Texas Department of Transportation

Texas A&M Transportation Institute

PROJECT SUMMARY REPORT

# 0-7138: Assess Driver Distraction in an Era of Rapid Technological Change for Digital Advertising Billboards

## Background

Outdoor advertising signs impact millions of travelers around the world every day. These signs are designed to attract driver attention, thus taking it away from the driving task. Driver inattention and distraction are two critical factors for road safety. Regulation of outdoor advertising signs must deal with changing technologies, including digital billboards, which allow for modifications to sign illumination, motion, and content (Figure 1). Regulations are not keeping pace with changing sign trends and must be updated to address potential impacts on road user safety.


**Figure 1. Illuminated Digital Billboard (Photograph Modified to Remove Logos and Phone Number).**

## What the Researchers Did

This research project focused on the degree of driver distraction caused by typical and digital advertising signs and potential safety impacts of that distraction. The project included a comprehensive state-of-the-practice review, crash investigation, and on-road human factors evaluation. The research team located each of the digital billboards in Texas and used those locations in the crash investigation and human factors site selection process.

The human factors evaluation took place in Amarillo, Arlington, Killeen, and San Antonio. A total of 85 participants drove an instrumented Texas A&M Transportation Institute (TTI) vehicle around the study route while their eye-gazing behavior was monitored. The research team used the eye-tracking data to determine how often and for how long the participants looked at different types of signing along the study route. At the completion of their drive, the participants completed a closeout survey, which gathered feedback on digital and standard billboards. The research team also evaluated the nighttime lighting levels of digital and standard billboards along the human factors evaluation route.

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Texas A&M Transportation Institute and
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## What They Found

The state-of-practice review found varying levels or regulations governing digital billboards. There is limited federal guidance, resulting in many state and local agencies trying to develop their own regulations. These regulations often try to limit conversion of standard billboards to digital, establish minimum spacings between digital billboards, and require dimming of the signs at night. Some jurisdictions have not allowed off-premise digital billboards but are limited on what they can do to on-premise digital signing

The proximity of the sign, whether digital or standard, to the roadway impacted how often the signs were looked at. Signs closer to the road drew more looks than those further away. Signs in less visually complex environments were looked at more often than signs in more complex environments. The findings of this study suggest that digital billboards are looked at more often and for longer durations than standard billboards. Although this type of advertising might attract more and longer looks and benefit advertisers, it might have adverse traffic safety effects. Numerous studies have shown that taking eyes off the roadway significantly increases the risk of crashes and incidents. The safety evaluation portion of the study did see some minor impacts on crashes but no statistically significant crash impacts.

Digital signing that is too bright might cause glare or disability glare to drivers, especially older drivers. This glare could prevent critical information such as warning, guide, and advisory signs from being seen for both younger and older drivers. The research team found both on- and off-premise signing that was very bright. Many of the observed off-premise digital billboards were typically within a more reasonable range of brightness levels compared to on-premise digital signs. The digital billboards were typically brighter than standard illuminated billboards. The driving study close-out survey gathered many responses from participants that indicated sign brightness was a concern.

## What This Means

The research team used the study findings to make recommendations and provide guidance to better regulate digital billboards to minimize negative impacts on safety to the traveling public. Agencies can use the research to support efforts to improve regulation of both standard and digital billboards. Improved regulation should result in a safer driving environment. The research team also recommended additional areas where research or regulation may be needed concerning digital signing. Addressing additional areas such as digital on-premise signage is needed to reduce distraction caused by these types of signs.


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