



U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

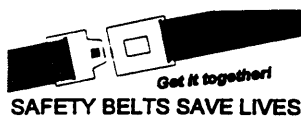
Dear Crash Data Researchers/Users:

Thank you for choosing crash data from the National Highway Traffic Safety Administration (NHTSA) for your research or other use. The information contained in this motor vehicle crash report is collected, maintained and distributed in accordance with Public Law 89-564. In accordance with this Public Law, NHTSA is required not to release any case information until completion of quality control procedures. These procedures include a review of the case material to extract all names, licenses and registration numbers, non-coded interview material, non-research related researcher comments in the margins, non-factual data, and the production number portion of the vehicle identification number (VIN).

If you requested NHTSA to query its database files in order to identify a specific crash, then that query was made using non-personal descriptors you provided for use in our search. This motor vehicle crash may have been identified from a data search and matches the general, non-personal descriptors you provided, but we cannot confirm that this is the specific crash report you requested.

If you have any questions with regard to the above procedures, please contact the Field Operations Branch, Crash Investigation Division, National Center for Statistics and Analysis at 202-366-4820. Again, please be advised that we cannot confirm that this is the case that you have specifically requested nor can we certify the information to be correct.

*** *** ***



AUTO SAFETY HOTLINE
(800) 424-9393
Wash. D.C. Area 366-0123

NCSA

**TRANSPORTATION SCIENCES CENTER
ACCIDENT RESEARCH GROUP**

Division of Calspan Corporation
Buffalo, NY 14225

**CALSPAN ON-SITE SCHOOL BUS/PEDESTRIAN ACCIDENT INVESTIGATION
CALSPAN CASE NO. 95-7
SCHOOL BUS: 1989 FORD CHASSIS/THOMAS BUILT BODY
LOCATION:
DATE: 1994**

Contract No. DTNH22-94-D-07058

Prepared for:

U.S. Department of Transportation
National Highway Traffic Safety Administration
Washington, D.C. 20590

DISCLAIMER

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no responsibility for the contents or use thereof.

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the National Highway Traffic Safety Administration.

The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points are coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

CALSPAN ON-SITE SCHOOL BUS/PEDESTRIAN ACCIDENT INVESTIGATION

CALSPAN CASE NO. 95-7

SCHOOL BUS: 1989 FORD CHASSIS/THOMAS BUILT BUS BODY

LOCATION:

DATE: 1994

SUMMARY

This on-site investigation focused on a school bus/pedestrian accident that occurred as a result of the pedestrian's coat drawstring becoming snagged in the downstream end of the handrail on the bus. The driver failed to detect the 9 year old pedestrian and accelerated from the bus stop. The pedestrian was dragged a short distance by the bus as the drawstring remained snagged in the rail. The string subsequently tore and the pedestrian was struck by the right rear tire of the Type C school bus. She sustained a fracture of the right humerus and a dislocation of the right clavicle. The bus driver was alerted to the accident by students on board the bus. Calspan was notified of this accident on 1995, and inspected the involved school bus on 1995.

The involved school bus was a Type C 1989 Ford B700 conventional chassis with a Thomas Built 65 passenger body. The bus was assembled in 1989 and was identified by vehicle identification number (VIN): 1FDXB70H. The Thomas school bus body identification number was . This school bus, and the entire fleet in the School District, were powered by compressed natural gas (CNG) which operated on a maximum service pressure of 3000 psi. Power was transmitted through a four-speed automatic transmission with a steering column mounted transmission selector lever.

The bus was equipped with a manually operated bi-fold door that opened inward toward the forward side of the stairwell. The control lever handle for the door was conventionally located at the center instrument area. There were four steps within the stairwell. Located at the trailing side of the stairwell was a 1" diameter stainless steel handrail. The handrail was formed with a radius at the upper end and protruded 4.75" outward of the padded attachment point. The handrail extended 42" downward to a formed angle of approximately 32 degrees, then continued 4.25" to the attachment point with the stairwell wall. The lower end of the handrail was mounted approximately 9.0" inboard of the door opening.

The Transportation Supervisor for the School District had received the recall notification for the handrail modifications for the Thomas Built bus bodies. He ordered the appropriate rubber bushings and directed his chief mechanic to install the units on all 34 buses in the fleet. The mechanic modified 33 of the buses and failed to check to ensure that all buses were retrofitted with the bushing. One of the buses was not modified with the handrail bushing, Bus No. the Type C bus involved in this accident.

The exterior mirrors consisted of a "banana type" deep convex mirror that measured 12.0" in width, 6.25" in height, and 3" in depth (convex curvature) mounted to the corners of the engine cowl. These mirrors provided the driver with a view across the front of the bus and a view along the side of the vehicle. Rectangular plane (flat) mirrors were mounted to the A-pillars of the bus which provided the driver with vision along the sides of the bus. The right convex mirror provided the driver with a clear view of the egress area adjacent to the right door.

The school bus driver was a 63 year old female with a reported height of 63" and weight of 110 lbs. She had approximately 26 years of school bus driving experience and had been with the School District as a permanent driver for the past 15 years. She had completed the required driver training programs and held a valid CDL license with a restriction for corrective lenses.

