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ISM AND THE SINKING OF THE SS EL FARO-

OCT. 1, 2015:

The National Transportation Safety Board's Analysis

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The National Transportation Safety Board has published its report of its investigation into the sinking of the SS El Faro in October 2015 during Hurricane Joaquin. In the course of its broad analysis, reviewed not only company operations and its ISM program, but also regulatory and class oversight, together with activities of U. S. government agencies such as NOAA and the Federal Communications Commission.

This memo will address the Board's examination and critique of the safety management system.

A company's ISM program may be viewed from two separate perspectives – a comprehensive program aspiring to improvement of vessel operations and safety where, despite the company's best efforts, performance falls short, or a program which in and of itself, is inadequate. The NTSB report examines the latter position finding numerous deficiencies in the Owner's program.

The ship, on a regular voyage from Jacksonville, Florida to San Juan, Puerto Rico, was caught in Hurricane Joaquin. The ship was a ro-ro vessel carrying both motor vehicles and containers. She was a shelter deck design, meaning that the first deck below the main deck was not water tight. The vessel had open vents on either side of the shelter deck leading to the decks below. During heavy seas, considerable water entered the vessel through these vents causing her to list substantially. The list caused the lube oil suction to come out of the lube oil in the main engine sump. This, in turn, caused the main engines to shut down; they could not be restarted. The ship then broached in the heavy seas and was lost.

The report begins by summarizing the deficiencies in the company's safety program which lead to the sinking, stating:

> "The NTSB's accident investigation identified the following safety issues: captain's action, the use of non-current weather information, late decision to muster the crew, ineffective bridge resource management, inadequate company oversight, company safety management system, flooding in cargo holds, loss of propulsion, down flooding through ventilation closures, need for damage control plan; and lack of appropriate survival craft." (Report – Abstract.)
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> With respect specifically to the safety management system, the NTSB found:
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> "The company's safety management system was inadequate and did not provide the officers and crew with the necessary procedures to ensure safe passage, water tight integrity, heavy weather preparations, and emergency response during heavy weather conditions." (Report p. 244.)
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> The report also stated:

"The NTSB has concluded that the company had an inadequate SMS and an ineffective process for assessing officer performance; that it did not provide effective training for on-board equipment and programs; that it did not ensure that the El Faro had a functioning anemometer; that it failed to ensure that the risk posed by Hurricane Joaquin was adequately addressed; and that it failed to track the vessel's position relative to the storm and support the captain during the accident voyage. Had the company addressed some of the safety issues identified in this report, the casualty might not have occurred. Thus, the NTSB concludes that the company's lack of oversight in critical aspects of safety management, including gaps in training for ship board operations in severe weather, denoted a weak safety culture in the company and contributed to the sinking of the El Faro." (Report p. 220.)

The NTSB then found a number of specific inadequacies in the SMS system including:

- Lack of an effective process for evaluating the performance of the ship's officers;
- Lack of an effective training program for use of computerized Cargo Max stability instrument including the damaged stability module;
- Lack of training in heavy weather operations including advance meteorology and ship handling from which the captain was exempt;
- Lack of effective officer training program for the use of the ship's computerized weather information software;
- Lack of a functioning an anemometer;
- Depriving the captain of a "vital" tool for understanding his ship's position relative to the hurricane;
- Failure to train the crew in use of the "rapid response damage assessment" service to which the company subscribed;
- Failure of the company to monitor the position of the ship relative to the storm or provide the master with "support for storm avoidance and heavy weather preparations" during the voyage;
- The company failed to assess the risk posed by the hurricane;
- The company's lack of oversight in critical aspects of safety management including gaps in turning through severe weather;
- Providing an inadequate stability booklet lacking down flooding angles and wind-heel criteria necessary to increase the officers' awareness of the ship's vulnerabilities in heavy weather such as unintentional flooding and listing. (Report, pp. 244-245)

In short, the Board deemed the company's efforts deficient with respect to crew training and oversight of its operations.

Training

The NTSB found that although all officers were properly certificated under STCW and domestic law and had received satisfactory to excellent personnel evaluations, (although the evaluations were ultimately criticized as being incomplete (Report p. 215)), the managers had no one person assigned to and responsible for ongoing training. The Board then found that inadequate training contributed to the sinking in four respects:

(1) Shutdown of the main engines. The plant was lost because the bellmouth of the lube oil suction feeding the main engines came clear of the lube oil when the vessel took on severe port list. The plant then automatically shut down and could not be restarted. The Board found that the pump required a minimum depth of oil of 26 inches, it had 25 inches at the time of the loss, and engineers on earlier voyages had mentioned a 32 inch depth as a safety margin. The Board concluded that if the 32" level had been in place, that level would "increase the likelihood of maintaining propulsion." (Report p. 186.)

With respect to ISM, the Board found that the company had not provided guidance on this issue as a matter of risk assessment in preparation for heavy weather. Specifically, the Board concluded that the crew purportedly was unaware of the ship's design criteria setting the maximum list at which the main engines would remain operational was 15 degrees. (Report p. 187.)

(2) Seawater Ingress. The Board found that sea water entered the vessel through open cargo hold vents and an open "scuttle" on the shelter deck. The "scuttles" allowed crew members to access the lower holds. The scuttles had dogs allowing them to be made water tight, but the managers had no policy for monitoring the opening and closing of any water tight doors while at sea.

Because the vents to the cargo holds were necessary for the removal of gasoline fumes from motor vehicles being carried as cargo, they were required to be open while the vessel was at sea. The vents were equipped, however, with fire dampers, which, when closed, rendered the ventilator shaft water tight. The fire control and safety plan did not specify that the dampers should be closed for flooding or damage control. (Report. P. 193.) The Board found that the weight of the testimony established that as a matter of routine, the crew left the dampers open even in heavy weather.

