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U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

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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.

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TRANSPORTATION SCIENCES CENTER
ACCIDENT RESEARCH GROUP

Calspan Advanced Technology Center
[redacted]

CALSPAN INADVERTENT AIR BAG DEPLOYMENT INVESTIGATION
CALPSAN CASE NO. 94-36
VEHICLE: 1987 PORSCHE 944 TURBO
LOCATION: [redacted]
DATE: [redacted] **1994**

Contract No. DTNH22-94-D-07058

Prepared for:

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

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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.

TECHNICAL REPORT STANDARD TITLE PAGE

1. *Report No.* 94-36	2. *Government Accession No.*	3. *Recipient's Catalog No.*
4. *Title and Subtitle* Calspan On-Site Air Bag Deployment Investigation Vehicle - 1987 Porsche 944 Turbo Location [redacted], VA		5. *Report Date* [redacted]1995 6. *Performing Organization Code*
7. *Author(s)* Accident Research Group		8. *Performing Organization Report No.*
9. *Performing Organization Name and Address* Transportation Sciences Center Accident Research Group Division of Calspan Corporation [redacted]		10. *Work Unit No.* 1115 (5080-5089) 11. *Contract or Grant No.* DTNH22-94-D-07058
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15. *Supplementary Notes* Limited on-site investigation of an inadvertent air bag deployment that involved a 1987 Porsche 944 Turbo.		

16. *Abstract*

This limited on-site investigation focused on the inadvertent deployment of the driver and passenger side air bags in a 1987 Porsche 944 Turbo. The 52 year old male driver was participating in a controlled racing event on [redacted], 1994, and was decelerating his vehicle by braking to prepare for a right turn when the supplemental air bag system inadvertently deployed. He maintained control of the vehicle and brought it to a controlled stop off the race track on a access lane.

The driver was wearing a full face crash helmet and the manual 3-point lap and shoulder belt system. He sustained a superficial thermal burn of the right anterior wrist from the hot gas that exhausted from the air bag and an abrasion to the lateral right wrist from air bag contact. In addition, the driver sustained tinnitus (ringing sensation in his ears) which has persisted since the event.

The vehicle was inspected at a Porsche dealership in the driver's home city of [redacted]. There was no evidence of damage to the exterior and undercarriage components of the vehicle, therefore an impact induced deployment was ruled out. [redacted] initially declined to repair the 944 Turbo citing the vehicle was out of warranty. The driver was subsequently offered a settlement which provided him full parts replacement and fifty percent of the labor with a clause that prevented him from seeking monetary compensation for the tinnitus.

17. *Key Words* Supplemental Restraint System (SRS) Driver and passenger side air bags Inadvertent deployment Tinnitus (Ringing sensation in driver's ears)	18. *Distribution Statement* General Public		
19. *Security Classif. (of this report)* Unclassified	20. *Security Classif. (of this page)* Unclassified	21. *No. of Pages*	22. *Price*

CALSPAN INADVERTENT AIR BAG DEPLOYMENT INVESTIGATION
CALSPAN CASE NO. 94-36
VEHICLE: 1987 PORSCHE 944 TURBO
LOCATION: [redacted] VA

SUMMARY

This limited on-site investigation focused on a driver's complaint to the NHTSA of an inadvertent deployment of the Supplemental Restraint System (SRS) which consisted of driver and passenger side air bags in a 1987 Porsche 944 Turbo. The incident occurred on [redacted] 1994, at the [redacted] The driver was participating in a controlled racing event for street legal automobiles and was decelerating for a turn when the driver and passenger side air bags deployed inadvertently. The driver maintained control of the vehicle and maneuvered the Porsche onto an access road adjacent to the track where he brought the vehicle to a controlled stop. There was no impact damage to the vehicle exterior or undercarriage components. The driver sustained a superficial burn with an abrasion of the anterior right wrist and prolonged tinnitus (ring sensation in the ears) which he associated with the inadvertent deployment.

The inadvertent deployment occurred on a closed race track, therefore there was no police investigation. Data for this investigation were obtained from several interviews with the driver of the Porsche and a thorough inspection of the exterior and undercarriage components of the vehicle.

The driver/owner purchased the 1987 Porsche 944 Turbo as a used vehicle in 1988. At the time of purchase, he stated that the vehicle had an odometer reading of approximately 8K km (5K miles). The driver has maintained the vehicle in excellent condition and has performed all the required maintenance himself. In addition to routine maintenance, the driver had made several modifications to improve the handling and braking of the vehicle for race track events. These modifications included the replacement of the original equipment wheels and tires with (41 cm) 16" alloy wheels with wide, low profile performance tires, the addition of Porsche 968 front and rear sway bars, a truss bar bolted across the top of the front shock towers to minimize lateral movement, high performance front and rear disc brake pads, and a cool air kit for the front brakes which consists of a vent duct to the leading edge of the brake calipers. The vehicle was originally equipped with a cellular telephone by the previous owner, however, the system was removed prior to this driver's purchase. The antenna remained attached to the left rear quarter window. The driver stated that he installed a citizens band (CB) radio in the center console of the vehicle directly below the radio/cassette player. He further stated that there were no engine, electrical, or interior modifications to the Porsche. The driver installed a translucent Lexan cover to the front bumper facia to protect the frontal area from insects and road debris.

The driver stated that he has been involved in controlled racing activities for numerous years and has competed at tracks throughout the eastern states. In addition, he has been active in several car clubs and is a certified driving instructor for three affiliations. The driver drives the Porsche to the location of the event and participates in the event with all street legal components. He does not modify or alter the vehicle prior to the event. He noted that he is highly experienced with the handling and performance characteristics of the vehicle and has driven over one thousand laps on race courses as both a competitor and an instructor.

The driver stated that the inadvertent deployment occurred as he was traveling on a straight segment of the race track while decelerating for a turn. He indicated that his initial speed was approximately 190 km/h (120 mph) and that he braked with moderate force, under the level required to lock the wheels of the vehicle. He estimated that he slowed to approximately 110 km/h (70 mph) and was in a proper alignment on the track for the turn. At this point, the supplemental driver and passenger side air bags deployed.

