

**NATIONAL TRANSPORTATION SAFETY BOARD**  
**Public Meeting of February 18, 2009**  
**(Information subject to editing)**

**Marine Accident Report**  
**Allision of Hong Kong-Registered Containership M/V *Cosco Busan***  
**With the Delta Tower of the San Francisco-Oakland Bay Bridge**  
**San Francisco, California**  
**November 7, 2007**  
**NTSB/MAR-09/01**

This is a synopsis from the Safety Board's report and does not include the Board's rationale for the conclusions, probable cause, and safety recommendations. Safety Board staff is currently making final revisions to the report from which the attached conclusions and safety recommendations have been extracted. The final report and pertinent safety recommendation letters will be distributed to recommendation recipients as soon as possible. The attached information is subject to further review and editing.

**EXECUTIVE SUMMARY**

On Wednesday, November 7, 2007, about 0830 Pacific standard time, the Hong Kong-registered, 901-foot-long container ship M/V *Cosco Busan* allided with the fendering system at the base of the Delta tower of the San Francisco–Oakland Bay Bridge. The ship was outbound from berth 56 in the Port of Oakland, California, and was destined for Busan, South Korea. Contact with the bridge tower created a 212-foot-long by 10-foot-high by 8-foot-deep gash in the forward port side of the ship and breached the Nos. 3 and 4 port fuel tanks and the No. 2 port ballast tank. As a result of the breached fuel tanks, about 53,500 gallons of fuel oil were released into San Francisco Bay. No injuries or fatalities resulted from the accident, but the fuel spill contaminated about 26 miles of shoreline, killed more than 2,500 birds of about 50 species, temporarily closed a fishery on the bay, and delayed the start of the crab-fishing season. Total monetary damages were estimated to be \$1.24 million for the ship, \$1.5 million for the bridge, and more than \$70 million for environmental cleanup.

The following safety issues were identified during this accident investigation:

- Medical oversight of the *Cosco Busan* pilot
- Medical oversight of mariners in general;
- Guidance for vessel traffic service operators in exercising authority to manage traffic;
- Procedures for improving the assessment of oil spills in California waters; and
- Training and oversight of the *Cosco Busan* crew.

As a result of its investigation of this accident, the Safety Board makes safety recommendations to the U.S. Coast Guard, the American Pilots' Association, and Fleet Management Limited.

## CONCLUSIONS

1. The following were neither causal nor contributory to the accident: wind and current; the vessel propulsion and steering systems; the bridge navigation systems; bridge team response to orders; vessel harbor traffic; navigation aids, including the RACON at the center of the Delta–Echo span; maintenance of a proper lookout; pilot training and experience; and vessel traffic service equipment and operational capability.
2. The California Department of Transportation’s assessment of damage to the San Francisco—Oakland Bay Bridge following the allision was timely and appropriate.
3. The California Department of Transportation’s decision to allow the bridge to remain open to traffic after the allision was appropriate.
4. In this accident, the bridge tower fendering system worked as intended to protect the pier structure and to limit damage to the striking vessel to the area above the waterline.
5. The pilot’s order for hard port rudder at the time of the allision was appropriate and possibly limited the damage to the vessel and the bridge fendering system.
6. Although the pilot had been diagnosed with sleep apnea, he was being treated for the condition, and there was no evidence that he was sleep-deprived at the time of the accident.
7. As evidenced by his prescription history and duty schedule, the pilot was most likely taking a number of medications, the types and dosages of which would be expected to degrade cognitive performance, and these effects were present while the pilot was performing piloting duties, including on the day of the accident.
8. The Cosco Busan pilot, at the time of the allision, experienced reduced cognitive function that affected his ability to interpret data and that degraded his ability to safely pilot the ship under the prevailing conditions, as evidenced by a number of navigational errors that he committed.
9. The pilot and the master of the Cosco Busan failed to engage in a comprehensive master/pilot information exchange before the ship departed the dock and failed to establish and maintain effective communication during the accident voyage, with the result that they were unable to effectively carry out their respective navigation and command responsibilities.
10. The master of the Cosco Busan did not implement several procedures found in the company safety management system related to safe vessel operations, which placed the vessel, the crew, and the environment at risk.
11. The interactions between the pilot and the master on the day of the allision were likely influenced by a disparity in experience between the pilot and the master in navigating the San Francisco Bay and by cultural differences that made the master reluctant to assert authority over the pilot.
12. Because the *Cosco Busan* crew was not drug tested, no conclusive evidence exists as to whether or not crew use of illegal drugs played a role in the accident.
13. Vessel Traffic Service San Francisco personnel, in the minutes before the allision, provided the pilot with incorrect navigational information that may have confused him about the vessel’s heading.
14. Vessel traffic service communications that identify the vessel, not only the pilot, would enhance the ability of vessel masters and crew to monitor and comprehend vessel traffic service communications.

