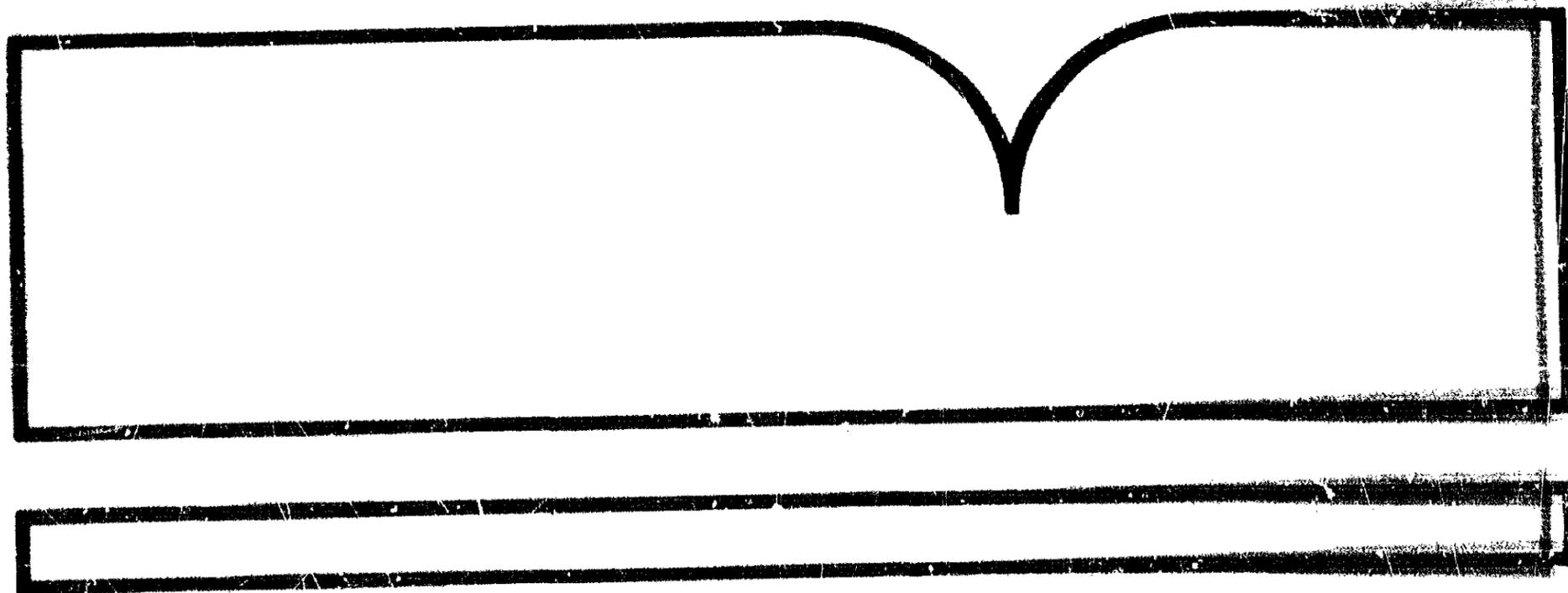


PB87-916210

Highway Accident/Incident Summary Report  
Alexandria, Virginia, April 4, 1987

(U.S.) National Transportation Safety Board  
Washington, DC

30 Dec 87



U.S. Department of Commerce  
National Technical Information Service

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**National  
Transportation  
Safety Board**

Washington, D.C. 20594

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## **HIGHWAY ACCIDENT/INCIDENT SUMMARY**

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Accident No.:	DCA-87-MH-004
Location:	Alexandria, Virginia
Date:	April 4, 1987
Time:	7:15 p.m. e.s.t.
Occupants:	1 driver, 65 passengers
Operator:	Spirit of '76 Tours
Damage:	Approximately \$25,000
Injuries:	1 fatal; 32 nonfatal
Type of Accident:	Collision with arched stone overpass

### The Accident

On April 4, 1987, a 70-passenger double-decked sightseeing bus carrying a driver and 65 passengers en route to Mount Vernon, Virginia, was traveling southbound in the right lane of the Mount Vernon Memorial Highway portion of the George Washington Memorial Parkway, a four-lane highway approximately 3 1/2 miles south of Alexandria, Virginia. There were 24 persons on the main level, 34 persons on the upper level, 1 person on the stairs, and 6 persons whose locations could not be determined. About 7:15 p.m. e.s.t., the top of the bus struck the Alexandria Avenue arched stone overpass. The bus was estimated to have been traveling between 22 and 42 mph. As a result of the impact, the bus roof was sheared off rearward, exposing the upper seating level. The bus remained upright and there was no fire. There were no other vehicles involved in the accident. According to the busdriver, it was dark and the weather was "misty." At National Airport, approximately 7 miles north of the accident site, the temperature at 6:53 p.m. e.s.t. was 44° F, the dew point was 34° F, and the wind was from the southwest at 12 knots, no rain was reported, and the visibility was 12 miles. Twenty-eight minutes after the accident, light rain showers with a visibility of 10 statute miles were reported at National Airport.

A nearby resident, who was in his backyard, observed the bus traveling southbound in the right lane of the parkway, heard the crash, and had his wife report the accident to the U.S. Park Police. Several other residents reported the accident to the Fairfax County Fire and Rescue Department at approximately 7:23 p.m. On arrival at the scene, rescuers immediately started triage, and the incident commander established a command post.

Thirty-three passengers were transported to four area hospitals: Alexandria, Mount Vernon, Fairfax, and the Washington D.C. Hospital Center. Twenty-five passengers with minor injuries were treated and released; 8 sustained minor to critical injuries and were hospitalized. The busdriver exhibited symptoms of shock, was transported by ambulance to Alexandria Hospital, and was admitted for observation. Four passengers were transported by helicopter to Fairfax Hospital and the Washington Hospital Center. One passenger died approximately 10 hours after the accident from injuries sustained in the accident. All but one of the injured persons were on the upper level of the bus, and most of the severely injured were located toward the rear of the upper level. The injured passenger on the main level and located in the last row of seats in the bus sustained a minor injury. (See table 1 for injury severity.) There were no persons pinned or trapped in the bus wreckage. (See appendix A for the bus seating chart.)

