Effective Traffic Signing

24 Hour Performance

Prepared for

Rollie Bible

3M Traffic Safety Systems

Effective Traffic Signing

Traffic signs provide:

- Regulations
- Warnings
- Guidance

Effective Traffic Signing

Signs must be:

- Visible
- Legible
- Understandable
- Allow time for proper response
- Perform 24 hours a day

Effective Traffic Signing

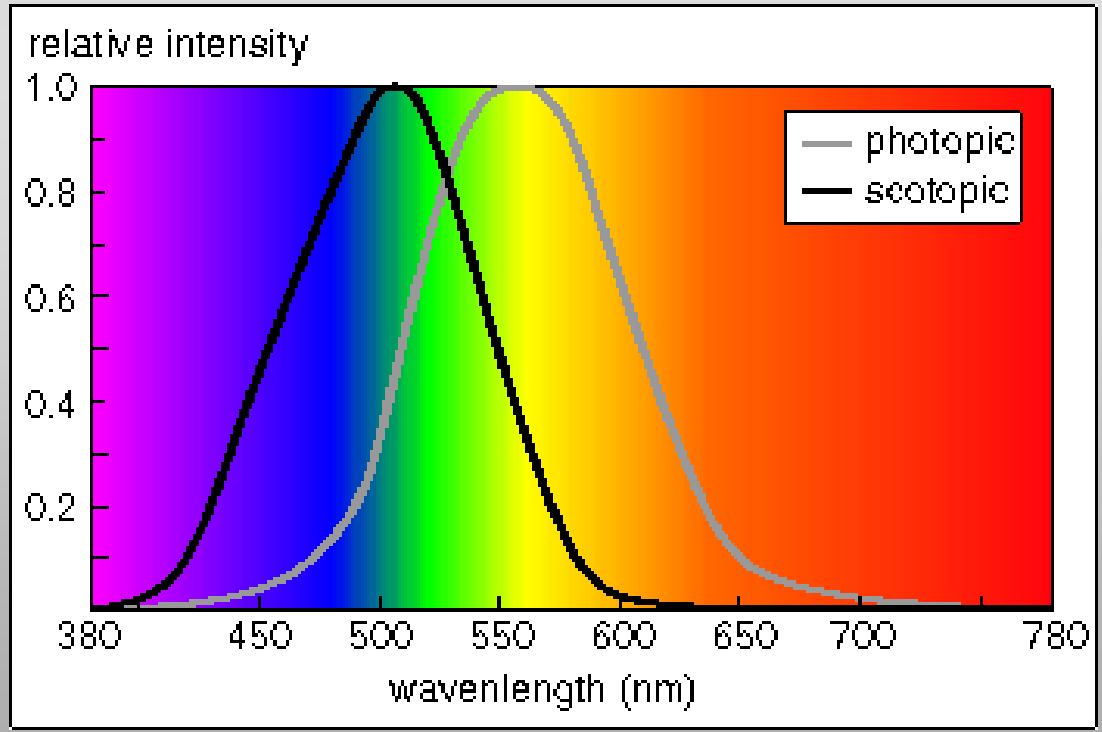
…must be Visible…

- 24 hours a day
  - Daytime Conspicuity
    - Use Fluorescent Materials
  - Nightime Performance
    - Use materials that provide “ideal performance” in the “functional use zone”

Effective Traffic Signing

Human Vision:

- The v(lambda) Curve (sensitivity of the eye)



