

For **Shipping**

SMART FIRE SAFETY TRAINING

Scalable solutions can help reduce risks,
protect resources and save lives.



LION®



Introduction

It only takes a few seconds for a small fire in a cargo plane or container ship to become a huge problem. If the fire breaks out midflight or in the middle of the ocean, there's little time to get help. Even if a fire starts while the plane is on the ground or the ship is in port, the combination of intense flames and confined spaces can be disastrous.

That's why fire safety training is so important for people who transport goods.

Proper extinguisher training helps crew members, cargo handlers, dockworkers and others respond quickly and confidently to an emergency. Live-fire drills and advanced digital training keep aviation and maritime firefighting teams ready for action.

Together, these training sessions help companies protect their people, their resources and the goods they deliver around the world.

This paper explores fire safety training for the cargo industry. It also addresses fire science basics and modern training tools that can help prevent aviation and maritime disasters.



A Constant Concern

While planes and ships are among the safest forms of transportation, accidents still occur. Several recent fires have started in planes after lithium-ion batteries overheated and burst into flames. On ships—which often transport chemicals, hazardous liquids and other highly flammable goods—a fire can start virtually anywhere. Unchecked, fires on planes and ships can lead to serious injuries and loss of life.

Aviation and maritime fires also can cause significant financial losses. Damaged or destroyed goods can't be sold. Gutted planes and ships can cost millions of dollars to repair or replace. And airports or ports may have to temporarily stop operations and direct shipments elsewhere, adding significant delays and expenses throughout the supply chain.

Fire extinguishers serve as the first line of defense during the early stages of a fire. But for that defense system to work, employees need quality extinguisher training.

IN 2024, THERE WERE...

250 cargo ship fires, a 20% increase from the previous year

89 lithium battery incidents (smoke or fire) on passenger and cargo planes

Sources: Allianz Safety & Shipping Review 2025 and the Federal Aviation Administration



The Importance of Hands-On Training

While theoretical knowledge is valuable, hands-on extinguisher training shows users how to respond safely to a real fire emergency. Training helps them:

- ✓ **Develop muscle memory:** Handling an extinguisher helps build confidence and familiarity, making it easier to act under pressure.
- ✓ **Memorize P.A.S.S.:** Training reinforces the P.A.S.S. method (Pull, Aim, Squeeze and Sweep) and helps instill proper techniques.
- ✓ **Understand fire situations:** Practice helps people know when a fire can be extinguished and when evacuation is the best option.
- ✓ **Enhance decisions:** When people train in simulated conditions, they're more likely to react correctly in real situations.

THE P.A.S.S. METHOD

PULL out pin on handle.

AIM nozzle at base of fire.

SQUEEZE handle to use extinguisher.

SWEEP side to side until fire is out.



The Future of Fire Safety

Traditional fire extinguisher training can be messy, costly and time-consuming. But as technology improves, companies are changing how they teach fire safety.

Digital training systems have become more popular in recent years, thanks to their combination of realism and safety. These products, which include LED simulators and VR training systems, are easy to set up and can be used in any location where fires can occur. And because they're fully digital, there's no need to clean up chemicals or water after a training session.



Aviation Extinguishers

Aircraft fire extinguishers must contain “clean agent” gasses, which don’t create blinding dust or leave residue that can corrode avionics. That means standard Class A, B and C extinguishers should not be used on airplane fires; in fact, they should not be used near airplanes that could become coated with dust.

The aviation industry uses halon extinguishers instead because they are clean, effective and work on a range of fires. But halon is an ozone-depleting substance, and these extinguishers are being phased out.

For now, existing halon extinguishers are legal and compliant. They will be replaced with more eco-friendly alternatives in the coming years.

Fire Classifications & Extinguishers

For fires not near planes—or for fires on ships or docks—workers can use the following extinguishers:

CLASS A

Ordinary combustibles (wood, paper, cloth, many packing materials).



Use water, foam or multipurpose dry chemical extinguishers.

CLASS B

Flammable liquids (gasoline, oils, solvents, adhesives).



Use foam, CO₂ or dry chemical extinguishers.

CLASS C

Energized electrical equipment.

