School Bus Crash Investigation
Dynamic Science, Inc.
Case 99009
Contract DTNH22-94-D27058
Task 131
Alabama
June, 1999

This research was supported by the National Highway Traffic Safety Administration (NHTSA), U.S. Department of Transportation. The opinions, findings, and recommendations contained herein are those of the authors, and do not necessarily represent those of NHTSA.

The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points be 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.

TABLE OF CONTENTS

Background

This two-vehicle collision involved a 1994 Bluebird School Bus and a 1995 Toyota Camry. This collision was selected for additional follow-up study, due to the damage of the involved school bus. A remote-style investigation was conducted during which information was sought from the investigating police jurisdiction, and the bus owners (the school district). Although information was promised by the school district, it was never received. This report is based solely on the police report and an examination of an exemplar vehicle. The date of the collision was mid September 1997 at 0700 hours. The weather was clear and the roadway was dry.

Summary

Vehicle 1, a 1994 Bluebird School Bus, was traveling south on a two-lane undivided asphalt paved roadway. The posted speed limit is 56 Km/h (35 MPH) and the roadway was dry and free of defects. Vehicle 2, a 1995 Toyota Camry, was traveling south on the same roadway. Vehicle 1 was being driven by a 63 year old male driver who was restrained by a 3-point manual lap and shoulder restraint. Vehicle 2 was being driven by a 72 year old female driver who was restrained by the available manual 3-point lap and shoulder restraint and the deployment of the Supplemental Restraint System (driver's frontal air bag).

While traveling south on the two-lane roadway Vehicle 1 had come to a complete stop because of traffic in his lane. Vehicle 2 approaching from the rear of Vehicle 1 and cresting a small hill, did not notice that Vehicle 1 was at a complete stop. Vehicle 2's left frontal plane impacted the right rear plane of Vehicle 1. After the initial impact, Vehicle 2 veered to the right and off the road edge to the west and came to final rest off of the roadway.

An exemplar school bus was photographed and measured. The seats were of the high back design 67 cm (26.4 in.) above the seat cushion and at an 80.5 degree angle. The leading edge of the seat cushion was 40 cm. (15.7 in.) above the floor while the rear edge was 40 cm. (15.7 in.) above the floor. The angle of the seat cushion was 2.0 degrees while applying pressure to the measuring device. The lateral dimension of the seat cushion was 99 cm. (39 in.) on the left side, and 99 cm (39 in.) on the right. The seat cushion width was 39 cm (15.4 in.). The distance between the seat back to seat back cushion was 58 cm (22.8 in.). The aisle width measured 31 cm (12.2 in.)

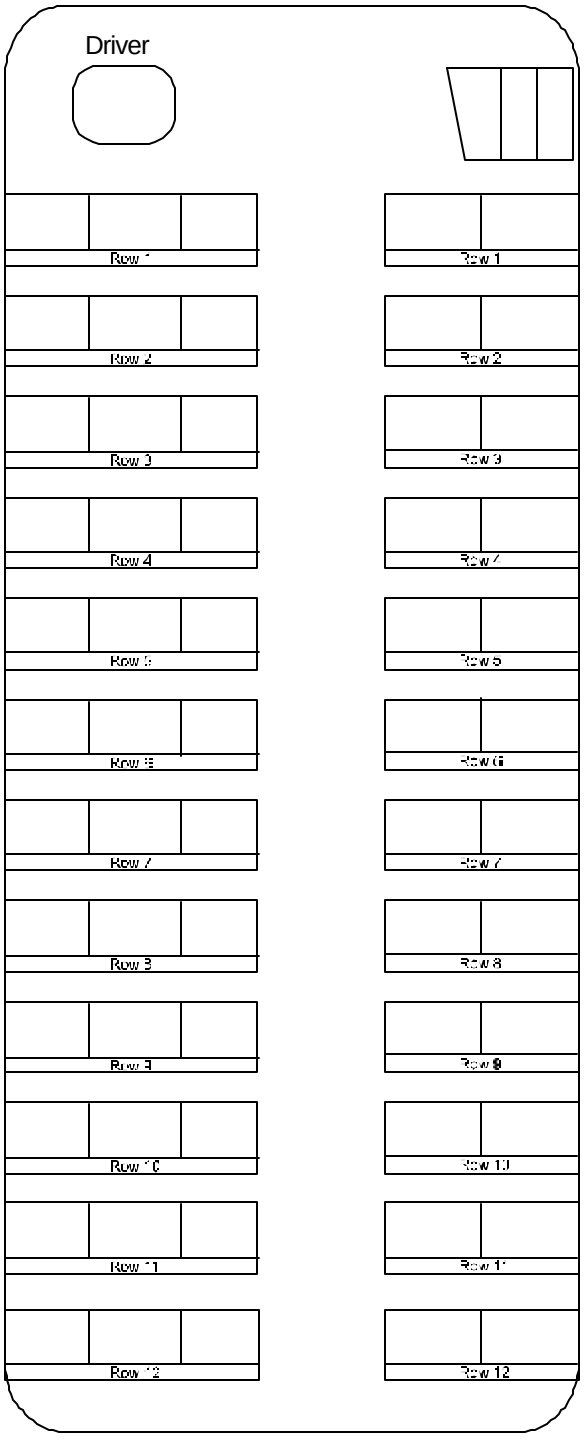
Vehicle 1 was not equipped with any safety restraints in the passengers' area. As noted above the driver's position is equipped with a manual 3-point lap and shoulder restraint.

Vehicle 1 was carrying 28 students at the time of the collision. The age and seating positions are unknown.

The police report reflects that a 15 year old female passenger was taken in a private vehicle to a nearby regional hospital. The report reflects that the 15 year old female suffered a visible type injury of unknown severity. There were no other reported injuries for either vehicle.

Damage to Vehicle 1 included the rear bumper and body panels in that area. The cost of repair is unknown. Vehicle 2 had damage to the front bumper, hood, grill and left front fender.

Neither vehicle was required to be towed because of their damages.



15 year old student injured in unknown seating position