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Thursday the 21st. of May 2026

Lyon

Emergency Response Risk Mitigation

Inland Tanker Barging

Inland Tanker Barging

Operator and Owner Perspectives | Human Safety, Environment, Assets, Legal Entities

Key Objectives

- Clarify roles, liabilities, and critical decision rights.
- Standardize first-hour actions to contain acute impacts.
- Mitigate fleet-wide operational and commercial contagion.
- Turn emergency incidents into long-term resilience opportunities.

Presentation Agenda

01 High-Consequence Risk Context
02 Priority Hierarchy & Golden Rules
03 Stakeholder & Juridical Map
04 Owner vs. Operator Liability
05 Incident Timeline (0 to 90 Days)
06 First-Hour Playbook & Human Factors
07 Environmental Priorities & Assets
08 Command Structure & Notifications
09 Mitigation Cost Comparison Table
10 Fleet-Wide Impact Analysis
11 Roadmap to Operational Resilience

Why Inland Tanker Emergencies Are High-Consequence

Understanding the unique operational, geographical, and regulatory risk profile

Confined Waterways

Severely limited maneuverability with lack of immediate safe-haven options. Navigation channels are narrow and shallow.

Multi-Jurisdiction Complexity

Overlapping regional, national, and port authority regulations create compliance challenges.

Hazardous Cargoes

High potential for severe pollution, fire, or toxic release with immediate environmental impact.

Terminal Interface Complexity

High-stakes coordination with multiple terminals, jetty operators, and cargo handlers.

Community Proximity

Close to dense populations and critical drinking water infrastructure. Immediate public safety risk.

Tight Commercial Schedules

Just-in-time operations leave minimal buffer for incident response and recovery.

85%	Incidents occur in confined waters	**3x**	Faster escalation vs deep-sea	**24h**	Average response time critical	**15min**	Golden window for containment

Speaker Note: Emphasize that unlike deep-sea incidents, inland emergencies immediately impact third parties, local infrastructure, and trigger intense, multi-agency regulatory scrutiny within the first hour.

Acute Scenarios & Consequence Amplifiers

Critical emergency scenarios and factors that escalate incident severity

Acute Emergency Scenarios

Collision/Grounding

Structural damage, hull breach, cargo release. Immediate risk of sinking.

Fire/Explosion

Tank rupture, vapor ignition, toxic smoke. Life safety priority.

Toxic Exposure

Chemical vapors, H2S release, respiratory hazards. Immediate evacuation.

Loss of Containment

Cargo spill, tank failure, valve rupture. Environmental priority.

Navigational Blackout CRITICAL

Loss of GPS, radar failure, power outage. Vulnerable to collision in busy waterways.

Consequence Amplifiers

Nighttime Operations

Reduced visibility, slower response times, increased human error risk.

Weather/Visibility

Fog, rain, snow reduce situational awareness and maneuverability.

Congested Locks/Bridges

Narrow passages, traffic bottlenecks, limited escape routes.

Limited Tug Access

Remote locations, shallow water, delayed assistance.

Severity Impact Rating HIGH MED LOW

Combined effect of multiple amplifiers significantly increases incident severity

Speaker Note: These scenarios and amplifiers are not mutually exclusive - they often compound. A nighttime collision in foggy weather with limited tug access creates a perfect storm scenario requiring immediate, coordinated response.

