

FIRE-CONTAINERS LTD

fire safety and electric vehicle containment units with integrated fire detection and recirculating fire suppression

the challenge

Transporting lithium-ion batteries (Lib) or Electric vehicles by sea freight presents several dangers, including the risk of fire and explosion due to thermal runaway, especially if the batteries are damaged or defective. This is exacerbated by the confined environment of a ship, where a fire can spread quickly and cause catastrophic damage leading to total loss scenarios. Lithium-ion batteries are also prone to overheating, which can be triggered by physical impact or exposure to high temperatures during shipping.

The Fire Safety Containment Unit (FSCU) and Electric Vehicle Containment Units (EVCU) developed and patented by Fire Containers limited have been specifically designed to mitigate these risks by providing a secure fully self-contained containment system with integrated fire detection and recirculating fire suppression. It safely stores, monitors and transports Lib batteries (or other flammable substances). Both the EVCU and FSCU contain onboard water tanks and high-pressure water misting systems which filter and recirculate the onboard water back into the firefighting systems.

It is vitally important to detect these fires at an early stage of development and the units fire suppression capabilities rapidly extinguish flame development and cool all cargo within the unit preventing any fire spread inside the units and ensuring the safety of the ship and crew.

The FSCU and EVCU significantly reduces the dangers associated with transporting lithium-ion batteries and electric vehicles by sea freight and provides early warning to crew in the event of an incident.



the innovation

The FSCU is designed to enhance operational tactics by providing a specialised solution tailored to the unique challenges posed by Lithium-ion battery (Lib) incidents.

The Fire Safety Containment Unit (FSCU) offers significant safety benefits in detecting and managing Lib fires. One of the primary advantages is its ability to prevent the spread and reignition of fires, which is a common risk with Lib fires. The unit is equipped with a built-in detection system, fire suppression system and water supply, allowing it to safely contain and extinguish flame immediately on detection and prevent further fire spread. Additionally, all firefighting water is contained within the unit protecting emergency responders, crew and the environment from further toxic hazards.



The EVCU, specifically designed for vehicles, provides a secure environment to transport, and store electric vehicles, minimising fire risks and providing immediate deployment of firefighting capabilities on detection of a fire.

Both units enhance safety and operational efficiency by addressing the unique dangers of lithium-ion batteries. Also, current firefighting tactics on ships relies on applying hundreds of thousands of litres of water to try and contain these types of fires but due to the early detection and recirculating capabilities of the units then very little onboard water is required to control a fire as the principal firefighting tactic is the production of steam to control fire development.

In summary, the FSCU and the EVCU offer a comprehensive solution for safely managing and mitigating the risks of Lithium-ion battery fires.



how it was implemented

In 2023 I was getting regular requests from fire services across the United Kingdom asking how they could effectively deal with electric vehicle (EV) incidents which were becoming more frequent.

Following research, we noticed a disconnect in what vehicle manufacturers were stipulating and what companies were producing to deal with the problem. Namely, vehicle manufacturers were saying do not submerge their Lithium-Ion batteries (Lib) and equipment manufacturers were building 'Submersion' type units to submerge vehicles in water if they had been involved in fire.

The Electric Vehicle Containment Unit (EVCU) was designed by a team combining expertise from the fire and rescue services, design engineering, and the vehicle recovery industry. We aimed to address the unique challenges posed by electric vehicle fires, particularly those caused by lithium-ion battery failures. The design incorporated a mobile containment system with fire suppression and a water supply to provide high pressure water misting to fight the flame front without submersion of the battery packs whilst also cooling the battery packs at the same time and slowing the thermal runaway process.

The EVCU was designed, built and implemented for first responders and vehicle recovery teams to mitigate fire risks during incidents and now remains the only operational unit of its

type in the UK and is deployed on a regular basis for the removal of electric vehicles following accidents or fires.

Since the implementation of the EVCU the Fire Safety Containment Unit (FSCU) has also been developed for safe transport of Lithium-ion batteries.



result

The benefits of Electric Vehicle Containment Units (EVCUs) and Fire Safety Containment Units (FSCUs) are substantial for both safety and operational efficiency. EVCUs are specifically designed to handle electric vehicle (EV) fires, particularly those caused by lithium-ion battery malfunctions. They provide a controlled environment to recover and transport damaged EVs, reducing the risk of fire reignition and ensuring safe handling during and after an incident.

FSCUs are more versatile, addressing the challenges of safely transporting lithium-ion batteries, especially by sea freight. With built-in fire suppression systems and secure containment, FSCUs prevent the spread of fires during transit, mitigating potential hazards to the ship, crew, and cargo. Both units safeguard responders, recovery teams, and the surrounding environment by isolating the fire risks, providing essential protection in high-risk situations.

In addition to improving safety, these units enhance operational efficiency by offering a specialised, reliable solution tailored to modern challenges posed by electric vehicles and lithium-ion batteries. This minimises downtime, reduces the potential for secondary incidents, and ensures that fires are swiftly controlled.

Overall, EVCUs and FSCUs play a crucial role in modern fire management, ensuring the safety of personnel, infrastructure, and the environment.



conclusion

As global lithium battery use rapidly increases, driven by the rise of electric vehicles (EVs), renewable energy storage, and consumer electronics, the roles of the Electric Vehicle Containment Unit (EVCU) and Fire Safety Containment Unit (FSCU) become increasingly crucial. Both units help manage the unique safety challenges posed by lithium-ion batteries, which are prone to thermal runaway and fire risks.

The EVCU ensures safe containment, recovery, and transportation of EVs after accidents, minimising fire hazards caused by damaged batteries. As EV adoption expands, the EVCU provides essential protection for first responders and the public.

The FSCU plays a key role in safely transporting lithium-ion batteries, particularly in sea freight and storage applications, preventing battery fires and ensuring safe transit across global supply chains. Both units contribute to creating safer, more secure battery transport and management systems, addressing the growing risks associated with the widespread use of lithium batteries.

With the continued proliferation of battery-powered technologies, the EVCU and FSCU are essential to mitigating fire hazards, protecting lives, and ensuring the safe and efficient handling of lithium batteries worldwide.

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