

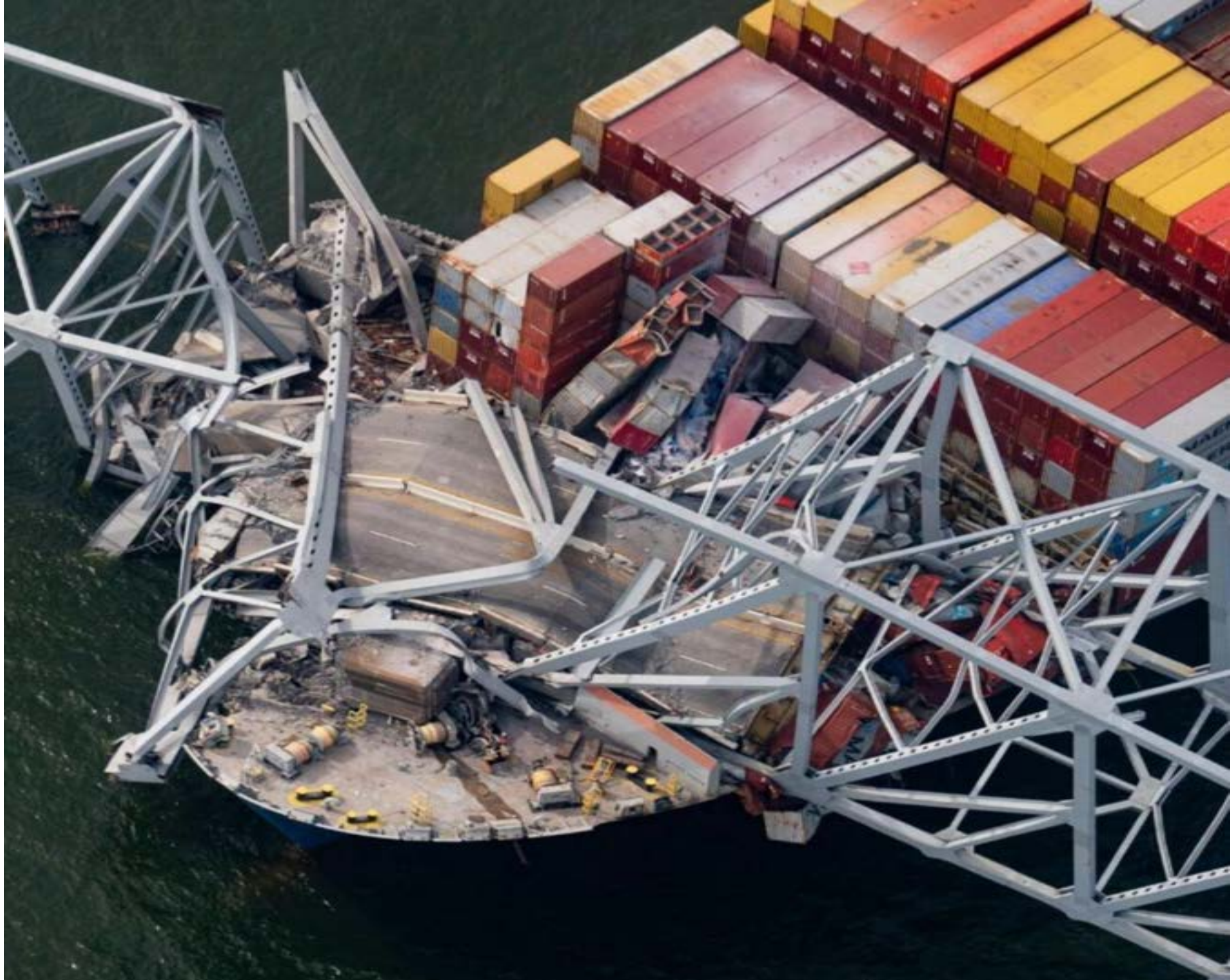


# Salvage of the DALI

Daniel Dettor, Resolve Marine











## Built for Speed!

- Funding agreement in place before the incident occurred.
- Prescriptions around response times
- Pre-identified resources
- Agreements with tug and barge operators, local fire departments, etc



# OBJECTIVES of UNIFIED COMMAND

## RESPONSE MILESTONES

- Missing Persons Recovery
- Temporary Alternate Channel
- Limited Deep Draft Access Channel
- Dali Re-Location
- Full Channel Reconstitution
- Wreckage and Debris Removal

Salvage efforts were one part of a much larger effort related to the general incident, and the social and economic ramifications,



# OBJECTIVES of DALI SALVAGE PLAN Phase 1

## SALVAGE PLAN MILESTONES

- Vessel Assessment and Stabilization
- Container Unloading / DG Cargo etc.
- Free bridge sections from vessel
- Refloating
- Tow vessel to terminal for further works (Bridge road sections removal )
- Sail Vessel to Norfolk for Final Bridge removal, Further Cargo Removal, Hazmat Mitigation, Temporary Repairs