First 15 Minutes - Immediate Onboard Actions

Critical timeline for immediate emergency response - actions that must be taken within the golden hour

0-15 Minutes: Critical Actions

1. Raise Alarm & Muster Crew

Sound general alarm, muster at emergency stations, conduct headcount, account for all personnel

2. Assess Situation & Isolate

Evaluate incident severity, isolate energy sources, secure ignition points, stop cargo operations

3. Establish Communications

Notify shore, alert authorities, contact operator/owner, initiate emergency protocols

4. Deploy Countermeasures

Deploy booms, activate fire suppression, use foam, secure cargo transfer equipment

5. Protect Life Safety

Evacuate if necessary, provide first aid, account for all personnel, ensure PPE

6. Preserve Evidence

Document scene, secure logbooks, preserve samples, maintain chain of custody

Time-Critical Decision Points: 0-3 min: Alarm & Muster | 3-8 min: Assessment & Isolation | 8-15 min: Countermeasures & Notifications

Speaker Note: Emphasize that the first 15 minutes are critical for containing the incident. Every action must be deliberate and coordinated. The Master must maintain command while delegating specific tasks to crew members. Documentation begins immediately to support later investigation.

First-Hour Shore-Side Emergency Response & Escalation

Critical shore-side actions, resource mobilization, and stakeholder coordination during the first hour

Immediate Response Actions (0-15 min)

1. Operator ERT Activation

Activate Emergency Response Team, establish command center, mobilize resources

2. Owner Crisis Team

Notify owner crisis team, activate insurance protocols, appoint legal counsel

3. Authority Notifications

Notify port authority, flag state, environmental agency, police/EMS

4. Resource Mobilization

Deploy tugs, salvors, spill contractors, medical evacuation

5. Unified Command Establishment

Coordinate with authorities, establish incident command structure, assign roles and responsibilities

Stakeholder Communications & Media Management

Emergency Hotline

24/7 emergency contact, immediate escalation protocols

Media Response

Holding statements, press releases, spokesperson training

Documentation

Evidence preservation, logbook maintenance, chain of custody

Stakeholder Updates

Regular updates to charterers, insurers, terminals

Escalation Triggers:

Injuries | Pollution | Fire/Explosion | Navigation Restrictions | Media Interest

Speaker Note: The first hour is critical for containing the incident and preventing escalation. Shore-side response must be coordinated with onboard actions. Clear communication protocols and pre-established relationships with authorities and contractors are essential for effective response.

Priority Hierarchy and Golden Rules

Establishing clear decision frameworks for acute inland tanker emergencies

Response Priority Hierarchy

1	**Preserve life and prevent injury** Absolute priority: immediate focus on crew, terminal staff, first responders, and public safety.
2	**Stabilize the incident** Stop the escalation: isolate energy sources, extinguish fires, secure navigation, and prevent sinking.
3	**Protect the environment** Contain hazardous spills, deploy booms, and minimize impact on waterways and local ecosystems.
4	**Safeguard assets** Protect the barge hull, machinery, and cargo integrity only after ensuring human and environmental safety.
5	**Preserve evidence and records** Secure logbooks, VDR data, samples, and communications for investigation and legal protection.

Golden Rules of Engagement

- **Stop-work authority is absolute**
  Any crew member can halt an operation if safety is compromised.
- **No lone decisions for high-risk actions**
  Complex interventions require cross-check with shore management or experts.
- **Verify before act**
  Always use verified emergency checklists; avoid relying on memory under stress.
- **Maintain a clear command chain**
  The Master commands the vessel; shore teams support and liaise with authorities.
- **Use closed-loop communications**
  Confirm messages are received, understood, and executed accurately.
- **Manage fatigue aggressively**
  Implement relief cycles early during prolonged emergency responses.
- **Document decisions and deviations**
  Log all actions, especially when deviating from standard procedures to save lives.

Speaker Note: The priority hierarchy strictly dictates that asset protection (e.g., saving a barge from sinking) must *never* jeopardize life safety or environmental containment. The golden rules must be explicitly supported by both Owner and Operator management *before* an incident occurs.

Stakeholder and Juridical Entity Map

Mapping the complex web of responsibilities, liabilities, and interfaces during an incident

Core Operations (The Incident Epicenter)

Barge Owner Asset liability, financing, insurance provider, strategic crisis lead.	**Operator / Manager** Day-to-day DOC holder, HSSEQ, crewing, operational shore response.
Master & Crew On-scene Incident Commander, immediate life-saving & containment.	**Charterer / Cargo Owner** Cargo liability, product expertise, commercial supply chain impact.

