



National Transportation Safety Board

Human Performance Factors

Carrie Bell

Human Factors Group Chairman

Overview

- Bridge resource management
- Company oversight
 - Safety management system
 - Training
 - Safety culture
- Coast Guard training
 - Bridge resource management
 - Meteorology

Captain's Experience

- All officers were qualified and credentialed mariners
- Captain
 - 24 years of experience
 - 6 years with TOTE
 - In May 2014, named captain of *El Faro*
- Captain's responsibilities
 - Safe operation and navigation
 - Company's representative on board

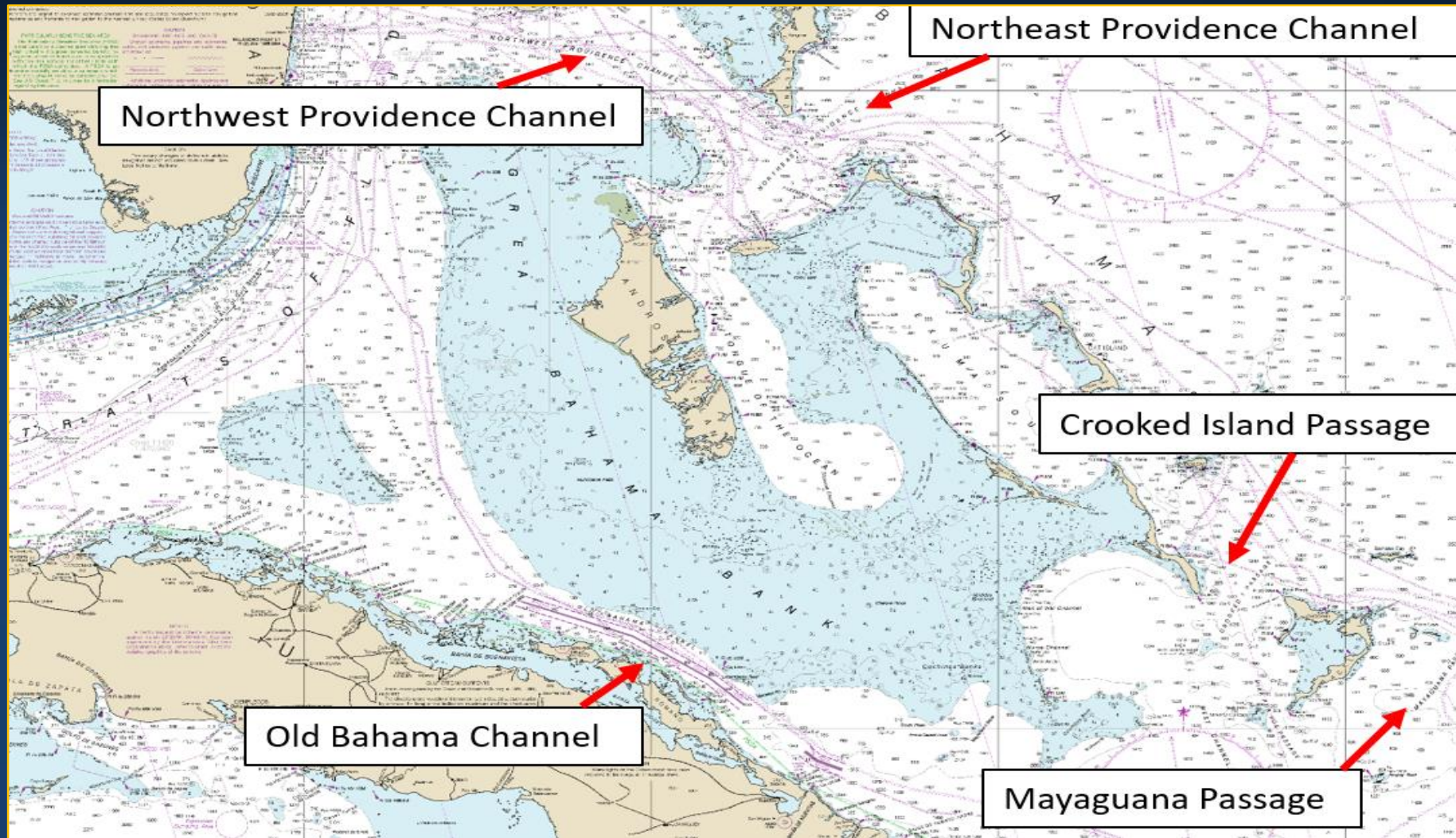
Officers' Experience

- Deck Officers
 - Captain, chief mate, second mate, third mate
- Experience
 - Deck: Employed at TOTE for over 10 years
 - Sailed primarily on same route
 - Chief mate was newest member of team
- Engineering Officers
 - Chief, 1st, 2nd, three 3rd engineers
 - Senior engineers 6–12 years experience with TOTE steam ships

Opportunities to Change Course



Passages Available along *El Faro's* Route



Captain's Reluctance to Change Course

- Why did the captain not take action against the impending danger?
 - Experience
 - Normalization of risk
 - Experience can cloud judgement
 - Confirmation bias
 - Ignore information that conflicts with beliefs

Crew's Reluctance to Challenge Captain

- Why did the crew not challenge the captain?
 - Confidence in his abilities
 - Reluctant to question
 - Hierarchical structure
 - Power distance
 - Poor implementation of BRM
 - Starts at leadership level

Bridge Resource Management

- Effective BRM
 - Cohesive team
 - Manages risk and maintains shared mental model
 - Cooperatively monitors vessel progress
 - Acquires and exchanges information
 - Anticipates dangerous situations
 - Open environment to challenge



Bridge Resource Management

- Power Distance
 - Unequally distributed power between officers
 - Can be created by hierarchy
 - Subordinates do not feel empowered to challenge
 - Often characterized by mitigated speech

