for each intersection.

Road Safety Audit of VivaNext Bus Rapid Transit Corridor, EDCO / Metrolinx, 2019

Conducted Road Safety Audit of Initial Design of this 13.0 km long corridor in accordance with TAC Road Safety Audit Guide. The assignment included a review of more than 400 design drawings and preparation of a Road Safety Audit Report identifying safety related deficiencies and our suggestions to remove those deficiencies and/or improve safety

Intersection Analysis Engineering Assessment Seven Intersections, Alberta Transportation, 2019

Conducted In-service Road Safety Reviews of seven unsignalized intersections at high-speed roadways in Alberta. The task included, office review, detailed field investigation, development of countermeasures and an individual report for each intersection.

Development of Safety Performance Functions (SPF) and Network Screening, Region of Peel, 2018

Conducted quality assessment of data, assist in developing SPFs for various collision types and severity. Performed network screening using empirical Bayes method and Method of Moments and developed collision probability functions for the rail crossings using logistic regression method.

Assessment of Existing Safety Performance of High Occupancy Toll (HOT) Lane Corridors, Ministry of Transportation, 2018

Conducted safety assessment of existing conditions along the proposed HOT lane corridors on Hwy 401, Hwy 410, Hwy 400, Hwy 404, and QEW with an objective to determine how safety varies spatially along the corridor and identify locations along each corridor that may require corrective actions to improve safety. A detailed report for each corridor was produced

Safety Review of Existing Conditions – Road Reconstruction for Rymal Road East and RR 56, City of Hamilton, 2018

Conducted a safety review as part of detailed design for reconstruction of Rymal Rd. E. from Upper Centennial Parkway (RR 56) to Swayze Rd. and for Upper Centennial Parkway from Rymal Rd. E. to approximately 1 km south of Rymal Rd. E. totalling 3 km. A list of countermeasures was recommended to be considered during the detailed design

Update of Safety Analyst Software based on 2011, 2012 and 2013 Data, Ministry of Transportation, Head Office, 2017

Updated the Safety Analyst software using the 2011, 2012 and 2013 collision and traffic volume data. Re-calibrated the Ministry's Safety Performance Functions.

Henvey Windfarm T-Line Entrances, Ministry of Transportation Ontario - 2017

Conducted economic appraisal for passing lanes using the MTO's OPR guidelines and Safety Analyst Software.

Safety Performance Function Development Update, Halton Region, 2017

Compile the infrastructure, traffic volume, and collision data for SPF development. Assist in developing SPFs for various collision types and severity.

Transportation Risk Assessment, Nuclear Waste Management Organization (NWMO), 2017

Collected collision and traffic volume data from Ministry of Transportation Ontario. Estimated probability of collision on MTO highway network and railway network. Estimated risk of nuclear material transportation via road and rail. Reviewed deliverables.

Highway 26 Culvert Replacement, Ministry of Transportation Ontario, 2016

Conducted complete traffic engineering for replacement of two culverts. The tasks completed included, traffic analysis, development of PHM 125 drawings, detour designs, design of temporary concrete barriers, guiderails, quantity calculations, preparation of contract drawings, and specifications according to MTO standards.

2016 Travel Time Study, Ministry of Transportation Ontario, Central Region, 2016

Collected travel time data in the highways and arterial roads using GPS device. Processed travel time data.

Development of Safety Performance Functions (SPF) and Network Screening, Niagara Region, 2016

Conducted quality assessment of data, assist in developing SPFs for various collision types and severity. Performed network screening using empirical Bayes method and Method of Moments

and developed collision probability functions for the rail crossings using logistic regression method.

Environmental Assessment Study of Arterial Roads within Highway 427 Industrial Secondary Plan Area (Area 47), City of Brampton, 2016

Conducted a safety review of the study corridor and all intersections include detailed collision analysis, field investigation to identify the deficiencies, and recommendations of improvements to be considered during development of design alternatives

Development of Safety Performance Functions (SPF), Region of Waterloo, 2016

Conducted quality assessment of data, assist in developing SPFs for various collision types and severity.

Red Hill Valley Parkway Safety Review, City of Hamilton, 2015

Conducted office and field investigations to review the safety and operational performance of the Red Hill Valley Parkway between Dartnall Road and the Queen Elizabeth Way and identify safety and operational measures that could be implemented to increase the highway's performance and reduce the number and or severity of collisions.

Lincoln Alexander Parkway Median Safety Study, City of Hamilton, 2015

Conducted office and field investigations to determine collision patterns and potential contributing factors, as well as non-conformance with multiple standards and guidelines. Recommended countermeasures and corrective actions and conducted a Benefit/Cost analysis.

