Ethan Ray

RoadSafe LLC
Tucson, AZ 85704
207-891-7617
ethan@roadsafellc.com
www.roadsafellc.com

SUMMARY

A Research Scientist for RoadSafe LLC, Ethan contributes to numerous research projects in the roadside safety industry. Ethan holds a bachelor's degree in civil engineering from Worcester Polytechnic Institute.

DETAILED BIOGRAPHICAL SKETCH

Ethan Ray is a research scientist with RoadSafe LLC with fifteen years of practical work experience in the field of civil engineering. Ethan received his undergraduate degree in Civil Engineering from Worcester Polytechnic Institute. While at Worcester Polytechnic Institute, he conducted the following research projects:

- **"Design of an HDPE Crash Cushion."** in cooperation with Dr. Malcolm Ray and the Laboratorio sulla Sicurezza dei Trasporti at the Politecnico di Milano. Milan, Italy. Fall 2006.
- **"Flooding and Erosion Control in the Informal Settlements of Windhoek, Namibia."** in cooperation with Dr. Chrysanthe Demetry, Dr. Richard Vaz, the Namibia Housing Action Group and the Polytechnic of Namibia. Windhoek, Namibia. Spring 2006. (Awarded Presidents Top Interactive Qualifying Project (IQP) Award, 2007)

Ethan began his career in Engineering as a Non-Destructive Testing inspector. During his 10-year employment in the NDT industry he was promoted from within the company from field inspector trainee to lead inspector to project manager.

Ethan joined RoadSafe LLC during the Fall of 2017. His practical, field proven, data collection and analysis skills developed over the last seventeen years are called upon for procedure development, worksheet development, and regulatory guidance research.

Ethan's recent professional duties at RoadSafe LLC have focused on the area of in-service performance evaluations (ISPEs) of roadside safety hardware and development of draft specifications for material requirements for components used in roadside safety hardware. In the pursuit of performing ISPEs for both governmental and industry clients, Ethan has become skilled at data assembly, database filtering, dataset design, ISPE evaluation, ISPE analysis, writing data dictionaries, and reporting of ISPE findings.

PROFESSIONAL FOCUS

Assemblage of datasets, evaluation, analysis, and reporting of ISPEs; development of national standard specifications for material requirements; application of crash-based and encroachment-based models in roadside safety; risk and cost effectiveness analysis of design alternatives; design and evaluation of roadside improvements; development of roadside design guidance and tools.

EDUCATION

- BS in Civil Engineering, Worcester Polytechnic Institute, Worcester, Massachusetts (2009).

COMMITTEE SERVICE

- Transportation Research Board -- Roadside Safety Design, Committee AKD20 (Friend, 2017 – present).
- Transportation Research Board – Highway Safety Performance, Committee ANB25 (Friend, 2017 – present).
- Transportation Research Board – Bicycle Transportation, Committee ANF20 (Friend, 2019 – present).
- Transportation Research Board – Pedestrians, Committee ANF10 (Friend, 2019 – present).

EXPERIENCE

2017-Present: Research Scientist at **RoadSafe LLC, Canton, Maine**: Perform research in the areas of roadside and highway safety, in-service performance evaluations, crash modeling, cost-benefit analysis, risk assessment, and materials requirements for components used in roadside safety hardware. Collect and analyze field data. Develop procedures and specifications for incorporation in AASHTO publications.

2007-2017: Project Manager and Lead Inspector at **WavesinSolids LLC & TechKnowServ Corp., State College, PA**: As Project Manager for the non-destructive testing services branch of WavesinSolids LLC (2007-2012) and TechKnowServ Corp. (2012-2017) Ethan was actively engaged in all steps leading up to and following on-site inspections. Ethan assisted customers in determining the best testing method for their specific applications. He developed technical procedures, work proposals and quotes while also preparing the TKS inspection teams for on-site work. He also performed technical analysis, reported on findings and ensured customer satisfaction through the entire process.