The driver was a 52 year old male with a height of 180 cm (71") and weight of 63 kg (140 lbs). He stated that he was in a normal upright seated position with the seat adjusted to a mid track position when the SRS inadvertently deployed. He had the seat back reclined to a position that allowed him to drive the vehicle with his arms fully extended onto the steering wheel. The driver stated that his hands were positioned on the steering wheel between the spokes at the 3 and 9 o'clock positions, with his thumbs wrapped over the top of the upper spokes. He was properly restrained by the vehicle's 3-point lap and shoulder belt system. In addition to the manual belt system, the driver was wearing a full face helmet with a face shield. The left front door window was in the full open position with all remaining windows and sunroof in the closed positions.

While braking with his arms fully extended on the steering wheel, the driver stated that the supplemental driver and passenger air bags deployed. Initially, the driver was not aware that the air bags had deployed. He stated that he momentarily entered a "nowhere land" as his vision was obstructed by a gray shield which he later determined to be the driver's side air bag and the smoke associated with the deployment. The driver extended his head out of the left door window opening as he continued to brake and steer the vehicle on a straight line trajectory and noted an access lane off the left side of the track. He steered the vehicle into the lane and continued to brake and brought the Porsche to a controlled stop off the track, out of the way of other vehicles.

The driver of the Porsche 944 initially thought the vehicle was on fire due to the smoke and gray appearence of the air bag. He immediately attempted to exit the vehicle. The driver stated that he opened the left door and had difficulty releasing the manual belt buckle by depressing the wrong side of the buckle assembly. As he released the belt system, the driver exited the vehicle and at this point, first noted that the air bags had deployed. Several track personnel ran over to his vehicle and asked the driver if he was alright.

Although the driver did not hear the deployment of the driver and passenger side air bags, he immediately detected a ringing sensation in both ears (tinnitus). He removed his helmet and attempted to recover from the shock of the inadvertent deployment. The driver noted a small diameter thermal burn to the right anterior wrist and an abrasion at the lateral aspect of the wrist which were attributed to the hot gases exhausting from the right vent port of the air bag and direct contact with the inflating bag. He remained in his driving position during the deployment event and did not contact the driver's side air bag with his facial or thoracic regions.

The driver allowed his body to calm down after the deployment event and subsequently drove himself to a local hospital in the involved Porsche. The emergency room physician treated the burn and the abrasion with *Neosporin.* The driver complained of chest pain and nervousness. The physician detected a decrease in the driver's blood oxygen level and placed him on oxygen. The driver also received a chest X-ray and an electrocardiograph (EKG) which yielded negative results. He was discharged from the hospital following treatment.

The tinnitus (ringing sensation) in the driver's ears did not dissipate following the inadvertent deployment. He consulted a hearing specialist who stated that the tinnitus may clear-up or remain as a permanent impairment. The driver was willing to take a wait-and-see attitude regarding the tinnitus with aspirations that it will diminish or subside.

The driver folded the driver's side air bag back into the module assembly and taped the cover flaps in a closed position and drove the vehicle back to his residence in [redacted]. He reported the inadvertent deployment to the Porsche regional representative. Porsche initially declined to repair the vehicle citing the warranty had expired and the driver neglected to the return the vehicle to a Porsche dealership for a required inspection of the air bag system at the four year interval in 1991. The driver subsequently returned the vehicle to the dealership to allow a Porsche representative to inspect the vehicle.

The driver subsequently notified the NHTSA of the inadvertent deployment. A [redacted] investigator inspected the Porsche 944 Turbo on [redacted] 1994, at the dealership. The Porsche was identified by vehicle identification number (VIN) WP0AA2952HN[redacted] and had an odometer reading of 106,456 km (66,122 miles). The vehicle was equipped with a 5-speed manual transmission and a electrically operated sun roof. The exterior of the vehicle was in excellent condition and was free of dents and scratches. There were several superficial paint abrasions on the hood and front fenders which the driver attributed to track debris. All gaps between the body panels appeared to be uniform and within normal tolerance. There was no evidence of impact damage to the exterior surfaces, inclusive of the tires and wheels.

The Porsche was driven into the service facility of the dealership and raised on a hydraulic floor lift to inspect the undercarriage of the vehicle for possible damage. There was no damage or direct contact evidence to the undercarriage. All components were intact and none appeared to have been replaced or removed prior to this inspection.

The interior of the vehicle was in excellent original condition with no evidence of alterations or damage, except for the deployed driver and passenger air bags. The driver's side module was contained within the four-spoke steering wheel. The module opened at the designated tear points in an H-configuration with an 4.0 x 16.8.cm (2.5 x 6.6") upper flap and a 7.6 x 16.8 cm (3.0 x 6.6") lower cover flap. The air bag remained folded with the module cover flaps taped in a partially closed position. There was no damage to the knee bolster or to the manual 3-point lap and shoulder belt system.

The passenger side air bag was fully extended from the module. The module was located at the juncture of the upper and mid instrument panel. The passenger side module cover door was hinged at the top surface which allowed the door to open in an upward direction. The door was 37.5 cm (14.75") in width and had a vertical profile of 10.8 cm (4.25") and a horizontal depth of 6.4 cm (2.5"). The outboard edges of the door contacted and cracked the laminated windshield. The contact points on the windshield were located 19.0 & 53 cm (7.5 & 21") right of center. This contact and resultant windshield damage was typical of a Porsche 944 SRS deployment. In addition to the door contact, the deployed passenger side air bag contacted the windshield above the mid point of the module. A woven nylon fabric transfer evidenced the contact point. The passenger side air bag was vented by two 5.7 cm (2.25") diameter ports located on the side surfaces of the bag. There was black generant residue around the inboard vent port of the bag and additional residue scattered about the interior of the vehicle.

The air bag indicator lamp was tested during the inspection process. The ignition key was turned to the run-position and the air bag indicator lamp glowed continuously until the ignition was turn to the off-position. A service technician at the dealership stated that the diagnostic module in this 1987 Porsche 944 did not contain a readout mode of systems faults through the indicator lamp or through the use of a remote test unit. Therefore, there was no method readily available to test the system for faults.

Conclusions

Based on the statements from the driver regarding the sequence of events that preceded the deployment and the lack of impact damage to the vehicle, it was apparent that the supplemental driver and passenger air bag system deployed inadvertently in this 1987 Porsche 944 Turbo. The driver was fortunate that he was traveling on a straight segment of the race track with no others vehicles in his immediate area and that he was able to maintain control of the vehicle and stop safely off the track without causing an injury producing event to himself or to track personnel.

