



Dear TxDOT Right of Way Division:

Ms. Margaret Lloyd, Vice President of Scenic Texas, recently provided me with several documents pertaining to proposed rule changes regarding outdoor advertising signs. Ms. Lloyd asked me for my professional opinion about the merits of this proposed change and the strength of the underlying research. My opinions in this matter are contained in this brief report. Please feel free to contact me if I can provide additional information or clarification.

This report contains my written comments concerning the proposed rulemaking. In accordance with Transportation Code, §201-811 (a) (5), I declare that I do not do business with the department, I do not stand to benefit monetarily from the proposed amendments, and I am not an employee of the department.

Documents provided and reviewed:

1. Texas Transportation Commission Minute Order, dated may 29, 2014, 1 page.
2. Texas Department of Transportation - Right of Way, marked Exhibit A, dated May 23, 2014, 7 pages.
3. Texas Department of Transportation - Right of Way, marked Exhibit B, dated May 23, 2014, 8 pages.
4. Texas Department of Transportation - Right of Way, marked Exhibit C, dated May 23, 2014, 4 pages.
5. "The Right Sign for Your Business," by the International Sign Association, dated May 20, 2014, 2 pages.
6. "Research Based Approach to: Sign Size, Sign Legibility, Sign height" by the United States Sign Council, USSC, 2 pages, September 1, 2009 (although note the copyright date of 2003). Only "Page 7 - Vertical Offset or Sign Height" and an unnumbered page headed "Detection...Conclusion" were included.
7. "On-Premise Signs Guideline Standards. Research Based Approach to: Sign Size, Sign Legibility, Sign Height" by the United States Sign Council (USSC), authored by Andrew D. Bertucci. Undated, although © 2003, 39 pages.
8. Email from Tim Cunningham to Margaret Lloyd, dated June 11, 2014, in response to Ms. Lloyd's request for "all of the scientific studies..."

## **MY BACKGROUND AND QUALIFICATIONS:**

Before addressing this proposed rulemaking, the studies relied upon, and my opinions in this matter, I have provided below a brief overview of my qualifications to review this material and render an expert conclusion.

I am a human factors/engineering psychologist with more than 40 years of experience in the area of human performance in fields as diverse as highway safety, nuclear power plant operations, and aerospace.

I was employed as a Research Psychologist by the Federal Highway Administration (FHWA) for 11 years, and during that time I directed the agency's Highway Aesthetics Laboratory, established as a result of the Highway Beautification Act (HBA). I was the senior author of FHWA's first report on the safety aspects of digital billboards, which I named "Commercial Electronic Variable Message Signs (CEVMS). That report, published in 1980, was judged the Outstanding Technical Achievement of the Year by FHWA, and was cited in an Amicus brief filed with the U.S. Supreme Court by the U.S. Department of Justice.

Since retiring from Government service, the consulting firm that I established, The Veridian Group, Inc., has served to advise and assist State, County and local Governments, as well as billboard owners and operators, in matters of driver and traffic safety. I have testified as an expert witness in numerous jurisdictions throughout the U.S., and have never been denied qualification as an expert.

I am a Fellow of the Human Factors and Ergonomics Society (HFES), a Certified Professional Ergonomist, and a Member Emeritus of the Transportation Research Board (TRB). I currently serve as Chair of TRB's Digital Billboards Subcommittee.

I have given invited presentations on the subject of roadside digital signage in several countries, and authored numerous peer-reviewed publications on this topic. I also serve as a reviewer for several prestigious professional journals and conferences.

I believe that I am eminently qualified to address the question that has been posed to me.

## **THE ISSUE.**

As I understand it, the Texas Transportation Commission (Commission) issued a "Minute Order" on May 29, 2014, in which it proposed several rule changes regarding the control and regulation of outdoor advertising along interstate and primary roads. One of the proposed changes concerns the permitted height of such billboards; i.e. the rule change to Chapter 21, Subchapter I, Section 21.189(a) would change the maximum sign height from 42.5 ft, to 65 ft. This change is based, at least in part, on "scientific studies indicating that to have a functional viewing distance at 60-70 mph a sign should have approximately 65 feet of vertical offset."

