



# GNSI DECISION BRIEF

## **Cracks in Our Foundation:** How Neglected Bridges Threaten National Security

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## Cracks in Our Foundation: How Neglected Bridges Threaten Our National Security

### Introduction

The poor condition of U.S. infrastructure merits wider discussion, as its implications go beyond public safety and economic operations. The Department of Homeland Security (DHS) identified four critical infrastructure areas—energy and water, facilities, information and communication technology, and transportation—as lifeline systems essential for ensuring public safety, economic security, and national security.<sup>i</sup>

The U.S. interstate highway system, created by the 1956 National Interstate and Defense Highways Act under President Dwight D. Eisenhower, has been vital for national security.<sup>ii</sup> It facilitates troop movements and aids in the evacuation of large cities during emergencies. Additionally, Military Power Projection Platforms (PPP) rely on roads and bridges for movement to their designated sea or aerial ports of embarkation.<sup>iii</sup> Yet, despite their recognized importance in national security, the U.S. has allowed its transportation lifelines to degrade.

Alongside roads, bridges fall under the transportation lifeline function. With over 600,000 bridges spanning across the United States, and 167 million vehicles crossing them daily, they are a vital component of the nation's infrastructure. In today's globally interconnected society, an accidental channel blockage due to a downed bridge or intentional attack could have ripple effects that go well beyond the impacted area. Bridges deserve a deeper focus because of their critical role in both national security and economic operations as these structures connect cities, act as evacuation routes, provide faster transportation of goods, and support troop movements.

### Infrastructure and National Security

The nation's deteriorating infrastructure not only plays a critical role in national security but also projects weakness on the world stage, both to allies and adversaries. Allies may lose confidence in the U.S., while adversaries may see opportunities for exploitation. Domestically, public trust in government institutions also inevitably suffers.

In the United States, 42% of bridges are over 50 years old, and over one-third of them need repairs, with the American Road & Transportation Builders Association classifying many as "structurally deficient."<sup>iv</sup> Every four years, the American Society for Civil Engineers (ASCE) publishes a national Report Card assessing the state of the nation's infrastructure. Since the inaugural report in 1998, the U.S. has consistently scored its bridges in the "C" range, indicating that they remain in mediocre condition and require attention.<sup>v</sup>

A good portion of the U.S. infrastructure was constructed using standards from half a century ago. These previous standards

are no longer adequate and do not meet the current resiliency standards. The US National Academy of Sciences (NAS) defines resiliency as "the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events."<sup>vi</sup> By ensuring that there are infrastructure resiliency standards in place and that they are upheld, critical structures like bridges are better able to recover from disruptive events.

A recent attempt to address the nation's aging infrastructure was the Bipartisan Infrastructure Law (BIL) Congress passed in 2021. The recent influx of capital provided by the BIL dedicated \$40 billion for bridges including \$12.5 billion for the Bridge Investment Program. While BIL is a suitable initial measure to address the nation's aging infrastructure, it is just the beginning. States do not have sufficient funding to maintain and repair the nation's aging infrastructure, so federal funding for updating and maintaining infrastructure must be substantial and continuous.

### Ramifications of Bridge Collapses

On March 26, 2024, the containership Dali struck the Francis Scott Key Bridge in Baltimore, Maryland resulting in the bridge's collapse, six fatalities, and two injuries. The Port of Baltimore is one of the busiest ports in the nation, ranked first for handling automobiles and second for coal imports. It also supports 15,330 jobs directly and 139,180 jobs relating to port work.<sup>vii</sup> The bridge collapse disrupted access to the Port of Baltimore for over 11 weeks, and current estimates show that Maryland lost up to \$15 million a day in revenue.<sup>viii</sup>

This unintentional vessel strike highlighted the vulnerabilities of port systems due to downed bridges. After the Francis Scott Key collapse, 11 vessels were trapped in the port, four of which were a part of the Maritime Administration's Ready Reserve Force, meant to quickly supply American troops if necessary.<sup>ix</sup>

Vulnerabilities due to blocked ports aren't new. Historically, ships have been deliberately sunk to block critical channels and trap enemy ships and submarines during conflicts.<sup>x</sup> In WWII, blockships were used to obstruct port entrances, and in 2014 during the initial occupation of Crimea, Russia used two outdated vessels to trap the Ukrainian Navy in port.<sup>xi</sup>

Downed bridges could act in the same way as blockships in that they impact the deployment of military assets and advance an adversary's objectives during times of crisis. Moreover, these blockships could obstruct civilian ports, limiting access to resources and straining the economy. The repercussions could be even worse if they impact the ability for key government agencies to respond to national disasters and reduce mobility for people in surrounding areas.