Table 1. Injury severity

<u>Injuries</u>	<u>Bus Occupants</u>	<u>Total</u>
Critical (AIS-5)	1	1
Moderate (AIS-2)	4	4
Minor (AIS-1)	28	28
None (AIS-0)	33	33
Total	66	66

Injury classifications are based on the American Association for Automotive Medicine's Abbreviated Injury Scale (AIS) codes.

### Highway Information

The George Washington Memorial Parkway is one of 6 parkways and 337 park areas operated and maintained by the National Park Service (NPS) throughout the United States. Originally constructed as the first Federal parkway between 1927 and 1932 to provide a scenic vehicular approach to the Mount Vernon Estate, the Mount Vernon Memorial Highway retains most of its original design elements and continues to achieve its original legislative purpose. The Alexandria Avenue Bridge, except for newly-added retaining walls, also retains its original design elements. Listed on the National Register of Historic Places, the Mount Vernon Memorial Highway is managed as a nationally significant historical parkway. In addition to visitors to Mount Vernon and other recreation visitors, the Mount Vernon Memorial Highway serves as a major commuter route for the residents living in the Mount Vernon area.

At the accident site, the concrete-surfaced parkway is an undivided, four-lane roadway, 40 feet wide with 9-foot-wide left lanes and 11-foot-wide right lanes. The overpass was not illuminated nor was it marked with reflectorized delineators to assist in identifying the size and shape of the underpass. Due to the arched configuration of the stone overpass, the outside lanes have less clearance because the arch tapers from approximately 14 feet 6 inches at the center line to 10 feet 2 inches at the edge of the roadway. (See appendix B, figure 3.) The 13-foot 2-inch bus went under the bridge in the right lane. (See appendix C for a diagram of the arched stone overpass and tour bus collision point.) There were no tire marks on the approach to the overpass. Postimpact tire marks, 34 feet long, began 15 feet past the southern exit of the overpass. The tire marks indicated that the busdriver applied the service brakes after the bus exited the overpass. The bus came to rest 200 feet south of the overpass.

The parkway has a posted speed limit of 45 mph. On the southbound side of the parkway at the time of the accident there was a reflectorized 18- by 24-inch "Low Clearance" sign posted about 345 feet before the overpass. (See appendix B, figure 1.) An identical sign was posted on the northbound side of the parkway. Visibility with respect to the sign in the southbound direction was partially obscured by low hanging branches. A turn-around road for vehicles unable to clear the underpass is located near each "Low Clearance" sign.

NPS regulations prohibit trucks from using the parkway. Despite the prohibition, some trucks have used the parkway and, according to the NPS superintendent and U.S. Park Police have struck the underside of the arched overpass. In response to this problem, the NPS superintendent on December 18, 1986, requested that height-clearance signs conforming with the W12-2 specifications of the "Manual on Uniform Traffic

Control Devices" (MUTCD) 1/ be acquired and installed in advance of and over each lane at the overpass. (See appendix D.) The design and ordering of the signs was in the NPS procurement process when the accident occurred. As an interim measure, the NPS installed temporary "Low Clearance" signs in advance of both approaches to the overpass on December 19, 1986. These signs, however, were not in conformance with the MUTCD.

On April 10, 1987, 6 days after the accident, the NPS replaced the temporary advance warning signs on the approaches to the overpass with signs that meet the MUTCD W12-2 specifications. The W12-2 warning signs were installed in advance of and on the overpass over each of the northbound and southbound lanes. The sign over the left southbound lane indicates a 13-foot 4-inch clearance and the sign over the right southbound lane indicates a 10-foot 2-inch clearance. (See appendix C, figures 2 and 3.) The signs are positioned so that vehicles with dimensions in excess of those posted clearances can take alternate routes.

The "Park Road Standards" 2/ state that for new bridges, the vertical clearance at underpasses should be at least 14 feet above the entire roadway width. This is consistent with the American Association of State Highway and Transportation Officials (AASHTO) bridge standards which are the Federal standards for bridge and road specifications. This overpass was built before the adoption of these standards by the NPS.

The accident site was located in an area without any ambient lighting which may have prevented the busdriver from identifying the arched stone overpass. The dark, grey color of the stones in the overpass helped it to blend into the darkness of the night. The overpass was not illuminated nor were there any reflective devices on the structure. The busdriver stated that he failed to see the overpass in time to move his bus to the left lane where there was sufficient clearance. The busdriver had made this trip in this bus 20 to 30 times and should have recognized the previous intersection of Morningside Drive as a clue that he was getting close to the overpass. However, he had not previously driven the route at night.

According to the Federal Highway Administration (FHWA), there are 79 NPS structures in the NPS eastern region that have clearances less than 14 feet. 3/ The Safety Board is aware that generally the NPS does not allow commercial vehicles on park roads. In this case, the carrier was permitted by the NPS to operate on the George Washington Memorial Parkway. The Safety Board believes that it is important to evaluate the structures in the National Park System open to public travel to provide sufficient and appropriate warnings to prevent similar accidents. If high-clearance vehicles are going to be permitted to use park roads, the low-clearance structures should be appropriately signed.

#### Bus Information

The carrier, Spirit of '76 Tours, Inc., started business in 1975 and was authorized by the Interstate Commerce Commission to conduct operations in 48 states. At the time of

1/ The MUTCD contains standards and specifications for the design, usage, and placement of traffic control devices on roadways, streets, and highways. It is promulgated by the Federal Highway Administration (FHWA) and is for use on all public streets and highways regardless of which agency has jurisdiction.