15. Although Vessel Traffic Service San Francisco personnel should have provided the pilot and the master with unambiguous information about the vessel's proximity to the Delta tower, the Safety Board could not determine whether such information, had it been provided, would have prevented the allision.
16. The lack of U.S. Coast Guard guidance on the use of vessel traffic service authority limited the ability of Vessel Traffic Service San Francisco personnel to exercise their authority to control or direct vessel movement to minimize risk.
17. Even though the pilot's personal physician, who prescribed the majority of medications to the pilot, was aware of the pilot's occupation and his medical history, including his documented history of alcohol dependence, he continued to inappropriately prescribe medications that, either individually or in concert, had a high likelihood of adversely affecting the pilot's job performance.
18. Although the pilot did not disclose to the physician who conducted his January 2007 medical evaluation all of his medical conditions or medication use, as he was required to do, the physician exercised poor medical oversight on behalf of the California Board of Pilot Commissioners by finding the pilot fit for duty despite having collected sufficient information regarding his multiple medical conditions and medications to call into question his ability to perform his piloting duties safely.
19. Although the pilot did not disclose to the U.S. Coast Guard and the California Board of Pilot Commissioners all of his medical conditions or medication use, as he was required to do, the information he did provide should have been sufficient to prompt the Coast Guard, at a minimum, to conduct additional review of the pilot's fitness for duty.
20. The U.S. Coast Guard, which had the ultimate responsibility for determining the pilot's medical qualification for retaining his merchant mariner's license, should not have allowed the pilot to continue his duties because the pilot was not medically fit.
21. The U.S. Coast Guard's system of medical oversight of mariners continues to be deficient in that it lacks a requirement for mariners to report changes in their medical status between medical evaluations.
22. Because the *Cosco Busan* was crewed with mariners who were new to the vessel, who had not worked together previously, who for the most part were new to the company, and who were insufficiently trained in vessel operations and company safety procedures, Fleet Management placed the vessel and crew at risk when the vessel got under way in South Korea.
23. Providing a safety management system manual to the *Cosco Busan* crew only in English and not also in the vessel's working language limited the crewmembers' ability to review and follow the SMS.
24. Fleet Management had not successfully instilled in the *Cosco Busan* master and crew the importance of following all company safety management system procedures.
25. The failure of the U.S. Coast Guard and the California Department of Fish and Game's Office of Spill Prevention and Response to quickly quantify and relay an accurate estimate of the quantity of oil spilled to the Unified Command did not affect the overall on-water recovery effort in this accident.
26. The Federal on-scene coordinator failed to aggressively use the resources available to him to obtain timely and accurate information about the extent of the spill in order to fulfill his responsibilities.

27. Effective communication regarding response activities was established and maintained between the oil spill response organizations, the qualified individual, the U.S. Coast Guard, and the Unified Command on the day of the accident.
28. The designated oil spill response organizations' level of response to the Cosco Busan fuel oil spill was timely and effective.
29. A mechanism for the collection and regular communication among pilot oversight organizations of pilot-related performance data and information regarding pilot oversight and best practices would enhance the ability of those organizations to effectively oversee pilots.
30. Recently implemented international regulations with regard to the protection of fuel oil tanks on nontank vessels will, over time, reduce the likelihood of oil spills in mishaps such as occurred with the *Cosco Busan*.

