



U.S. Department
of Transportation
**Federal Highway
Administration**

Memorandum

Subject: **INFORMATION AND ACTION:**
MUTCD – Interim Approval for Use of
Clearview Font for Positive Contrast
Legends on Guide Signs
(IA-5)—TERMINATION

Date: January 28, 2016

From: Mark R. Kehrli 
Director, Office of Transportation
Operations

In Reply Refer To:
HOTO-1

To: Federal Lands Highway Division Engineers
Division Administrators

Purpose: Through this memorandum, the Federal Highway Administration's (FHWA) Office of Transportation Operations (HOTO) issues guidance to the Federal-Aid Divisions regarding the January 25, 2016, Federal Register notice officially terminating the subject Interim Approval, issued September 2, 2004. The notice discontinues the provisional use of an alternative lettering style in traffic control device applications. The result of this termination rescinds the allowance of the use of letter styles other than the FHWA Standard Alphabets on traffic control devices except as provided otherwise in the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD) and herein. Existing signs that use the provisional letter style and comply with the Interim Approval are unaffected by this action and may remain as long as they are in serviceable condition. This action does not create a mandate for the removal or installation of any sign. The requirement of the MUTCD to display destination and street names using upper- and lower-case lettering is unchanged by this action. State agencies should disseminate this message to local jurisdictions for further action.

Background: The Federal Register notice provides a synopsis of considerations that led to the termination of the Interim Approval. The attached Technical Brief provides additional detailed information regarding the synthesis of research studies and resulting practices that support this action.

Conclusion: Based on the findings outlined in the Federal Register notice and in the attached Technical Brief, the FHWA does not intend to pursue further consideration, development, or support of an alternative letter style. Accordingly, further implementation of an alternative letter style is discontinued, subject to the following:

- Those agencies that have signs already in the process of fabrication or contracts awarded may fabricate and install those signs with the alternative alphabets as specified, subject to the terms of the Interim Approval and the FHWA's policy.

- Projects or signs currently in the design stage shall be amended, to the extent practicable, to specify the Standard Alphabets. This change should not affect overall sign sizes because the alternative alphabets consistently require sign sizes that are at least equal to, and in most cases larger than, signs that use the Standard Alphabets. A simple substitution in specification should sufficiently effect this change. In compliance with the MUTCD, freeway and expressway signs shall continue to display destination and street name legends composed of upper- and lower-case letters using Series E(modified). Other legends that are composed of all upper-case letters, such as cardinal directions, exit numbers, and action or distance messages, are displayed using Series E. For conventional roads, Series D is desirable, though Series C may be considered for unusually long legends.
- The discontinuation of the provisional letter style does not affect the requirement to display street and destination names using a combination of leading upper-case and following lower-case letters (see MUTCD Section 2A.13).
- Community wayfinding signs (see MUTCD Section 2D.50) may continue to use a lettering style other than the Standard Alphabets as long as it provides at least equivalent legibility as provided in the referenced Section of the MUTCD.
- Agencies whose specifications or standards specify the provisional lettering style should issue revisions to these policies in a timely manner. Signs that are ordered after the effective date of this termination are not authorized under the former Interim Approval and must comply with the provisions of the MUTCD regardless of jurisdiction or funding source. State agencies that requested and were granted Interim Approval on behalf of all jurisdictions in that State shall notify those agencies of the rescinding of the subject Interim Approval.

Attachments:

January 25, 2016 Federal Register notice
Technical Brief

cc:

Associate Administrators
Chief Counsel
Chief Financial Officer
Directors of Field Services
Director of Technical Services

DEPARTMENT OF TRANSPORTATION**Federal Aviation Administration****Agency Information Collection Activities: Requests for Comments; Clearance of Renewed Approval of Information Collection: General Operating and Flight Rules**

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice and request for comments.