## **TxDOT'S MISAPPLICATION OF THE CITED RESEARCH.**

There are two principal forms of outdoor advertising visible to motorists traveling on interstate and primary routes. The first type is the *off-premise* advertising sign, commonly referred to as a *billboard*. The second type is the *on-premise* sign. The two types of signs serve two completely different purposes and hence are controlled or regulated quite differently. On-premise signs, as their name implies, typically announce the name of the business or service that is conducted on the premises on which the sign is located. They serve a purpose not unlike that of an official Tourist Oriented Destination (TOD) sign - i.e. they help the motorist to identify and locate the business and therefore assist in the driver's guidance or wayfinding task. On-premise signs are not regulated via the Highway Beautification Act; rather they are governed by local zoning codes, if at all.

Off-premise signs (billboards), conversely, do not serve the same purpose. They are not located on the same premises as that in which the business or service being advertised is conducted, and hence generally do not serve the same purpose of wayfinding that may be provided by an on-premise sign. Indeed, billboards commonly advertise products or services but serve no immediate guidance or wayfinding purpose - e.g. ads for movies, new cars, credit cards, or attorneys, to name a few. Billboards erected and operated along federal highways are regulated in accordance with the Highway Beautification Act (HBA) and through Federal-State agreements entered into as a result of the HBA.

Within the United States, the on-premise signage industry is represented by two major organizations, which often collaborate on projects: the United States Sign Council (USSC) and the International Sign Association (ISA). Conversely, the off-premise (billboard) industry is represented by the Outdoor Advertising Association of America (OAAA). Because of the different purposes served by off- and on-premise signs, there is little overlap or collaboration between the two industries, despite the fact the their signage products increasingly employ the same technology - that of light emitting diodes, or LEDs, which permit remote and instantaneous change.

The studies relied upon by TxDOT were sponsored, conducted, and published by the USSC, with the intent of application specifically to on-premise signs. There is nothing in these three documents to suggest or imply that the recommendations made are, or should be, applicable to roadside billboards.

Because on-premise signs may experience more constraints in location and placement than billboards, arguments about sign size, legibility, and height that the industry believes should be applicable to such signs are inappropriate when applied to billboards.

For this reason alone, I believe that TxDOT is unjustified in relying upon the recommendations contained in these documents to billboards.

## **APPROPRIATENESS OF THE TxDOT CITATIONS TO THE SCIENTIFIC STUDIES.**

Although a TxDOT representative provided Ms. Lloyd with three PDF documents claimed to be responsive to her request for *all of the scientific studies relied upon* by TxDOT in its proposed rulemaking, a review of the three documents demonstrates that only one (Ref. 7 above) can be considered a "scientific study." Reference #5, "The Right Sign for Your Business," as provided in response to Ms. Lloyd's request, clearly does not meet the requirement of being a scientific study because:

It is but a fragment of a larger report that was *not* provided. Note that it contains only two unnumbered pages, and two tables –labeled Table 4 and Table 5, demonstrating that there is more to this report than was provided by TxDOT.

There is no research, and no reference to any research (with one exception) contained in this report. There is merely a series of self-serving recommendations meant to provide a basis for signs that are as large, as bright, and as tall as they can possibly be. I further note that the single research citation is to a paper prepared by Mr. Richard N. Schwab. I have known Mr. Schwab for 40 years; I worked with and for him at FHWA. I respect him and his work, but the paper cited in the provided document is not research – it is simply an opinion piece prepared by Mr. Schwab under contract to the signage industry.

The assumptions made that form the basis of the recommendations in this report excerpt are simply erroneous, and, in some cases absurd. Here are but two examples.

The report states: "Experts recommend designing signs with letters a minimum of one-inch tall for every twenty-five of distance." This is simply untrue. FHWA, in its Manual of Uniform Traffic Control Devices (MUTCD) previously recommended one inch of letter height to 40 ft of distance. To accommodate the aging U.S. population, that recommendation was recently changed to one inch of letter height to 30 ft of distance. It is not, and never has been, 25 ft.

The report bases its "required legibility distances" (which in turn drives its recommendations for sign size and height) on "how far a car at different speeds will travel from the time a driver first sees the sign *until the car safely comes to a stop*" (italics mine). It is patently absurd to assume, and to incorporate into guidance, that a driver, traveling at freeway speeds, will actually stop on the roadway because the driver has read an advertising sign. Can TxDOT find some justification for including stopping sight distance in its determination of the size and height that should be permitted for roadside billboards?

The claims made in the document (at least in the two isolated pages provided) are offered with no research basis.

