



NAVAL SAFETY COMMAND SAFETY AWARENESS DISPATCH



SA 23-32

USS Saturn Shipyard Fire

"Chief, there are men trapped in that hold!" —Workmen on the deck of the USS Saturn

Any Sailor or civilian worker who's been in a major ship's maintenance availability knows how treacherous that environment can be. With hoses, electric cables, scaffolding, open hatches and scuttles and hot work seemingly everywhere, ships in maintenance availabilities tend to have a higher risk of mishaps (especially fires) than during other phases in their service lives. While the Navy has improved fire safety for ships undergoing maintenance over the last several decades, there is still work to be done, from chain of command oversight to individual Sailors' training and vigilance. As a case-in-point, shipboard fires during maintenance availabilities cost more than \$4 billion between 2008 and 2020, including the total loss of the USS Miami (SSN-755) and USS Bonhomme Richard (LHD-6). In most of those fires over the 12 years, it wasn't a lack of standards or procedures that caused the fires but a lack of compliance with those standards or procedures.



USS Saturn near Norfolk Navy Yard, 1944

Recalling a bit of naval history, this dispatch serves as a "lest we forget" moment to remind us how the heightened fire risk during ship maintenance periods has been, and will always be, present. The USS Saturn fire is the tragic story of a compressed ship refit schedule coupled with not following the fire safety standards that were in place at the time. Read on and see how, as in most modern cases, there was an opportunity for someone (you) to break the error chain through vigilance and compliance with all fire safety measures.

The information in this safety awareness product was obtained from open sources including the National Archives and the July 2021 Major Fires Review.

The Fire

USS Saturn (AK-49), a 423-foot cargo ship, reached the Norfolk Navy Yard on April 12, 1944, to be converted to a refrigeration ship in 60 days. More of these ships were needed quickly, and officials wanted to speed up the work. For that to happen, welders, burners, joiners, shipfitters and laborers were all authorized to work simultaneously. The hull would be insulated with mineral wool and encased in kiln-dried lumber. The decks would be covered in eight inches of cork, covered in lumber and encased in metal. On April 27, joiners (*carpenters*), were cutting floor timbers and working on floor joists on the starboard side. Nearby, other joiners were installing cork. That afternoon, painters had prepared the cork slabs with a primer that was a mixture of cutback asphalt and mineral spirits (both highly flammable). Not all the men knew about the flammability of the chemicals used in the insulating process.

Supervisors of the civilian workers and the ship's command staff took advice on precautions from the yard fire chief. They agreed that, while hazardous, the work would continue. The ship's superintendent followed the yard chief's recommendations, including keeping a water hose extended down into the hold for quick firefighting should the need arise. Five-gallon pump water extinguishers were also kept on hand. Based on a safety memo already in force in the yard, the ship also had carbon dioxide extinguishers and one man from the ship was assigned to stand on deck as a fire watch. The memo required a fire watch be set for each welder, cutter or burner job.

USS Saturn Shipyard Fire

On the 27th, the joiners feared they would fall behind and asked that extra cork be prepared for them to install on the night shift. They had been using the cork as fast as the painters could prepare it. Sometime after 2:30 p.m., a pile of cork slabs was coated with primer and placed in the hold. Later that day, a fire marshal's inspection of the area found nothing of concern except a bit of trash and many hose lines in the bottom that posed a trip hazard. Before the painting supervisor left that afternoon, he told the joiners' supervisor that prepared cork was highly flammable. At approximately 6:10 p.m., the welding supervisor checked the work in the hold before heading to an office to complete paperwork. In the hold, two men finished welding a bulkhead while another welded the deck. Above, a welder waited for a crane to lower a deck plate. He lit a cigarette and watched the others work.

At approximately 6:20 p.m., several men spotted flames on the pile of cork on the starboard side of the deck in the Saturn's hold and shouted "Fire!". The fire watch ran toward an extinguisher, but the flames had taken off. He tried to douse the fire with a CO2 extinguisher, but it was ineffective. The fire watch reached for a water hose leading to the deck below but was blocked by flames. He put a coat over his head and ran for the ladder. Above, someone was yelling at the workers to get out.



Fire damage in USS Saturn's hold

The Costs

Fourteen men who ran from the starboard side of the deck to the port side and huddled against the hull were found together in a corner. When the Saturn's medical officer arrived, all 14 men were lying together, face up. None appeared to be burned, but their faces showed signs of carbon monoxide poisoning. Six of them were already dead and eight were given artificial respiration, but none of them recovered. A fifteenth man was found deceased further down in the ship. The fire resulted in approximately \$25,000 damage (about \$450K in today's dollars), which was contained in the hold.