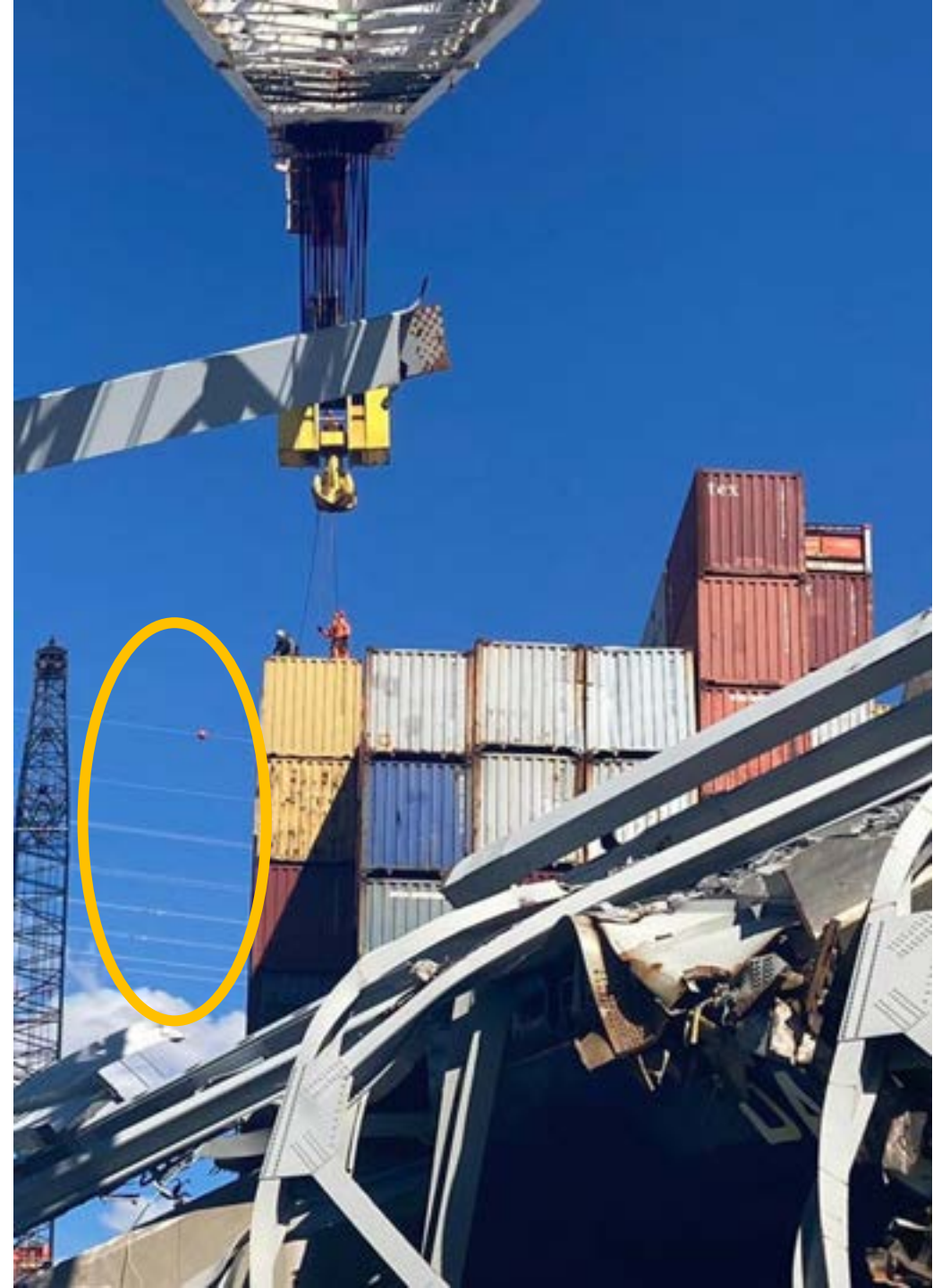


# VESSEL ASSESSMENT & STABILISATION



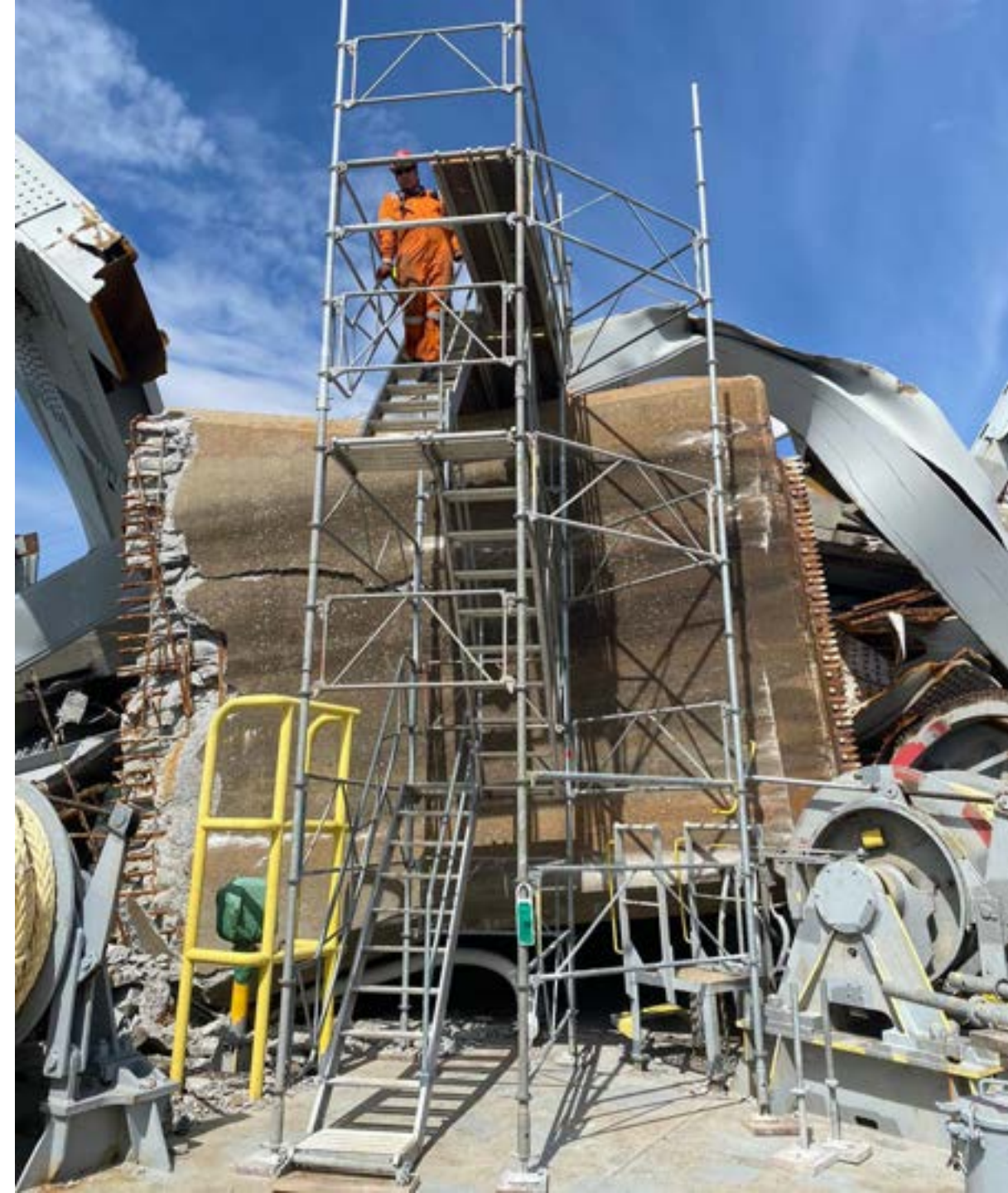
## “Unseen” Hazards

- High Voltage Transmission Lines for the Eastern Seaboard
- The Dali was sitting directly on top of a 40 inch Natural Gas Main
- Having Baltimore Gas and Electric reps in the Incident Command Post assisted in the redirection of power and gas so that crane barges could operate.



