

A man wearing a white hard hat and a dark blue work jacket is focused on a laptop. He is standing on the deck of a ship, with the ocean and a sunset sky in the background. The laptop screen displays a technical interface with various charts and data points.

EARLY DETECTION

The key to improving fire safety on RoRo ships

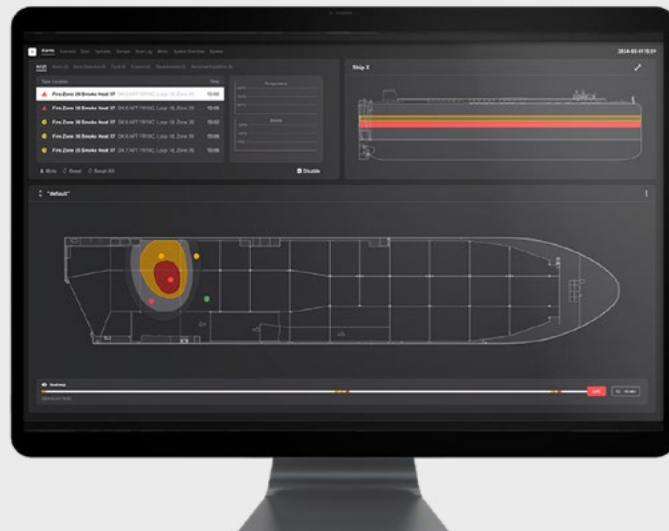


INTRODUCTION



In the light of safety challenges on RoRo ships, Consilium's solution Early Detection emerges as a pioneering approach to fire safety with a significant potential to improve marine safety.

“The benefit of Early Detection is to find and solve an issue before it becomes a serious problem”, says Isak Nordberg, Head of product line Software and Services at Consilium Safety Group.



Early Detection: The key to improving fire safety on RoRo ships

In an era characterised by rapid technological advancements and evolving safety challenges within the marine industry, the management of ship safety has never been more crucial.

The shipping industry has recently faced several safety challenges. A case in point is an incident in March 2022. A fire on the coast of the Netherlands resulted in the loss of the ship and its cargo of around 4,000 vehicles. This is not an isolated incident; there have been several fire incidents lately with ships carrying vehicles.

Vehicle carriers are known as RoRos, which stands for roll-on/roll-off – the way the cargo is loaded and unloaded. These ships, with their densely packed cargo and large holds, are particularly vulnerable to fire, which can be difficult to control and spreads quickly.

The large size of RoRo ships and the large open decks design complicates fire-fighting efforts and increases the risk of casualties. Vehicles are known to be one of the most common reasons for fires on vessels and the large number of plastics and rubber material in vehicles gives a lot of energy to the flames, creating heavy smoke and spreading the fire to surrounding cargo.

Challenges in managing EV battery fires

The increasing transportation of electric vehicles and their lithium-ion batteries creates a new level of risk.

As awareness grows within the marine industry about the specific challenges RoRo ships face, Consilium's focus sharpens. *“When it comes to RoRo ships, developing safety measures focused on electric vehicles has been particularly urgent”*, Nordberg explains, emphasizing Consilium's commitment to addressing these concerns.

Studies show that electric vehicles carry a fire risk comparable to vehicles with combustion engines. However, when an electric vehicle catches fire, the firefighting and management will require a new set of knowledge and understanding.

If the batteries overheat or are mechanically damaged, they can experience ‘thermal runaway’ – a rapid and uncontrollable increase in temperature that can lead to fires in electric vehicles. These fires are difficult to extinguish and can reignite spontaneously.

“On roads, firefighters clear the area around burning vehicles, flooding the underside with water. While on ships, reaching the fire is difficult. The space is narrow, which increases the risk of being trapped,” Isak Nordberg explains.

Prevention is better than cure

To address these challenges, Consilium Safety Group has developed Early Detection, a software service that can be seamlessly integrated with fire and gas detection systems to improve early fire detection or even prediction on ships and better monitor and protect cargo on board.

Today’s approach is ‘detection’ to ‘first response’, followed by ‘clearance’ and in the worst case, evacuation. The difference and key benefit of Early Detection is that an alarm is raised before there is actual damage or a fire situation on board.

Rather than reacting to immediate threats, Early Detection proactively alerts users with messages before a situation escalates. It provides a time window that can mean the difference between safety and disaster.

With Early Detection, you get up to four extra minutes before the actual alarm is triggered and you will have a possibility to solve the issue before it becomes a problem.

“Heat detectors on ships activate upon measuring the heat at that specific point, which means that the fire needs to have progressed significantly for these systems to trigger the regulated alarm levels. By using large amount of data and machine learning we are able to adjust the sensitivity of heat detectors to trigger at lower temperatures, we enhance their responsiveness. This adjustment provides crucial additional minutes”, says Nordberg and continues:

“With these minutes, you have the opportunity to, for example, cover the vehicle with a special fire blanket, which ultimately means that you can prevent the fire from spreading to other vehicles”, Nordberg states.

The technical backbone of Early Detection

Early Detection consists of two key components, the Consilium fire detection system, which serves as the foundation, facilitating total control over the system’s functionality. It supports both addressable and conventional products, ensuring seamless integration and retrofitting. It is designed to support backwards compatibility, making it easy to upgrade.

The other component, SMIG (Safety Management Interface Graphics), is Consilium Safety Group’s graphical interface for the real-time visualisation of alarms and critical data. SMIG turns complex data from all parts of the vessel into intuitive, actionable insight. It enables crew members to instantly visualise the location and severity of anomalies and assess the spread of smoke and heat, and it will give direct access for controlling fire doors, dampers, ventilation and other critical systems.

