



Brace for Impact:

MV Bright Field Allision

Leadership ViTS Meeting

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THE MISHAP

On December 14, 1996, shoppers and sightseers near the New Orleans Riverwalk fled at sighting the Motor Vessel (MV) *Bright Field*, a foreign cargo ship, bearing down upon them. As the crowd escaped, the fully loaded vessel rammed into the waterfront wharf. A shopping mall, a Hilton hotel, and a parking garage sustained severe damage when the *Bright Field* destroyed their outer walls and came to rest between a gaming boat and cruise ship. Remarkably, the accident did not cause any fatalities, but the combined damages to the vessel, wharf, and shoreside buildings reached \$20 million.

Main Engine

- The single main engine could be started, stopped, reversed, accelerated, and decelerated from either the wheelhouse or the engine room. No other propulsion source was designed or installed. Control transfer between the locations required ~30 seconds.
- Increasing engine rpm too quickly could damage the engine, so a scavenging air pressure limiter restricted the engine's acceleration rate.
- During emergencies, bridge officers could command engine room personnel to override the limiter by means of a "crash maneuver" button that would override the scavenging air pressure limiter.
- The *Bright Field* was equipped with a primary engine oil pump (#1) and a backup engine oil pump (#2).

Engine Oil System

- Standard oil pressure was 4 bar (1 bar \approx 1 atm).
- If pressure fell below 3 bar, alarms on bridge and in engine room would sound.
- If pressure fell below 2.4 bar, an automated switch would activate the backup pump as long as the backup pump was set to standby. The two pumps would work simultaneously until pressure was restored.
- If pressure fell below 2.3 bar, the main engine would shut down.
- The engine would not restart until the low pressure situation was fixed.

Navigation: State law required a pilot from a Louisiana Pilot's Association to navigate foreign freighters through the Mississippi's turns. The *Bright Field's* Chinese crew hired one such pilot to steer the vessel from Anchorage, Louisiana to a location near the Gulf of Mexico, where he would disembark.

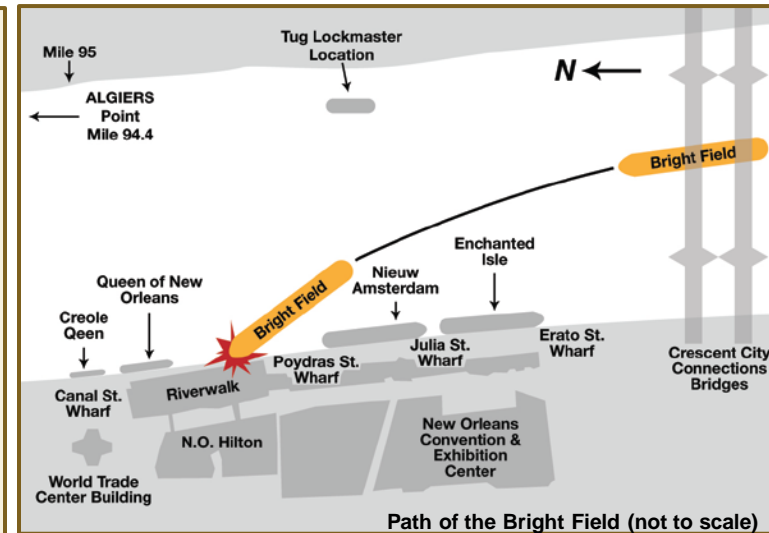


The *Bright Field's* #1 and #2 engine oil pumps

WHAT HAPPENED?



Chain of Events

- Chief engineer observes engine oil pressure gauge dropping below normal levels.
- Backup pump fails to start and main engine shuts down.
- Just before rounding Algier's Point, the pilot notices that engine-induced vibrations have ceased.
- Pilot asks captain and 2nd mate if there is problem, but they ignore him and confer together in Chinese.
- Pilot notices rpm indicator has dropped from 72 to 30, indicating engine trip; pilot warns harbor of the situation.
- A crewmember manually starts the backup engine oil pump.
- Pressure rises to acceptable levels.
- Chief engineer restarts the main engine.
- 2nd mate calls engine room and demands immediate rpm increase, but does not transmit the urgency of the situation or instruct the chief engineer to use the "crash maneuver" button.
- Chief Engineer informs 2nd mate that engine power has been restored and transfers engine control to wheelhouse.
- *Bright Field* crashes into the Riverwalk.





PROXIMATE CAUSES






The oil system's alarm should have notified crews of falling pressure, but the alarm was incorrectly calibrated. The sump was maintained well below the acceptable volume, and alarms indicating low sump levels had been readjusted to allow this practice. The decreased volume caused the sump's capacity to circulate in 1/3 the normal time; air bubbles entrained in the oil could not dissipate, and air bubbles entering suction collapsed. Millions of collapsing bubbles lowered overall system pressure. Eventually, pressure fell to unacceptable levels, automatically stopping the engine and leaving the *Bright Field* unable to maneuver through the strong currents which swept it toward the river's left descending bank.




UNDERLYING ISSUES



Inadequate Risk Assessment and Mitigation

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- Riverfront stakeholders did not act upon risk assessments and statistics the U.S. Coast Guard provided. Stakeholders, though aware that none of the banks along the Port-of-New-Orleans were allision-free, chose to locate tourist attractions, hotels, and restaurants in an area that lacked a “crush zone” that could absorb the impact from an allision.
 - Although the accident did not result in fatalities, ships moored along the left descending bank displayed unpreparedness for such emergencies. These vessels lacked efficient and effective evacuation processes.
 - Bright Field* operators, though aware of the risks of navigating the Mississippi during high-water season, navigated at the fastest possible speed and did not discuss potential risks or appropriate actions in the event of an emergency.
 - The *Bright Field's* crew, which was familiar with the ship's long history of engine troubles, never informed the pilot (whose sole responsibility was to navigate the river's bends until it reached the Gulf of Mexico) of engine problems.

Poorly Maintained Engineering Plant

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- Ship owners ignored messages informing them of the lack of parts an equipment necessary to rectify mechanical problems.
 - Crew members did not perform adequate maintenance with the resources that were available and allowed components of the main engine to operate until they failed.

FOR FUTURE NASA MISSIONS



Tugboats tow the Bright Field away from the allision site.

- Thorough analysis of low-probability, high-consequence events should inform an appropriate mitigation plan.
- Designers strive to build redundant and failsafe systems in anticipation of anomalous events, but human factors play a critical role in risk management.
- Acceptance of risk involving aging, critical equipment should include sustainment planning and funding.
- NASA must propagate an attitude where safety is paramount not only within the Agency, but also across the rising commercial sector.
- Cost and schedule risk can motivate operators to compromise safety risk in the name of efficiency.