Authorities & Regulators (Statutory Interface)

Port / Waterway Authority Traffic control, safe haven designation, local incident command.	**Environmental Agency** Pollution monitoring, cleanup oversight, ecosystem protection.
Flag State & Class Society Statutory compliance, vessel certification, structural integrity approval.	**Police / Local Government** Public safety, evacuations, criminal investigations, media relations.

Support Services & Risk Transfer

Insurers (H&M, P&I) Financial coverage, claims handling, appointment of surveyors/experts.	**Salvors & Contractors** Towage, wreck removal, specialized firefighting, spill response.
Fire / EMS Medical evacuation, acute shore-based firefighting support.	**Terminal / Jetty** Shore interface, cargo isolation, facility emergency response plan.

Key Interfaces (Who authorizes what?)

Contractual	Owner↔Operator management agreement, Charter Party terms, LOF or commercial salvage contracts.
Statutory	Mandatory reporting to Flag State, Port Authority incident command, Police investigations.
Operational	Master↔Terminal interface, Operator↔Crew emergency comms, Unified Command establishment.

Speaker Note: Emphasize that in an emergency, the boundaries between these entities blur. Clear pre-agreed delegation of authority between Owner and Operator is crucial. Misalignment here delays salvage contracting, media response, and regulatory notifications, directly increasing liability.

Owner vs Operator: Roles, Liabilities, Decision Rights

Defining liability boundaries and decision authority during an acute crisis

Barge Owner Focus

Primary Focus

Asset integrity, insurance provisioning (H&M), financing structures, Class Society relations, and strategic stakeholder management.

Liability Exposure

Ultimate property damage, major structural loss, strategic financial exposure, and long-term brand/reputational damage.

Key Decision Rights

- Approval of strategic commercial salvage (e.g., LOF)
- Release of public media statements
- Major financial approvals (uninsured emergency funds)
- Long-term vessel stand-down decisions

Documentation Requirements

Corporate incident reports, formal insurance notifications, claims setups, and long-term regulatory alignment.

Operator Focus

Primary Focus

Day-to-day safe navigation, crewing operations, HSSEQ compliance, dispatch logistics, and direct terminal interfaces.

Liability Exposure

Acute pollution events, personal injury (crew/third-party), operational cargo loss, and immediate statutory violations.

Key Decision Rights

- Refusal of unsafe ports or hazardous terminals
- Emergency route deviation & safe haven execution
- Tactical emergency cargo transfers (ship-to-ship)
- Deployment of local tactical salvors/tugs

