



STIC Note

LED Lighting for Safety - Rotary Wing



BACKGROUND/PROBLEM

The Aviation Logistics Center (ALC) approached the Science and Technology Innovation Center (STIC) about an interest in evaluating better ways to light the hoist hook on CG helicopters. Current practice is to clip a chemical light onto the hoist hook during low-visibility and night operations. To determine if there are better solutions, the STIC worked with ALC and the Office of Aviation Safety (CG-1131) to purchase and test LED cable hoist lights.

METHODS

The MH-65 and MH-60 rotary wing aircraft have different styles of hoist hooks, and therefore require different hoist light designs. The MH-65 uses a Breeze style light hook, while the MH-60 uses a Goodrich style light hook. Zephyr International produces lights for both styles of hooks (Figure 1).



Figure 1. Goodrich (MH-60) Style Light on the Left, Breeze (MH-65) Style Light on the Right. Photo Credit: USCG



Figure 2. Breeze Style Light on an MH-65. Photo Credit: USCG

The STIC purchased four Breeze hook lights and five Goodrich hook lights, for a total of nine lights to cover all testing requirements. Each light cost approximately \$1,000. ALC first bench-tested the lights for battery life and cold weather operation. The Aviation Life Support Equipment (ALSE) Division tested the Breeze light at the ATTC Rescue Swimmer Training Facility (RSTF) (Figure 3), where



Figure 3. Breeze Style Light at ALC RSTF. Photo Credit: USCG

aviators and Rescue Swimmers evaluated the devices. Once ground-testing was completed, user surveys were requested from air crews and boat crews that tested the lights in operation.

EVALUATION

The Breeze style light testing at RSTF illustrated a potential problem where the light caused the spring bumper to separate from the hook causing the spring to travel free on the cable. Users also noticed that the light obstructed the rescue swimmer's operations and made it difficult to attach the hook to the lifting sling. Because of these problems, the ALSE did not recommend the light to be used on the MH-65. Goodrich style light (Figure 4) ground-testing did not indicate any problems, and it was recommended that the light be tested for 60 days on training evolutions with the MH-60.



Figure 4. Ground Testing of Goodrich Style Light. Photo Credit: USCG

After approximately 20 training evolutions with the Goodrich style light, the evaluation was canceled because the weight of the light caused the rubber bumper to separate from the hook and travel freely on the hoist cable. This was deemed a

safety concern, and thus halted the evaluation. Completed surveys were gathered from the evaluators and the responses did not support a recommendation for operational use. Most of the feedback focused on the size, weight and brightness of the light. The size made it difficult for the Rescue Swimmers to manipulate the hook, the weight made it difficult for the Flight Mechanics to control the swing of the hook, and the brightness affected the night vision of the flight crews. There was one positive review from a pilot stating that they were able to see the hook better when the light was on.

CONCLUSIONS

The common practice of flight crews is to clip a chemical light onto the hoist hook and this simple solution is still preferred over the LED lights tested. Surveys from boat crews also indicated that any benefit from the more brightly-lit hook was marginal, and was unlikely to reduce the likelihood of fouling the hoist hook.

FUTURE WORK

Future hoist lights should be considered for testing if they have addressed the shortcomings identified based on the evaluation results for the hoist hook light alternatives and especially due to safety risks.

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