APRIL 2019

FACT SHEET

AAA HEADLIGHT RESEARCH

Background

Only one-quarter of driving is done at night, yet 52 percent of driver fatalities and 75 percent of pedestrian deaths occur after dark. Headlights, one of the most critical safety components of a vehicle, often do not provide adequate lighting to safely illuminate the roadway. Since 2015, AAA has conducted a number of research projects and consumer surveys to better understand the limitations of headlights and what can be done to improve safety for nighttime driving.

This latest headlight research was intended to evaluate Adaptive Driving Beam Headlights (ADB) currently in operation in Europe and Canada. The study looked to compare U.S. specification headlights to European specification to determine differences in performance. With ADB, the high beams are always on and when another vehicle is detected, that area is shaded to prevent glare that would otherwise interfere with the other driver's field of vision. Some newer U.S. vehicles are equipped with a similar technology that automatically switches between high and low beam, which does help to address this issue and increase visibility, but only when other vehicles aren't present. However, once an oncoming or preceding vehicle is detected, the car will switch from high to low beams, thus losing the benefit of the additional light.

This project, along with previous ones that also examined the limitations of U.S. headlights, was used to respond to NHTSA's proposed changes to current U.S. headlight standards and offer suggestions on how nighttime driving safety can be improved.

Key Findings *(from 2019, 2018 and 2015 research)*

Comparison of European and U.S. Specification Headlights (2019)

- Average illumination for high beam is 12.5 percent higher for European specification as compared to U.S. specification headlamps.
- European specification systems consistently provided more roadway lighting when an oncoming vehicle was approaching, or a preceding vehicle was close.
- Based on static target illumination data, the increase in roadway lighting could be as much as 86 percent (comparison of average European specification high beam to U.S. specification low beam).
- The adaptive driving beam (ADB) system maintained high beam operation in all areas except those intentionally shaded by the system to minimize glare.

Headlight Lens Deterioration (2018)

- Deteriorated headlamps produce only 22 percent of the light output (low beam) that new, original headlights provide.
- Original equipment manufacturer headlight replacement parts restore headlights to like new condition.
- Professional and DIY restorations returned light output by up to 70 percent.

Method	Percentage of Restored Light	Total Cost*
Replacement – original equipment manufacturer headlamp assembly	100 percent	$331 - $427
Replacement – certified aftermarket headlamp assembly	90 percent	$131 - $259
Replacement – non-certified aftermarket headlamp assembly	83 percent	$104 - $190
Restoration – professional	70 percent	$77
Restoration – DIY	70 percent	$21

**Costs for vehicles researched includes parts, labor and tax.*
Range includes professional as well as do-it-yourself installation.

Automotive Headlight Systems (2015)

- Low beam headlights found on most cars are insufficient at speeds above 39 mph (halogen reflector), 45 mph (halogen projector/HID) and 52 mph (LED) when used on roadways without additional overhead lighting.
- High beam headlights provide an average of 28 percent more forward illumination than low beams.
- On high beam, headlights provide adequate lighting for maximum speeds of 48 mph (halogen reflector) and 55 mph (halogen projector/HID/LED).
- Among those U.S. adults who drive at night, two-thirds (64 percent) say they do not regularly use their high beam headlights.
- One-in-five Americans report performing a headlight restoration service on their vehicle.

AAA Recommendations

- When driving at night on unlit roadways, use high beams whenever possible. There is a difference between seeing the roadway markings, signs, and other vehicles, versus being able to perceive a non-reflective object in your path.
- Monitor and adjust driving speeds when traveling on unlit roads at night to allow enough time to detect, react and stop the vehicle in order to avoid striking a pedestrian, animal or object in the roadway.
- If your car's headlamp lenses are anything but crystal clear, have them restored or replaced to improve light output. Inexpensive replacement and restoration services are available at most repair shops including AAA Approved Auto Repair facilities.