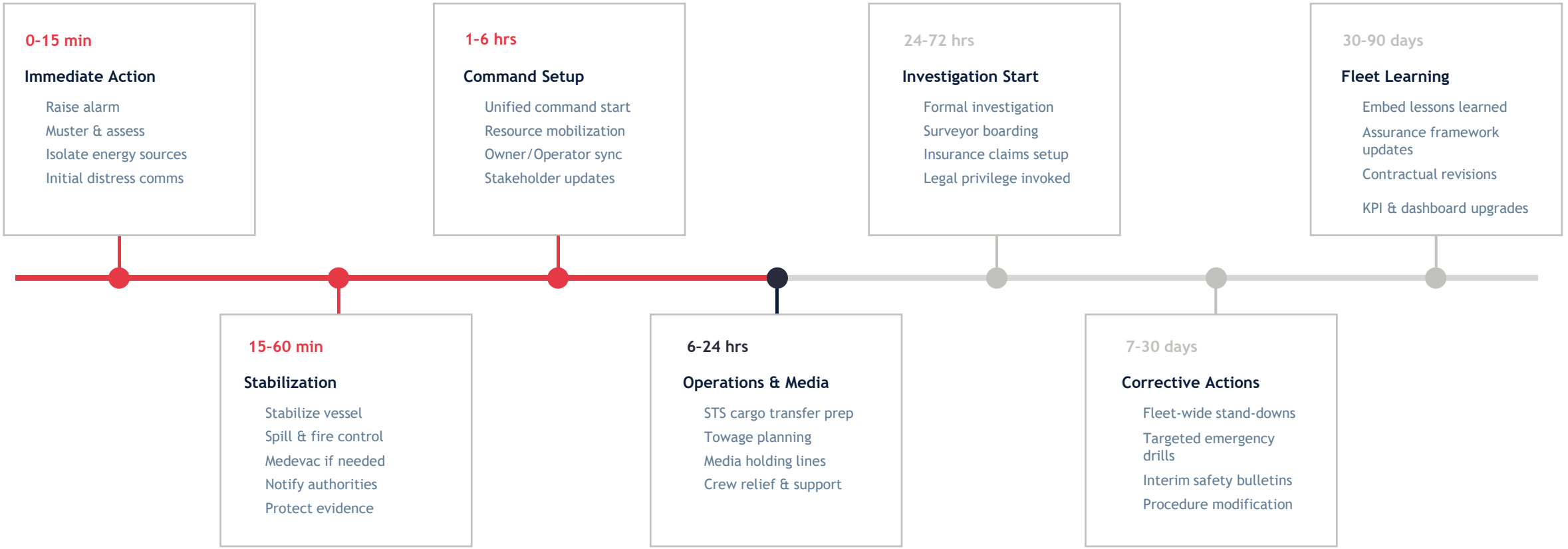
Documentation Requirements

Deck and engine logs, Management of Change (MoC) records, immediate incident alerts, and acute authority notifications.

Speaker Note: Tension often arises when operational emergencies require immediate financial commitments. An operator must have the explicit authority to order a costly emergency tug without waiting for owner board-level approval, whereas owners must control external media and strategic salvage contracts to prevent long-term liability exposure.

Incident Timeline: First 15 Minutes to Learning

The critical progression from immediate acute response to long-term fleet resilience



Speaker Note: Emphasize that the first 15 to 60 minutes dictate the entire trajectory of legal, environmental, and reputational impact. Missteps in Phase 1 and 2 exponentially multiply the cost, commercial liability, and regulatory complexity in the 30-90 day window.

First-Hour Playbook and Human Factors

Executing critical actions while mitigating cognitive breakdown under stress

First-Hour Immediate Checklist

1	**Alarms & Muster:** Sound alarm, account for all personnel on board (POB).
2	**Situational Snapshot:** Quickly assess acute threat (fire, spill, drift, breach).
3	**PPE & Boundaries:** Enforce safety gear, establish hot zones to protect crew.
4	**Isolate Energy/Sources:** Shut down cargo pumps, close manifold valves.
5	**Containment:** Deploy booms or foam systems immediately if safe to do so.
6	**Initial Notifications:** Alert port, terminal, and operator via emergency matrix.
7	**Casualty Care:** Triage injuries, prep for immediate medical evacuation.
8	**Evidence Preservation:** Secure VDR data, logbooks, and product samples.
9	**Designate Scribe:** Assign crewmember solely to log actions and timestamps.

Human Factors Under Stress

Cognitive Risks (The "Fog of War")

Tunnel Vision: Extreme cognitive narrowing leading to missed secondary hazards and loss of overall situational awareness.

Task Fixation: Committing all mental resources to one localized issue while ignoring that the vessel is drifting.

Communication Gaps: Falsely assuming that shore response or terminal personnel fully understand the severity.

Mitigation Strategies

Role Cards: Pre-assigned tactical duties (Command, Comms, Operations) to prevent overlap and decision paralysis.

Closed-Loop Comms: Repeat critical instructions back to sender to confirm absolute understanding before execution.

Brief-Pause-Execute: Mandatory 10-second team alignment before taking any irreversible action or valve operation.

