

Need a solution?
Think Jersey DOT

Tech Brief

Development of Uniform Standards for Allowable Lane Closure

FHWA-NJ-2008-014

September 2008

BACKGROUND

- Work zones are a part of daily highway traffic operations that are essential for maintaining the highway infrastructure operate at a desired level of service.
- Work zones can be either scheduled or unexpected maintenance, reconstruction and rehabilitation activities that are needed as a result of increasing traffic volumes, adverse weather effects and aging infrastructure.
- Whether lane closures are short term or long term, they adversely affect traffic with long delays, queue lengths and accidents.
- When and how long a lane closure is permitted, how many lanes can be closed need to be determined carefully by transportation agencies to minimize their impact on traffic and productivity.
- Estimation of the impact of lane closures on traffic require detailed information of traffic (e.g. hourly weekday and weekend traffic volumes), and roadway (e.g. number of lanes, lane and shoulder width, roadway capacity).

HERE'S THE PROBLEM

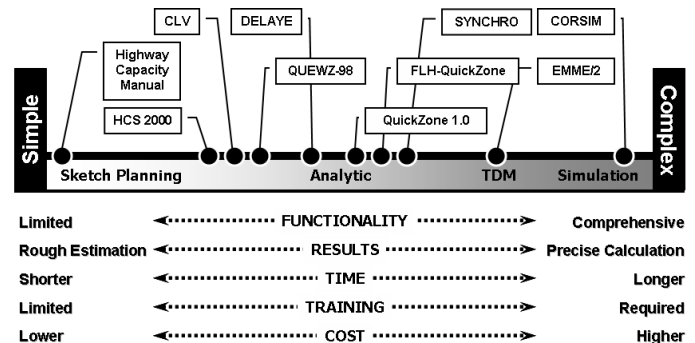
- Many state DOTs have specific strategies and policies for lane closures that are followed during work zones that are intended to minimize the impact of lane closures on traffic.
- The current process to develop allowable lane closing hours that is being conducted by the NJDOT involves the collection of traffic volumes, consultation with local authorities and the reliance on previous knowledge of the roadway.
- This is an ad-hoc process that lacks uniformity and does not make use of traffic engineering basics to assess the impacts of lane closures.
- Thus, there is a need to develop a process for determining and modifying lane closures that will have uniformity and take into account effects on productivity and traffic delay.

AND, HERE'S THE SOLUTION

- Develop a user friendly computer tool for NJDOT engineers that can use the available traffic and roadway data and make use of traffic engineering basics to assess the impacts of lane closures.
- Implementation of such a tool would minimize the time and effort spent to estimate the impact of lane closures.

BUT HOW CAN IT BE DONE?

- Various tools are available to planners and engineers to address work zones.
- Simpler tools include the categories of sketch planning and analytic while more complex tools include regional travel demand models and general-purpose traffic simulations.
- Before selecting a specific work zone-modeling tool, there are five model selection criteria that should be considered: functionality, results, time, training and cost. Choosing a tool is generally a tradeoff among these five criteria.



THESE ARE OBJECTIVES...

The main objectives of this project are:

- Estimate delays caused by lane closures.
- Develop a computer implementation of the developed delay estimation approach.
- Develop uniform and well-accepted lane closure guidelines.
- Conduct training: In particular, develop a training program and manual for use of the software process, and train NJDOT personnel who are involved in lane closure decision making.

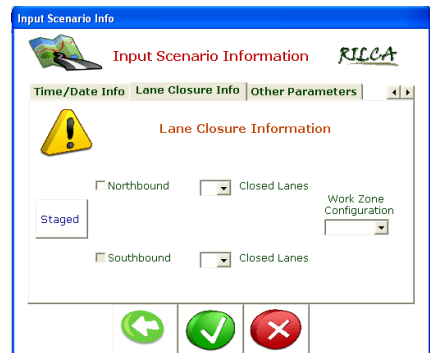
HERE IS WHAT WE DID...

A panel of experts including a number of NJDOT engineers involved in lane closure decision making discussed the specifics of the lane closure tools, the lane closure algorithm, and the available traffic count data. The panel decided that for short term lane closures, the **Rutgers Interactive Lane Closure Application (RILCA)** tool and for long term lane closures, **QuickZone** lane closure tool was selected.

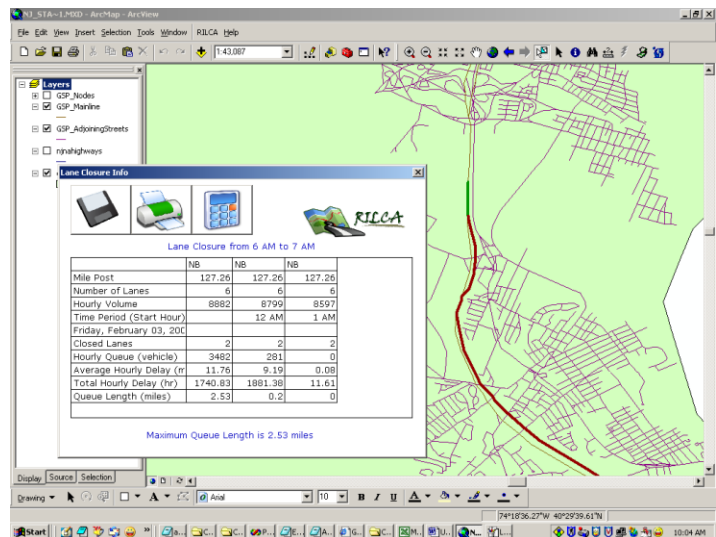
- **QuickZone**, developed by Noblis, Inc. (formerly Mitretek) is widely used by other State and local DOTs in the USA and thus it is well tested and validated. FHWA has

identified QuickZone as one of its key “ready to deploy” technologies. This presents a great advantage given the application-oriented nature of this project.

- **RILCA** is an interactive computer tool developed by Rutgers Intelligent Transportation Systems (RITS) laboratory for NJDOT for planning work zone lane closures.
- RILCA is aimed at providing engineers with a computerized and easy tool for determining allowable lane closure hours on NJ freeways.
- RILCA was developed using ArcView GIS software package as the main development environment. The GIS map of the NJ freeways and its surrounding network is displayed using ArcView and various analysis and visualization options are provided for planning of lane closure hours. It provides users the following applications:



- Volume information on selected links at a given time period on any given date.
- Link characteristics (such as number of lanes, AADT, milepost, link length).
- A function that generates lane closure schedule for selected link based on the hourly volume data processed by the RITS team.
- A simple visualization function that shows the extent of expected delays as a result of lane closure and possibility of spill back onto the upstream links all in the form of link colors.
- Integrated lane closure cost estimation function.



FOR MORE INFORMATION CONTACT:

NJDOT PROJECT MANAGER:	W. Lad Szalaj
	609-530-4569
e-mail	Lad.szalaj@dot.state.nj.us
UNIVERSITY PRINCIPAL INVESTIGATOR:	Dr. Kaan Ozbay
UNIVERSITY:	Rutgers University
PHONE NO.	(732) 445-2792
e-mail	kaan@rci.rutgers.edu

A final report is available online at:

<http://www.state.nj.us/transportation/refdata/research/>

If you would like a copy of the full report, please FAX the NJDOT, Bureau of Research, Technology Transfer Group at (609) 530-3722 or send an email to Research.Bureau@dot.state.nj.us and ask for:

Development of Uniform Standards for Allowable Lane Closure

NJDOT Research Report No: FHWA-NJ-2008-014