



## Project Number

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## Prioritized Safety Consideration by Work Zone Types and Pilot Implementation

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### Current Situation

With Florida's continuing development and a roadway network that is both growing and aging, work zones are becoming more common. With this increase in work zones comes an increase in work-zone-related crashes. Despite signage and various warning systems, vehicles still enter work zones or make sudden maneuvers to avoid them, which could result in injury or death for both Florida workers and drivers. The increasing electronic infrastructure that monitors, advises, and signals traffic on Florida roadways, i.e., Intelligent Traffic Systems, makes possible new methods of protecting both workers and drivers near work zones. These Smart Work Zone (SWZ) concepts have been limited primarily to limited access roadways, but as ITS spreads to arterials, SWZ concepts become possible on these heavily used roads.

### Research Objectives

University of South Florida researchers evaluated the effectiveness of SWZ applications in improving work zone safety on arterials for three work zone features: lane closure, lane shift, and work on shoulder or median.

### Project Activities

The research team focused on safety interventions to reduce driver behaviors known to cause incidents near work zones: fast driving; high variance among vehicle speeds; sudden decelerations; and sudden lane changes. They investigated the effectiveness of four interventions and their combinations: the active work zone awareness device (AWAD), a trailer that displays an approaching driver's speed next to a warning sign; arrow boards, that signal a lane change; presence of stationary law enforcement vehicles with flashing blue lights (LE); and connected vehicle technologies that can deliver safety messages directly to properly equipped vehicles (CVT); as well as combinations of these methods.

The research team consulted with FDOT staff to select seven work zone sites on busy arterials that covered different work zone types, roadway types, and traffic conditions. For each pilot study site, the research team collected data at two positions: upstream of the work zone where SWZ applications were deployed and at work zones when workers were present. Driver behavior was evaluated before and after implementation of safety measures by collecting vehicle speed data on each lane using electronic monitoring and by collecting data on traffic conditions, traffic signal status, and driving behaviors using video cameras.

Generally, AWAD showed consistent effectiveness in reducing risky driver behaviors. The effect was increased when combined with LE. The researchers recommended that AWAD use be standardized by FDOT for routine use on Florida roads. They note the additional effectiveness of LE and advise that it should be added to AWAD presence regularly to maintain the effectiveness of AWAD. CVT showed little effect, probably because few vehicles were properly equipped and using the specific app needed to receive the messages. However, as CVT becomes more widespread, it can be expected to play a positive role in work zone safety.

### Project Benefits

This project demonstrates that with the use of the right Smart Work Zone applications, significant changes in driver behavior near work zones can be achieved.

*For more information, please see [www.fdot.gov/research/](http://www.fdot.gov/research/).*



*Work zones on arterials with a lane closure are one situation where workers and drivers are at extra risk.*