

Quarterly Progress and Performance Indicators Report:

Project Number and Title: Safety Assessment of New England Roadways during the COVID-19 Pandemic

Research Area: Thrust Area 4

PI: Mohammadali Shirazi, Ph.D., Assistant Professor, University of Maine

Reporting Period: 7/1/2022 to 9/30/2022

Submission Date: 9/30/2022

*****IMPORTANT: Please fill out each section fully and reply with N/A for questions/sections with nothing to report. For ease of reporting to the USDOT, please do not remove, or change the order of, any sections/text. You may remove/add each rows in tables as needed. Thank you! *****
The report is due on the last day of the reporting period in .doc format to tidc@maine.edu.

Overview:

Provide **BRIEF** highlights of activities performed during the reporting period.

- We developed initial safety models. Further work is needed to develop better models and analyze data.
- We are writing a literature review paper for a high impact journal.
- We finalized speeding models and submitted a paper for publication, and two papers for presentation.

Meeting the Overarching Goals of the Project:

How did the previous items help you achieve the project goals and objects? Please give one bullet point for each bullet point listed above.

- Initial safety models were developed but more work is needed. We requested and received more data from DOT.
- We submitted a paper for publication, and two papers for presentation at the TRB.
- We are drafting a literature review paper for publication.

Accomplishments:

List any accomplishments achieved under the project goals in bullet point form...

- We finalized speeding models for Interstates and freeways in Connecticut and Maine and completed our paper.
- We submitted a paper for publication, and two papers for presentation at the TRB.
- We developed initial safety models.

Task, Milestone, and Budget Progress:

Complete the following tables to document the work toward each task and budget (add rows/remove rows as needed, make sure you complete the Overall Project progress row and include all tasks even if they have ended or have not been started.

Table 1: Task Progress*

Task Number: Title*	Start Date	End Date	% Complete
Task 1-1 Literature review	Nov 1, 2020	Jan 31, 2021	100%
Task 1-2 Collecting Data	Nov 1, 2020	May 31, 2022	100%
Task 1-3 Models-Speeding	Mar 1, 2021	May 31, 2022	100%
Task 2-1 Models -Crash	Nov 1, 2021	Dec 31, 2022	55%
Task 2-2 Models -Post Shut Down	Jan 1, 2022	Dec 31, 2022	75%
Task 2-3 Analyzing the results.	May 1, 2022	Nov 15, 2022	65%
Task 2-4 Recommendations	June 16, 2022	Nov 15, 2022	20%
Task 2-5 Final Report	July 16, 2022	Dec 31, 2022	60%
Overall Project:	Nov 1, 2020	Dec 31, 2021	78%
Phase 1 Overall	Nov 1, 2020	May 31, 2021	100%
Phase 2 Overall	Nov 1, 2021	Dec 31, 2021	73%

*This table has been updated to reflect phase 2.

Table 2: Milestone Progress

Milestone #: Description	Corresponding Deliverable	Start Date	End Date
1-Completing the literature review	Summary of Literature Review	Nov 1, 2020	Jan 30, 2021
2-Completing data collection	Summary of Data Collection	Nov 1, 2020	May 28, 2022
3-Completing the statistical analysis and analyzing results	Summary of Models	March 1, 2021	Dec 31, 2022 (expected)
4-Analyzing the results	Summary of Results	May 1, 2022	Nov 15, 2022 (expected)
5-Completing the project recommendations	Summary of Recommendations	June 16, 2022	Dec 15, 2022 (expected)
6-Completing the final Report	Final Report	July 16, 2022	Dec 31, 2022 (expected)

Table 3: Budget Progress*

Project Budget*	Spend – Project to Date	% Project to Date (include the date)
\$70,000		
\$59,650		

*This table has been updated to reflect phase 2.

Is your Research Project Applied or Advanced?

- Applied** (*The systematic study to gain knowledge or understanding necessary for determining the means by which a recognized and specific need may be met.*)
- Advanced** (*An intermediate research effort between basic research and applied research. This study bridges basic (study to understand fundamental aspects of phenomena without specific applications in mind) and applied research and includes transformative change rather than incremental advances. The investigation into the use of basic research results to an area of application without a specific problem to resolve.*)

Education and Workforce Development:

Answer the following questions (N/A if there is nothing to report):

1. Did you provide any workforce development or training opportunities to transportation professionals (already in the field)? If so, what was the training? When was it offered? How many people attended? (i.e. The research team provided an in the field training for the SAR technology for 3 maintenance crew members of the MassDOT on 3/31/2021. The members learned how to use the technology and interrupt the data.)

