BEFORE THE U.S. DEPARTMENT OF TRANSPORTATION AND THE FEDERAL HIGHWAY ADMINISTRATION

PETITION FOR RULEMAKING TO REPEAL THE RECTANGULAR RAPID FLASHING BEACON INTERIM APPROVAL

SUBMITTED BY
SOFT LIGHTS FOUNDATION
ON
NOVEMBER 23, 2022

I. Introduction and Summary

In 2008, the Federal Highway Administration issued an Interim Approval which authorized the use of a device called a Rectangular Rapid Flashing Beacon. This device pulses intense, strobing, directed energy visible radiation from Light Emitting Diodes into the eyes of drivers to command them to stop. The FHWA issued the Interim Approval based on a set of studies which used invalid metrics to measure the intensity of the light from a flat surface chip and which failed to assess the neurological and psychological impacts of using LED strobe lights on those who are most sensitive to such strobe lights.

Since the release of the RRFB Interim Approval, many cities, counties, and states have installed RRFBs, typically as mid-block pedestrian crossings. The results have been that numerous people have suffered life-threatening photosensitive seizures, debilitating migraines, panic attacks, anxiety, fear, nausea, anger, agitation, and PTSD-type symptoms when exposed to RRFB strobe lights. The use of RRFB devices violates that Americans with Disabilities Act prohibition against discrimination and requirement of equal access. Those who cannot neurologically process and tolerate such high intensity, strobing, directed energy visible radiation are suffering discrimination.

On October 19, 2022, the FHWA Office of Civil Rights notified the Soft Lights Foundation that the health impacts of LED strobe lights are beyond the FHWA's authority, meaning that the FHWA has deferred to another agency to determine the safety of RRFB strobe lights. The agency mandated by Congress to regulate the comfort, health, and safety of visible radiation from electronic devices, which would include the visible radiation from RRFBs, is the Food and Drug Administration. The FHWA failed to comply with Administrative Procedures Act requirements of petitioning the FDA to publish comfort, health, and safety requirements for

LED products prior to issuing the RRFB Interim Approval. **Given that neither the FHWA nor the FDA have assessed the comfort, health, and safety impacts of LED strobe lights, the FHWA exceeded its authority in issuing the RRFB Interim Approval without prior approval from the FDA.**

This petition requests that the FHWA repeal the RRFB Interim Approval to protect the comfort, health, and safety of the public, and to eliminate the discriminatory barriers created by RRFBs.

II. Statement of Facts

A. MUTCD Interim Approval

While the original FHWA RRFB Interim Approval was granted July 16, 2008, the FWHA issued a Memorandum for RRFBs on March 20, 2018.[1] This Interim Approval was issued "pending official rulemaking". As of November 2022, RRFBs have not been approved through the official rulemaking process. Per the FHWA, "*The RRFB does not meet the current standards for flashing warning beacons as contained in the 2009 edition of the MUTCD, Chapter 4L, which requires a warning beacon to be circular in shape and either 8 or 12 inches in diameter, to flash at a rate of approximately once per second, and to be located no less than 12 inches outside the nearest edge of the warning sign it supplements.*" Also, per the FHWA, *"The RRFB uses rectangular-shaped high-intensity light-emitting-diode (LED)-based indications, flashes rapidly in a combination wig-wag and simultaneous flash pattern, and may be mounted immediately adjacent to the crossing sign."*

1 https://mutcd.fhwa.dot.gov/resources/interim_approval/ia21/index.htm

These statements by the FHWA are significant because they confirm that RRFBs use LED flashes (which are different than incandescent flashes), that these LED flashes are "high-intensity", that the device "flashes rapidly", that the flashes are in a "wig-wag" pattern, and that none of this meets current MUTCD standards.

As discussed in the following sections, the use of high-intensity, rapidly flashing (strobing), wig-wag patterns with unrestricted peak luminance and spatial non-uniformity are predicted to cause epileptic seizures, and in fact have been documented to cause not only seizures, but also migraines, panic attacks, nausea, decreased cognitive functioning, and loss of visual freedom.

In the Interim Approval, the FHWA discusses the results of studies that show that the LED strobe lights used on RRFBs increase yielding rates. While increased yielding rates is desirable, the increase in yielding rates came at the expense of cognitive functioning, visual freedom, and serious adverse neurological and psychological reactions, all of which are unacceptable comfort, health, and safety risks. In addition, the RRFB LED strobe lights create new accessibility barriers for those who become disabled in the presence of LED visible radiation, especially intense pulsed flat surface visible radiation, and thus RRFBs do not comply with the ADA.