2/ The 1984 "Park Road Standards" were developed by an NPS Road Standards Task Force in conjunction with the FHWA. These standards replace those that were issued in 1968. NPS compliance with standard signing and marking as contained in the MUTCD is referenced on page 36 of the 1984 "Park Road Standards."

3/ FHWA letter of July 18, 1987, to the Safety Board.

the accident, the bus was operated under local authority granted by the Washington Metropolitan Area Transit Commission which includes the District of Columbia, Maryland, and Virginia. The carrier was permitted by the NPS to operate the bus on the George Washington Memorial Parkway.

The bus was a British 1964 Bristol "LODEKKA" Model FLF right-hand drive (separate driver's compartment) double-decked sightseeing tour bus. (See appendix B, figure 4.) It had five forward speeds and was designed to transport 70 passengers--38 on the upper level and 32 on the lower level. The exits consisted of a main entry which was a four-panel folding door on the forward left side, a floor-level emergency exit door in the rear on the main level, and an emergency exit window above the last seat across the rear of the upper level. The bus height was 13 feet 2 inches, the length was 30 feet, the wheelbase was 19 feet 2 inches, and the width was 7 feet 11 1/2 inches. There was no placard indicating vehicle-height clearance in the driver's compartment. Safety Board investigators inspected the bus on April 8, 1987, at the U.S. Park Police Station, Anacostia, Washington, D.C.

Because these buses may be above the recommended minimum height clearances for low-clearance bridges and other structures, it is important that busdrivers are aware of their vehicle's height limitations. According to the AASHTO:

Where a depressed facility is a parkway with traffic restricted to passenger vehicles, the vertical clearance at structures desirably should be 15 feet and in no case less than 12.5 feet. The minimum clearance should be obtained within all portions of the roadway.

Since these vehicles may be driven in this environment, the Safety Board believes that double-decked buses should have a placard or decal indicating vehicle height in the driver's compartment for quick reference. This will ensure that busdrivers will take appropriate action when they come to a low-clearance structure.

The damage to the right front of the upper level extended downward vertically 26 inches. At the center line of the upper level, the damage extended downward 18 inches. At the front of the bus, the roof was compressed 34 inches rearward, and the entire roof was sheared at the upper deck window belt line. No other damage was noted on the bus. The inspection did not reveal any preexisting mechanical conditions that may have contributed to the accident.

The busdriver stated that he had previously downshifted to the fourth gear to go up a slight incline toward the accident site and that he was traveling about 15 mph. According to the carrier, the top speed of the bus in third gear was approximately 22 mph and the speed range in the fourth gear was 22 to 42 mph. The busdriver, therefore, could have been traveling between 22 and 42 mph at the time of the accident.

#### Driver Information

The 29-year-old busdriver lived in Washington, D.C., and was employed by the carrier as a full-time busdriver between April and August 1985 and then as a part-time busdriver (evenings and weekends) until the accident. He worked for the carrier approximately 10 to 26 hours each week while employed as a full-time maintenance worker for a company in Fairfax, Virginia. The busdriver had worked previously in various positions for car rental agencies, and in March 1985, he was hired by Tourmobile Sightseeing as a tour vehicle driver (low-speed tour tram) in the Washington, D.C., area before he was employed by the carrier. The busdriver indicated that he was in good health with no significant chronic or acute illnesses or ailments.

The busdriver applied for a busdriver position with the carrier on April 15, 1985, and was accepted for employment. He received training in the operation of the company's British double-decked, right-hand drive buses on a local parking lot approximately 4 hours each day for approximately 2 weeks for a total of 40 hours. He then advanced to supervised on-the-road driving. The busdriver was provided with routing instructions and cautions (i.e., clearance limitations) without benefit of on-route familiarization training, including the route to Mount Vernon, Virginia, via the George Washington Memorial Parkway.

The busdriver completed the carrier's employment application on April 15, 1985, indicating that he had resided for 8 years in Washington, D.C. At the time of employment, he should have obtained a Washington, D.C., driver's license with a 31C endorsement that is required for a person driving for-hire commercial vehicles registered in Washington, D.C. Instead, the busdriver had a driver's license issued by Virginia. This license was not endorsed to permit the busdriver to operate for-hire vehicles, nor was it endorsed to permit him to operate a passenger-carrying bus with more than 32 passenger seats. Consequently, he was not properly licensed to operate a for-hire bus either in Virginia or Washington, D.C. He did not complete the section of the application that asked for a driver license history including denials, suspensions, and revocations.

On December 22, 1986, the carrier requested a driver's license record check from the Washington, D.C., Department of Motor Vehicles. The response dated February 12, 1987, indicated that there was no record of the busdriver having been licensed or having any citations in Washington, D.C. In Maryland and North Carolina, however, the busdriver was under suspension. Maryland suspended his driving privilege in 1978 because he failed to appear to answer charges of speeding and improper vehicle registration. There was one of each of these violations on the Maryland record. Maryland notified North Carolina (the busdriver's State of residence at the time of the violations) of the suspensions, and North Carolina, under a reciprocal agreement with Maryland, suspended his license. In 1984, the busdriver satisfied the criterion for the Maryland registration violation, but the speeding violation suspension remained on the record at the time of the accident. Thus, the busdriver's privilege to operate a motor vehicle was suspended in Maryland and North Carolina at the time of the accident.

The Safety Board contacted the National Driver Register (NDR) concerning the busdriver, and the NDR had no record of these suspensions. The Safety Board was not able to determine why the busdriver's license suspensions were not listed in the NDR.

The Safety Board has long been concerned about the effectiveness of the NDR to identify problem drivers. The NDR data base is comprised of only driver license suspensions, revocations, and conviction information that is voluntarily provided by the States. Because the timely submission of data is limited and varies from State to State, the NDR has never reflected complete and accurate driver licensing information.