Photopic – Daytime

Scotopic - Nighttime

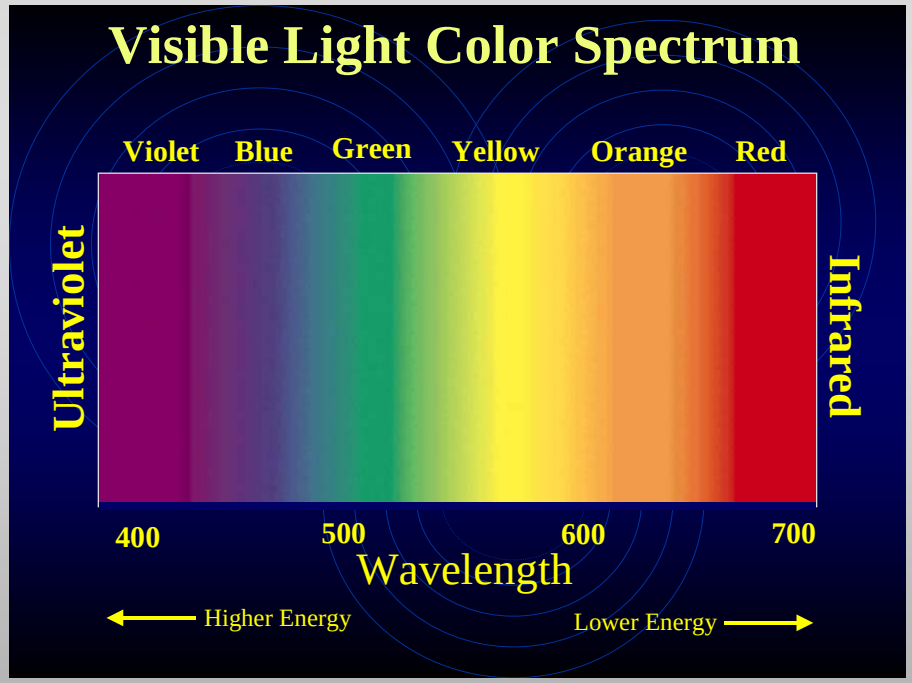
Effective Traffic Signing

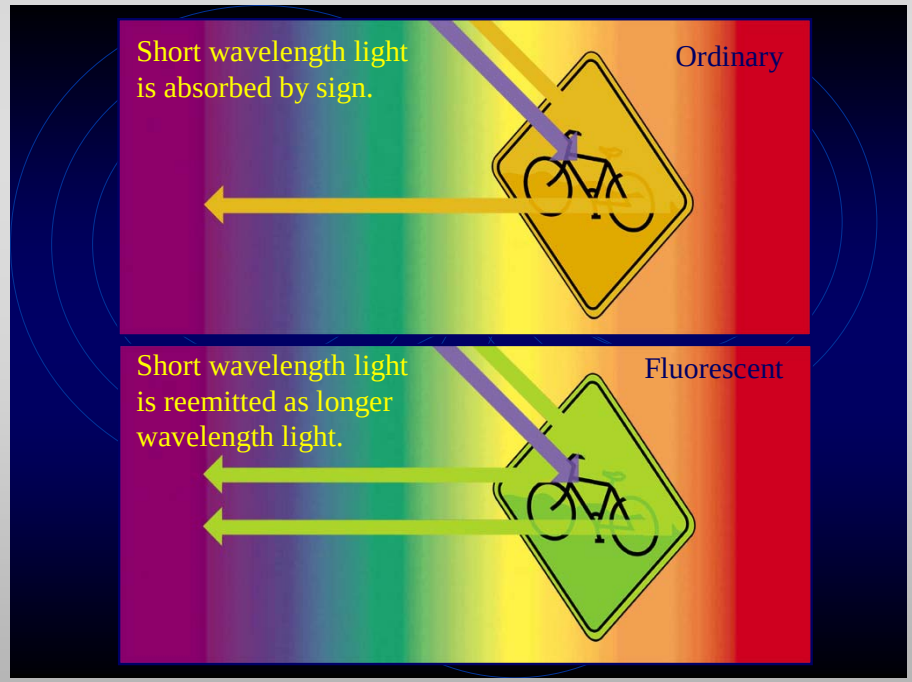
Fluorescent Materials:

- Fluorescence is NOT a color !!
- Fluorescence IS a material property
  - Achieved via dyes or pigments
  - May or may not be durable

Effective Traffic Signing

Fluorescent Materials for Signing:





Effective Traffic Signing

Fluorescent Signs – Advantages:

- Provide **daytime** conspicuity
  - Especially at dawn, dusk, inclement weather
- Attention getting
  - Add “extra” daytime luminance
  - Perform at the peak sensitivity of the eye
    - No “novelty effect”

Effective Traffic Signing

Nighttime Performance – Minimum v. Ideal

- Research points to “ideal luminance”
- Performance based evaluation
  - not specification jousting

Effective Traffic Signing

Meeting Drivers' Needs - Key Research

1. *"Line of Sight Distances to Signs*" Hummer et al; TRB-05-1473 , North Carolina State University
2. *Driver Eye Fixation and Reading Patterns while Using Highway Signs under Dynamic Nighttime Driving Conditions: Effects of Age, Sign Luminance and Environmental Demand***"** Schieber, Frank; Heimstra Human Factors Lab – University of South Dakota, TRB 2004-001951

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Research continued…

3. *"Traffic Sign Luminance Requirements of Nighttime Drivers for Symbolic Signs"* Schnell et al, Operator Performance Lab - University of Iowa, TRB 2004
4. *"The Safety Effects of Traffic Sign Upgrades"* Ripley, D. A.; H.R. Green and Associates, Presented at 2004 ITE Annual Meeting, 2005 TRB Visibility Symposium

Effective Traffic Signing

Research continued…

5. *"A Proposal for Performance-Based Sign Sheeting Criteria"* Paul J. Carlson, Ph.D., P.E.,Texas Transportation Institute, TRB Visibility Symposium,Washington, DC, April 2005. (Expanded in September 2005 for ASTM D04 Committee)

ttiresearch.tamu.edu/p-carlson/files/Performance-Lum-Spec.v03.pdf

Effective Traffic Signing

Research Summary:

