

Log # M-411



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: JUN 26 1997

In Reply Refer To: M-97-41 through -43

Admiral Robert E. Kramek
Commandant
U.S. Coast Guard
Washington, D.C. 20593-0001

On the evening of June 22, 1995, the Liberian-registered passenger vessel *Star Princess*, carrying 1,568 passengers and 639 crewmembers, was en route from Skagway to Juneau, Alaska, via the Lynn Canal under the direction of a southeast Alaska pilot. At 0142 on June 23, the *Star Princess* grounded on the submerged Poundstone Rock in Lynn Canal, about 21 miles north of Juneau. The vessel's bottom sustained significant damage on the starboard side, including the rupture of oil tanks, which resulted in the loss of at least 5 gallons of oil. The vessel was piloted to safe anchorage at Auke Bay, Alaska, (about 10 miles north of Juneau) to assess damage and debark passengers. No injuries or deaths resulted from this accident. The total cost resulting from required repairs and the delay before the vessel could return to service was estimated at \$27.16 million.¹

The National Transportation Safety Board determined that the probable cause of the grounding of the *Star Princess* was the pilot's poor performance, which may have been exacerbated by chronic fatigue caused by sleep apnea. Contributing to the accident was the fact that the pilot and the watch officers did not practice bridge resource management.

The Safety Board examined the possibility that fatigue, associated with previously undiagnosed obstructive sleep apnea (OSA), might have impaired the pilot's ability to safely navigate the *Star Princess* on the morning of the grounding. It was medically determined after the accident that the pilot suffered from OSA, a sleeping disorder. OSA can cause an individual to awaken repeatedly throughout a sleep period, often without being aware of having done so. This situation may have prevented the pilot's obtaining restful sleep, creating circumstances that may have caused fatigue.

¹For further information, read Marine Accident Report -- *Grounding of the Liberian Passenger Ship Star Princess on Poundstone Rock, Lynn Canal, Alaska, June 23, 1995* (NTSB/MAR-97/02).

The fact that the pilot suffered from a sleep disorder would likely affect any fatigue-based performance criteria. One sleep researcher found that the pilot fell asleep in an average of about 5 minutes when placed in a dark, quiet room. An individual who is not sleep deprived will, on average, require about 20 minutes to fall asleep under similar circumstances. Thus the less time a person needs to fall asleep from the 20-minute average, the more the individual is sleep deprived and in need of rest. In the case of the pilot, during postaccident testing sessions he fell asleep in about one-quarter the time required for rested individuals. OSA is a chronic disorder that is often present for years or decades prior to diagnosis. Since daytime sleepiness is almost uniformly present in patients who suffer from OSA, chronic fatigue is one of the hallmarks of the disorder. Therefore, the Safety Board concluded that the pilot was chronically fatigued as a result of OSA.

The pilot claimed that because he was unsure of what course the *Fair Princess* (another vessel in the vicinity) would take, he paid careful attention to the vessel. If such was the case, the pilot could have concentrated on the *Fair Princess* to the exclusion of maintaining a safe distance from Poundstone Rock. Focus on a particular stimulus to the exclusion of other critical data can be one effect of fatigue on performance. The pilot also stated that when he first felt the ship shudder upon grounding, he was not immediately sure as to the nature of the problem. Only when he moved to the starboard bridge wing and observed the buoy traveling down that side of the vessel did the pilot realize that he had struck Poundstone Rock. Not only should the pilot have been aware of the location of the buoy from transiting the area on previous occasions, he had for several miles been observing the buoy marking the rock. Under normal conditions, such an experienced pilot should have immediately deduced that he had not safely passed Poundstone Rock when he felt the vessel shudder. A fatigued pilot, however, might not be sufficiently alert to realize that he had grounded. Because the available data suggest that the pilot's performance was degraded consistent with the effects of fatigue, the Safety Board concluded that fatigue may have reduced the pilot's ability to appropriately assess and respond to the developing situation.

The Safety Board also evaluated the pilot's use of the antidepressant Effexor in the context of his performance on the accident morning. Besides the postaccident statements made by the pilot about his Effexor use, the Safety Board obtained and reviewed medical opinions concerning the pilot's use of this medication and what effect, if any, it may have had on his performance.

The pilot himself stated that while the medication tended to cause some minor physical side effects, these did not affect his ability to pilot the vessel. The physicians consulted by the Safety Board were in agreement that Effexor would have had no effect on the pilot's behavior. Their consensus was that the pilot was not impaired by his medication at the time of the accident, particularly given the low dosage of Effexor he was taking. Based on the unanimity of the professional opinions of all physicians consulted, the Safety Board concluded that the pilot's use of an antidepressant (Effexor) probably did not affect his performance.

While concluding that the pilot's use of medication was not causal or contributory to this accident, the Safety Board remains concerned about the possible effects of medication on pilot

performance. The Alaska Board of Marine Pilots was not aware that the pilot had been regularly taking the prescription medication Effexor, nor was the pilot required to provide this information to the agency. The pilot first provided the information during testimony following this accident.

Use of medication by operators in the transportation industry has been an issue in previous accidents the Safety Board has investigated. For instance, after its investigation into the collision of the towboat *Mauvilla* with a railroad bridge,² the Safety Board recommended to the U.S. Department of Transportation (DOT) that it should:

I-94-5

Require the modal operating administrations to develop and disseminate bulletins, notices, circulars, and other documents that call attention to the need for an employee reporting procedure concerning use of medication (over-the-counter and prescription) while on duty and that urge the transportation industry to develop and implement informational and educational programs related to this subject.