For example, the report states: "Table 5 sets out generally accepted sign height guidelines." But no such basis is provided for this "general acceptance." There is certainly no acceptance from FHWA, which, through the MUTCD, sets out both minimum and maximum height guidelines for official traffic control signs (including regulatory, warning, and guidance signs), which all can agree deserve a greater precedence for roadside signage visible to drivers than do advertising signs. The authors state: "Freeway signs intended to be read from great distances should be very tall." We already know that these "great distances" include the provision for the driver viewing the sign to come to a complete stop (on the freeway).

But there is another factor to consider here. The MUTCD lays out in great detail the required size and height for signs that are intended to convey direct traffic-safety related messages. The very largest signs recommended in the MUTCD do not exceed 124 sq. ft., and the very tallest do not exceed 17 ft above the roadway grade. Can the authors of this report excerpt justify the need for advertising signs that are nearly five times taller than official highway signs? Can TxDOT make such a justification? If so, it should be spelled out.

In another ISA document<sup>1</sup> (not provided in support of this proposed rules change) the organization lists a series of "position statements" which represent "ISA's official positions on various important industry issues." One of these positions, titled: "On Premise Sign Size Standards," includes the following discussion: "... cities must consider the latest in scientific research and data regarding the relationship between sign sizes and motorist visibility (sic). Observing these guidelines is just as important with reference to commercial signs as it for traffic safety signs, the latter of which are governed by the Manual on Uniform Traffic Control Devices, *which uses minimum sign standards* italics added). What the ISA document fails to mention, however, is that the MUTCD also identifies *maximum* sign sizes.

Using the example provided by the supplied ISA document, a sign for Lydia's Beauty Shop, and using the data from their Table 4 which shows a "required" 720 foot readability distance at freeway speeds (> 65 mph as per their example) each of the sign's 18 letters would need to be 28.8 inches tall (at their misapplied 1 in. of letter height for each 25 ft. of distance). Using their math, if each letter occupied a square measuring 28.8 inches per side (i.e. 829.44 square inches per letter), and this sign included 18 letters, the sign message itself would have to occupy 14,929.92 square inches, not including the recommended additional 40% of empty/white space to surround the message. This would require the message area of the sign to be 103.68 square feet in size, the white space would require an additional 69.12 sq ft, and the overall sign would be 172.8 sq ft. This suggested size makes this example of an on-premise sign larger than certain formats of billboards known as posters, which are often 5 ft. high x 11 ft. wide (55 sq ft).

Now imagine, because these are on-premise signs under discussion, that these signs are to be placed in front of, or on the roof of, a small strip shopping center adjacent to the roadway, and that this shopping center contained 10 stores, If each store had an 18-letter name, one can quickly see

---

<sup>1</sup> <http://www.signs.org/GovernmentRelations/PositionStatements.aspx#On-Premise>

how absurd this argument becomes, with 10 signs, each measuring 172 square feet, one sign immediately adjacent to the next.

### **AUTHOR AND EDITORSHIP OF THE SCIENTIFIC STUDIES.**

Only one of the three studies (Ref. 7) identifies the individuals responsible for its writing, editing and review. This section discusses what we know about these contributors.

Mr. Bertucci is a principal of Bertucci Maren Associates. Their company address is the same as that for the United States Sign Council (USSC), which sponsored this research. Bertucci Maren's phone number is 215-785-1920; that of the USSC is 215-785-1922. The Yellow Pages lists his company under: "Advertising Agencies and Counselors." They seem to have no website. An individual named Nancy Maren is the current Executive Director of the USSC. It seems likely that Ms. Maren is the other principal of Bertucci Maren Associates.

Richard B. Crawford, Esq. is listed as having provided "legal and technical review" of the report. Mr. Crawford is the owner of Mercer Sign Consultants, and served as President of the USSC as well as Chairman of the USSC Legislative Committee. Efforts to locate Mercer Sign Consultants on the web simply lead back to Mr. Crawford. Mr. Crawford seems to write or edit the USSC's periodic reports.

Philip M. Garvey is listed as having performed "research validation and peer review." Mr. Garvey is Senior Research Associate at the Thomas D. Larson Pennsylvania Transportation Institute of Penn State University. Mr. Garvey has performed several research studies for USSC and ISO over the years, some of which touch upon the subject of this report, sign height. This raises the question as to whether Mr. Garvey is truly a "peer reviewer" since much of the work in the present report is directly based on Mr. Garvey's earlier work for the same organization.

