

WSDOT Interim Guidance for Crosswalk Rapid Flashing Beacon (RFB) Systems

In response to the FHWA Termination of IA-11, Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons, WSDOT has chosen to utilize circular rapid flashing beacons (CRFBs) in place of rectangular rapid flashing beacons (RRFBs). Standard details have been developed and made available through the WSDOT website at <http://www.wsdot.wa.gov/Design/Standards/PlanSheet/IS-22.htm>.

To comply with current MUTCD requirements for flashing beacon flash rates, as described in Chapter 4 Section 4L.01, WSDOT will be implementing the following flashing beacon pattern for CRFBs:

- The left beacon is on and the right beacon is off for 0.25 seconds.
- The left beacon is off and the right beacon is on for 0.25 seconds.
- The left beacon is on and the right beacon is off for 0.25 seconds.
- The left beacon is off and the right beacon is on for 0.25 seconds.
- The left beacon is on and the right beacon is off for 1.00 seconds.
- The left beacon is off and the right beacon is on for 1.00 seconds.
- Cycle repeats.

Beacon	Time (seconds)							
	0.25	0.25	0.25	0.25	1.0		1.0	
Left	ON	OFF	ON	OFF	ON		OFF	
Right	OFF	ON	OFF	ON	OFF		ON	

This pattern complies with the MUTCD requirement that the flash rate be not less than 50 or more than 60 times per minute for each beacon, as each beacon flashes 3 times for every 3 second cycle, or 60 times per minute. This pattern also complies with the requirement that the illuminated period of each flash be a minimum of 1/2 and a maximum of 2/3 of the total cycle, as each beacon is on for 1/2 of the cycle length at 1.5 seconds of the 3 second cycle length and 30 seconds out of every 60 seconds.

Additionally, this pattern provides an irregular sequence, which appears to provide better responsiveness than fixed 50-50 wig-wag flashing lights, while still abiding by the recommendations of the Epilepsy Foundation that flashing light sequences operate at 2 flashes per second or less (2 Hz) and include periodic longer breaks rather than a continuous flash cycle.

WSDOT will continue to evaluate other flash patterns for possible requests for experimentation, based on research which appears to show that dark time greater than 50% improves driver responsiveness and ability to recognize the sign information and associated entities.

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References:

FHWA Interim Approval IA-11:

https://mutcd.fhwa.dot.gov/resources/interim_approval/ia11/fhwamemo.htm

FHWA Termination of Interim Approval IA-11:

https://mutcd.fhwa.dot.gov/resources/interim_approval/ia11/terminationmemo/index.htm

MUTCD Chapter 4L: <https://mutcd.fhwa.dot.gov/htm/2009r1r2/part4/part4l.htm>

TRB Journal 2073-08, Stutter-Flash Light-Emitting-Diode Beacons to Increase Yielding to Pedestrians at Crosswalks: <http://trrjournalonline.trb.org/doi/abs/10.3141/2073-08>

Epilepsy Foundation Recommendations regarding Photosensitivity and Seizures:

<https://www.epilepsy.com/learn/triggers-seizures/photosensitivity-and-seizures>

FHWA TechBrief FHWA-HRT-15-041, Comparison of Driver Yielding for Three Rapid-Flashing Patterns Used with Pedestrian Crossing Signs:

<https://www.fhwa.dot.gov/publications/research/safety/15041/15041.pdf>