Roshanak Dizaji

M.Sc.

Expert Summary

Roshanak has over 16 years of work experience in Transportation Engineering and Software Engineering. Roshanak's main expertise include safety analysis, volume processing, data analytics, travel time studies, collision analysis, traffic and transit microsimulation modeling. Roshanak also boasts a strong background in design and development of a wide range of software applications including smartphone applications, desktop applications, real-time software/ hardware applications, and automation of the analysis/ processing of large-scaled data.

Specialized Professional Competencies

- Network Screening and Safety Performance Function (SPF) Development
- AADT Production
- Collision Analysis
- Data Analytics
- Microsimulation Modeling

Professional Experience

- True North Safety Group: 2022-present
- TES Information Technology: 2020-2021
- CIMA+: 2016 - 2020
- AECOM: 2014 – 2016
- University of Waterloo: 2010 - 2013
- Other (Software companies): 2007 - 2009

Academic Background

- Master of Applied Science, Transportation Engineering, University of Waterloo, 2012

- Bachelor of Science, Computer Engineering, Tehran Central Azad University, Tehran, Iran, 2002

Additional Courses

- AIMSUN – Advanced multi-resolution modeling and calibration, TSS, Toronto, April 2017
- AIMSUN – Foundations, TSS, Toronto, April 2016

Project Experience

Road Safety Strategic Plan (RSSP) – Nagara Region (Ongoing)
Developed a road safety strategic plan using the safe system principles to achieve the long term goal of Vision Zero. Conducted significant stakeholder and public consultation. Developed a 5-year action plan.

Road Safety Management and Plan – City of Niagara Falls (Ongoing)
Produced AADT for intersections and road sections. Developed Safety Performance Functions (SPFs) for intersections and road sections. Conducted network screening to

identify locations with a potential for safety improvement. Developed an annual collision report to identify patterns and trends. Developed emphasis areas for Vision Zero plan.

Development and Implementation of Road Crash Database System in Kenya, Kenya National Highways Authority (2020 - Ongoing)

Implementing TES for Kenya including GIS and infrastructure inventory. Developing a mobile app for iOS and Android for crash reporting for the police. Customizing reports.

TES Application Enhancement, York Region (2021 - ongoing)

Conducted AADT production, Safety Performance Functions development and Network Screening analysis (2015-2019) for intersections and road segments within the TES Software; Additionally, developed and enhanced a predictive Signal Warrant algorithm based on the OTM Book 12.

Deployment of the TES Safety Module for MTO, Ministry of Transportation Ontario (Ongoing)

Incorporated MTO collisions into TES. Customized the TES Safety Module to replace Safety Analyst for network screening, countermeasure selection, benefit-cost analysis, and project prioritization as part of the MTO APIL process.

Network Wide AADT Production – City of Waterloo (2023)

Estimated historical AADT for counted intersections and road sections. Utilized the counted locations to develop AADT for non-counted locations. Developed a network-wide AADT map.

Network Wide AADT Production – City of Richmond Hill (2023)

Estimated historical AADT for counted intersections and road sections. Utilized the counted locations to develop AADT for non-counted locations. Developed a network-wide AADT map.

TES Application Upgrade and Implementation, Ministry of Transportation Ontario (2020 - ongoing)

Updated the GIS and infrastructure inventory in TES for MTO. TVIS-LHRS reconciliation. Implemented volume production methodologies

for MTO in TES including PDCS, PCS, and non-counted stations. Customized reports for MTO volume reporting. Implemented curve matching for PSC stations.

Operation Performance Review (OPR) Guide Update – Ministry of Transportation Ontario – Head Office (2022)

Updated the MTO OPR Guide to include updated and more case studies (e.g. roundabouts). Updated the content of the guide to include new technologies such as video conflict analysis. Updated the content of the guide to retire Safety Analyst and replace it with TES.

Deployment of the TES Application for the City of Vaughan – City of Vaughan (2022)

Identified the needs of the City for a transportation data management system. Compiled all infrastructure attributes. Processed 5 years of historical collision data. Processed historical TMC and ATR data. Conducted network screening to identify locations with safety issues. Provided training to staff.

HWY 115 Safety Analysis – Ministry of Transportation Ontario – Eastern Region (2022)

Conducted a safety review along a stretch of Highway 115 from Lansdowne Street to Highway 35. Reviewed collision frequencies and severities on mainline and interchange mainline sections before and after the implementation of 4 different pavement types. Conducted the analysis for different road surface conditions.

