The Science and Research Behind Sign Regulations

Using Traffic Safety as a Key Criterion

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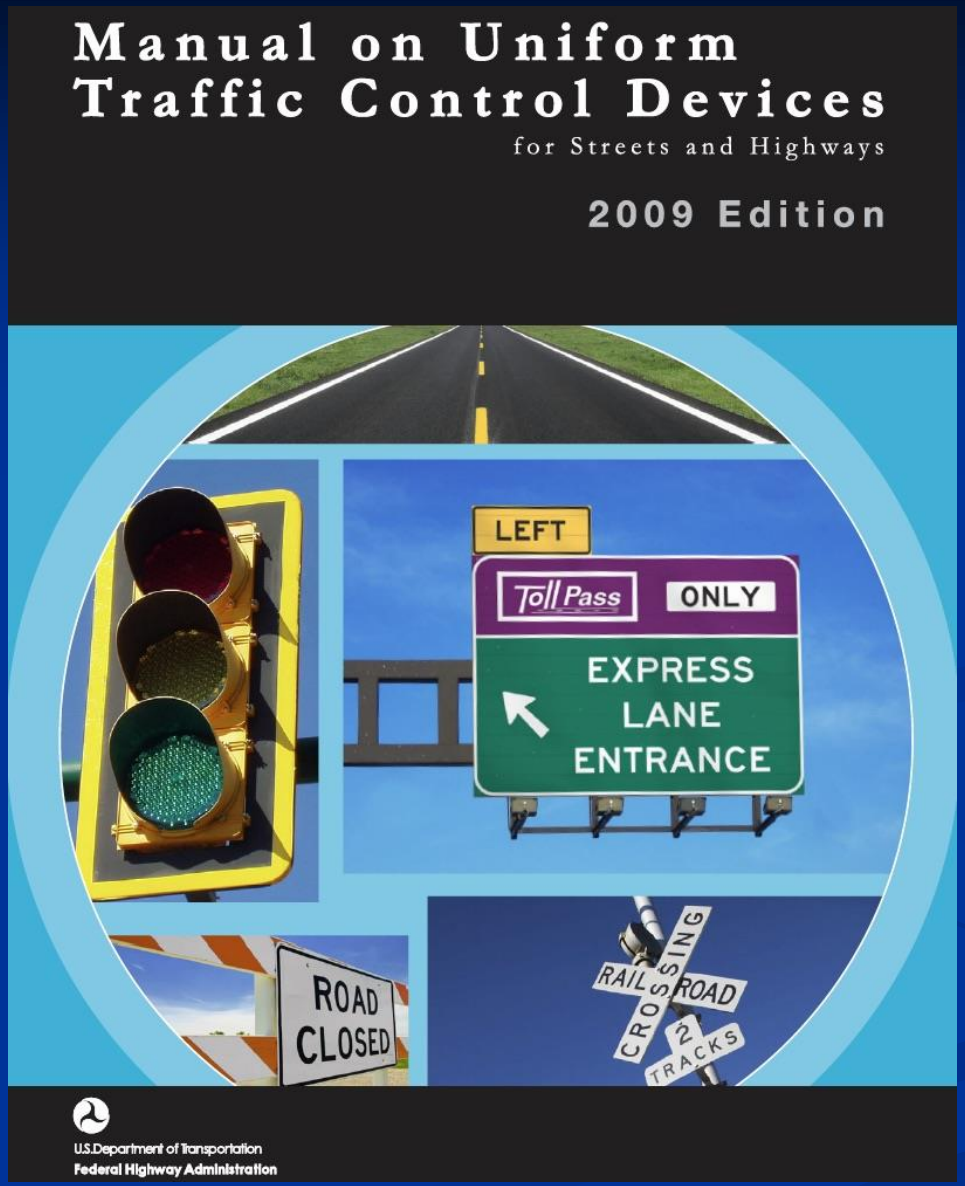
Safety Concerns Not New

