



LED Elevated Runway Guard Lights

Study Goals

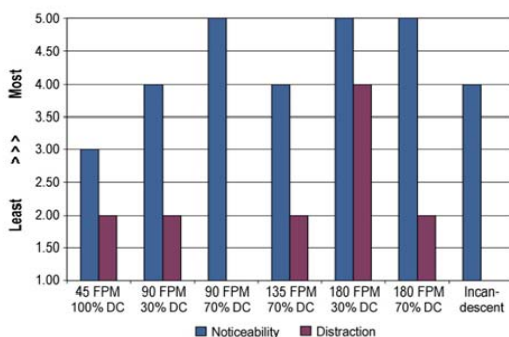
Researchers from the Lighting Research Center (LRC) at Rensselaer Polytechnic Institute investigated the benefits of the LED-based elevated runway guard light (ERGL) compared to the incandescent-based ERGL.



Research Activities

A laboratory study first conducted in 2008 by LRC researchers showed that the minimum luminous intensity requirements for incandescent-based ERGLs were adequate, but the intensity of LED-based ERGLs with the right combination of flash rate, duty cycle, and waveform shape could be reduced to one-third of the recommended value for an incandescent system. Incandescent lamps have reduced effective intensity due to the slow rise time in light output caused by the larger thermal mass of the filament, whereas the light output of LEDs has a faster rise time and thus higher effective intensity and increased conspicuity. This is the reason why LED-based ERGL intensity can be reduced without reducing visibility.

A follow-on study conducted by LRC scientists in 2010 at Schenectady County Airport in Glenville, N.Y., validated the laboratory findings. The field study results illustrated in the graph show that the LED-based ERGL at an intensity value less than 30% of the incandescent



Field study results

base case and modulated at 90 flashes per minute (FPM) and 70% duty cycle (DC) showed the highest noticeability to the observing pilots with minimum distraction.



Pilot perception of the prototype LED-based ERGL (left and right) at Daytona Beach International Airport.

In 2011, LRC researchers supported the FAA and researchers at Embry-Riddle Aeronautical University to conduct a larger scale field study at Daytona Beach International Airport in Florida to validate the LRC's study findings. The 86 pilots who participated in the study perceived the lower intensity LED prototype fixtures to be brighter, more noticeable, and more preferred than the incandescent based ERGLs.

A properly designed LED-based ERGL with much lower intensity is more effective than an incandescent-based ERGL in alerting pilots. Furthermore, LED-based systems have the potential to be less expensive to use and maintain.

For More Information

Radetsky, L.C., et al. 2014. Proc. of 2014 FAA Worldwide Airport Technology Transfer Conference, Galloway, N.J., August 4-8, 2014; www.airporttech.tc.faa.gov/DesktopModules/FlexNews/DownloadHandler.aspx?id=7d2febec-ad2b-40eb-8fd7-9813e3bfc083&f=S10109-Radetsky.pdf.

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