It is important to note that the FHWA states in its conditions for RRFB use, "**That FHWA has the right to rescind this Interim Approval at any time;**" and "**That issuance of this Interim Approval does not guarantee that the provisions, either in whole or part, will be adopted into the MUTCD.**" Given these statements, it is not necessary for the FHWA to engage in a drawn-out notification process to entities that have implemented RRFBs. The FHWA may rescind the approval "at any time" and city, county, state, and federal entities were

fully aware that they might be required to remove the RRFBs so as to eliminate discriminatory barriers and protect the public's right to comfort, health, and safety.

Item 5(c) of the Beacon Flashing Requirements of the Interim Approval states, "*The flash rate of each individual RRFB indication, as applied over the full flashing sequence, shall not be between 5 and 30 flashes per second to avoid frequencies that might cause seizures*." Here the FHWA makes it clear that the FHWA was aware the flashing lights can trigger seizures. However, the FHWA, in issuing Interim Approval, did not recognize that flash rate is only one of many factors that can trigger a seizure, and that the values 5Hz and 30Hz do not guarantee that seizures will not occur. In particular, LED flashing lights are considered "strobe" lights by the manufacturers due to the intensity and rate of the flashes. The peak luminance of the RRFB light is unrestricted, and may be 500,000 or 1,000,000 nits, far exceeding the 20-nit safety threshold. LED strobe lights are digital in nature, with instant-on and instant-off properties, which is far more taxing on the nervous system than a flashing light with longer ramp-up and decay times. As noted earlier, RRFBs have a "wig-wag" flash pattern, which increases the risk of seizure. The FHWA placed no restriction on the number of RRFBs placed in a given visual zone, with some government entities installing RRFBs such that the strobing lights can be seen on three, four, or five RRFBs at the same time. To our knowledge, no study has been made to assess the impacts of multiple RRFBs in proximity.

Therefore, while the FHWA's concern for seizure prevention may be well-intentioned, we know that the beacon flashing restrictions stipulated the Interim Approval are insufficient to protect against seizures because **seizures from RRFB strobe exposure have been documented just as predicted by the research studies**.

B. The RRFB Product

Figure 1 shows the intense light emitted by an RRFB. Carmanah is one manufacturer of RRFBs. In this promotional video (https://youtu.be/KBltx0Argag), Carmanah states that RRFBs are "attention grabbing strobe lights." The fact that RRFBs push high intensity, strobing visible radiation directly into the eyes of drivers should immediately disqualify RRFBs from use. The fact that RRFBs "grab" attention should also be a red flag. Safe roads do not include strobe lights or stolen attention.

Figure 1 – Rectangular Rapid Flashing Beacon

C. Texas A&M Transportation Institute Studies

The FHWA relied on just three studies for their decision to issue the RRFB Interim Approval. Evaluation of the Rectangular Rapid Flash Beacon at a Pinellas Trail Crossing in St. Petersburg, Florida[2], October 2009 by William Hunter of the University of North Carolina Highway Safety Research Center, Will You Stop for Me? Roadway Design and Traffic Control Device Influences on Drivers Yielding to

[2] https://nacto.org/docs/usdg/evaluation_of_the_rectangular_rapid_flash_beacon_hunter.pdf

Pedestrians in a Crosswalk with a Rectangular Rapid-Flashing Beacon[3] – June 2016 by Fitzpatrick of the Texas A&M Transportation Institute and Evaluation of Pedestrian Hybrid Beacons and Rapid Flashing Beacons[4] in July 2016, also by Kay Fitzpatrick, Texas A&M Transportation Institute. Although not referenced by FHWA, a similar report Comparison of Driver Yielding for Three Rapid-Flashing Patterns Used With Pedestrian Crossing Signs[5] was published in May 2015 by Kay Fitzpatrick of the Texas A&M Transportation Institute.

The following paragraphs will analyze key statements from the Will You Stop for Me? report.

Page 5: "*Rectangular rapid-flashing beacons flash in an eye-catching sequence to draw drivers' attention to the sign and the need to yield to a waiting pedestrian.*" It is significant that that the researchers note that RRFBs produce "eye-catching" flashes and "attention to the sign." For people with autism and others, this capture of the mind is dangerous, resulting in decreased awareness, a focus on the sign rather than the surroundings, and hyperfocus on the flashing light.