- Research on safety issues of roadside advertising began in the 1930s
- "Dueling studies"- Michigan and Minnesota (1951-2)
- First study on safety impacts of digital signs (CEVMS) by FHWA in 1980
  - Early studies inconsistent, but
  - More rigorous studies found concerns
  - Found 15 impacts of CEVMS on traffic safety and visual environment
  - Recommended further research (not begun for 30 years)

Principles Governing Roadside Signage* *Should Be* Universal

- The Manual of Uniform Traffic Control Devices:
  - Is the bible for all *official* roadside signage
  - Has been in constant publication since 1927
    - Under its current title since 1935
  - Establishes 5 key tenets for signage*
    1. Fulfill a need
    2. Command attention
    3. Convey a clear, simple meaning
    4. Command respect from road users
    5. Give adequate time for proper response
       - *The MUTCD also addresses signals and markings


Manual on Uniform
Traffic Control Devices
for Streets and Highways
2009 Edition
LEFT
Toll Pass
ONLY
EXPRESS
LANE
ENTRANCE
ROAD
CLOSED
RAIL ROAD
CROSSING
2
TRACKS
U.S.Department of Transportation
Federal Highway Administration

Should Roadside Advertising Share the Goals of the MUTCD?

	Official Highway Signs	Advertising Signs
1. Fulfill a Need	Required	Debatable
2. Command attention	Required	Goal of sign owners
3. Convey a clear, simple meaning	Required	Stated goal of all advertising
4. Command respect from road users	Required	Debatable
5. Give adequate time for proper response	Required	Goal of sign owners

There are Two Obvious Areas of Overlap

1. Convey a clear, simple meaning

2. Give adequate time for proper response

Convey a Clear, Simple Meaning

- Highway Signs accomplish this is many ways:
  - Consistent typeface, font, color, shape
  - Fewest possible words or symbols – rigorously tested in laboratory and on-road studies
  - Placed on the road only where they are needed
  - Redundant coding
    - Color, shape, message *all* contribute to meaning
      - So the loss of any one will not cause confusion

3 Things Tell You This is a STOP Sign

- It is white on red
- It says STOP
- It is octagonal in shape
- The loss of any one (or even two) of these attributes will not destroy its meaning.



Other Examples of Official Signs



Warning signs are black on yellow diamonds



Regulatory signs are black on white



Construction signs are orange



Some signs have their own unique shape and color

Advertising Industry Guidelines Preach Clear, Simple Signs

- "To safely assist mobility and meet the need for information, both commercial and non-commercial roadside signs should provide drivers with clear messages…"
- "Local sign code drafters should focus on what is minimally necessary to assure that the signs in their community, which guide motorists to local businesses, can be easily seen, read, and understood by drivers."
  - *The Signage Sourcebook*

But when it comes to practice, the results are too often like this:

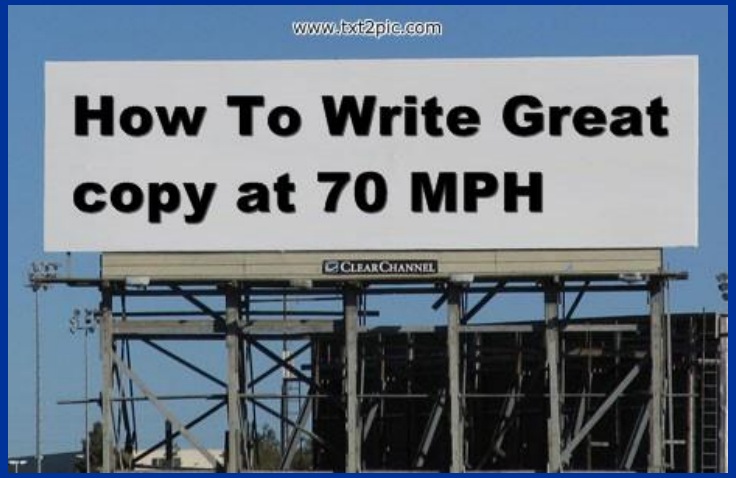


It can, and has, been done

(Just not very often)