Calspan had previously investigated a similar inadvertent deployment that involved a 1988 Porsche 944 Turbo (Case No. 89-44). The driver of this event reported that he was operating the Porsche on a straight down grade segment of a race track at a speed of 110-120 km/h (70-75 mph). He braked to reduce his speed for a left curve and down shifted into third gear when the driver and passenger side air bags inadvertently deployed. He noted that the vehicle was not involved in an impact sequence or bottoming action with the track surface. The driver maintained control of the

vehicle through the curve and brought the Porsche to a controlled stop several hundred meters beyond the point of deployment. This event was clearly an inadvertent deployment of the vehicle's SRS.

SRS Replacement

Following the driver's initial complaint to [redacted] regarding the repair of the SRS, a [redacted] representative recommended that the driver file a claim with his insurance company to cover the cost of SRS replacement which was estimated in excess of $6K. He continued to pursue a warranty replacement and threatened legal action against [redacted] for compensation for his hearing impairment (tinnitus). [redacted] subsequently offered to repair the vehicle providing full replacement parts with the owner reimbursing [redacted] for fifty percent of the labor. This agreement included a clause that would prevent the driver from seeking monetary compensation for injury associated with the inadvertent deployment. The driver has agreed to accept this offer from [redacted]

ATTACHMENT A

Vehicle Photographs

SELECTED PRINTS
Porsche Exterior

1. Frontal view of the 1987 Porsche 944 Turbo.

2. Left front three-quarter view.

3. Left profile view of the frontal structure and *Lexan* shield.

4. Right rear view.

5. Right side view of the Porsche 944 Turbo.

6. Right profile view of the frontal area.

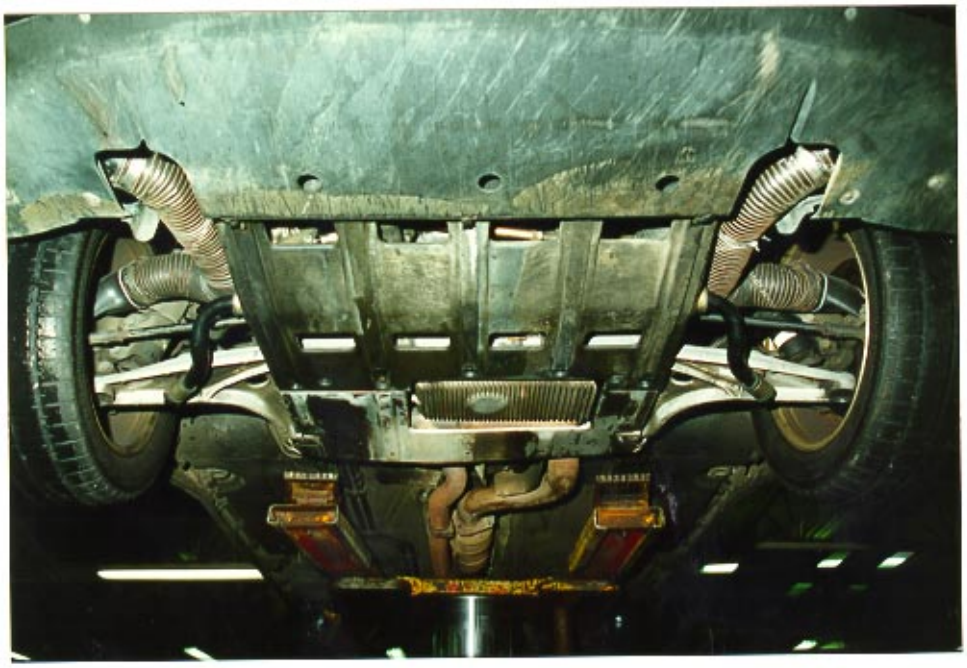
7. Right front three-quarter view.