## Vulnerable Bridges and Infrastructure as Targets

Bridges are potential strategic targets in armed conflict. Damage to, or the destruction of, bridges can negatively impact the logistical capabilities of the military. Shortly after the occupation of the Crimean Peninsula by the Russian Federation in 2014, Russian President Vladimir Putin ordered the construction of a bridge connecting mainland Russia to Crimea. In 2018, Russia completed the construction of the Kerch Bridge. Russian forces relied upon the Kerch Bridge to transport supplies from Russia into Crimea for distribution to troops within Southern Ukraine. In July 2023, Ukrainian forces used sea drones to transport and detonate explosives underneath a section of the Kerch Bridge.<sup>xiii</sup> Damage to the bridge caused it to be shut down until repairs were made the following day, allowing only one lane to reopen for use. The Kerch Bridge attack disrupted the transport of critical supplies to Russian soldiers on the frontlines and diverted resources to repairing and securing the bridge after the attack.

As Western support for Ukraine in the Russo-Ukrainian conflict continues, Russia seeks opportunities to retaliate without escalating to armed conflict with Western countries. Russian security services have examined social media accounts of persons in Western countries who may be open to collaborating with Russia by performing reconnaissance or committing sabotage against strategic targets.<sup>xiii</sup> So far, such operations have targeted a military installation in Germany tied to training Ukrainian troops, a warehouse in London housing Ukrainian aid supplies, and a shopping mall in Poland.<sup>xiv</sup> While bridges have not been targeted yet, they could become a target for Russian sabotage.

Likewise, bridges are a potential target for terrorists. The International Centre for Counter-Terrorism (ICCT) found that informants and undercover agents fortunately thwarted plots and terrorist attacks against American bridges and tunnels. Research suggests four reasons terrorists often avoid bridges and tunnels: counter-terrorist measures, the perceived soundness and hardness of the structures, expense, and difficulty of attack as compared to soft targets.<sup>xvi</sup> With this in mind, building and retrofitting structures could help deter intentional attacks.

## Managing Risks: Strategies for Bridge Safety

As the recent collapse of the Francis Scott Key Bridge has shown, the question is not whether a catastrophic event—accidental or intentional—will occur, but when. The resilience of communities is often only determined after a disaster, and rarely recognized beforehand. This makes it challenging for individuals, communities, the private sector, and all levels of government to demonstrate the “payoff” for investments in resilience.<sup>xvii</sup> The challenge then becomes proactive investments in the resiliency of the structures themselves and in the personnel tasked with responding to disasters.

After the collapse of the Francis Scott Key in March 2024, a New York Times analysis of federal data and shipping traffic identified dozens of U.S. bridges that lacked sufficient protection against similar vessel strikes. Recent inspections revealed that 309 bridges either lacked protective systems or had deteriorating foundations.<sup>xviii</sup>

Aging bridges can stand the test of time when properly maintained – if resources and personnel are consistently allocated for maintenance and modern enhancements are prioritized. The current editor-in-chief of the Journal of Critical Infrastructure stated, “In and of itself, the age of infrastructure does not appear to be the primary driver in determining the risk of infrastructure failure – it is neither necessary nor sufficient for failure to occur.”<sup>xix</sup>

Funding bridge maintenance, investing in modernization, and promoting resilience in future builds requires a consistent funding stream. In 2003, experts on The Blue Ribbon Panel on Bridge and Tunnel Security were tasked by The American Association of State Highway and Transportation Officials (AASHTO) to guide government leaders and infrastructure owners with recommendations on how to improve bridge and tunnel security.<sup>xx</sup> The panel recommended identifying high risk bridges and tunnels where attacks would bring economic disruptions, high casualty numbers, other societal issues for security investment to improve the probability of withstanding intentional sabotage with new funding by the Department of Homeland Security.<sup>xxi</sup> The recent incidents of bridge failures, as well as the destruction of bridges in conflicts, highlight vulnerabilities in an already taxed and aging infrastructure system. Addressing the vulnerabilities in the United States’ aging infrastructure is not only a public safety and economic stability concern, but vital for national security.

## Decision Points

1. **Given the threat to bridge infrastructure resulting from underfunded budgets and deferred maintenance, what safety measures and funding are being implemented to protect the nation's bridges from intentional targeting?**
2. **What immediate steps should be taken to enhance the security and resiliency of U.S. bridge infrastructure ensuring the protection of critical transportation routes?**
3. **In what ways can the U.S. leverage international best practices with higher resilience standards to improve its own infrastructure?**
4. **What strategies should be developed to protect roads and bridges from being targeted by adversaries during international conflicts or sabotage?**
5. **In light of the recent incident where the containership Dali struck the Frances Scott Key Bridge highlighting vulnerable port systems, what strategic measures should the U.S. implement to mitigate the risks associated with critical infrastructure failures?**
6. **What proactive steps can be taken to ensure rapid recovery and continuity of military and civilian logistics when vital bridges fail?**

