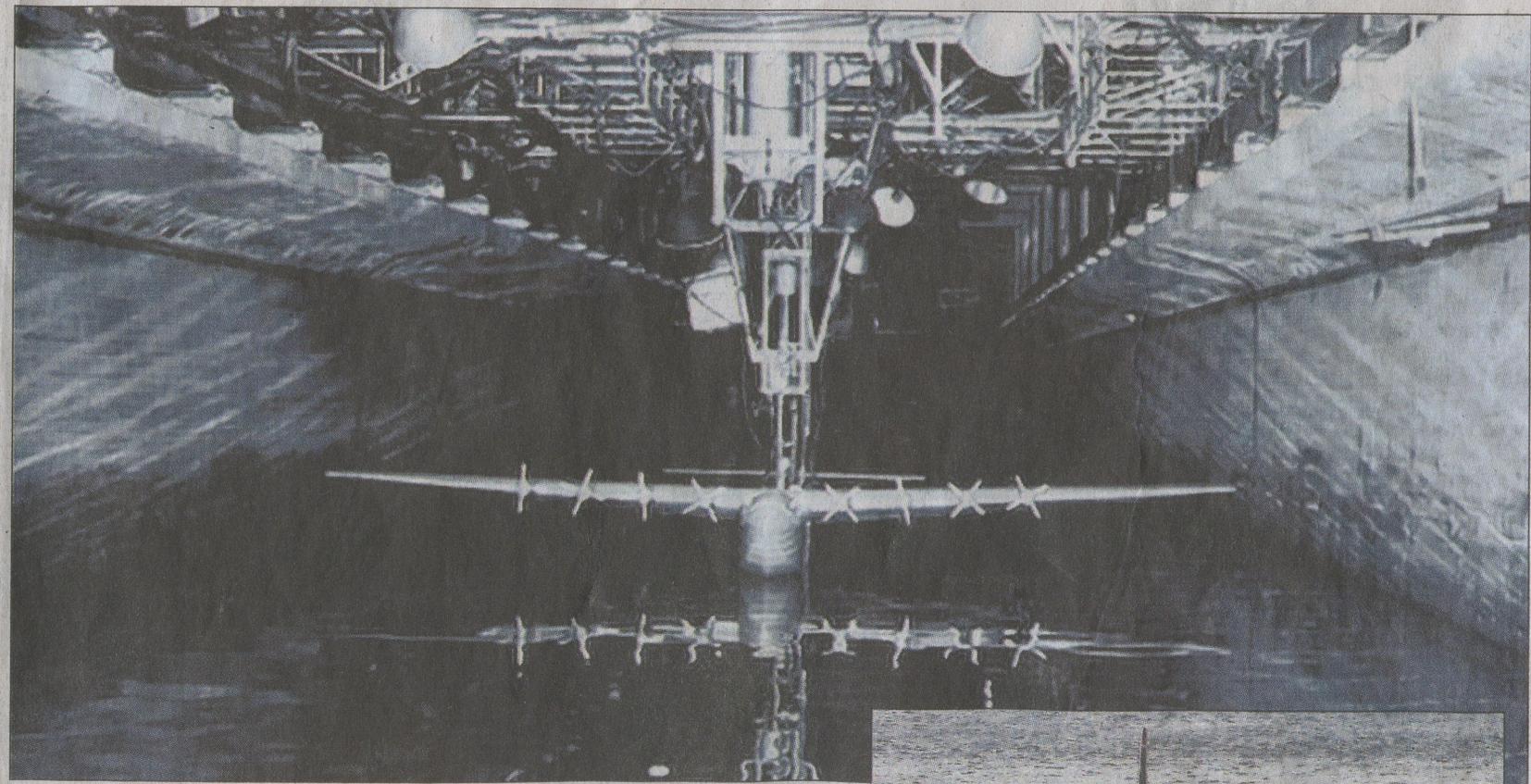


DAILY PRESS EXCLUSIVE

A PLANE CRASH IN 1944 IS SAVING LIVES TODAY



In the 1940s, NACA engineers in Hampton tested a model of the famed Hughes H-4 Hercules, a water-landing airplane called the "Spruce Goose." The Langley center continued to test various aircraft in water landings into the late 1960s. PHOTO COURTESY OF NASA LANGLEY