Undercarriage Views of the Porsche 944 Turbo

8. Underside of the left front bumper facia and valance.

9. Underside view of the right bumper facia and valance.

10. Profile view of the right side bumper facia and valance panel.

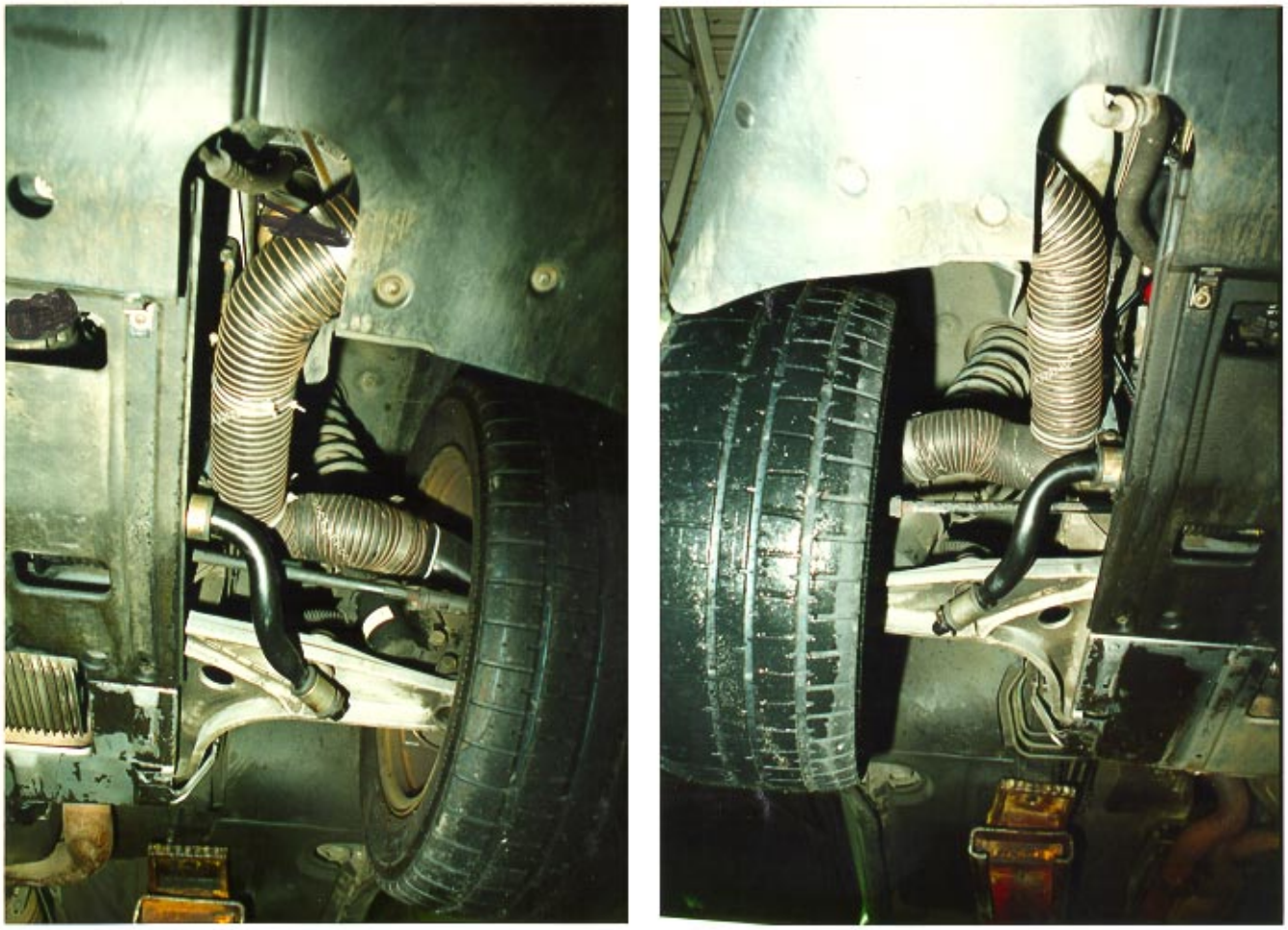


11. Valance and engine shield with retrofitted OEM front anti-sway bar.

12. Mid undercarriage and exhaust system of the 944.

13. Rear undercarriage components viewed from the rear of the vehicle.

14. Transaxle, rear suspension components, and the retrofitted OEM rear anti-sway bar.



15. & 16. Aftermarket left and right front disc brake cooling ducts.

17. Overall view of the inadvertently deployed driver and passenger side air bags.

18. Driver/owner taped driver's side air bag module closed.

19. Driver's seat mid track adjustment relative to the steering assembly.

20. Inadvertently deployed passenger's side air bag.

21. Inboard 6.4 cm (2.5") vent port of the passenger air bag.

22. Passenger side module cover flap contact damage to the right windshield.

ATTACHMENT B

NASS Occupant Forms

U.S. Department of Transportation
National Highway Traffic Safety Administration

OCCUPANT ASSESSMENT FORM

Form Approved
O.M.B. No. 2127-0021

NATIONAL ACCIDENT SAMPLING SYSTEM
CRASHWORTHINESS DATA SYSTEM

1. ~~Primary Sampling Unit Number~~ ____
2. Case Number - ~~Stratum~~ 94-36
3. Vehicle Number 01
4. Occupant Number 01

OCCUPANT'S CHARACTERISTICS

5. Occupant's Age 52
Code actual age at time of accident.
(00) Less than one year old (specify by month): _____
(97) 97 years and older
(99) Unknown

6. Occupant's Sex 1
(1) Male
(2) Female
(9) Unknown

7. Occupant's Height 180
Code actual height to the nearest centimeter.
(999) Unknown

71 inches X 2.54 = ___ centimeters

8. Occupant's Weight 063
Code actual weight to the nearest kilogram.
(999)Unknown

140 pounds X .4536 = ___ kilograms

9. Occupant's Role 1
(1) Driver
(2) Passenger
(9) Unknown

OCCUPANT'S SEATING

10. Occupant's Seat Position 11
Front Seat
(11) Left side
(12) Middle
(13) Right side
(14) Other (specify): _____
(15) On or in the lap of another occupant

Second Seat
(21) Left side
(22) Middle
(23) Right side
(24) Other (specify): _____
(25) On or in the lap of another occupant

Third Seat
(31) Left side
(32) Middle
(33) Right side
(34) Other (specify): _____
(35) On or in the lap of another occupant

Fourth Seat
(41) Left side
(42) Middle
(43) Right side
(44) Other (specify): _____
(45) On or in the lap of another occupant

(97) In or on unenclosed area
(98) Other seat (specify): _____
(99) Unknown

11. Occupant's Posture 0
(0) Normal posture

Abnormal posture
(1) Kneeling or standing on seat
(2) Lying on or across seat
(3) Kneeling, standing or sitting in front of seat
(4) Sitting sideways or turned to talk with another occupant or to look out a rear window
(5) Sitting on a console
(6) Lying back in a reclined seat position
(7) Bracing with feet or hands on a surface in front of seat
(8) Other abnormal posture (specify): _____
(9) Unknown

EJECTION/ENTRAPMENT

12. Ejection 0
    (0) No ejection
    (1) Complete ejection
    (2) Partial ejection
    (3) Ejection, unknown degree
    (9) Unknown

13. Ejection Area 0
    (0) No ejection
    (1) Windshield
    (2) Left front
    (3) Right front
    (4) Left rear
    (5) Right rear
    (6) Rear
    (7) Roof
    (8) Other area (e.g., back of pickup, etc.) (specify):_____
    (9) Unknown

14. Ejection Medium 0
    (0) No ejection
    (1) Door/hatch/tailgate
    (2) Nonfixed roof structure
    (3) Fixed glazing
    (4) Nonfixed glazing (specify):
    _____
    (5) Integral structure
    (8) Other medium (specify):
    _____
    (9) Unknown

15. Medium Status (Immediately Prior To Impact) 0
    (0) No ejection
    (1) Open
    (2) Closed
    (3) Integral structure
    (9) Unknown

16. Entrapment 0
    (NOTE: Entrapped means that part of the person was in the vehicle and mechanically restrained; jammed doors and immobilizing injuries by themselves are not sufficient to constitute entrapment.)
    (0) Not entrapped
    (1) Entrapped
    (9) Unknown

RESTRAINT SYSTEM EVALUATION

17. Manual (Active) Belt System Availability 4
(0) None available
(1) Belt removed/destroyed
(2) Shoulder belt
(3) Lap belt
(4) Lap and shoulder belt
(5) Belt available—type unknown

Integral Belt Partially Destroyed
(6) Shoulder belt (lap belt destroyed/removed)
(7) Lap belt (shoulder belt destroyed/removed)

(8) Other belt (specify): _____

(9) Unknown

18. Manual (Active) Belt System Use 04
(00) None used, not available, or belt removed/destroyed
(01) Inoperative (specify): _____