In October 1986, the Commercial Motor Vehicle Safety Act of 1986 (Public Law 99-570) became law. The act requires the Federal and State governments to establish and maintain a program that identifies and tracks commercial motor vehicle drivers and their records. The Safety Board believes that when the system becomes fully operational it will yield substantial safety benefits. Briefly, the act:

- o prohibits commercial drivers from holding more than one license;
- o prohibits employers from allowing employees to operate commercial vehicles with suspended or revoked licenses;

- o requires that all commercial drivers be tested under minimum testing standards developed by the U.S. Department of Transportation (DOT):
- o requires that the DOT establish minimum uniform standards by which the States issue licenses; and
- o requires creation of a license information system that will serve as a clearinghouse of information on the licensing of commercial drivers.

The Safety Board believes that the act, if properly implemented, will be a useful tool that will permit the States and motor carriers to obtain information about driving records and accidents quickly and accurately to ensure that commercial vehicle driver licenses are only issued to those with clear records.

According to Federal Motor Carrier Safety Regulation (FMCSR) (49 CFR 391.15(b)), the loss of driving privileges would normally disqualify the busdriver from driving in interstate commerce. (See appendix E.) However, the busdriver was driving in a commercial zone and was exempt from meeting most of the FMCSRs, including the driver qualifications listed in Part 391. The FMCSRs in effect for a commercial zone pertain to accident reporting requirements, hours of service, and certain requirements covering hazardous materials. The busdriver's qualification file contained the Virginia and Washington, D.C., records, but did not contain records from Maryland and North Carolina.

As a result of its investigation of qualifications of drivers of heavy trucks, <sup>4/</sup> the Safety Board issued a safety recommendation to the FHWA:

H-86-30

Eliminate the exemption from Part 391 of the Federal Motor Carrier Safety Regulations granted to commercial drivers who work exclusively within a single city or commercial zone.

On July 13, 1987, the FHWA issued a notice of proposed rulemaking that would eliminate the regulation exempting interstate commerce drivers and motor carriers who operate solely within commercial zones from meeting applicable FMCSRs. The proposed rule would go into effect on January 1, 1988, and would "grandfather" certain drivers operating exclusively in commercial zones for a 2-year period when employed by a particular carrier as of January 1, 1988, and when not operating a vehicle placarded for transporting hazardous materials.

If the proposed NPRM is adopted, vehicles operated in interstate commerce within commercial zones would be required to comply with FMCSRs, such as inspection requirements, equipment standards, repair and maintenance regulations or compatible State standards, and applicable driver qualification regulations.

Medical and Pathological Information

After the accident, the busdriver was transported to the hospital by ambulance accompanied by a U.S. Park Police officer. The busdriver voluntarily provided a specimen of blood to the police officer for toxicological analysis. This sample was collected 1 hour 15 minutes after the accident. In addition, the hospital, at various times during the course of treatment of the busdriver, obtained blood and urine specimens for analysis.

<sup>4/</sup> Safety Study—"Training, Licensing, and Qualification Standards for Drivers of Heavy Trucks," April 17, 1986 (NTSB/SS-86/02).

The U.S. Park Police provided a portion of the blood specimen to Safety Board investigators for independent analysis. The portion of the sample retained by the police was analyzed and did not indicate presence of alcohol or other drugs. The portion of the blood sample examined for the Safety Board, using a more sophisticated analytic technique, was found to contain a high concentration of benzoylecognine (0.78 microg/ml) and diazepam (of undetermined concentration). The hospital reported the presence of a metabolite of marijuana (28 ng/ml) in the urine.

Cocaine was the source of the benzoylecognine in the driver's blood. <sup>5/</sup> Based on the pharmacokinetics of cocaine, it is estimated that the driver used cocaine within a 2- to 3-hour period before the accident. Furthermore, the dose he used was large enough to indicate that he was more than an occasional user. The presence of diazepam (Valium) <sup>6/</sup> and the absence of its metabolite indicates recent use of valium, 2 or 3 hours before the sample was taken. However, without blood concentrations the Safety Board cannot make any conclusions about his use of this drug. Only urine concentrations are available on the third drug, marijuana. Consequently, little can be concluded about the significance of this drug except it had been used.

The evidence shows that three drugs have been used and that two of these drugs (cocaine and diazepam) appear to have been used quite recently. Cocaine is a central nervous system (CNS) stimulant and diazepam is a CNS depressant. The effects of this combination of drugs on performance is unknown, although there is a high probability that a combination of a euphoric high from cocaine and reduced mental alertness from the use of diazepam will result in impairment. The third drug, marijuana, is a hallucinogen and since only urine concentrations of the principal metabolite were determined, the time of use cannot be estimated. Based on the urine concentration, this drug could have been used a few hours or a few weeks before the accident depending on the driver's pattern of use (infrequent or frequent) of this hallucinogen. Based on the toxicological information, the Safety Board suspects the driver's performance and judgment may have been impaired at the time of the accident due to the use of one or more of these drugs.

The carrier reported having a policy since 1975 of terminating employees if they are found using alcohol or drugs on the job and off the job if driving a motor vehicle is involved. Since 1980, the carrier reported dismissing five employees who either drank alcohol on the job, had an accident, or were suspended for driving while intoxicated in their personal vehicles.

The Safety Board is concerned at the incidence of alcohol and other drug involvement in commercial vehicle accidents. The 99th Congress also expressed its concern when it enacted P.L. 99-570, "Commercial Motor Vehicle Safety Act of 1986." This legislation contained a provision that specified a 1 year disqualification if a truckdriver is convicted of operating a commercial vehicle while the driver is under the influence of alcohol or a controlled substance. A lifetime suspension is provided for the second offense. Incentives are provided in the law for States to enact similar legislation.

<sup>5/</sup> Cocaine is a psychoactive stimulant and local anesthetic.