A look at the USSC website indicates how closely Mr. Garvey is linked with this organization:

On-Premise Sign Research Review, ...

www.signshop.com, 1 Jan 2014 [cached]

On-Premise Sign Research Review, presented by Philip Garvey, senior research associate, The Pennsylvania State University and Richard Crawford, legislative consultant, The United States Sign Council.

The USSC will be represented ...

www.signshop.com, 31 Mar 2010 [cached]

The USSC will be represented at the New Orleans APA event by Nancy Maren, USSC Executive Director; Rick Crawford, USSC Legislative Consultant; USSC President Perry Cook; Board Member Paul Tripp; and Philip Garvey, human factors research associate at Pennsylvania State University and a major contributor to the USSC Foundation research effort.

Looking further into Mr. Garvey's work for the USSC, it becomes clear that the current report under review is based heavily on his prior work for the organization, including:

"Sign Visibility Literature Review - Final Report," Submitted to United States Sign Council, December 15, 1995.

"What Message Are You Sending? - Improving Sign Visibility," Presented at ATSSA 26<sup>th</sup> Annual Convention and Traffic Expo '96, January 26, 1996.

"Model Guidelines for Visibility of On-Premise Advertisement Signs," funded by United States Sign Council, 1997.

Finally, a review of the USSC website under the heading "Publications," lists 19 studies that are available to the public for purchase. Of these 19 publicly available reports, the overwhelming majority (13) were performed by Mr. Garvey and his colleagues, and two were performed by Tantala. One was listed as being performed by Bertucci and Crawford.

Peter J. Tantala, P.E. is listed as providing "development of algebraic equations." Mr. Tantala is a principal in the firm Tantala Associates, based in Philadelphia, PA. This is a family owned consulting firm, and, together with Alfred Tantala and Michael Tantala, they have performed, under contract, many studies on behalf of the outdoor advertising industry (primarily OAAA). Their most recent study submitted for presentation and publication to the Transportation Research Board (TRB) of the National Academies was rejected in independent peer review as being biased and using inappropriate research methods and statistical analysis. (This was in 2009, and they have not submitted any of their subsequent research for TRB review). The volume of work that the Tantala firm has done for OAAA can be seen here:

<http://www.oaaa.org/Search.aspx?sb-inst=1002&sb-search=tantala>

## **HEIGHT REQUIREMENTS FOR OFFICIAL HIGHWAY SIGNS.**

It should be without argument that official highway signs should take precedence on our primary and interstate routes over commercial advertising signs, whether on- or off-premise. This is clearly stated throughout the MUTCD. A search of the FHWA MUTCD website indicates 12 places where the word "advertising" appears in the 2009 edition of the MUTCD. These occurrences clearly indicate that advertising is never permitted as part of official traffic control devices:

[http://search.fhwa.dot.gov/search?client=fhwa\\_web&site=fhwa\\_web&output=xml\\_no\\_dtd&proxystylesheet=fhwa\\_web&ie=UTF-8&oe=UTF-8&as\\_q=advertising+&num=10&btnG=Search&as\\_epq=&as\\_oq=&as\\_eq=&lr=&as\\_ft=i&as\\_filetype=&as\\_occt=any&as\\_dt=i&as\\_sitesearch=mutcd.fhwa.dot.gov/htm/2009&sort=date:D:L:d1&as\\_lq=&ulang=en&ip=162.233.200.238&access=p&entqr=3&entqrm=0&ud=1&start=0](http://search.fhwa.dot.gov/search?client=fhwa_web&site=fhwa_web&output=xml_no_dtd&proxystylesheet=fhwa_web&ie=UTF-8&oe=UTF-8&as_q=advertising+&num=10&btnG=Search&as_epq=&as_oq=&as_eq=&lr=&as_ft=i&as_filetype=&as_occt=any&as_dt=i&as_sitesearch=mutcd.fhwa.dot.gov/htm/2009&sort=date:D:L:d1&as_lq=&ulang=en&ip=162.233.200.238&access=p&entqr=3&entqrm=0&ud=1&start=0)

Further, in the agreements between FHWA and the States as part of the Highway Beautification Act (HBA), there are clearly stated prohibitions on the time, place, and manner in which roadside billboards may appear.

