

Education

- Doctor of Philosophy in Civil Engineering, with a minor in statistics, Oregon State University, Corvallis, OR. June 2012.
- Master of Science in Civil Engineering, Oregon State University, Corvallis, OR. September 2010.
- Bachelor of Science in Industrial Engineering, Universidad Centroamericana “José Simeón Cañas,” San Salvador, El Salvador, Central America. June 2004.

Short Biography

Dr. Avelar is an Associate Research Engineer at the Texas A&M Transportation Institute of the Texas A&M University System. Dr. Avelar has over thirteen years of work experience fulfilling research, consulting and management roles in transportation projects. His work focuses in developing data-driven practical answers for stakeholders to various transportation topics.

He has produced results and materials for stake holders in the United States, El Salvador, and the Dominican Republic in the topics of transportation safety, statistical analysis, traffic operations, and the economic aspects of safety and maintenance operations. Some of these projects include: Large scale evaluation of traffic operations at the network level for the three major cities of El Salvador, Central America; operations and safety tradeoffs of reduced freeway cross-sectional elements, for the Texas Department Of Transportation; Safety Implications of Freeway Managed Lanes for FHWA and the HOV/MUL Pooled Fund; Safety and Operational Assessment of advisory speed signs in Oregon, and developing Safety Performance Functions for Signalized Intersections in the State of Oregon, for the Oregon Department Of Transportation.

Affiliations and Registrations

Transportation Research Board (TRB):

- Operational Effects of Geometrics Committee, Friend of Committee, 2009-present
- Traffic Flow Theory & Characteristics, Friend of Committee, 2010-present
- Highway Capacity and Quality of Service Committee, Friend of Committee, 2011-present
- Safety Performance Committee, Friend of Committee, 2012-present
- Low Volume Roads Committee, Friend of Committee, 2012-present

Institute of Transportation Engineers, Member, 2008-Present

- Member, ITE, Texas Region, 2015
- President, ITE-OSU Student Chapter, Fall 2008-Spring 2009. Coordinated student activities and hosting speaker meetings with transportation engineering companies

Professional Engineer in Texas. Registration No. 122224, 2015.

Years of
Qualifying
Experience **13**



Texas A&M
Transportation
Institute

Relevance to Statement of Work

Link Between Pavement Marking Retroreflectivity and Night Crashes on Michigan Two-Lane Highways.

Dr. Avelar coauthored a research paper in 2014 that investigated the safety association of retroreflectivity and nighttime crashes. The research used five years of Michigan retroreflectivity data to investigate the safety at different visibility levels. In general, this research found that safety seems to deteriorate as the retroreflectivity level of pavement markings wanes.

Investigating Maximum Intensities for Yellow Rapid-Flashing Beacons at Night

Dr. Avelar coauthored a research paper in 2015 that utilized data regarding the configuration of Rapid Flashing Beacons at pedestrian crossings. Using data from three studies, the paper performed various analyses and determined a recommended maximum intensity of the flashing beacons such that impeding and incapacitating glare is minimal or at least not expected to increase crash risk to drivers.

Safety Evaluation of Curve Warning Speed Signs, Oregon DOT, 2009-2011

Dr. Avelar was a key member of this was a research effort. The project evaluated the safety implications of advisory speeds at horizontal curve locations on Oregon rural two-lane highways. The primary goals of this research effort were to characterize driving operations at rural two-lane highway curve locations where advisory speed signs were present, and to determine to what extent these signs play a role in enhancing safety. Speed data was collected at 16 sites and compliance with advisory speed signs determined. An evaluation of crash data of 200 curves and how advisory speed relates to historic crash information was performed, developing a statistical model that identifies critical variables that are associated with the posted speed and how they ultimately relate to the expected crash frequency. The resulting advisory speed models were then contrasted to the expected advisory speeds based on the Oregon Policy as well as the 2009 MUTCD thresholds.

Analysis of the Shoulder Widening Need on the State Highway System, Texas DOT, 2015.

Dr. Avelar was a key team member for this project. The project defined criteria for roadway shoulder suitability for pedestrians and bicycles, applied these criteria to Texas highways and determined candidate locations that merit shoulder improvements. The main objective of the research was to inform the development of a Strategic Corridor Development Plan. This project required analyzing the complete roadway inventory of highways in Texas to characterize the relationship between geometry and crashes, as well as to contrast geometry and location during an examination pedestrian travel patterns.

Reducing Lane and Shoulder Width to Permit an Additional Lane on a Freeway, Texas DOT, 2014-2015.

In this research, TTI evaluated the safety and operational implications of adding a freeway lane at urban freeways in Texas. Speed and safety data were collected at 73 sites in the cities of Houston, Dallas and San Antonio. The research team performed an evaluation of site crash data and how safety relates to the cross-sectional elements. The research team developed a statistical model identifying the critical variables and how they ultimately relate to the expected crash frequency. The research team performed a similar analysis for the operational data as well. 667, 297 speed records were used for this effort. A smart spreadsheet was developed for use the models by decision makers at TxDOT to assess the expected impacts of changes in cross-sectional elements of Texas freeways.

