

## Primer on Digital and Projected Advertising Displays: Regulatory and Road Safety Assessment



Photo: G. Forbes



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Digital and projected advertising displays (DPADs) illuminated with light-emitting diodes (LEDs) are a rapidly emerging form of roadside advertising that differ from static advertising signs in terms of their brightness and ability to display content dynamically. Most jurisdictions' sign by-laws were crafted prior to the widespread use of DPADs and the significant increase in DPAD permit applications is exposing a substantial gap in current by-laws and regulations.

Advertising is a form of expression which is considered a fundamental freedom under the Canadian Charter of Rights and Freedoms. It is a non-essential type of roadside information concerning the driving task and inherently increases collision risk by distracting drivers. Therefore jurisdictions must balance the freedom to advertise with the potential increase in crashes.

### **Distracting Effects of DPADs**

Roadside advertisements are a source of driver distraction. The distracting elements of these signs primarily include their size, luminance, content, and location. Prior to the early 2000s, these advertisements were often signs with static messages that were sometimes front- or back-lit. Most jurisdictions have regulated static advertising signs for decades and there is a general satisfaction or acceptance about their road safety impacts. The brightness of DPADs and their ability to show high-resolution video

are raising concern about their road safety impacts regarding driver distraction. Many jurisdictions are now seeking to revise their roadside advertising by-laws and regulations, particularly from a road safety perspective, to reflect this new technology.

Roadside advertising signs can be categorized as either on-premise or off-premise. Essentially, the former refers to signs displaying first-party content and the latter refers to signs displaying third-party content. On-premise sign owners are typically sensitive to sign spacing limits and less sensitive to minimum frame duration limits. Conversely, off-premise sign owners are typically sensitive to minimum frame duration limits and less sensitive to sign spacing.

Despite years of research there have been no definitive conclusions about the presence or strength of adverse safety impacts of DPADs measured by increased collision frequency. This uncertainty undermines the understanding of cause and effect relationship between various DPAD characteristics (e.g., brightness, animation, frame duration, etc.) and road safety (e.g., changes in collision frequency). Guiding principles can help address this uncertainty and provide a mechanism for controlling the road safety impact of DPADs to similar levels as more traditional static advertising signs.

## Guiding Principles

### Safety

Public safety should be the primary concern of a jurisdiction and road safety professional. Regulations and by-laws should control the distracting effects of DPADs to limit the increase in collision risk.

### Consistency

DPADs should emulate static advertising signs such that they are perceived by drivers as static signs. This can help ensure that the road safety impacts of DPADs are similar to the impacts of static signs.

### Specificity

DPAD by-laws and regulations should only pertain to issues unique to DPADs and not issues that are common to all advertising signs. This recognizes that there are existing advertising sign by-laws and regulations that can be applied to DPADs.

### Evidence-based

DPAD by-laws and regulations should be scientifically supported and sensitive to local conditions as much as possible. This helps jurisdictions defend their policies, encourages jurisdictions to follow best practices, and recognizes that a rigid, one-size-fits-all approach to regulating DPADs is unlikely to be effective.



Example of an off-premise DPAD.  
This type of DPAD is a billboard.

Photo: MORR Transportation Consulting



Example of an on-premise DPAD.  
This type of DPAD is a message centre.

Photo: MORR Transportation Consulting



Example of text scrolling.

Photo: MORR Transportation Consulting

## Pragmatism

Regulations should be practical and recognize a jurisdiction's resources and capabilities for enforcing by-laws and regulations.

## Considerations for Consistent Practice

DPAD by-laws and regulations should encourage consistent practice and promote transparency, reasonableness, and flexibility when evaluating permit applications. Considerations for consistent practice should include the lateral placement of DPADs, the method for measuring sight distance to a DPAD, differentiating between on- and off-premise DPADs, and defining the maximum number of DPADs permitted within a driver's field of view.

### Lateral Placement of DPADs

Jurisdictions can require DPADs to be within or outside a driver's cone of vision. In general, the former increases glance frequency to the DPAD, reduces glance duration, and increases the probability of a driver detecting the DPAD. The latter decreases glance frequency, increases glance duration, and decreases the probability of a driver detecting the DPAD.

### Measuring Sight Distance to DPADs

Sight distance can be calculated using engineering or human factors methods. The human factors method calculates sight distance as a function of reading time and sign legibility. It is more scientific than the engineering method and explicitly considers a driver's interaction with a DPAD; however, these sight distances can be difficult to calculate and can vary significantly based on season (e.g., tree foliage in the summer can reduce sight distance compared to winter) and sign content (e.g., a single DPAD may have several messages, each with a different sight distance). The engineering method uses stopping sight distance (SSD) or decision sight distance (DSD) as a proxy for determining the sight distance to a DPAD. It is a pragmatic approach that is simpler to calculate and can be applied more consistently.

### Differentiating Between On- and Off-Premise DPADs

Generally, the distracting effects of on- and off-premise DPAD functional capabilities (e.g., brightness, frame duration, animation) are the same. However, the sensitivity of on- and off-premise DPAD owners to frame duration and spacing are different. Differentiating on- and off-premise DPADs can simultaneously accommodate both types of owners while mitigating road safety risks.

### Maximum Number of DPADs within a Driver's Field of View

The maximum number of DPADs within a driver's field of view is a policy decision to be made by each jurisdiction individually. It represents the theoretical number of frame changes a driver will observe in their field of view and addresses the issue of the



Example of a DPAD behind a traffic signal.

Photo: MORR Transportation Consulting



Example of scrambling text as a transition effect.

Photo: MORR Transportation Consulting

systemic effects of DPAD distraction (as opposed to the distraction effects of an individual sign).

## ***Safety Regulations for DPADs***

There are ten aspects of DPADs that jurisdictions should consider regulating from a road safety perspective. Six of these concern intrinsic properties of DPADs and four concern their location.

Intrinsic DPAD characteristics to regulate are:

- Minimum on-premise DPAD frame duration
- Minimum off-premise DPAD frame duration
- Transition time between frames and transition effects
- Message sequencing and text scrolling
- Brightness
- Animation

The placement of DPADs should be regulated concerning the following:

- Maximum on-premise DPAD density
- Minimum off-premise DPAD spacing
- Proximity to traffic control devices
- Proximity to key decision making points

The direct road safety impacts of both intrinsic and placement aspects, particularly combinations of different aspects in various contextual situations, is unknown. Future research is necessary to more precisely and accurately quantify the change in collisions due to different types and locations of DPADs. The application of guiding principles in regulating DPADs to emulate static signs can help ensure that the road safety impact of DPADs is similar to static signs.

## **More information**

The information in this primer is extracted from a Transportation Association of Canada publication, entitled *Digital and Projected Advertising Displays: Regulatory and Road Safety Assessment Guidelines*. These guidelines are intended to assist jurisdictions in developing their own regulations concerning digital and projected advertising displays (DPADs), evaluating DPAD permit applications, and assessing the potential road safety impact of DPADs. They provide recommendations that are designed to control DPADs such that they emulate static advertising signs and therefore result in a similar distracting and road safety effect as static advertisements. This publication is available for purchase in TAC's online bookstore.

## **Disclaimer**

Every effort has been made to ensure that all information in this primer is accurate and up-to-date. The Transportation Association of Canada assumes no responsibility for errors or omissions. The primer does not reflect a technical or policy position of TAC.

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