Page 38: "*Unfortunately, the amount of improvement in yielding is not consistent, and there is clearly a large range of yielding among sites (19 to 98 percent per site driver yielding).*" This study appears to not have led to any new knowledge of why the yield rates are so different, other than to say that many variables affect yield rates. Therefore, it is not conclusive whether RRFBs are any better at causing an increase in driver yielding rates compared to any other strategy such as raised intersections, road diets, curb-outs, non-LED flashing lights, etc.

The following paragraphs will analyze key statements from the 2016 Evaluation of Pedestrian Hybrid Beacons and Rapid Flashing Beacons report.

Page 5: The authors reference the RRFB light intensity via an opinion letter which states, "*It is our Official Interpretation that the yellow lights used as warning beacons in RRFBs shall*

[3] https://static.tti.tamu.edu/tti.tamu.edu/documents/TTI-CTS-0010.pdf
[4] https://www.fhwa.dot.gov/publications/research/safety/16040/16040.pdf
[5] https://www.fhwa.dot.gov/publications/research/safety/15041/15041.pdf

meet the SAE J595 requirements for peak luminous intensity (candelas) for Class 1"[6] The reference to peak luminous intensity in candelas shows a misunderstanding of flat surface LED visible radiation. The intensity of LED light is measured in nits (candela per square meter) which is the peak density of the light. The luminous intensity is a measurement for curved surface emitters such as tungsten filament. This misunderstanding of the nature of LED light has created a serious error in the way LED light is measured and has significant impacts on comfort, health, and safety.

Page 8: "*For a subset of the 12 sites used in the FHWA study to evaluate the beacon shape, the luminous intensity (also called brightness) of the beacons was measured*." The researchers have used an invalid metric for brightness for a flat surface source. Luminous intensity is used for curved surface emitters where the emitted light is spatially uniform and disperses following an inverse square law. For flat surface emitters such as LEDs, the brightness is measured in nits (candela per square meter).[7] LED light is spatially non-uniform and directed, and the brightness is measured using peak luminance, not luminous intensity.

Page 11: "*However, LED brightness can also make it more difficult for drivers to see objects around a device (disability glare) or result in drivers looking away from a device (discomfort glare). Either condition—disability glare or discomfort glare—may result in drivers missing hazards located near the source of the glare. In the case of LEDs used at pedestrian crossings, this may affect drivers' ability to detect pedestrians.*" and "*To prevent devices from being set at brightness levels that produce disability or discomfort glare, the profession needs to quantify the effect of bright traffic control devices on a driver's ability to detect pedestrians in and around the crosswalk*." The problem here is that the industry and the researchers mistakenly believe that luminous intensity measures brightness from a flat surface LED,

[6] https://mutcd.fhwa.dot.gov/resources/interpretations/4_09_17.htm
[7] https://ocw.snu.ac.kr/sites/default/files/NOTE/791.pdf

when in fact the correct metric is peak luminance. The researchers also focused only on glare and did not address the neurological and psychological issues related to high intensity LED strobe lights.

Page 11: "*For flashing traffic control devices, there are two important and competing considerations in designing the brightness of traffic control devices: • Is the brightness high enough to command the driver's attention and elicit the desired response (e.g., yielding to pedestrians)? • Is the brightness low enough that it does not impair a driver's ability to see pedestrians because of disability or discomfort glare?*" First, the use of the word "command" illustrates how RRFBs violate civil rights. Commanding a user's attention would seem to be a fundamental violation of the Constitutional right to liberty and freedom. Second, there is a third set of crucial considerations, which is how LED strobe lights impact the nervous system, vision, cognitive functioning, neurological and psychological reactions.

Page 12: "*Following the identification of the pedestrian's direction, the researcher asked the participants to rate the intensity of the LED (comfortable, irritating, or unbearable) before asking the field crew to set up the next condition*." The participants in this study did not include those most sensitive to LED visible radiation, so while these participants may not have selected "unbearable", the results would surely have been different if the participants had photosensitivity such as from a concussion, or due to epilepsy, migraine condition, or autism.

Page 22: Contains a table, Figure 2, of measured LED characteristics from the study. The table shows the measured intensity in candela. As mentioned previously, luminous intensity is an invalid metric for a flat surface LED emitter. For a flat surface, the intensity is measured in nits (candela per square meter) in near-field, approximately 1 micrometer from the chip. We are unaware of a handheld device that is precise enough to measure peak luminance in far-field conditions, so the peak luminance must use specifications from the chip manufacturer. The table from Page 22 therefore does not provide useful or valid data.