Fatigue Controls: Implement mandatory relief cycles early, even within the first two hours of a prolonged response.

Pre-briefed Scenarios: Rely on muscle memory built through realistic, joint shore-ship Crew Resource Management drills.

Speaker Note: A checklist ensures actions are methodical, but human factors are what actually cause checklists to fail. Stress degrades working memory; therefore, role cards and closed-loop communications are non-negotiable tools to prevent single points of failure during the first 60 minutes.

Environmental Priorities vs Asset Protection

Navigating critical operational trade-offs and decision frameworks during acute incidents

Acute Trade-Off Scenarios

Controlled Cargo Transfer Local spill/exposure risk	VS	**Tow to Safe Haven** Structural failure in transit
Heavy Foam Use Rapid fire suppression	VS	**Waterway Runoff** Toxic chemical pollution
Deliberate Grounding Intentional hull damage	VS	**Uncontrolled Drift** Collision with critical infra

Decision Criteria Matrix

- **Environmental Sensitivity Mapping:** Proximity to drinking water intakes, ecological reserves, or dense populations.
- **Product Properties:** Evaporation rate, toxicity, flammability, and water solubility (sinker vs. floater).
- **Weather & Tide:** Current speed, wind direction pushing toxic plumes, and visibility constraints.
- **Terminal / Port Constraints:** Berth availability, local authority restrictions, and facility emergency plans.

Pre-Approved Readiness Measures

Standing MOUs Pre-negotiated contracts with local emergency salvors and terminal responders.	**Cascaded Booms** Pre-positioned spill containment equipment mapped to critical high-risk waterway segments.
Mutual Aid Agreements with competitor fleets for emergency STS transfers or tug assistance.	**Scenario Playbooks** Drilled response plans pre-approved by flag and local state authorities.

Overriding Decision Principles

1. Life Safety First (Absolute)

Environmental containment or asset preservation actions must **never** compromise the immediate safety and evacuation of crew or shore personnel.

2. The ALARP Principle

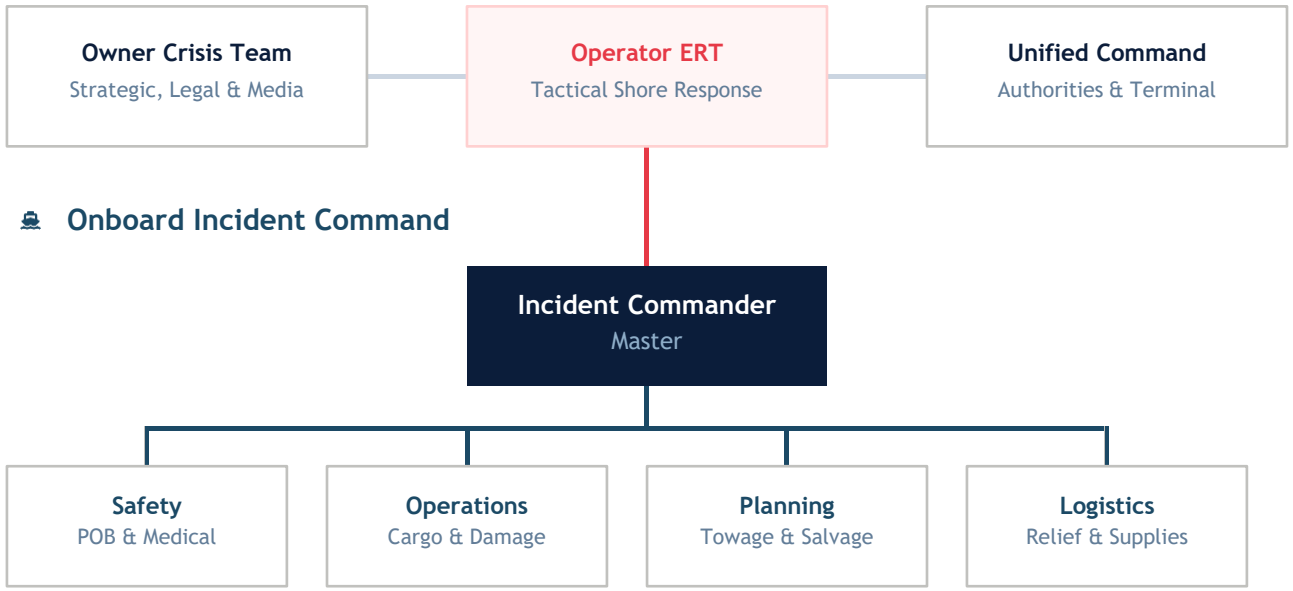
Manage risks to **A**s **L**ow **A**s **R**easonably **P**racticable. Willingly sacrificing the asset (e.g., deliberate grounding) is justified to prevent catastrophic environmental pollution.

