

The background of the slide is an aerial photograph of a large container ship, the Hamburg Süd, crossing a suspension bridge. The ship is heavily loaded with stacked containers and is moving across the bridge. The bridge has multiple lanes and is supported by tall towers and cables. The water is dark, and the overall scene is captured from a high angle, showing the ship's path across the bridge.

Safeguarding Toll Bridges from Vessel Strikes:

Initial Risk Evaluation Results and Path Forward

May 13, 2026

Francis Scott Key Bridge Allision

On March 26, 2024, the container ship MV Dali struck the Francis Scott Key Bridge resulting in its collapse.



National Transportation Safety Board (NTSB) Investigation and Bridge Review Findings

68 *Bridges identified for further vessel collision risk review in March 2025*

- Built prior to the 1991 vessel collision design guidance
- Have an unknown level of risk of collapse from a vessel collision
- NTSB recommends owners conduct risk evaluations and develop Risk Reduction Plans where appropriate



California's NTSB Identified Bridges*



Golden Gate Bridge
Opened: 1937



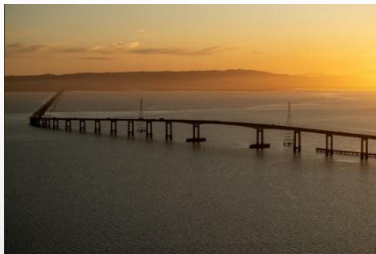
Richmond San Rafael Bridge
Opened: 1956



Carquinez Bridge
Eastbound Opened: 1958
Westbound Opened: 2003



Benicia Martinez Bridge
Southbound Opened: 1962
Northbound Opened: 2007



San Mateo Hayward Bridge
Opened: 1967



Antioch Bridge
Opened: 1978



Coronado Bridge
Opened: 1969

*NTSB acknowledges completed risk assessment for the San Francisco Oakland Bay Bridge

NTSB Recommended Actions and State-Owned Toll Bridges



Calculate the risk of bridge collapse from vessel allisions

Risk evaluation by Caltrans

Completed



Develop comprehensive Risk Reduction Plan

BATA & Caltrans partnering with maritime agencies to develop & implement the Risk Reduction Plan

In Progress



Evaluate need for Motorist Warning System

BATA & Caltrans partnering with maritime agencies to assess need

In Progress

Measuring Risk of Bridge Collapse from Vessel Allision

In any given year, how likely is it that a ship could cause a bridge to collapse?

Risk is based on three main factors:



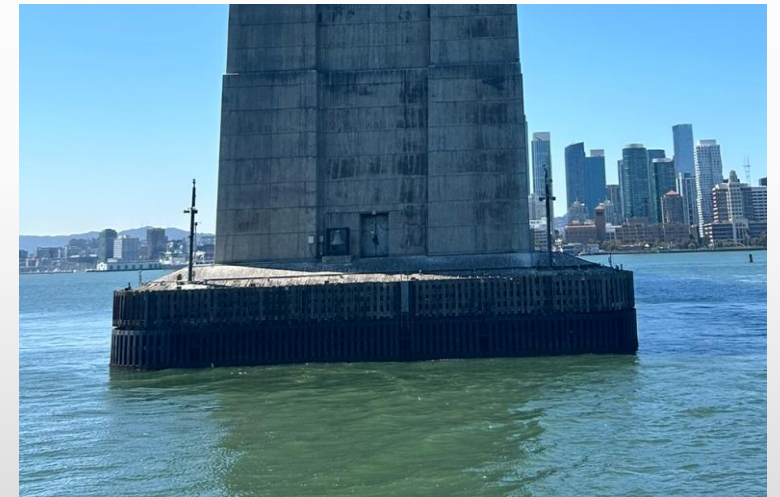
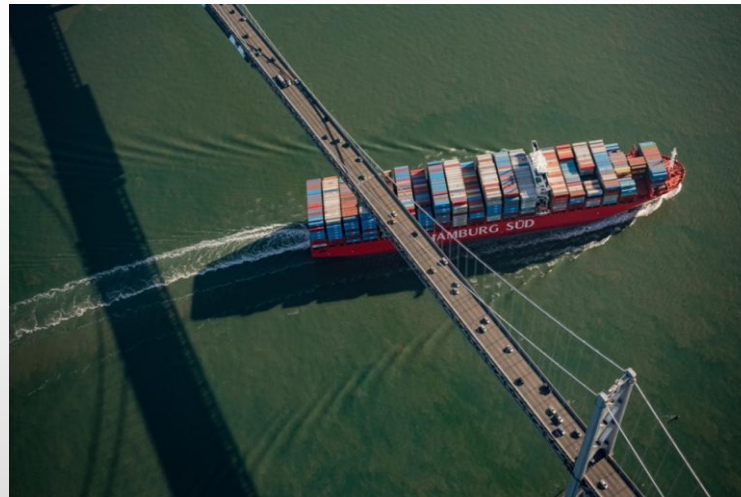
Vessel Traffic