Table 5. LED characteristics for set I.

LED Location	Flash Pattern	Target Intensity (Candela)	Measured Intensity (Candela)	Optical Power (Candela-s/min)	Pulse Rate (Number of Pulses/Cycle Length)	On Ratio (Percent)
Above	2-5	600	622	25,600	8.75	69
Above	2-5	1,400	1,426	58,800	8.75	69
Above	2-5	2,200	2,207	91,000	8.75	69
Above	Wig-wag	600	605	36,300	2.00	100
Above	Wig-wag	1,400	1,442	86,500	2.00	100
Above	Wig-wag	2,200	2,237	134,200	2.00	100
Below	2-5	600	675	27,900	8.75	69
Below	2-5	1,400	1,450	59,800	8.75	69
Below	2-5	2,200	2,249	92,700	8.75	69
Below	Wig-wag	600	633	38,000	2.00	100
Below	Wig-wag	1,400	1,458	87,400	2.00	100
Below	Wig-wag	2,200	2,256	135,300	2.00	100
Within	100	600	649	3,900	1.00	10
Within	100	1,400	1,471	8,800	1.00	10
Within	100	2,200	2,225	13,300	1.00	10
Within	Five pulses	600	652	14,700	6.25	38
Within	Five pulses	1,400	1,454	32,700	6.25	38
Within	Five pulses	2,200	2,216	49,900	6.25	38

Note: Flash patterns are defined as follows: 2-5 = 2-5 flash pattern; wig-wag = wig-wag flash pattern; and 100 = one 100-ms flash pattern.

Figure 2 - LED Brightness

Page 31: A discussion of the participants, identifying participants by male or female, and by age. The category of those who are sensitive to LED strobe lights is entirely missing from the classification of the participants. To ensure comfort, health, safety, and wellbeing of the most sensitive members of the population, this study needed to test using people identified has having epilepsy, migraines, anxiety, autism, PTSD, etc. There is also an ethical dilemma concerning the idea of exposing someone who may suffer a seizure or debilitating migraine to such LED strobe lights that would need to be addressed in a study.

Page 24: "*During nighttime, more participants considered the LEDs to be unbearable, as illustrated in figure 27 and figure 28 for set I and figure 29 and figure 30 for set II. Trends in the data show that a larger proportion of the participants felt the flash patterns with the higher intensities were*

irritating or unbearable. Within set I, the wig-wag pattern with a target intensity of 2,200 candelas had the lowest number of participants, indicating it was comfortable for both older and younger drivers." Even though candela is the wrong metric to use with flat surface LED sources, the researchers still noted that brighter LED lights were "irritating" or "unbearable". This information is of critical importance when we assess the neurological and psychological impacts of being subjected to LED strobe lights while driving. After how many pulses does "irritation" turn to "anger" or "rage"? When the driver is surrounded by additional visible radiation such as from LED streetlights, oncoming LED headlights, and LED floodlights, at what point does the addition pulsed visible radiation from RRFBs simply become too much for the human mind to process? What are the long-term psychological effects of being subjected to irritating or unbearable LED strobe lights? Does pulsing irritating and unbearable light into driver's eyes make for a better society?

Page 58: "*Queries 3 and 4 explored whether certain flash patterns and LED locations affected the participants' sense of urgency in needing to yield to a pedestrian.*" The idea of creating a sense of urgency for drivers is an unwise goal, leading to increased stress in a society already filled with many stressors. What are the short-term and long-term impacts of intentionally causing drivers to be stressed? Traffic engineers should be working to reduce stress levels, not creating artificial and unnecessary sources of urgency and stress.

Page 137: "*The brightness of LEDs in the field appears to be highly variable. Part of the reason could be that current requirements only specify a minimum intensity. The minimum intensity is defined within SAE Standard J595; the minimum measured at a horizontal angle of 0 degrees and vertical angle of 0 degrees for class I yellow peak luminous intensity is 600 candelas*." Standards such as SAE Standard J595 are only applicable to curved surface emitters such as tungsten filament. A flat surface emitter such as an LED requires restrictions on spatial non-uniformity, peak luminance, spectral power distribution, and square wave flicker and flash characteristics. We are unaware of any standards for LED

products, whether from the SAE or the FHWA or the FDA. Thus, with no standards for comfort, health, or safety, LED strobe lights on RRFBs can be dangerously bright.