Speaker Note: Trade-offs in an emergency are rarely win-win. Masters and Shore Operations teams must have pre-authorization from the Owner to sacrifice the asset (the barge) if it guarantees the prevention of a major ecological disaster or saves a life. Delays caused by seeking financial approval during an acute crisis amplify liabilities exponentially.

Incident Command Structure and Notification Logic

Clear chain of command, mandated reporting timelines, and acute escalation triggers

Shore Command Structure



Notification Logic

Immediate	Port Authority, Terminal, Operator ERT, Search & Rescue (SAR), Owner.
< 1 Hour	Flag State, Class Society, Insurers (H&M, P&I), Key Charterer.
Statutory	Strict jurisdiction-based timelines for local Environmental Agencies.

Escalation Triggers

- **Injuries / Medevac:** Escalates to shore EMS and activates P&I correspondent.
- **Pollution / Containment Loss:** Immediate Environmental Agency notice and clean-up mobilization.
- **Fire / Explosion:** Triggers full Unified Command with local fire/police.
- **Navigation Restriction:** Triggers Waterway Authority broadcast to regional traffic.

Speaker Note: The most common failure in incident response is a broken chain of command, where shore management bypasses the Master. Emphasize that the Master is the Incident Commander until relieved or until a Shore Unified Command is formally established. Rigid, pre-drilled notification logic avoids missed statutory windows.

Cost Impacts: Single Incident vs Fleet-Wide vs Prevention

Analyzing the cascade of operational consequences and strategic mitigation levers

Impact Category	Single Barge Incident	Fleet-Wide Consequences	Preventive Measures & Cost Avoidance
Response & Environment	Local tug assistance, spill boom deployment, acute cleanup, onboard medical evacuation.	Parallel activation of shore crisis teams, broader environmental regulator scrutiny on operations.	**Reduce:** Pre-agreed emergency contracts, mapped sensitive areas, structured Incident Command drills.
Asset Damage & Cargo	Direct hull repair, localized cargo contamination, product loss, immediate off-hire period.	Precautionary sister-vessel inspections, forced stand-downs, network-wide cargo rescheduling.	**Reduce:** Defect trend analysis, transfer integrity checklists, predefined sister-vessel review triggers.
People & Mgmt Time	Dedicated technical focus on one casualty, crew repatriation, acute trauma support.	Executive distraction, relief crew mobilization, fleet-wide fatigue checks, decision bottlenecks.	**Reduce:** Delegated authorities, relief crew pools, cross-training, robust mental health support plans.
Downtime & Operations	Single voyage interruption, missed terminal window, localized towage/recovery delay.	Cascading planning inefficiencies, reallocation of tonnage, under-absorption of fleet overhead.	**Reduce:** Business continuity planning, reserve capacity strategy, digital fleet visibility logic.
Commercial & Reputation	One-vessel delay claims, localized demurrage, performance dispute on a single charter.	Loss of confidence, reduced nominations, tighter vetting, brand damage to owner/operator.	**Reduce:** Key-account reassurance plans, charter-party emergency clauses, visible corrective actions.
Legal, Ins. & Strategic	Event deductible, claim handling costs, single root-cause investigation, localized fines.	Portfolio premium pressure, expanded legal audits, long-term trust rebuilding, systemic costs.	**Reduce:** Early insurer notification, legal hold protocols, no-blame reporting culture, verification audits.