The passengers and crew in the Hudson River crash owe a debt to two pilots who fell in the Hudson River in World War II

In the 1940s, NACA engineers in Hampton tested a model of the famed Hughes H-4 Hercules, a water-landing airplane called the "Spruce Goose." The Langley center continued to test various aircraft in water landings into the late 1960s. PHOTO COURTESY OF NASA LANGLEY



Passengers wait to be rescued on the wings of a US Airways jet that ditched safely into the Hudson River on Jan. 15 in New York. AP PHOTO

The passengers and crew in the Hudson River crash owe a debt to two pilots who fell into the James in World War II.

BY PETER FROST

pfrost@dailypress.com | 247-4744

Just after 12:30 p.m. Sept. 20, 1944, a B-24 Liberator made a spectacular crash landing in the James River.

Cruising about 98 miles per hour parallel to the old James River Bridge in what was then Warwick County, the 44,000-pound bomber slowly de-

scended and eased into the calm waters of the river.

A veteran aircraft of several bombing missions during World War II, the B-24 hydroplaned for several hundred feet before its nose and wings were pulled dramatically underwater.

"All of the sudden, it fell like a ton of bricks," said Edward L. Hoffman, an engineer for the Hampton-based Na-

tional Advisory Committee for Aeronautics — NACA, which eventually became NASA.

Hoffman, now 86 and a Newport News resident, watched the spectacle with a handful of fellow scientists from aboard a small boat 100 yards away.

The B-24's improbable landing in the James was no accident. It was an

ambitious voluntary "ditching" that represented the first test of its kind conducted intentionally on a full-scale aircraft.

The resulting data, combined with decades of model testing at the Hampton complex, were compiled in a 1957

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Ex-engineer: '... All surprised by how bad it fell apart'

▶ **WATER LANDING** Continued from A1

Ex-engineer: '... Al

report co-written by Hoffman. The report is still viewed as the definitive study on landing distressed aircraft in water. It laid the groundwork for developing procedures and guidelines for commercial and military planes that are still used today.

A day after the bomber plunged into the river, the Sept. 21, 1944, the headline of the Daily Press read, "B-24 'Ditched' To Experiment On Structures — James River Test Designed To Save Lives In The Future."

Nearly 65 years later — Jan. 15, 2009 — an experienced pilot saved all 155 people aboard US Airways Flight 1549 with a successful emergency landing on the Hudson River in New York City.

Capt. Chesley B. "Sully" Sullenberger III, a former Air Force pilot, experienced dual engine failure on the Airbus A320 jet just after takeoff from New York's LaGuardia Airport. Seeing no other options, Sullenberger glided the aircraft safely into the river without causing extensive damage to the plane and thus allowing all aboard to escape.

"Obviously, NASA wasn't in the cockpit with Sully, and what he did required a tremendous amount of skill and composure," said Joseph R. Chambers, a retired NASA engineer and now a historian and author of several books about NACA and NASA Langley Research Center's contributions to aviation. "But the fundamentals and procedures he was trained in really came out of what these guys did here at Langley."

Over two decades beginning in the late 1930s, Langley researchers detailed the results of tests on about 40 aircraft types, ranging from small military fighters to large commercial freighters and transport planes. For each plane, the report advised pilots how best to set the controls of the aircraft to withstand the water impact, minimizing damage to the plane and allowing its crew and passengers the best chance of survival.

For example, should the landing gear be down or retracted? (Retracted.) How fast should the aircraft be moving when it hits the water? (As slow as possible.) At what angle should the plane

be eased into the water? (That varies by the type of plane and water conditions, but generally, the nose should be up.) What position should its wing flaps be in for impact? (Down.)

Hoffman's report paved the way for modern airplane configuration and emergency water-landing techniques, such as those used by Sullenberger in his heroic ditching of Flight 1549. Part of the report's 59 pages have been incorporated by engineers into modern aircraft design and into flight training materials for aspiring pilots in the military and commercial flying enterprises.

