

Comments on MUTCD Proposed Changes

By Soft Lights

Soft Lights is an advocacy group dedicated to protecting those with light sensitivity disabilities, many of whom are protected under the Americans with Disabilities Act. We welcome this opportunity to comment on the proposed MUTCD changes, docket <https://www.regulations.gov/document/FHWA-2020-0001-0001>

Rectangular Rapid-Flashing Beacon

We first wish to address the device called the Rectangular Rapid-Flashing Beacon. The Notice of Proposed Amendments recommends use of these devices based on a single research study performed in 2014 at the Texas A&M Transportation Institute.

<https://static.tti.tamu.edu/tti.tamu.edu/documents/TTI-2014-5.pdf> A corporate promotional video of an RRFB is found here: <https://youtu.be/d-mERtZC86s>

The short research paper from Texas A&M suggests that drivers are more likely to yield with use of these light bars. However, the study is missing many critical factors related to human health and safety.

1. Luminance – The density of light hitting the eye is measured in candela per square meter (sometimes called ‘nits’). The luminance measurement used in the experiments is not listed, and therefore we cannot rely on the data from this paper because we do not know the intensity of the light.
2. Human eyes are not biologically designed to have high luminance light shined directly into the eye. Low luminance light reflected from an object can be used to make sense of the world, but high luminance light shined directly into the eye will reduce vision, and cause eye damage and psychological harm.
3. The Spectral Power Distribution of the light used in the experiment is not listed and therefore we cannot fully determine how much eye damage is caused by use of these rapid flashing lights.
4. There was no measurement of the psychological effects on the driver after having been immersed in the beams of the high energy, rapid flashing light.
5. There was no testing done on drivers or pedestrians with light sensitivity disabilities such as those with autism, Post Traumatic Stress Disorder, Complex PTSD, epilepsy, migraine sufferers, bipolar disorder, generalized anxiety disorder and others protected by the ADA.
6. The study did not examine the effects of adding additional signs. We have already seen situations where cities have installed multiple RRFBs along the same street, all in proximity, such that the driver is forced to endure high intensity light being into their eyes from multiple sources at different distances simultaneously, greatly reducing driver vision and increasing driver stress.
7. The study did not use different luminance values for day, dusk, and night operation.
8. The study did not compare the use of alternative methods of non-flashing traffic control devices.
9. The study did include information about how Artificial Intelligence in vehicles and Automated Emergency Braking Systems can be used to detect pedestrians. An AI system inundated with rapidly flashing, high luminance lights will have a more difficult time recognizing the pedestrian.

Our focus is on protecting the physical and mental health of those with light sensitivity disabilities. The high luminance rapid flashing may cause sensory overload, a debilitating migraine headache, flashbacks, mental anguish, loss of vision, nausea, or permanent eye damage. Based on real-world experience and feedback from the disability community, RRFBs are an unacceptable physical and psychological health risk and must be prohibited.

Signs with Light Emitting Diodes

Many formerly static signs such as stop signs, speed limit signs and yield signs have been outfitted with high-luminance LEDs. The number of LEDs placed on the sign range from 1 to hundreds. There are currently no limits on the Spectral Power Distribution or luminance of these LEDs, which is leading to physical and psychological harm for pedestrians and drivers. An example is shown below.



Vehicle Speed Feedback Sign

A commercial promotional site is located here: <https://trafficlogix.com/radar-signs-overview/>. Studies have shown that vehicle speed feedback can reduce driver speeding. However, since there are currently no limits on luminance, Spectral Power Distribution or quantity of flashing, cities have already installed vehicle speed feedback signs that reduce driver and pedestrian safety due to the emission of too much information and the use of high-luminance lights as punishment devices.

Information Signs

Informational signs are suffering from excessive luminance, rate of message change and quantity of nearby information. The driver or pedestrian is subjected to sensory overload. Therefore, all non-essential signs such as commercial advertising must be prohibited, and strict limits must be placed on the luminance and change rate of the messaging signs. Permanent electronic information signs must be prohibited from natural areas to protect driver mental health.

To protect human vision, human physical health, human mental health, to comply with the Americans with Disabilities Act, and to best assist Artificial Intelligence systems, we request the following updates to the MUTCD.

1. Maximum luminance of any individual Light Emitting Diode shall be 50 candela per square meter in daylight and 20 candela per square meter at night.
2. Any light that turns on/off in a patterned manner shall do so in a linear, non-digital manner, ramping in intensity from off to on, and from on to off, at maximum rate of once per three seconds.
3. Rapid flashing is prohibited.
4. A Vehicle Speed Feedback Sign shall only display the speed if the vehicle is exceeding the posted limit. The luminance and flashing of the sign shall be kept at low intensities such that the sign is used as a warning, not a punishment. Limits from items (1), (2), and (3) shall apply.
5. To protect human eyes from damage, the amount of visible light from an emitter that is below 500 nanometers shall be less than 5% of the Total Spectral Power.
6. To protect against sensory overload and decreased vision, a sign with LED lighting shall combine and diffuse the individual LED point-sources into a single emission source.
7. Maximum luminance of the light entering the eye from all light sources, including traffic control signs, vehicle headlights, flood lights and streetlights shall be 50 candela per square meter.
8. The number of existing light sources at a location, including from nearby traffic control devices, streetlights, street signals, electronic business signs and other sources of light shall be considered before approving the installation of an additional traffic control device or other electronic sign that emits visible light.
9. The MUTCD shall be updated to contain explicit language that states how those with light sensitivity disabilities are protected.

Submitted by:

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