Florida Department of Transportation Research

Evaluation of Warning Lights on Maintenance of Traffic Devices and Development of Possible Alternatives
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Orange plastic drums are common on Florida roadways, warning motorists and guiding them safely through work zones. The orange color is mandated by the Manual on Uniform Traffic Control Devices, which also requires that drums bear retroreflective white and orange sheeting when used at night. But Florida also requires warning lights on channelizing devices and temporary barriers. Past studies have shown that warning lights aid driver detection of safety devices, but more recent work, following introduction of high-intensity retroreflective materials, which are brighter at greater distances, has brought into question continued use of warning lights.

Texas Transportation Institute (TTI) researchers examined the effectiveness of warning lights. The study had two objectives: evaluate warning lights in work zones on temporary traffic control devices and temporary barrier walls; and evaluate temporary barrier wall delineation alternatives. The researchers examined the performance of retroreflective sheeting and warning lights under adverse conditions.

The researchers reviewed previous research and existing state policies regarding the use of steady-burn warning lights and temporary barrier wall delineation. They developed standards for characterizing attributes of steady-burn warning lights and channelizing device retroreflectivity under field conditions, including fog, dew and dirt, misalignment of lights, and headlamp illumination.

The fog conditions needed for testing were not frequent enough in the field, so the researchers created fog in a laboratory setting to measure luminance of retroreflective sheeting and the luminance of a steady-burn warning light under varying levels of fog. These studies suggested that warning lights would offer a relative visibility benefit only under the most unlikely natural visibility conditions.

Orange drums guide drivers through this work zone. Each drum is required to have retroreflective sheeting and a warning light.

Among other studied effects, dew reduced drum luminance up to 84 percent. Dirt significantly affected the luminance of the older type of retroreflective, high-intensity sheeting, but had much less effect on luminance of the newer, prismatic sheeting. The researchers found that most warning lights were misaligned, which reduced their luminance.

To determine the effect of warning lights on older driver perception and behavior in work zones, the researchers conducted a human factors study. Older drivers drove active construction projects in an instrumented vehicle and were evaluated based on tracked eye glances, lane keeping, and their opinions. While the drivers generally expressed a preference for the warning lights, in practice, they never noticed if the lights were present during the test run. Based on this and other study findings, the researchers recommended that steady-burn warning lights should no longer be required.

The results of this study add to the knowledge that makes Florida highways safer for all its drivers and workers. Dropping the requirement for warning lights can save the Florida Department of Transportation time and money.

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