However, recognizing that the vents needed to remain open to rid the vessel of gasoline fumes the motor vehicles produced, the Board did not suggest that as part of generalized preparations for heavy weather, that there be instructions that the vents be closed. It did recommend that the company establish procedures for "opening, closing, and logging all closures

that make up a vessel's watertight envelope while the vessel is at sea. (Report p. 253). Further, the Board recognized that the company did in its SMS refer the master to the ship's stability data in the case of flooding. However, neither the stability booklet or the computerized Cargo Max plan identified the vents as down flooding points which needed to be made water tight. Nor did the ship have a damage control plan on board which the NTSB said should also have identified the need to close the vents. (Report pp. 195-198, 213, 222.)[1]

(3) Weather information. The vessel was receiving both real time data and data that was delayed by six hours. Because the ship was close to land, it also got television's "Weather Channel" and radio warnings from Coast Guard aircraft flying hurricane watches. The Board found that the master was relying on the delayed information. The storm did not behave in accordance with these predictions, and so the ship accordingly sailed into the worst of the hurricane.

The Board found that the Company did not provide formal training in the use and interpretation of the weather data it was making available to the ships, and the officers did not understand the time delay elements of the data upon which the master was relying. (Report pp. 216-217.)

As a subtext to the foregoing, the Board also criticized the Company with respect to ISM heavy weather issues, concluding:

> "The company identified heavy or severe weather as a risk to the vessels, yet it inadequately mitigated that risk by failing to provide specific guidance, instructions, and checklists to prepare the vessel for heavy or severe weather. Furthermore, company audits did not identify the gaps. Thus, the NTSB concluded that the company's SMS was inadequate and did not provide the officers and crew with the necessary procedures to ensure safe passage, water tight integrity, heavy weather preparations and emergency response during heavy weather conditions." (Report p. 213.)

(4) Bridge Resource Management. The NTSB also found the Bridge Resource Management training inadequate.

The ship was equipped with a VDR which eventually was recovered from a depth of 15,000 feet. The last audio recording ended at 0740 on October 1, 2015. Presumably, at that time, the sinking of the El Faro was well advanced. For the twenty or so previous hours the ship was encountering steadily worsening weather and receiving multiple and confusing weather

[1] One of the difficulties the Board recognized is that Class and the Coast Guard had authority to review the stability booklet; Class had done so and the Board found that the booklet complied with current regulatory requirements.

reports. During the 8-12 and then 12-4 night watches on September 30, the master received three calls from the watch officers suggesting a course change to mitigate the effects of the storm. The master rejected each such suggestion. Also despite those calls, the master remained in his quarters.

The report states that BRM stresses "assertiveness" and then states that the mates did not "assertively voice their concerns in the captain's presence." The Board concluded that the mates were not assertive enough and the master, having received three calls, should have promptly returned to the bridge "to gain a better awareness of the changing weather situation."

The Board stated that SMS requires quarterly BRM training, but it found "no evidence that management implemented BRM aboard El Faro. Thus, the NTSB concludes that the company's failure to ensure the implementation of BRM contributed to the sinking." (Report pp. 209-212.)

Company Oversight

The NTSB, citing the Code itself as requiring full support for the ships' master, criticizes the company failing to do so. In support of its criticism, the Board notes that no one was assigned to track the position of the ships in the fleet, thereby not being able to render advice regarding weather conditions the ships could anticipate. Nor did the company provide the master with "competent sources of nautical experience for purposes of consultation." (Report p. 219.)

On the issue of company oversight and support, the report generally focused on the accident voyage, stating a lone point that "Investigators . . . found very little shoreside oversight or support for the accident voyage." (Report p. 219.)

The SMS required internal audits to be conducted by the "Designated Person Ashore" every 12 months. Indeed, the company left it to the master to submit reports only "biannually" on the vessel's compliance with the ISM program. The DPA had conducted the last audit seven months before the vessel was lost. Neither of these most recent reports noted any nonconformities or deficiencies requiring corrective action. (Report pp. 63-64.) The Board made no comment on this aspect of the company's program beyond recitation of the foregoing facts.

Conclusion

Although the report is couched in the driest of bureaucratic language, it chronicles in harsh, harrowing, detail the tragic loss of thirty three lives in the sinking of the SS El Faro.

Like all substantial casualties, no one act or omission caused the loss; rather, numerous actions matured at the scene time producing a catastrophe. The multiple deficiencies in the owner's ISM program played their part, but only a part.

Although the Board makes a number of recommendations to the owners concerning their ISM program, including a need for a comprehensive external audit of the system, the lesson for the industry is far broader than the faults in one company's system.[2]

This report, and indeed that of the Coast Guard which issued its own report based on the joint investigation by both agencies, exposed systemic failings in the oversight of the shipping industry. Both reports unsparingly discussed the long-term lack of experienced personnel in both the class society and the Coast Guard and the consequent inability to exercise effective oversight – a long-term problem requiring a long-term solution, including adequate funding for the Coast Guard.

Likewise, the report teaches that the complexity of modern vessels and their cargoes demand sophisticated, continuing, and comprehensive training of all engaged in their operation, that all operations must be thoroughly examined so that instruction, operation, and supervision address all issues. And finally, safety must be a centerpiece of senior management's concerns and upper management must in turn commit the resources, material and human, to meet the demands of a modern shipping operation.

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[2] Although the Board is charged with investigating transportation casualties for the purpose of determining probable cause, it has no authority to promulgate regulations; hence the "Recommendations."