Said Chambers, "I want to call it the Bible."

Crashing a military aircraft into the James River was a risky proposition. Although the area wasn't nearly as populous as now, the banks of the river were speckled with single-family homes that the B-24 would have to fly over for part of its approach.

The two test pilots, both decorated Army Air Forces aviators in World War II, would be risking their lives. Most B-24s ditched at sea filled quickly with water and sank within minutes.

In addition, they were flying an aircraft modified with additional steel reinforcements over the front bombardier's window and support brackets fastened along fragile bomb bay doors — features that would alter the way the B-24 handled.

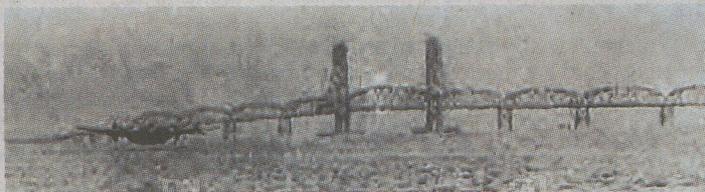
Simply put, the B-24 "was a dubious ditching aircraft," Frederick A. Johansen wrote in his 1999 book "B-24 Liberator: Rugged But Right."

But after losing hundreds of bombers and crew members in the English Channel during the war, Army Air Forces was determined to develop better procedures for pilots to follow in emergencies.

In a six-month period surrounding D-Day, for example, 50 B-24s were ditched in the operational theater, Johansen wrote. Thirty-one of the planes broke into two or more pieces, and 24 percent of the crew members drowned.

Most ditchings were the result of depleted fuel after bombers returned from long bombing raids or from damage sustained in battle.

ll surprised by how bad it fell apart'



On Sept. 20, 1944, NACA purposely crashed a B-24 Liberator bomber into the James River to test its water-landing capabilities. This sequence shows the test.

PHOTOS COURTESY OF NASA LANGLEY RESEARCH CENTER

Before the James River study, NACA had been testing $\frac{1}{16}$ -scale models of the bomber for more than a year in a 2,900-foot-long wa-

ter-filled tank in Hampton, Hoffman and Chambers said.

The tank — 24 feet wide and filled with water 12 feet deep that

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View a video of the water-landing research at dailypress.com/waterlanding.

engineers manipulated to mirror conditions at sea — was outfitted with catapults that launched the model aircraft toward the water at various speeds. Engineers measured damage to the planes, the loads that could be experienced by the occupants and how the planes performed coming in at different angles.

During the war, so many tests were being conducted, NACA added another tank alongside the original, and teams of engineers worked around the clock.

“As this thing went on, the Army and Navy grew more and more interested in what we were doing,” Hoffman said.

The Army Air Forces pushed for the James River crash test to verify the results that Langley’s engineers were getting from their models, Chambers said.

The engineers, wary of the live test because of the results from their tank experiments, reluctantly agreed.

On that cloudless day in September 1944, the intense mist kicked up by the B-24’s impact cleared, and the bomber’s two pilots emerged from the wreckage unharmed.

The plane was destroyed.

Just below the cockpit, the B-24’s fuselage was crumpled like a sheet of tin foil, and its four wing-mounted engines were mangled. The bomber’s nose sec-

tion was all but severed from the rest of the aircraft.

“We expected some damage, but we were all surprised by how bad it fell apart,” said Hoffman, whose job was to record what part of the aircraft’s fuselage touched the water first.

The service planned to ditch three B-24s into the river, but after the first test proved catastrophic, the additional tests were canceled.

Nonetheless, the crash landing was considered a success.

“What they found was that the full-scale tests validated the tank tests,” Chambers said.

Based on that success, Langley continued to test various aircraft after the war and into the late 1960s.

One of its final projects was the Boeing 707, a jet developed in the 1950s that’s widely viewed as the first commercially successful passenger jet. Most modern jet designs are based on the original 707 concept. The ditching procedures that the Hampton engineers prescribed for the 707 continue to be used today.

“Langley’s contributions to the operational safety of the nation’s civil and military aircraft programs are legendary,” Chambers said. “What happened in the Hudson River last month is the legacy of those tests done here years ago.”