Billboard companies promote their signs for AMBER Alerts

So let's compare an official AMBER Alert to one displayed on a digital billboard

AMBER Alert Signs

Official sign



Billboard



Give Adequate Time for Proper Response

- Two ways to achieve this goal:
  - Research and science says – keep the sign and the message short and sweet.
  - Advertising industry says – let me make my sign bigger and taller so that it can be read from longer distances and for a longer period of time.
- Official signs follow the KISS principal.
- Why shouldn't advertising signs be required to do the same?

The legal question is:

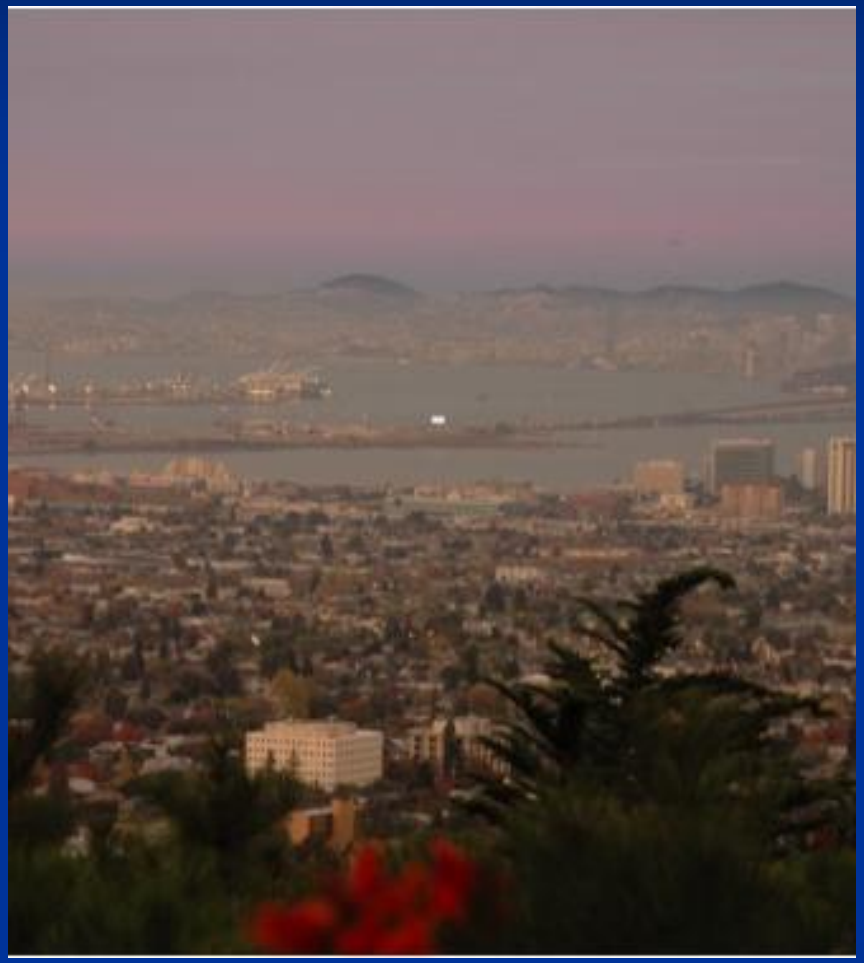
- Can local Governments place constraints on message components (size, number of words, fonts) without regulating content?
- Other countries have done this.
- Can it be done in the US?

