

1. Report No. UMTRI-2001-3		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Field Measurements of Direct and Rearview-Mirror Glare from Low-Beam Headlamps				5. Report Date January 2001	
				6. Performing Organization Code 302753	
7. Author(s) Sivak, M., Flannagan, M.J., Schoettle, B., and Nakata, Y.				8. Performing Organization Report No. UMTRI-2001-3	
9. Performing Organization Name and Address The University of Michigan Transportation Research Institute 2901 Baxter Road Ann Arbor, Michigan 48109-2150 U.S.A.				10. Work Unit no. (TRAIS)	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address The University of Michigan Industry Affiliation Program for Human Factors in Transportation Safety				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes The Affiliation Program currently includes Adac Plastics, AGC America, Automotive Lighting, BMW, Corning, DaimlerChrysler, Denso, Donnelly, Federal-Mogul Lighting Products, Fiat, Ford, GE, Gentex, GM NAO Safety Center, Guardian Industries, Guide Corporation, Hella, Ichikoh Industries, Koito Manufacturing, Libbey-Owens-Ford, LumiLeds, Magna International, Meridian Automotive Systems, North American Lighting, OSRAM Sylvania, Pennzoil-Quaker State, Philips Lighting, PPG Industries, Reflexite, Schefenacker International, Renault, Stanley Electric, Stimsonite, TEXTRON Automotive, Valeo, Vidrio Plano, Visteon, Yoroka, 3M Personal Safety Products, and 3M Traffic Control Materials. Information about the Affiliation Program is available at: http://www.umich.edu/~industry					
16. Abstract <p>This study measured direct and rearview-mirror glare illuminances produced by low-beam headlamps in a sample of 22 passenger vehicles. The glare illuminances were measured for 12 common glare situations that were defined by a full factorial combination of three scenarios (oncoming driver, center rearview mirror of a preceding driver, or driver-side mirror of a preceding driver one lane to the right), two longitudinal distances (25 m or 50 m), and two vertical locations (illuminated vehicle being either a car or a light truck/van/SUV). The measurements were made outdoors at night on asphalt pavement.</p> <p>The median illuminances ranged from 0.5 lux for an oncoming driver of a light truck/van/SUV at a distance of 50 m, to 3.4 lux at the driver-side mirror of a preceding car at 25 m one lane to the right. (These values do not take into account window transmittance or mirror reflectance.) The ratios of the maxima and the minima measured for each of the 12 glare situations ranged from about 5:1 to 36:1.</p> <p>The median actual illuminances were compared to the median expected illuminances based on a recent, laboratory-measured, representative sample of U.S. low-beam patterns, taking into account the possible effects of dirt, voltage, misaim, and pavement reflectance. This analysis indicates that the actual illuminances could be very well modeled using the laboratory-measured beam patterns and assuming a linear relationship between the light output of clean and dirty headlamps. Additional analyses evaluated the relationships between headlamp mounting height and glare illuminance.</p>					
17. Key Words glare, oncoming traffic, rearview mirrors, cars, light trucks, vans, SUVs, low beams, passing beams, lamp mounting height, field measurements				18. Distribution Statement Unlimited	
19. Security Classification (of this report) None		20. Security Classification (of this page) None		21. No. of Pages 19	
22. Price					