## VESSEL ASSESSMENT & STABILISATION

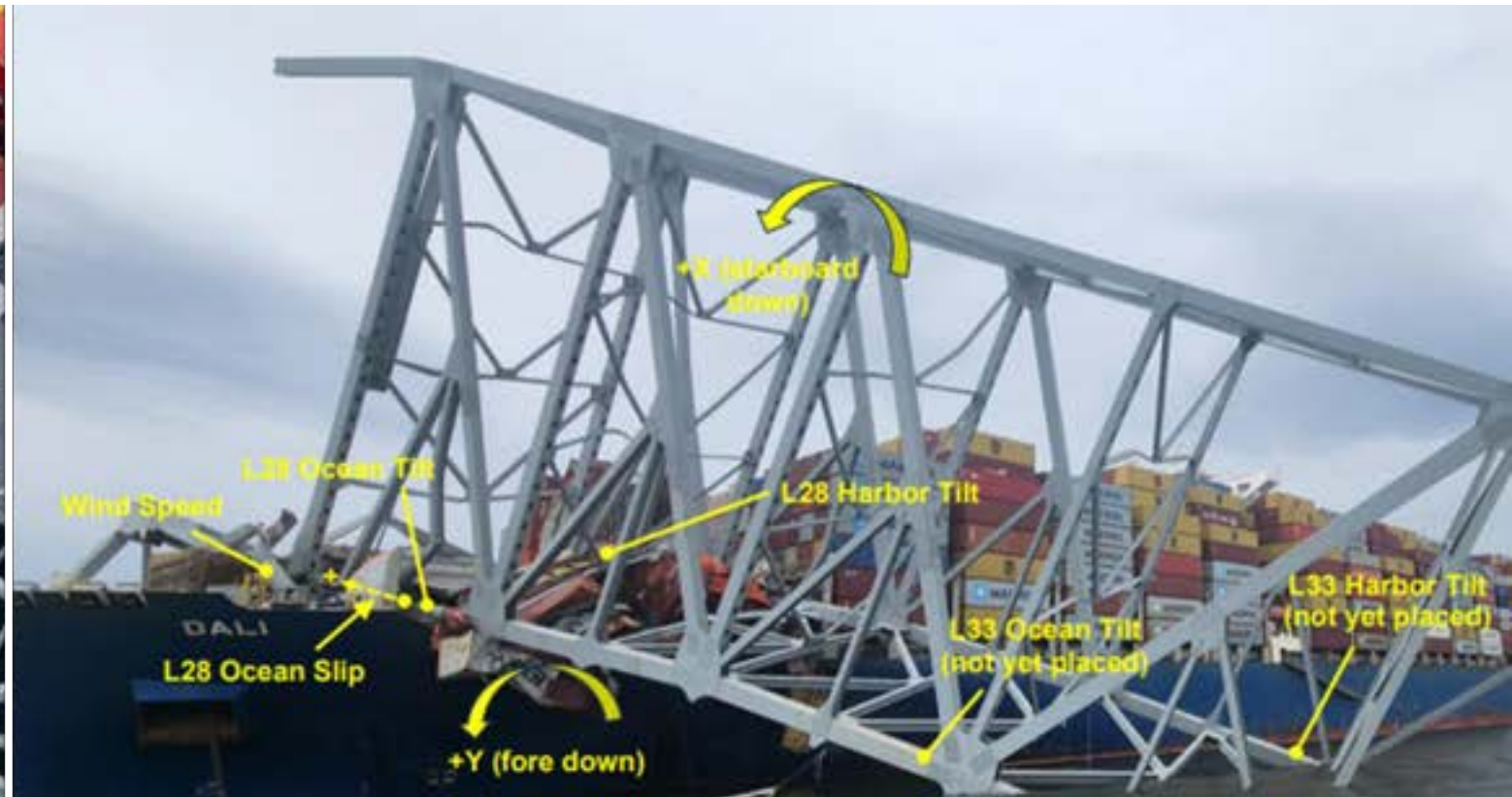
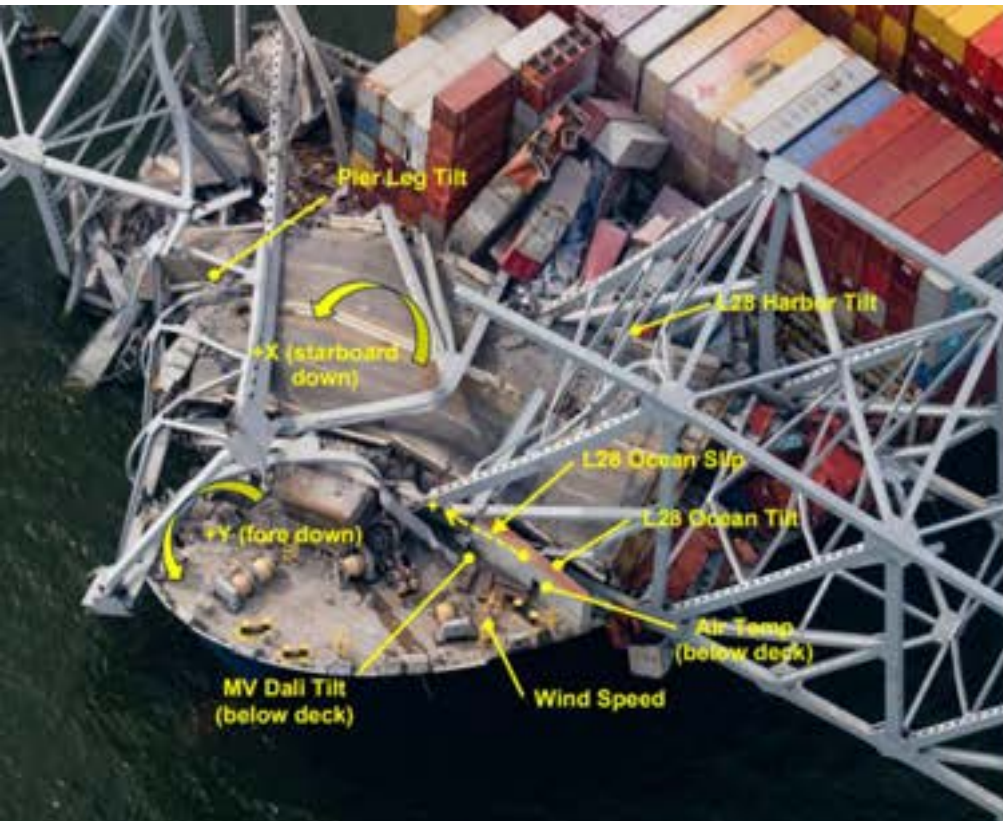
- Make site safe
- Understand how the bridge structure was laying on the ship. What was moving? What wasn't?
- Restore fire main forward
- Restore power and repair mooring winches
- Additional Anchors and Ballast