Page 137: "*The brighter the LEDs, the longer it took for the participants to determine which direction the pedestrian was facing. In other words, lower brightness was associated with reduced disability glare.*" This same conclusion is confirmed in other studies of flashing lights at night.[8] Lower brightness is safer and a static light is safer than a flashing light. The absence of regulations makes RRFBs too dangerous for use.

In an interview published on April 24, 2018, researcher Kay Fitzpatrick stated, ""*When I talk to engineers interested in the RRFB device and our research, I emphasize the use of caution. Our research did not answer all the questions, and it's clear that additional studies are needed to determine under what conditions this particular traffic control device is most effective.*"[9] – Questions that were not answered in Ms. Fitzpatrick's studies include neurological and psychological impacts of LED strobe lights, impacts on awareness, vision, and cognitive functioning, and civil rights issues such as visual freedom and compliance with the Americans with Disabilities Act and Rehabilitation Act.

D. Flashing Light Research Studies

A January 2022 study titled, Visually sensitive seizures: An updated review by the Epilepsy Foundation[10] published in the journal Epilepsia contains vital information on the negative impacts of flashing lights. The opening line in the abstract states, "*Light flashes, patterns, or color changes can provoke seizures in up to 1 in 4000 persons*." For the American population, this translates to approximately 83,000 people who must be protected from the risk of suffering a life-threatening seizure.

[8] https://www.respondersafety.com/Download.aspx?DownloadId=f31a5f73-7b95-44c7-bd25-1e4cdfce5229
[9] https://tti.tamu.edu/news/tti-pedestrian-safety-research-influences-national-policy/
[10] https://onlinelibrary.wiley.com/doi/10.1111/epi.17175

The abstract also states, "*Images with flashes brighter than 20 candelas/m2 at 3-60 (particularly 15-20) Hz occupying at least 10 to 25% of the visual field are a risk, as are red color flashes or oscillating stripes.*" Notice that this report uses 3Hz as a lower limit and 60Hz as the upper limit, versus the 5Hz and 30Hz specified in the FHWA RRFB Interim Approval. While we have been unable to obtain the RRFB peak luminance specs from the manufacturers, it is likely that that the peak luminance exceeds 500,000 nits. Considering that seizure risk increases at a luminance greater than 20 nits, it is clear that RRFB LED strobe lights are dangerous for people who have been diagnosed with photosensitive epilepsy. The authors write, "*Prevention of seizures includes avoiding provocative stimuli…*" Therefore, the action of government entities installing and operating RRFBs ignores the advice provided by the medical community of eliminating provocative stimuli. The last line in the abstract states, "*Visually-induced seizures remain significant public health hazards so they warrant ongoing scientific and regulatory efforts and public education*." This petition to repeal the Interim Authorization of RRFBs is one of those regulatory efforts.

In the article IEEE Recommended Practices for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers[11], there is a diagram showing the risk of seizure. Notice that in any situation, there is at least a medium risk of seizure. The high risk of seizure begins at 20 nits and greater than 1 Hz. Here is yet another lower limit (5Hz from the FHWA and 3Hz from the Epilepsia study). Given that RRBs are likely 500,000 nits or greater, RRFB brightness is essentially off the chart in brightness and would likely trigger seizures regardless of the flash rate. It should be clear from this diagram that the use of flashing lights should be avoided in almost all situations.

