



# STIC Note



## Safety of Burning Vessels

### BACKGROUND/PROBLEM

Vessels that are investigated or interdicted by the United States Coast Guard (USCG) and determined to be a hazard to navigation must often be destroyed at sea. The suggested nominal method is to burn and sink subject vessels to eliminate them as a hazard. The USCG does not prescribe ignition methods for this purpose and a common technique used is to hand throw a signal flare into a fuel laden vessel. Reports from operations crews suggest that there could be improvements in safety and efficiency of igniting and burning target vessels.



Figure 1. Vessels being destroyed at sea as hazards to navigation (Source: U.S. Coast Guard).

### METHODS

STIC identified three new methods to assess for improved safety and efficiency of burning vessel operations. These methods were proposed to similarly ignite liquid fuel in open areas of the target vessel, while providing the crew with less exposure to the ignition source and subsequent fire.

The ThrowFlame XL18 Flamethrower is an industrial backpack flamethrower that can use any commonly available liquid fuel. The flamethrower can be used with or without a napalm mix. Diesel produces maximum range and the longest burn times. The flamethrower is

equipped with a 4 ft. long high-pressure hose with swivel mount and specialized high-pressure O-Rings tailored exclusively for flame throwing fuel. The device is considered windproof and has a pushbutton ignitor. The XL18 has the option to discharge the gel gas mixture without introducing the flame, potentially offering better burning efficiency by coating the subject vessel with accelerant before igniting.



Figure 2. ThrowFlame XL18 Flamethrower (Source: [www.throwflame.com](http://www.throwflame.com)).

The Orion 12 Gauge High-Performance Red Aerial Signals are USCG approved for day or nighttime signal use at altitudes up to 500 feet with brightness up to 16,000 candelas. Burn time can last 7 seconds. The signals can be discharged from a shotgun or the Orion signal launcher offering greater control and accuracy when launching toward the target vessel.



Figure 3. 12 Gauge safety launcher and flares (Source: Orion Safety Products).

SEI Industries Ltd. Aerial Fire Ignition Dragon Eggs are delayed ignition incendiary devices consisting of a 1” diameter polystyrene hollow spheres with 3 grams of potassium permanganate sealed inside. The Dragon Egg launcher injects glycol just prior to projecting it towards the desired location. The glycol and potassium permanganate create a chemical reaction resulting in an incendiary source. A spring launcher and compressed gas launcher are available.



Figure 4. Dragon Egg ignition (Source: SEI Industries).

## EVALUATION

Due to safety and environmental policy constraints the STIC was unable to field test the identified equipment and proposed ignition techniques within the task timeline.

The decision was made to issue the gear to be utilized by field units that have existing operational approval to dispose of vessels by burning during USCG missions.

## CONCLUSIONS

Methods that allow a greater standoff distance when igniting prepared vessels are generally considered to offer an increase in safety for personnel. The further assessment to be conducted by operations crews should provide the information needed to validate the benefits of this equipment. A risk assessment was conducted with USCG Station South Padre Island to address new hazards that the proposed techniques and equipment may introduce.

## FUTURE WORK

The equipment is being transferred to USCG Station South Padre Island to be used on vessels of opportunity during normal operations as able. Station South Padre Island will be consulted based on their experience with the equipment and provide their assessment and feedback to the RDC.

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