N/A

2. Did you hold meetings with any transportation industry organizations or DOTs? If so, what was the meeting's purpose? When was it offered? How many people attended? (i.e. The research team held a meeting with MaineDOT to update them on the progress of the research findings and how the findings can be implemented on 3/31/2021. 15 DOT maintenance members were present at the meeting.)

- We contacted DOT for a meeting, but they were busy to meet. We however corresponded with the DOT via email, and shared our second paper with them. We received new data from Maine DOT.

3. Did you host/participant in any K-12 education outreach activities? If so, what was the activity? What was the target age/grade level of the participants? How many students/teachers attended? When was the activity held? (i.e. 25 8th graders and 2 teachers visited the concrete lab and created small concrete trinkets like Legos on 3/31/2021. They learned about the different types of fibers that can be used in the concrete.)

N/A

Technology Transfer:

Complete all of the tables below and provide additional information where requested. Please provide ALL requested information as this is one of the most important sections for reporting to the USDOT. **ONLY provide information relevant to this reporting period.**

Use the table below to complete information about conference sessions, workshops, webinars, seminars, or other events you led/attended where you shared findings as a result of the work you conducted on this project:

Table 4: Presentations at Conferences, Workshops, Seminars, and Other Events					
Type	Title	Citation	Event & Intended Audience	Location	Date(s)
Conference presentation	Speeding during Covid-19 pandemic in Maine	Shahlaeegilan, A., Shirazi, M., Marshall, E., Ivan, J.N. (2022)	ITCD (ASCE conference)	Seattle, Washington	May 29-June 3, 2022
Conference presentation	Modeling the impact of the COVID-19 Pandemic on Speeding at Rural Facilities in Maine using Short-Term Speed and Traffic Count Data.	Shahlaeegilan, A., Shirazi, M., Marshall, E., Ivan, J.N. (2022)	TRB	Washington DC	Submitted
Conference presentation	Leveraging Probe Data to Model Speeding on Urban Limited Access Highway Segments during the COVID-19 Pandemic	Marshall, E., Shirazi, M., Shahlaee, A., Ivan, J.N. (2022)	TRB	Washington DC	Submitted

Use the table below to report any publications, technical reports, peer-reviewed articles, newspaper articles referencing your work, graduate papers, dissertations, etc. written as a result of the work you conducted on this project. Please list only completed items and exclude work in progress.

Table 5: Submitted/Accepted Publications, Technical Reports, Theses, Dissertations, Papers, and Reports				
Type	Title	Citation	Date	Status
Peer-reviewed journal	Modeling the impact of the COVID-19 Pandemic on Speeding at Rural Facilities in Maine using Short-Term Speed and Traffic Count Data.	Shahlaeegilan, A., Shirazi, M., Marshall, E., Ivan, J.N. (2022)	June 2022	Accepted for publication
Peer-reviewed journal	Leveraging Probe Data to Model Speeding on Urban Limited Access Highway Segments during the COVID-19 Pandemic	Marshall, E., Shirazi, M., Shahlaee, A., Ivan, J.N. (2022)	June 2022	Submitted

Answer the following questions (N/A if there is nothing to report):

1. Did you deploy any technology during the reporting period through pilot or demonstration studies as a result of this work? If so, what was the technology? When was it deployed?
N/A
2. Was any technology adopted by industry or transportation agencies as a result of this work? If so, what was the technology? When was it adopted? Who adopted the technology?
N/A
3. Did findings from this research project result in changing industry or transportation agency practices, decision making, or policies? If so, what was the change? When was the change implemented? Who adopted the change?
N/A
4. Were any licenses granted to industry as a result of findings from this work? If so, when? To whom was the license granted?
N/A
5. Were any patent applications submitted as a result of findings from this research? If so, please provide a copy of the patent application with your report.
N/A
6. Did industry organizations or DOTs provide cost-share (cash or in-kind) to your research during the reporting period? Who was the organization? Please provide an in-kind support invoice from the organization with your report (this is kept confidential and used for record keeping purposes only).
N/A

Please add figures/images that can be included on the website and/or in marketing/social media materials to further clarify your research to the general public. This is very important to our Technology Transfer initiatives.

Describe any additional activities involving the dissemination of research results not listed above under the following headings:

Outputs:

Definition: Any new or improved process, practice, technology, software, training aid, or other tangible product resulting from research and development activities. They are used to improve the efficiency, effectiveness, and safety of transportation systems. List any outputs accomplished during this reporting period:

- We finalized speeding models in Maine and Connecticut. Our latest results show that the odds of speeding significantly increased during pandemic in both states.