SUMMARY: In accordance with the Paperwork Reduction Act of 1995, FAA invites public comments about our intention to request the Office of Management and Budget (OMB) approval to revise a previously approved information collection. Part A of subtitle VII of the Revised title 49 U.S.C. authorizes the issuance of regulations governing the use of navigable airspace. Information is collected to determine compliance with Federal regulations. This revision addresses requirements from the Enhanced Flight Vision Systems (EFVS) Rule, RIN 2120-AJ94.

DATES: Written comments should be submitted by March 25, 2016.

ADDRESSES: Send comments to the FAA at the following address: Ronda Thompson, Room 441, Federal Aviation Administration, ASP-110, 950 L'Enfant Plaza SW., Washington, DC 20024.

PUBLIC COMMENTS INVITED: You are asked to comment on any aspect of this information collection, including (a) Whether the proposed collection of information is necessary for FAA's performance; (b) the accuracy of the estimated burden; (c) ways for FAA to enhance the quality, utility and clarity of the information collection; and (d) ways that the burden could be minimized without reducing the quality of the collected information. The agency will summarize and/or include your comments in the request for OMB's clearance of this information collection.

FOR FURTHER INFORMATION CONTACT: Ronda Thompson by email at: Ronda.Thompson@faa.gov.

SUPPLEMENTARY INFORMATION:

OMB Control Number: 2120-0005.
Title: General Operating and Flight Rules.

Form Numbers: None.

Type of Review: Revision of an information collection.

Background: The reporting and recordkeeping requirements of Federal Aviation Regulation (FAR) part 91, General Operating and Flight Rules, are authorized by part A of subtitle VII of

the Revised title 49 U.S.C. FAR part 91 prescribes rules governing the operation of aircraft (other than moored balloons, kites, rockets and unmanned free balloons) within the United States. The reporting and recordkeeping requirements prescribed by various sections of FAR part 91 are necessary for FAA to assure compliance with these provisions.

Respondents: Approximately 21,200 airmen, state or local governments, and businesses.

Frequency: Information is collected on occasion.

Estimated Average Burden per Response: .5 hour.

Estimated Total Annual Burden: 235,183 hours.

Issued in Washington, DC, on January 14, 2016.

Ronda Thompson,

FAA Information Collection Clearance Officer, Performance, Policy, and Records Management Branch, ASP-110.

[FR Doc. 2016-01312 Filed 1-22-16; 8:45 am]

BILLING CODE 4910-13-P

DEPARTMENT OF TRANSPORTATION**Federal Highway Administration****National Standards for Traffic Control Devices; the Manual on Uniform Traffic Control Devices for Streets and Highways; Notice of Termination of Interim Approval IA-5**

AGENCY: Federal Highway Administration (FHWA), Department of Transportation (DOT).

ACTION: Notice.

SUMMARY: The Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) is incorporated in our regulations, approved by FHWA, and recognized as the national standard for traffic control devices used on all streets, highways, bikeways, and private roads open to public travel. This notice terminates the Interim Approval for Use of Clearview Font for Positive Contrast Legends on Guide Signs (IA-5), issued September 2, 2004, as authorized by Section 1A.10 of the MUTCD, and discontinues the provisional use of an alternative lettering style in traffic control device applications. The result of this termination rescinds the use of letter styles other than the FHWA Standard Alphabets on traffic control devices, except as provided otherwise in the MUTCD. Existing signs that use the provisional letter style and comply with the Interim Approval are unaffected by this action and may remain as long as they are in serviceable condition. This

action does not create a mandate for the removal or installation of any sign. This action does not amend any provision of the MUTCD.

DATES: Effective 30 days after publication in the **Federal Register**.

FOR FURTHER INFORMATION CONTACT: For questions about this notice, contact Mr. Kevin Sylvester, MUTCD Team Leader, FHWA Office of Transportation Operations, (202) 366-2161, or via email at Kevin.Sylvester@dot.gov. For legal questions, please contact Mr. William Winne, Office of the Chief Counsel, (202) 366-1397, or via email at William.Winne@dot.gov. Office hours are from 8:00 a.m. to 4:30 p.m., e.t., Monday through Friday, except Federal holidays.