# VESSEL ASSESSMENT & STABILISATION

- Install sensors to monitor changes

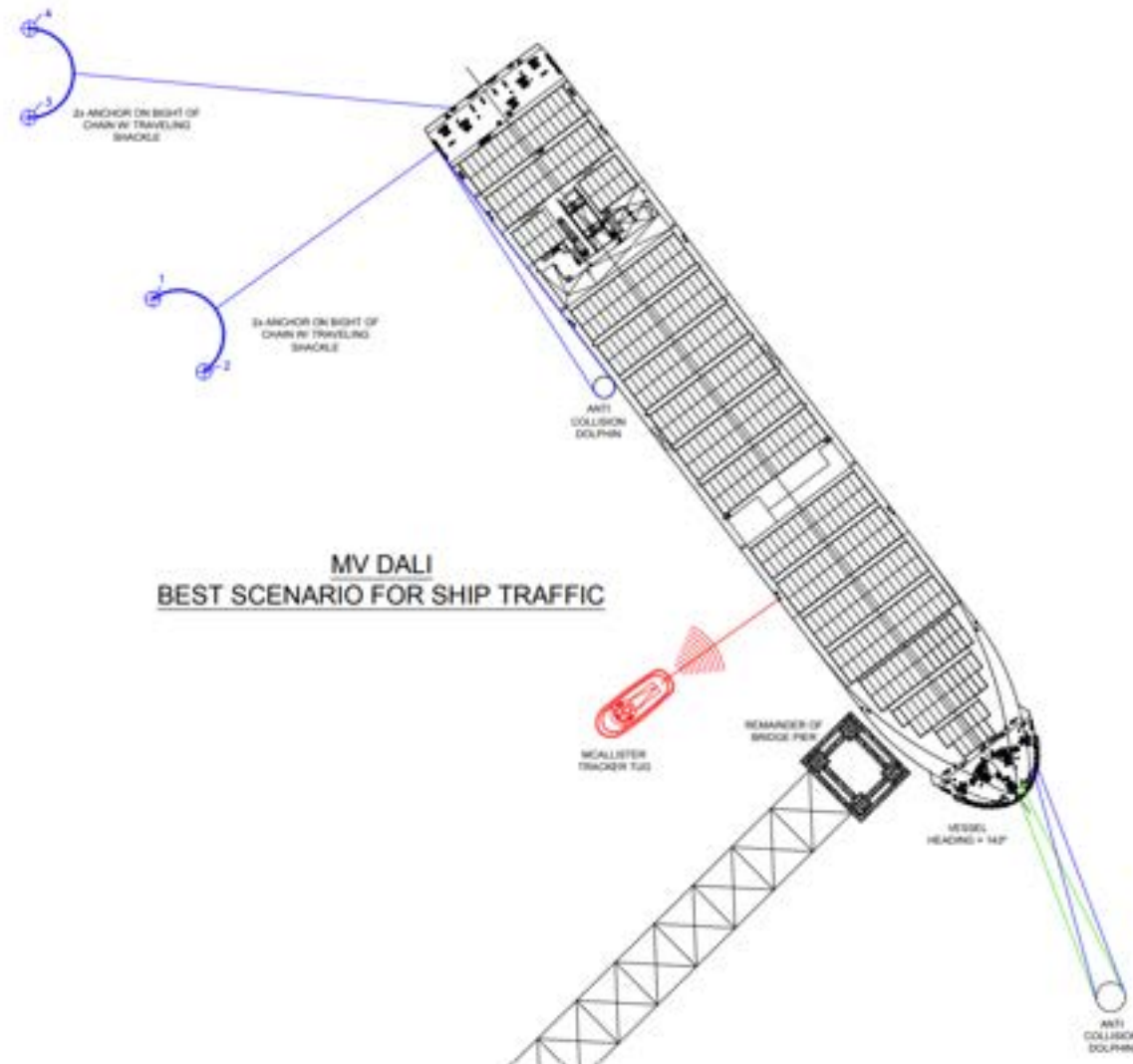






Witness marks in cracks on  
Roadway

# VESSEL STABILISATION



# INSTALL BALLAST SYSTEM FOR VOID TANKS





# CONTAINER UNLOADING / DG CARGO

## CONTAINER UNLOADING / DG CARGO

Intact Bay 10

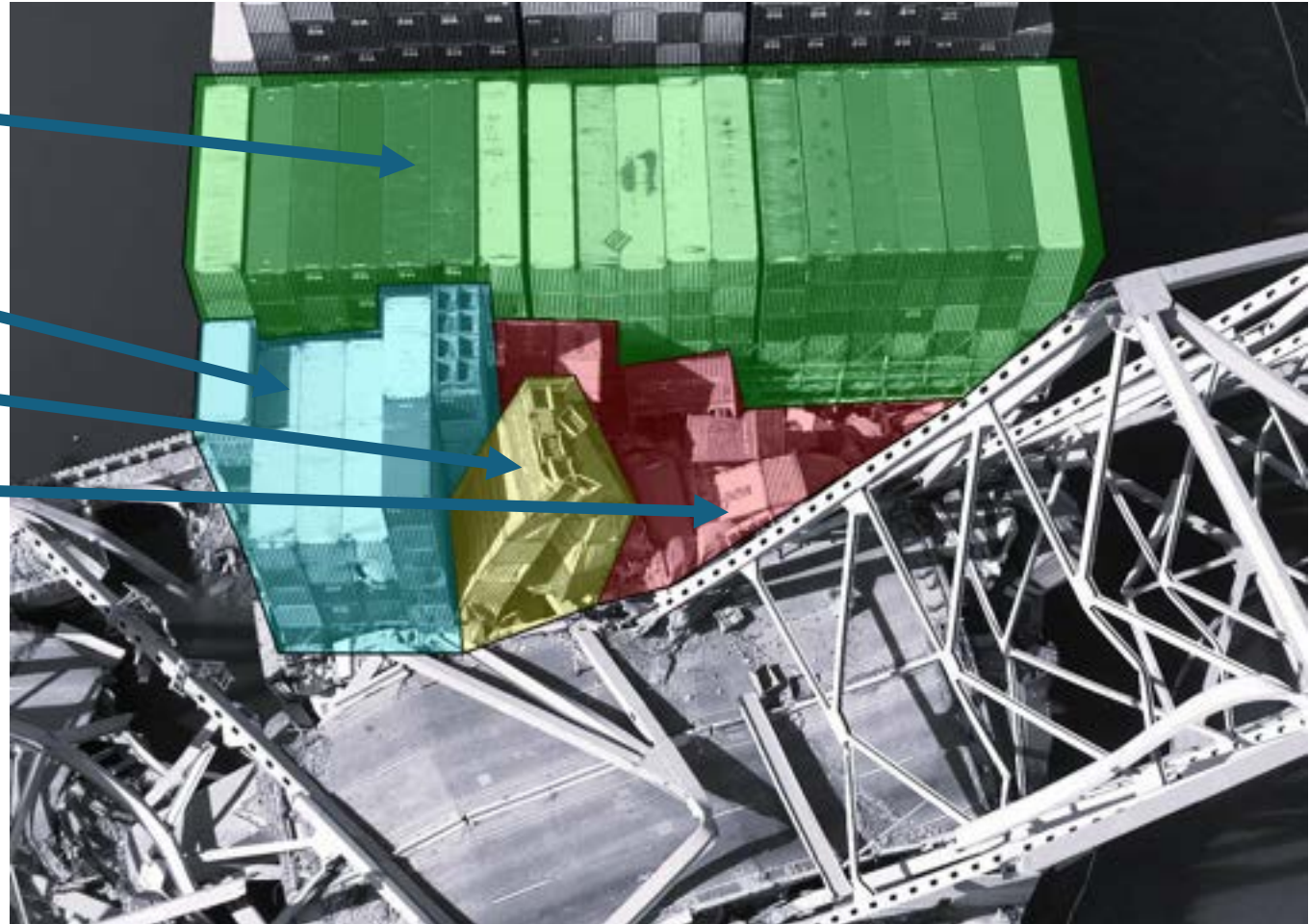
Intact Bay 06

Toppled Bay 06

Displaced Bay 06

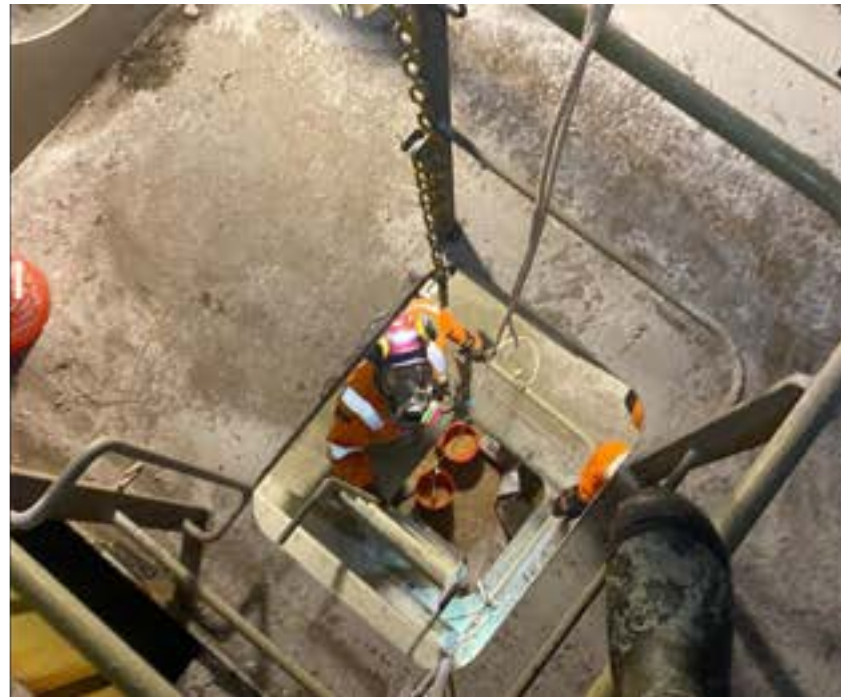
Bay 06: ~ 100 Containers Topside

Bay 10: ~ 120 Containers topside



## CONTAINER UNLOADING / DG CARGO

- Soybean removal (100 tons by hand)







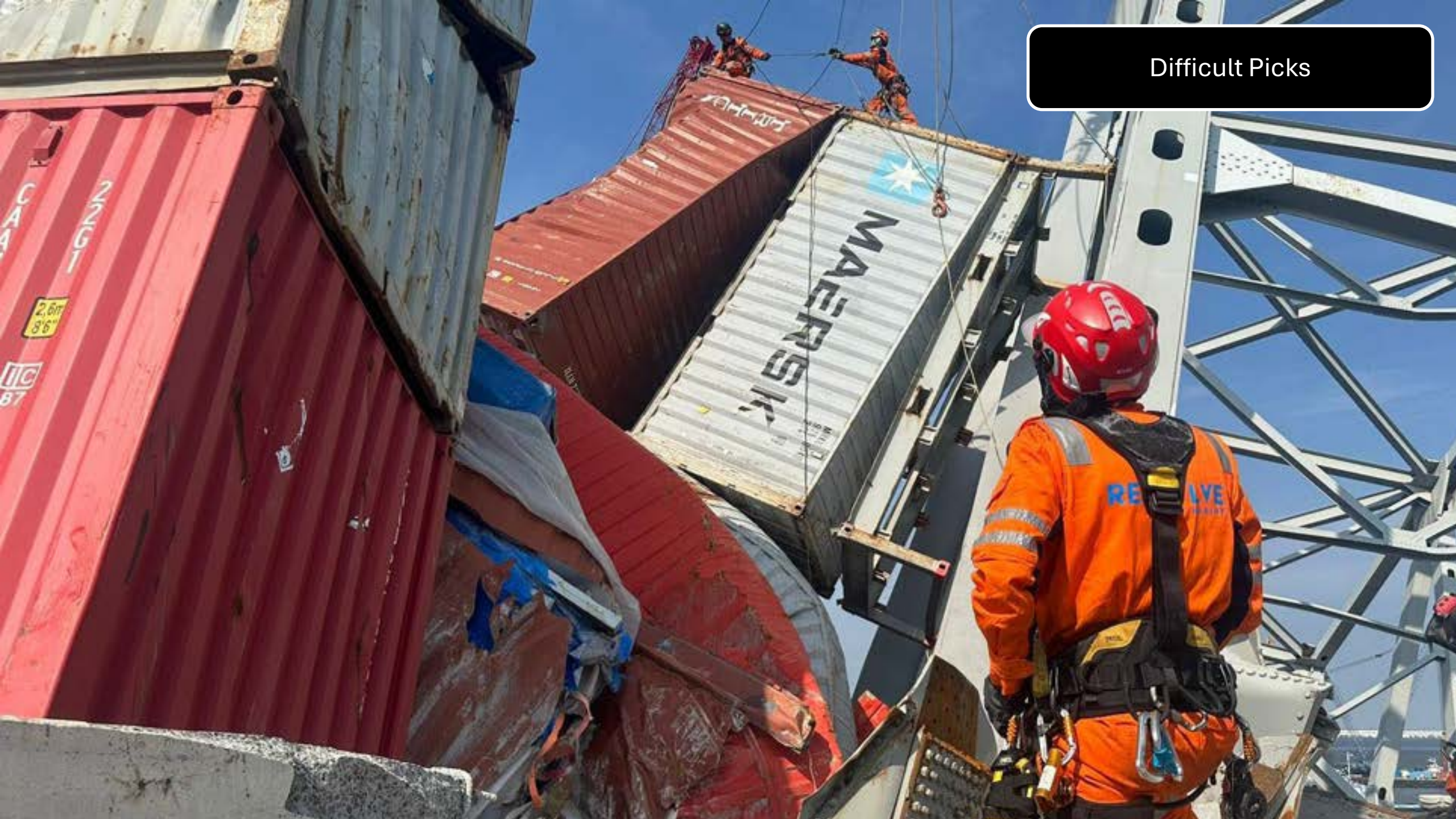


Progress





Difficult Picks









Separating Stuck  
Containers









Testing of liquid found in bow thruster room. Suspected sulphonic acid, onsite test inconclusive – needs lab test





