



NTSB National Transportation Safety Board

Visual Perception

Barry Strauch

Perception and the 33118

- No action to avoid colliding with the Sea Ray
- One crewmember said “Oh God” just before the collision

Visual Perception

- Visual perception:
 - A function of visual input and neural processing
 - Visual system relies on different receptors for day and night vision
 - Perceptual abilities degraded at night

Visual Perception

- Our brains interpret visual information based upon:
 - Previous experience
 - Existing knowledge
 - Expectancies
 - Uniqueness of object/phenomenon detected

Visual Perception

- Basic principles:
 - Color, contrast, and fine detail perception degraded at night
 - Movement more easily perceived than stationary activity
 - Change more easily detected than static

Perception and the 33118 crew

- Only the Sea Ray's all around (stern-mounted) white light visible to 33118 crew
- The hull was indistinguishable from the water

Perception and the 33118

- Angle formed by paths of the 33118 and Sea Ray unchanging
- Size of Sea Ray's all around light very small
- The Sea Ray's all around light lacked conspicuity

Perception and the 33118 crew

- Sea Ray was detected at some point
- Slowing the 33118 would have given the crew more time to recognize Sea Ray and take action to avoid collision



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Coast Guard Oversight

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The Coast Guard



Oversight of its Own Operations

- How did the Coast Guard oversee its SPC-LE operations in San Diego

Effective Oversight

- An ongoing awareness and enforcement of best practices by:
 - Relying on both retrospective and prospective data
 - Avoiding complacency
 - Providing sufficient level of safety in considering and addressing the operational risks

Effective Oversight

- Retrospective data:
 - Violations
 - Accidents/Incidents
 - Crew training and testing data
 - Review of GARs
 - AIS and other electronic data
- Prospective data
 - SMS audits
 - Observation rides

Bayside Blaster

- January 12, 2002
- Biscayne Bay, Florida
- 24-foot patrol boat struck passenger carrying touring vessel
- Patrol boat traveled at max speed at time of collision

Bayside Blaster

- Probable Cause:

“...Failure of the coxswain ... to operate his vessel at a safe speed ...

Contributing ...was the lack of Coast Guard oversight...”

Bayside Blaster

- NTSB suggestions to improve oversight included:
 - Station personnel directly observing coxswain performance
 - Applying transponder technology to station operations
- Two recommendations issued

Station San Diego Oversight

- No speed restrictions within San Diego Bay below max operating limit
- No enforcement of AIS policy
- Almost all oversight based on RFO and STAN team evaluations

Station San Diego Oversight Lacked

- Systematic monitoring of available electronic data
- Internal oversight activities independent of RFO and STAN team evaluations

On System Safety

“... Managing system safety is a continuous process of trying to determine how much risk exists in particular activities and decisions, how much risk is acceptable, and how to achieve multiple system goals and requirements.”

Leveson, N., Dulac, N., Marais, K., and Carroll, J. (2009). Moving beyond normal accidents and high reliability organizations: A systems approach to safety in complex systems. *Organization Studies*, 30, 227-149.





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