SUPPLEMENTARY INFORMATION:**Background**

Numerous research efforts have taken place over the last 15 years with the goal of improving the legibility of highway signs. One area of focus has been on guide signs. As a result of some early studies,¹ FHWA issued an Interim Approval allowing provisional use of an alternative lettering style known as Clearview™ for signs in positive contrast color orientations (lighter legend on darker background).² Although the research supported only one series of this lettering style, the Interim Approval was written in a way that would authorize narrower letter forms, to correspond to the system of the FHWA Standard Alphabets, in anticipation of successful future research evaluations. However, subsequent evaluations showed no benefit to the narrower letter forms and degraded sign legibility when compared to the corresponding FHWA Standard Alphabet series.³ Additionally, tests of alternative lettering in negative contrast color orientations (dark legend on lighter background, such as for regulatory and warning signs) showed no improvement and significantly degraded legibility of the sign.⁴

¹ Carlson, P.J., *Evaluation of Clearview Alphabet with Microprismatic Retroreflective Sheetings*, Report No. FHWA/TX-02/4049-1. Texas Transportation Institute, August 2001, resubmitted October 2001.

² Interim Approval 5 can be accessed at the following Web address: http://mutcd.fhwa.dot.gov/res-ia_clearview_font.htm.

³ Chrysler, S.T., P.J. Carlson, and H.G. Hawkins. *Nighttime Legibility of Ground-Mounted Traffic Signs as a Function of Font, Color, and Retroreflective Sheeting Type*, Report No. FHWA/TX-03/1796-2. Texas Transportation Institute, September 2002.

⁴ Holick, A., S.T. Chrysler, E. Park, and P.J. Carlson. *Evaluation of the Clearview™ Font for Negative Contrast Traffic Signs*, Report No. FHWA/

Ultimately, the consistent finding among all the research evaluations is that the brightness of the retroreflective sheeting is the primary factor in nighttime legibility.

The presence and availability of two separate letter styles with differing criteria have resulted in significant confusion and inconsistency in highway sign design, fabrication processes, and application. Although the terms of FHWA's 2004 Interim Approval are explicit, misunderstandings and misapplications of the provisional letter style have resulted. Inconsistent sign design practices are becoming more common and may have coincided with the provisional allowance of an alternative lettering style due to a lack of consistent implementation and inaccurate presumptions that lesser sign design criteria, such as reduced interline and edge spacing, are broadly acceptable. Additionally, many agencies believed that the alternative lettering style should be used in all applications and that all lettering should be displayed in upper and lowercase lettering, regardless of the type of message. There is also considerable confusion that the requirement of the MUTCD to display destination and street names in upper and lowercase lettering equates to the use of the provisional lettering style rather than the Standard Alphabets. In actuality, there is no interdependency between letter style and case.

Purpose of This Notification

Uniformity in the display of traffic control devices is central to the underlying foundation of the MUTCD. As such, FHWA establishes the criteria therein with uniformity in mind. This uniformity extends not only to the

content of the message displayed, but also to the format and appearance of the display itself. Although seldom specifically identifiable by the motorist, non-uniformity of a sign display or sequence of signs might exhibit itself in less direct ways, such as diminished legibility requiring additional glance time directed toward a sign or group of signs instead of toward the traffic on the road.

The FHWA is committed to exploring solutions that can significantly contribute to enhanced road user safety and are readily and feasibly implemented. In this particular case, there is no benefit of the alternative method that cannot be similarly achieved within the established practice. In many cases, the established practice actually demonstrated benefits that the alternative could not achieve. The FHWA believes that devoting further resources to the development of an alternative will not yield dramatically different results that would warrant an institutional change.

Conclusion

Based on these findings, FHWA does not intend to pursue further consideration, development, or support of an alternative letter style. Accordingly, FHWA discontinues further implementation of an alternative letter style and terminates and rescinds the Interim Approval for new signing installations, except as otherwise provided in the MUTCD. Existing signs that use the provisional letter style and comply with the Interim Approval are unaffected by this action and may remain as long as they are in serviceable condition. This action does not create a mandate for the removal or installation of any sign. This action does not amend any provision of the MUTCD.