Waterway & Environment



Bridge Defenses



Initial Risk Evaluation Results

Risk Threshold

- For the critical Bay Area toll bridges, risk of a collapse due to a ship strike should be no more than 0.01% per year (1 in 10,000)*
- Most Bay Area Toll Bridges predate the vessel collision design guidance
- Overall, both risk and probability are very small
- Does not mean the bridges are unsafe

* Source: 2009 AASHTO Guide Specifications and Commentary for Vessel Collision Design of Highway Bridges

State-Owned Toll Bridges	Within Risk Threshold
Richmond-San Rafael Bridge	No
Carquinez Bridge	No
Benicia-Martinez Bridge	No
Antioch Bridge	Yes
San Mateo-Hayward Bridge	Yes

Path Forward: Continuing Risk Reduction

Status and Upcoming Work

COMPLETED

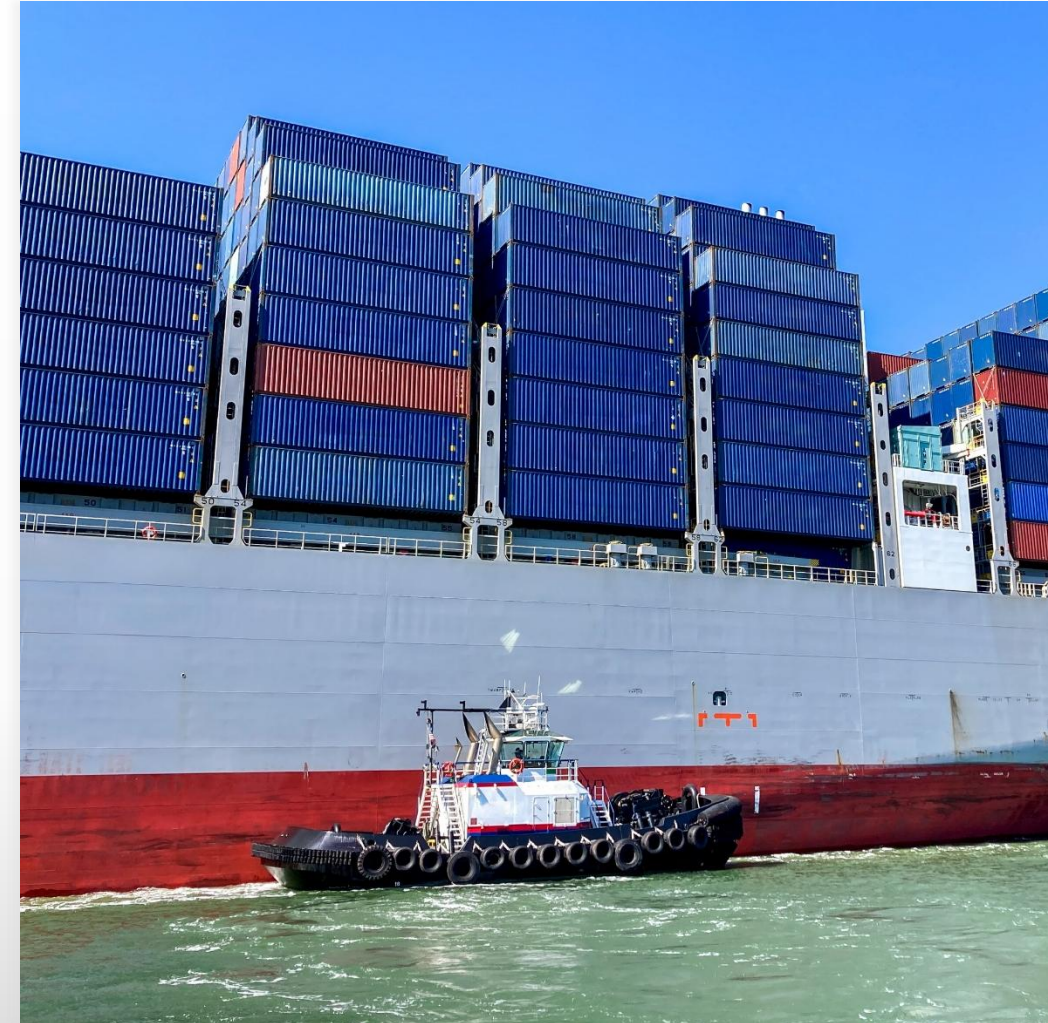
- ✓ Ports and Waterways Safety Assessment risk analysis completed, and a working group formed to review findings and develop actions
- ✓ Motorist Warning System evaluation launched by Caltrans
- ✓ Caltrans completed initial risk evaluation for all bridges

NEAR-TERM

- ➔ Review industry best practices
- ➔ Partner with maritime domain operators including United States Coast Guard (USCG), Bar Pilots, & CHP on emergency response plan
- ➔ Upgrade navigational aids (radar, lights, sensors)
- ➔ Develop and implement comprehensive Risk Reduction Plan