PUBLICATIONS

Refereed Publications

1. **Ethan M. Ray**, Christine E. Carrigan, and Chuck A. Plaxico **"Demonstrating Crashworthiness of Bridge Railings in Maine,"** Transportation Research Record, OnlineFirst. Transportation Research Board, Washington D.C., 2024. https://doi.org/10.1177/03611981241255600

2. Thomas R. Hay, Subash B. Jayaraman, **Ethan M. Ray**, D. Robert Hay, **"Rail Surface Characterization,"** Materials Evaluation, 66(11), pp 1144-1151. The American Society for Nondestructive Testing, Columbus, OH, 2008. http://pascal-francis.inist.fr/vibad/index.php?action=getRecordDetail&idt=20849382

Technical Reports

1. Christine E. Carrigan, **Ethan M. Ray**, **"Data Collection Practices for Use with In-Service Performance Evaluations,"** National Cooperative Highway Research Program Web-Only Document 407, National Academy of Sciences, Washington, D.C., 2024.

2. Chuck A. Plaxico and **Ethan M. Ray**, **"Investigation of Material Requirements for Highway Guardrail Systems,"** National Cooperative Highway Research Program Report 1020, National Academy of Sciences, Washington, D.C., 2022.

3. M.H. Ray, C.E. Carrigan and **Ethan M. Ray "Development of Safety Performance-Based Guidelines for the Roadside Design Guide,"** National Cooperative Highway Research Program Report 972, National Academy of Sciences, Washington, D.C., 2022.

4. Christine E. Carrigan, Malcolm H. Ray, **Ethan M. Ray**, and Archie Ray, **"Multi-State In-Service Performance Evaluations of Roadside Safety Hardware,"** National Cooperative Highway Research Program Web-Only Document 332, National Academy of Sciences, Washington, D.C., 2022.

5. Christine E. Carrigan, Chuck A. Plaxico, **Ethan M. Ray**, and Archie Ray, **"In-Service Performance Evaluation (ISPE) of New England Transportation Consortium (NETC) Steel Bridge Railings,"** New England Transportation Consortium (NETC), NETCR119, Augusta, ME, 2022.

6. Chuck A. Plaxico and **Ethan M. Ray**, **"Development of MASH Computer Simulated Steel Bridge Rail and Transition Details,"** New England Transportation Consortium (NETC), NETCR115, Augusta, ME, 2020.

7. M.H. Ray, C.E. Carrigan and C.A. Plaxico **"Guidelines for Shielding Bridge Piers,"** National Cooperative Highway Research Program Report 892, National Academy of Sciences, Washington, D.C., 2018. (authored Appendix)

8. Christine E. Carrigan, Malcolm H. Ray, **Ethan M. Ray**, and Archie M. Ray, **"Proposed Alternative Procedures for Assessing Compliance with the Washington State Department of Transportation Control Zone Policies,"** RoadSafe LLC, 2017.

Peer reviewed Conference Proceedings

1. C.E. Carrigan, **E. Ray**, and M.H. Ray **"Proposed Methodology for Quantifying Roadside Tree Crash Risk"** 2019 Data Modeling and Analysis in Support of Improved Roadside Safety Poster Session, 98th Annual Meeting, Washington D.C., January 13-17, 2019.

INVITED PRESENTATIONS

1. **Ethan M. Ray**, Christine E. Carrigan, and Chuck A. Plaxico **"Demonstrating Crashworthiness of Bridge Railings in Maine: Applying Uniform ISPE Assembly and Analysis Criteria,"** 2024 Roadside Safety Features and Design Lectern Session, 103rd TRB Annual Meeting, Washington D.C., January 7-11, 2024.

