Florida Department of Transportation Research

# Guidelines for Activating Ramp Meters During Off-peak Hours and Weekends

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## Current Situation

Have you tried driving somewhere when a major event is happening or in close proximity to a traffic incident? If so, it's likely you've experienced what transportation agencies call "non-recurrent congestion." This congestion can be caused by traffic crashes, sporting events, work zones, adverse weather, and other unplanned or temporary conditions that disrupt traffic.

Non-recurrent congestion accounts for more than half of all congestion.

Transportation agencies have tools to manage regular, predictable congestion, like peak hour traffic, but they have not been tested for managing non-recurrent congestion?

*In a recent study, a Florida International University and University of North Florida research team developed guidelines for activating ramp meter signals during non-recurring congestion.*

Ramp metering is a common strategy to manage traffic congestion. Ramp metering signals (RMSs) at freeway on-ramps manage the frequency at which vehicles enter the ramps. RMSs are usually activated during predictable times of congestion. but they haven't typically been used for non-recurrent congestion.

Activating RMSs during non-recurrent conditions could reduce congestion on freeways, but there are no guidelines or criteria for how to use them during these situations.

## Research Objectives

This research sought to develop specific guidelines for activating RMSs during non-recurring congestion.

## Project Activities

The Florida International University and University of North Florida research team reviewed existing guidelines for deploying RMSs from several agencies, including states with guidance for non-recurrent congestion. The team then analyzed a 10-mile section of I-95 in Miami-Dade County, Florida, that included 22 RMSs. They developed guidelines for activating and deactivating RMSs in response to non-recurrent traffic incidents and adverse weather conditions on weekdays using real-time traffic and weather data. Since the RMSs are not operational on weekends, the team used a simulation approach to develop the guidelines for activating and deactivating the signals in response to incidents on weekends.

The study showed using RMSs during off-peak hours and on weekends reduced the chance of developing congestion after traffic incidents by 45% during the day and 82% at night. Similar impact was seen during moderate to heavy rains, reducing post-traffic incident congestion by 83% in the day and 97% at night. In the simulations, the study found using this strategy led to a better traffic and fewer delays when activated on the weekends.

## Project Conclusions and Benefits

The research suggested that activating RMSs during off-peak hours and weekends, as needed, would likely reduce congestion. The recommended guidelines can help agencies determine when and if they should use RMSs during periods of non-recurrent congestion.

The research team put these guidelines into a spreadsheet application designed to determine when to activate or deactivate RMSs during off-peak hours and weekends, based on prevailing traffic conditions.

For more information, please see *fdot.gov/research*.