

The Regulation of Signage: Guidelines for Local Regulation of Digital On-Premise Signs

Menelaos Triantafillou – University of Cincinnati

Alan C. Weinstein – Cleveland State University

Introduction

Advancements in technology and their application to signage have been a constant in the evolution of signs, their design, and their role in defining physical places. Parallel to this, with each successive application of new technology to new signs – internal/external lighting, backlit awnings, and currently digital sign technology or electronic message centers -- local governments have found themselves unable to understand the new sign technology or the specifics of how to regulate the new types of signs it allowed. Eventually, during the first phase of the use of new technologies, sign regulations are amended to impose various restrictions on the new type of signs. During subsequent phases, a more balanced picture emerges because more knowledge about the new technology becomes available, the sign industry provides more options and technical specifications to address community concerns and meet statutory standards, and local governments gain experience with regulating these new signs,.

Perhaps there are no better places that illustrate the evolution in sign design, specifically lighting and graphics, and the integration of new sign technology in a concentrated district than Times Square in New York City and “The Strip” in Las Vegas. Even though these districts do not resemble the typical American commercial strip, their current visual character is the result of the evolution of new technology in the design of signage and its use in a very defined space.

In the 1890’s, the introduction of incandescent light bulbs made the electrification of Broadway possible and began to give a new aesthetic to New York’s theater district and Times Square. The first electrically-illuminated sign appeared in Times Square 1892 and was an advertisement for a Coney Island resort. Signs illuminated with light bulbs replaced the previous hand painted wooden billboards that

were primarily textual in nature, similar to signs that are the average preference for Main Street-type historic places. Times Square became known as “The Great White Way” due to its saturation of electric billboards and signs in theater marquees, restaurants, and shops. There were many negative reactions to the use of this new technology that added colorful lighting displays to the content of building signs and billboards. The concentration of specific land uses, the theaters, and the location of the square were driving the continuous need for exciting signs. New advances in technology fed the need for inventing new creative graphics. Gradually, the current character of Times Square emerged, but each time technology made it possible to invent a new sign, opposition by New Yorkers resulted in regulatory responses. Finally, in 1987, a comprehensive signage ordinance was enacted to regulate billboards on buildings.

Today, Times Square and the Las Vegas “Strip” contain some of the world’s largest signs and the new technology of Electronic Message Centers is defining a new era of exciting graphics, messaging, and place definition making these two districts unlike any other place in the world. With the collaboration of the sign industry, the businesses, the regulators and the elected officials, both Times Square and “The Strip” have evolved into unique districts with a distinctive character.

But how much of this new sign technology can – or should be – adapted to the rest of the country -- to “Mainstreet USA”? And, what are the appropriate regulatory options for local governments to consider when businesses and sign companies seek to introduce this technology in their communities? These questions are the focus of this session.

New Technology

Currently, the concern with the applications and regulation of on-premise digital sign technology is in its initial phase, marked by confusion among the planning and zoning community both as to how these signs work and how they can and should be regulated. Further adding to the confusion is the fact that the technology is evolving rapidly, offering exciting possibilities for new types of sign displays in exterior and interior environments. For example, during the opening ceremonies of the 2008

Beijing Olympics, the floor of the stadium was equipped with a 3000 sq m video digital screen that used very similar type LED technology.

Technically, digital signs are a more complex and graphically versatile technology than what planners are used to: internally or externally illuminated signs that present a fixed message. Rather than using incandescent lamps or fluorescent tubes as a light source, digital signs use light-emitting diodes (LEDs), a semiconductor-based light source. LEDs transmit across the visible, ultraviolet and infrared wavelengths, and can generate very bright colors. According to Wikipedia, when a light-emitting diode is forward biased (switched on), electrons are able to recombine with holes within the device, releasing energy in the form of photons. This effect is called electroluminescence and the color of the light (corresponding to the energy of the photon) is determined by the energy gap of the semiconductor. An LED is usually small in area (less than 1 mm²), and integrated optical components are used to shape its radiation pattern and assist in reflection.