(02) Shoulder belt
(03) Lap belt
(04) Lap and shoulder belt
(05) Belt used—type unknown
(08) Other belt used (specify): _____

(12) Shoulder belt used with child safety seat
(13) Lap belt used with child safety seat
(14) Lap and shoulder belt used with child safety seat
(15) Belt used with child safety seat—type unknown
(18) Other belt used with child safety seat (specify): _____
(99) Unknown if belt used

19. Proper Use of Manual (Active) Belts 1
(0) None used or not available
(1) Belt used properly
(2) Belt used properly with child safety seat

Belt Used Improperly
(3) Shoulder belt worn under arm
(4) Shoulder belt worn behind back or seat
(5) Belt worn around more than one person
(6) Lap belt worn on abdomen
(7) Lap belt or lap and shoulder belt used improperly with child safety seat (specify): _____

(8) Other improper use of manual belt system (specify): _____

(9) Unknown

20. Manual (Active) Belt Failure Modes During Accident 1
(0) No manual belt used
(1) No manual belt failure(s)
(2) Torn webbing (stretched webbing not included)
(3) Broken buckle or latchplate
(4) Upper anchorage separated
(5) Other anchorage separated (specify): _____

(6) Broken retractor
(7) Combination of above (specify): _____

(8) Other manual belt failure (specify): _____

(9) Unknown

21. Air Bag System Availability/Function 1
(0) Not equipped/not available
(1) Air bag

Non-functional
(2) Air bag disconnected (specify): _____

(3) Air bag not reinstalled
(9) Unknown

22. Air Bag System Deployment 2
(0) Not equipped/not available
(1) Air bag deployed during accident (as a result of impact)
(2) Air bag deployed inadvertently just ~~prior to accident~~
(3) Air bag deployed, accident sequence undetermined
(4) Nondeployed
(5) Unknown if deployed
(6) Air bag deployed as a result of a noncollision event during accident sequence (e.g., fire, explosion, electrical)
(9) Unknown

23. Are There Indications of Air Bag System Failure? NO 1
(0) Not equipped/not available
(1) No
(2) Yes (specify): _____

(9) Unknown

Note: See Variables 44 through 48 (Page 5) for Information on Automatic Belts

24. Police Reported Restraint Use N/A
(0) None used
(1) Police did not indicate restraint use
(2) Shoulder belt
(3) Lap belt
(4) Lap and shoulder belt
(5) Belt used, type not specified
(6) Child safety seat
(7) Other or automatic restraint (specify): _____

(8) Restrained, type unknown
(9) Police indicated "unknown"

NO POLICE INVESTIGATION

HEAD RESTRAINT AND SEAT EVALUATION

25. Head Restraint Type/Damage by Occupant at This Occupant Position: 1
    - (0) No head restraints
    - (1) Integral—no damage
    - (2) Integral—damaged during accident
    - (3) Adjustable—no damage
    - (4) Adjustable—damaged during accident
    - (5) Add-on—no damage
    - (6) Add-on—damaged during accident
    - (8) Other (specify): _____
    - (9) Unknown

26. Seat Type (this Occupant Position): 0 2
    - (00) Occupant not seated or no seat
    - (01) Bucket
    - (02) Bucket with folding back
    - (03) Bench
    - (04) Bench with separate back cushions
    - (05) Bench with folding back(s)
    - (06) Split bench with separate back cushions
    - (07) Split bench with folding back(s)
    - (08) Pedestal (i.e., column supported)
    - (09) Other seat type (specify): _____
    - (10) Box mounted seat (i.e., van type)
    - (99) Unknown

27. Seat Performance (this Occupant Position): 1
    - (0) Occupant not seated or no seat
    - (1) No seat performance failure(s)
    - (2) Seat adjusters failed
    - (3) Seat back folding locks or "seat back" failed (specify): _____
    - (4) Seat track/anchors failed
    - (5) Deformed by impact of occupant
    - (6) Deformed by passenger compartment intrusion (specify): _____
    - (7) Combination of above (specify): _____
    - (8) Other (specify): _____
    - (9) Unknown

CHILD SAFETY SEAT

28. Child Safety Seat Make/Model 0 0 0
(000) No child safety seat
Applicable codes are found in your NASS CDS Data Collection, Coding and Editing
(950) Built-in child safety seat
(997) Other make/model (specify):
_____
(998) Unknown make/model
(999) Unknown if child safety seat used

29. Type of Child Safety Seat 0
(0) No child safety seat
(1) Infant seat
(2) Toddler seat
(3) Convertible seat
(4) Booster seat
(7) Other type child safety seat (specify):
_____
(8) Unknown child safety seat type
(9) Unknown if child safety seat used

30. Child Safety Seat Orientation 0 0
(00) No child safety seat

Designed for Rear Facing for This Age/Weight
(01) Rear facing
(02) Forward facing
(08) Other orientation (specify):
_____
(09) Unknown orientation

Designed For Forward Facing for This Age/Weight
(11) Rear facing
(12) Forward facing
(18) Other orientation (specify):
_____
(19) Unknown orientation

Unknown Design or Orientation For This Age/Weight, or Unknown Age/Weight
(21) Rear facing
(22) Forward facing
(28) Other orientation (specify):
_____
(29) Unknown orientation

(99) Unknown if child safety seat used

31. Child Safety Seat Harness Usage 0 0

32. Child Safety Seat Shield Usage 0 0

33. Child Safety Seat Tether Usage 0 0

Note: Options below applicable to Variables OA31-OA33.
(00) No child safety seat

Not Designed With Harness/Shield/Tether
(01) After market harness/shield/tether added, not used
(02) After market harness/shield/tether used
(03) Child safety seat used, but no after market harness/shield/tether added
(09) Unknown if harness/shield/tether added or used

Designed With Harness/Shield/Tether
(11) Harness/shield/tether not used
(12) Harness/shield/tether used
(19) Unknown if harness/shield/tether used

Unknown If Designed With Harness/Shield/Tether
(21) Harness/shield/tether not used
(22) Harness/shield/tether used
(29) Unknown if harness/shield/tether used

(99) Unknown if child safety seat used

INJURY CONSEQUENCES

34. Injury Severity (Police Rating) —

(0) O - No injury NO PAR
(1) C - Possible injury
(2) B - Nonincapacitating injury
(3) A - Incapacitating injury
(4) K - Killed
(5) U - Injury, severity unknown
(6) Died prior to accident
(9) Unknown