## **PROBABLE CAUSE**

The National Transportation Safety Board determines that the probable cause of the allision of the Cosco Busan with the San Francisco–Oakland Bay Bridge was the failure to safely navigate the vessel in restricted visibility as a result of (1) the pilot's degraded cognitive performance from his use of impairing prescription medications, (2) the absence of a comprehensive pre-departure master/pilot exchange and a lack of effective communication between the pilot and the master during the accident voyage, and (3) the master's ineffective oversight of the pilot's performance and the vessel's progress. - Contributing to the accident was Fleet Management Limited's failure to properly train and prepare crew members prior to the accident voyage, and their failure to adequately ensure that the crew understood and complied with the safety management system; and the U.S. Coast Guard's failure to provide adequate medical oversight of the pilot in view of the medical and medication information that the pilot had reported to the Coast Guard.

## **SAFETY RECOMMENDATIONS**

### **New Recommendations**

As a result of this accident investigation, the National Transportation Safety Board makes the following safety recommendations:

#### **To the U.S. Coast Guard:**

1. Propose to the International Maritime Organization that it include a segment on cultural and language differences and their possible influence on mariner performance in its bridge resource management curricula. (M-09-XX)
2. Revise your vessel traffic service policies to ensure that vessel traffic service communications identify the vessel, not only the pilot, when vessels operate in pilotage waters. (M-09-XX)
3. Provide Coast Guard-wide guidance to vessel traffic service personnel that clearly defines expectations for the use of existing authority to direct or control vessel movement when such action is justified in the interest of safety. (M-09-XX)

4. Require mariners to report to the Coast Guard, in a timely manner, any substantive changes in their medical status or medication use that occur between required medical evaluations. (M-09-XX) Supersedes M-05-05
5. Establish a mechanism through which representatives of pilot oversight organizations collect and regularly communicate pilot performance data and information regarding pilot oversight and best practices. (M-09-XX)

**To Fleet Management Limited:**

1. When assigning a new crew to a vessel, ensure that all crewmembers are thoroughly familiar with vessel operations and company safety procedures before the vessel departs the port. (M-09-XX)
2. Provide safety management system manuals that are in the working language of a vessel's crew. (M-09-XX)

**To the American Pilots' Association:**

Inform your members of the circumstances of this accident, remind them that a pilot card is only a supplement to a verbal master/pilot exchange, and encourage your pilots to include vessel masters and/or the officer in charge of the navigational watch in all discussions and decisions regarding vessel navigation in pilotage waters. (M-09-XX)

**Previously Issued Recommendations Reclassified in This Report**

To the U.S. Coast Guard:

**M-05-04**

Revise regulation 46 CFR 10.709 to require that the results of all physical examinations be reported to the Coast Guard, and provide guidance to mariners, employers, and mariner medical examiners on the specific actions required to comply with these regulations.

Safety Recommendation M-05-04, previously classified "Open—Acceptable Response," is reclassified "Closed—Acceptable Alternate Action" in the "Coast Guard Medical Oversight of Mariners" section of this report.

**M-05-05**

In formal consultation with experts in the field of occupational medicine, review your medical oversight process and take actions to address, at a minimum, the lack of tracking of performed examinations; the potential for inconsistent interpretations and evaluations between medical practitioners; deficiencies in the system of storing medical data; the absence of requirements for mariners or others to report changes in medical condition between examinations; and the limited ability of the Coast Guard to review medical evaluations made by personal health care providers.

Safety Recommendation M-05-05, previously classified “Open—Acceptable Response,” is reclassified “Closed—Acceptable Action—Superseded” in the “Coast Guard Medical Oversight of Mariners” section of this report.