

H-186

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: May 17, 1979

Forwarded to:

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General Services Administration
18th and F Streets, N.W.
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SAFETY RECOMMENDATION(S)

H-79-29

About 3:30 p.m. on August 22, 1978, an ambulance responding to an emergency call and traveling at a calculated speed of 90 to 95 mph failed to negotiate a curve on New Hampshire State Route 116 east of Littleton, New Hampshire, and rolled over. Two persons in the ambulance were killed and the driver was injured. 1/

The ambulance was a modified 1974 Chevrolet Suburban Custom 10, VIN CCY 164F127588, owned and operated by the Ross Ambulance Service of Littleton. The exterior modifications to the vehicle included the installation of a custom, reinforced and insulated fiberglass roof cap, extending the full width and length of the roof, to provide 54 inches of headroom in the rear compartment and the installation of a metal step installed below the bumper across the rear of the vehicle, attached to the chassis by angle iron brackets. Interior modifications included the installation of a vinyl-linoleum-covered plywood floor panel set on 2-by 4-inch wood stringers, unsecured to the vehicle's metal floor; a plywood partition with sliding plexiglass panels installed between the driver's compartment and the rear compartment, to which a rearfacing bench seat and a jump kit rack were attached; a squad bench along the right side of the rear compartment; and cabinets, to which the stretcher clamp-rail was attached, along the left side of the rear compartment. Two portable oxygen bottles were secured in the upper left corner of the rear compartment. The partition, benches, and cabinets were secured to the vehicle sidewalls by means of "L" brackets. These components rested on but were not attached to the plywood or metal floor.

1/ For more detailed information, read "Highway Accident Report--Ross Ambulance Service, Ambulance Overturn, State Route 116, Littleton, New Hampshire, August 22, 1978" (NTSB-HAR-79-4).

This vehicle model is no longer modified for ambulance use because of insufficient customer demand since the issuance of the General Services Administration (GSA) Specification KKK-A-1822 2/ which applies to modification of ambulances purchased with Federal funds. This specification requires that ambulances have a height and width greater than the ambulance involved in this accident. Since this ambulance was not purchased with Federal funds, the requirements of the specification did not apply.

A review of the Federal Motor Vehicle Safety Standards (FMVSS) revealed that there are no standards or specifications which assure that the total design and construction of ambulances as modified by the after-market installers are of sufficient structural strength and stability to withstand impact forces similar to requirements imposed on the original vehicle manufacturer. FMVSS 208, Occupant Crash Protection in Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses, applied to the 1974 Chevrolet Suburban Custom 10 Van as manufactured. However, this protection was not extended to the patient(s) or medical personnel occupying the body of the ambulance since it did not apply to the modifications made after the vehicle was sold by the manufacturer.

There are no performance requirements for the after-market modifications of vehicle structural integrity, crashworthiness, interior occupant protection, and the anchorage of items such as litters, benches, cabinets, oxygen bottles, or flooring. The only guidance concerning these safety factors provided for the after-market installers are as follows:

1. GSA Specification KKK-A-1822 dated January 2, 1974. It provides specifications for the use of new commercial vehicles modified as ambulances and purchased with Federal funds. Ambulances complying with these specifications need only meet the requirements of FMVSS 105, 106, and 116 (Brakes), be capable of a sustained speed of 70 mph, have a fuel range of at least 150 miles, and other vehicle performance characteristics.
2. Truck Body and Equipment Association, Ambulance Manufacturers Division (AMD): Standard 101, Static Load Test for Ambulance Body Structure; 003, Oxygen Tank Retention System; 004, Litter Retention System; 005, Ambulance Electrical System; and 006, Sound Level Test Code for Ambulance Patient Compartment Interiors.

2/ KKK-A-1822, January 2, 1974, Federal Specification, Ambulance approved by Federal Supply Services, General Services Administration for the use of all Federal agencies.

3. Ambulance Design Criteria, issued by the National Highway Traffic Safety Administration sets forth as a guideline the same criteria as the AMD standards.

The after-market modification of any vehicle is critical in that it can bring about a change in the handling characteristics of the vehicle. In the modification of the accident vehicle, the handling characteristics were changed by increasing the weight ratio to the rear of the center of the vehicle. The gross vehicle weight rating was 28 percent (1,530 lbs) over the original manufacturer's gross vehicle weight rating. The majority of this weight was distributed to the rear axle, resulting in a 45 to 55 percent front-to-rear distribution.

There are no standards available to guide the after-market installer to avoid these changes. The only reference to loading instructions in the GSA Specification KKK-A-1822 is the requirement that no less than 30 percent of the vehicle weight be on the front suspension. However, Janeway calls for a "combination of not less than 50 percent of the total weight on the front wheels under maximum load conditions, and independent front suspension." ^{3/} The Safety Board concludes that explicit standards applicable to after-market modification of emergency medical vehicles are needed. This is especially urgent since the after-market modifier or installer may have little or no capability to test his final product. These explicit specifications should be worded to insure the operational safety of all vehicle systems.

GSA specification KKK-A-1822 should include specifications on general body construction and ambulance body structure that insures that patients and medical technicians riding in the ambulance body have the same protection as the driver. The completed ambulance should be capable of withstanding reasonable impact forces. The current FMVSS standards are applicable only to the basic vehicle before modification, rather than to the complete after-market product.

Therefore, the National Transportation Safety Board recommends that the General Services Administration:

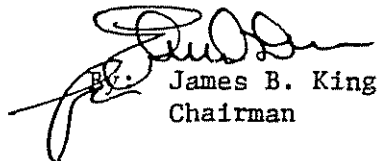
^{3/} Robert N. Janeway, "Vehicle Design Aspects of Safe Handling," Passenger Car Design and Highway Safety, Proceedings of a Conference on Research, Association for the Aid of Crippled Children and Consumer Unions of the U.S., Inc., 1961, pp. 33 and 34.

Add to the Federal Specification KKK-A-1822 of January 2, 1974, Ambulances Approved by Federal Supply Services, performance-type requirements in the following areas:

- (1) Maintenance of the manufacturer's vehicle handling characteristics during modification procedures;
- (2) loading instructions to guide users so as not to change vehicle handling characteristics;
- (3) body structural integrity;
- (4) anchorages for all equipment installed; and
- (5) occupant protection.

(Class II, Priority Action) (H-79-29)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and HOGUE, Members, concurred in this recommendation.


By: James B. King
Chairman