35. Treatment - Mortality 6
(0) No treatment
(1) Fatal
(2) Fatal - ruled disease (specify):
_____

Nonfatal
(3) Hospitalization
(4) Transported and released
(5) Treatment at scene - nontransported
(6) Treatment later
(8) Treatment - other (specify):
_____
(9) Unknown

36. Type Of Medical Facility (for Initial Treatment) 2
(0) Not treated at a medical facility
(1) Trauma center
(2) Hospital
(3) Medical clinic
(4) Physician's office
(5) Treatment later at medical facility
(8) Other (specify):
_____
(9) Unknown

37. Hospital Stay 0 0
(00) Not Hospitalized
_____Code the number of days (up through 60) that the occupant stayed in hospital.
(61) 61 days or more
(99) Unknown

38. Working Days Lost 0 0
_____Code the number of days (up through 60) that the occupant lost from work due to the accident
(00) No working days lost
(61) 61 days or more
(62) Fatally injured
(97) Not working prior to accident
(99) Unknown

STOP - GO TO VARIABLE 44 ON PAGE 7

VARIABLES 39 THROUGH 43 ARE COMPLETED BY THE ZONE CENTER

39. Time to Death 0 0
_____Code number of hours from time of accident to time of death up through 24 hours. If time of death is greater than 24 hours, code number of days. (Note: 1 day = 31, 2 days = 32, ... n days = 30 +n up through 30 days = 60)
(00) Not fatal
(96) Fatal - ruled disease
(99) Unknown

40. 1st Medically Reported Cause of Death 0 0

41. 2nd Medically Reported Cause of Death 0 0

42. 3rd Medically Reported Cause of Death 0 0
_____Code the Occupant Injury from line number(s) for the medically reported injury(s) which reportedly contributed to this occupant's death
(00) Not fatal or no additional causes
(96) Mode of death given but specific injuries are not linked to cause of death. (specify):
_____
(97) Other result (includes fatal ruled disease) (specify):
_____
(99) Unknown

43. Number of Recorded Injuries for This Occupant 0 2
_____Code the actual number of injuries recorded for this occupant.
(00) No recorded injuries
(97) Injured, details unknown
(99) Unknown if injured

AUTOMATIC BELT SYSTEM

44. Automatic (Passive) Belt System Availability/ Function — 0
(0) Not equipped/not available
(1) 2 point automatic belts
(2) 3 point automatic belts
(3) Automatic belts - type unknown

Non-functional
(4) Automatic belts destroyed or rendered inoperative
(9) Unknown

45. Automatic (Passive) Belt System Use — 0
(0) Not equipped/not available/destroyed or rendered inoperative
(1) Automatic belt in use
(2) Automatic belt not in use (manually disconnected, motorized track inoperative) (specify):

(3) Automatic belt use unknown
(9) Unknown

46. Automatic (Passive) Belt System Type — 0
(0) Not equipped/not available
(1) Non-motorized system
(2) Motorized system
(9) Unknown

47. Proper Use of Automatic (Passive) Belt System — 0
(0) Not equipped/not available/not used
(1) Automatic belt used properly
(2) Automatic belt used properly with child safety seat

Automatic Belt Used Improperly
(3) Automatic shoulder belt worn under arm
(4) Automatic shoulder belt worn behind back
(5) Automatic belt worn around more than one person
(6) Lap portion of automatic belt worn on abdomen
(7) Automatic lap and shoulder belt or automatic shoulder belt used improperly with child safety seat (specify):

(8) Other improper use of automatic belt system (specify):
(9) Unknown

48. Automatic (Passive) Belt Failure Modes During Accident — 0
(0) Not equipped/not available/not in use
(1) No automatic belt failure(s)
(2) Torn webbing (stretched webbing not included)
(3) Broken buckle or latchplate
(4) Upper anchorage separated
(5) Other anchorage separated (specify):

(6) Broken retractor
(7) Combination of above (specify):
(8) Other automatic belt failure (specify):

(9) Unknown

49. Seat Orientation (this Occupant Position) — 1
(0) Occupant not seated or no seat
(1) Forward facing seat
(2) Rear facing seat
(3) Side facing seat (inward)
(4) Side facing seat (outward)
(8) Other (specify):

(9) Unknown

Check the Primary Source Used In Determining Belt Use.

[ ] Not equipped/not available/destroyed or rendered inoperative
[✓] Vehicle inspection
[ ] Official injury data
[✓] Driver/occupant interview
[ ] Other (specify):

[ ] Unknown if belt used

ARE ALL APPLICABLE MEDICAL RECORDS INCLUDED WITH INITIAL SUBMISSION? NO [ ] YES [ ]

UPDATE CANDIDATE? NO [ ] YES [ ]

STOP - VARIABLES 50 THROUGH 53 ARE COMPLETED BY THE ZONE CENTER

TRAUMA DATA

50. Glasgow Coma Scale (GCS) Score (at Medical Facility) 97
    (00) Not injured
    (01) Injured - not treated at medical facility
    (02) No GCS Score at medical facility
    (03-15) Code the actual value of the initial GCS Score recorded at medical facility.
    (97) Injured, details unknown
    (99) Unknown if injured

51. Was the Occupant Given Blood? 1
    (1) No - blood not given
    (2) Yes - blood given (specify units):_____
    (9) Unknown if blood given

52. Arterial Blood Gases (ABG) - HCO_3 01
    (00) Not injured
    (01) Injured, ABGs not measured or reported
    (02-50) Code the actual value of the HCO_3
    (96) ABGs reported , HCO_3 unknown
    (97) Injured, details unknown
    (99) Unknown if injured

BELT USE DETERMINATION

53. Primary Source of Belt Use Determination 3
    (0) Not equipped/not available/destroyed or rendered inoperative
    (1) Vehicle inspection
    (2) Official injury data
    (3) Driver/occupant interview
    (8) Other (specify):_____
    (9) Unknown if belt used

U.S. Department of Transportation

National Highway Traffic Safety Administration

OCCUPANT INJURY FORM

Form Approved
O.M.B. No. 2127-0021

NATIONAL ACCIDENT SAMPLING SYSTEM
CRASHWORTHINESS DATA SYSTEM

1. Primary Sampling Unit Number ___ ___	3. Vehicle Number ___ ___
2. Case Number - Stratum ___ ___ ___ ___	4. Occupant Number ___ ___

INJURY DATA

Record below the actual injuries sustained by this occupant that were identified from the official and unofficial data sources. Remember not to double count an injury just because it was identified from two different sources. If greater than ten injuries have been documented, encode the balance on the Occupant Injury Supplement.