Authority: 23 U.S.C. 101(a), 104, 109(d), 114(a), 217, 315, and 402(a); 23 CFR 1.32; and, 49 CFR 1.85.

Issued on: January 15, 2016.

Gregory G. Nadeau,
*Administrator, Federal Highway
Administration.*

[FR Doc. 2016-01383 Filed 1-22-16; 8:45 am]

BILLING CODE 4910-22-P

DEPARTMENT OF VETERANS AFFAIRS

National Research Advisory Council, Notice of Meeting

The Department of Veterans Affairs (VA) gives notice under the Federal Advisory Committee Act, 5 U.S.C., App. 2, that the National Research Advisory Council will hold a meeting on Wednesday, March 2, 2016, in Room 730 at 810 Vermont Ave. NW., Washington, DC. The meeting will convene at 9:00 a.m. and end at 3:30 p.m., and is open to the public. Anyone attending must show a valid photo ID to building security and be escorted to the meeting. Please allow 15 minutes before the meeting begins for this process.

No time will be allocated at this meeting for receiving oral presentations from the public. Members of the public wanting to attend, or needing further information may contact Pauline Cilladi-Rehrer, Designated Federal Officer, ORD (10P9), Department of Veterans Affairs, 810 Vermont Avenue NW., Washington, DC 20420, at (202) 443-5607, or by email at pauline.cilladi-rehrer@va.gov at least 5 days prior to the meeting date.

Dated: January 19, 2016.

Rebecca Schiller,
Advisory Committee Management Officer.

[FR Doc. 2016-01297 Filed 1-22-16; 8:45 am]

BILLING CODE 8320-01-P

TECHNICAL BRIEF

Federal Highway Administration

Manual on Uniform Traffic Control Devices for Streets and Highways: Termination of Interim Approval No. 5, Clearview Font for Positive Contrast Legends on Guide Signs

Introduction: On January 25, 2016, the FHWA published a notice in the Federal Register¹ terminating the use of an alternative letter style, Clearview™, on traffic control devices. The use of this alternative letter style was authorized under the provisions of the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD) for Interim Approval. Agencies wishing to use the alternative letter style were required to request approval from FHWA. The alternative letter style has not been adopted in the MUTCD.

Research History and Implementation: Initial studies evaluated only one letter form type of the provisional letter style with two different intercharacter spacing criteria. These are now known as 5-W and 5-W-R, the latter of which has a compressed intercharacter spacing so that the length of a word would approximate that of the same word composed of the FHWA Standard Alphabet Series E(modified). This compressed version was found to provide no improvement over Series E(modified). These studies did not evaluate numerals for legibility or recognition. The narrower letter forms of the provisional letter style (designated as 1-W, 2-W, 3-W, and 4-W) were also not evaluated for legibility in these studies.

The study² on which the Interim Approval was primarily based found that changing the type of retroreflective sheeting alone resulted in a 6% improvement in legibility to the FHWA Standard Alphabet Series E(modified). However, this quantitative result was not otherwise reported as a major finding. The practical difference attributed to the letter style was characterized as “modest” and the apparent improvement of the provisional letter style could be “partly attributed to [its] increased size.” Because of the narrowly focused research statement, which examined the cumulative effect of a change to two variables, the study recommended that the sponsoring agency adopt a new standard to change both the retroreflective sheeting to microprismatic and the letter style to 5-W³. The fact that the sponsoring agency already owned 100 licenses of the design and fabrication software for the provisional letter style and had furnished one licensed copy to a sign fabricator was also noted in the recommendation.

Subsequent testing^{4,5} showed that FHWA Standard Alphabet Series D resulted in longer legibility distances than the 3-W letter style of the alternative alphabet.

¹ *Federal Register*, Vol. 81, No. 15. 81 FR 4083. National Archives and Records Administration, January 25, 2016.