Annual Collision Report – Niagara Region (2022)

Conducted a detailed collision analysis for 2017-2021 to identify patterns and trends in the collisions for all road users. Developed graphics and drafted text. Developed a visually appealing report for elected officials and the public.

Annual Collision Report – City of Hamilton (2022)

Conducted a detailed collision analysis for 2017-2021 to identify patterns and trends in the collisions for all road users. Developed graphics and drafted text. Developed a visually appealing report for elected officials and the public.

Annual Collision Report – City of Brantford (2022)

Conducted a detailed collision analysis for 2017-2021 to identify patterns and trends in the collisions for all road users. Developed graphics and drafted text. Developed a visually appealing report for elected officials and the public.

School Crossing Guard Warrant, Exposure Index – City of Vaughan (2022)

Developed a methodology for the study to consider exposure index and risk factors. Collected traffic counts at intersections with various traffic control for the spring and fall of 2022. Developed a plan for new locations and for the future monitoring.

Riley Communities Mobility Study & Improvements Plan - City of Calgary (2022)

Retained as part of the Urban Systems project team to conduct a planning-level safety review of the intersections and roadways within Calgary's Riley Community, supporting Calgary's Safer Mobility Plan.

Development of Safety Performance Functions (SPFs) and Network Screening - City of Cambridge (2022)

Updated the road network model. Estimated AADTs for intersections and road sections for counted locations. Predicted AADTs for non-counted intersections and road sections. Developed SPFs for various site types for collision severity levels and initial impact types. Conducted network screening for intersections and road sections. Documented the results.

Evaluation of the City of London Road Safety Strategy, City of London, 2020 and 2021

Prepared collision data for the time before the implementation of the road safety strategy and after the road safety strategy. Performed a before and after analysis to determine the effect of the countermeasures implemented.

Development of Annual Safety Report, County of Essex (2021)

Reviewed the 2015-2019 collision data. Identified patterns and trends. Suggested countermeasures and further studies to address.

Development of Safety Performance Functions (SPFs) and Network Screening, City of Hamilton (2021)

Updated the road network model. Estimated AADTs for intersections and road sections for counted locations. Predicted AADTs for non-counted intersections and road sections. Developed SPFs for various site types (including ramps and parkway sections in the City of Hamilton) for collision severity levels and initial impact types. Conducted network screening for intersections and road sections. Documented the results.

Development of Safety Performance Functions (SPFs) and Network Screening for Intersections and Rural Roads, City of Ottawa (2021)

Updated the road network model. Estimated AADTs for intersections and road sections for counted locations. Predicted AADTs for non-counted intersections and road sections. Developed SPFs for various site types (including intersections and rural road sections) for collision severity levels and initial impact types. Conducted network screening for intersections and rural road sections using the sliding window with empirical Bayes method. Documented the results.

Development of Annual Safety Report, City of Hamilton (2020)

Reviewed the 2015-2019 collision data. Identified patterns and trends. Suggested countermeasures and further studies to address the trends identified in the collision data.

Transportation Operations and Safety Study, Halton Region (2020)

Compiled collisions and traffic volume data. Produced AADTs. Conducted network screening. Conducted benefit-cost analysis of countermeasures.

Annual Collision Report – Niagara Region (2020)

Conducted a detailed collision analysis for 2015-2019 to identify patterns and trends in the collisions for all road users. Developed graphics and drafted text. Developed a visually appealing report for elected officials and the public.

Development of Safety Performance Functions and Network Screening, City of Ottawa (2020)

Conducted data analysis and AADT prediction. Developed Sliding Window algorithm and Curve/ Tangent analysis to be used in development of Safety Performance Functions for intersections and midblocks. Identified the result network screening candidate sites for in-service road safety review.

Development of Safety Performance Functions and Network Screening, City of Hamilton (2020)

Developed an automation tool for generation of work order numbers for importing the ATR and TMCs into the TES software. Conducted the AADT prediction analysis for development of Safety Performance Functions.

Development of Safety Performance Functions and Network Screening, City of Guelph (2020)

Developed an automation tool to import the ATR data (with the PDF format) into TES. Conducted data analysis and AADT prediction for development of Safety Performance Functions for intersections and midblocks.

Development of Safety Performance Functions and Network Screening, City of Markham (2020)

Conducted data analysis and AADT prediction for development of Safety Performance Functions for intersections and midblocks.