The DOT developed a statement for use by all operating administrations concerning the potential threat to public safety posed by the on-duty use of some over-the-counter and prescription medications by persons performing safety-sensitive duties, strongly urged employers to include appropriate information to address this issue in their employee training materials, and encouraged employers to reiterate to their employees the need to report use of such medications when required by applicable DOT rules or company policies. The DOT circulated this statement to all departmental drug and alcohol program managers, asking that it be made available throughout the regulated industries. Because these efforts satisfied the intent of the recommendation, the Safety Board classified Safety Recommendation I-94-5 "Closed--Acceptable Action" on October 26, 1995.

During the *Star Princess* accident investigation, Safety Board representatives found that, in the marine transportation mode, the issue of medication reporting may not be as familiar with industry members as it could be. As marine pilots are individual contractors rather than employees of firms that may have medication reporting requirements, it would be helpful for them to be made aware of the possible effects that medications could have on their work performance and of the safety benefits provided by medication reporting policies.

Federal pilot licensing procedures require that pilots annually pass a physical examination that addresses vision, color sense, and general physical condition. The *Merchant Marine Personnel Physical Examination Report* (as revised in March 1995), used to conduct the examination, directs the examining physician to report what medications the pilot is taking.

²See Railroad/Marine Accident Report -- *Derailment of Amtrak Train No. 2 on the CSXT Big Bayou Canal Bridge near Mobile, Alabama, September 22, 1993* (NTSB/RAR-94/01).

At the State level, the medication reporting situation is less clear. The Alaska State medical certification procedure for pilot licensing does not specifically require a pilot to declare whether he or she is taking medications. Other States' pilot licensing organizations also do not appear to require pilots to make full disclosure regarding medications they may be taking. Many medications have effects that could negatively affect the performance of persons with safety-sensitive responsibilities. The Safety Board has previously discussed the need for transportation employers to be aware that employees are taking medication so that employers can determine the potential effects of the medication on the employee's fitness for duty.³ While pilots are not "employees" but self-employed individual contractors, they nevertheless have safety responsibilities in marine transportation of valid concern to licensing authorities.

The Safety Board was also concerned about some decisions made by the *Star Princess* master following the accident. About 1 minute after the *Star Princess* grounded, at 0142, the pilot radioed the U.S. Coast Guard. The master and crew immediately began to check the vessel for damage and flooding and, although four tanks were flooding and hydraulic oil had leaked from the starboard shaft lubrication system, the ship was determined to be stable. As a precaution, lifeboats were readied to be lowered. The master also asked the off-watch pilot where the vessel might be beached, if necessary. At 0155 the master notified the crew of the grounding and told crewmembers to advise those passengers who were awake of the accident. He did not wake the sleeping passengers to tell them that there had been a grounding, that the situation was under control, or that they would be kept informed. He did not direct any passengers to go to muster stations. The master said he thought waking the passengers would have upset them unnecessarily.

On the other hand, the master also clearly considered the situation serious enough to call for the readying of lifeboats, and he explored the possibility of beaching the damaged vessel. The Coast Guard, too, had been alerted. The alternative not taken by the master — notifying all passengers shortly after the grounding — would have allowed them time to prepare for a possible evacuation, rather than being awakened suddenly when and if the vessel became endangered.

The damage assessment by divers was not made until between 0437 and 0655. An announcement to all passengers informing them of the situation was not made until 0918. Had the initial damage assessment in this instance been incorrect and the vessel been more seriously damaged, the passengers and crew could have been exposed to undue risk. Given that 2,207 passengers and crewmembers were on the ship, the delay before a thorough damage assessment was made consumed valuable time that might have been needed to muster everyone at lifeboat stations had the ship been in danger and a rapid evacuation necessary. Therefore, the Safety Board concluded that the master did not give the passengers timely notification about the

³See, for example, Marine Accident Report -- *Grounding of the Panamanian Flag Passenger Carferry M/V A. Regina, Mona Island, Puerto Rico, February 15, 1985* (NTSB/MAR-86/02) and Railroad Accident Report--*Derailment of Amtrak Train 87, Silver Meteor, Palatka, Florida, December 17, 1991* (NTSB/RAR-93/02/SUM).

situation; had the passengers needed to evacuate, they would not have been prepared. The Safety Board considers that passengers and crew should receive timely public announcements concerning emergency situations that may require evacuation of the vessel. Timely notification allows passengers and crew to effectively manage an evacuation, if necessary, and avoids confusion and panic.

Therefore, the National Transportation Safety Board issues the following safety recommendations to the U.S. Coast Guard:

Advise pilots about the effect of fatigue on performance and about sleeping disorders such as sleep apnea. (M-97-41)


Review, in consultation with experts in occupational health, your medical standards, guidelines, and examination forms to ensure that they require the disclosure and appropriate evaluation of the history or presence of any medical conditions, symptoms, or medication use that would affect an individual's fitness to pilot a vessel. (M-97-42)

Advise passenger vessel operators of the need for masters to provide immediate notification to passengers and crew of emergency situations that have been assessed as having the potential to require evacuation of the vessel. (M-97-43)

The Safety Board also issued Safety Recommendations M-97-44 and -45 to the State pilot commissions, M-97-46 and -47 to the Alaska Board of Marine Pilots, M-97-48 to the Southeastern Alaska Pilots Association, M-97-49 and -50 to the Alaska Coastwise Pilot Association, M-97-51 to the San Diego Bay Pilots Association, Inc., M-97-52 and -53 to Princess Cruise Lines, M-97-54 and -55 to the American Pilots' Association, and M-97-56 and -57 to the International Council of Cruise Lines.

The National Transportation Safety Board is interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations M-97-41 through -43. If you need additional information, you may call (202) 314-6458.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By: 
Jim Hall
Chairman