Sequential Warning Lights Evaluation, Ministry of Transportation Ontario, 2014

Conduct field data collection for assessing operational and safety benefits of lane closures with Sequential Warning Lights in construction areas.

Traffic Analysis for Detailed Design – Structure Rehabilitation of Humber River Bridge at Weston Road Off-ramp, Ministry of Transportation Ontario, 2015

Conducted traffic engineering of the study area including level of service and capacity analysis of Highway 410 EB Collector lanes upstream and downstream of the Weston Road Off-ramp and

Synchro analysis of two Weston Road ramp terminals, safety assessment, illumination warrants and recommended countermeasures to be considered during the detailed design

Traffic Analysis for Detailed Design – Resurfacing of Highway 401 between Kipling Avenue and Mimico Creek, Ministry of Transportation Ontario, 2015

Conducted traffic engineering of the study corridor including level of service and capacity analysis, safety assessment, and recommended countermeasures to be considered during the detailed design. The work also included conducting illumination warrants according to MTO's Policy for Highway Illumination and completion of SP100F08 for contract documents

Ontario Traffic Manual (OTM) Book 11 – Pavement Markings and Delineation, Ministry of Transportation Ontario, Head Office 2015

Reviewed the existing OTM Book 11. Identified deficiencies and summarized potential updates in light of the new MUTCDC published by TAC and updates to a number of OTM Books. Produced a publication a ready document with high quality graphics.

Operational Performance Review (OPR) Guidelines, Ministry of Transportation Ontario, Head Office 2015

Reviewed the existing MTO OPR Guidelines. Identified deficiencies and summarized potential updates in light of configuration of the Safety Analyst software.

Sequential Warning Lights Evaluation, Ministry of Transportation Ontario, 2014

Conduct field data collection for assessing operational and safety benefits of lane closures with Sequential Warning Lights in construction areas.

Joint Merge and OTM Book 7 Traffic Control Comparison, Ministry of Transportation Ontario, 2014

Conduct field data collection, including video capture using high quality COHU HD cameras, AIMC- 2100 micro-computers to identify driver merging behavior; and Bluetooth detector receivers to monitor travel time through each section of the construction area, and allow calculation of speed and delay. Two distinct

studies were conducted on Highways 403 (Brantford) and 406 (St. Catharines).

Development of Priority Lanes for Pan Am/Para Am Games in the Greater Toronto and Hamilton Areas, Ministry of Transportation Ontario, Central Region, 2014

Analyzed the impact of the proposed Priority Lanes along Highways 401, 404, 427, 403, and the Queen Elizabeth Way. Identified capacity and geometric constrained areas. Developed alternative solutions to address the problems in the constrained areas and selected the preferred alternative. Developed design criteria for the Priority Lanes including the type of the buffer, signs, pavement markings. Developed schematic map drawings for the priority corridors. Identified locations for extended traffic monitoring during the Games. Proposed a methodology to conduct a before and after to evaluate the performance of the Priority Lanes

Survey of Commuter Parking Lot Study, Ministry of Transportation, Eastern Region, 2014

Designed and conducted survey of occupancy and amenities of 36 parking lots in MTO Eastern Region. Designed and conducted Origin-Destination survey for the 36 parking lots. Compared each parking lot against MTO standards and guidelines and recommended improvements where necessary. Consulted with local transit agencies. Developed travel forecasting models for each parking lot to identify space needs in the next 5, 10, and 20 years

Ontario Traffic Manual Book 7 (Temporary Conditions) Update, Ministry of Transportation, 2014

Developed the Ministry of Transportation of Ontario's training materials for the 2014 OTM Book 7.

Update the Safety Analyst Software based on 2009 and 2010 Data, Ministry of Transportation, Head Office, 2014

Updated the Safety Analyst and software using the 2009 and 2010 collision traffic volume data. Re- calibrated the Ministry's Safety Performance Functions.

Prioritization of Signalized Intersections for Operational Improvements in Halton Region, Halton Region, 2014

Ranked all signalized intersections in Halton Region based on their observed signal delay and their safety performance. Developed Synchro models for top 20 intersections. Recommended treatments for intersections improvements.

Review of Safety Impacts of Static Electronic Advertising Signs and Bus Shelter Scrolling Advertisements, City of Toronto, 2013

Conducted literature review of the safety impacts of advertising signs. Conducted a jurisdictional scan in Ontario. Conducted review of sign by-laws and regulations in Canada, the US, Australia, and the UK. Conducted a before and after study to identify the impacts of bus shelter scrolling advertisements on safety at intersections.