Speaker Note: The direct cost of an emergency (Single Incident) may be high, but the *Fleet-Wide* indirect cost is materially higher due to operational contagion. The highest ROI lies in the third column: preparedness and governance reduce both direct acute impacts and systemic long-tail exposures.

Fleet-Wide Impact of a Single Barge Emergency

Why one vessel incident rapidly triggers systemic operational and commercial contagion

Operational Contagion

Schedule disruption across multiple voyages, cascading crew redeployment challenges, and potential forced temporary stand-downs for sister vessels.

Commercial Contagion

Broader charter party exposure, unexpected terminal restrictions applied to the entire fleet, and rapid erosion of key customer confidence.

Compliance Contagion

Expanded multi-vessel regulator inspections, fleet-wide safety document reviews, and intensified Port State Control intervention.

Financial Contagion

Escalating deductibles, portfolio-level premium pressure, unrecoverable uninsured systemic losses, and extended fleet-wide off-hire periods affecting overarching cash flow.

Reputational Contagion

Brand trust erosion among critical stakeholders, negative media visibility extending beyond the operator to the parent owner, and weakened ESG standing.

Owner & Operator Containment Actions

- **Launch Fleet Alerts**
  Distribute verified facts and interim operating instructions instantly to stop rumors.
- **Sister-Vessel Checks**
  Assess exposure regarding comparable cargoes, routes, equipment, and crew fatigue.
- **Temporary Controls**
  Apply precautionary speed limits, restrict night navigation, or mandate dual approvals.
- **Stakeholder Outreach**
  Proactively align with charterers, financiers, authorities, and insurers directly.

Systemic Decision Triggers

- Discovery of a shared **equipment design flaw**
- Exposure on an **identical route or cargo type**
- Evidence of a **repeated human-factor pattern**
- Direct **regulator concern** or terminal intervention
- Escalating **media visibility** and public sensitivity

Speaker Note: An isolated emergency rarely remains isolated. Authorities, charterers, and insurers immediately question the fitness of sister vessels. Rapid, proactive execution of fleet-wide containment actions is critical to prevent a localized acute crisis from morphing into a chronic, systemic commercial failure.

From Incident to Resilience: Actions & Commitments

Transforming acute organizational stress into long-term systemic fleet capability

Resilience Roadmap

Phase 1: Immediate Control

Enforce **immediate fleet controls** and restrictions.

Execute **targeted inspections** across sister vessels.

Phase 2: Systemic Redesign

Formalize **Management of Change** for identified flaws.

Implement **drill redesign** and update contracts/escalations.

Phase 3: Culture & Assurance

Integrate data and **KPI upgrades** across the fleet.

Conduct continuous **culture and training refresh** programs.

Key Organizational Commitments

1. **Shared Crisis MoU**
   Formalize pre-agreed Owner-Operator boundaries and financial authorities.
2. **48-Hour Drill Execution**
   Validate the new command interfaces within 48 hours of policy approval.
3. **Updated Notification Matrix**
   Hardcode statutory reporting timelines based on multi-jurisdiction rules.
4. **30-Day Lessons Learned**
   Mandatory close-out loop linking incident findings directly to fleet operations.

Executive Call To Action

Approve the resilience roadmap and policy framework today.

Assign dedicated owners, resources, and strict delivery timelines.

Schedule an independent assurance verification audit for next quarter.

Speaker Note: A crisis ends when the operational threat is neutralized; true resilience begins when systemic learning is fully embedded. Do not let the momentum of the incident fade. Secure explicit boardroom approval on this roadmap today to ensure the fleet emerges stronger and more prepared for the next unforeseen event.