

FAA Runway Guard Lights

As part of the FAA's Centers of Excellence program, the LRC is exploring the potential performance and application of new light source technologies, primarily LEDs, in airport and airfield lighting. Recently, LRC scientists compared the functioning of runway guard lights (RGLs) using LEDs to those using traditional incandescent light sources. RGLs indicate where pilots should yield when maneuvering a plane onto an active airport runway.



Runway guard light.

One advantage of LED technology is the ability to "tune" LEDs to make the light output more or less noticeable to the human eye. In this study, researchers "tuned" the LED-based RGLs, manipulating frequencies (flash rates) and on-times, to determine the relative intensity requirements and to increase conspicuity compared to incandescent-based RGLs. Reaction times and conspicuity data were collected from subjects in conditions that represented daytime, nighttime and foggy daytime.

Phase 1: Defining minimum intensity requirements for incandescent RGLs

LRC scientists determined, for the three test conditions, the current minimum luminous intensity requirements necessary for incandescent-based RGLs is sufficiently noticeable to pilots. Based on the findings, the researchers concluded that the current minimum luminous intensity levels for incandescent-based RGLs should not decrease for any of the tested conditions.

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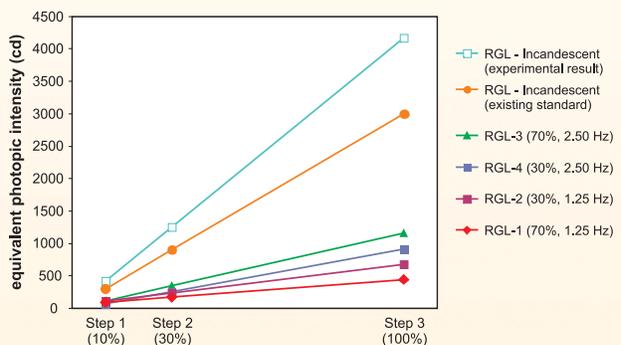
Federal Aviation Administration (FAA)
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Runway guard lights on the airport tarmac.

Phase 2: "Tuning" LED-based RGLs

Researchers went on to test a range of LED-based RGL frequencies and on-times. Based on those findings, the most effective combination of frequency and on-times for best conspicuity results and the fastest reaction times were frequencies of 1.25 Hz and 2.50 Hz, with on-times of 30% and 70%.



The average minimum intensity of LED-based RGLs could be reduced by approximately 60% from the current recommended values.

Phase 3: Reduced intensity

When applying the ideal combinations of frequency and on-times, the average minimum intensity of LED-based RGLs could be reduced by approximately 60% from the current recommended values. The amount of reduction is dependent on the specific temporal signature of the LED lamp.