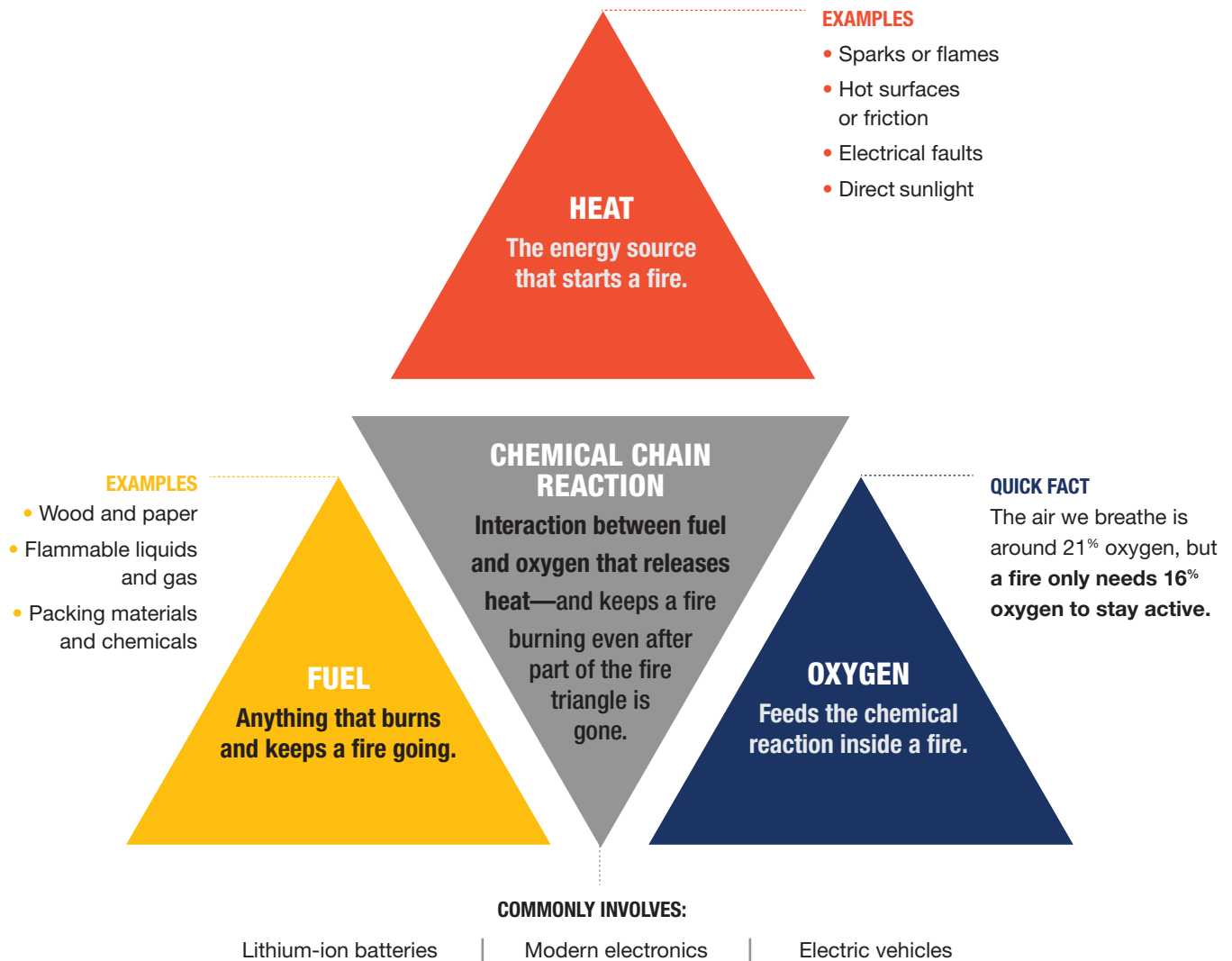


Use CO₂ or dry chemical extinguishers.



Inside the Fire Tetrahedron

To understand how extinguishers work, you first need to understand the science behind fires. For decades, the fire triangle was the building block of fire safety training. It consisted of heat, fuel and oxygen. But modern science has introduced a fourth element—the chemical chain reaction—to create the fire tetrahedron.



PUTTING OUT THE FLAMES

To extinguish a fire, you need to do at least one of the following:

- Cool the fire to remove heat
- Remove or isolate the fuel to stop combustion
- Smother the fire to deplete oxygen
- Interrupt the chemical reaction to end self-sustaining flames



Live-Fire & Advanced Digital Solutions

Aviation and maritime fire departments require special training to deal with emergencies on planes and ships. The Federal Aviation Administration mandates that Aircraft Rescue and Fire Fighting (ARFF) teams participate in at least one live-fire drill every 12 months. Likewise, the International Maritime Organization sets strict training requirements for fighting fires on ships.