Transfer of Sulphonic Acid from  
Damaged Tanks to Intact Tanks







## SALVAGE PLAN MILESTONES

**FREE BRIDGE SECTION  
FROM VESSEL**



Precutting East Side Structure





Cold Cutting Machine in Place

RESOLVE  
MARINE

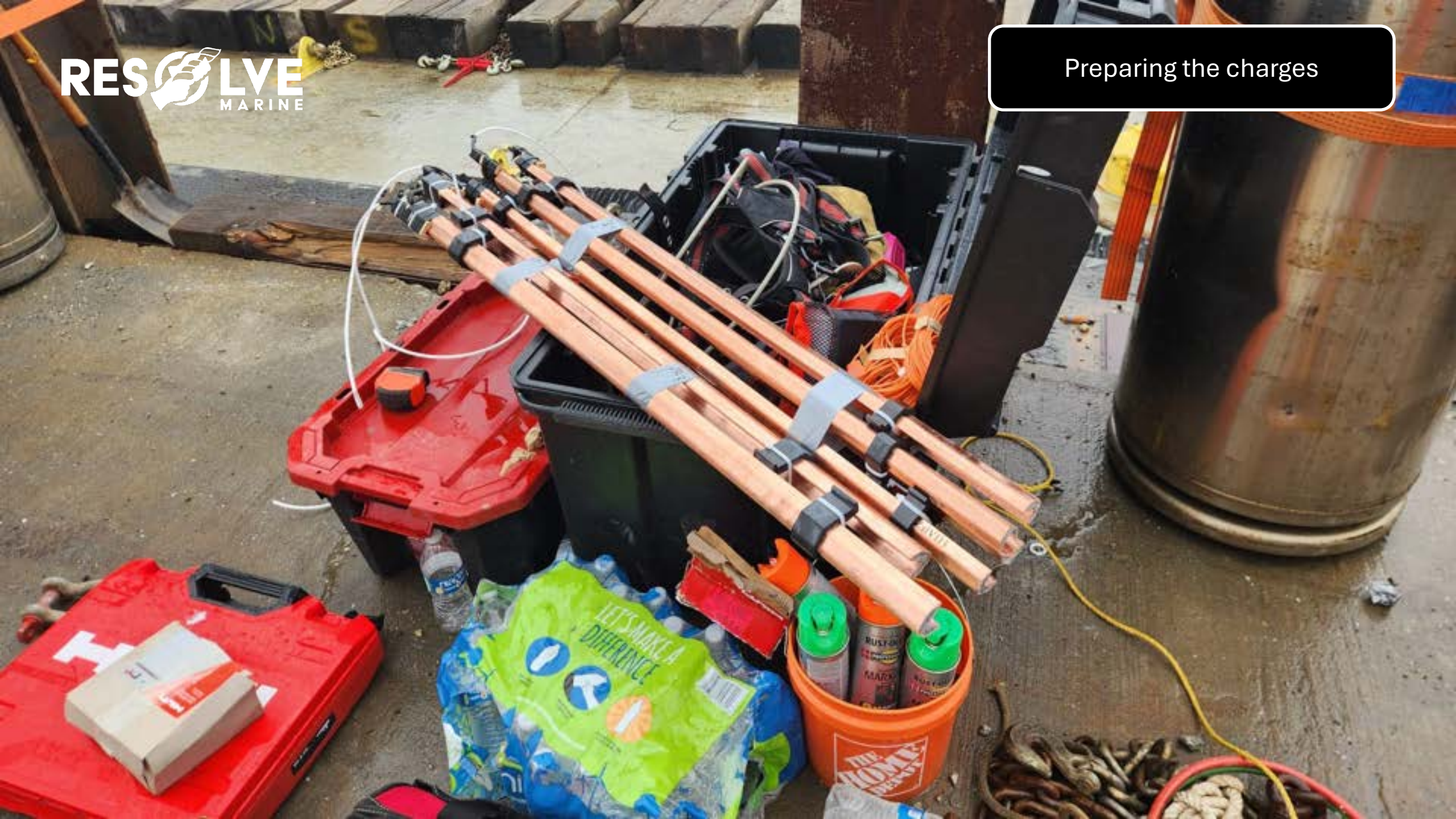




## Explosives Received

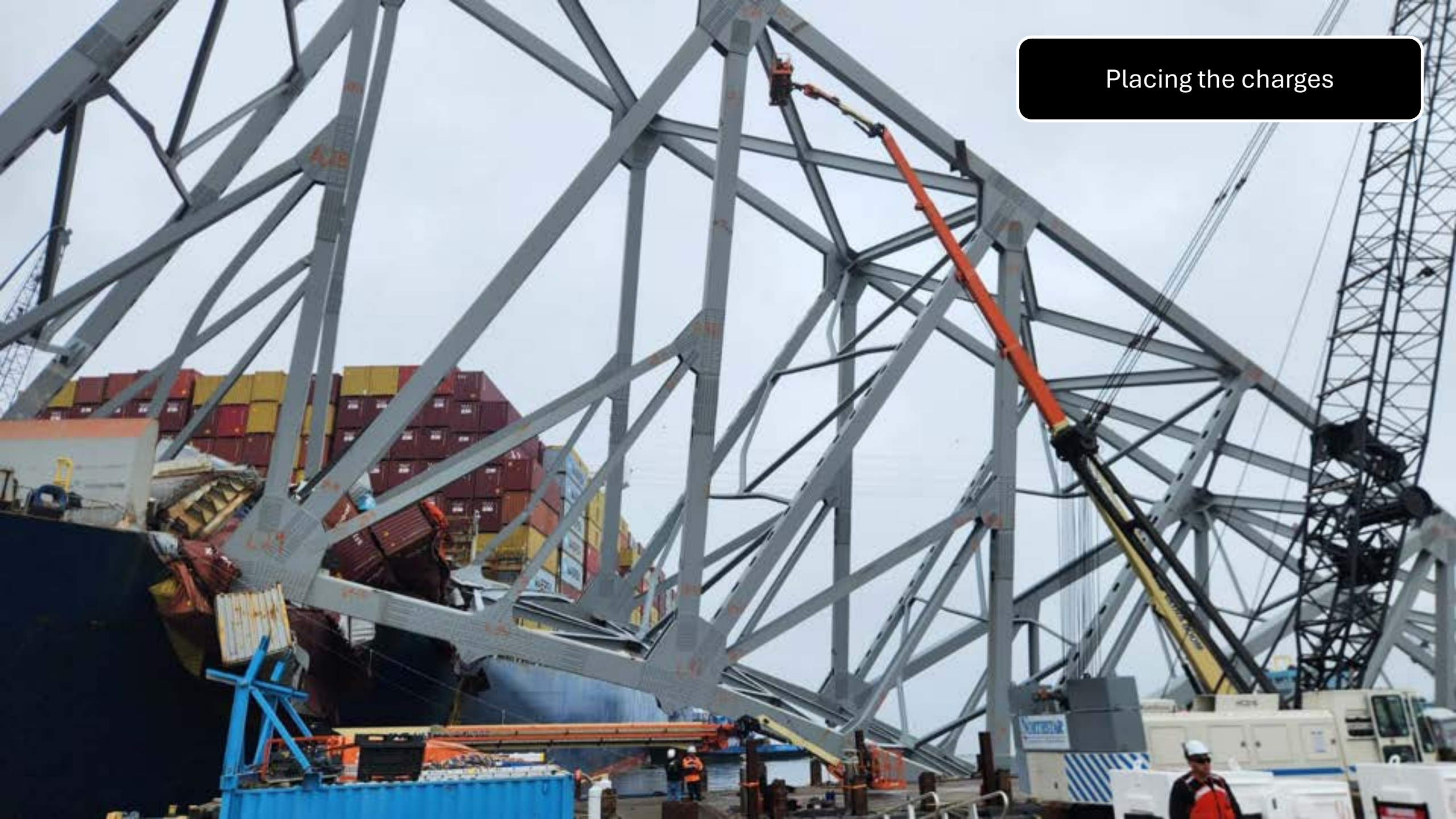








Placing the charges