2. **Ethan M. Ray, "NCHRP Report 1010 In-Service Performance Evaluation: Guidelines for the Assembly and Analysis of Data - Summary of Research,"** 2023 ISPE Subcommittee Meeting of the TRB AKD20 Committee Meeting, 102nd Annual Meeting, Washington, D.C., January 8-12, 2023.

3. **Ethan M. Ray**, and M.H. Ray **"The Roadside Safety Analysis Program version 3: Update"** 2019 Safety Hardware Evaluation & Implementation of Current Standards Session of the AZ ITE-IMSA Spring Conference, Phoenix, AZ, February 26-28, 2019.

4. **Ethan M. Ray**, M.H. Ray **"Historical Decision-Making Basis and Guidance in the RDG"** 2018 Joint Committee Meeting of AFB20 and TCRS, Austin, TX, July 8-11, 2018.

5. **Ethan M. Ray**, C.E. Carrigan, and M.H. Ray **"Procedures for Consideration of Roadside Features using Crash-based Methods,"** 2018 Data Gathering Session of the TRB AFB20 Committee Meeting, 97th Annual Meeting, Washington, D.C., January 7-11, 2018.

6. C.E. Carrigan, **E. Ray**, and M.H. Ray **"Consideration of Roadside Features in the Highway Safety Manual"** TRB ANB 25 Committee Workshop, 97th Annual Meeting, Washington, D.C., January 7-11, 2018.

SPONSORED RESEARCH PROJECTS

1. **"In-Service Performance Evaluation (ISPE) of Roadway Safety Features"** Transportation Pooled Fund TPF-5(481), cleared by FHWA, funding continued through present.

2. **"National In-Service Performance Evaluation Guidelines for Defining Acceptable Roadside Safety Hardware,"** National Cooperative Highway Research Program Project 22-58, National Academy of Sciences, $400,000, in progress.

3. **"Crashworthiness of Roadside Hardware on Curbed Roadways,"** National Cooperative Highway Research Program Project 22-50, National Academy of Sciences, $400,000, in progress.

4. **"Update to AASHTO M 180-18 and Associated Highway Guardrail Specifications,"** National Cooperative Highway Research Program Project 22-40, National Academy of Sciences, $550,000, completed, pending publication.

5. **"A Transportation Agency Data Collection Practice for Use with In-Service Performance Evaluations (ISPEs),"** National Cooperative Highway Research Program Project 22-44, National Academy of Sciences, $400,000, 2024.

6. **"Multi-State In-Service Performance Evaluations of Roadside Safety Hardware,"** National Cooperative Highway Research Program Project 22-33, National Academy of Sciences, $650,000, 2022.

7. **"In-Service Performance Evaluation of NETC Bridge Railings,"** New England Transportation Consortium (NETC) Project 20-1, 2022.

8. **"Evaluation of Roadside Safety Hardware Installation and Maintenance Cost Increases,"** TxDOT Project 48-9IDP5009 Work Authorization 01, 2021.

9. **"Development of Methods to Evaluate Side Impacts for Next Edition MASH,"** National Cooperative Highway Research Program Project 22-32, National Academy of Sciences, $500,000.

10. **"Development of Safety Performance Based Guidelines for the Roadside Design Guide,"** National Cooperative Highway Research Program Project 15-65, National Academy of Sciences, $300,000, 2020.

11. **"Recommended Guidelines for the Selection and Placement of Test Levels 2 through 5 Median Barriers,"** National Cooperative Highway Research Program Project 22-31, National Academy of Sciences, $300,000, 2020.

12. **"Development of MASH Computer Simulated Steel Bridge Rail and Transition Details,"** New England Transportation Consortium (NETC) Project 18-1, 2020.

13. **"Guidelines for Shielding Bridge Piers,"** National Cooperative Highway Research Program Project 12-90, National Academy of Sciences, $450,000, 2018.

14. **"Consideration of Roadside Features in the Highway Safety Manual,"** National Cooperative Highway Research Program Project 17-54, National Academy of Sciences, $1,140,000, 2018.