

Best Practices for Road Weather Management

Version 2.0

City of Clearwater, Florida Weather-Related Signal Timing

The City of Clearwater, Florida operates a computerized traffic control system with 145 signals. City traffic managers have developed a unique rain preemption feature that modifies signal timing during rain events to clear traffic from Clearwater Beach, which is a prime destination for tourists visiting Orlando and Tampa Bay. Thunderstorms typically occur in the afternoon, causing significant sudden increases in traffic exiting the beach via the Memorial Causeway (i.e., State Route 60), which is shown in the figure.

System Components: An electric rain gauge is mounted on top of a traffic signal pole near the beach and connected to the signal controller. Vehicle detectors on the causeway are used to measure the length of traffic queues on inbound lanes. A twisted pair cable communication system connects the rain gauge, vehicle detectors, and controllers to a signal system computer at the City's Traffic Operations Center (TOC).

System Operations: During peak beach hours, the central computer activates the rain gauge with a time-of-day command. When the rain gauge senses a predetermined rainfall amount, the signal system computer issues a preemption command to 14 downtown traffic signals along the Route 60 corridor. These signal controllers execute new timing plans with longer green times for inbound approaches. The computer selects the appropriate timing plan based upon traffic volumes. When the volume returns to normal levels, the central computer restores normal signal timing plans.

Transportation Outcome: By modifying traffic signal timing in response to rain events, the signal system computer prevents traffic congestion and enhances roadway mobility.



City of Clearwater, FL Map

Implementation Issues: The City of Clearwater was one of the first jurisdictions to deploy an Urban Traffic Control System (UTCS) with the assistance of federal funds. The UTCS included preemption features for drawbridges and railroad crossings. City personnel assessed localized conditions, observed driver behavior during thunderstorms, and determined that a similar feature could be implemented for rain events affecting Clearwater Beach. The City's signal technicians installed a commercially available rain gauge at an intersection that is adjacent to a parking garage used by beach visitors. The signal system engineer modified existing UTCS preemption algorithms to alter signal timing based upon rainfall and traffic volume data.

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In 2003 the City's central UTCS will be upgraded from a mainframe computer system to a PC-based system to support adaptive signal control as part of a county-wide, federally-funded Congestion Mitigation and Air Quality project. Closed Circuit Television cameras and Dynamic Message Signs will also be installed on the City's primary corridors to facilitate more efficient incident management and timely dissemination of traveler information. Pinellas County will operate a TOC and utilize a Wide Area Network to facilitate data sharing between the county TOC and TOCs located in the cities of Clearwater and St. Petersburg.

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