<sup>6/</sup> Hospital records reflected the administration of valium to the driver during his treatment, but this occurred after the blood specimen was collected by the police, and therefore, could not have affected the analysis of the blood specimen. Valium is an anti-anxiety agent that may reduce mental alertness.

The Safety Board has investigated at least two commercial vehicle accidents in which alcohol or drug abuse by the driver has been a cause or contributing factor. An accident on November 11, 1985, in St. Louis County, Missouri, involved a schoolbus owned by a private company providing contract services to the Missouri Department of Elementary and Secondary Education. 7/

The alcohol-impaired school busdriver lost control of the vehicle and collided with a guard rail and sign pillar. As a result of this accident, two students were killed and the school busdriver and 11 students received serious to moderate injuries. Another accident involving an alcohol-impaired driver occurred on December 2, 1982, in Los Banos, California, when a tractor-trailer truck struck a utility pole, overturned, and scattered 18 surface-to-air missiles along the roadway. The truckdriver had been drinking and fell asleep while he was driving the truck.

On October, 1, 1987, the Safety Board started a special investigation in which truck accidents fatal to the truckdriver will be studied in eight States for 12 months. Approximately 240 accidents in California, Colorado, Georgia, Maryland, Wisconsin, New Jersey, North Carolina, and Tennessee will be investigated. Trucks weighing over 10,000 pounds gross vehicle weight will be included in the study. The focus of the investigations will be factors related to alcohol or drug use by the driver, the relationship of stressful working conditions to accident causation, and the motor carriers and their responsibilities to ensure safe operations. The truckdriver's history and the circumstances of the accident will be thoroughly documented. The results of the study will be used as a basis for safety recommendations.

#### Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the busdriver to anticipate and to recognize his approach to the low clearance overpass and move the bus into the left lane in time to allow it to clear the overpass. Contributing to the accident was the lack of appropriate advance warning of the low clearance, the inadequate delineation of the overpass by means of artificial illumination or reflective signing, and the driver's recent use of illicit drugs.

Therefore, the National Transportation Safety Board made the following recommendations:

--to the National Park Service:

Inform all park superintendents of the facts, conditions, and circumstances of this accident. Identify any low-clearance structures over roadways in the National Park System. Determine the extent and severity of any low-clearance problems in relation to the vehicles that use the park roads and provide information to roadway users about the low-clearance problems. (Class II, Priority Action) (H-87-58)

7/ Highway Accident Report—"Schoolbus Loss of Control and Collision with Sign Pillar, U.S. Highway 70 near Lucas and Hunt Road, St. Louis, Missouri, November 11, 1985" (NTSB/HAR-87/02).

In cooperation with the Federal Highway Administration, identify and implement appropriate countermeasures for low-clearance structures over all park roadways including, but not limited to, roadway and low-structure signing, lighting, or the prohibition of vehicles on the roadway that cannot clear the lowest clearance structures. (Class III, Longer Term Action) (H-87-59)

—to Webb Tours, Inc.:

Revise its hiring practices to ensure that applicant busdrivers are properly licensed and certificated to operate buses in conformance with the rules and regulations of the jurisdiction in which it operates. (Class II, Priority Action) (H-87-60)

—to the American Bus Association and the United Bus Owner's of America:

Inform members of the facts, conditions, and circumstances of the accident. (Class II, Priority Action) (H-87-61)

Recommend that members apply a placard or decal indicating vehicle height to the interior of double-decked buses for the driver's quick reference. (Class II, Priority Action) (H-87-62)

**BY THE NATIONAL TRANSPORTATION SAFETY BOARD**

/s/ JIM BURNETT  
Chairman

/s/ JOHN K. LAUBER  
Member

/s/ JOSEPH T. NALL  
Member

/s/ JAMES L. KOLSTAD  
Member

PATRICIA A. GOLDMAN, Vice Chairman, did not participate.