² Carlson, P. J. *Evaluation of Clearview Alphabet with Microprismatic Retroreflective Sheetings*, Report No. FHWA/TX-02/4049-1. Texas Transportation Institute, August 2001, resubmitted October 2001.

³ The sponsoring State agency adopted this recommendation, but substituted 5-W-R for 5-W as its standard.

⁴ Chrysler, S. T., P. J. Carlson, and H. G. Hawkins. *Nighttime Legibility of Ground-Mounted Traffic Signs as a Function of Font, Color, and Retroreflective Sheeting Type*, Report No. FHWA/TX-03/1796-2. Texas Transportation Institute, September 2002.

⁵ Holick, A. and P. J. Carlson. *Nighttime Sign Legibility as a Function of Various Combinations of Retroreflective Sheeting and Font*, Report No. FHWA/TX-04/1796-4. Texas Transportation Institute, September 2003.

Legibility and recognition deficiencies with numerals of the provisional style were reported in a field experiment as early as 2009. A formal evaluation⁶ later confirmed that the numerals of the Standard Alphabets exhibited superior performance when compared with those of the provisional lettering style.

A 2014 study⁷ found that there is no practical difference between Series E(modified) of the Standard Alphabets and 5-W of the provisional letter style when tested in positive-contrast color orientations.

Explorations of the provisional letter style in negative-contrast color orientations⁸ revealed that the provisional letter style actually reduced the nighttime legibility when compared with the Standard Alphabets.

Recognition vs. Pure Legibility

Research has focused primarily on the legibility of one letter style compared to another. One of the studies acknowledged the fact that the excessively long legibility distances reported in some of the earlier work were actually the result of recognition, rather than legibility, due to learning effects by the participants among the set of test words. These research evaluations did not necessarily simulate the actual process of reading a sign: detection, recognition, and reaction via multiple glances. While legibility alone might be considered a valid surrogate measure for the entire process of interpreting a highway sign, marginally differing results do not necessarily indicate a practical significance that can justify an institutional or systematic change.

Degradation of Consistency in Signing Layouts

The presence and availability of two separate letter styles with differing criteria have resulted in significant confusion and inconsistency in the highway sign design and fabrication processes. Although the terms of the FHWA's 2004 Interim Approval are explicit, misunderstandings and misapplications of the provisional letter style have resulted. In 2011, the FHWA issued a *Design and Use Policy*⁹ on this topic that included explicit criteria in question-answer format with photographic examples to illustrate acceptable and unacceptable practices. This additional guidance has failed to allay these practices. The following are representative examples of ways in which these concerns have manifested themselves:

- **Sign Design.** Poor sign design practices are becoming unduly institutionalized. This phenomenon appears to have coincided with the provisional allowance of an alternative lettering style due to a lack of consistent implementation and inaccurate presumptions

⁶ Miles, J., B. Kotwal, S. Hammond, and F. Ye. *Evaluation of Guide Sign Fonts*, Report No. MN/RC 2014-11. Texas A&M Transportation Institute, February 2014.

⁷ Ibid.

⁸ Holick, A., S. T. Chrysler, E. Park, and P. J. Carlson. *Evaluation of the Clearview™ Font for Negative Contrast Traffic Signs*, Report No. FHWA/TX-06/0-4984-1. Texas Transportation Institute, January 2006, resubmitted April 2006.

⁹ <http://mutcd.fhwa.dot.gov/resources/clearviewdesignfaqs/index.htm>

that lesser sign design criteria, such as reduced interline and edge spacing, are broadly acceptable.

