



*Day is done, gone the sun,
From the hills, from the lake,
From the skies.
All is well, safely rest,
God is nigh...*

A Sailor's Last Liberty Call

Navy photo by PH2 Dennis Cantrell

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It was late January, and a winter storm had hit the area. Two inches of snow and ice had accumulated on the walkways, ramp and upper deck of the two-level pier where a Navy ship lay berthed. A light, freezing rain still was falling; the ambient air temperature was 29 degrees Fahrenheit.

Meanwhile, a 20-year-old seaman apprentice and some shipmates huddled inside their warm ship, making liberty plans for the evening—plans that, unknown to any of them, were doomed. The seaman apprentice agreed to meet his friends ashore but decided to play a computer game before getting ready to leave the ship.

Because of the slippery conditions, the previous night's chief of the guard at the pier had directed that Sailors should use the lower deck. Shipboard watchstanders, however, hadn't passed this guidance to the liberty-goers, so they were using both decks on the pier, according to personal preference.

Thirty-five minutes after his shipmates had departed the ship, the seaman apprentice eased

down the brow, en route to joining them. As directed by a guard on the pier, he used the lower deck. He walked until he was about 50 feet from the vehicle gate, where a steam cloud obscured his vision. Despite having condensation on his glasses, he kept walking until he reached the closed and latched vehicle gate, which he couldn't open, even though it wasn't locked.

Disoriented by the steam cloud, the seaman apprentice moved to his right and felt his way along the gate, around a corner, and on down the length of a chain-link fence toward the head of the pier. He still was trying to find an exit when the fence he had been following ended adjacent to an uncovered piped utility transition pit (PUTP) that was filled with hot (more than 200 degrees Fahrenheit) water. Steam leaking from a failed strainer in the drip-station, coupled with leakage from a potable water line, had created the pool of water. A combination of the submerged steam and condensate leak and immersed steam piping then had heated the water.

With no grating over the pit and with no railing

on the seaward side of the PUTP, the seaman apprentice slipped on a piece of ice and fell into the boiling water. Submerged up to his chest, he struggled to get out by clinging to piping and to the top edge of the pit. Two shipmates and a pier sentry heard his screams for help and pulled the victim to safety. The ship's quarterdeck was alerted, and emergency medical assistance was requested.

A chief petty officer who was on the scene said the victim remained conscious while waiting for an ambulance. He was concerned that he may have lost the duty keys in the fall and that he was causing a

scene. He also was upset that he was going to miss muster aboard his ship. "The poor kid was almost apologetic," the chief told investigators.

With 80 percent of his body scalded, the young Sailor died two days later in the burn-trauma unit of a local hospital, with his parents at his bedside. Burial was in Arlington National Cemetery.

Mishap-Investigation Findings

The unprotected opening to the PUTP presented a fall hazard that certainly could have resulted in significant injury on its own, but the collection of water inside, heated to scalding temperature, made the hazard deadly. The presence of escaping steam created a low-visibility situation that effectively masked both the fall and scalding hazards.

How did this hazard come to exist, and why hadn't it been corrected? Protection against falls into the PUTP was required by OSHA standards, but the designer didn't install any devices. According to 29CFR1910.23(a)(8), "Every floor hole into which persons can accidentally walk shall be guarded by either a standard railing with standard toe-board on all exposed sides, or a floor-hole cover of standard strength and construction. While the cover is not in place, the floor hole

Sailors leave and return to the nuclear-powered aircraft carrier *USS Enterprise* (CVN-65) while it's moored at a Naval Station Norfolk double-deck pier.

Navy photo by JOC Dave Fliesen



shall be constantly monitored by someone or shall be protected by a removable standard railing.” This requirement is meant for worker safety and would apply, regardless of who authorized access to the lower level. The design engineers had discussed protecting the opening of the PUTP but ultimately dismissed the idea as unnecessary.

Fall protection is a basic requirement of workplace safety, and the lead design engineer indicated that the design team had considered installing a grating, but they ultimately dismissed that idea, too. Here was their rationalization:

- A grating would interfere with expected future modifications to piping systems and would complicate required access for maintenance.
- The intended use of the pier’s lower level was “only for utility worker access,” not as a transit lane for pedestrian traffic.
- The PUTP was located at the end of a cul-de-sac, and, thus, no one could transit through the area.
- The PUTP was believed to represent a negligible fall hazard for qualified utilities workers.
- A 25-foot chain-link fence adjoining the vehicle-access gate would keep non-qualified personnel clear of the PUTP.
- The design specified that gates would be equipped with “cipher-type padlocks” to control access to the lower level.

Although not designed to accumulate and hold water, the PUTP served as a collection point for water that leaked from piping for potable water and steam. There were no design provisions for automatically draining or pumping collected water from the pit.

The safety aspect of the design review of the pier was cursory in nature, and the hazard associated with the unprotected PUTP wasn’t found during this review. No facility-system-safety working group (FSSWG) was established to support the design review, and no industrial-hygiene (IH) review was conducted.

The fall hazard associated with the PUTP wasn’t identified as a construction safety hazard during routine oversight.

No safety professional or IH specialist was involved in the final acceptance inspection for the pier, and no safety or IH discrepancies were noted during this inspection.

Steam leaking from a failed strainer in the drip-station, coupled with leakage from potable-water lines, filled the PUTP with water. The water then was heated to more than 200 degrees Fahrenheit by a

combination of the submerged steam and condensate leak and immersed piping. After this mishap, workers pumped out the PUTP and identified two defects. The strainer had a small irregular hole that appeared to be a material defect or an area of extremely localized corrosion (pitting). The second defect was a loose mechanical joint in the potable-water line, allowing water to drain into the PUTP.

The required periodic workplace-safety inspections of the pier’s lower level were not done because it wasn’t clear who was responsible for the inspections. Two different offices assumed the other was responsible, and, as a result, neither office ever checked the PUTP.

Although required by an instruction, safety engineers never did a follow-up evaluation with facility operators and maintainers to identify any residual concerns or hazards at the pier.

Two shipmates and a pier sentry heard his screams for help and pulled the victim to safety.

The steam leak at the mishap site had existed and had been documented for at least 10 weeks before the mishap. The presence of the leak, though not its exact location, was well-known to several people. Its effect on visibility in the area varied, depending on the wind direction.

Various base utilities workers knew about the PUTP but didn’t view the arrangement as a fall hazard that required additional safety protection. And, although they twice had pumped out the PUTP, they didn’t recognize it as a scald hazard that required any other action. They also didn’t try to identify and repair the source of all the water.

The facilities-condition-assessment program requires inspection of the material condition of pier decks on a two-year cycle. Because the pier in this mishap was a new facility, it hadn’t yet been scheduled for inspection, and none had been done.

After this tragedy, the Navy installed handrails, lights and barriers and moved to change the design of future double-deck piers. ■