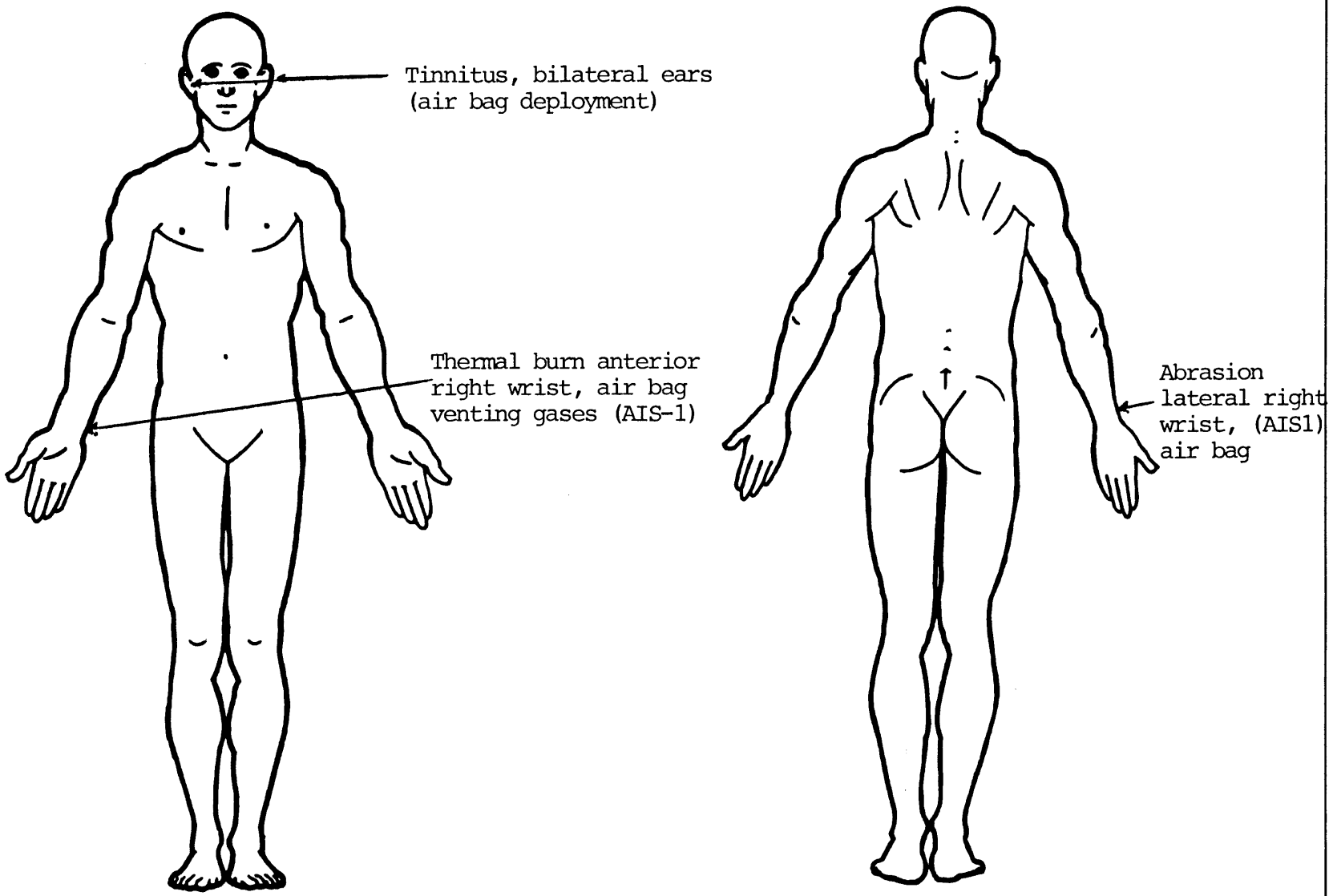
	Source of Injury Data	A.I.S. - 90 Body Region	Type of Anatomic Structure	Specific Anatomic Structure	Level of Injury	A.I.S. Severity	Aspect	Injury Source	Injury Source Confidence Level	Direct/ Indirect Injury	Occupant Area Intrusion Number
1st	5. 7	6. 7	7. 9	8. 02	9. 02	10. 1	11. 1	12. 45	13. 1	14. 1	15. 00
2nd	16. 7	17. 7	18. 9	19. 20	20. 02	21. 1	22. 1	23. 93	24. 1	25. 2	26. 00
3rd	27. ___	28. ___	29. ___	30. ___ ___	31. ___ ___	32. ___	33. ___	34. ___ ___	35. ___	36. ___	37. ___ ___
4th	38. ___	39. ___	40. ___	41. ___ ___	42. ___ ___	43. ___	44. ___	45. ___ ___	46. ___	47. ___	48. ___ ___
5th	49. ___	50. ___	51. ___	52. ___ ___	53. ___ ___	54. ___	55. ___	56. ___ ___	57. ___	58. ___	59. ___ ___
6th	60. ___	61. ___	62. ___	63. ___ ___	64. ___ ___	65. ___	66. ___	67. ___ ___	68. ___	69. ___	70. ___ ___
7th	71. ___	72. ___	73. ___	74. ___ ___	75. ___ ___	76. ___	77. ___	78. ___ ___	79. ___	80. ___	81. ___ ___
8th	82. ___	83. ___	84. ___	85. ___ ___	86. ___ ___	87. ___	88. ___	89. ___ ___	90. ___	91. ___	92. ___ ___
9th	93. ___	94. ___	95. ___	96. ___ ___	97. ___ ___	98. ___	99. ___	100. ___ ___	101. ___	102. ___	103. ___ ___
10th	104. ___	105. ___	106. ___	107. ___ ___	108. ___ ___	109. ___	110. ___	111. ___ ___	112. ___	113. ___	114. ___ ___

HS Form 433B (1/94)

This report is authorized by P.L. 89-563, Title 1, Section 106, 108, and 112. While you are not required to respond, your cooperation is needed to make the results of this data collection effort comprehensive, accurate, and timely.