The accident occurred on a local residential street in _____ on _____ 1994, during afternoon daylight hours. The driver stopped at the designated bus stop and discharged the 9 year old pedestrian and her older sister at the mouth of the driveway for their residence. The older sister exited the bus followed by the involved pedestrian. The right drawstring of the pedestrian's jacket became snagged in the lower end of the handrail as the pedestrian exited the bus. The driver failed to detect the drawstring and did not allow the pedestrian sufficient time to clear the bus. She immediately closed the manually operated bi-fold door and began to accelerate from the stop. The pedestrian was probably rotated in a clockwise direction as the bus began to move forward. She was either knocked to the road surface by the right side of the bus, or was pulled down by the drawstring and dragged approximately 20'. The drawstring broke and the pedestrian was contacted by the sidewall of the right rear bus tire.

Students on board the bus in the third row of seats observed the pedestrian and notified the driver of the accident. She immediately checked the right convex mirror and stopped the bus. The driver observed the pedestrian walking up her driveway with her mother assisting her. The driver backed the school bus to the driveway and exited the bus to check the condition of the pedestrian. The pedestrian complained of pain in the right arm and had a visible abrasion on the mid upper arm. The driver offered to call over the two-way radio for an ambulance, however, the mother of the pedestrian declined and advised the driver that she would call for medical assistance. The driver returned to the bus and completed the run, discharging the remaining 45 students on board the bus.

The driver returned to the school and notified the bus garage of the accident. The pedestrian was subsequently transported by ambulance to a local hospital where she was diagnosed with a fractured right humerus and a dislocation of the right clavicle (AIS-2). The lack of a crushing injury suggests that the pedestrian was not run over by the tire of the bus, but struck by the side wall or leading edge of the tread which could have deflected the arm away from the tire.

The driver was charged with a leaving the scene of an injury accident violation, however, the charge was reduced to an improper start which she plead guilty and was fined \$100.00. She remains as an active bus driver for the _____ School District.

The drawstring was not examined during this on-site investigation. The Sergeant from the Ohio Highway Patrol who supervised the police investigation stated that the drawstring had a plastic tear drop-shaped tab at the end and that the string had torn at a point 32" above the end tab. He further stated the pedestrian reported to her parents that this event was the third occurrence in which the same jacket drawstring had become snagged in the same school bus with the involved driver. The previous events were detected prior to the acceleration of the bus, therefore no accident occurred. These prior events were not reported to the Transportation Supervisor. The rubber hand rail bushing had been installed in the bus following this accident, and several months prior to Calspan's notification of the event.

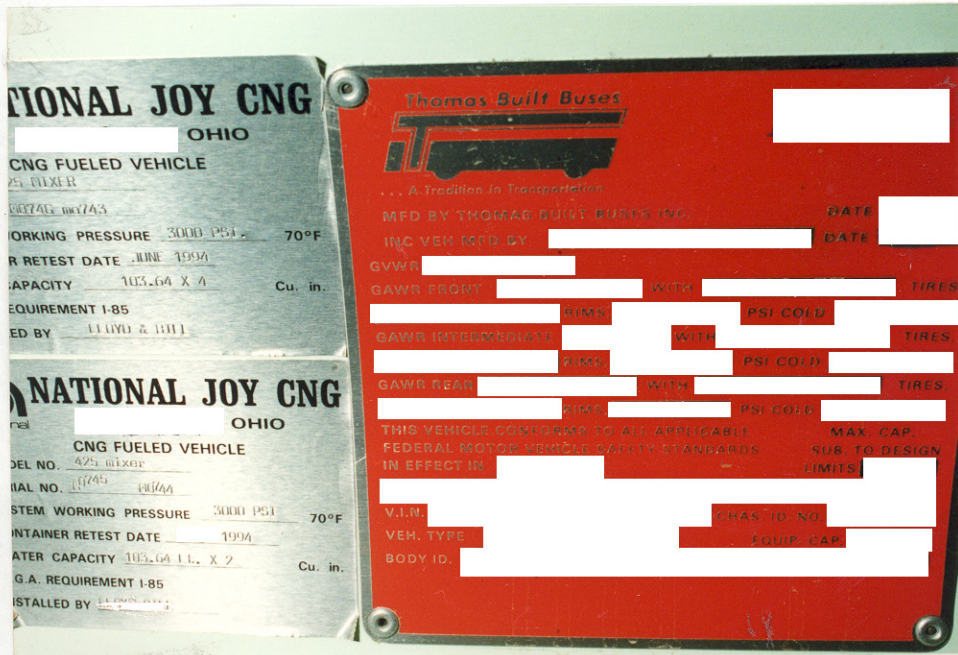
Causal Factors

The primary causal factors for this school bus/pedestrian accident was the design of the handrail which permitted objects such as the drawstring to become caught during egress from the bus. In addition, the bus mechanic failed to ensure that all buses were modified with the retrofitted rubber bushing that was identified in the recall notice dated 1993. Driver error was also a major factor in this accident since she failed to provide the pedestrian with sufficient time to safely clear the bus prior to accelerating from the stop. The driver also failed to visually track the child and check the rear view mirrors to ensure that it was safe to depart the bus stop.

Preliminary Photographs
 Calspan Case No. 95-7
 OH



1. Frontal view of the involved Type C Ford/Thomas Built Body school bus.



2. Identification label affixed to left front ceiling of bus.



3. Door, stairwell area of the involved bus.



4. Interior view of the stairwell and post-accident modified handrail.



5. & 6. Post-accident retrofitted rubber bushing at the lower attachment of the handrail.



7. Interior view of the post-accident modified handrail.



8. Handrail, door jamb, and the side surface of the involved school bus.



9. Sidewall and tread of the right rear tire.