



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** May 3, 2006

**In reply refer to:** M-06-14

Mr. James W. Owens  
Chairman and CEO  
Caterpillar, Inc.  
100 NE Adams Street  
Peoria, Illinois 61629

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The National Transportation Safety Board (Safety Board) is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your organization to take action on the safety recommendation in this letter. The Safety Board is vitally interested in this recommendation because it is intended to prevent accidents and save lives.

The recommendation addresses the proper installation of support clamps on the fuel injection lines of your marine engines. The recommendation derives from the Safety Board's investigation of the fire on board the small passenger vessel *Express Shuttle II* near Port Richey, Florida, on October 17, 2004, and is consistent with the evidence we found and the analysis we performed.<sup>1</sup>

The *Express Shuttle II* was operated as a shuttle boat by Paradise of Port Richey, carrying passengers and crew to and from the company's casino boat in the Gulf of Mexico. While the *Express Shuttle II* was returning to the company marina after delivering 78 passengers to the casino boat the morning of October 17, 2004, a fire broke out in the engine room. Only the master and two deckhands were on board at the time. None of the crew activated the vessel's fixed carbon dioxide fire suppression system. The crew tried to fight the blaze with portable extinguishers, but when the fire burned out of control, they prepared to abandon ship. A passing recreational boat rescued the crewmembers. Firefighters from Port Richey and Pasco County fought the blaze, but the vessel, valued at \$800,000, was destroyed.

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<sup>1</sup> For further information, see National Transportation Safety Board, *Fire on Board U.S. Small Passenger Vessel Express Shuttle II, Pithlachascotee River Near Port Richey, Florida, October 17, 2004*, Marine Accident Report NTSB/MAR-06/02 (Washington, DC: NTSB, 2006).

As a result of its investigation, the Safety Board determined that the probable cause of the fire on board the *Express Shuttle II* was a fractured, improperly installed fuel-injection line on the inboard side of the starboard engine that allowed diesel fuel to spray onto the engine and ignite. Contributing to the cause of the fire was the failure of Paradise of Port Richey to have a preventive maintenance program, which could have identified the company's ongoing problem with the vessel's fuel lines before a failed line led to the fire.

On-scene investigation of the *Express Shuttle II* wreckage found that the entire length of the fuel line to cylinder 5 on the starboard engine was without support clamps. Other lines on the starboard engine were clamped (investigators found seven other clamps), but none of the clamps was secured to the engine block. On service calls to the *Express Shuttle II* during the week before the fire, technicians from Ring Power Corporation, Caterpillar's local authorized representative, noted that several fuel lines on the starboard engine lacked clamps.

The fuel supply lines were removed from the *Express Shuttle II*'s starboard engine and sent to the Safety Board's materials laboratory in Washington, D.C., for examination. The laboratory found that the line to cylinder 5 had failed because of metal fatigue at the base of the ferrule on the fuel-pump end of the line. The laboratory concluded that "the total lack of clamping led to excessive vibrations that caused the line to fatigue and fail." The laboratory also found indications of "vibrational contact" between two other fuel injection lines (Nos. 1 and 3) on the starboard engine. The lines were worn through more than 20 percent of their diameters, "another indication of incorrect clamping or other installation problems," according to the laboratory's report.

Safety Board investigators learned that Paradise of Port Richey had replaced the fuel injection lines on the vessel's starboard engine numerous times in the 10 months preceding the fire. Invoices showed purchases of 13 replacement fuel lines on 11 different occasions during that time, all intended for the *Express Shuttle II*'s starboard engine, according to the evidence. Investigators also determined that Paradise of Port Richey personnel had not consulted the Caterpillar service manual when replacing fuel lines on the *Express Shuttle II*.

In examining the Caterpillar manual, Safety Board investigators determined that though it gives detailed instructions for torquing the fuel lines, it does not include the steps required to replace a single fuel line. The manual also does not clearly indicate the correct location of fuel line clamps, despite giving warnings that improperly clamped lines could vibrate, become damaged, then leak and cause a fire. In the Board's opinion, a more detailed explanation of the procedure for replacing a single fuel line could reduce misunderstandings or mistakes by vessel maintenance personnel.

The National Transportation Safety Board, therefore, makes the following safety recommendation to Caterpillar, Inc.:

Revise the service manual for your marine engines to give specific instructions on how to replace a single fuel line and on where fuel line clamps should be located. (M-06-14)

As a result of its investigation of the *Express Shuttle II* fire, the Safety Board has issued other safety recommendations to the U.S. Coast Guard and to Paradise of Port Richey, the owner of the *Express Shuttle II*. We urge you to take action on the safety recommendation in this letter. The Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation. Please refer to Safety Recommendation M-06-14 in your reply. For additional information, you may call Captain Michael Brown at (202) 314-6174.

Acting Chairman ROSENKER and Members ENGLEMAN CONNERS, HERSMAN, and HIGGINS concurred in this recommendation.

*[Original Signed]*

By: Mark V. Rosenker  
Acting Chairman