OFFICIAL INJURY DATA – SOFT TISSUE INJURIES

Indicate the Location, Specific Anatomic Structure, Detail (size, depth, fracture type, head injury clinical signs and neurological deficits), and Source of all injuries indicated by official sources (or from PAR or other unofficial sources if medical records and interviewee data are unavailable.)



SOURCE OF INJURY DATA

OFFICIAL
(1) Autopsy records with or without hospital/ medical records
(2) Hospital/medical records other than emergency room (e.g., discharge summary)
(3) Emergency room records only (including associated X-rays or other lab reports)
(4) Private physician, walk-in or emergency clinic

UNOFFICIAL
(5) Lay coroner report
(6) E.M.S. personnel
(7) Interviewee
(8) Other source (specify):

(9) Police

INJURY SOURCE

FRONT
(01) Windshield
(02) Mirror
(03) Sunvisor
(04) Steering wheel rim
(05) Steering wheel hub/spoke
(06) Steering wheel (combination of codes 04 and 05)
(07) Steering column, transmission selector lever, other attachment
(08) Add on equipment (e.g., CB, tape deck, air conditioner)
(09) Left instrument panel and below
(10) Center instrument panel and below
(11) Right instrument panel and below
(12) Glove compartment door
(13) Knee bolster
(14) Windshield including one or more of the following: front header, A (A1/A2)-pillar, instrument panel, mirror, or steering assembly (driver side only)
(15) Windshield including one or more of the following: front header, A (A1/A2)-pillar, instrument panel, or mirror (passenger side only)
(16) Driver side air bag compartment cover
(17) Passenger side air bag compartment cover
(18) Windshield reinforced by exterior object (specify):
(19) Other front object (specify):

LEFT SIDE
(20) Left side interior surface, excluding hardware or armrests
(21) Left side hardware or armrest
(22) Left A (A1/A2)-pillar
(23) Left B-pillar
(24) Other left pillar (specify):
(25) Left side window glass or frame
(26) Left side window glass including one or more of the following: frame, window sill, A (A1/A2)-pillar, B-pillar, or roof side rail.
(27) Other left side object (specify):
(28) Left side window sill

RIGHT SIDE
(30) Right side interior surface, excluding hardware or armrests
(31) Right side hardware or armrest
(32) Right A (A1/A2)-pillar
(33) Right B-pillar
(34) Other right pillar (specify):
(35) Right side window glass or frame
(36) Right side window glass including one or more of the following: frame, window sill, A (A1/A2)-pillar, B-pillar, or roof side rail.
(37) Other right side object (specify):
(38) Right side window sill

INTERIOR
(40) Seat, back support
(41) Belt restraint webbing/buckle
(42) Belt restraint B-pillar or door frame attachment point
(43) Other restraint system component (specify):
(44) Head restraint system
(45) Air bag (use codes "16" and "17" for injuries sustained from air bag compartment covers)
(46) Other occupants (specify):
(47) Interior loose objects
(48) Child safety seat (specify):
(49) Other interior object (specify):

ROOF
(50) Front header
(51) Rear header
(52) Roof left side rail
(53) Roof right side rail
(54) Roof or convertible top

FLOOR
(56) Floor (including toe pan)
(57) Floor or console mounted transmission lever, including console
(58) Parking brake handle
(59) Foot controls including parking brake

REAR
(60) Backlight (rear window)
(61) Backlight storage rack, door, etc.
(62) Other rear object (specify):

EXTERIOR of OCCUPANT'S VEHICLE
(65) Hood
(66) Outside hardware (e.g., outside mirror, antenna)
(67) Other exterior surface or tires (specify):
(68) Unknown exterior objects

EXTERIOR OF OTHER MOTOR VEHICLE
(70) Front bumper
(71) Hood edge
(72) Other front of vehicle (specify):
(73) Hood
(74) Hood ornament
(75) Windshield, roof rail, A-pillar
(76) Side surface
(77) Side mirrors
(78) Other side protrusions (specify)
(79) Rear surface
(80) Undercarriage
(81) Tires and wheels
(82) Other exterior of other motor vehicle (specify):
(83) Unknown exterior of other motor vehicle

OTHER VEHICLE OR OBJECT IN THE ENVIRONMENT
(84) Ground
(85) Other vehicle or object (specify)
(86) Unknown vehicle or object

NONCONTACT INJURY
(90) Fire in vehicle
(91) Flying glass
(92) Other noncontact injury source (specify):
(93) Air bag exhaust gases
(97) Injured, unknown source

INJURY SOURCE CONFIDENCE LEVEL

(1) Certain
(2) Probable
(3) Possible
(9) Unknown

DIRECT/INDIRECT INJURY

(1) Direct contact injury
(2) Indirect contact injury
(3) Noncontact injury
(7) Injured, unknown source

OCCUPANT INJURY CLASSIFICATION

Body Region

(1) Head
(2) Face
(3) Neck
(4) Thorax
(5) Abdomen
(6) Spine
(7) Upper Extremity
(8) Lower Extremity
(9) Unspecified

Type of Anatomic Structure

(1) Whole Area
(2) Vessels
(3) Nerves
(4) Organs (includes muscles/ ligaments)
(5) Skeletal (includes joints)
(6) Head - LOC
(9) Skin

Specific Anatomic Structure

Whole Area
(02) Skin - Abrasion
(04) Skin - Contusion
(06) Skin - Laceration
(08) Skin - Avulsion
(10) Amputation
(20) Burn
(30) Crush
(40) Degloving
(50) Injury - NFS
(90) Trauma, other than mechanical

Head - LOC
(02) Length of LOC
(04, 06, 08) Level of Consciousness
(10) Concussion

Spine
(02) Cervical
(04) Thoracic
(06) Lumbar

Vessels, Nerves, Organs, Bones, Joints are assigned consecutive two digit numbers beginning with 02

Level of Injury

Specific injuries are assigned consecutive two-digit numbers beginning with 02.

To the extent possible, within the organizational framework of the AIS, 00 is assigned to an injury NFS as to severity or where only one injury is given in the dictionary for that anatomic structure. 99 is assigned to any injury NFS as to lesion or severity.

Abbreviated Injury Scale

(1) Minor injury
(2) Moderate injury
(3) Serious injury
(4) Severe injury
(5) Critical injury
(6) Maximum (untreatable)
(7) Injured, unknown severity

Aspect

(1) Right
(2) Left
(3) Bilateral
(4) Central
(5) Anterior
(6) Posterior
(7) Superior
(8) Inferior
(9) Unknown
(0) Whole region