The visibility of an object is largely determined by the relative contrast between the object and its background. Thus, it might be assumed that without consideration of environmental conditions surrounding a target illuminated by a headlamp, target visibility may not be accurately assessed. That is, methods that consider only illuminance characteristics of headlamps (e.g., distribution and intensity of light) may assess headlamp performance differently from methods that include roadway and viewing conditions in the appraisal.

In this report, headlamp performance ratings are first generated using CHESS, a software application that determines visibility by simulating headlamp illumination, roadway, and target characteristics, using target contrast. The CHESS ratings were then compared with ratings obtained by two alternative illuminance-based ratings methods. The first method, the lux-area method, computes road area at or above an established lux threshold. The second method, the distant-light method, computes the average lux level within a predefined forward road area centered on the midline of the vehicle. Twenty-two tungsten halogen (TH) headlamps were evaluated using each method and their performance ratings were compared with the CHESS ratings. The simple illuminance-based measures were found to be closely correlated with the CHESS ratings. The distant-light method produced the highest correlations.