

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: March 22, 1978

Forwarded to:

Honorable Joan Claybrook  
Administrator  
National Highway Traffic Safety  
Administration  
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

H-78-15 and -16

The National Transportation Safety Board is investigating the collision of a motor home and an automobile about 4:00 p.m. on July 14, 1977, on U.S. Route 69 south of McAlester, Oklahoma. The automobile was southbound when it skidded on wet pavement and slid sideways across the centerline in front of the motor home. All six persons in the automobile were killed; the driver and one passenger in the motor home were also killed, and the six other passengers were injured.

The left door of the motor home opened during the impact and permitted the unrestrained driver to be ejected partially from the vehicle. When the vehicle overturned, it crushed the driver between the cab and the road surface. The left door's latch, manufactured by the Ford Motor Company, is typical of automotive door latches, wherein the striker enters the latch body and is captivated in a slot formed by two rotating plates. Neither inspection nor operation of the door latch after the accident revealed any visible impairment of function. There was no obvious distortion of any part of the latch, with the exception of the externally connected lever arm, which had a very slight twist. The actuating rod for the interior handle was bent and shortened by approximately 1 7/8 inches. The crushing of the door upon impact, which bent the rod, also unlatched the latching mechanism, and kept it unlatched. The original length of this rod was 12 3/4 inches and the distorted length was 10 7/8 inches.

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When a vehicle body is distorted torsionally, the transverse load developed at the door latch assembly will cause a longitudinal door foreshortening due to the impact deformation of the door panel. This load acts the same as longitudinal compression forces developed in the vehicle structure under conditions of head-on or rear-end impact. When the door panel is impacted in such a way as to cause a foreshortening of the panel in the longitudinal direction, the latch is subject not only to longitudinal tensile loads but also to rotational displacement between the latch and striker, thus adversely affecting latch performance. The latch assembly should function to maintain proper engagement between the rotor and striker under load conditions.

Federal Motor Vehicle Safety Standard (FMVSS) No. 206 requires the latch to be able to withstand an ultimate longitudinal load of 2,500 lbs in the fully latched position, and 1,000 lbs in the secondary latched position, which is the attitude that exists between the latch and striker when the latch holds the door in a position less than fully closed. The standard also states that the latch must be able to withstand an ultimate transverse load of 2,000 lbs in the fully latched position and 1,000 lbs in the secondary latched position. These requirements indicate that the latch must remain in the fully latched position when subjected to an inertia load of 30g in any direction. The Society of Automotive Engineers (SAE), in its Recommended Practice J839b, has developed nondynamic, laboratory tests on door latch assemblies to meet the requirements of FMVSS No. 206. The interdependent components of the door latch system (including the door latch, striker assembly, outside handle, key cylinder, and any connecting mechanisms) require evaluation through a static test.

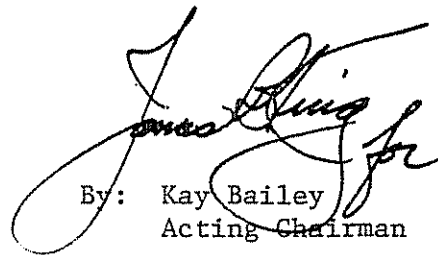
The actuation of the door latch is caused by the bending of the latch remote rod due to encroaching impact deformation of the door panel. Although some possible causes of accidental door openings have been anticipated prior to experimental testing, there could be other causes that can be discovered only by evaluating the dynamics of a door that opened under crash conditions.

The latch assembly should be evaluated in a dynamic test even though it normally functions only under brief, low dynamic loading conditions. Whereas a static testing procedure cannot simulate the brief loading time occurring under actual impact conditions, dynamic testing in conjunction with static loading offers a more realistic simulation of actual loading conditions. Dynamic testing could be done by subjecting the latch and actuating system components to impact loads. Therefore, the National Transportation Safety Board recommends that the National Highway Traffic Safety Administration:

Revise FMVSS 206 to require performance tests on door latch assemblies rather than the nondynamic, laboratory tests as described in the Society of Automotive Engineers' Recommended Practice, SAE J839b. (Class II, Priority Action) (H-78-15)

Work with the Society of Automotive Engineers to devise methods of testing to demonstrate experimentally the satisfactory performance of latching systems. (Class II, Priority Action) (H-78-16)

BAILEY, Acting Chairman, McADAMS, HOGUE, and KING, Members, concurred in the above recommendations.



By: Kay Bailey  
Acting Chairman