Calibration of Safety Performance Functions and Network Screening, City of Niagara (2020)

Conducted data analysis. Calibrated the Safety Performance Functions for intersections and midblocks.

Development of Safety Performance Functions and Network Screening, Region of Halton (2020)

Conducted data analysis for development of Safety Performance Functions for intersections and midblocks.

Development of Safety Performance Functions, City of Brampton (2020)

Conducted data analysis and AADT prediction for development of Safety Performance Functions for intersections and midblocks.

Development of Site Selection for Red Light Cameras, City of Guelph (2020)

Conducted Red Light Camera analysis to identify the candidate sites for red light camera installation for signalized intersections.

Development of Site Selection for Red Light Cameras, City of Niagara (2020)

Conducted Red Light Camera analysis to identify the candidate sites for red light camera installation for signalized intersections.

Development of Safety Performance Functions and Network Screening, City of London (2020)

Conducted data analysis. Developed SPFs and conducted network screening for intersections and midblocks. Identified candidate sites for in-service road safety review.

Development of SPFs and Site Selection for Red Light Cameras, City of Guelph (2019)

Conducted data analysis. Developed SPFs and conducted network screening for signalized intersections. Identified candidate sites for red light cameras using several factors including pedestrian collisions.

2016 Travel Time Studies – Ministry of Transportation Ontario (2017)

Conducted a detailed travel time analysis in support of MTO's 2016 Travel Time study. Designed and developed several automation tools which processes the 2016 GPS and TomTom data.

Development of Reference Coding System for GTAA – Ministry of Transportation Ontario (2016)

Designed and developed an automation tool which conducts detailed segmentation analysis at Meso level for MTO's Travel Time Studies. The tool processes and analyzes a large-scale GPS data.

De-Icing Extension – Ministry of Transportation Ontario (2016)

Developed a tool which conducts the data processing including data integration and data aggregation for 20 km extension of the test area in Ontario. The data is then analyzed, and the required performance measures are estimated.

Transportation Risk Management, Nuclear Waste Management Organization (2016)

Developed a tool to generate a list of bounding collisions for road and rail modes based on event trees; to process the MTO's historical traffic collision data and identify the bounding collisions for road and rail modes; and to analyze the bounding collision data and estimate the collision probabilities.

Developing Collision Modification Factors (CMFs) for intersection countermeasures, Ministry of Transportation Ontario (2016)

Developed a software tool which processes the countermeasure data and converts it to XML format data to be used in Safety Analyst software.

Feasibility Study for HOTL on Hwy 400 – Ministry of Transportation Ontario (2018)

Undertook detailed traffic analysis in support of feasibility study and business case for High Occupancy Toll (HOT) Lanes on one of the five corridors in Central Region (i.e., Hwy 400). Different horizon scenarios are being developed and analyzed for this assignment to understand the future operational constraints.

CN South Milton Industrial Precinct Transportation Modeling – Region of Halton (2017)

Undertook detailed traffic analysis in support of Region of Halton's assessment study reviewing the impacts of truck operation at the proposed CN Milton Logistics Hub ("the Terminal") in terms of potential negative environmental outcomes (i.e., air and noise pollution) and traffic impacts to the adjacent regional road system.

Metropolitan Expressway – Major Reconstruction – Ministry of Transportation of Quebec (2017)

Undertook detailed traffic analysis in support of the major reconstructions of Metropolitan Expressway in Quebec. An Aimsun model was first developed and calibrated to the existing condition to understand the traffic operation. Many staging scenarios have been developed for this assignment using Aimsun model to understand the traffic impact of the construction at each stage.

Area 47 EA – City of Brampton (2016)

Undertook detailed traffic analysis in support of the Environmental Assessment Study in

accordance with the recent Highway 427 Industrial Secondary plan (Area 47) Transportation Master Plan Study: Developed and calibrated the existing micro–simulation VISSIM model as well as the existing and horizon AM and PM peak period models.

Waterloo LRT – Region of Waterloo (2015) -
Conducted VISSIM micro-simulation traffic operations analysis and Synchro9/ SimTraffic9 traffic staging analysis along LRT corridor to determine the most effective traffic signal timings. Analyzed the traffic signal design and the Transit signal priority treatments for more than 50 intersections along the corridor to accommodate public transit and vehicular traffic.