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<sup>i</sup> "DHS Resilience Framework: Providing a roadmap for the Department in Operational Resilience and Readiness," U.S. Department of Homeland Security, July 2018, [https://www.dhs.gov/sites/default/files/publications/dhs\\_resilience\\_framework\\_july\\_2018\\_508.pdf](https://www.dhs.gov/sites/default/files/publications/dhs_resilience_framework_july_2018_508.pdf)

<sup>ii</sup> "National Interstate and Defense Highways Act (1956)," National Archives, Accessed on August 5, 2024, <https://www.archives.gov/milestone-documents/national-interstate-and-defense-highways-act>

<sup>iii</sup> "Coordinating Military Deployments on Roads and Highways: A Guide for State and Local Agencies," U.S. Department of Transportation Federal Highway Administration, Accessed August 5, 2024, [https://ops.fhwa.dot.gov/publications/fhwahop05029/appendix\\_a.htm](https://ops.fhwa.dot.gov/publications/fhwahop05029/appendix_a.htm)

<sup>iv</sup> "2023 Bridge Report," American Road & Transportation Builders Association, Accessed July 18, 2024, <https://artbridgereport.org/reports/2023-ARTBA-Bridge-Report.pdf>

<sup>v</sup> "ASCE's Infrastructure Report Card Gives U.S. 'C-' Grade, Says Investment Gap Trillion, Bold Action Needed," American Society of Civil Engineers, March 3, 2021, <https://www.asce.org/publications-and-news/civil-engineering-source/society-news/article/2021/03/03/asc-es-infrastructure-report-card-gives-us-c>

<sup>vi</sup> "Disaster Resilience: A National Imperative," Washington, DC: The National Academies Press, November 29, 2012

<sup>vii</sup> "Maryland At A Glance," Maryland Manual On-Line: A guide To Maryland & It's Government, Accessed August 3, 2024, <https://msa.maryland.gov/msa/mdmanua-01/glance/html/port.html>

<sup>viii</sup> "Understanding the Impact of the Key Bridge Collapse," Maryland Chamber of Commerce, March 28, 2024, <https://www.mdchamber.org/2024/03/28/understanding-key-bridge-collapse-impact>

<sup>ix</sup> Roberts, Angela, "11 ships are trapped behind the Key Bridge, including 4 considered critical to the nation's defense," The Baltimore Sun, August 6, 2024, <https://www.baltimoresun.com/2024/04/04/key-bridge-ships-stuck-ready-reserve-force-maritime-administration/>

<sup>x</sup> Savitz, Scott, "Blockship Tactics to Trap Enemy Fleets," U.S. Naval Institute, Vol. 147/12/1426, December 2021, <https://www.usni.org/magazines/proceedings/2021/december/blockship-tactics-trap-enemy-fleets>

<sup>xi</sup> Ibid.

<sup>xii</sup> Coalson, Robert, "From Logistics to Psychology, Effects of Crimea Bridge Blast Will Linger," Radio Free Europe/Radio Liberty, July 18, 2023, <https://www.rferl.org/a/crimea-bridge-explosion-effects-logistics-psychology/32508853.html>

<sup>xiii</sup> Mekhennet, Souad, Catherine Belton, Emily Rauhala, Shane Harris, "Russia recruits sympathizers online for sabotage in Europe, officials say," The Washington Post, July 10, 2024, <https://www.washingtonpost.com/world/2024/07/10/russia-sabotage-europe-ukraine/>

<sup>xiv</sup> Ibid.

<sup>xv</sup> Allison, Benjamin V., "Deadly Detours: Why Terrorists Do Not Attack US Bridges and Tunnels," International Centre for Counter-Terrorism, December 16, 2022, <https://www.icct.nl/publication/deadly-detours-why-terrorists-do-not-attack-us-bridges-and-tunnels>

<sup>xvi</sup> Disaster Resilience: A National Imperative," Washington, DC: The National Academies Press, November 29, 2012.

<sup>xvii</sup> Baker, Mike, Anjali Singhvi, Helmuth Rosales, David W. Chen, Elena Shao, "Dozens of Major Bridges Lack Shields to Block Wayward Ships," The New York Times, April 6, 2024, <https://www.nytimes.com/interactive/2024/04/06/us/bridge-collapse-protections-baltimore.html>

<sup>xviii</sup> Little, G. Richard, "Managing the Risk of Aging Infrastructure," International Risk Governance Council, November 2012, [https://irgc.org/wp-content/uploads/2018/09/R.-Little\\_Risk-of-Aging-Infrastructure\\_revision-Nov2012.pdf](https://irgc.org/wp-content/uploads/2018/09/R.-Little_Risk-of-Aging-Infrastructure_revision-Nov2012.pdf)

<sup>xix</sup> "Recommendations for Bridge and Tunnel Security," Federal Highway Administration, September 2003, <https://www.fhwa.dot.gov/bridge/security/brp.pdf>

<sup>xx</sup> Ibid.