

Fire Down Below!

What started as a routine day for the USS Bennington quickly turned into a nightmare: Explosions and fires killed 102 in one of the worst peacetime disasters in Navy history.

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ARTICLE

In the early morning air of a clear spring day, the bow of the USS *Bennington* (CVA-20) effortlessly cut its way through waters just off Narragansett Bay.¹ The ship was on a heading away from the mainland, and was about to settle down for morning flight quarters for pilot carrier qualification.

Seaman First Class William Vickers stood in Hangar Bay 3 looking out at an unusually calm ocean. “It looked like a sheet of glue; it was so calm. No ripples no nothing, just a shimmering sheet of water,” he remembered.² Vickers had just descended from the bridge of the “Big Benn.” He had been relieved early from the 0400-0800 watch and decided to grab a quick cup of coffee from the crew’s mess. He then went up to the hangar deck to steal a quick moment of solitude. Finishing his coffee, he headed down to his berthing compartment for a few hours of sleep. There, as he climbed into his rack, he felt the carrier suddenly rock. Given the amazingly calm ocean he had been looking at just moments earlier, Vickers instinctively knew that some kind of disaster had struck the ship that was his home.

Smoke Is First Sign of Trouble

The *Bennington* was an Essex-class aircraft carrier launched in 1944. The postwar development of jet aircraft had resulted in the ship’s modernization under the SCB-27A project. So thorough was the modernization that, except to an extremely well-trained eye, no one would recognize the ship afterward as the same Big Benn from World War II.

Among the improvements were the catapults. The new catapults were the hydraulic Type H Mark 8 (H8), an upgraded version of the H4-1 with which she had been equipped during the war. The H8 could launch a total aircraft weight of 15,500 lbs. to a speed of 105 knots within 1.69 seconds.³ To achieve that, the catapult’s main accumulator and additional air flasks were designed to provide a maximum operating pressure of 3,500 psi.⁴ It was with those high-powered catapults that the *Bennington* began its flight operations on the quiet morning of 26 May 1954.

Although Vickers was about to catch up on sleep, the ship’s commanding officer, Captain William F. Raborn, and the flight deck and catapult crews were prepping for aircraft launchings. Relatively minor trouble occurred immediately—a malfunction on the first launch attempted on the starboard catapult.⁵ No further launch attempts were made from that catapult; all launches were made from the port catapult. Shortly after the 13th launch, an early sign of major trouble was seen from the *Bennington*’s bridge. According to the deck log, at 0610: “From the bridge, white ‘smoke’ was visible apparently coming from Hangar Bay number one (1); sounded the general alarm, sounded fire quarters.”⁶

Captain Raborn had reacted quickly, so fast that the two alarms were sounded before the worst was to occur.

After the alarms went off, fire was reported in the forward auxiliary machinery room. Before evaluation of that report could be made, however, “two (2) or three (3) violent explosions occurred. Reported by ship service telephone to be in vicinity of Wardroom Country.”⁷ The *Bennington* was shaken to her keel as fire, smoke, and explosive concussions swept through the passageways and vents below decks.

Soon after the disaster, Lithographer Third Class William Kirk related his experience in a letter written to a friend:

The PPO [Police Petty Officer] woke me about 0605. At 0610 I was sitting up in my rack with my feet hanging over the side. At 0615 GQ sounded. Everyone was bitching. Then the fire bugle sounded. I jumped out of my rack and, still bitching, began putting on my pants. I had one leg in when I felt the first explosion. I didn’t know what it was. It felt like a concussion, a big suction. My stomach went up and down, it felt sickening. The deck moved, the whole ship seemed to rock and shake. I went sailing into another bunk rack and was knocked down. I got up. and ran for the ladder. Before I could start going up smoke was coming in through the vents. The PA system was blaring: “this is no drill.” Guys were shouting: “Jesus Christ it’s real.” There was a mad scramble for the ladder, on the second deck it was smoky and a madhouse of guys. I finally got to the top of the ladder leading to the hangar deck when I felt another explosion. I looked back and saw that there were four guys behind me coming up the ladder. After they emerged there was a cloud of black smoke and I didn’t see anyone else come up.⁸

William Vickers also reacted quickly. Following the initial sudden rock of the ship:

I hollered “Get the hell out of this hole, we have been hit with a torpedo or bomb or another ship.” Some of the crew said, “Shut the hell up and go back to sleep.” I hollered out, “I ain’t been to sleep, I’ve been on watch and it’s slick as glass on that water, didn’t you feel the ship rock?” Some said, “Yeah, so what?” When I got to the top [of the] ladder on the first deck below the hangar deck, here comes a Sailor with his pants and shirt on fire.