Traffic Engineer Services on Retainer, Prioritize Warranted Signalized Intersections and Left Turn Lanes, Ministry of Transportation Ontario, Western Region, 2013

Obtained and collected data for unsignalized intersections which were warranted for signal installation as well as unsignalized intersections for which left turn lanes were warranted. Developed a methodology for prioritization of intersections based on safety improvements and operational improvements. Prioritized intersections for the Ministry.

Configuration of Safety Analyst Software for Efficient and Effective Safety Management of MTO's Road Network, Ministry of Transportation Ontario, 2013

Compiled infrastructure, collision, and volume data for all road elements from all MTO regions. Worked with the programmer to develop a data conversion tool for Safety Analyst to convert the infrastructure, collision, and volume data from the existing MTO databases to a format that complies with Safety Analyst

Traffic Volume Production 2010, 2011, and 2012, Ministry of Transportation Ontario, 2012

Data processing and analysis producing traffic pattern Pseudo-Curves, PDCS data supplementation and analysis. Estimating volume of traffic at stations which do not have observations for any years based on a Geographically Weighted Regression Model

Downtown Parking Utilization Study, City of Burlington, 2012

Reviewed public parking facilities inventory within the study area. Field supervision and technical analysis for the parking utilization study, including occupancy, duration, and turnover, of existing downtown municipal parking facilities.

Alternative Methodologies for Travel Time Studies, Ministry of Transportation Ontario – Central Region, 2012

Collected travel time data in the highways and arterial roads using GPS device. Processed travel time data from various wireless technologies

In-Service Road Safety Review of Six Locations, Regional Municipality of Halton, 2011

Evaluated operational characteristics including signal timings of six locations using Synchro / SimTraffic software package for intersections and Highway Capacity Software for road segments, Conducted field investigation consisting of review of traffic control devices, roadway geometrics and geometrical characteristics, safety devices, intersection operations and road user interactions, and site conditions, Identified potential for operational improvements and developed countermeasures for potential implementation to treat the potential improvement items and prepared engineering reports

AT-GRADE RAILWAY CROSSINGS

Retained to conduct compliance reviews for each of the railway grade crossings, which involved identifying existing deficiencies, determining the appropriate remedial measures and the associated budget level cost estimate. It also involved identifying eligibility of the safety improvements for federal funding. Such projects were completed for the following road authorities:

- Ministry of Natural Resources and Forestry, Ontario (2023-2024) – 69 crossings
- Region of Durham, Ontario (2023) – 21 crossings
- Region of Peel, 14 crossing locations, 2019
- City of Hamilton, 88 crossing locations, 2019
- City of Winnipeg (sub), 209 crossing locations, 2019
- City of Niagara Falls, 20 crossing locations, 2018
- City of London, 64 crossing locations, 2018

- City of Saskatoon, 65 crossing locations, 2017
- Town of Milton, 19 crossing locations, 2017
- Town of Fort Erie, 17 crossing locations, 2017
- Town of Oakville, 4 crossing locations, 2016
- City of Burlington, 3 crossing locations, 2016
- Region of Halton, 10 crossing locations, 2014

Train Whistle Cessation Study of At-Grade Railway Crossings, Various

Conducted studies including detailed safety assessments of at-grade railway crossings for implementation of whistle cessation. The work included conducting compliance review, site visits, data collection, traffic engineering, and safety assessment. The work was undertaken according to the Railway Safety Act, Railway-Roadway grade Crossings Policy of Transport Canada and the Grade Crossings Regulations and Standards.

Project experience includes:

- Town of Parry Sound, 4 crossing locations, 2019
- City of Niagara Falls, 1 crossing location, 2018
- Town of Cramahe, 2 crossing locations, 2016

Sharing of Information for at-Grade Railway Crossings, Various

Conducted site visits. Collected data to satisfy municipal responsibilities. Prepared sharing of information sheets. Exchanged the sharing of information sheets with railways.

Project experience includes:

- Town of Caledon, 20 crossing locations, 2016
- City of St. Catharines, 19 crossing locations, 2016
- City of Hamilton, 88 crossing locations, 2016

Railroad Pre-emption and Interconnection Review, City of Hamilton, 2017

Reviewed the design and implementation of six railway/traffic signal interconnection systems and the associated pre-emption designs. Calculated and compared the vehicle and pedestrian clearance distance and time at each location.

