



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

QUARTERLY PROGRESS REPORT

Project Title:	Operational Improvements at Traffic Circles (Project 2002-16)		
RFP NUMBER:	NJDOT RESEARCH PROJECT MANAGER: Robert Sasor		
TASK ORDER NUMBER/Study Number: 129 / 4-26544	PRINCIPAL INVESTIGATOR: Kaan Ozbay (Rutgers) / George List (RPI)		
Study Start Date: 01/01/2002 Study End Date: 12/31/2004	Period Covered: 4 th Quarter 2004		

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Phase 1: Preliminary Literature Search	5%	50%	100%	5%
Phase 2				
Task 1: Literature Review	10%	25%	100%	10%
Task 2: Selection and Use of Computer Tool.	10%	100%	100%	10%
Task 3: Evaluation of Operational Alternatives.	30%	11.5%	80%	24%
Task 4: Safety Evaluation	20%	10%	40%	8%
Task 5: Cost – Benefit Analysis	10%	10%	60%	6%
Tasks 6: Final Recommendations	5%			
Tasks 7: Administration / Final Report.	10%	10%	40%	4%
TOTAL				67%

Project Objectives:

Objective 1: Simulation Modeling and Validation of Geometry and Traffic Patterns of Existing and Proposed Operational Improvement Alternatives of Circles Under Study.

Objective 2: Determination and Evaluation of Operational and Safety Improvement Alternatives using a Series of Measures of Effectiveness (travel time, delays, air pollution, gas consumption, etc.)

Objective 3: Recommendation of best operational and safety improvements based on a rigorous and realistic cost-benefit analysis

Project Abstract:

Traffic circles have been used in the United States since 1905. However, their use has been limited since the 1950s due to the realization that they worked neither efficiently nor safely (NCHRP- WEB Page). Recently, there has been increasing interest in improving existing traffic circles to address these safety and efficiency problems. Several States including New Jersey are in the process of exploring effective operational alternatives for enhancing safety and efficiency of these traffic circles built in the early parts of 20th Century.

Many existing traffic circles in New Jersey that were designed to handle lesser traffic volumes than today's volumes fall under this category of traffic circles that need to be improved since they are faced with increasing congestion and accident problems. Although replacement of these traffic circles appear to be a viable option time and money needed for the construction of alternative solutions can be prohibitive especially in this atmosphere of diminishing resources for any kind of major investment due to the budget problems of the State.

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The next best option appears to be the implementation of operational alternatives that can extend the life of these circles until they can be rebuilt in the next 5 to 20 years.

To study operational alternatives, traffic simulation computer software that can accurately model the geometry & traffic on circles, and provide animated graphics of traffic movements is needed. The major goal of this computer based analysis of the traffic circles as proposed in this study is to accurately evaluate the effectiveness of various traffic engineering measures such as ramp metering, sign and line treatments, reconstructing or adding lanes, in terms of improve traffic flow or safety at a specific circle.

1. Progress this quarter by task:

- **Task 3:**

Below a summary of our efforts in this quarter:

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- PARAMICS model for the Brooklawn circle was validated and calibrated using the traffic counts extracted from the data. The validation /calibration for the base year is complete for this circle.
- Sensitivity analysis for Brooklawn circle simulation model was completed for morning and afternoon peak periods.
- PARAMICS model of the Brooklawn circle with ALT 2B as recommended by DVRPC was modeled as well. The cycle time of the traffic signal that had been proposed to be deployed at HWY 130 and Old Salem Rd. was obtained from SYNCHRO. The sensitivity analysis of this alternative was completed based on the cycle time of this specific signal. The comparison of the current and the alternative model of the circle was performed based on the average network travel time.
- The simulation model of the Asbury circle were extended to include nearby roadways and traffic signals. It was observed in the modeling of the two previous circles that correct interarrival times are very important in accurate representation of the traffic circle operation. Thus, the 4 nearby signals were also added to the simulation model. In order to precisely model these signalized intersections, a site visit was done on 10/01/2004 to collect infrastructure and operational data. Origin-destination matrix was determined based on the traffic counts that we had collected. Fine-tuning of the O-D matrix will be completed as soon as the traffic counts at these intersections are received from NJDOT.

- **Task 4:**

- A meeting was arranged with the RPI team, Alix Demers and Jeff Wojtowicz on November 17th and 18th, 2004. The meeting was intended to finalize the methodology of the safety analysis and discussed the next steps. RPI is working on finalizing the safety analysis and recommendations for the Collingwood and Brooklawn circles.

- **Task 5:** The draft chapter for the Cost-Benefit analysis includes the analysis of Brooklawn circle with the proposed operational alternatives as suggested in the DVRPC report.

2. Proposed activities for next quarter by task

- We will continue Tasks 3, 4 and 5.

3. List of deliverables provided in this quarter by task (product date)

A final report on modeling and analysis of the Brooklawn circle.
Safety analysis on the Collingwood Circle.



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4. Progress on Implementation and Training Activities

NJDOT officials will be visited to present the Brooklawn circle analysis and results.

5. Problems/Proposed Solutions

Last quarter we requested a no-cost extension.

Total Project Budget	\$ 422,524
Modified Contract Amount:	
Total Project Expenditure to date	\$308,203
% of Total Project Budget Expended	73%

* These are approximate expended amounts for the project; these estimates are for reference only and should not be used for official accounting purposes. For a more accurate project accounting please review the quarterly invoice for this project.

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