A Succession of Explosions

Depending on how close one was to the origin of the explosions, accounts differ as to their number and intensity. According to the deck log, either two or three explosions occurred. Those below decks noted three explosions. An ensuing court of inquiry investigating the disaster noted that several crewmen reported that the first explosion sounded like a hammer thrown against a bulkhead.⁹ Two explosions that followed seem to have been significantly larger than the first. Although to Vickers it had seemed the ship’s exterior had been struck, damage-control (DC) crews soon determined that the explosions were internal in origin.

For a short time, efforts were effectively coordinated from DC central, but events soon placed that station in jeopardy. Set in a protected location, it had survived the explosions. But soon afterward its director, Chief Carpenter James Hurd, reported that smoke was filling the compartment.¹⁰ Fires, smoke, and debris proved enormous obstacles to the damage-control crews on the third and second decks; they were not able to reach and access DC central for some time. Between 0645 and 0655 the station reported that air

was getting thin in the compartment and there was danger of suffocation. But just one minute later, at 0656, positive news came from damage control: All fires were reported out. It had taken approximately 44 minutes to extinguish the blazes, and it seemed that the greatest danger to the ship and crew had passed. But Sailors continued to perish. Shortly after 0712, the bridge ceased receiving responses from DC central, whose crew seemingly had succumbed to a lack of oxygen.¹¹ Then, at 0758, the bridge received a report indicating that the DC central crew had been rescued. That report was not wholly accurate. As the court of inquiry later reported: "the normal watch in Damage Control Central handled damage control action with limited personnel until smoke asphyxiated the personnel in the space."¹² Some of them had indeed been rescued, but for others, including Hurd, who gave orders that others be rescued before him, time simply ran out.¹³

Overwhelmed with Casualties

The *Bennington*'s medical department had more casualties than it could reasonably handle. Three physicians were on board at the time of the explosions, but one was killed, leaving only the ship's medical officer, Commander Clyde W. Norman, and the air group's flight surgeon. Fortunately, 21 hospital corpsmen were also on hand. Their berthing compartment, where many had been at the time of the explosions, had not been affected. The medical personnel had no idea of the extent of the damage to the ship. Their full attention focused on the increasing number of casualties. In his medical report, Norman hinted at the mental state of his staff early on in the crisis: "There was no definite way of ascertaining at such an early time how many human casualties there would ultimately be; but a certain premonition prevailed... that a large number of casualties could be expected."¹⁴ Even though sick bay had 60 available beds, there were more wounded than could be accommodated. Norman halted the transport of injured to sick bay and ordered them instead to be taken to the aft end of the hangar deck.

With smoke still pouring from the lower decks, Captain Raborn had brought the ship about and was heading toward Newport, Rhode Island. All the aircraft that could be launched without the assistance of a catapult were flown off to clear the flight deck as a still relatively new aircraft, the helicopter, was about to be used. Top commanders ashore, along with Raborn on board the *Bennington*, arranged for casualties to be airlifted to Newport Naval Hospital.¹⁵ In addition, ship-bound helicopters ferried in additional physicians and corpsmen.¹⁶ A total of 64 patients were evacuated by helicopter to the naval hospital; an additional 18 were taken ashore by boat. A small number of casualties were also sent to the medical facility on the base where the *Bennington* had docked.¹⁷ Of the 82 patients at the naval hospital, just eight had not suffered burns. The remainder had burns covering anywhere from 2 to 100 percent of their bodies.¹⁸ The disaster's final toll was horrendous: 102 dead and 118 injured.¹⁹

Damage Reflects Intense Blasts

The *Bennington* herself had sustained substantial damage. An assessment at New York Naval Shipyard (where repairs were made) found serious damage on the hangar deck and the second and third decks. Minor damage was noted on the fourth deck. The most severe structural damage was found on the hangar deck, which bulged upward in four places. More than anything, those bulges, from 1½ inches to 4 inches in height, indicated the intensity of the explosions, as the decking there was 2½-inch-thick, specially treated steel armor.²⁰

The damaged areas of the ship were chaotic, a clutter of waterlogged debris in areas that earlier had been open passageways, neat staterooms, and orderly messing spaces. When damage-control teams finally entered the port catapult room, they found extensive fire damage, and on later inspection at New York Naval Shipyard, one-half inch of oil was found on the deck and the entire compartment was heavily coated with soot. In the pump space in the compartment below, 4 inches of oil covered the deck, apparently overflow from the catapult compartment above. The pump motors also were coated with oil.²¹

The catapult was not heavily damaged, and the shipyard damage report noted that it “has been tentatively decided that Port Catapult will not be replaced.”²² However, attached piping on the launching accumulator and No. 1 air flask was heavily damaged. In particular, the vent relief pipe was found to have twisted and burst open adjacent to the relief valve.²³ The valve had been blown off the top of the accumulator and come to rest eight feet away; the threaded opening in the fitting that held the relief valve was found to have been increased in size by one-half inch.²⁴ Also, an elbow in the pipe from the accumulator’s oil-level gauge that was connected to a 4-inch air pipe was found to have burst.²⁵ Clearly, something had happened within the catapult to cause that kind of damage, but what? And what caused the other explosions?