[11] https://www.bio-licht.org/02_resources/info_ieee_2015_standards-1789.pdf

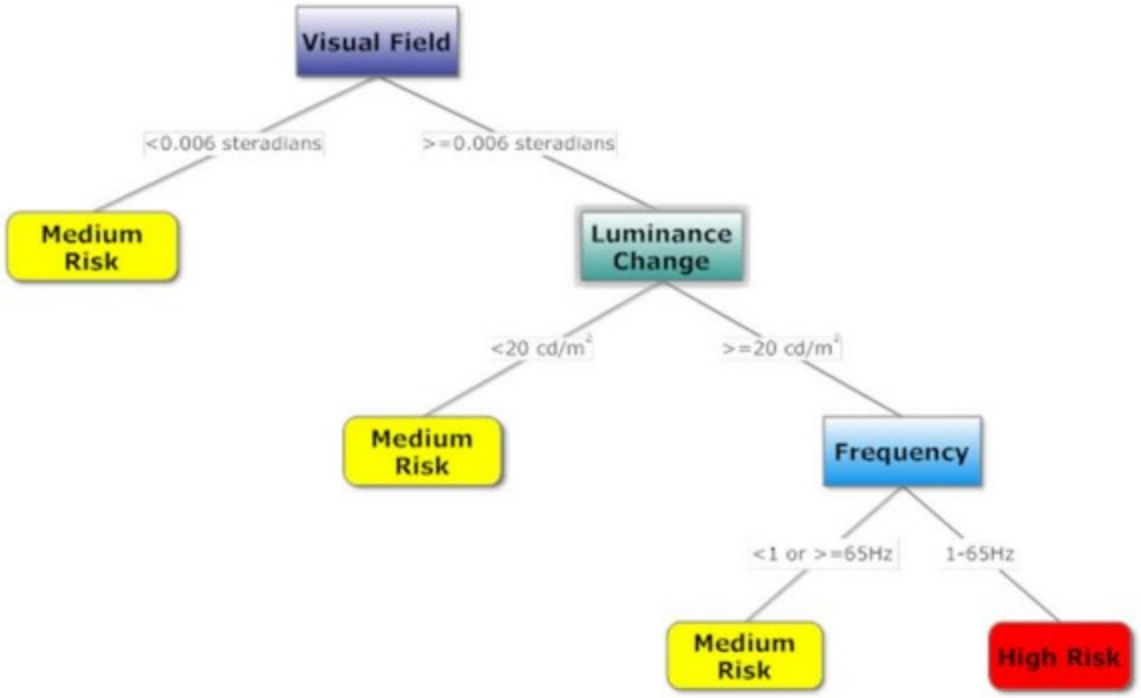

Figure 3 - IEEE Photoepilepsy Diagram

E. Personal injury stories

The possibility of injury such as seizure, migraine, or panic attack is not theoretical. These injuries have already occurred in the real world. Here are stories of personal injury from RRFBs.

Individual 1 – September 9, 2021 – Email to Oregon Department of Transportation

"*LED lights are now so intense, they are causing injury. I personally have suffered repeated psychological trauma from being poked in the eyes by LED lights. Many times, when I drive on Highway 101, I am attacked by these devices and poke in my eyes by the light. My nervous system is now completely frazzled by having been assaulted by these strobing lights so many times. I most likely have Complex PTSD. LED lights have such an intense peak luminance and peak radiance that they overwhelm my central nervous system. I cannot properly see, think, or concentrate. I have mild autism, so these RRFBs are illegal barriers to access and are discriminatory*."

Individual 2 - March 17, 2022 – Email to Little Canada, Minnesota

"*I have photosensitive epilepsy and experience epileptic auras. One day I was driving home from work and I encountered an RRFB (Rectangular Rapid Flashing Beacon). A pedestrian pushed the button on the RRFB and the strobing RRFB was so distracting and blinding that I almost drove into the pedestrian. My epileptic auras began and I was immediately nauseous, my left leg started to twitch, and I felt pain in my eyes. My legs were wobbly, and I felt physically unstable. I drove to my apartment, stepped inside, and then felt like I was losing control of my bladder. Instead, I vomited. I then did almost nothing but sleeping for the next two days and missed work.*"

Individual 3 – July 8, 2022 – Email to Williamstown, Massachusetts

"This incident occurred on Friday, July 8th of 2022 in Williamstown Massachusetts around 3:50 in the afternoon. My mother and I were driving west on Rt. 2 through Williamstown MA, as we approached the intersection of Park St and Rt. 2, a pedestrian approached the crosswalk positioned on the west side of the intersection which triggered the strobe lights on the crosswalk sign. There were no other visible strobe lights in the area and there is a small rise in the road just before the intersection, so the crosswalk came into view suddenly. My mother, a photosensitive epileptic, had an immediate and violent seizure in the passenger seat sitting next to me. Her head and her right arm smashed against the passenger side window a couple of times and her left hand hit my arm a few times while her limbs flailed. Thankfully, I was able to maintain control of my car and rapidly decided to turn right (north) onto park street, to reduce any prolonged exposure to the strobe light facing Rt. 2. There is no curb on Rt. 2 to pull over and I did not want to risk my mother coming into contact with another strobe light, so I felt it best to take this course of action. The crosswalk is positioned to the west of the intersection so I was able to make the turn immediately without needing to wait for the pedestrian to cross. After turning down park street, I turned right again into the first available driveway