- Incorrect Applications of the Provisional Letter Style. Many agencies erroneously believed that the alternative lettering style should be used in all applications and that all lettering should be displayed in upper- and lower-case lettering, regardless of the type of message. While there is evidence of this phenomenon occurring at State levels, these misunderstandings have metastasized at the local levels, in part, due to inaccurate or incomplete reports published in news media and trade journals, and promotional efforts of commercial entities, including some associated with the early development of the provisional letter style. There is also considerable confusion that the requirement of the MUTCD to display destination and street names in upper- and lower-case lettering equates to the use of the provisional lettering style rather than the Standard Alphabets. In actuality, there is no interdependency between letter style and case.
- Negative-Contrast Applications of the Provisional Letter Style. Commercial availability and promotion of the alternative letter style for negative-contrast color orientations—which was not part of the Interim Approval—have also resulted in confusion among agencies and sign manufacturers. Regulatory and warning signs, including some as basic as the standard Speed Limit sign, have been observed using the alternative lettering style that has not been approved for use due to its inferiority to the Standard Alphabets in negative-contrast color orientations¹⁰.

Conclusions of Research Evaluations

A significant number of research studies have been performed in pursuit of an alternative letter style. However, inconsistent or counterintuitive conclusions have been drawn from the results as reported to support or promote use and/or further study of an alternative letter style. The following examples illustrate this concern:

- Sign Size. The impetus reported for pursuing an alternative letter style was to avoid the need for larger lettering, thereby avoiding larger sized signs. With the standard spacing of 5-W lettering, the word lengths are typically longer than with Series E(modified), resulting in a larger sign.
- Increase in Letter Height to Accommodate an Alternative Letter Style. A 2003 study¹¹ concluded that 3-W lettering of the provisional style in a larger letter height produces longer legibility distances than Series D in a smaller letter height. The researchers recommended that 8-inch 3-W lettering be used to replace all signs that used 6-inch Series D lettering. While increases in letter heights in this range can result in increased legibility distances independent of letter style, they will also result in larger signs, including with this scenario. The additional costs associated with larger sign sizes appear not to have been considered in making this recommendation. The recommendation to increase the letter height by 2 inches in order to justify the use of the alternative letter style on conventional roadways contravenes the original premise of considering an alternative letter style: improve legibility without costly increases in sign sizes. Following such a recommendation would result in an 80% increase in the

¹⁰ Holick et al. *Evaluation of the Clearview™ Font for Negative Contrast Traffic Signs*.

¹¹ Holick and Carlson. *Nighttime Sign Legibility*.

area for a typical one-line Destination sign. The increase in area for a three-line Destination sign typically used at conventional road junctions would be 95%.

- Compressed Intercharacter Spacing. To mitigate the issue of larger signs, which would often necessitate replacement of the supporting structure, compressed intercharacter spacing criteria were developed for the provisional 5-W letter forms, referred to as 5-W-R. The use of 5-W-R is restricted to retrofits where an existing sign support structure that is still in serviceable condition does not have the capacity to accommodate a larger sign. It was expected that these cases would be relatively rare. However, some agencies have specified the compressed intercharacter spacing of 5-W-R as their default standard for all new signs, including those installed on new support structures, resulting in no net improvement over the Standard Alphabets that these signs replaced.
- Comprehensive vs. Incremental Analysis of Results. While the most recent study suggested that there is no practical advantage to using the alternative lettering style over the Standard Alphabets because of the lack of consistent improvement in the legibility index, it questioned whether it is possible to achieve additional improvements in legibility. Instead, the researchers recommended that any future research on letter style focus on improvements that would reduce the cost of signs without affecting their safety performance. This recommendation did not consider the inconsistencies that have arisen due to the presence of two different lettering styles and criteria.
- Specific Focus of Research Evaluations. Early research made iterative revisions to letter forms, size, and spacing of an alternative letter style until what appeared to be a statistically significant improvement resulted, but only for the alternative letter forms. Development of an alternative letter style eventually became self-propagating, excluding any consideration of optimizing the established Standard Alphabet letter forms and other criteria such as stroke width, loop height, or intercharacter spacing. This process unnecessarily presumed a fundamental dysfunction with the existing practice that could not be rectified. One study¹² in which “no conclusion can be drawn about the relative legibility” based its recommendation for letter style on a different study rather than the one conducted.
- Interline Spacing. The closed-course research evaluations did not use signs with multiple lines of legend that would simulate actual highway signing. Because the interline spacing is customarily based on the initial upper-case letter height, and the lower-case loop and rising stem heights of the provisional style are larger than those of the Standard Alphabets, the resulting space between lines of legend is reduced. The effect of this apparent reduced interline spacing was not measured. Reports of signs whose legends appear crowded are likely attributable to this effect.
- In-Service Performance and Comparison. A recent field evaluation¹³ observed no statistically significant difference between new signs that used the provisional 5-W lettering and a combination of new and existing signs that used Series E(modified).

¹² Smiley, A., C. Courage, T. Smahel, G. Fitch, and M. Currie. *Required Letter Height for Street Name Signs: An On-Road Study*, Paper No. 01-2225. Human Factors North and Toronto Transportation, 2001.

¹³ Mahmassani, H. S., C. W. Frei, and M. Saberi. *Clearview™ Font in Illinois: Assessing IDOT Experiences and Needs*, Report No. FHWA-ICT-13-003. Northwestern University Transportation Center, January 2013.

The recommendation of this study was to continue using Clearview for positive-contrast signs based on the fact that it had been implemented and there was no difference or negative reaction reported. Though, there appeared to be no consideration of the need to continue to use the Standard Alphabets in the majority of signing applications. This evaluation concluded that retroreflective sheeting materials might affect legibility, regardless of the letter style, corroborating past evidence. Additionally, it was reported in this evaluation that the intercharacter spacing of Clearview was often “manually adjusted” to avoid increasing the size of signs.

- **Practical Significance.** The 2014 study¹⁴ evaluated a modification of the Standard Alphabets, using larger lower-case letters and a lesser stroke width based on Series E(modified). Based on a comparison between the comparable alternative alphabets and the Standard Alphabets, there was no statistically significant difference in the legibility and/or recognition that could justify further exploration of any one of the letter styles over another. Further, legibility and recognition of numerals of the alternative alphabet were found to be inferior to those of the Standard Alphabets.

Implementation

Interestingly, a number of agencies are now using 20-inch leading upper-case letters with either 5-W or 5-W-R of the provisional lettering style. However, there is not necessarily a proportional increase in legibility or recognition with increases in letter height^{15, 16}. The basic premise of the development of an alternative letter style was to address a generalized hypothesis¹⁷ that letter heights of 20 inches would be needed to address the needs of older drivers, partly due to irradiation that can occur with different combinations of high-brightness retroreflective materials. This conclusion was extrapolated from a laboratory simulation and came during the infancy of higher-brightness retroreflective background sheeting on highway guide signs. It was intended to address a more practical visual acuity that would represent a broader cross-section of drivers and was at best, an approximation, as the actual Standard Alphabets were not used in this simulation. The research on an alternative lettering style was promoted largely as a means to avoid unnecessarily enlarging signs to meet this recommendation (cited in various articles as anywhere between a 20% increase to as much as a 33% increase), thereby sparing transportation agencies those additional costs while gaining the benefit of improved effectiveness. The presumption was that letter forms completely different from those of the Standard Alphabets would be the solution and did not examine modification to or optimization of the established Standard Alphabet letter forms. In fact, even the early research¹⁸ had determined that it was the relative contrast of the level of retroreflectivity used for the legend and background that was the critical factor in the legibility and that high-contrast brightness combinations should be avoided.

¹⁴ Miles et al. *Evaluation of Guide Sign Fonts*.

¹⁵ Mace, D. J., P. M. Garvey, and R. F. Heckard. *Relative Visibility of Increased Legend Size vs. Brighter Materials for Traffic Signs*, Report No. FHWA-RD-94-035. Federal Highway Administration, 1994.

¹⁶ Garvey, P. M. and D. J. Mace. *Changeable Message Sign Visibility*, Report No. FHWA-RD-94-077. Federal Highway Administration, April 1996.

¹⁷ Staplin, L. K., K. Lococo, and J. Sim. *Traffic Control Design Elements for Accommodating Drivers with Diminished Capacity*, Report No. FHWA-RD-90-055. Federal Highway Administration, 1990.

¹⁸ Mace et al. *Relative Visibility*.