Connecting the initiation  
system



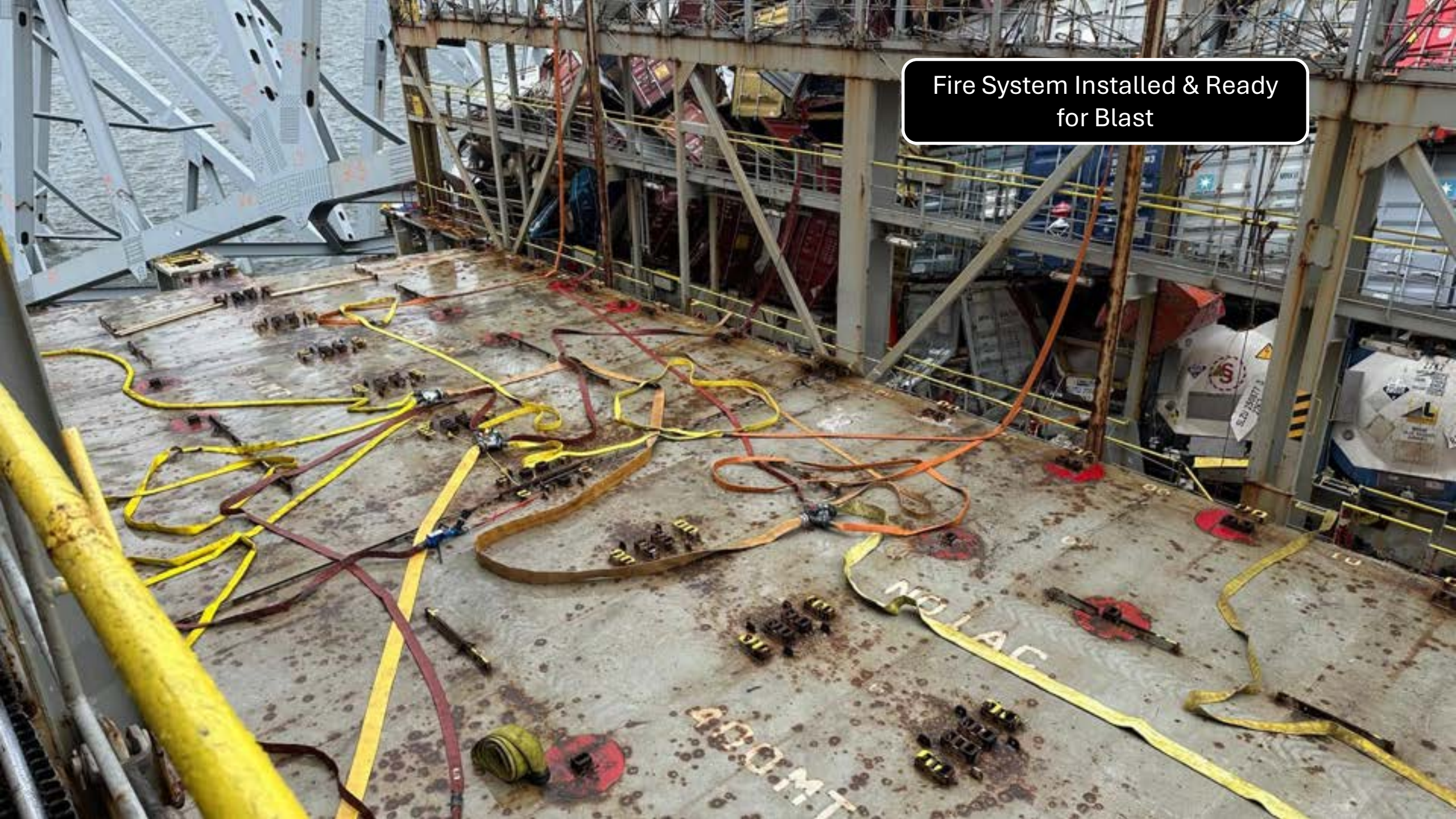


Plywood to protect the glass





Fire System Installed & Ready  
for Blast







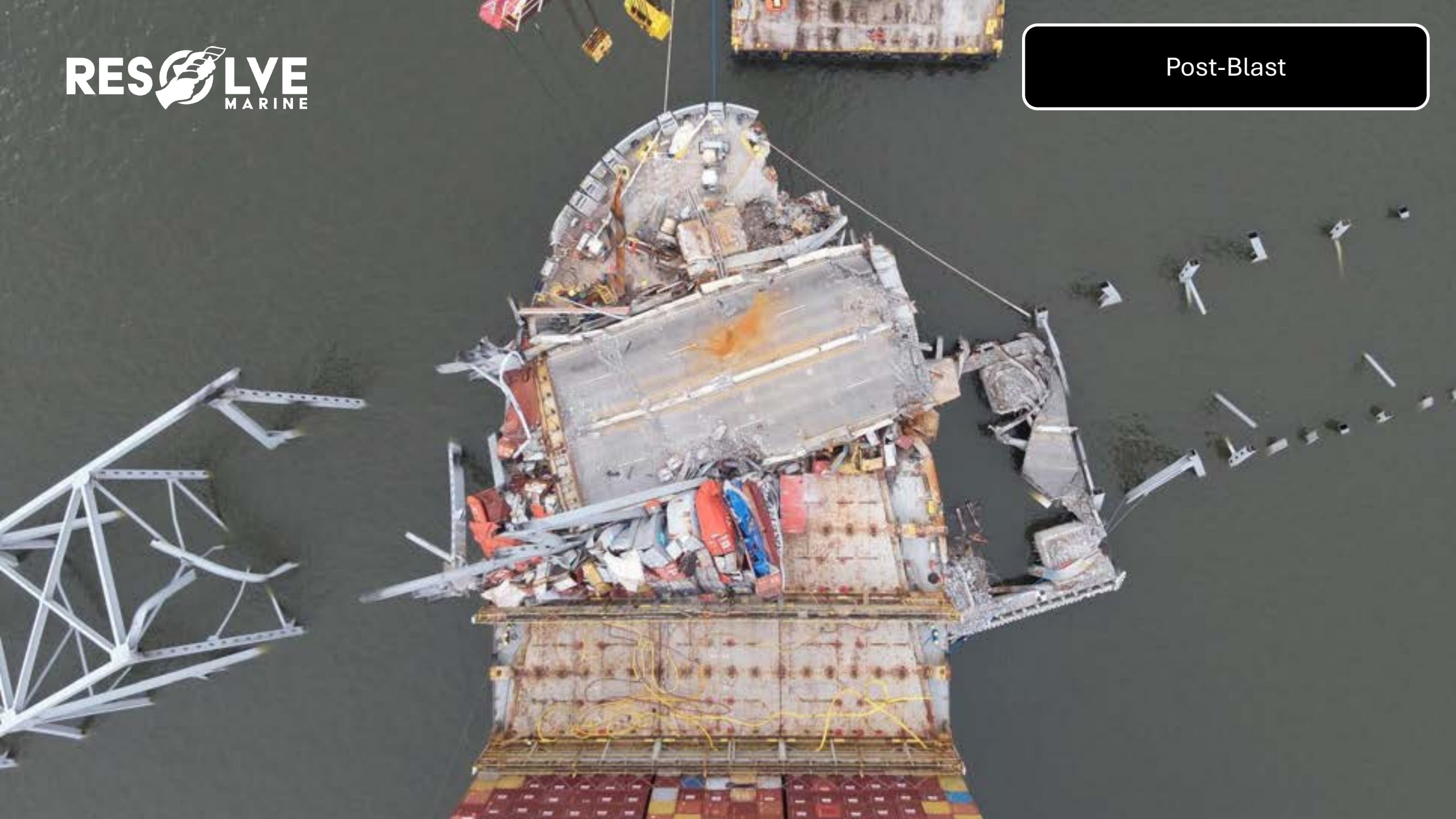




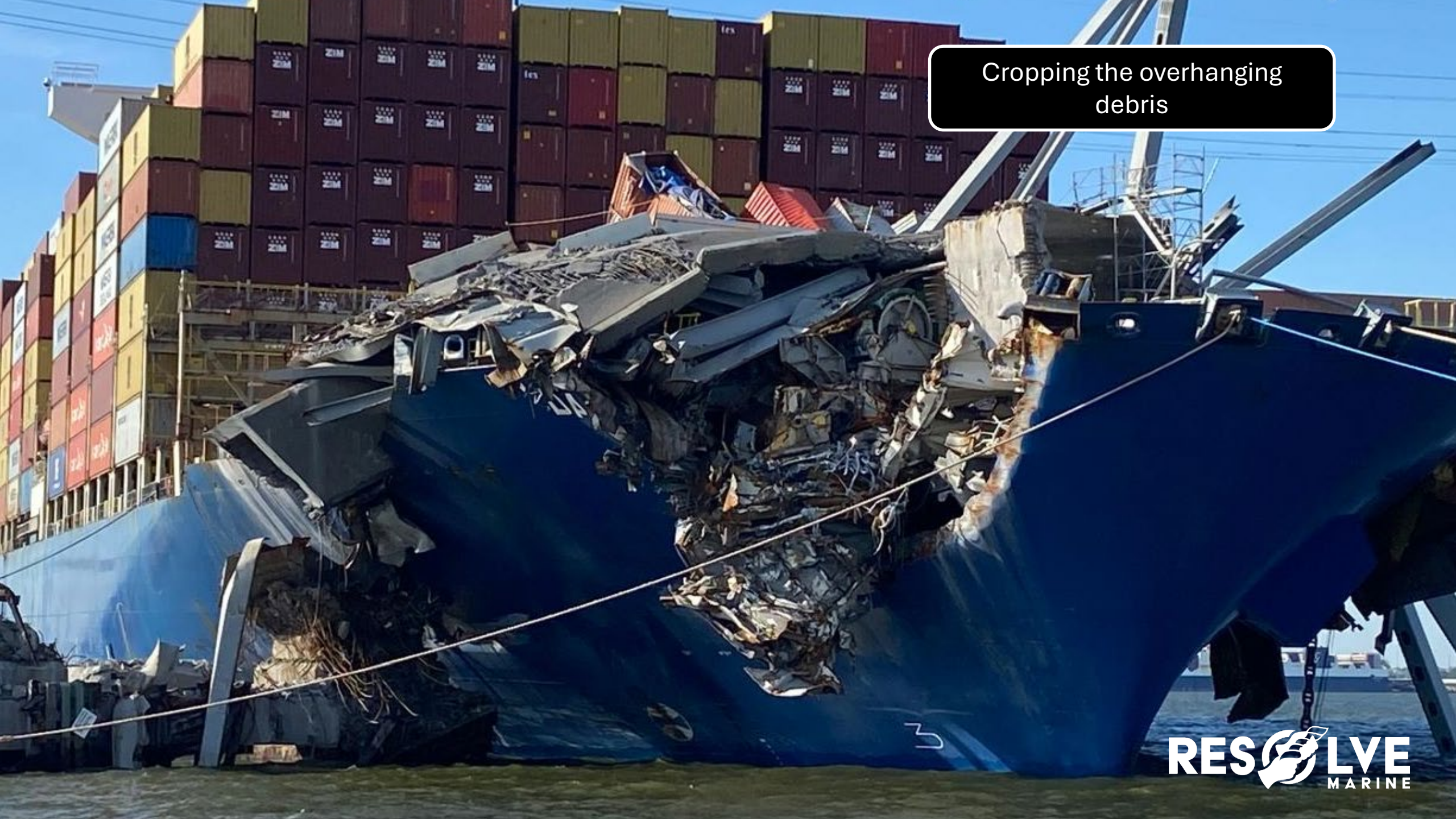












Cropping the overhanging  
debris





## SALVAGE PLAN MILESTONES

REFLOAT / TOW TO TERMINAL



Refloated in 55 DAYS!!

