

By the Dawn's Early Light: On the Fall of the Francis Scott Key Bridge. Was it An Accident?

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The Baltimore bridge that collapsed on March 26th was named for Francis Scott Key, who wrote the lyrics to the American national anthem "The Star-Spangled Banner" in 1814.

His inspiration was the British bombardment of Fort McHenry in the critical port of Baltimore during the War of 1812.

The British had just burned the U.S. Capitol and the White House and had set their sights on the Baltimore port, with the guns from hundreds of British ships trained on shelling the American flag. If the flag were taken down, they would know the Americans had surrendered, and the British agreed the shelling would stop. But in the dawn's early light, the flag still waved, held up by patriots who replaced soldiers who had fallen before them. Francis Scott Key observed all this from a British ship on which he had been allowed on board to negotiate a prisoner release. It is a quite moving story, dramatized [here](#).

What the dawn's early light brought on March 26, 2024, by contrast, were shocking news videos of the Francis Scott Key Bridge collapsing when the Singapore-owned cargo ship Dali slammed into it. It was "[like something out of an action movie](#)," said Baltimore Mayor Brandon Scott. Several commentators are [calling it a "black swan" event](#) that [will have catastrophic effects](#) on global supply chains. Interestingly, the War of 1812 was also about disruptions to U.S. trade with foreign nations, in that case by blockade by the British navy. But more on that, and on how our forebears turned dependence on foreign manufacturers into economic independence, after a look at what went amiss with the Dali and the bridge.

An Unusual Stroke of Bad Luck

Before it fell, the Key Bridge was a pivotal artery for traffic, cargo and supplies across the country. The Interstate 695 running across the bridge connects to I-95, one of the country's

busiest and most important supply chain highways, running from the northern to the southern end of the Eastern seaboard. [Shipping is expected to resume](#) to full capacity by the end of May, but [rebuilding the bridge](#) to appropriate standards could take five to seven years. That means this strategic artery will no longer be accessible for transporting hazardous materials, which Maryland law forbids to be transported by tunnel (including unleaded fuel, diesel, propane gas, and nitrogen chemicals for fertilizer), along with oversized cargo that cannot fit through roadway tunnels in the area (including tractors and military vehicles).

Observers contend there is [still no plausible explanation](#) for the direct hit to the bridge's most critical support.

The power went out on the ship about three minutes before the strike, yet multiple layers of security for maintaining steering control are mandated by U.S. and international regulation. Even without power, the Dali should have continued in the direction it was headed; but instead it veered to the right, for a direct hit into the key pylon supporting the bridge.

Engineering Professor Emerita W. M. Kim Roddis, a registered professional engineer with experience in bridge design, acknowledged in an interview in a [March 28 article on GW Today](#) that it was a "one in a million" occurrence. As reported in the George Washington University publication, she was asked how a 1.6-mile-long bridge that carried 31,000 cars per day could suffer such a complete collapse. She responded:

The container ship Dali lost power multiple times on its way out of Baltimore Harbor. The ship's inability to steer resulted in it heading at an angle towards the southwestern major bridge pier—the pylon.

The navigation chart for Baltimore Harbor shows four protective devices called dolphins, one in front of each pier for outgoing and incoming ships. ... They essentially serve as bumpers to deflect or slow boats and ships that are headed toward the pylon.

The [Dali's] angled course allowed the ship to miss the dolphin and strike the pylon. When the ship collided with the pylon it exerted a huge crushing force on the pier, bursting the pylon apart. This pylon was the only support for the bridge on that side. ... The continuity of the structure meant that all three spans came down when the southwestern pylon was lost. ...

The angle the ship came in at was unusual. So, yes, this was an unlikely accident. ... [O]ne-in-a-million is in the right ballpark.

What About a Cyberattack?

The [FBI issued a statement](#) the morning of the Dali crash saying there was no evidence of a terrorist attack, but insurers and reinsurers will no doubt be investigating, since insurance contracts now typically exclude damage from terrorist attacks. Insurance claims are expected to be high and to spill over into the global reinsurance market. (An [interesting bit of trivia](#) is that Dali's insurer, a company named Britannia, is owned by a company called Wadia Group. Founded in 1726, it built the ship from which Francis Scott Key saw the flag waving over Fort McHenry in 1814.)