Key Issues with LED Signage

Digital sign manufacturers operate at the national level and that makes it difficult for local planners to have direct access to the technology before an application for a sign permit is made through a local sign company. In addition, there are no national standards for the production of digital signs; however, the sign industry, through the International Sign Association, is working with various states to develop such standards. In short, digital signs present planners with the question of how to regulate a type of sign that uses a new technology and is dynamic, rather than the static signs to which they are accustomed ... and there is little guidance to answer that question. Thus, local government is asked to issue a permit for something it does not understand.

Assuming the local government does not have any regulations that are specific for digital sign technology, what does it do? Usually it will copy another community's requirements. But how were those regulations developed? Most local governments have limited experience with LED signs, mainly from electronic billboards on highways, a small number of electronic message centers signs in commercial areas, and signs embedded in the monument signs of houses of worship and administration

buildings. In fact, most of the reaction to digital signs from APA and other groups is focused on the off-premise digital billboards with many studies looking at the issue of driver's safety when reading the bright and changeable billboard messages. Research by the Federal Highway Administration and the Transportation Research Board has been examining digital signs along highways. In addition, APA has reviewed a few communities that have enacted amendments to their sign codes to address digital signs, mainly focusing on digital billboards. These studies do not directly help the local planner and zoning regulator with the enactment of local regulations to manage on-premise LED-based signs. Specific knowledge from research of commercial environments at the local level where digital signs will need to be incorporated into the existing signs and visual character is not yet available. That said, the International Sign Association has been funding research to address key aspects of digital signs and is working with the States to develop standards.

Electronic Message Center Sign Luminance

An important question is: What level of digital sign brightness is acceptable at night? Many local sign ordinances include standards and guidelines for commercial signs that employ a variety of light source types (fluorescent, neon, incandescent and high intensity discharge such as mercury, metal halide or high pressure sodium). These signs have a fixed message. The lamps inside the sign illuminate letters or symbols that do not have the ability to change what is displayed on the sign: a graphic that was approved by the building/zoning department. In these signs, the only change possible is through switching on or off or dimming certain parts of the sign.

Digital signs, on the other hand, use LEDs and the sign face consists of a multitude of closely spaced dots of pixels or light elements similar to a television screen. These signs are controlled by a computer and their message can change and be displayed as a colored image on the sign's face. As a result, the brightness of the displayed image changes according to the program that drives it and the sign can produce varying levels of luminance. Consequently, the regulation of lighting limits will depend on the signage graphic display program, its location within an environmental zone (*i.e.* dense urban areas where there is much electric light as opposed to 'darker'

suburban and exurban areas), the size of the sign, and the distance from which it is seen.

At present, most communities that regulate the luminance of on-premise digital signs have merely copied the standards that have been previously applied to digital billboards. Typically, these currently call for a maximum luminance of 5000 nits during daylight hours and 500 nits at night; however, the daylight luminance will likely be increasing to 7,500 nits based on discussions between the off-premise industry and the federal government.

Methodologies are being developed that will allow to compute new maximum levels of luminance depending on the factors explained, and their placement and proximity to residential areas.

Changing Display Message and/or Image

The programmable change of messages and/or images in a combination with vivid colors and graphics makes digital signs unique. Digital signs have the ability to accommodate any changing display pattern through the computer program that drives them and turn on and off color and brightness to compose new images. Static signs do not change their message and/or image. Most sign ordinances do not permit flashing signs or 'light movement' on the sign. A key question with digital signs is: Should the number of changes in the display be regulated? If yes, how do we establish a practical and defensible number? What should the time interval (in seconds) be between each successive display frame? Currently, there are no unified standards among the local sign ordinances that have been amended to accommodate digital signs. Of the ordinances sampled/referenced, most have considered the research done for billboards and have focused on driver distraction from changing messages. Approaches range from a complete ban on digitally changing graphics to the use of arbitrary guidelines and standards. Currently, many communities have adopted an 8 second static image requirement derived from an interim guidance recommendation issued by the federal government that governs off premise advertising signs/ billboards.