The purpose of the MUTCD is to communicate to drivers information that is timely, accurate, and relevant to their driving task. The design and placement of official signs has been based on nearly 100 years of research, and concerns every aspect of their size, appearance, and placement. This is done to ensure that they can be perceived, comprehended, and acted upon by drivers in a timely and safe manner. The fact that the largest recommended size of *any* official sign is 144 x 124 inches (124 sq ft), and signs this large are very rarely used, and the greatest recommended height above the roadway that any official sign should be is 17 ft. indicates that, for purposes of safety, there is no need to have signs be any larger or higher than these limits.

The fact that outdoor advertisers seek to have their signs dramatically larger (roadside billboards adjacent to highways are typically 14 ft by 48 ft (672 sq. ft) or 20 ft by 60 ft (1200) sq. ft) and dramatically higher (65 ft per the current proposal) simply so that advertisers can communicate their messages at the expense of official traffic control devices, is in direct conflict with the purpose of the MUTCD and the decades of research that has gone into its development and refinement focused on traffic safety.

Although each jurisdiction uses slightly different terminology, one of the universal prohibitions against billboards is that they shall not conflict or interfere with the visibility of traffic control devices, including signage. Permitting the installation of billboards at the height proposed in this draft legislation violates this prohibition and is harmful to traffic safety in several ways:

Because of their proposed height, they conflict with the ability of drivers to observe and read traffic control devices, which are, by design, located closer to the driver's eye level. They do this by drawing the driver's eye upward to their larger, brighter, more colorful display, at the expense of the official traffic signage.

Because of their height, they will require the driver to take his or her eyes off the road for a longer period of time. Official traffic signs are required to be placed at low elevations above the road surface precisely so that they can be read quickly and easily. The higher a sign is placed, the farther and longer a driver must look away from the road to read it.

If advertisers adhered to their own industry guidance to keep their signs simple, with few words, simple fonts, and reasonable figure-ground contrast, this type of distraction would be less of an issue. But despite the existence of such industry guidelines, and similar recommendations for readability published in the MUTCD, too many billboards are designed to be intentionally difficult and time consuming to read – based on the misguided assumption that the longer the driver focuses on the sign, the more memorable the message will be. Thus, allowing the proposed higher mounting locations will exacerbate, rather than reduce, this problem.

Finally, there is another, even more egregious error, in the development of this guidance by the USSC. The organization's recommendations for increased heights are based on the "need" for a

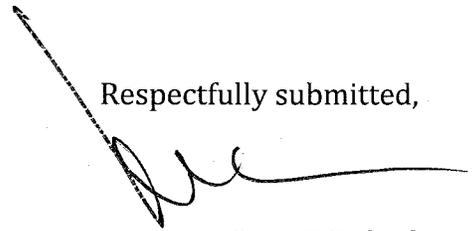
July 10, 2014

driver to read these signs *without loss of eye contact* (italics added) – see Ref. 6, Line 1. In other words, these industry groups want drivers to be able to read such advertisements at great distances, while looking at them continuously. The obvious danger of this position is that, while looking continuously at an advertising sign, the driver cannot be simultaneously looking at traffic or the road ahead. In fact, the same document suggests two different “reading times,” one that is five seconds long, the other that is eight seconds long. Since we know that, when a driver takes his/her eyes off the road for a period of two seconds or longer, the risk of crash or near crash increases by 2.8 times, it seems outrageous that the signage industry would propose an increase in sign heights so that drivers could read such signs, without interruption, for five or eight seconds. Yet that is exactly what this proposal is intended to accomplish. Indeed, if we extend the USSC’s argument to its logical conclusion, if there are multiple advertising signs adjacent to the roadway, and if each sign was placed such that drivers could view them “without loss of eye contact” for five or eight seconds, the driver would never be able to look at the road or the traffic ahead.

### **CONCLUSION.**

The proposed changes to the Texas Transportation Code that would permit billboard heights to be raised from 42.5 to 65 feet are unwise and unwarranted. It is based on flawed research, developed and peer reviewed by the same individuals working on behalf of the same organizations. It conflicts with guidance in the MUTCD, and serves the purpose of making commercial advertising signs more important and more attention getting than official traffic control signs. And it is based on the unreasonable belief that advertising signs must be visible to drivers continuously (i.e. without loss of eye contact) which ensures that such drivers must have their eyes off the road continuously to be able to read these commercial signs.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Jerry Wachtel', written over a diagonal line that descends from the top right towards the center of the page.

Jerry Wachtel  
President