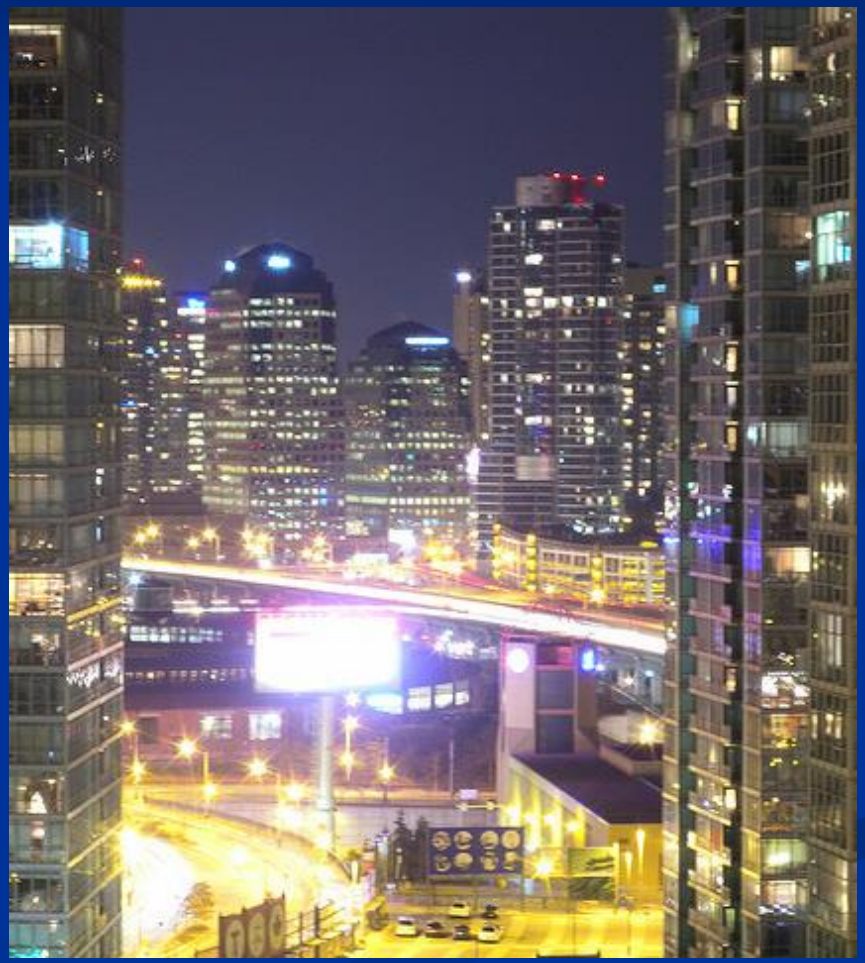
Sign Brightness (Luminance)

No Aspect of Digital Signs Has Caused More Public Anger

- Here again the science is clear.
- There are well researched and vetted standards for acceptable sign brightness.
- All experts agree that excessive sign brightness causes glare and degrades driver performance.
  - And all (except one working for the billboard industry) agree that digital billboards are as much as 10 times brighter than is appropriate.

Examples of Excessive Digital Billboard Luminance





The Luminance Issue

- There are no complaints about conventional billboards.
  - Those that are floodlit at night are easy to read.
- So why do digital signs and billboards need to be many times brighter than traditional signs?
  - Answer: They don't!
- Question: So why can't local Government agencies rely on the science and place appropriate upper limits on sign luminance?

Interactive Signs

The Science is Clear

- Using cell phones, especially texting, while driving, is dangerous.
  - This activity causes some combination of visual, physical, and cognitive distraction.
  - Most states have partial or complete bans in place.
- So why do we permit roadside advertising that encourages the driver to call or text?

Examples of Interactive Signs

This sign suggests that the driver scan a bar (QR) code



This sign suggests that the driver text for more info



Message Change Interval (Dwell Time)

Dwell Time

- In the US, digital signs may change their image and message as often as the sign owner wishes.
  - Typical dwell times are 4, 6, or 8 seconds.
    - There are no Federal regulations about dwell time.
- A psychological concept known since the 1920s as the *Zeigarnik Effect* has been shown to affect the viewers' behavior as they continue to look for "what comes next" on the display.
  - The advertising industry uses this principle constantly.