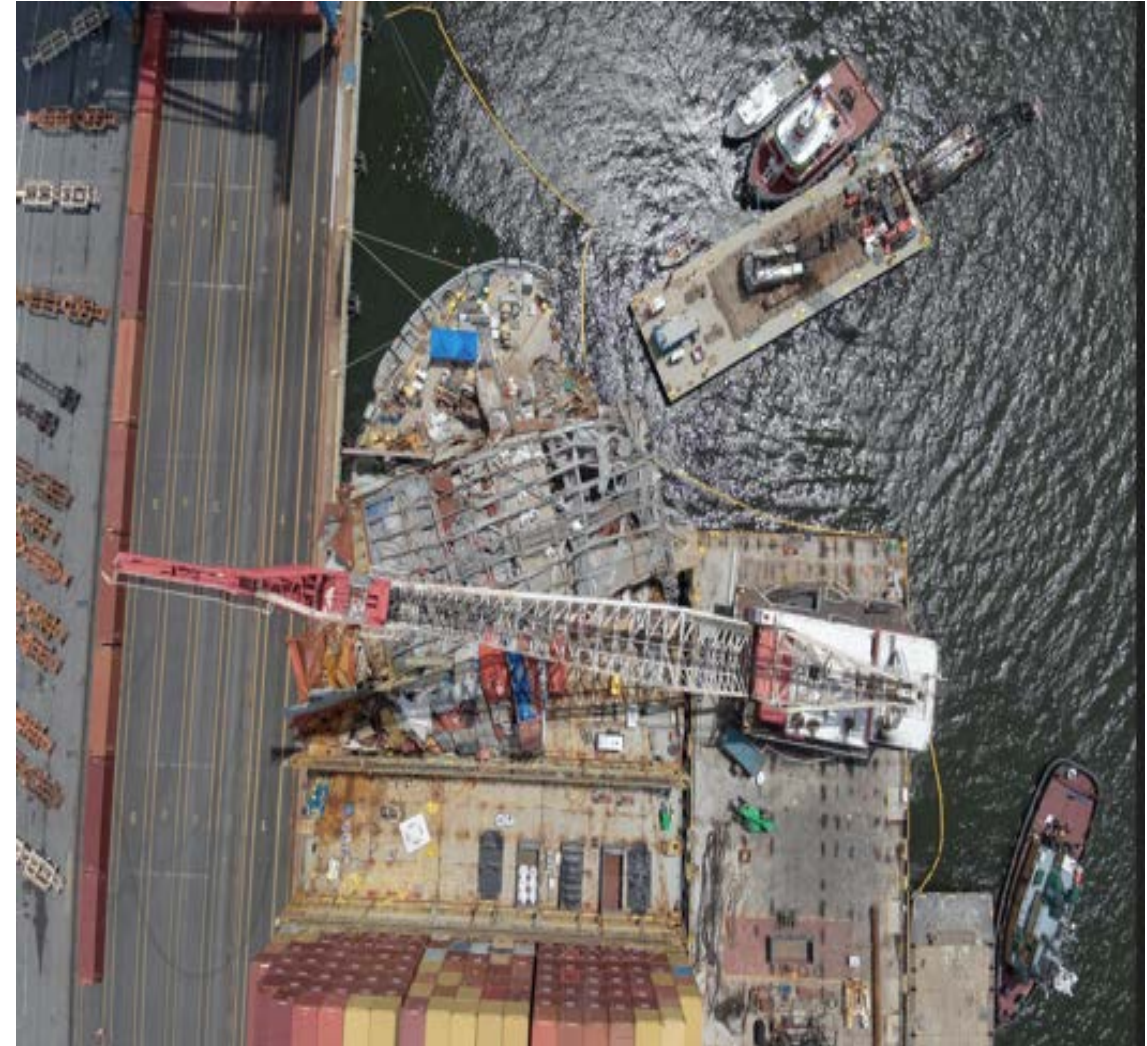




# OBJECTIVES of DALI SALVAGE PLAN Phase 2

## SALVAGE PLAN MILESTONES Phase 2

- Removal and disposal of Bridge Road structure (tarmac)
- Removal and disposal of Bridge Main Structure / Pillars
- Removal and disposal of Debris from Bow
- Removal of Damaged Containers from Hold No1 (including DG Containers)
- Waste handling and disposal for all damaged cargo
- Cleaning of holds from contaminants and preparation of vessel for ocean voyage to repair yard





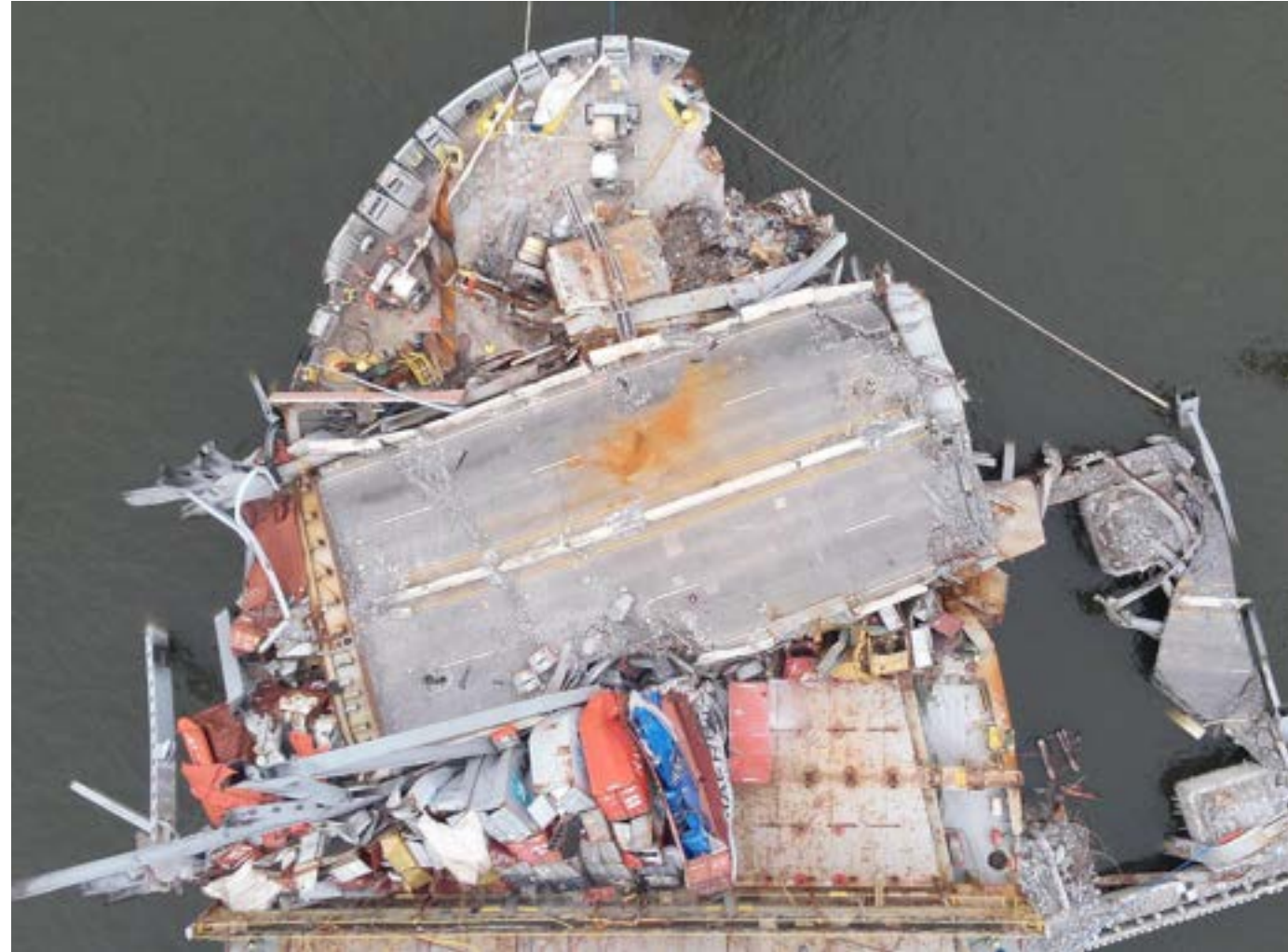
Inspected Road Deck for  
Potential Cutting





## REMOVAL & DISPOSAL OF TARMAC

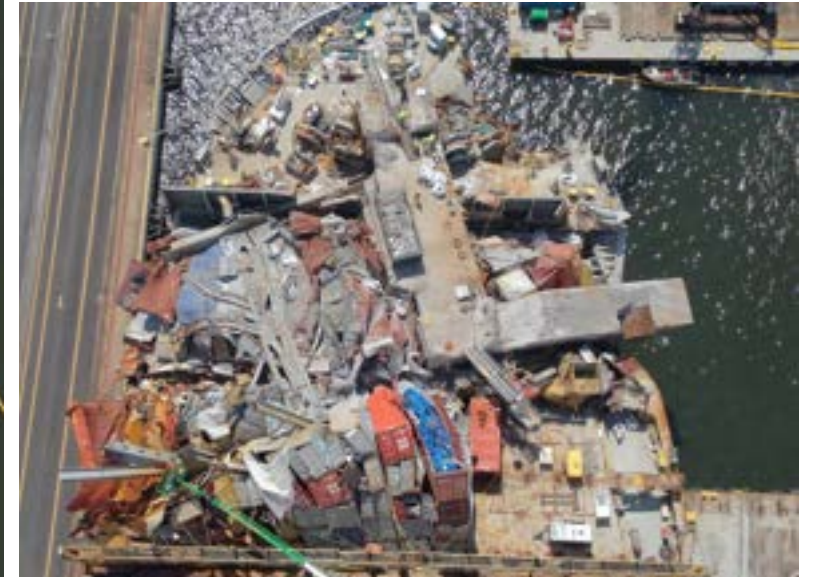
With the vessel relocated alongside to the container terminal in Baltimore the road sections of the bridge were cut/ sectioned and removed