- Many (most) signs are obstructed on approach
- Drivers fixate on signs for ~3 seconds to harvest information
- Ideal luminance occurs at ~80 cd/M^2
- Effective signs improve safety

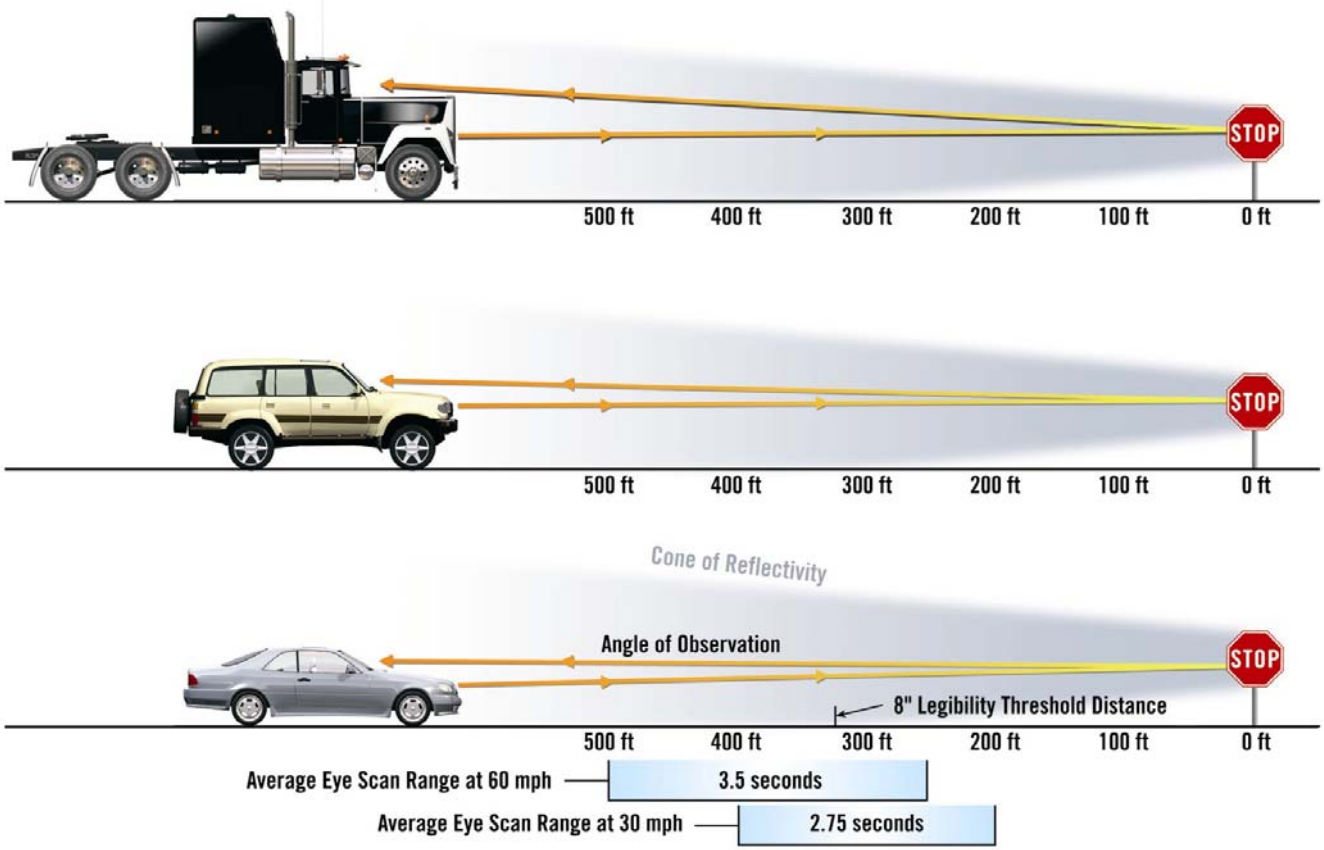
Summary of Human Factors Research

Obs angle

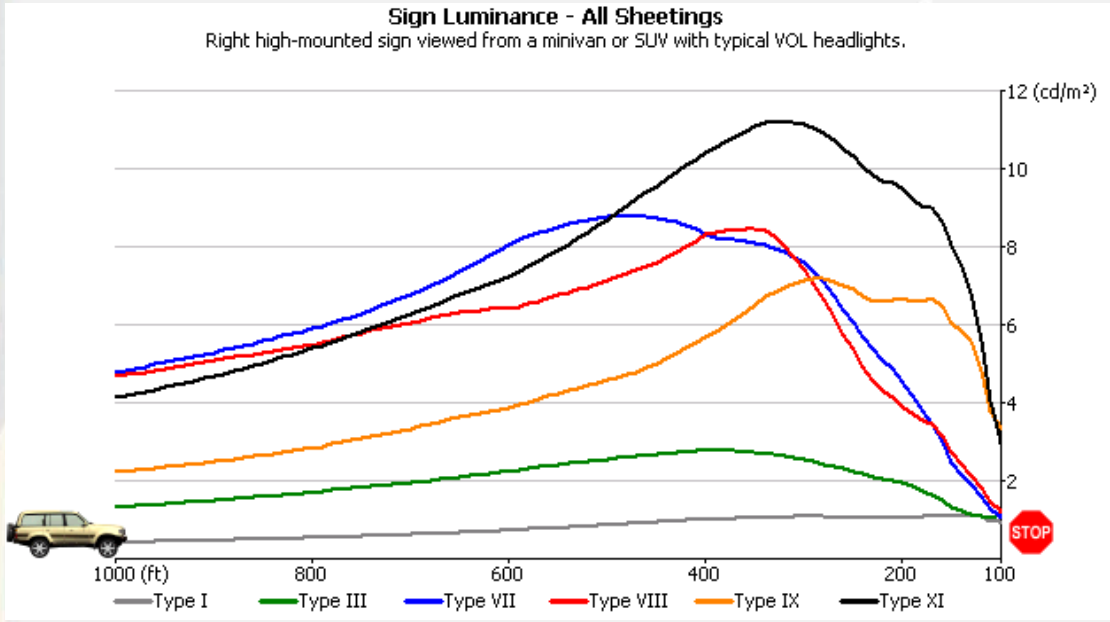
500’ = 0.70^0
400’ = 0.90^0
300’ = 1.20^0
200’ = 1.75^0

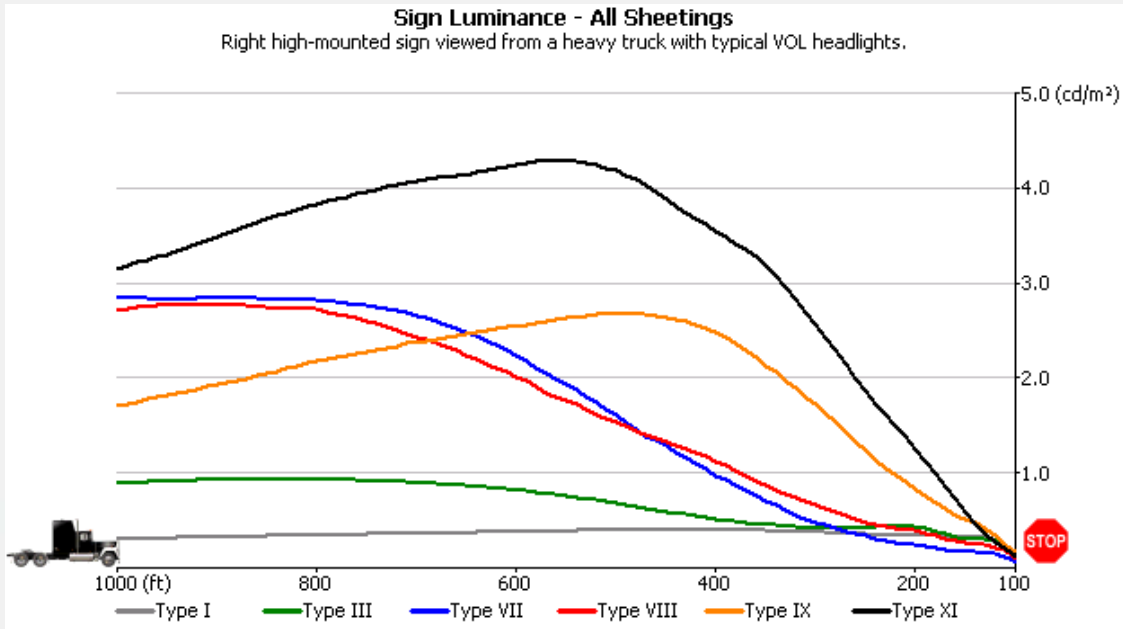
500’ = 0.35^0
400’ = 0.45^0
300’ = 0.60^0
200’ = 0.90^0

500’ = 0.30^0
400’ = 0.40^0
300’ = 0.50^0
200’ = 0.75^0



V1.3





DG³

V1.3

Effective Traffic Signing

Sign material selection should (must?) be based on installed sign performance to meet drivers' needs including older drivers, and drivers of large trucks, buses and RVs….

Effective Traffic Signing

3M Scotchlite DG^3 Sheeting
is optimized to meet drivers' needs,
24 hour a day!

Questions….

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