The court of inquiry ultimately reported, essentially, that although a most-probable cause of the accident had been identified, the exact initiator had not been positively determined.²⁶ The court had investigated many possibilities, including, apparently, the idea that the hydraulic oil might have been sabotaged. An analysis of the oil, however, discounted the possibility of its deliberate dilution with flammable or volatile solvents.²⁷ Also, none of the crew was implicated as having contributed to the disaster, and Raborn was exonerated of blame. The cause seemed to have been mechanical.

Investigation of the catapult machinery found carbonaceous deposits within the piston valve, the accumulator, the connected No. 1 air flask, and the piping that connected all three. The inquiry’s report thus concluded that

the heavy and loosely adhering carbon deposits on the piston valve and the closely adhering deposit on the interior of the accumulator end of the piston valve housing were evidently deposited thereon by combustion within the housing.

The report laid out the most probable sequence of events within the catapult system. The catapult was firing normally until the diminishing level of oil within the accumulator formed a vortex, whose interior vacuum allowed air to extend into and through the piping, possibly as far as the piston valve, housed between the accumulator and the engine cylinder. The launch stroke continued normally until the shutdown sequence was initiated. That included closing the piston valve to cut off the oil’s access to the catapult. However, because of the abnormal amount of air in the piston valve’s control, the valve closed in an abrupt; abnormal; manner.

As a result of the violently closing valve, diesel ignition occurred. Requiring no spark or flame, diesel ignition occurs when a fuel mixes with very hot air; compressed air can reach very high temperatures. The air remaining in the system then was sufficient to permit the resulting flame to get into the accumulator, igniting oil vapor and foam therein. The rapid rise in pressure caused the relief valve to open, as it should have, but then the overboard discharge pipe from the valve burst. That was followed by the relief

valve blowing off the top of the accumulator, spewing hot gas and flame that engulfed the compartment. The crewmen didn't have a chance.

At some point after the start of the accumulator fire, the court indicated, an elbow burst in a brass pipe connecting the accumulator oil-level gauge to a four-inch air pipe, which in turn connected the accumulator to the No. 1 air flask. The rupture allowed air from the flask—under very high pressure—to mix with hydraulic oil and vent out of the system as an oil fog. That volatile fog spread throughout the forward part of the ship via open hatches and passageways. It detonated when it had mixed sufficiently with additional air and came into contact with some undetermined ignition source.

Potential for Accidents Was Known

The court of inquiry report mentioned three particular points in its “Finding of Fact” section:

- Fact 107 mentions the known occurrence of diesel action within hydraulic catapults “for many years,” but that it had not (until the *Bennington*) led to any serious consequences.
- Fact 108 says that “previous instances have been reported of air reaching the piston valve from the accumulator due to vortex action in the accumulator of the catapults.”
- Fact 109 mentions that an anti-vortexing baffle actually had been installed in the H8 catapult launching accumulators of the USS *Hornet* (CVA-12) in an attempt to eliminate this air carryover.

Those three facts indicate that the possibility, if not the probability, of such an accident occurring was known at the time of the *Bennington* disaster.

The previous October a similar accident with an H4-1 catapult had occurred on board the USS *Leyte* (CVA-32). Two corrective efforts were initiated as a result of that accident: Developing and testing of a less flammable hydraulic fluid and conducting a survey to determine nitrogen requirements of all shipboard hydraulic systems. Of final note is Fact No. 120 from the court's report, which says that “in high pressure hydro-pneumatic [hydraulic] systems using oil, insurance underwriters require the use of nitrogen, in lieu of air.” Therefore, while the private sector required nitrogen use in similar systems, the Navy did not. In fact, one recommendation of the court of inquiry was that nitrogen be used in the future in most high-pressure hydro-pneumatic systems, noting that the disaster would not have occurred had nitrogen been in use in the catapults.²⁸

While Vickers, Kirk and the other surviving crewmen would long remember the disaster, the only individuals who may have known exactly what happened that day were the doomed members of catapult crew. The inquiry noted that an officer told the court that “he heard a yell from the vicinity of the port catapult room prior to the first explosion as follows: ‘This thing is going to blow. Let's get out of here!’” That frightening piece of testimony clearly indicated that those in the catapult room knew something very wrong was happening.

