

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: December 23, 1975

Forwarded to:

Honorable James B. Gregory
Administrator
National Highway Traffic Safety
Administration
Washington, D. C. 20590

} SAFETY RECOMMENDATION(S)

} H-75-40 through H-75-44

On May 13, 1975, a Rohr Industries' prototype bus was being road-tested near Phoenix, Arizona. The two occupants heard a noise from the engine compartment, felt a loss of engine power, and saw smoke coming from the rear engine compartment. They attempted to raise the hydraulically powered engine hood, but it would not open. The driver tried to extinguish the fire through the hood's access door, but he was not successful. The fire spread to the passenger compartment and destroyed the bus.

The circumstances which not only caused, but also contributed to the severity of, this incident suggest that at least five Federal Motor Vehicle Safety Standards are in order. Even though the vehicle involved was a limited-production prototype, the following basic issues are applicable to all vehicle types.

Firefighting Accessibility

The prototype had a massive engine compartment hood. The size and weight of the hood necessitated the use of a power mechanism to open it. After the engine compartment fire was detected, the hood-opening mechanism would not operate. The fire probably could have been extinguished if the hood could have been opened.

Current cab-over-engine trucks incorporate mechanical as well as hand-operated power-assist mechanisms to tilt the cab forward, thereby providing engine compartment access. Designers of future bus and other motor vehicle types should be aware of engine hood configurations which may interfere with quick access to the engine and related components.

Autoignition Temperature of Fluids in the Engine Compartment

This incident illustrates the potential hazards of using a fluid with an autoignition temperature lower than the operating temperatures of engine components. Fluids essential to vehicle propulsion systems must be located in engine compartments, regardless of ignition characteristics. Those not essential, which, if they leaked would ignite under the engine compartment environment, should not be permitted in the engine compartment.

Fire Alarm System

This incident illustrates the importance of the earliest possible warning of an engine compartment fire. Delayed fire detection resulted in the failure of components which ultimately caused the complete loss of the bus. The fire was not detected early because the driver's seat was about 30 feet from the engine compartment and there was no fire alarm system.

Fire Wall

The fire wall protected the passenger compartment from the fire for 9 minutes after it was detected. The fire wall would have been more effective had it not been for the consumption of the combustible rubber ducts between the air conditioning fan housings and the fire wall vents. Regardless of vehicle type, the primary objective of a fire wall is to protect the passenger compartment from fire encroachment. Most existing vehicle types use combustible materials through and adjacent to their fire walls, which reduces their effectiveness. Examples of the use of combustible materials include heating and air conditioning ducting; rubber and plastic grommets; rubber boots for the transmission, clutch, brake, and accelerator pedal linkages; and boots for steering columns. Although it may be necessary to use some combustible materials in the accessory and control cutouts in the fire wall, a restriction should be placed on such use.

Use of Combustible Material in the Engine Compartment

The fire increased in intensity as the many combustible materials in the engine compartment were consumed. Rubber hoses, insulation material, fiberglass reinforced plastic fan shrouds, and fan belts contributed to the fire's intensity.

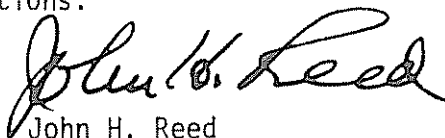
Certain parts made of combustible materials are essential to engine operation, others are not.

Because of the above-mentioned safety issues, the National Transportation Safety Board recommends that the National Highway

Traffic Safety Administration develop Federal Motor Vehicle Safety Standards:

1. To require that all trucks and buses are designed so that one person could gain access to the engine and related components within 1 minute without the assistance of power-assist mechanisms. (Recommendation H-75-40) (Class III, Longer Term Followup)
2. To prohibit the use in the engine compartment of rear-engine buses of any fluid, except for those essential to propulsion, with an autoignition temperature less than the surface temperatures of the operating engine components. (Recommendation H-75-41) (Class III, Longer Term Followup)
3. To require that all buses with propulsion engines mounted to the rear of the driver's seat be equipped with a fire alarm or automatic fire suppression system in the engine compartment. (Recommendation H-75-42) (Class III, Longer Term Followup)
4. To require that all buses be equipped with a fire wall of noncombustible material between the passenger and the engine compartments which will provide sufficient fire protection for occupants to assure their successful evacuation. (Recommendation H-75-43) (Class II, Priority Followup)
5. To limit the quantity of combustibile materials permitted in engine compartments of rear engine buses. (Recommendation H-75-44) (Class III, Longer Term Followup)

REED, Chairman, McADAMS, THAYER, BURGESS, and HALEY, Members, concurred in the above recommendations.


By: John H. Reed
Chairman