to get myself and my mother off the road. That entire maneuver, from contact with the strobe light to when I ultimately pulled into the driveway off of Park St. took about 20-25 seconds, and my mother's seizure was ongoing this entire time. I turned the car off in the driveway and put my arms around my mother to help prevent any further physical injury to her limbs which are still flailing around the cabin of the car. Her seizure progressed for another 60 seconds before she began choking, so I tilted her head forward a bit. Her body stopped seizing after another 30 seconds and then she remained unresponsive for another 2 minutes. I could tell she was breathing so I remained in the driveway until she recovered. I had no ability to administer actual first aid and I could not take her to a hospital without risking further exposure to strobe lights or other seizure triggers. She finally recovered enough to talk to me and asked me for some water/milk to drink. I helped her get a drink of water and I decided to remain on the driveway for another 10 minutes while she regained some strength. We exited Williamstown by heading north on Park St. until it eventually meets up with Rt. 7 north. We had no further incidents on our drive home to Cambridge NY however, my mother was in visible pain the entire ride home. This was one of the most violent seizures I had ever witnessed my mother having and my ability to respond would have been even more limited if it weren't for the position of Park St being east of the strobe light."

F. Warnings On Other LED Products

The operator's manual for the Ryobi P705 Flashlight includes the following: "**WARNING: Do not direct the light beam at persons or animals and do not stare into the beam yourself (not even from a distance) Staring into the light beam may result in serious injury or vision loss.**" The parenthetical "(not even from a distance)" indicates that Ryobi is aware that LEDs emit dense directed energy that has little dissipation, even at long distances, and that LED visible radiation does not follow an inverse square law.

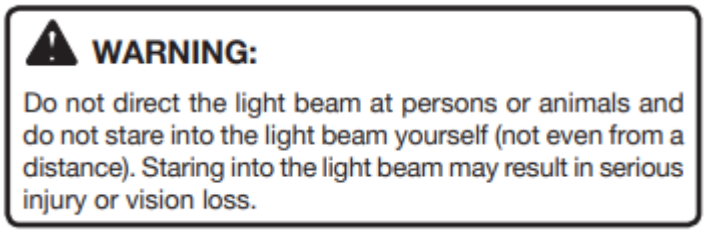

Figure 4 - Ryobi P705 LED Flashlight Warning

It is difficult to imagine that the FHWA has given Interim Approval to the RRFB product that pulses high intensity LED strobe lights directly into the eyes of drivers, when companies such as Ryobi put a warning label on their product explicitly stating that LED light is dangerous and can cause serious injury or vision loss. This is a liability issue for government entities that install RRFBs, knowing that they can cause eye injury.

G. Food and Drug Administration Regulation

In 1968, Congress passed the Radiation Control for Health and Safety Act, directing and authorizing the Food and Drug Administration to regulate electromagnetic radiation from electronic products. Electromagnetic radiation is categorized by frequency. While humans have managed to harness this radiation, the radiation can also be harmful to human health. In the US, the federal agency responsible for setting comfort, health, and safety standards for electromagnetic radiation is the FDA. As can be seen in Figure 5, this includes radiation on the human visible portion of the spectrum. Light Emitting Diode products are electronic products that emit visible radiation, and thus it is the duty and responsibility of the FDA to set protective standards.

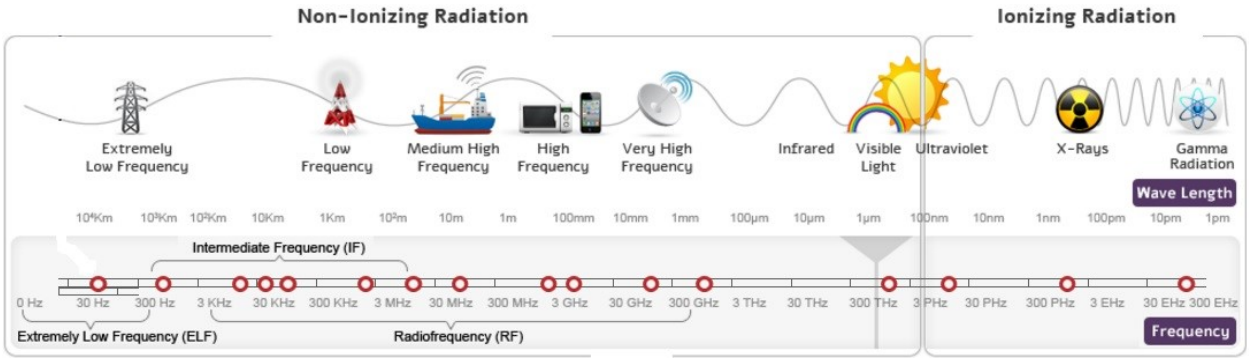

Figure 5 - Electromagnetic Spectrum[12]