Reviewed and confirmed the necessary pre-emption sequence and timing required

Risk and Countermeasure Assessment Tool to Control Access to Railway Property, Transport Canada, 2015

Conducted a literature review to identify trespassing risk factors. Gathered GIS data related to population, land-use, train volume, train speed, track characteristics, and trespassing related collisions. Used spatial analysis in ArcGIS to identify high risk areas. Developed a tool to proactively identify high risk areas for trespassing.

Detailed Safety Assessment, VIA Rail Canada and the City of Ottawa, 2014

Conducted detailed safety assessments for seven (7) at-grade railway crossings on VIA Rail's Smiths Falls Subdivision. The work included conducting compliance review, site visits, data collection, traffic engineering, and safety assessment. The work was undertaken according to the Railway Safety Act, Railway-Roadway grade Crossings Policy of Transport Canada and the Grade Crossings Standards. The project included complex at-grade crossings with a dedicated transitway and politically sensitive crossings.

Pedestrian Railway Safety Assessment, City of London, 2013

Conducted a detailed review of guidelines and Canadian technical standards (RTD 10, Railway Safety Act, Grade Crossings Standards, Canadian Road/Railway Grade Crossing Detailed Safety Assessment field Guide, etc.) related to road/railway grade crossings to identify factors leading to pedestrian collisions and non-conformities and to provide input for the development of data collection checklist during field visits, conducting field visits to confirm the developed checklist.

EXPERT OPINION PROJECTS

Conducted internal reviews including field visits, field measurements, signage reviews, speed studies, literature reviews, and review of guidelines of the respective jurisdictions regarding the subject matter for expert opinion projects.

Municipal Public Service

Project Manager of Traffic Services, City of Hamilton

- Provided leadership in a team environment that focused on meeting the City's responsibilities as a leader and steward in the delivery of technical and administrative services to the public, internal clients, and external customers
- Ensured that departmental goals and objectives were achieved through the effective and efficient use of financial and staff resources
- Used a "best practices" approach to develop and deliver quality services in a timely and cost-effective manner. Implemented strategies to improve effectiveness and efficiency
- Promoted a service-oriented culture and focus within the section and instilled a customer service focus in all activities and attained and maintained currency with evolving standards and community trends.
- Recommended policy and improvement strategies, in the delivery of services to meet mandated goals and objectives
- Evaluated financial, administrative and staff performance against internal and external benchmarks.
- Delivered technical information to various committees, Councillors, other City departments, outside bureaus, contractors, and the public
- Promoted teamwork and integration between groups within the section and with other parties participating in cross-functional and cross-program initiatives
- Involved in establishing the City of Hamilton Automated Speed Enforcement
- Developed the ranking criteria and analysis for the City Automated Speed Enforcement program
- Involved in capital project scope preparation
- Managed the City's Traffic Counts and Studies programs, collected and analyzed traffic data, prepared tenders, and contracts, collated and reported data to internal and external clients
- Managed the data collection (Eco Counters) for active transportation projects
- Supervised collision analysis and responsible for the operation of the new Traffic Collision Software system (TES) and ensured quality control of data and reports
- Managed the City's Collision Counter Measure Safety program (ISRSRs)
- Managed the City's Red-Light Camera program
- Provided reports to the Manager/Superintendent/Legal on collision rates, types of collisions etc.
- Ensured compliance with Provincial and Federal statutes and regulations and municipal by-laws and policies, with specific regard for the Occupational Health and Safety Act
- Continually investigated alternate techniques and technologies to ensure that optimum methods are being utilized
- Responsible for conducting comprehensive safety studies
- Involved in preparing the department capital budget
- Maintained the collisions database in TES software
- Responsible for maintaining the Traffic Counts and Studies programs
- Managed the development and implementation of Safety Performance Functions (SPFs)
- Ran Network Screening in TES on an annual basis to identify areas within road network with positive Potential for Safety Improvement (PSI)
- Responsible for conducting the analysis for the Red-Light Camera program
- Provided collisions and traffic volume data to members of the public, elected representatives and other agencies
- Conducted comprehensive safety studies

Professional Societies and Associations

- Road Safety Professional Level 1, Transportation Professional Certification Board
- Member, Jordan Engineers Association
- Member, ITE

Publications/Presentations

- Izadpanah, P., Hawash, K., Hadayeghi, A. (2015), Is Your Jurisdiction Prepared for the New At-Grade Railway Crossings Regulations? Canadian Institute of Transportation Engineers Annual Conference, Regina, Saskatchewan, Canada.
- Izadpanah, P., Elmadhoon, M, Hawash, K., Rouhieh, B., and Hadayeghi, A. (2014) Improving Pedestrian Safety at Grade Railway Crossings, Canadian Institute of Traffic Engineers, Waterloo, Ontario.