



Shipboard Flooding

Whether working on vessels with a load displacement of 100,000 tons or a few hundred, the last thing anyone would want is for that vessel to start filling up with water. We have so many ways to fight shipboard flooding with so many installed contingencies we can forget how damning it is for water to start flowing into hollow chunks of steel above mile-deep seas. That's why we must remain vigilant and ensure our personnel are trained and ready to prevent and combat flooding at any time. In addition to the threat of sinking, shipboard flooding contributes to mold buildup and damages structural integrity and ship stability. It can result in loss of services, operational capabilities, and, worst-case scenario, death. Being able to identify causal factors is essential but being able to identify how to fight shipboard flooding properly and mitigate risk is paramount.

It's Hullways Something

A docking module was moored between two Improved Navy Lighterage Systems (INLS), which are essentially mobile, floating piers, featuring ramps descending into the water for amphibious vehicles. On night patrol, rovers reported to the OOD that the bow of the moored docking module looked lower than normal. The OOD instructed them to monitor for changes. Not 30 minutes later, the bow was submerged with the aft end of the ship three feet above the adjacent vessel (this may not seem like much, but it is significant for this type of craft). Immediate action was taken and mooring lines were doubled. While securing the new mooring lines, the crew realized one of the original mooring lines had snapped. The emergency response team was called away and the personnel deployed dewatering pumps after prepping and staging. When they opened the hold, the air that was compressed in the flooded space escaped, leading to the complete submersion of the craft's bow. P-100s, the Navy's go-to pump, were deployed overnight. Between the pump and the extra mooring, the water level didn't worsen, but it didn't improve either. The next morning, the vessel was towed and beached. – *So, how did a mooring line snap?*

How did a snapped line cause flooding? Well, INLSs are great for small craft to moor to in proper conditions; however, inclement weather brought rough seas (Sea State 4). It caused the line to snap. The combination of ramp modules and a docking module without a mooring line combined with insufficient fendering created a kind of can-opener effect. The ramp of the INLS was digging into the hull of the docking module's bow resulting in four hull breaches. Knowing the limitations of any equipment you're working with is essential and having the proper mooring configuration cannot be overlooked. Good on the rovers for calling out as soon as they saw a problem. Who knows what could have been gifted to the bottom of the ocean on that evening; although, a bill for \$300,000 in damages isn't worth bragging about.



File photo, not associated with mishap

It's Hard to Play a Guitar with Broken Strings

Supply personnel were going about their daily routine, but upon entering one of their spaces, they noticed something wrong. It occurred to them that the 18 inches of water on the deck didn't belong there. Flooding was called away, and the emergency team arrived within five minutes to dewater the space. Nothing broke. Nothing was struck. Nothing was out of the ordinary; however, the day prior, the ship underwent ballasting. The fire main valve for the ballast tank was never fully closed causing the ballast tank to overfill. The casualty was called away and rectified without any issues. – *With all the systems installed on a ship, how does a ballast tank overfill without alarms sounding or anyone noticing? As it turns out, the ballast system console (BSC) provided inaccurate information on tank levels, valve positions and alarm statuses, making it impossible for the ballast control team to have any level of accuracy in their situational awareness. What's worse, it was a known issue. Ask any musician. They'll tell you it's very difficult to play a broken instrument. They'll fix it immediately. A ship's instruments aren't something you play, it's vital for the survival of the ship and her crew. In the case of the musical instrument, the worst thing that could happen is it sounds bad. In the*

case of the ship, the water was present long enough to damage \$1.6 million of aviation consumables. The BSC should have been addressed immediately, especially with how critical of a system it is.

Rusty and Cracking Under Pressure

Fresh out of the yards, a naval ship was underway conducting ballasting operations. A person with relatively high experience developed detailed stability and ballasting plans – all in compliance with regulations. All ballast tanks were surveyed during the ship’s dry-dock maintenance availability period three months before the underway. For two days, flowthrough ballast water exchanges were conducted on seven tanks, and, per the approved ballast plan, everything was “as expected.” Then it started. Ballasting exchanges began early in the morning. After correctly aligning the ballasting system IAW proper procedure, the watchstander noted an unexpected minor list and took corrective action to return the ship to an even keel. *(It’s unclear whether the ship took action to investigate the cause of the list or simply applied a correction to fix the symptoms.)* Two hours later a high bilge alarm activated. *(Wait a minute, ballast water goes into ballast tanks or overboard, not into the bilge.)* Flooding of 5-6 inches was quickly discovered. Despite initial-response efforts, flooding continued to increase, and, 30 minutes later, the water was 8-inches deep. Shortly thereafter, the cause of the flooding was identified, and a box patch was applied, reducing the leak to barely a trickle. – *The root cause of the flooding was later determined to be a rusted check valve, which was initially scheduled for overhaul/replacement during the previous maintenance availability. In order to reduce the overall cost of the availability, this work was downgraded to a simple cleaning. It is unclear from the investigation whether that work was actually accomplished. Post-mishap the check valve was found heavily corroded; you can make your own assessment. This mishap clearly shows that the material condition of a single valve can put the ship at risk.*



Key Takeaways

As much as it is harped on and it may seem “stale,” real damage control situations are never planned. They are never caused because “it’s the right time for it.” More often than not, they happen because someone somewhere at some point in time made a poor decision. Whether that decision is one of overzealousness or the decision is literal indecision – they cause a ripple. The problem may seem insignificant, but eventually the ripple finds its way and becomes a wave. It seems like many flooding mishaps are just inconveniences that can be and are handled. But, they are far more than that.

1. Know the limitations. In one of the above examples, the limitations of the “floating pier” were not known. In inclement weather, their safety net turned into a can opener. While this may be an extreme example of not knowing the limitations of equipment, damage control equipment also has set limitations. It is important to trust our gear but also to know the point at which that gear will fail, especially when it isn’t yours.

2. Make sure everything is functioning as intended. Along with knowing the limitations, we need to ensure everything is in working order. While maintenance can be time consuming, its importance cannot be overstated. If a piece of equipment is inaccurate, down or damaged, continued use can lead to disastrous consequences.

3. Don’t overestimate yourself. The military is no place to be overconfident. As much as we would like to believe we are untouchable and perfect, this just isn’t the case. Every program in the military has multiple levels of oversight for a reason; in the business of life and death, mistakes cannot be made.

And remember, “Let’s be careful out there”