- We found that as density increases, speeding decreases. Therefore, agencies should consider a trade-off between level of service and safety when managing the network.
- We found that Covid-19 had a profound impact on speeding. Speeding continued to happen in both Connecticut and Maine, even one year after the start of pandemic.
- The initial crash models were developed. These models help to understand crash pattern after pandemic.

Outcomes:

Definition: The application of outputs; any changes made to the transportation system, or its regulatory, legislative, or policy framework resulting from research and development activities. List any outcomes accomplished during this reporting period:

- Speeding models can provide insights about the change in odds of speeding after pandemic.

Impacts:

Definition: The effects of the outcomes on the transportation system such as reduced fatalities, decreased capital or operating costs, community impacts, or environmental benefits. The reported impacts from UTCs are used for the assessment of each UTC and to make a case for Federal funding of research and education by demonstrating the impacts that UTC funding has had on technology and education. NOTE: The U.S. DOT uses this information to assess how the research and education programs (a) improve the operation and safety of the transportation system; (b) increase the body of knowledge and technologies; (c) enlarge the pool of people trained to develop knowledge and utilize technologies; and (d) improves the physical, institutional, and information resources that enable people to have access to training and new technologies. List any outcomes accomplished during this reporting period:

- The outcome of our models will assist DOT to understand the impact of pandemic on speeding and possibly work on countermeasures to reduce speeding and decrease frequency and severity of crashes.

Participants and Collaborators:

Use the table below to list individuals (compensated or not) who have worked on the project other than students.

Table 6: Active Principal Investigators, faculty, administrators, and Management Team Members				
Individual Name & Title	Dates involved	Email Address	Department	Role in Research

Use the table below to list **all** students who have participated in the project during the reporting period. (This includes all paid, unpaid, intern, independent study, or any other student that participated in this project.) **ALL FIELDS ARE REQUIRED.**

Table 7: Student Participants during the reporting period								
Student Name	Start Date	End Date	Advisor	Email Address	Level	Major	Funding Source	Role in research
Ennis Marshall	May, 2022	Dec. 2022	Dr. Shirazi		MSc.	Civil Eng.	TIDC	Graduate Research Assistant

Use the table below to list any students who worked on this project and graduated or received a certificate during this reporting period. Include information about the student's accepted employment during the reporting period

Table 8: Students who Graduated During the Reporting Period			
Student Name	Degree/Certificate Earned	Graduation/Certification Date	Did the student enter the transportation field or continue another degree at your university?
N/A			

Use the table below to list any students that participated in Industrial Internships during the reporting period:

Table 9: Industrial Internships			
Student Name	Degree/Certificate Earned	Graduation/Certification Date	Did the student enter the transportation field or continue another degree at your university?
N/A			

Use the table below to list **organizations** that have been involved as partners on this project and their contribution to the project during the reporting period.

Table 10: Research Project Collaborators during the reporting period						
Organization	Location	Contribution to the Project				
		Financial Support	In-Kind Support	Facilities	Collaborative Research	Personnel Exchanges
Maine Department of Transportation (Maine DOT)	Augusta, ME				X	
University of Connecticut	Storrs, CT				X	

Use the table below to list **individuals** that have been involved as partners on this project and their contribution to the project during the reporting period. (**List your technical champion(s) in this table.** This also includes collaborations within the lead or partner universities who are not already listed as PIs; especially interdepartmental or interdisciplinary collaborations.)

Table 11: Other Collaborators				
Collaborator Name and Title	Contact Information	Organization and Department	Date(s) Involved	Contribution to Research
Dr. John Ivan		University of Connecticut*	November 1, 2020	Collecting Connecticut Data. Writing Papers
Mr. Dennis Emidy		Maine DOT	November 1, 2020	Technical Champion

Use the following table to list any transportation related course that were taught or led by researchers associated with this research project during the reporting period:

Table 12: Course List						
Course Code	Course Title	Level	University	Professor	Semester	# of Students
CIE 521	Civil Engineering Systems and Optimization	Graduate level	UMaine	Dr. Shirazi	Fall 2022	2

Changes:

- We requested no-cost extension by Dec 31, 2022. Our request was approved.

Planned Activities:

- We plan to finalize our literature review paper.
- We plan to clean the new data we received from DOT and improve our safety models.