December 8, 1987

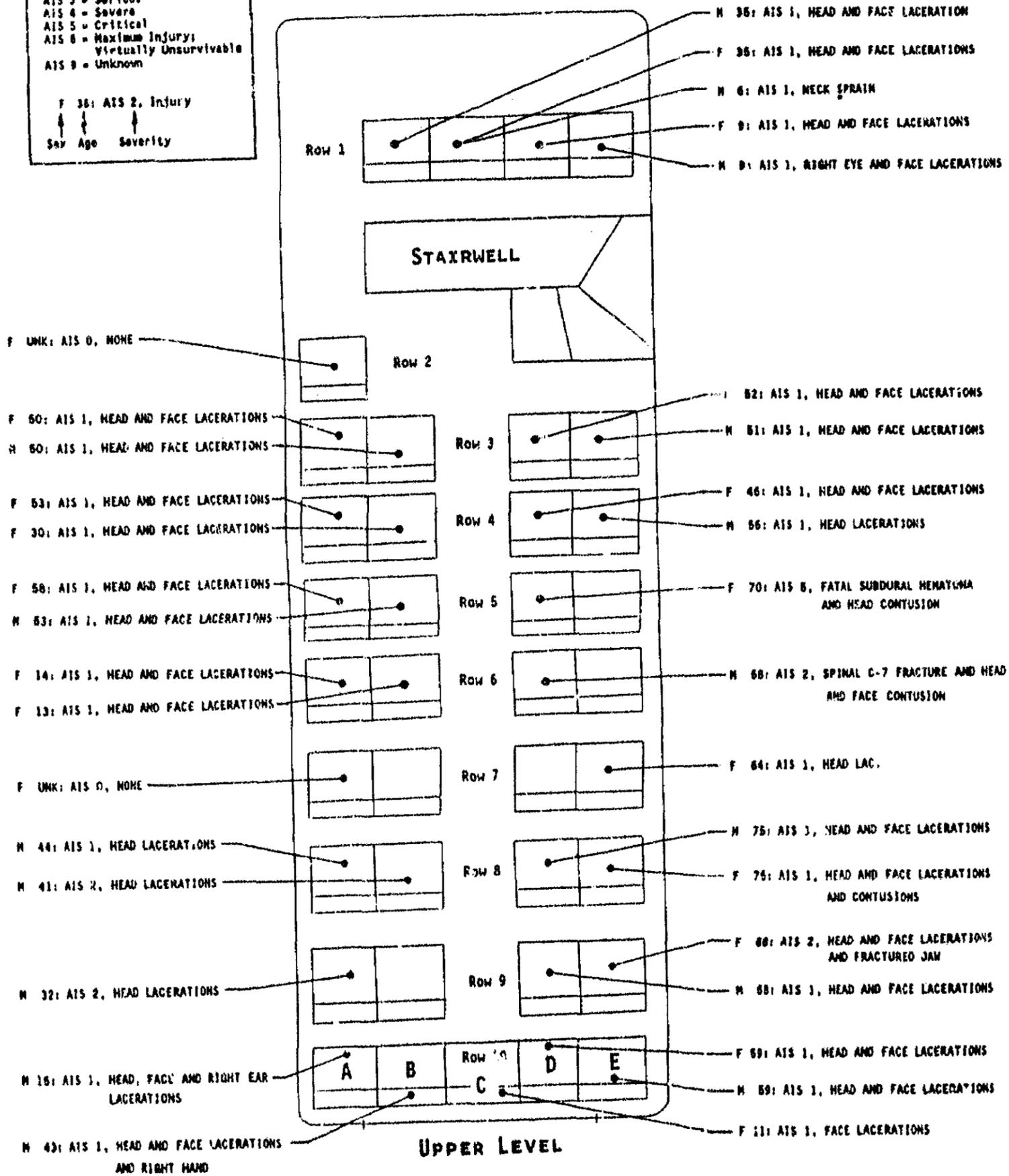
### APPENDIX A BUS SEATING CHART

**Legend**

- AIS 0 = No Injury
- AIS 1 = Minor
- AIS 2 = Moderate
- AIS 3 = Serious
- AIS 4 = Severe
- AIS 5 = Critical
- AIS 6 = Maximum Injury; Virtually Unsurvivable
- AIS 9 = Unknown

F 36: AIS 2, Injury

Sex Age Severity



APPENDIX B

FIGURES DEPICTING THE ACCIDENT SCENE AND THE TOUR BUS

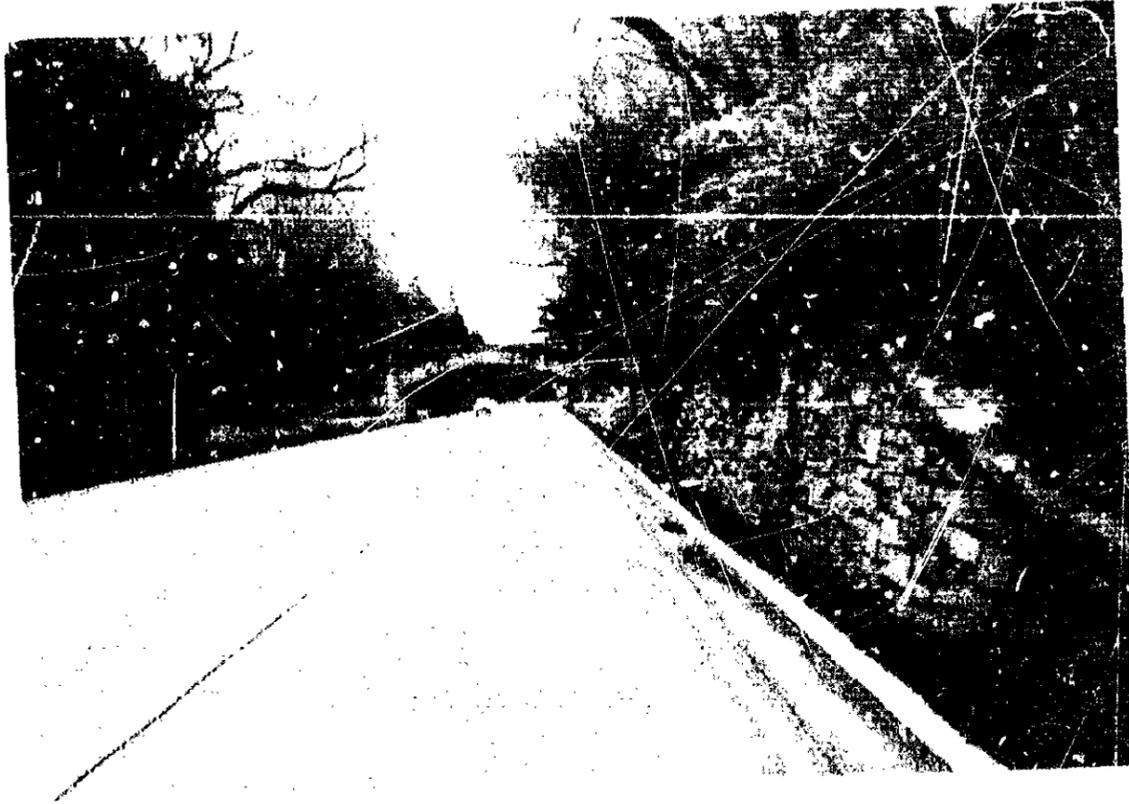


Figure 1.—Southbound approach to accident site showing "Low Clearance" sign.



Figure 2.—Southbound approach to accident site showing W12-2 warning signs.