Relevant Publications

- Avelar, R., M. Pratt, J. Miles, T. Lindheimer, N. Trout, and J. Crawford. *Develop Metrics of Tire Debris on Texas Highways*. 0-6860-S. Texas A&M Transportation Institute, College Station, TX. July 2016.
- Fitzpatrick, K., R. Avelar, I. Potts, M. Brewer, J. Robertson, C. Fees, J. Hutton, L. Lucas, and K. Bauer. *Investigating Improvements to Pedestrian Crossings With an Emphasis on the Rectangular Rapid-Flashing Beacon*. Federal Highway Administration. FHWA-HRT-15-043. June 2015.
- Dixon K., K. Fitzpatrick, R. Avelar, M. Perez, S. Ranft, R. Stevens, S. Venglar, and T. Voight. *Reducing Lane and Shoulder Width to Permit an Additional Lane on a Freeway*. Technical Report. Final Report. Texas Department of Transportation. FHWA/TX-15/0-6811-1. March 2015.
- Dixon K., C. Monsere, R. Avelar, J. Barnett, P. Escobar, S. Kothuri, and Y. Wang. *Improved Safety Performance Functions for Signalized Intersections*. Final Report. Oregon Department of Transportation. August 2015.
- Dixon K., R. Avelar. *Validation of Models for Quantifying Safety Performance of Driveways on State Highways*. Final Report. Oregon Department of Transportation. June 2014.
- Fitzpatrick, K., V. Iravarapu, M. A. Brewer, D. Lord, J. Hudson, R. Avelar, and J. Robertson. *Characteristics of Texas Pedestrian Crashes and Evaluation of Driver Yielding at Pedestrian Treatments*. Final report. FHWA/TX-13/0-6702-1. May 2014.
- Dixon K., R. Avelar, L. Brown, I. van Schalkwyk. *Quantifying Safety Performance of Driveways on State Highways*. Oregon Department of Transportation. August 2012.
- Dixon K. and R. Avelar. *Safety Evaluation of Curve Warning Advisory Speed Signs*. Oregon Department of Transportation. May 2011.
- Dixon K., K. Fitzpatrick, and R. Avelar. "Operational and Safety Tradeoffs – Reducing Freeway Lane and Shoulder Width to Permit an Additional Lane". *Transportation Research Record, the Journal of the Transportation Research Board*. No. 2588 / 2016. pp. 89-97. ISSN 0361-1981. DOI 10.3141/2588-10.
- Dixon K., R. Avelar. "Validation Technique Applied to Oregon Safety Performance Function Arterial Segment Models". *Transportation Research Record, the Journal of the Transportation Research Board*. No. 2515 / 2015. pp. 115-123. ISSN 0361-1981.
- Avelar R., K. Dixon, and P. Escobar. "Evaluation of Intersection-Related Crash Screening Methods Based on Distance from Intersection". *Transportation Research Record, the Journal of the Transportation Research Board*. No. 2514 / 2015. pp. 177-186. ISSN 0361-1981. DOI 10.3141/2514-19.
- Avelar R., K. Fitzpatrick, and J. Robertson. "Investigating Maximum Intensities for Yellow Rapid-Flashing Beacons at Night". *Transportation Research Record, the Journal of the Transportation Research Board*. No. 2485 / 2015. pp. 33-41. ISSN 0361-1981. DOI 10.3141/2485-05.
- Avelar R., K. Dixon, and G. Schertz. "Identifying Low Volume Road Segments with High Severe Crash Frequencies". *Transportation Research Record, Journal of the Transportation Research Board*. Low-Volume Roads 2015. Volume 1. No. 2472/2015. pp. 162-171. ISSN 0361-1981.
- Avelar R. and P. Carlson. "Link between Pavement Marking Retroreflectivity and Night Crashes on Michigan Two-Lane Highways". *Transportation Research Record, the Journal of the Transportation Research Board*. No. 2404 / 2014. pp. 59-67. ISSN 0361-1981.
- Avelar R., K. Dixon, L. Brown, M. Mecham, and I. van Schalkwyk. "Influence of Land Use and Driveway Placement on Safety Performance of Arterial Highways". *Transportation Research Record, the Journal of the Transportation Research Board*. No. 2398 / 2013. pp. 101-109. ISSN 0361-1981.

- Avelar R. and K. Dixon. “How Far Are Current Advisory Speeds from being Optimal? An Analysis Based on Safety Performance”. *Transportation Research Record, the Journal of the Transportation Research Board*. No. 2080 / 2012. pp. 183-191. ISSN 0361-1981.

Relevant Employment History

Dates	Position(s)	Organization
03/2016-Present	Associate Research Engineer	Texas A&M Transportation Institute
2013–03/2016	Associate Research Scientist	Texas A&M Transportation Institute
2012–2013	Post-Doctoral Research Associate	Texas A&M Transportation Institute
2007–2012	Research Assistant	Oregon State University
1/2005-5/2006	Traffic Analysis Unit Lead	Bonal Centroamerica S.A. de C.V.