In the end, the court of inquiry acknowledged that while naval authorities had known an accident involving catapult dieseling was possible, those same authorities considered it unlikely that such an occurrence would lead to serious consequences. But when that

possibility erupted into reality on 26 May 1954, the consequences were deadly serious, as measured in the sacrifice of 102 lives.

1. Log Book of the USS *Bennington* (CVA-20) Wednesday 26 May, 1954: Remarks Sheet," p. 513, National Archives, College Park, MD.
2. William G. Vickers, Interview by Christopher Edwards, 4 April 2002, Penngrove, CA.
3. *NAVAER 51-15HA-502 Handbook Operation and Maintenance Instructions Catapult Type H, Mark 8*, (Published Under Authority of the Secretary of the Air Force and the Chief of the Bureau of Aeronautics, 1 October, 1956), p. 3.
4. Ibid.
5. RADM John M. Hoskins, U.S. Navy, President; RADM Edgar A. Cruise, U.S. Navy, Member; CAPT James E. Leeper, U.S. Navy, Member; and CAPT Raymond J. Zanzot, U.S. Navy, Member; "Record of Proceedings of a Court of Inquiry: To inquire into an explosion and fire on board the USS *Bennington* (CVA-20) which occurred on 26 May 1954," 26 May 1954, p. 28, Department of the Navy Office of the Judge Advocate General (Claims, Investigations and Tort Litigation) Washington, DC.
6. Log Book of the USS *Bennington*, p. 513.
7. Ibid.
8. William W. Kirk to Paul M. Irvins, "Letter to Paul," 1 June 1954, used with permission (<http://uss-bennington.org/stz-explosion-wkirk54-ltr.html>).
9. RADM John M. Hoskins et al, "Record of Proceedings," p. 47.
10. Log Book of the USS *Bennington*, p. 513.
11. Ibid.
12. RADM John M. Hoskins et al, "Record of Proceedings," p. 31.
13. USS *Bennington* Commanding Officer to Secretary of the Navy, 26 August 1954. "Awards for meritorious actions; recommendations for, enclosure (1), Description of action and sample citation for CHCARP James W. Hurd (Deceased), recommended for Navy and Marine Corps Medal, plus statements of eyewitnesses," Naval Historical Center, Department of the Navy, Washington Navy Yard, DC.
14. USS *Bennington* Medical Officer Commander Clyde W. Norman to Chief of Naval Research, 16 August 1954, "USS *Bennington* Disaster; medical report of," p. 2, Bureau of Medicine and Surgery, Department of the Navy, Washington, DC.
15. U.S. Naval Hospital, Newport, RI, "A Report by the U.S. Naval Hospital, Newport, R.I. Concerning the Handling and Treatment of Casualties from the USS *Bennington* Disaster," p. 2, Bureau of Medicine and Surgery, Department of the Navy, Washington, DC.
16. USS *Bennington* Medical Officer CDR Clyde W. Norman, "USS *Bennington* Disaster; medical report of," p. 3.

17. Ibid.

18. John L. Enyart, CAPT, MC, USN and Donald W. Miller, CAPT, MC, USN, "The Treatment of Burns Resulting from Disaster," Paper produced at the U.S. Naval Hospital, Newport, RI, " p. 2, Bureau of Medicine and Surgery, Department of the Navy, Washington, DC.

19. RADM John M. Hoskins et al, "Record of Proceedings," pp. 32-46. (The dead included a civilian contractor on board at the time of the disaster.)

20. Robert F. Sumrall, *Warship's Data 5: USS Yorktown (CV-10)*, (Missoula, MT: Pictorial Histories Publishing Company, 1990), p. 39.

21. Bureau of Ships to New York Naval Shipyard, "USS *Bennington* (CVA-20)-Report of Damage Sustained," 1 June 1954, pp. 2-3, National Archives, New York, NY.

22. Ibid, p. 3, Emphasis is in original.

23. Ibid, p. 3.

24. RADM John M. Hoskins et al, "Record of Proceedings," p. 50.

25. Bureau of Ships, "USS *Bennington* (CVA-20)-Report of Damage Sustained," p. 3.

26. RADM John M. Hoskins et al, "Record of Proceedings," p. 56.

27. Commander, New York Naval Shipyard to Chief Technical Adviser, Court of Inquiry, USS *Bennington* (CVA-20), "Port Catapult Oil, Analysis of, USS *Bennington* (CVA-20), 25 June 1954, p. 6, National Archives, New York, NY.

28. RADM John M. Hoskins et al, "Record of Proceedings," pp. 55, 56, 64, 67.