Likely Cause

The fire started in the large pile of cork coated with asphalt enamel and primer and spread rapidly. Fumes and gases from the burning cork overcame the workers who couldn't find their way out or the exits were blocked by fire. The investigation could not determine whether the fire started due to someone smoking near the compartment or from hot work. Regardless, storing highly flammable cork (*or any flammable material*) in the same compartment with welding and cutting in progress is a recipe for disaster.

Safety Culture at The Yard

Some supervisors said they believed it was OK for one fire watch to patrol a work area instead of individual jobs. Others admitted they didn't ask for a fire watch or protest when they saw too few watches. However, some workers claimed two fire watches were in the hold at the time of the fire.

The supervisors may have felt pressured to complete their work to make the 60-day deadline.

The commandant of the fifth naval district noted that, in his view, there was a relaxation of vigilance at the navy yard. The result was disaster.

Immediately after the fire, welders began requesting more fire watches and smoking was prohibited throughout the ship.

The July 2021 Major Fires Review

Fast forward to today, where there could be 40 or more Navy ships in maintenance availabilities at any given time. For one such ship, the USS Bonhomme Richard, its 2020 maintenance availability would be its last. We won't get into all the immediate follow-up corrective actions directed by a higher authority except to say there were many. The Naval Safety Command conducted a comprehensive historical review of major fires onboard U.S. Navy ships over a 12-year period, which found that noncompliance with fire safety

USS Saturn Shipyard Fire

policies and procedures was likely prevalent across the fleets. In response, the Vice Chief of Naval Operations directed a deep dive into the historical record to understand and address common issues that resulted in so many fires. The resulting report was the Major Fires Review (MFR).

Below are a few issues (not an all-inclusive list) identified in the MFR that share the same traits with the USS Saturn fire from nearly 80 years ago. For the entire report, follow this link to the Navy.mil website: [For Release Major Fires Review \(18 Oct 21\).pdf \(navy.mil\)](#)

-The improper handling and stowage of hazardous and combustible material caused or increased severity in 60 percent of the fires reviewed.

-In six of the 15 major fire events, commanding officers and crews failed to recognize the inherent risks associated with the transition to a significant maintenance period and the related changes in ship configuration and environment. The MFR also found a lack of defense-in-depth regarding ships' compliance. The lack of a multilayered approach to fire safety either resulted in high-consequence events or elevated the risk of a major fire occurring.

-Many mishap ships displayed declining standards in watchstanding, including poor ownership of stowage and cleanliness of spaces, poor log keeping, procedural noncompliance, absent forceful backup and a lack of critical self-assessment.



Key Takeaways

The MFR summarizes 12 common deficiencies among the 15 major fires studied, including issues related to oversight and compliance. We recommend you review the entire study, but for now, these takeaways are targeted toward those on the deckplates getting the job done and their supervisory chains.

1. Compliance isn't just checking a block. Defense-in-depth, in the case of shipyard fires, is a system of policies and procedures that work together to prevent—and control—fires during hot work operations. If you have one fire watch for three welders, that's not compliance. If flammable material is stored in the space, that's not compliance. Rigging an additional hose because of the highly flammable material near hot work is not compliance. In fact, it's a huge red flag. Defense-in-depth would be ensuring all the required steps are taken, so if one defense layer fails, the others either prevent the fire or keep it from causing significant damage.

2. If you don't have the resources, ask. We've written about not being the one holding the secret in earlier dispatches. Don't wing it if you don't have enough fire watches—tell someone. If the firefighting water pressure isn't enough, speak up. It is your safety (or maybe your life) on the line.

3. If you aren't vigilant, then you aren't safe. Following takeaway #1 is a continuous and evolving task. Maintenance availabilities can range from weeks pierside to years in shipyards. Adherence to the host of NAVSEA, NSTM, and OSHA regulations and procedures can never be relaxed. Conditions can change over time, altering the safety requirements that were initially met when hot work was started. Activities and ship's crew alike must maintain awareness of ongoing hot work and ensure the site and adjacent areas are not compromised between shifts or periods of delay. As we've said before, "Everyone is a safety officer" because fire doesn't know or care who is responsible for preparing the job site.

Remember, "Let's be careful out there"