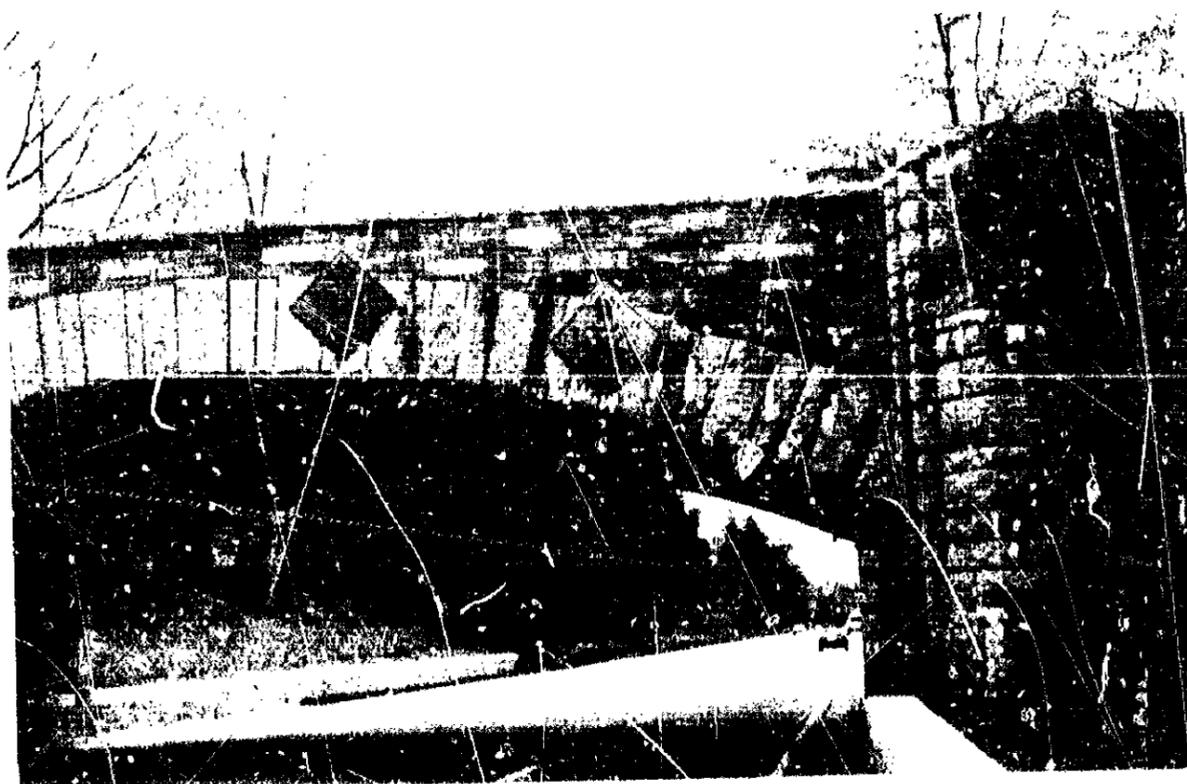


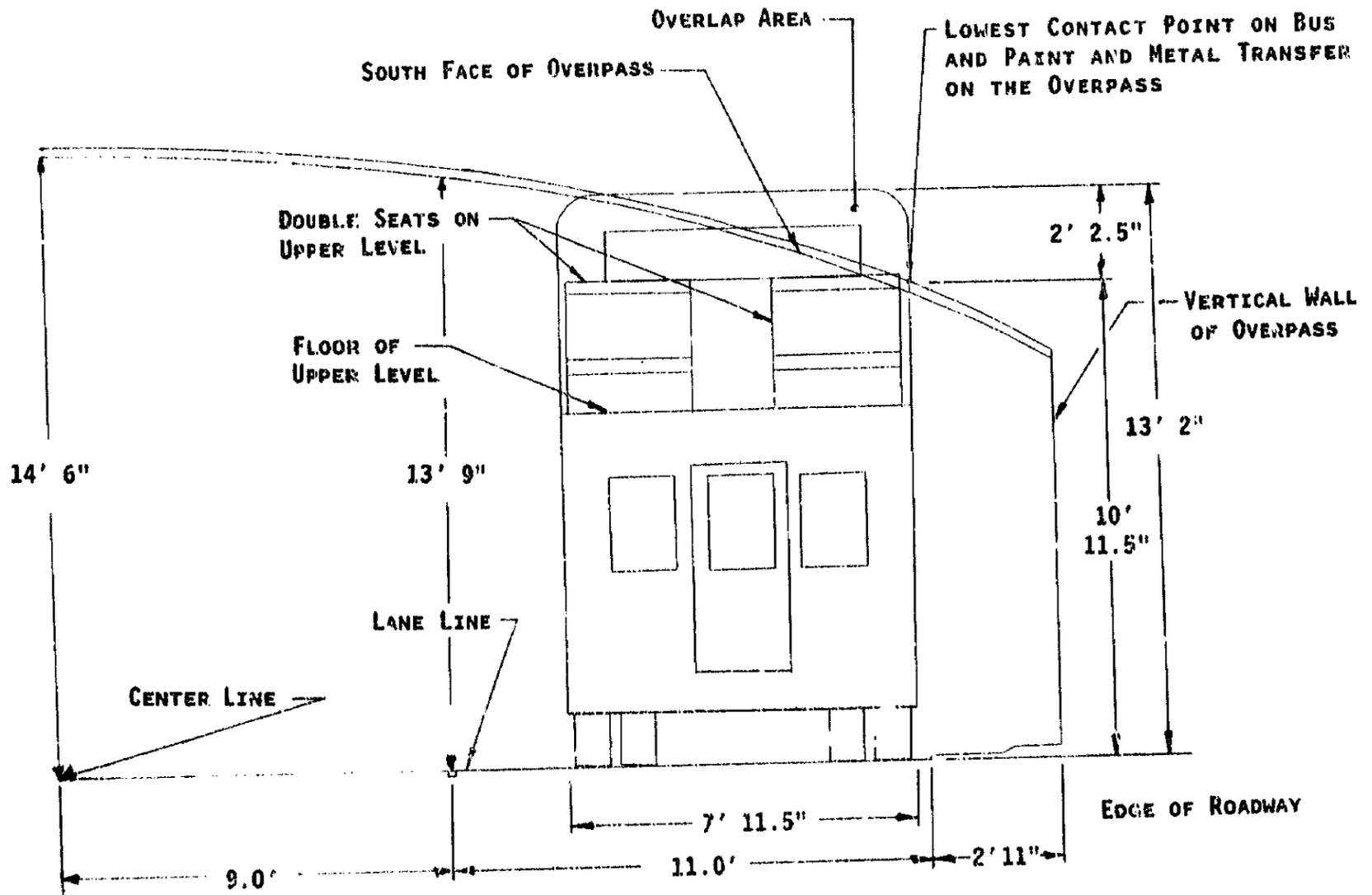
Figure 3.--Southbound view of accident site showing W12-2 warnings signs installed after the accident.