The cyberattack possibility is confirmed in an April 5 article in *Security Magazine* titled

[“Protecting Ships from Cyber Terrorism”](#). The author observes:

The investigation into Baltimore’s Francis Scott Key Bridge collapse has only just begun, but we’ve already seen news reports containing an unclassified memo from the Cybersecurity and Infrastructure Security Agency (CISA) and comments from the Department of Homeland Security concerning the cause. ... At this time, there is no evidence that the incident was anything more than a tragic accident, but the involvement of these U.S. government agencies indicates concerns of a cyberattack.

Those concerns are highly warranted. For some time, maritime cybersecurity has been top of mind for regional, national and global policymakers. ...

There are plenty of onboard systems to attack. Hackers are known to intercept satellite communications used extensively by ships at sea. They can also spoof or jam GPS systems, manipulate the automatic ID system (AIS), steal vital data, or inject malware or ransomware into any number of onboard systems via infected devices files. Such attacks can throw a ship off course. When combined with a compromised propulsion system, the consequences can be horrific.

The cyberattack possibility is also confirmed in an article in *The Security Ledger* titled [“Container Ships Easy to Hack, Track, Send Off Course and Even Sink, Security Experts Say”](#). In fact training is now offered at the Norwegian University of Science and Technology to prepare for cyberattacks. An article in *Norwegian SciTech News* titled [“What Do You Do If a Hacker Takes Over Your Ship?”](#) begins with this chilling scene involving the hijacking of a ship’s steering:

You’re on the bridge, with the ship’s course shown on the digital display. But why is the ship continuing to turn west?

Everything looks normal on the computer screens in the dark wheelhouse — but outside, the land is dangerously close. What’s going on?

Down in the engine room, workers report via radio that everything is normal, but they wonder why the bridge has changed course. The engines are revving and the ship is picking up speed. The engine room hasn’t done this. What now?

In July 2020, World Economic Forum head [Klaus Schwab warned](#) (see video below) of “the frightening scenario of a comprehensive cyberattack which would bring a complete halt to the power supply,” such that Covid 19 “would be seen as a small disturbance in comparison”

And at the WEF annual conference in Davos, Switzerland, in January 2023, WEF managing director [Jeremy Jurgens said](#) during a presentation highlighting the WEF Global Security Outlook Report that 93 percent of cyber leaders believed that the current geopolitical instability makes a catastrophic cyber event likely before 2025.

Time to Repair and Rebuild

Hopefully the Key Bridge strike was an accident, as most news outlets contend. But whether it was or not, we have serious weaknesses in critical infrastructure that need to be

addressed. Bridges such as the Key Bridge are [classified as “fracture critical”](#) by the federal government – meaning that if one component of the bridge’s primary structural frame fails, all or most of the span will collapse. There are more than 16,800 such bridges in the U.S., according to the Federal Highway Administration. According to the American Society of Civil Engineers (ASCE) and the federal government, [46,000 U.S. bridges have aging structures](#) and are in “poor” condition. The Dali was 984 feet long—nearly twice the length of the ships used when the bridge was built during the 1970s. To minimize the potential of ships bringing down bridges, say experts, they need to be fortified with dolphins and other structures to protect around their danger points.

And that is just for the bridges. We also have a deficient electrical grid, aging dams and power facilities, and much more that are vulnerable to attack or structural disintegration. In the last of its “report cards,” which come out every four years, the [ASCE estimated](#) in 2021 that total U.S. infrastructure needs were approximately \$5.937 trillion. Of that sum, \$3.35 trillion was funded, leaving a wide funding gap of more than \$2.5 trillion. Where will this money come from? The federal government is \$34.6 trillion in debt, and the [Government Accounting Office is recommending](#) cutting rather than expanding the budget. We need a work-around that avoids tapping federal coffers.