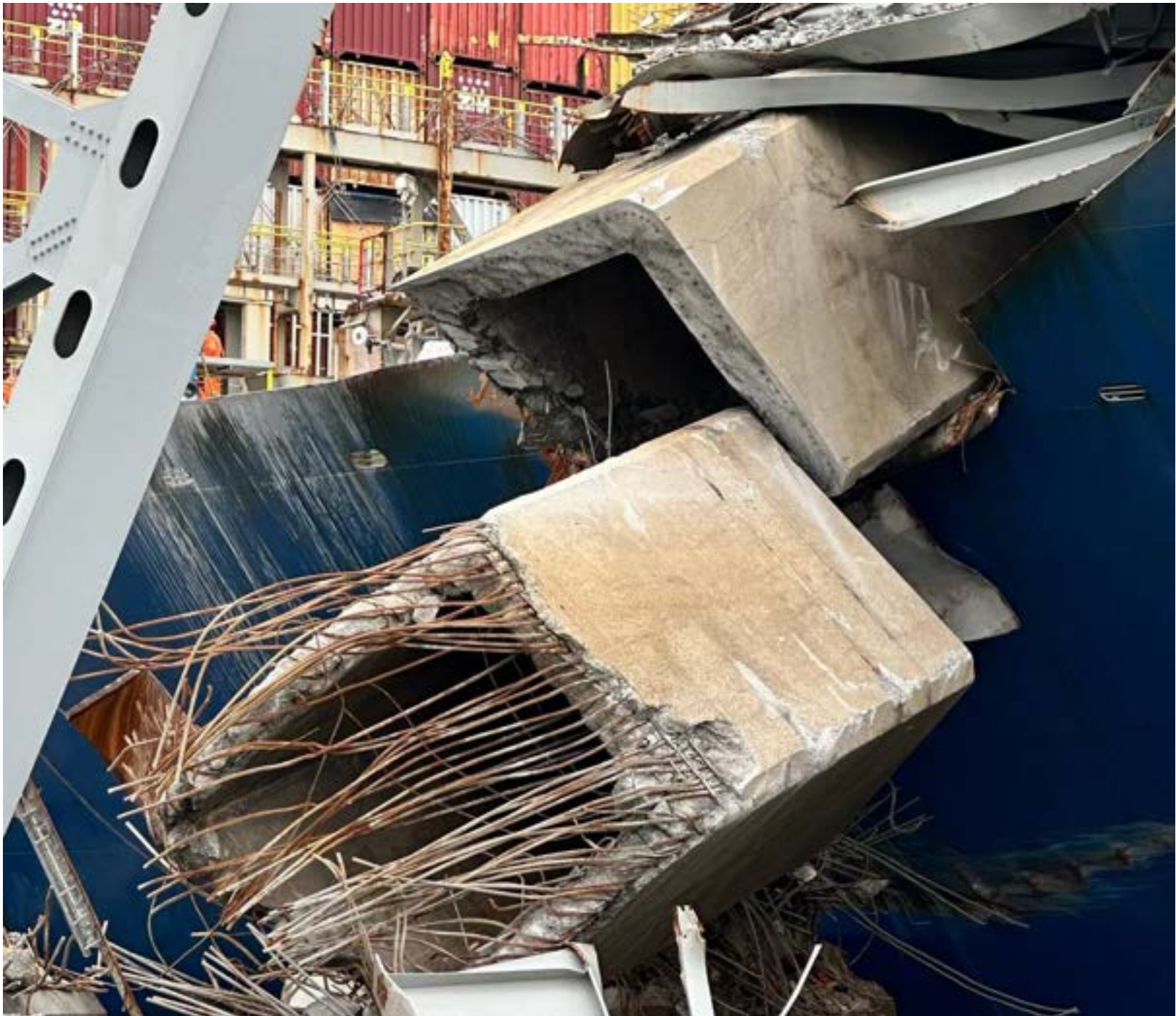


## REMOVAL & DISPOSAL MAIN STRUCTURE/PILLARS

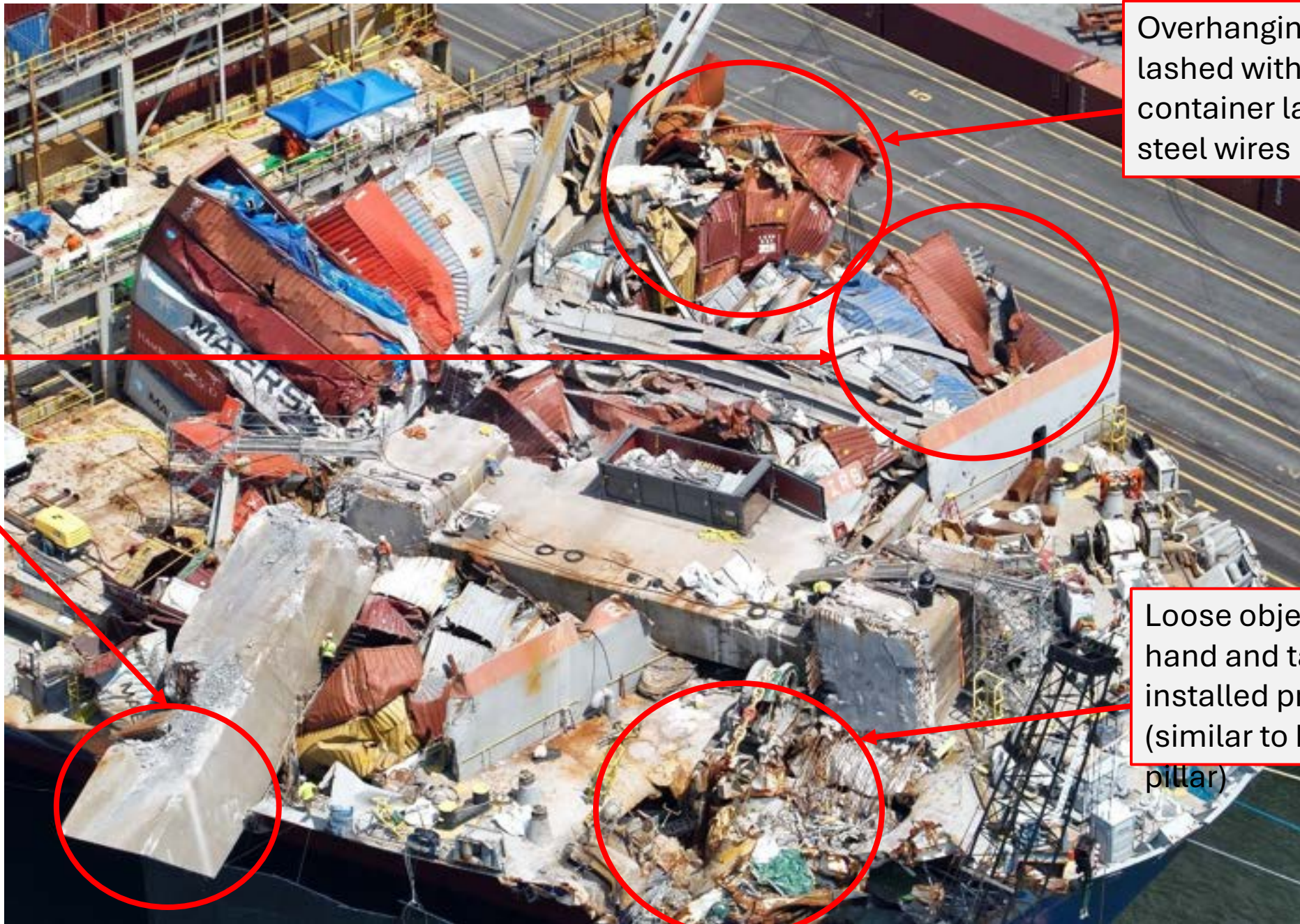
Main metal structure for the bridge deck/road removed to reveal all the cement pillars and supporting structures











Removed

Overhanging containers lashed with nylon straps, container lashing bars & steel wires

Loose objects removed by hand and tarpaulin installed prior sailing (similar to hole aft of Sb pillar)



## REMOVAL OF DAMAGED CONTAINERS





## WASTE HANDLING/DISPOSAL OF DAMAGED CARGO





THANK YOU