Unfortunately, as of this writing, the FDA has not published the necessary comfort, health, or safety standards for LED products. To rectify this situation, the Soft Lights Foundation has petitioned the FDA to regulate LED products and the visible radiation emitted by them.[13] As of this writing, the petition is under review by the FDA and accepting public comments.

The Administration Procedures Act of 1946 defines the system for creating new regulatory rules. To our knowledge, neither the FWHA nor any of the RRFB manufacturers have petitioned the FDA for authorization to manufacture, sell, or operate RRFBs. While we acknowledge that the FDA has made a grave error by not publishing comfort, health, and safety regulations for LED products decades ago, the FHWA and the manufacturers cannot choose to simply ignore the Administrative Procedures Act. The correct set of steps would have been for the FHWA or RRFB manufacturers to petition the FDA for regulatory approval, at which point the FDA would have either rejected the petition or would have developed the necessary regulations to protect the public from the directed energy visible radiation emitted by LED devices.

In a letter to the Soft Lights Foundation on October 19, 2022[14], the FHWA Office of Civil Rights stated, "*The allegations you have raised about the health impacts of RRFBs raise complex issues related*

[12] https://www.tnuda.org.il/en/physics-radiation/what-radiation/electromanetic-radiation-spectrum
[13] https://www.regulations.gov/document/FDA-2022-P-1151-0001
[14] https://www.softlights.org/wp-content/uploads/2022/10/Baker-CL-2022-0375.pdf

to the regulation of all Light Emitting Diode (LED) lights, not just those used in RRFBs, that extend beyond FHWA's authority." The reference to regulation of LEDs is to the FDA. The FHWA thus acknowledges that it has no authority to regulate LED products and thus the FHWA has no authority to issue the RRFB Interim Approval until the FDA has published the regulations for LED products.

H. Civil Rights Claims

The lack of FDA regulations for RRFBs and the dangerous and discriminatory LED strobe lights has already led to multiple claims of discrimination. Discrimination is prohibited by the Americans with Disabilities Act. A news media story details one such RRFB ADA lawsuit in Ashland, Oregon.[15] An RRFB civil rights violation claim has been submitted to the Minnesota Human Rights Commission, Case Q# 107420, and this case is currently in progress. Another RRFB ADA claim has been made in Williamstown, Massachusetts. An LED civil rights claim has been made to the New York State Human Rights Commission, Case 10212383.

RRFBs violate our right to visual freedom. While the idea that LED strobe lights restrict visual freedom may be a new idea, and lacking legal case histories, it should not be difficult to realize that pulsing high intensity, strobing, directed energy visible radiation into our eyes would be a violation of basic human rights.

III. Conclusion

In this petition, we have shown the following:

1. LED products are unvetted, unregulated, unapproved, dangerous, and discriminatory.

[15] http://ashland.news/local-activist-sues-city-of-ashland-over-flashing-leds/

2. The FHWA acknowledges that the FHWA has no regulatory authority for RRFBs because RRFBs are an electronic product regulated by the FDA.
3. RRFBs have been shown to cause serious harm and injury, including nausea, panic attacks, seizures, reduced cognitive functioning, and possible eye injury.
4. RRFBs are discriminatory, violating ADA prohibitions against discrimination and ADA requirements of equal access.
5. Researchers used the wrong metric of peak luminous intensity, rather than the correct metric of peak luminance to measure the brightness of RRFB LED visible radiation.
6. Researchers found that the brightness of RRFBs at night is irritating and unbearable to many people.
7. Researchers failed to assess the impacts of RRFB LED strobe lights on those who are most sensitive and most likely to be harmed, including those with epilepsy, autism, migraine conditions, people recovering from a concussion, and those with PTSD.
8. Research by the Epilepsy Foundation and IEEE found that there is a risk of seizure from flashing lights starting at 20 nits. RRFB LED strobe lights are possibly in excess of 500,000 nits.

For these reasons, we request that the FHWA repeal the RRFB Interim Approval.

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