

Critical Connections: Building a Resilient Intermodal Supply Chain

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Why is Resilience Critical Now?

- Increasing global disruptions
- Rising demand for just-in-time delivery and e-commerce
- Intermodal supply chains span continents and modes

Resilience



The ability to:

- **Anticipate** risk
- **Absorb** shocks
- **Recover** rapidly
- **Adapt** to long-term shifts

Intermodal Vulnerabilities

- **Physical:** Port congestion, single points of failure (bridges, tunnels)
- **Cyber:** Ransomware attacks on terminals and logistics software
- **Policy misalignment:** Multiple jurisdictions or agencies involved
- **Dependency risks:** Over-reliance on one port, corridor, or carrier

Hurricane Katrina Port Impact (2005)

- Major hurricane severely damaged port facilities along the Gulf Coast
- Port of New Orleans closed for two weeks, impacting grain, steel, and petroleum exports
- Rail and road links also disrupted, slowing recovery across multiple supply chains
- Lessons:
 - Need for hardened infrastructure, redundant routing, and rapid port recovery plans



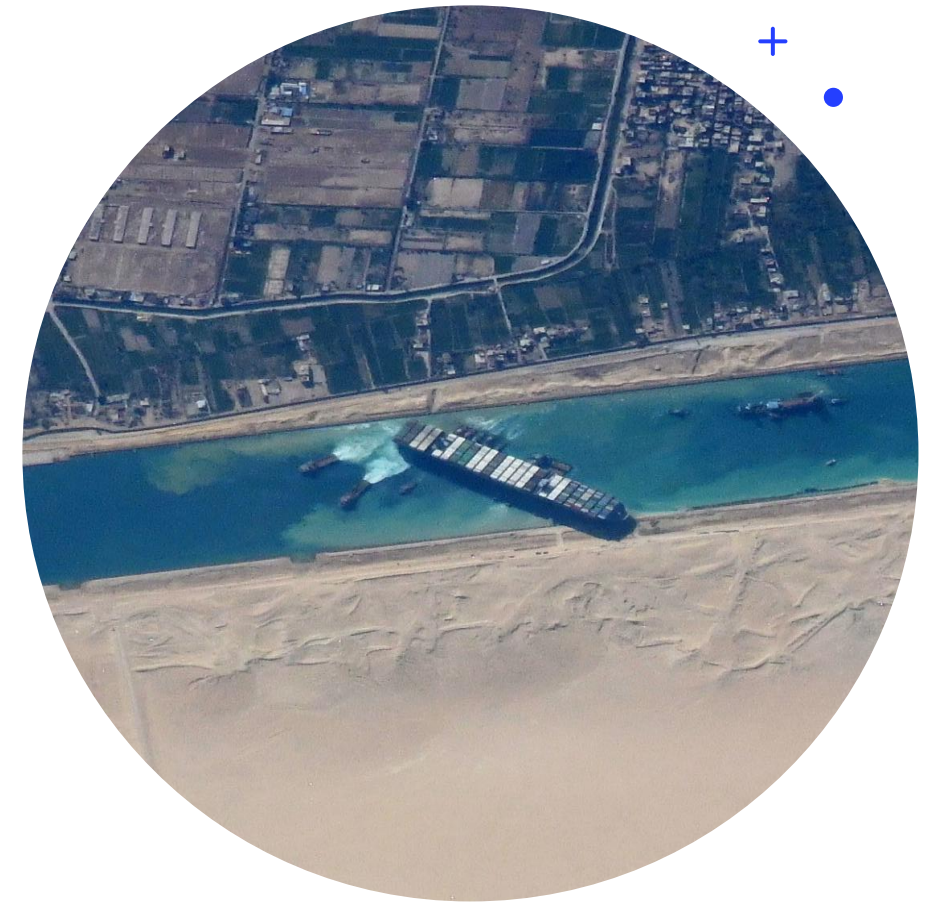
Midwest Floods (2019)

- Historic flooding in the Missouri River basin (NE, IA, KS, MO)
- Over \$10.9 billion in economic loss
- Interstate 29 closed for 42 days
- Lessons:
 - Importance of alternate corridors, and rapid rail repair
 - Demonstrated need for integrated emergency planning between port, rail, and trucking sectors



Suez Canal Blockage (2021)

- 12% of global trade disrupted for 6 days
- Massive downstream ripple effects in Asia, Europe, Americas
- Lessons:
 - Lack of redundancy in maritime routes
 - Need for contingency planning, cargo visibility, and diversified logistics options



Australia East-West Rail Flooding (2022)

- Closure lasted several months
- Postal delays of up to two weeks
- Freight prices increased by 20% due to mode shifts to road transport
- Lessons:
 - Dependency on a single corridor creates systemic risk
 - Redundancy planning and resilient infrastructure are essential
 - Highlighted the need for whole-system resilience planning, not just asset-level fixes



Resilient Intermodal System

1. Infrastructure Redundancy

- Parallel routes, adaptive designs

2. Integrated Data and Forecasting Systems

- AI-driven supply chain visibility, sensor-based alerts

3. Cross-Modal Planning

- Interagency planning, bilateral/multilateral MOUs

4. Workforce and Operational Agility

- Training, surge staffing, interoperable protocols

5. Extreme Weather and Risk Adaptation

- Hardened infrastructure, environmental forecasting



Global Collaboration Is Essential

Supply chains are international by nature

Need for shared:

- Risk data
- Response protocols
- Best practices

What is PIARC?

- **PIARC = World Road Association**
- We were **founded in 1909** as a non-profit, non-political association
- **First global forum for the exchange of knowledge, policy and practice on roads and road transport**
- We work with **high-income** as well as with **low- or middle income countries**

- We have **129 member governments** - they play a leading role
- As well as members who are regions, universities, companies and individuals.

- PIARC mobilizes the experience and knowledge of **1,900 experts** from more than 80 countries in **20+ Technical Committees and Task Forces.**
- Recognized for the quality and neutrality of our work
- Operations structured with 4-year Strategic Plans





DISASTER MANAGEMENT MANUAL

A MANUAL FOR PRACTITIONERS AND DECISION MAKERS!

Disaster Management Manual



17th World Winter Service, Road Resilience and Decarbonization Congress

10-13 March 2026
Chambéry, France



PIARC XXVIII WORLD ROAD CONGRESS

Vancouver, Canada



28th World Road Congress

4-8 October 2027
Vancouver, Canada



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THANK YOU

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