NTC Program Progress Performance Report (PPPR) Information Form

For P.I.'s Use

On a semi-annual basis the NTC sponsored P.I. must report Program Progress Performance Report (PPPR) using the format specified in this PPPR Information Form. The form must be submitted electronically to the corresponding NTC Associate Director by 2/22/2016.

Cover Period: 9/30/2015 – 3/31/2016

NTC Funded Project Information (Round/Year 2, 2014-2015)	
University Name	Arizona State University
Project Title	Effect of Traffic Roundabouts on Safety in Arizona
Principal Investigator	Michael Mamlouk, Ph.D., P.E., F.ASCE
PI Contact Information	Dr. Michael Mamlouk Professor Civil, Environmental and Sustainable Engineering Program School of Sustainable Engineering & the Built Environment Arizona State University, PO Box 873005 Tempe, AZ 85287-3005 Phone: 480-965-2892 mamlouk@asu.edu

The form includes the following six parts:

- Part I – Performance Indicators
- Part II – Accomplishments: What was done? What was learned?
- Part III – Products: What has the program produced?
- Part IV – Participants & Collaborating Organizations: Who has been involved?
- Part V – Impact: What is the impact of the program? How has it contributed to transportation education, research and technology transfer?
- Part VI – Changes/Problems

Supplementary documents/materials can be attached to this form with the submission.

Part I – Performance Indicators	
Reporting Period	**9/30/2015 – 3/31/2016**
1. Transportation-related courses offered during the reporting period that were taught by faculty and/or teaching assistants who are associated with the UTC	
Undergraduate courses	• CEE 412, Pavement Analysis and Design • CEE 475, Highway Geometric Design
Graduate courses	• CEE 511, Pavement Analysis and Design • CEE 576, Highway Geometric Design
2. Students supported by this grant	
Undergraduate students	N/A
Masters students	Student Name: Beshoy Souliman Supervisor: Dr. Michael Mamlouk
Doctoral students	N/A
3. Students participating in transportation research projects funded by this grant (but not supported by this grant)	
Undergraduate students	N/A
Graduate students	N/A
4. Students supported by this grant who received degrees	
Undergraduate degrees	N/A
Masters degrees	Beshoy Souliman will receive his master's degree in May 2016.
Doctoral degrees	N/A

Part II – Accomplishments: What was done? What was learned?	
Reporting Period	**9/30/2015 – 3/31/2016**
1. What are the major goals of the program?	The National UTC aims to promote strategic transportation policies, investment, and decisions that bring lasting and equitable economic benefits to the U.S. and its citizens. The Center is concerned with the integrated operations and planning of all modes serving the nation's passenger and freight transportation system, including the institutional issues associated with their management and investments. A balanced multi-modal approach will be used that considers freight and passenger travel mobility, reliability, and sustainability, as well as system operations during periods of both recurring and non-recurring incidents, including response to major emergencies. The modes in this theme include highway, transit, rail, and inter-modal interfaces including ports, terminals and airports. In particular, the center focuses on research, education, and technology transfer activities that can lead to (1) Freight efficiency for domestic shipping and for our international land, air, and sea ports; (2) Highway congestion mitigation with multi-modal strategies; and (3) Smart investments in intercity passenger travel facilities such as high speed rail. Major center activities are as following: • **Advanced & Applied Research Promoting Economic Competitiveness:** Our research activities are multimodal/intermodal and multidisciplinary in scope, with the aims of addressing nationally and regionally significant transportation issues pertinent to economic competitiveness and providing practice-ready solutions. • **Education, Workforce Development, Technology Transfer, & Diversity** The consortium is committed to providing high-quality transportation education and workforce development programs for a broad and diverse audience. Center's efforts will support the development of a critical transportation knowledge base and a transportation workforce that is prepared to design, deploy, operate, and maintain the complex transportation systems of the future.