Figure 4.--Double-decked British sightseeing tour bus.

APPENDIX C

DIAGRAM OF ARCHED STONE OVERPASS AND TOUR BUS COLLISION POINT



VIEW OF REAR OF BUS IN SOUTH BOUND  
RIGHT LANE

APPENDIX D

EXCERPT FROM MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES



W12-1  
24" x 24"



W12-2  
24" x 24"

**2C-34 Low Clearance Sign (W12-2)**

The Low Clearance sign is intended for use to warn vehicle operators of clearances less than the maximum vehicle height permitted plus 12 inches. It may be erected on or in advance of the structure. If a sign is placed on the structure, it may be a rectangular shape with the legend (12) FT (6) IN.

The actual clearance is normally shown on the sign to the nearest inch not exceeding the actual clearance. However, in areas that experience changes in temperature causing frost action, an allowance, not exceeding 3 inches, for this condition, is recommended.

Where the clearance is less than the legal limit, a sign to that effect should be placed at the nearest intersecting road or wide point in the road at which a vehicle can detour or turn around.

In the case of an arch or other structure under which the clearance varies greatly, two or more signs should be used as necessary on the structure itself, to give information as to the clearance over the entire roadway.

Clearances should be checked periodically, particularly in areas where resurfacing operations have taken place.

APPENDIX E

EXCERPT FROM FEDERAL MOTOR CARRIER SAFETY REGULATIONS

Federal Highway Administration, DOT

§ 391.15

Subpart B—Qualification and Disqualification of Drivers

§ 391.11 Qualifications of drivers.

(a) A person shall not drive a motor vehicle unless he is qualified to drive a motor vehicle. Except as provided in § 391.63, a motor carrier shall not require or permit a person to drive a motor vehicle unless that person is qualified to drive a motor vehicle.

(b) Except as provided in Subpart G of this part, a person is qualified to drive a motor vehicle if he—

- (1) Is at least 21 years old;
- (2) Can read and speak the English language sufficiently to converse with the general public, to understand highway traffic signs and signals in the English language, to respond to official inquiries, and to make entries on reports and records;
- (3) Can, by reason of experience, training, or both, safely operate the type of motor vehicle he drives;
- (4) Can, by reason of experience, training, or both, determine whether the cargo he transports (including baggage in a passenger-carrying motor vehicle) has been properly located, distributed, and secured in or on the motor vehicle he drives;
- (5) Is familiar with methods and procedures for securing cargo in or on the motor vehicle he drives.
- (6) Is physically qualified to drive a motor vehicle in accordance with Subpart E—Physical Qualifications and Examinations of Part 391;
- (7) Has been issued a currently valid motor vehicle operator's license or permit;
- (8) Has prepared and furnished the motor carrier that employs him with the list of violations or the certificate as required by § 391.37;
- (9) Is not disqualified to drive a motor vehicle under the rules in § 391.15;
- (10) Has successfully completed a driver's road test and has been issued a certificate of driver's road test in accordance with § 391.31, or has presented an operator's license or a certificate of road test which the motor carrier that employs him has accepted as equivalent to a road test in accordance with § 391.33;

(11) Has taken a written examination and has been issued a certificate of written examination in accordance with § 391.35, or has presented a certificate of written examination which the motor carrier that employs him has accepted as equivalent to a written examination in accordance with § 391.37; and

(12) Has completed and furnished the motor carrier that employs him with an application for employment in accordance with § 391.21.

[35 FR 646], Apr. 22, 1970, amended at 35 FR 17420, Nov. 13, 1970; 35 FR 16181, Dec. 16, 1970; 36 FR 222, Jan. 7, 1971, 36 FR 24220, Dec. 22, 1971; 45 FR 46424, July 10, 1980]

§ 391.15 Disqualification of drivers.

(a) *General.* A driver who is disqualified shall not drive a commercial motor vehicle. A motor carrier shall not require or permit a driver who is disqualified to drive a commercial motor vehicle.

(b) *Disqualification for loss of driving privileges.* A driver is disqualified for the duration of his loss of his privilege to operate a commercial motor vehicle on public highways, either temporarily or permanently, by reason of the revocation, suspension, withdrawal, or denial of an operator's license, permit, or privilege, until that operator's license, permit, or privilege is restored by the authority that revoked, suspended, withdrew, or denied it.

(c) *Disqualification for criminal offenses—(1) General Rule.* A driver who is convicted of (or forfeits bond or collateral upon a charge of) a disqualifying offense specified in paragraph (c)(2) of this section is disqualified for the period of time specified in paragraph (c)(3) of this section, if—

(i) The offense was committed during on-duty time as defined in § 395.2(a) of this subchapter or as otherwise specified; and

(ii) The driver is employed by a motor carrier or is engaged in activities that are in furtherance of a commercial enterprise in interstate, intrastate, or foreign commerce;

(2) *Disqualifying offenses.* The following offenses are disqualifying offenses: