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Medium-Truck Special Study Coding Manual

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Abstract

NHTSA has identified increasing trends in the occurrence of fatal medium-truck (GVWR 10,001 - 26,000 lbs.) crashes in recent years. Based on data from the Fatality Analysis Reporting System medium trucks were involved in 2 percent of total fatal crashes in 2015. In 2019 this number increased to 4 percent. To gain further understanding of medium-truck crashes, the Medium-Truck Special Study (MTSS) was conducted. The main objectives of the MTSS project were to identify the critical reasons for the critical events and causal factors in fatal crashes involving at least one medium truck to better align research programs and focus efforts on appropriate countermeasures, and assess if crash avoidance technologies could have affected the crash and injury severity of medium-truck crashes. This coding manual describes the data elements, attributes, and coding definitions used for the MTSS.

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Introduction

Background

The National Highway Traffic Safety Administration has identified increasing trends in the occurrence of fatal medium-truck (GVWR 10,001 - 26,000 lbs.) crashes in recent years. Based on data from the Fatality Analysis Reporting System, medium trucks were involved in 2 percent of total fatal crashes in 2015. In 2019 this number increased to 4 percent. To gain further understanding of medium-truck crashes, the Medium Truck Special Study (MTSS) was conducted.

Objective

The main objectives of the MTSS project were to:

- Identify the critical reasons for the critical events and causal factors in fatal crashes involving at least one medium truck to better align research programs and focus efforts on appropriate countermeasures, and
- Assess if crash avoidance technologies could have affected the crash and injury severity of medium-truck crashes.

About the Manual

Data elements are being collected in the MTSS based on information from the police crash report, images, reconstruction, and any other documentation obtained from police. The elements and attributes are predominately from current and legacy NCSA data collection programs including the following.

- Fatal Accident Reporting System (FARS)
    - 2018 data used
- Large Truck Crash Causation Study (LTCCS)
    - Conducted between 2001-2003
- Crash Investigation Sampling System (CISS)
    - Conducted 2016-Current
- Truck Crashworthiness Data Special Study (TCDSS)
    - Conducted by Special Crash Investigation for VSR using 2011 FARS data

This manual includes every element being collected in the MTSS. Elements populated into the data entry application from FARS will only list the element name. Elements with origins in other previous and current studies (not FARS) have detailed coding guidance included in this manual. For additional information regarding the FARS attributes, definitions, and remarks please refer to the 2018 FARS Coding and Validation Manual at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812828.

The manual is divided into sections based on subject, and the data entry application follows the same format.

- Crash
- Truck
- Other Vehicles
- Precrash
- Drivers
- Person
- Avoidance Equipment Assessment

CRASH

Math Analysis Case Number

ELEMENT VALUES:

Range: 001-400

REMARKS:

This element value describes the sequential case number based on NHTSA Math Analysis-provided documentation.

For additional information see the 2018 FARS Coding and Validation Manual.

FARS Case Number

This element populated from FARS case.

Number of Vehicle Forms

This element populated from FARS case.

Number of Occupant Forms

This element populated from FARS case.

Crash Date

This element populated from FARS case.

Crash Time

This element populated from FARS case.

Relation to Junction

This element populated from FARS case.

Type of Intersection

This element populated from FARS case.

Relation to Trafficway

This element populated from FARS case.

Work Zone

This element populated from FARS case.

Light Conditions

This element populated from FARS case.

Atmospheric Conditions

This element populated from FARS case.

FARS Crash-Related Factors

This element populated from FARS case.

First Harmful Event

This element populated from FARS case.

Manner of Collision

This element populated from FARS case.

Accident Event Sequence Number

This element populated from FARS case.

Sequence Vehicle # (This Vehicle)

This element populated from FARS case.

Sequence Areas of Impact (This Vehicle)

This element populated from FARS case.

Sequence of Events (SOE)

This element populated from FARS case.

Sequence Vehicle # (Other Vehicle)

This element populated from FARS case.

Sequence Areas of Impact (Other Vehicle)

This element populated from FARS case.

Trafficway Identifier

This element populated from FARS case.

Route Signing

This element populated from FARS case.

Land Use and Functional System

This element populated from FARS case.

Ownership

This element populated from FARS case.

National Highway System

This element populated from FARS case.

Special Jurisdiction

This element populated from FARS case.

Milepoint

This element populated from FARS case.

Global Position

This element populated from FARS case.

Crash Notes

The Notes page provides a location to include any additional information relevant to the crash form not captured in the preceding elements.

TRUCK

Note: The Truck Form is completed for vehicles with Body Type = 60-62, and 64-67.

For additional information see the 2018 FARS Coding and Validation Manual.

Vehicle Number

This element populated from FARS case.

Number of Occupants

This element populated from FARS case.

Unit Type

This element populated from FARS case.

Travel Speed

This element populated from FARS case.

Underride/Override

This element populated from FARS case.

Vehicle Removal

This element populated from FARS case.

Sequence of Events

This element populated from FARS case.

Most Harmful Event

This element populated from FARS case.

Vehicle Model Year

This element populated from FARS case.

Vehicle Identification Number

This element populated from FARS case.

Vehicle Make

This element populated from FARS case.

Vehicle Model

This element populated from FARS case.

Vehicle Body Type

This element populated from FARS case.

GVWR

This element populated from FARS case.

Vehicle Empty Weight – Power Unit/Cargo Body

ELEMENT VALUES:

Range: 00001-20,000 kgs

99999 Unknown

REMARKS:

This element value establishes the empty weight for power unit of the vehicle. The empty weight for the power unit includes the driver's weight and the weight of on-board fuel (i.e., these weights are added to manufacturer's weight specifications).

The (Unknown) designation is used when there is insufficient information to determine the empty weight.

Motor Carrier Authority/ID number

This element populated from FARS case.

Vehicle Configuration

This element populated from FARS case.

Cargo Body Type

This element populated from FARS case.

Cargo Type

ELEMENT VALUES:

(00) Empty

(01) General freight

(02) Household goods

(03) Building materials

(04) Metal (coils, sheets)

(05) Heavy machinery

(06) Large objects

(07) Motor vehicles

(08) Piggyback/tow-away

(09) Gases in bulk

(10) Solids in bulk

(11) Liquids in bulk

(12) Explosives

(13) Logs, poles, lumber

(14) Refrigerated foods

(15) Mobile home

(16) Farm products

(17) Live animals

(18) Other (specify): _____

(75) Tractor power unit with container cargo

(76) Tractor power unit with other bulk cargo (specify): _____

(97) Not applicable

(99) Unknown

REMARKS:

This element value establishes the type of cargo carried.

CODE "00" (Empty) is used when the unit is completely empty.

CODE "01" (General freight) is used for processed items, packaged or in some way containerized, and fairly closely packed. Use the degree of processing to differentiate between cargo types. For example, empty bottles, in crates, destined for a bottling plant are general freight, vehicle scrap glass is a solid in bulk. Other examples of general freight include air freight, baked goods, beer in containers, bales of cardboard, clothes, crated furniture,

unrefrigerated groceries, laundry, mail and parcels, office supplies, unused paper products, gases in cylinders, drilling mud in sacks, peat/topsoil in bags, rolls of burlap, carpet rolls, and bagged animal feed.

CODE "02" (Household goods) is used for uncrated household or office furniture, band equipment, theatrical equipment, and trade show displays.

CODE "03" (Building materials) is used for bricks, blocks, cement in bags, insulation, and mixed cargoes of these materials in addition to lumber, paint, hardware, windows, and other similar types of construction materials.

CODE "04" (Metal [coils, sheets, etc.]) is used for processed, unpackaged metal including metal pipe, coils, metal fencing, ingots, steel plates, corrugated tin, and similar processed metal cargoes. This category includes items like steel guard rails and other manufactured metal items that do not fall in either the heavy machinery, large object, or general freight categories. Scrap metal cargoes are excluded from this category.

CODE "05" (Heavy machinery) is used for cargoes that are typically carried on flatbed or low boy trailers. Examples include off-road vehicles like bulldozers and backhoes, forklifts, construction machinery, large lathes, and farm tractors.

CODE "06" (Large objects) is used for cargoes that are considered to be large individual objects. Examples include large concrete culvert or pipe, pianos, 30 ft. metal dog houses, prefabricated buildings, crushed or wrecked cars, concrete and steel manhole assemblies, bank vault door assemblies, mausoleums, concrete forms, bridge girders, ballistic missiles, and boats.

CODE "07" (Motor vehicles) is used for cargoes classified as motor vehicles capable of at least 40 mph on public roadways. These vehicles must be transported such that no wheels touch the ground. Motor vehicles are typically transported on flatbed trucks/trailers, on auto-carriers, and less frequently in van truck/trailers.

CODE "08" (Piggyback/tow-away) refers to trucks being carried piggyback on a power unit. The trucks being carried have their front axles off the ground, resting on the vehicle in front. Several vehicles may be hitched together in this manner. This category is also used for wreckers towing a vehicle in the conventional manner. In this situation, cargo weight should be coded as empty. A similar convention is used for log trailers when these units are carried piggyback on tractors with no cargo. The tractor is coded as pulling no trailer in this situation (i.e., first, second, and third trailer positions are coded as not applicable).

CODE "09" (Gases in bulk) is used when gases are carried in tank bodies only and are not otherwise containerized. Examples include aerosol propellant, butane, C02, LPG, nitrogen, and propane. Gas in cylinders is classified as general freight.

CODE "10" (Solids in bulk) is used for cargoes that are not packaged and are generally carried loose. Examples include scrap batteries, empty used bottles (new empty bottles are general freight), cement in bulk, wood chips, cloth scraps, empty used chicken coops, empty used produce or fruit crates/cartons, ice on a flatbed, all garbage, glass, lime, manure, all scrap metal, moss of any kind, mulch, old newspapers (current newspapers to be delivered are general freight), recyclable material, rocks, road service materials, sawdust, solid sludge, highway signs, used tires, tombstones, bagged rock salt, backhauls of empty pallets, and mixing concrete.

CODE "11" (Liquids in bulk) is used for all liquid cargoes that are transported in tanks and are not otherwise packaged. Examples include brine, gasoline, whiskey mash, milk, driller's mud (90% water), oil, septic waste, molten sulfur, sulfuric acid, water, and tallow.

CODE "12" (Explosives) is used when any portion of the load consists of explosives (i.e., the entire load is considered explosive). Two exceptions are ballistic missiles and torpedoes that are considered large objects.

CODE "13" (Logs, poles, lumber) is used when the cargo is logs or processed wood including poles, dimension lumber, plywood, chipboard, pulpwood, firewood, and new pallets fresh from the factory. Used crates, old pallets, wood chips, solid wood residues, and bark are classified as solids in bulk.

CODE "14" (Refrigerated foods) is used for cargoes of cooled food in a "reefer" or refrigerated van vehicle. The food may also be packed in ice in insulated containers.

CODE "15" (Mobile home) is used for mobile homes, office trailers, one-half of manufactured home, and "double-wide". Conventional homes are classified as other.

CODE "16" (Farm products) is used for cargoes that are unprocessed items that were grown or produced incident to any agricultural activity on a farm, in a garden, in an orchard, or in a nursery (excluding wood chips, bark, logs, lumber, and other processed wood).

CODE "17" (Live animals) is used for live animal cargoes. Examples include bees, cows, fowl, pigs, rats, zebras, cattle, horses, and circus animals.

CODE "18" [Other (specify): _____] is used for cargoes that cannot be classified in preceding categories. Examples include houses, people, and utility company cargoes (e.g., electrical parts/tools not intended for sale).

CODE "75" (Tractor power unit with container cargo) is used when the tractor power unit is transporting containerized cargo. An example would be a tractor power unit hauling a dumpster that is strapped to the fifth wheel.

CODE "76" [Tractor power unit with other bulk cargo (specify): _____] is used when the tractor power unit is transporting other non-containerized bulk cargo. Specify the nature of the cargo.

CODE "97" (Not applicable) is typically used to indicate that there is no trailer at the specified position (i.e., first, second, or third trailer position).

CODE "99" (Unknown) is used when there is insufficient information to determine the cargo type for a specific trailer.

Cargo Weight

ELEMENT VALUES:

Range: 00001-20,000 kgs

00000 No Cargo- Empty

99999 Unknown

REMARKS:

This element value establishes the weight of the cargo transported in ALL units of the vehicle, including any trailers. The cargo weight is recorded to the nearest 10 kilograms for each unit.

The (Unknown) designation is used when there is insufficient information to determine the weight of cargo.

Cargo Spillage

ELEMENT VALUES:

(0) No spillage

(1) Non-hazardous spillage

(2) Hazardous spillage

(7) Not applicable (includes tractor power unit)

(9) Unknown

REMARKS:

This element value establishes the occurrence of cargo spillage during the crash sequence. To qualify the cargo spillage must occur as a result of or following the first harmful event. Spillage of fuel from the involved vehicles and the scattering of debris from the crash are not considered cargo spillage. Similarly, cargo spillage that occurs prior to the first harmful event (i.e., pre-crash phase) is not considered applicable to this variable.

CODE "0" (No spillage) is used when there is no cargo spillage as a result of the crash or non-crash sequence.

CODE "1" (Non-hazardous spillage) is used when cargo spillage occurs as a result of the crash and the spilled cargo is non-hazardous is nature.

CODE "2" (Hazardous spillage) is used when cargo spillage occurs as a result of the crash and the spilled cargo is hazardous in nature.

CODE "7" [Not applicable (includes tractor power unit)] is used when there is no trailer at a specified location. This classification is also typically used for tractor power units that are not carrying cargo.

CODE "9" (Unknown) is used when there is insufficient information to determine if there was cargo spillage from a specific unit in the vehicle configuration.

For additional information see the 2018 FARS Coding and Validation Manual.

Hazardous Materials Involvement/Placard

This element populated from FARS case.

Vehicle Trailing

This element populated from FARS case.

Jackknife

This element populated from FARS case.

Bus Use

This element populated from FARS case.

Special Use

This element populated from FARS case.

Emergency Motor Vehicle Use

This element populated from FARS case.

FARS Vehicle-Related Factors

This element populated from FARS case.

Vehicle Condition Factors

ELEMENT VALUES:

(Code up to four elements.)

(0) No vehicle-related factors

(1) View obstruction – related to load

(2) View obstruction – related to vehicle design

(3) View obstruction - other

(4) Tire malfunction

(5) Braking system malfunction

(6) Transmission malfunction

(7) Engine problem

(8) Other (specify): _____

(9) Unknown

REMARKS:

This element value establishes vehicle conditions that may be relevant to crash occurrence. Select and enter up to four separate conditions. The other designation may be selected and entered multiple times. Specify the associated vehicle condition for each entry.

CODE "0" (No vehicle-related factors) is used when there is no evidence that a vehicle-related condition is relevant to this crash. This designation is also used to fill in unused coding spaces (i.e., less than four factors are coded).

CODE "1" (View obstruction – related to load) is used when the driver experiences a view obstruction that is related to the vehicle's load. Typically, in this circumstance, the obstruction is related to oversized cargo. Less frequently occurring, however, is the circumstance where the obstruction is related to improper loading of the cargo. Both situations are included in this designation.

CODE "2" (View obstruction – related to vehicle design) is used when the driver experiences a view obstruction that is related to vehicle design (e.g., view blocked by right upper A-pillar).

CODE "3" (View obstruction – other) is used when the driver experiences a view obstruction that is associated with a factor not described in preceding elements. Annotate electronic file entries to indicate the nature of this factor.

CODE "4" (Tire malfunction) is used when the vehicle experiences a tire malfunction (blowout, air out, etc.) during the precrash phase.

CODE "5" (Braking system malfunction) is used when the vehicle experiences a braking system malfunction during the precrash phase. NOTE: Degraded braking performance (i.e., out-of-adjustment) is coded under the other designation (Code "8").

CODE "6" (Transmission malfunction) is used when the vehicle experiences a transmission malfunction during the precrash phase.

CODE "7" (Engine problem) is used when the vehicle experiences an engine-related problem during the precrash phase. Examples of engine-related problems include stalling, missing, and throttle problems.

CODE "8" (Other) is used when the vehicle experiences a problem/exhibits a condition during the precrash phase that is relevant to crash occurrence but is not described in preceding elements.

CODE "9" (Unknown) is used when there is insufficient information to determine if there is a vehicle condition that is relevant to crash occurrence.

For additional information see the 2018 FARS Coding and Validation Manual.

Fire

This element populated from FARS case.

Trailer Identification Number

This element populated from FARS case.

Empty Weight – Trailer

ELEMENT VALUES:

Range: 00001-20,000 kgs

00000 No Trailer

99999 Unknown

REMARKS:

This element value establishes the empty weight for the trailer of the vehicle. The empty weight for the trailer includes the weight of any dolly's, B trains, or jeeps that are used in association with that trailer.

If there is no unit at a specified position use the No Trailer designation – 00000.

The (Unknown) designation is used when there is insufficient information to determine the empty weight of the trailer.

For additional information see the 2018 FARS Coding and Validation Manual.

Rollover

This element populated from FARS case.

Location of Rollover

This element populated from FARS case.

Number of Quarter Turns

Element Values:

0	No rollover
x	Enter the number of quarter turns:
98	End over end
99	Unknown

Range 1-20, Unknown

20 includes, 21 or more quarter rolls

Remarks:

Enter the number of quarter turns

Based on the technician's crash reconstruction. A "quarter turn" is defined as a rotation of 90 degrees about the longitudinal axis of the vehicle; this does not include rotation about the vertical axis, commonly called yaw. Therefore, if a vehicle rolled about the longitudinal axis onto its roof (i.e., side- to-side roll), then it would be considered a 180-degree roll and entered as "2" quarter turns.

Interrupted Roll

Element Values:

0	[No rollover]
1	Yes
2	No
99	Unknown
98	End over End

Remarks:

The purpose of this variable is to determine if the vehicle's rollover sequence was acted upon by another vehicle or object between the trip point and the final rest position. Examples may include the vehicle striking a tree with its top during the rollover sequence, or contacting an object in the environment. This impact should have an effect on the distance the vehicle would have traveled from trip point to final rest.

Yes

Used when the rollover sequence was interrupted.

No

Used when the rollover sequence was not interrupted.

Unknown

Used when it is unknown if the rollover sequence was interrupted.

Pre-Rollover Maneuver

Element Values:

0 No rollover

2 Departing roadway (to paved surface)

3 Departed roadway (to non-paved surface)

4 Returning to roadway (from paved surface)

5 Returning to roadway (from non-paved surface)

6 On roadway maneuver

7 Off roadway maneuver

99 Unknown

Remarks:

Determine the last controlled maneuver, relative to the roadway, prior to the initiation of the rollover.

No rollover

No rollover occurred involving this vehicle.

Departing roadway (to paved surface)

Vehicle departs roadway to a paved shoulder, gore or other area as the last movement prior to the tripping point. This area is usually delineated by painted lines or ceramic dots.

Departing roadway (to non-paved surface)

Vehicle departs roadway to an unpaved shoulder or unimproved area as the last movement prior to the trip point.

Returning to roadway (from paved surface)

Vehicle returns to the roadway from a paved shoulder or other area as the last movement prior to the trip point. Painted lines or ceramic dots usually delineate this area.

Returning to roadway (from non-paved surface

Vehicle returns to the roadway from an unpaved shoulder or other area as the last movement prior to the trip point.

On Roadway maneuver

The vehicle remained predominantly on the roadway and the trip point is on the roadway or immediately next to it.

Off Roadway maneuver

The vehicle departed the roadway completely. While off the roadway the vehicle began or completed a maneuver different than the one that took it off the roadway.

Unknown

The technician is unable to determine the maneuvers or location of the vehicle just prior to the rollover initiation. This code should be used only in very rare instances.

Rollover Initiation Type

Element Values:

0	[No rollover (no overturning)]
1	Trip-over
2	Flip-over
3	Turn-over (specify)
4	Climb-over
5	Fall-over
6	Bounce-over
7	Collision with another vehicle
8	Other rollover initiation type (specify)
98	End-over-end
99	Unknown

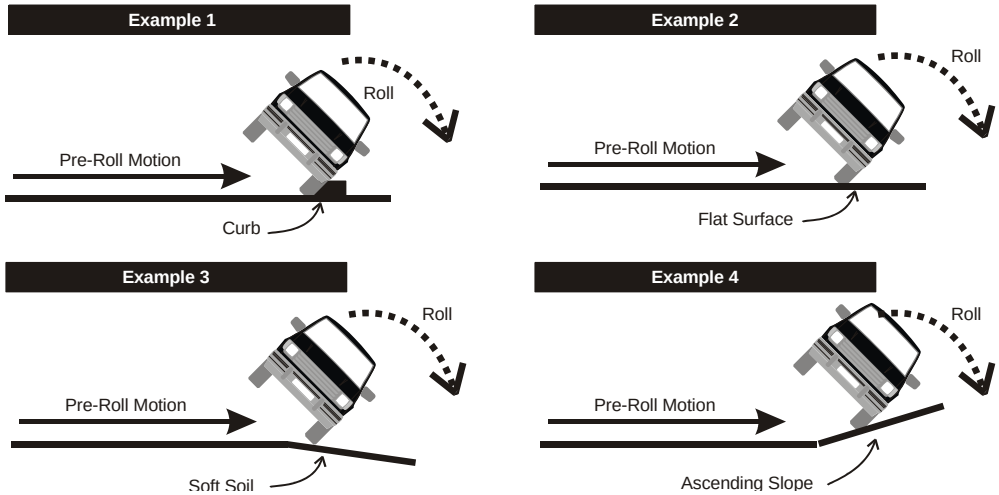
Remarks:

Various types of rollovers are identified above. A vehicle action that cannot be categorized under any of the above elements should be coded **Other rollover initiation type** and specified in the space provided. The attributes below are used for rollovers initiated about the longitudinal axis. Rollover Types indicated as Rollover – end-over-end (i.e., primarily about the lateral axis) will automatically code all the rollover variables to reflect an end-over-end rollover.

Trip-over

Used when the vehicle's lateral motion is suddenly slowed or stopped, inducing a rollover. The opposing force may be produced by a curb, potholes, or pavement/soil dug into by a vehicle's wheels.

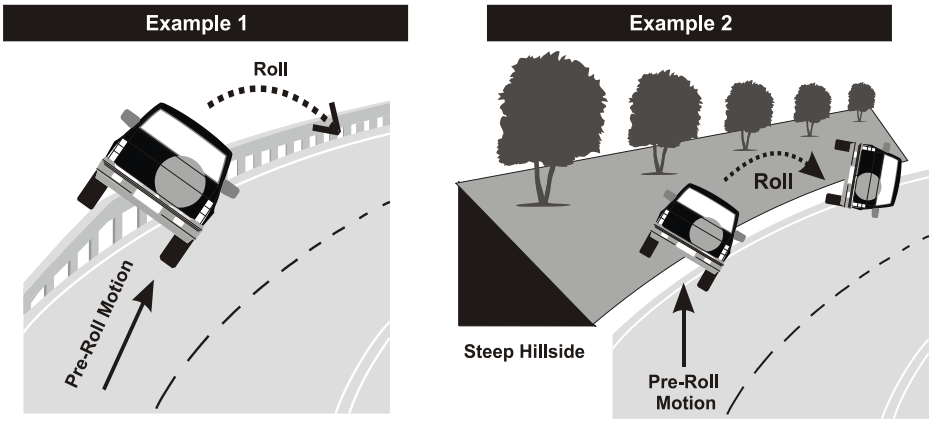
Trip-Over:
The vehicle's lateral motion is resisted by opposing force, inducing roll moment.



Flip-Over

Flip-Over

Forward moving vehicle is vigorously rotated about its longitudinal axis by a ramp-like object such as a guardrail taper or ditch back slope.

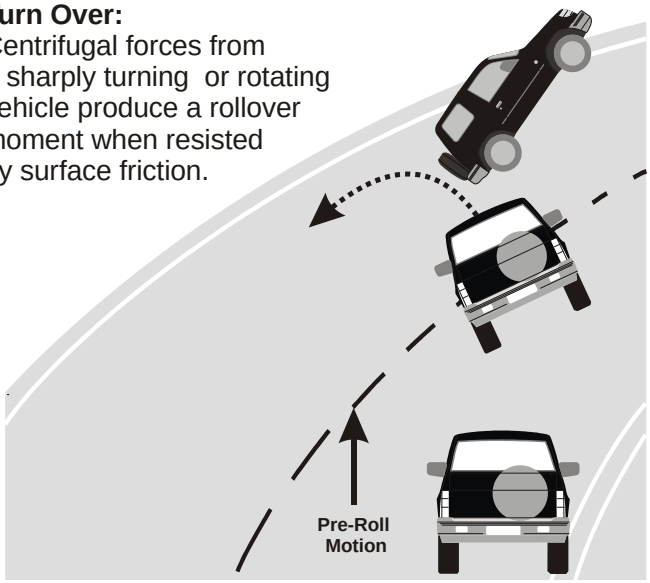


Used when the vehicle is rotated about its longitudinal axis by a ramp-like object may be in a yaw when it comes in contact with the ramp-like object. For example, if the vehicle traveling forward climbs the down turned end of a guardrail and rolls over about its longitudinal axis, use this code. to use this, the vehicle's roll need not begin on the ramp-like structure or object, for example, if the vehicle transverses the turned-down end of a guardrail, continues along the level portion, then rolls back toward the side of the guardrail from which it came, use this code.

Turn-Over

Used when centrifugal forces from a sharply turning or rotating vehicle produce a rollover when resisted by normal surface friction. This type of rollover is more likely to occur in vehicles with a higher center of gravity than most passenger vehicles. The surface type includes pavement surfaces plus gravel, grass, dirt, etc. The distinction between **Turn-over** and **Trip-over** is that no furrowing, gouging, etc. occurs to the surface at the point of trip. In addition see remarks for **Fall-over** below. When turnover is selected, the justification **must be entered**.

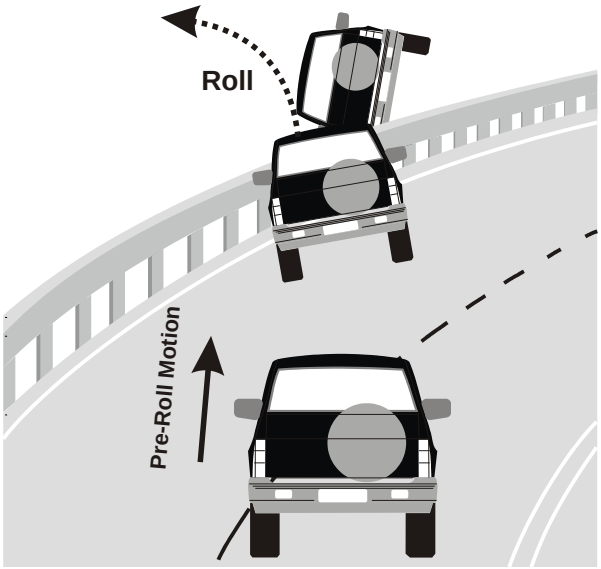
Turn Over:
Centrifugal forces from a sharply turning or rotating vehicle produce a rollover moment when resisted by surface friction.



Climb-Over

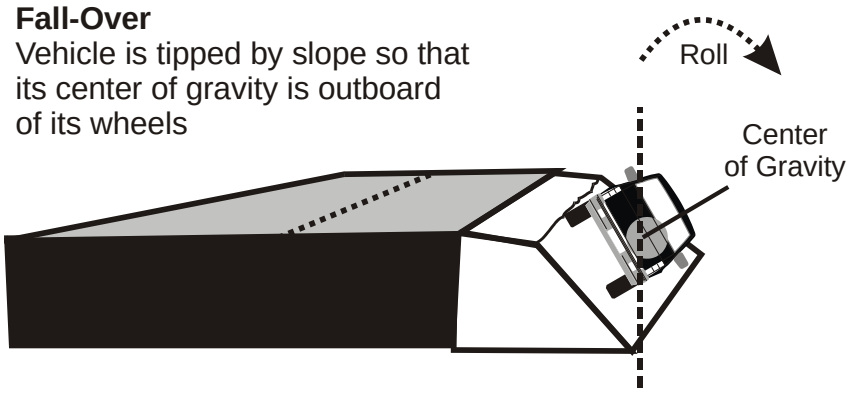
Used when a vehicle climbs up and over a fixed object such as a barrier or guardrail. The object should be high enough to lift the vehicle completely off the ground (i.e., the height should exceed the radius of the vehicle's largest diameter wheel). The vehicle must roll to the opposite side from which it approached the object.