The “American System” of Money and Credit

That brings us back to the War of 1812 and the financial challenges successfully overcome by our forefathers. At the end of the American Revolution, the colonies-turned-states were \$44 million in debt, a sum that at the time seemed impossible to repay. But Alexander Hamilton, the first U.S. Treasury Secretary, turned the debt to advantage by using it to capitalize the First U.S. Bank. Debt securities were traded for shares in the bank, paying a 6% dividend. The bank then issued the first U.S. currency, leveraging its capital into credit on the fractional reserve system.

But the Bank was controversial, and in 1811 its charter was allowed to expire – right before the War of 1812. Then as now, a major issue was disruption to foreign trade. As recounted [on the Federal Reserve’s website](#):

In the years leading up to the War of 1812, the U.S. economy had been on the upswing. The war with Britain, however, disrupted foreign trade. As one of the United States’ largest trading partners, Britain used its navy to blockade U.S. trade with other nations. The war prevented U.S. farmers and manufacturers from exporting merchandise, blocked U.S. merchants and fishermen from sailing the high seas, and curtailed federal government revenues, which were derived mainly from tariffs on trade. By 1815, the United States found itself heavily in debt, much like it had been at the end of the Revolutionary War thirty years earlier.

In April 1816, Pres. James Madison finally signed an act establishing the second Bank of the United States. The tale is continued in a 2018 article titled [“America’s Stunning Growth Under the Second National Bank”](#):

John Quincy Adams’ March 4, 1825 inauguration was the start of one of the most intense periods of economic progress in history. Canals and roads were pushed through, opening up the West to settlement, funneling new-mined coal to shops and cities, and creating entirely new Midwestern centers of industry. The iron industry, under tariff protection, was reborn after a century of imperial suppression. Railroads began military-

designed construction and grew quickly from nothing to thousands of miles. Financing and planning of these enterprises was coordinated by Federal, military, state, and local authorities. The Bank of the United States drove the program forward with credit regulation that throttled down parasitical speculation and directed public and private investment funds into infrastructure and industry. Researchers affiliated with the Bank-military-government leadership team did pioneering work with engines and electricity that led to spectacular advances later on.

Achievements included the Erie Canal and other canal networks connecting mining with manufacturing centers and Atlantic ports before the railroad era. In later years, the Bank of the United States sponsored creation of the Reading Railroad. The American coal-mining industry began as a direct result of these projects.

What Sen. Henry Clay and Lincoln's economic adviser Henry Carey called the "American System" of government-issued money and credit was used again by Lincoln's government to win the Civil War and to fund substantial post-war development, including completion of the Transcontinental Railroad linking both ends of the country.

That system was also used by Franklin Roosevelt's government under Secretary of Commerce Jesse Jones to get the country through the Great Depression and World War Two. At a time when U.S. banks were bankrupt, critical infrastructure was funded without tapping the federal budget by repurposing and greatly expanding the Reconstruction Finance Corporation (RFC) established earlier by Pres. Hoover to save the banks. Beginning with a modest \$500 million in capitalization, it lent or invested over \$40 billion from 1932 to 1957. It rebuilt the depressed economy, funded the New Deal and America's participation in World War II, and returned a net profit to the government.

A Modern U.S. National Infrastructure Bank on the "American System" Model

[HR 4052](#), a proposal for a \$5 trillion National Infrastructure Bank, is currently before Congress and has widespread support, with 31 co-sponsors. The proposed bank is designed to be a true depository bank, which can leverage its funds as all banks are allowed to do: with a 10% capital requirement, it can leverage \$1 in capital into \$10 in loans. For capitalization, the bill proposes to follow the lead of Hamilton's First U.S. Bank: existing U.S. bonds will be swapped for non-voting bank shares paying a dividend. For liquidity to back the loans, the bank will use incoming deposits or will issue bonds. Included in the many projects the bill covers is electrical grid security, a major need not just for ships and bridges but for infrastructure across the country. For more on this proposal, see the [website of the NIB Coalition](#).

Our forebears fought the American Revolution, the War of 1812, the Civil War and two World Wars to preserve our freedom and independence, the U.S. Constitution and Bill of Rights. They kept the flag waving in our darkest hours. A Hamiltonian-style national infrastructure bank is one promising tool for preserving that vision today.

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Featured image: MV Dali immobilized by the wreckage (From the Public Domain)

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