Together, these technologies offer an advanced monitoring system capable of detecting heat and smoke levels, providing early warnings that enable crew members to respond before a fire escalates.

“Imagine that there is an indication of fire somewhere on the ship. Three or four minutes can make all the difference; a small, manageable incident can quickly escalate. Instead of solely relying on the ship’s Head of Security, Early Detection offers every crew member the opportunity to act before a potential fire occurs”, says Isak Nordberg.

There are several fire safety improvements from Consilium’s Safety Group’s innovative projects. Some have already been implemented. Others will shape new regulations or set best practices and lay the foundation for future research and development.

Isak Nordberg emphasises Consilium’s commitment to innovation in marine safety. *“We’re aiming to be at the forefront of SafetyTech, constantly pushing the boundaries of what’s possible to improve safety at sea. For us, safety is not just a goal, it’s an ongoing mission.”*

Quick guide to Early Detection

Early Detection is developed by Consilium Safety Group. The key benefit is that an alarm is raised before there has been any actual damage or a fire situation has occurred on board. Primarily designed for RoRo ships, the technology’s benefits extend to any marine ship and can mitigate risks and protect lives, assets, and the environment.

KEY FEATURES AND BENEFITS

- **Proactive measures:** Shifts the approach from reactive to proactive, significantly reducing the risk of fire damage and ensuring the safety of the ship and its cargo.
- **Operational efficiency:** Minimizes disruptions by allowing for targeted responses to threats without necessitating broad evacuation or shutdown procedures.
- **Cost savings:** Prevents extensive damage to cargo and ships, saving costs associated with firefighting, repairs, and insurance claims.
- **Sensor technology:** Employs a combination of temperature, smoke, and gas sensors to monitor the environment for signs of fire.
- **AI based analysis:** Employs artificial intelligence to analyse sensor data, enabling the early identification of potential fire threats.
- **Real-time monitoring and alerts:** Provides real-time alerts to crew members, allowing for immediate action to prevent the escalation of fire incidents.
- **Integration with fire and gas alarm systems:** Seamlessly integrates with existing systems aboard RoRo ships, enhancing their effectiveness in fire detection and response.

INDUSTRY IMPACT

→ As **regulatory bodies** and shipping companies increasingly focus on enhancing fire safety, Early Detection sets a new standard for proactive safety measures in the marine industry.

KEY COMPONENTS

- **Consilium Fire detection system:** Modular platform for seamless system integration, supporting both addressable and conventional products. Enables easy upgrades and retrofitting, often without replacing existing cabling.
- **SMIG (Safety Management Interface Graphics):** Consilium Safety Group's graphical interface, is essential for visualising alarms and facilitating a quick understanding and control of the situation.

ALL RELEVANT SAFETY INFORMATION CRYSTAL CLEAR IN ONE SYSTEM

CCTV
5-Doors Mimic panel
Fire doors
CO₂ Release
Fire Patrol System

Fire Detection System
LL Switch panel
ESD Switch panel
Switch panels
Gallery
Sprinkler

RoRo ships in brief

DEFINITION

Ships designed to carry vehicles such as cars trucks, semi-trailer trucks, trailers, and railroad cars.

KEY FEATURES

- **Decks:** Multiple adjustable decks that can be reconfigured based on the cargo needs, optimizing space and efficiency for various vehicle types.
- **Ramps:** Equipped with built-in or shore-based ramps that allow for the quick loading and unloading of cargo, significantly reducing port stay times.
- **Specialized areas:** Some RoRo ships feature specialized areas for refrigerated units or oversized cargo, enhancing their versatility.

ADVANTAGES

- **Speed and efficiency:** The design allows for quick loading and unloading processes, reducing turnaround times in ports.
- **Flexibility:** Can transport a wide range of wheeled and heavy machinery, making them adaptable to different types of cargo.
- **Safety:** Vehicles are securely fastened and sheltered from the elements, reducing the risk of damage during transit.

USAGE

- **Primarily used** for transporting new and used vehicles, including personal cars, commercial trucks, and heavy equipment, across domestic and international routes.
- **Military applications** include the transport of tanks, trucks, and other wheeled and tracked military vehicles.

SAFETY CONCERNS

- **Fire risk:** Due to the nature of the cargo, RoRo ships face a higher risk of fire, particularly with the increase in electric vehicle (EV) transportation.
- **Stability issues:** Incorrect cargo distribution can affect a ship's stability, making proper loading crucial.

RECENT TRENDS

- **The growth** in global automobile sales and the increasing popularity of EVs have led to a higher demand for RoRo shipping services.
- **Innovations in** ship design and fire safety measures, such as Consilium's Early Detection system, are being developed to address the safety challenges faced by RoRo ships.

Global support with local expertise

Consilium offers fast and accessible support no matter where you are in the world. Nothing beats local expertise in your language. With a service network spanning over **55 countries** worldwide and local market companies in **28 countries***, we ensure accessibility anywhere you operate.



* **Europe:** Belgium, Bulgaria, Cyprus, Denmark, Finland, France, Greece, Italy, Netherlands, Norway, Spain, Sweden, Germany, UK **North & South America:** Brazil, Canada, Costa Rica, USA **Asia & Oceania:** Australia, China, India, Japan, Oman, Qatar, Singapore, South Korea, United Arab Emirates, Vietnam

As much as we are proud of our success, our commitment is to ensure safety. We have pledged to protect the lives of mothers and fathers, sisters and brothers, colleagues and friends. Our work never ends. That is why we keep innovating.



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