Climb-Over
Vehicle climbs up and over fixed object such as a guardrail



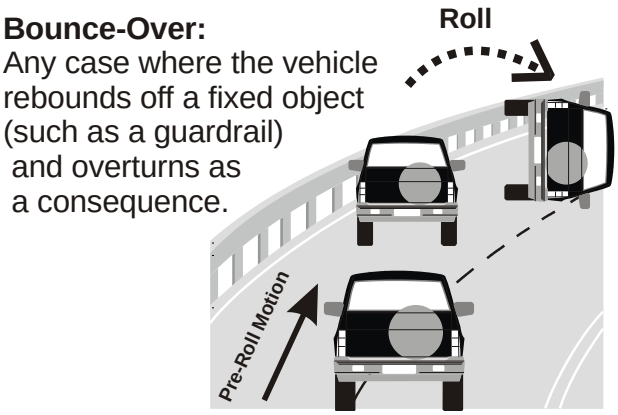
Fall-Over

Used when the surface the vehicle is traversing slopes downward in the direction of movement of the vehicle's center-of-gravity such that the vehicle's center of gravity becomes outboard of its wheels. The distinction between this and **Turn-over** above involves the negative slope of the traversed surface. If the rotation and/or the surface friction causes the trip, then use **Turn-over**; however, if the slope is so negative that a line straight downward through the vehicle's center-of-gravity (as shown in the illustration) would fall outside the vehicle's track, then use this attribute. For example, if a vehicle goes off the road and encounters a substantial surface drop off because of the elevated nature of the road in relation to its environment (cliff, ditch, etc.), then use this attribute.



Bounce-Over

Used when a vehicle deflects off a fixed object (such as a guardrail, barrier, tree, or pole) or a not-in-transport vehicle such that the vehicle's rotation causes it to overturn. The deflection momentum contributes to a rollover. to use this attribute, the rollover must occur in close proximity to the object from which it deflected. For example, if a vehicle strikes a center median barrier and rotates across two traffic lanes prior to the vehicle rolling over, then **Trip-over** or **Turn-over** would apply.



Collision with another vehicle

Used when an impact with another vehicle causes the rollover. The rollover must be the immediate result of the impact between the vehicles (e.g., intersection crashes where a vehicle is struck in the side and the momentum of the struck vehicle results in the rollover or offset end-to-end type crashes when one vehicle will vault over the tapered end of another vehicle resulting in a rollover). Otherwise use attributes above. For example, if a vehicle is struck in the side ***and*** the vehicle rotates ***and*** does not produce any wheel/rim gouges or furrows in the surface nor encounters any prominent raised objects (e.g., a high curb) ***and*** overturns in close proximity to the point of impact, then use this attribute.

Other rollover initiation type

Used when this vehicle's rollover initiation type cannot be described above. Whenever this is used, the technician is required to ***specify*** the type of rollover that occurred.

Unknown

Used when the type of rollover initiation is unknown

End-over-end

Entered when the type of rollover is end-over-end.

Rollover Initiation Object Contacted Class

Element Values:

0 No Rollover

1 Vehicle

2 Non-collision

3 Collision With Fixed Object

5 Collision With Non-Fixed Object

7 Other Event (specify)

9 Unknown Event or Object

Remarks:

The Object Contacted codes in the next variable are grouped into specific classes. The class is first selected and then the object lists are filtered for items in that specific class.

Vehicle

Used when the object contacted that caused this vehicle to rollover is another vehicle.

Non-collision

Is automatically entered by the program when a "Turn Over" or "Fall Over" is selected as the rollover initiation type, or when the rollover was initiated by a jackknife non-collision. Additionally, this code is used for end-over-end rollovers.

Collision with a Fixed Object

Used when an impact with a fixed object (a tree, breakaway pole or post, embankment, curb, etc.) caused the rollover.

Non-Breakaway Pole or Post

Used when the object contacted that caused the vehicle to rollover was a non-breakaway pole or post.

Collision with a Non-Fixed Object

Used when the collision that initiated the rollover is a non-fixed object (motor vehicle not in transport, animal, railway vehicle, trailer disconnected in transport, etc.).

Rollover Initiation Object Contacted

Element Values:

0 [No rollover (no overturning)]

Vehicle number (1-30)

Non-collision

31 Turn-over — fall-over

32 No rollover impact initiation (end-over-end)

34 Jackknife

Collision with Fixed Object

41 Tree (<=10 centimeters in diameter)

42 Tree (> 10 centimeters in diameter)

43 Shrubbery or bush

44 Embankment

45 Breakaway pole or post (any diameter)

47 Cable barrier guardrail

48 Guardrail Face

49 Guardrail End

Non-Breakaway Pole or Post

50 Pole or post (<=10 centimeters in diameter)

51 Pole or post (> 10 centimeters but <= 30 centimeters diameter)

52 Pole or post (> 30 centimeters in diameter)

53 Pole or post (diameter unknown)

54 Concrete traffic barrier

55 Impact attenuator

56 Other traffic barrier (specify)

57 Fence

58 Wall

59 Building

Non-Breakaway Pole or Post cont'd

60 Ditch or culvert

61 Ground

62 Fire hydrant

63 Curb

64 Bridge

68 Other fixed object (specify):

69 Unknown fixed object

Collision with Non-Fixed Object

76 Animal

77 Railway vehicle

78 Trailer, disconnected in transport

79 Object fell from vehicle in-transport

88 Other non-fixed object (specify):

89 Unknown non-fixed object

Other Event

98 Other event (specify)

Unknown Event or Object

99 Unknown event or object

Remarks:

This variable is related to Rollover Initiation Type and identifies the source of the force that acted upon the vehicle that resulted in the rollover. These attributes are obtained from the Exterior Vehicle Form, CDC tab, Object Contacted attributes. If the rollover was initiated by an impact that was assigned a CDC, then the applicable element value will be selected for this variable. If the rollover was not initiated by a CDC applicable impact, then it is unlikely that the same value will be selected. Therefore, the technician must determine the cause (i.e., initiation force) of the rollover and consequently the object contacted during the rollover. For example, if a vehicle strikes a curb that trips the vehicle, then select **Curb** even though the CDC Object Contacted for the rollover would probably equal **Overturn- rollover.**

Similarly, if a vehicle vaults a longitudinal barrier (Climb-over), then select **Concrete traffic barrier** or **Other traffic barrier**, depending upon the longitudinal barrier design. If a yawing vehicle rolls as a result of centrifugal forces caused by normal surface friction or as a result of burrowing into soft soil, then select **Ground** because the ground applied the force that acted as the tripping mechanism for the rollover.