LONG-TERM

- 🕒 Enhance bridge pier protection systems, as appropriate



Factors to Consider

Waterway & Environment:

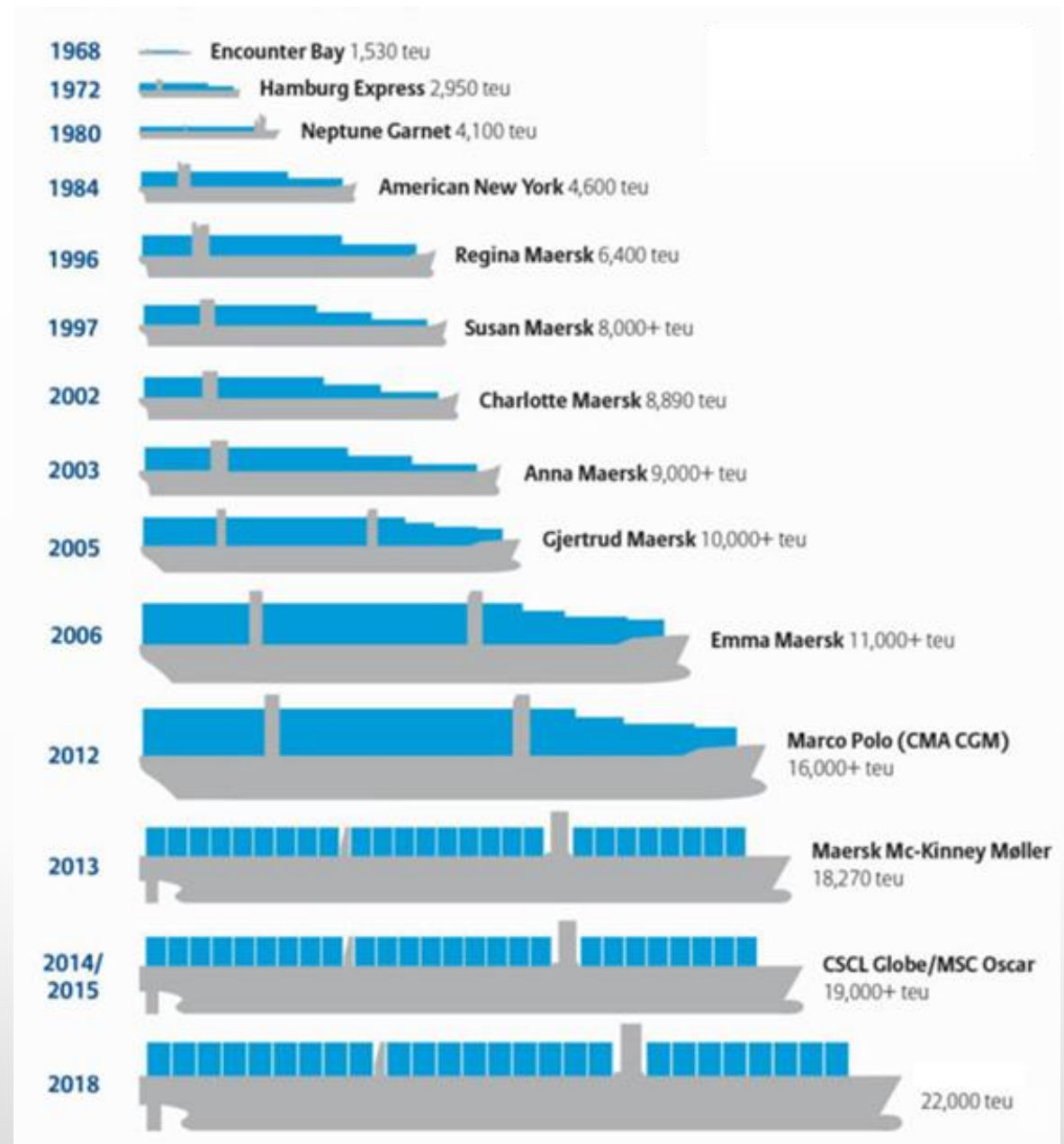
- Vessels continue to increase in size and weight
- Changing navigational routes to avoid bridges is not practical
- Effect of sea-level rise on pier protection

Bridge Defenses:

- Upgrading existing fenders to full protection involves complex set of tradeoffs

Asset Management:

- Allision is one of several risks identified in Toll Bridge Asset Management Plan



ISES (Source: <https://www.isesassociation.com/50-years-of-container-ship-growth/>)

Risk Reduction Strategies in Place



Prevention

- Operations overseen by San Francisco Bar Pilots and United States Coast Guard

Mitigation

- Navigational Aids
- Fenders

Response

- Coordination and Communication

Bay Bridge West Span Fender Replacement Update



Project Scope

Bridge mounted rubber fender system designed to absorb impact energy and protect the structure



Rubber Fender System

Improve energy absorption and reduce force transferred to the structure



Estimated Project Cost

\$130 Million



PROJECT TIMELINE



Questions