Aviation Options

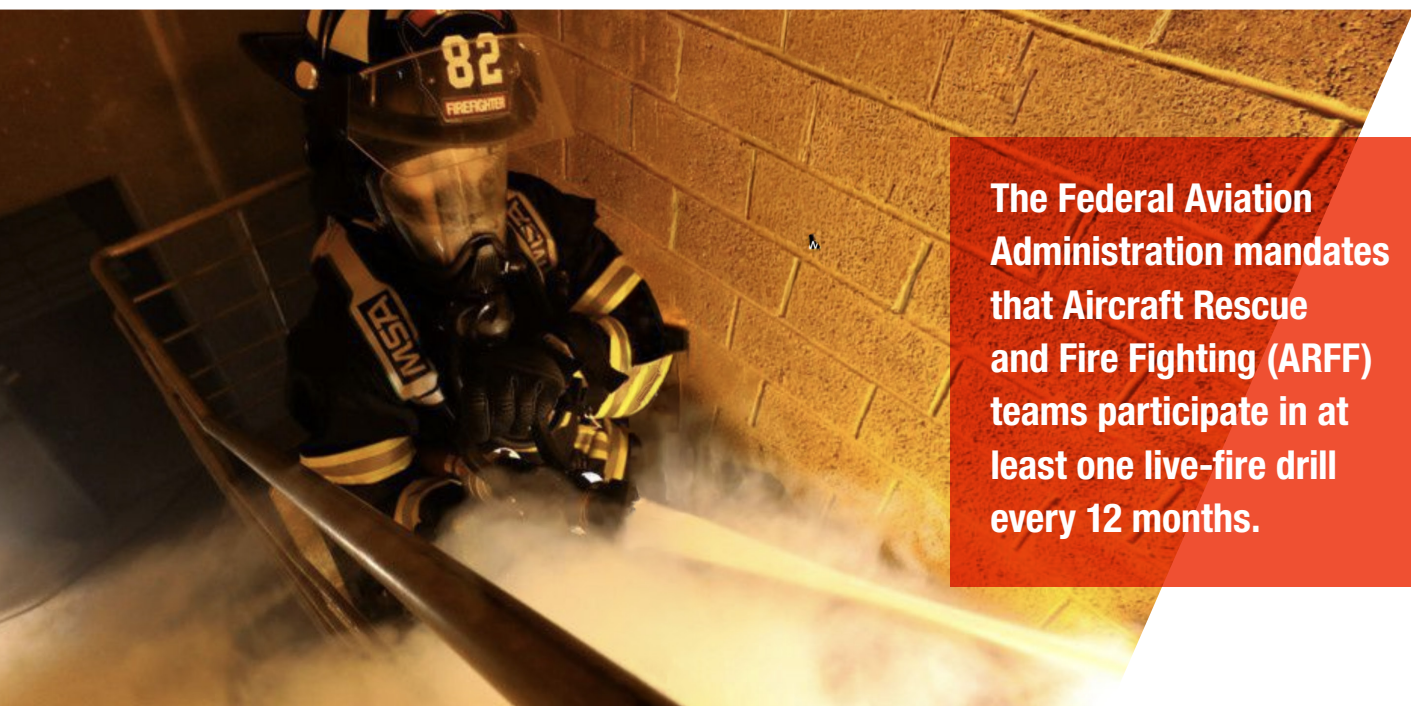
AARF teams often train on live-fire props that resemble plane wings and engines. These heavy-duty steel products typically use propane flames to create safe and repeatable training sessions. Some departments also have large training complexes that look like airports and feature full-size replicas of common planes.

Aviation firefighting teams can supplement their live-fire training with advanced digital solutions. These products use digital nozzles and LED panels that mimic flames, and they often pair with smoke generators to create fully immersive experiences.

Maritime Options

Maritime teams can train in simulated environments or actual ships that have been modified for live-fire training. These structures, which also can accommodate digital training sessions, help recreate the tight spaces and complex layouts of a cargo ship. Features often include hallways, bulkheads and doors.

Damage control simulators can help ship safety teams train on shutting valves and plugging water leaks. These structures resemble shipping containers, and they can be filled with water to safely test a team's ability to respond to an onboard emergency.



The Federal Aviation Administration mandates that Aircraft Rescue and Fire Fighting (ARFF) teams participate in at least one live-fire drill every 12 months.



GENERAL GOODS

Cargo labeled “general goods” may actually be highly flammable or explosive. These items are a major driver of ship fires.

Common Causes of Cargo Fires

Cargo planes and ships contain complex machinery and often carry highly flammable goods. Below are some of the most common causes of cargo fires:

In planes



Lithium-ion batteries: Damaged or improperly packed batteries can overheat and enter a state of thermal runaway, a chain reaction that produces extreme heat.



Hazardous materials: Undeclared or improperly declared hazardous goods can ignite due to pressure, vibration or temperature changes.



Electrical faults: Faulty wiring in cargo systems can ignite nearby materials. This scenario is less common in modern planes, but it’s still possible.

In ships



Misdeclared goods: Cargo labeled “general goods” may actually be highly flammable or explosive. These items are a major driver of ship fires.



Lithium-ion batteries: This is the same issue found in aviation—but the fires can be much larger because ships carry far more cargo than planes.



Engine room fires: Fuel leaks, electrical failures and overheated machinery can all lead to fires. Regular maintenance can help mitigate these issues.

Conclusion

Be Proactive, Not Reactive

Fire extinguisher training is an essential part of aviation and maritime safety. Effective training programs reduce risks, protect resources and save lives. With quality training, companies can prepare their workers to respond confidently in an actual emergency.

The same holds true for firefighting teams. They need consistent, reliable and safe training options that help them perfect their skills and meet regulatory requirements.

And while the best training may not be the cheapest option, the best solutions help pay for themselves. They're repeatable and scalable, which helps companies stay on budget.

Put simply, fire safety training can help companies protect their people and assets—as well as the vital goods they transport to consumers.



We've been in business for more than 125 years, and we're a global leader in fire safety. We provide cutting-edge fire extinguisher training products to workforces in all industries. Our live-fire and advanced digital products keep firefighters ready for action, no matter the location. Together, we prepare fire and safety leaders for whatever comes next.

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