Vehicle number

Select the vehicle number to report the vehicle that impacted this vehicle and caused the rollover to occur [i.e., Rollover initiation type must equal Collision with another vehicle]. Select the vehicle number of the vehicle that initiated the rollover to this vehicle. This will be most common when one vehicle (generally with a high center of gravity) is involved in an offset head-on crash with a second vehicle (possibly with a lower sloping front end) resulting in a vaulting type rollover. Do not use these attributes if the vehicle rolls over subsequent to its impact with

another vehicle but because of centrifugal force or a tripping mechanism. These latter two causes would take priority.

Turn-over — fall-over

Excludes end-over-end and is used when the vehicle roll is precipitated by centrifugal or gravitational forces and Rollover Initiation Type, has been selected **Turn-over** or **Fall-over**.

Jackknife

Used when a vehicle rolls over as result of a jackknife and the sole reason for the rollover is the force applied by the jackknifing trailer. For example, if a vehicle is pulling a trailer and the trailer jackknifes (i.e., 90 degrees rotation and intraunit damage) and overturns, for whatever reason (trailer tires furrow in soft earth, centrifugal force, trailer trips, load shifts causing it to tip, etc.), ***and*** the trailer's overturning causes this vehicle to overturn, then use this. However, if a centrifugal force or tripping mechanism causes the vehicle to overturn with or without the trailer overturning, then use another attribute.

Tree (< 10 centimeters in diameter)

Used when a vehicle impacts a tree that has a diameter of ten centimeters or less and the tree either (1) acts like a rigid barrier or (2) bends or breaks causing the vehicle to rollover [i.e., Rollover Initiation Type equals Trip-over, Flip-over, or Bounce-over]. Select another attribute when a vehicle impacts a tree and experiences a subsequent rollover due to centrifugal forces or other tripping mechanisms.

Tree (> 10 centimeters in diameter)

Used when a vehicle impacts a tree with a diameter of greater than 10 centimeters and the tree either (1) acts like a rigid barrier or (2) bends or breaks causing the vehicle to rollover [i.e., Rollover Initiation Type equals Trip-over, Flip-over, or Bounce-over]. Select another attribute when a vehicle impacts a tree and experiences a subsequent rollover due to centrifugal forces or other tripping mechanisms.

Shrubbery or bush

Used when a vehicle impacts shrubbery or bushes and the contacted object causes the vehicle to rollover [i.e., Rollover Initiation Type equals Trip-over or Flip-over]. This will be a very rare occurrence. Subsequent rollovers that result from centrifugal forces or other tripping mechanisms take priority for this variable.

Embankment

Used when a vehicle rides up or over an embankment and the vehicle rolls over as a result of the angle of the embankment [i.e., Rollover Initiation Type equals Flip-over or Fall-over]. Vehicles that dig into the surface of an embankment and rollover as a result of this tripping mechanism are captured in **Ground**.

Breakaway pole or post (any diameter)

Used whenever a vehicle impacts a breakaway pole or post (of any diameter) and that pole/post yields creating a ramping mechanism that causes a vehicle rollover. Select another attribute if a vehicle rolls over subsequent to the impact as a result of centrifugal forces or other tripping mechanisms.

Pole or post (<= 1**0 centimeters in diameter)**

Used whenever a vehicle impacts a non-breakaway pole with a diameter of 10 centimeters or less and that pole either (1) acts like a rigid barrier or (2) breaks or bends causing the vehicle to rollover [i.e., Rollover Initiation Type equals Flip-over or Bounce-over]. Do not use this attribute if a vehicle rolls over subsequent to the impact as a result of centrifugal forces or other tripping mechanisms.

Pole or post (> 10 centimeters but <= 30 centimeters in diameter)

Used whenever a vehicle impacts a non-breakaway pole with a diameter greater than ten centimeters but less than or equal to thirty centimeters and that pole either (1) acts like a rigid barrier or (2) breaks or bends causing the vehicle to rollover [i.e., 6 equals Flip-over or Bounce-over]. Select another attribute if a vehicle rolls over subsequent to the impact as a result of centrifugal forces or other tripping mechanisms.

Pole or post (>> 30 centimeters in diameter)

Used whenever a vehicle impacts a non-breakaway pole with a diameter greater than thirty centimeters and that pole either (1) acts like a rigid barrier or (2) breaks or bends causing the vehicle to rollover [i.e., Rollover Initiation Type equals Flip-over or Bounce-over]. Select another attribute if a vehicle rolls over subsequent to the impact as a result of centrifugal forces or other tripping mechanisms.

Pole or post (diameter unknown)

Used whenever a vehicle impacts a pole or post of an unknown diameter and that pole either (1) acts like a rigid barrier or (2) breaks or bends causing the vehicle to rollover [i.e., Rollover Initiation Type equals Flip-over or Bounce-over)]. Do not use this attribute if a vehicle rolls over subsequent to the impact as a result of centrifugal forces or other tripping mechanisms.

Concrete traffic barrier

Used whenever a vehicle impacts a concrete traffic barrier and that impact causes a rollover [i.e., Rollover Initiation Type equals Flip-over, Climb-over, or Bounce-over]. Rollovers that occur subsequent to the impact as a result of centrifugal force or other tripping mechanisms are not considered here. Refer to variable Objected Contacted for examples and definitions of concrete traffic barriers.