2. What was accomplished under these goals?	The main objective of this study was to evaluate the effect of using roundabouts on crash rate and severity in cities in Arizona. The effect on rate of accidents, damages, injuries, and fatalities of both single-lane and double-lane roundabouts are evaluated. In this study, 17 roundabouts in 5 cities in Arizona were used in the study, out of which 11 single-lane and 16 double-lane. Most of the locations of single-lane roundabouts were controlled by 2-way stop signs before the roundabout installation, while most of the locations of double-lane roundabouts were controlled by signals. Accidents data were collected and broken down into 3 levels: damage, injury, and fatality. The average rates of accidents, damages, and injuries per year and per year per million vehicles were evaluated. It was found that single-lane roundabouts reduced the accident rate of intersections. However, double-lane roundabouts increased the accident rate of intersections. A decision needs to be made as to either remove double-lane roundabouts or find solutions on how to make these roundabouts safe, such as making geometric improvements or educating the public on how to use them. The results also showed that both single- and double-lane roundabout conversions reduced the severity levels of accidents. Considering both accident rate and severity level, warrants needs to be developed for roundabout conversion for both single- and multi-lane roundabout conversion. This project supports one of the main activities of the center pertinent to economic competitiveness and providing practice-ready solutions to transportation problems.
3. How have the results been disseminated?	• A final report was prepared and sent to the NTC office at the University of Maryland. • A poster was presented at a local Institute of Transportation Engineering (ITE) conference in Arizona, March 2016. • A journal paper was submitted to the ASCE Journal of Transportation Engineering for publication.
4. What do you plan to do during the next reporting period to accomplish the goals? (4/1/2016 – 9/30/2016)	The project was completed in the current reporting period.

Part II – Products: What has the program produced?	
Publications are the characteristic product of research projects funded by the UTC Program. OST-R may evaluate what the publications demonstrate about the excellence and significance of the research and the efficacy with which the results are being communicated to colleagues, potential users, and the public, not the number of publications. Many research projects (though not all) develop significant products other than publications. OST-R may assess and report both publications and other products to Congress, communities of interest, and the public.	
Reporting Period	**9/30/2015 – 3/31/2016**
1. Journal publications:	Mamlouk, M., and Souliman, B., "Effect of Traffic Roundabouts on Accident rate and Severity," Submitted for Publication at the ASCE Journal of Transportation Engineering, 2016. Acknowledgement of federal support was included.
2. Books or other non-periodical, one-time publications	N/A
3. Other publications, conference papers and presentations	Mamlouk, M., and Souliman, B., "Effect of Roundabouts on Accident Rate and Severity in Arizona," Presented, Institute of Transportation Engineering (ITE) conference, Phoenix, AZ, March 2016.
4. Website(s) or other Internet site(s)	N/A
5. Technologies or techniques	N/A
6. Outreach activities	N/A
7. Courses and workshops	N/A
8. Inventions, patent applications, and/or licenses	N/A
9. Other products	N/A

Part III – Participants & Collaborating Organizations: Who has been involved?	
OST-R needs to know who has worked on the project to gauge and report performance in promoting partnerships and collaborations.	
Reporting Period	**9/30/2015 – 3/31/2016**
1. What organizations have been involved as partners?	Data were collected from the following agencies: • City of Scottsdale, AZ • City of Sedona, AZ • City of Phoenix, AZ • City of Cottonwood, AZ • City of Prescott, AZ
2. Have other collaborators or contacts been involved?	Engineers and other personnel of the cities listed above provided data and advice throughout the project.

Part IV – Impact: What is the impact of the program? How has it contributed to transportation education, research and technology transfer?	
DOT uses this information to assess how the research and education programs: • **increase the body of knowledge and techniques;** • **enlarge the pool of people trained to develop that knowledge and techniques or put it to use; and,** • **improve the physical, institutional, and information resources that enable those people to get their training and perform their functions.**	
Reporting Period	**9/30/2015 – 3/31/2016**
1. What is the impact on the development of the principal discipline(s) of the program?	This study increased the body of knowledge of the different types of roundabout performance on safety. The results of this study should help transportation decision makers on selecting the appropriate type of intersection control that would improve safety. The researchers have gained experience in analyzing databases and safety issues.
2. What is the impact on other disciplines?	The study will have a large impact on city engineers and decision makers in improving the safety of transportation in their municipalities.
3. What is the impact on the development of transportation workforce development?	The study will have a direct impact on improving the understanding of city officials on the safety of their intersections. This would result in improving their work performance.
4. What is the impact on physical, institutional, and information resources at the university or other partner institutions?	A large accident database was developed that should be useful to other researchers.
5. What is the impact on technology transfer?	Cities where the data were collected from should benefit from the project results and apply them to improve the safety of their intersections.
6. What is the impact on society beyond science and technology?	The study should improve the education and awareness levels of the public when driving within roundabouts.
7. Additional impacts	N/A

Part V – Changes/Problems	
If not previously reported in writing to OST-R through other mechanisms, provide the following additional information or state, "Nothing to Report, if applicable:	
Reporting Period	**9/30/2015 – 3/31/2016**
1. Changes in approach and reasons for change	Nothing to report.
2. Actual or anticipated problems or delays and actions or plans to resolve them	Nothing to report.
3. Changes that have a significant impact on expenditures	Nothing to report.
4. Significant changes in use or care of human subjects, vertebrate animals, and/or biohazards	Nothing to report.
5. Change of primary performance site location from that originally proposed	Nothing to report.