. However, as was pointed out, local commercial areas where on-premise signs are installed and are regulated are different than highways where off-premise billboards are located.

Digital Display Sign Size, Height, and Placement

Sign size and height have been key considerations of sign regulations. Almost all existing sign regulations have provisions for sign size that arbitrarily set total sign area without considering driving speeds, the driver's cone of vision, the sight distance needed to read a sign, or reaction time after the sign is read to make a decision to turn. The United States Sign Council has conducted considerable research on these issues and has developed standards and guidelines to address them effectively. In addition the Council has developed guidelines to be used to determine size of lettering so that it can be detected by the driver. On-premise digital signs need to be regulated on the basis of the standards and guidelines developed by the United States Sign Council and we will provide recommendations on how to address these and other issues with regard to the regulation of on-premise digital signs discussed during this session.

Current Practice

Based on a recent survey of numerous jurisdictions by one of the authors, the most common regulatory provisions applicable to digital on-premise signs appear below:

- Require that the sign display remain static for a minimum of 5- 8 seconds and require “instantaneous” change of the display; *i.e.*, no “fading” in/out of the message.
- Prohibit scrolling and animation outside of unique – and mostly pedestrian-oriented – locations.
- Limit brightness to 5,000 nits during daylight and 500 nits at night.
- Require automatic brightness control keyed to ambient light levels.
- Require display to go dark if there is a malfunction.
- Specify distancing requirements from areas zoned for residential use and/or prohibit orientation of s sign face towards an area zoned for residential use.

Opportunities for the Use of LED On-Premise Signage in the Local Commercial District

At the local commercial district or arterial strip the character of the environment and the driving speed are different than the highway where billboards are mostly located. The regulation of billboards at the local commercial districts varies from State to State and it is not really relevant to the regulation of on-premise signs. A typical commercial area already has many signs dispersed throughout a very loose mix of mostly freestanding buildings, parking lots, and utility poles and wires. Its character, including signage, evolved over a long period of time. The focus on the new technology and signs cannot ignore the existing spatial arrangements and the relationship with existing signs. Regulations will need to be applied in concert with the total environment, not by isolating these new signs. If planners were to apply a comprehensive approach to the management of signage, regulations for on-premise digital signs will be more effective and can also provide a way to 'visually decongest' existing strip commercial areas from ill-placed and ineffective signs.

Planners also need to consider differing approaches to digital signs for different types of zoning districts. What may be appropriate in a regional commercial district may well be "too little" signage for a downtown entertainment or sports arena district and "too much" for a neighborhood commercial district. In this regard, planners may want to consider using the "character areas" approach of the SFI Model Sign Code as a guide to the development of digital sign regulations that are tailored to specific zoning districts, as suggested below.

Character Area	Motion Limitation	Size Limitation		Could Apply to Part of Character Area
		EMCs as a Maximum % of the Total Sign Area Permitted on the Site	EMCs as a Maximum % of a Single Sign	
Downtown	8 seconds to Unlimited	30% to 100%	100%	Yes
Small Commercial - Suburban	8 seconds	30% to 50%	67%	No
General Commercial	8 seconds to Unlimited	30 % to 50%	80%	Yes
Highway Commercial (1)	8 seconds	30 % to 50%	80% to 100%	No
Mixed Use	8 seconds to 1 second	15% to 30%	50% to 80%	No
Offices	8 seconds to 1 second	15% to 30%	50% to 67%	No (2)
Industrial	8 seconds to Unlimited	30% to 50%	50% to 80%	No (2)

(1) Assumes that Highway Commercial is a relatively small geographic area focused at a highway interchange

(2) Harder to make distinctions among various locations in the office and industrial zone.