



STIC Note

LED Lighting for Safety - Headgear



BACKGROUND/PROBLEM

Maintaining visibility at night or in hazardous environments is essential when Coast Guard deck crews perform operations. The Science and Technology Innovation Center (STIC) received requests from the fleet for improved visibility during night time deck operations and for damage control evolutions, which prompted an investigation into hands-free lighting technology. Through research, STIC identified head lamp technology as a viable source of hands-free lighting technology available on the market.

METHODS

Based on field input, the STIC team focused on hands-free lights with 360-degree illumination for buoy deck operations and damage control operations with specialized safety firefighting lights. The STIC team also received input on safety needs of a firefighting crew from industry and DHS partners such as the National Urban Security Technology Laboratory (NUSTL). The team conducted market research to determine the best quality-to-value safety lights for hardhats.

Five headlamp models were purchased and shipped to cutters for operational testing and limited user evaluation (LUE). Feedback was solicited via questionnaire and email.

EVALUATION

The STIC team developed two kits for LUE: one for 360-degree lighting and one for hands-free lighting that could be worn in a hazardous environment. The first kit consisted of the Illumagear Halo Hard Hat light, as it was the only commercial-off-the-shelf (COTS) product found that met all desired attributes.



Figure 1. Illumagear Halo Hard Hat Light.

The Illumagear was sent to four cutters for LUE: CGC HICKORY, CGC MACKINAW, CGC HEALY, and CGC SPAR. Only CGC MACKINAW found the product useful; all other crews stated the lights were too bright to be used at night and did not significantly improve visibility or the safety of their operations. Furthermore, these lights could not be used during hazardous operations because they were incompatible with required face shields and other personal protective equipment (PPE).

The second kit, designed primarily for use by firefighting crews, consisted of four COTS, hazard-safe lights:

<u>Headlamp Model</u>	<u>ROM</u>
Nightstick DICATA	\$87.74
Nightstick FORTEM	\$76.39
FoxFury Discover LoPro	\$124.99
Streamlight Vantage	\$114.75

All four lights were sent to CGC HICKORY and CGC MACKINAW for testing. Operators on both cutters found that the Nightstick DICATA interfered with Bullard helmet face shields, although CGC MACKINAW operators noted that it was the brightest of all models evaluated and easiest to use for an operator wearing firefighting gloves. The remaining headlamps did not interfere with the face shields, but the buttons used to activate the headlamps were too small. CGC HICKORY reported difficulties in mounting the FoxFury Discover, due to the large size of the battery pack. No significant mounting difficulties were noted among the other models.



Figure 2. Nightstick Fortem Aboard CGC MACKINAW.

Button size, versatility in mounting and swivel, and compatibility with existing PPE are

important factors when considering model utility. CGC HICKORY concluded the Nightstick FORTEM is a worthwhile addition to all firefighting helmets. Additionally, CGC MACKINAW commented that the headlamps are “100% beneficial,” and stated that all the headlamps provide the same amount of light and usefulness.

CONCLUSIONS

Although improved lighting was requested, existing COTS 360-degree hard hat lights are not recommended for fleet use at this time. Crew feedback was overwhelmingly poor or disinterested, with the exception of the crews of CGC MACKINAW, who reported a positive impact on visibility and safety.

Feedback concerning the firefighting helmet safety lights was positive. A single model was not judged to be the best across evaluators, but all agreed that the headlamps were beneficial and would provide utility. Operators agreed these low-cost headlamps for firefighting helmets benefit Coast Guard operations and should be purchased for use in damage control operations across the fleet. CG-926 will engage CG-7 offices for recommendations for fleet purchase.

FUTURE WORK

Future designs of 360-degree hard hat lights may be viable if they include dynamic options, such as the ability to control lumens and color.

The Science and Technology Innovation Center (STIC) is a DHS S&T and USCG collaboration.