Simply lengthening the dwell time enough to reduce the Zeigarnik Effect would substantially reduce driver distraction – why can't it be done?

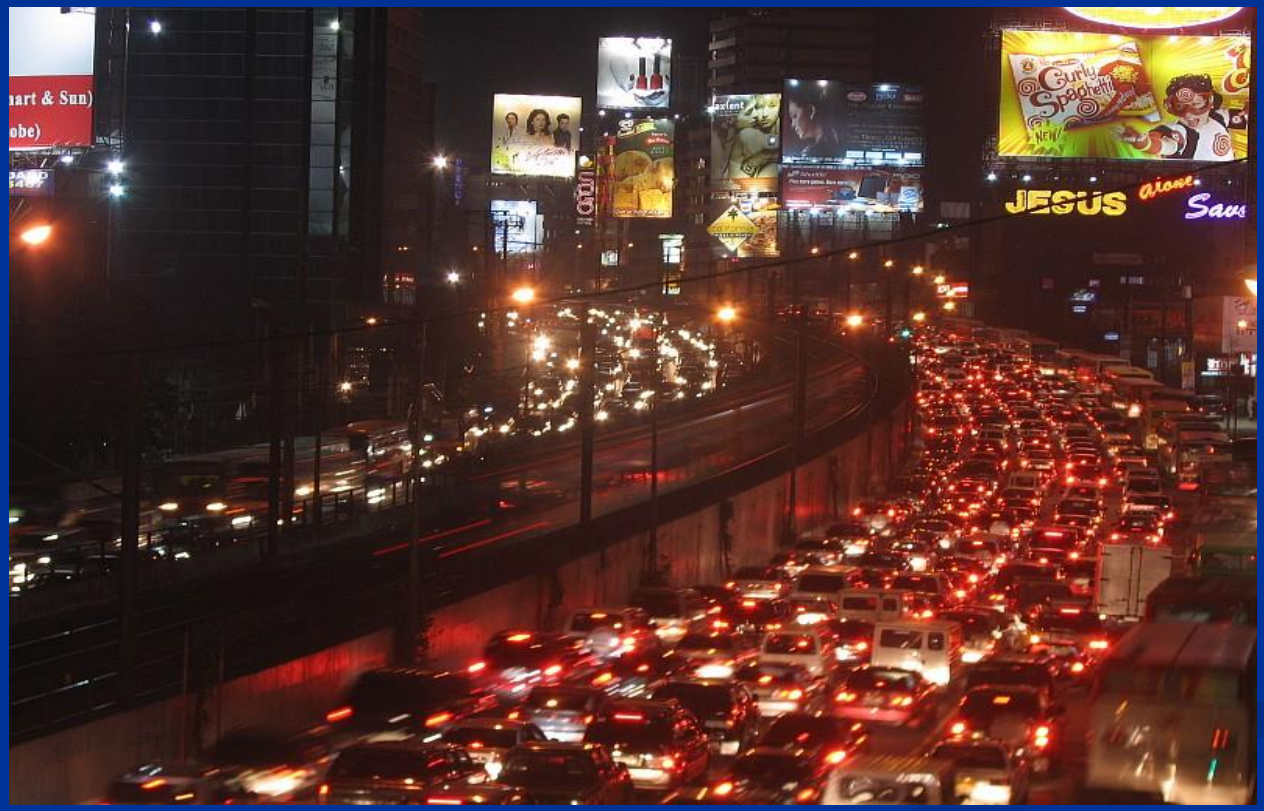
If local governments would develop regulations in these four areas, signs would be better and all road users would be safer

- Simplify messages to comport with good human factors practice
- Reduce luminance to widely acceptable levels
- Eliminate interactivity
- Increase dwell time to reduce Zeigarnik Effect

Roadside Advertising Has Been Around for a Very Long Time



It's Time That Local Regulations Caught up with Today's Technology, Traffic, and Driver Distraction



Questions?

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