Hwy 427 Extension – Ministry of transportation of Ontario (2015)

Conducted VISSIM micro-simulation analysis and Synchro9 analysis to assess the traffic operation of the Hwy 427 for the extension of over 12 km. Developed, calibrated, validated and analyzed the VISSIM micro-simulation model for the existing and horizon for AM and PM peak periods.

Highway 401 Widening – Ministry of transportation of Ontario (2015)

Conducted the VISSIM micro-simulation traffic operations analysis and Synchro9/ SimTraffic9 traffic staging analysis to assess the traffic operations for existing and staging conditions within the study area.

Sheppard East LRT – Metrolinx (2014)

Developed, calibrated and analyzed the VISSIM micro simulation model for the existing condition LRT corridor for AM and PM peak periods. The model was developed for the 13-kilometre LRT transit line.

Western Rd & Sarnia Rd EA – City of London (2015)

Developed, calibrated and analyzed the micro–simulation VISSIM model for the existing and future condition for AM and PM peak periods. More than 10 intersections as well as sidewalks and bike lanes included in the model. The project scope includes undertaking a Schedule 'C' Class Environmental Assessment Study to identify future transportation deficiencies and

assess traffic operation at the Western Road and Sarnia Road/Philip Aziz Avenue intersection.

Hwy 401/404 Bridge Rehabilitation – Ministry of transportation of Ontario (2014)

Conducted a detailed traffic study using VISSIM micro-simulation analysis to assess traffic operations under existing and staged conditions at the Highway 401 / Highway 404 / Don Valley Parkway interchange for AM and PM peak hours. The analyzed study area extends from Warden Ave for about 6km. Interchange to the Leslie St. interchange along Highway 401.

Assessment of Terminal Area Roadways – GTAA (2014)

Conducted the VISSIM micro-simulation traffic operations analysis for Pearson International Airport Area road network for the Terminal 1 and Terminal 3 outbound traffic for the AM and PM peak hours. The purpose of the study is to further understand the findings from the quick-estimation (QE) assessment completed by GTAA and the macroscopic LOS analyses completed using the Quick Analysis Tool for Airport Roadways (QATAR) model.

Guelph BRT – City of Guelph (2015)

Developed Synchro 9 model to investigate the feasibility of transit priority in City of Guelph. 12 signalized intersections were modelled through the City for the AM and PM peak hours. The transit priority measures were simulated for each intersection based on the specific configuration of that intersection.

Gore Road EA – Region of Peel (2015)

Conducted Synchro9/ SimTraffic9 analysis for the existing and future condition for AM and PM peak periods for more than 15 signalized/ un-signalized intersections. The project scope included undertaking a Schedule 'C' Class Environmental Assessment Study to identify future transportation deficiencies and assess traffic operation at Gore Road from Queen Street to Castlemore Road in the City of Brampton.

Port Colborne Industrial Park Development TIS – City of Port Colborne (2014)

Conducted Synchro9/Simtraffic9 traffic operations analysis for Site 4 under the proposed Port Colborne Employment Lands Industrial Park. Considered the peak hour factor, heavy vehicle percentage, Conflicting Ped, Ped Calls, pedestrian clearance time, Lane width, crosswalk width, median width, travel speed, left turn/ right turn speeds, Lane Alignment settings based on the City of Port Colborne Synchro standards.

TTC Chester Station – Traffic and Parking Lot study – City of Toronto (2015)

Conducted traffic and parking study for the TTC Chester station Green P parking lot which is centered within the vicinity of Chester Toronto Parking Authority (TPA) parking lot. The project scope includes examining the potential impacts of removing approximately 10 parking spaces from the parking lot in order to accommodate a second station entrance/exit, which would be located in the North-West corner of the TPA lot.

Professional Societies and Associations

- Institute of Transportation Engineers, member since 2009

Publications/Presentations

- Dizaji, R. and S. Tsang, Identifying Hot Spots on Rural Roads, ATSIP Traffic Records Forum, Nashville, 2023

- Taghipour Dizaji, R. and B. Hellinga, "Acquiring Multimodal Travel Behavior Data Using Smart Phones", 2012, ITS-Canada: 15th Annual Meeting, Quebec City, Quebec

- Taghipour Dizaji, R. "Smartphone-based Travel Behavior Surveying Systems", 2012, 4th Annual Joint CITE Section - Student Presentation Competition, Waterloo, Ontario