Bridge Resource Management Effectiveness

- Assertiveness
 - Challenging in a hierarchical environment
 - Fear of reprimand
 - Uncertain outcome of the situation
 - Reluctance to speak up

Bridge Resource Management Summary

- Loss of situation awareness
 - Inability to have shared mental model
- Limited information passed between watch officers
- High power distance

Company Oversight

- Preparing crew for heavy weather
- Monitoring ships at sea
- Shoreside communications with *El Faro*
- Training
- Assessment of officer performance

Safety Management System

- Did not address securement of cargo
 - Lashings, watertight doors, and hatches
- Lack of heavy weather checklists
- Minimal guidance for preparing crew for heavy weather

Safety Management System

- Communication with vessel during accident voyage was minimal
 - Two routine voyage messages
 - E-mail requesting change to northbound voyage
- Risk to vessel on this voyage was not addressed

Safety Management System

- Bridge Resource Management
 - Quarterly BRM training required onboard
 - BRM section marked “deleted” in SMS
 - Company did not follow through to ensure training was completed

Company Oversight

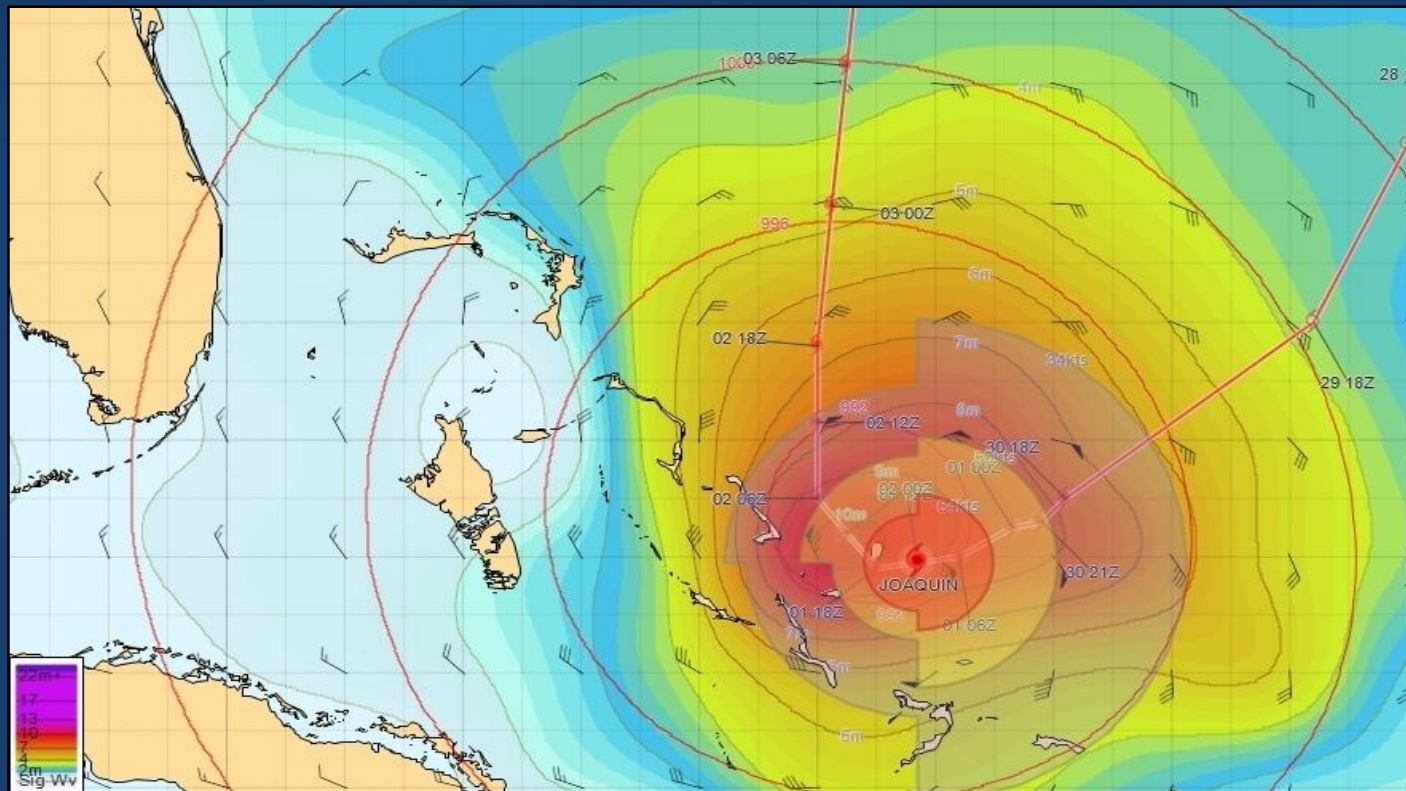
- No training department
 - Various training logged in separate departments
- Scenarios not specific to heavy weather
 - Shoreside drills did not include flooding
- Minimal accountability of work/rest records

Company Oversight

- Evaluating officer performance
 - Measurement of competency
 - Incomplete performance evaluations
- Personnel files not comprehensive
 - No documentation of known issues
 - Statements from management not reflected
 - No background on resignation with previous employer

Bon Voyage System (BVS) Training

- No requirement for formal training in weather information provided on bridge



Safety Culture

- Oversight not adequate
- Ineffective training
- No support for storm avoidance and heavy-weather preparations
- No risk assessment

Training

- Bridge resource management
 - Recurrent training
 - Updated concepts
 - Allow for lessons learned
 - Enhance course to include scenario-based training
- Advanced meteorology and shiphandling
- Captain was exempted

Summary – Human Performance Factors

- Findings
- Recommendations