world conference cities & ports by aivp

New York City 2025

Port Infrastructure Resilience

Forensic Engineering Applications Against Natural Disasters

Miami, Florida, USA

Forensic Engineering

Forensic engineering investigates how **climate-driven forces** (like storm surges, salinity, and sea level rise) impact **port structures**. By analyzing material degradation, design weaknesses, and environmental stresses, engineers identify **root causes of failure** and transform findings into **resilient design improvements**. This approach shifts the focus **from reactive repair** to **proactive adaptation**, strengthening long-term port reliability and safety.

Tools & Technologies

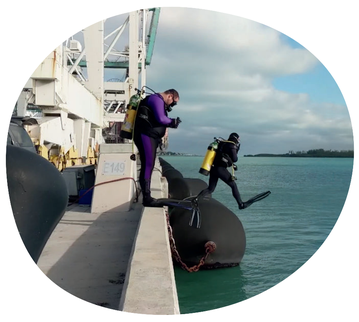
Advanced tools such as **Ground Penetrating Radar**, **ROVs**, and **underwater NDT** enable detailed assessments of hidden or submerged damage. Combined with **LiDAR mapping**, **digital twins**, and **AI-driven modeling**, these technologies provide **real-time insights** for predicting risks and guiding repairs. Together, they can **empower engineers** to design adaptive, data-informed solutions that enhance **port resilience and longevity**.

Financial Impacts

Ports investing in climate-resilient infrastructure, such as elevated docks and reinforced seawalls, are hypothesized to be more profitable by **minimizing operational disruptions** and **maintaining cargo throughput**. Climate risks like **the 2021-2022 Vancouver storm season**, where a seawall collapse cost $2.3 million in repairs, and frequent dock flooding underscore the financial stakes.

Resilient ports, such as Rotterdam, reduce repair costs and downtime while potentially lowering insurance premiums and boosting sustainability. Advanced forensic engineering can further identify cost-saving retrofits, while **proactive investments** in **adaptive designs** may attract funding from sustainability grants.

Additionally, long-term data from resilient ports suggests **increased investor confidence**, enhancing economic stability amid rising climate challenges.



More information & contact:

Gerald Zadikoff, PE, D.CE
CEO - Principal Engineer
gzadikoff@gmselby.com

Carlos Morales, E.I., MSc
Civil-Structural Engineer
cmorales@gmselby.com

www.gmselby.com

By

G.M. SELBY, INC. ENGINEERING