Impact attenuator

Used whenever a vehicle impacts a crash cushion (refer to variable Objected Contacted) and that impact causes a rollover [i.e., Rollover Initiation Type equals Flip-over or Bounce-over]. Rollovers that occur subsequent to the impact as a result of centrifugal force or other tripping mechanisms are not considered here.

Other traffic barrier

Used whenever a vehicle impacts a non-concrete longitudinal barrier as defined in variable Objected Contacted and that impact causes a rollover [i.e., Rollover Initiation Type equals Flip-over, Climb-over, or Bounce-over Rollovers that occur subsequent to the impact as a result of centrifugal force or other tripping mechanisms are not considered here.

Cable barrier guardrail

Refers to a guardrail consisting of 2 to 4 wire cables supported by cable mounts that are attached to steel posts.

Guardrail face

Refers to a cold formed standard W Section or thrie-beam of steel rigid beam elements bolted to posts usually with offset blocks.

Guardrail end

Refers to the end of a guardrail. Guardrails can have a separate flat or rounded piece of metal attached to the end of an expanse of guardrail face.

Fence, wall, and building

Are selected whenever one of these objects is contacted and that impact causes a rollover [i.e., Rollover Initiation Type equals Trip-over, Flip-over, Climb-over, or Bounce-over]. Definitions of these objects are defined in variable Object Contacted. Rollovers that occur subsequent to the impact as a result of centrifugal impacts and tripping mechanisms are not considered for these attributes.

Ditch or culvert

Used whenever a vehicle enters a ditch or culvert and the vehicle rolls over as a result of the slope of the ditch/culvert [i.e., Rollover Initiation Type equals Flip-over or Fall-over]. Refer to variable Objected Contacted for definition of ditch or culvert. Vehicles in a ditch that dig into the surface and rollover as a result of this tripping mechanism are captured in **Ground**.

Ground

Used when a vehicle rolls over as a result of contact with the ground [i.e., Rollover Initiation Type equals Trip-over]. "Ground" applies whether the rollover resulted from digging into soft soil, tripping over an accumulation of dirt or gravel, or gouging into the pavement. Vehicles that dig into the ground on embankments or in ditches and rollover, as a result of that digging, take this attribute.

Fire hydrant

Used whenever a vehicle impacts a fire hydrant and that impact causes a rollover. A fire hydrant is defined as a roadside device used by fire departments to provide water for fighting fires. Vehicles that rollover subsequent to a fire hydrant impact but not as a direct result of that impact (i.e., other tripping force) do not take this attribute.

Curb

Includes both mountable and barrier curbs as described for variable Objected Contacted. Curbs that act as a tripping mechanism will frequently have an impact (CDC) associated with them although this is not a criterion for using this attribute. When a curb acts as a tripping mechanism, Rollover Initiation Type is coded Trip over.

Bridge

Used whenever a vehicle impacts a bridge and that impact causes a rollover [i.e., Rollover Initiation Type equals Flip-over, Climb-over, or Bounce-over]. Refer to variable Objected Contacted for the definition of a bridge. Vehicles that rollover subsequent to a bridge impact but not as a direct result of that impact (i.e., other tripping force) do not take this attribute.

Other fixed object

Used when a fixed object, other than those previously identified impacted and that impact causes a rollover. Do not use this attribute if a vehicle rolls over subsequent to the impact as a result of centrifugal forces or other tripping mechanisms.

Unknown fixed object

Used when an unknown fixed object is impacted and that impact causes a rollover. Do not use this attribute if a vehicle rolls over subsequent to the impact as a result of centrifugal forces or other tripping mechanisms.

Passenger car, light truck, van, or other vehicle not in-transport

Used when a vehicle impacts a not-in-transport passenger car, light truck, van, or any other motor vehicle that is not a medium/heavy truck or bus and that impact causes the vehicle to rollover [i.e., Rollover Initiation Type equals Flip-over, Climb-over, or Bounce-over]. Vehicles that rotate and rollover as a result of centrifugal forces or other tripping mechanisms are not captured in this response.

Medium/heavy truck or bus not in-transport

Used when a vehicle impacts a not-in-transport medium/heavy truck or bus and that impact causes the vehicle to rollover [i.e., Rollover Initiation Type equals Flip-over, Climb-over, or Bounce- over]. Vehicles that rotate and rollover as a result of centrifugal forces or other tripping mechanisms are not captured in this response.

Animal

Used when a vehicle impacts an animal, and that impact causes the vehicle to rollover. This should be a very rare occurrence. Subsequent rollovers due to other tripping mechanisms are not captured in this response.

Railway vehicle

Used when a vehicle involved in a crash with a railway vehicle and the impact causes the vehicle to rollover. A railway vehicle is described as any moving or non-moving vehicle that travels on rails. This includes vehicles that are dual purpose, i.e., a vehicle designed to use both road and rail, if at the time of the crash the vehicle is on rails. Examples are trolleys on rails and trains.

Trailer, disconnected in transport

Used to report a trailer that has been disconnected from its power unit and subsequently impacted this vehicle and caused the rollover to occur. This will likely occur when a small trailer is involved in a head-on crash with a larger vehicle resulting in a vaulting type rollover. Do not use this attribute if the vehicle rolls over subsequent to an initial impact as centrifugal forces or tripping mechanisms take priority.

Object fell from vehicle in-transport

Used to report an object that was being carried by or was attached to a vehicle in-transport but fell from or became detached from that vehicle and subsequently impacted this vehicle and caused the rollover to occur. Do not use this attribute if the vehicle rolls over subsequent to an initial impact as centrifugal forces or tripping mechanisms take priority.

Other non-fixed object

Used when a non-fixed object, other than those described in the above attributes is impacted and that impact causes a rollover. Do not use this attribute if a vehicle rolls over subsequent to the impact as a result of centrifugal forces or other tripping mechanisms.

Unknown non-fixed object

Used when an unknown non-fixed object is impacted, and that impact causes a rollover. Do not use this attribute if a vehicle rolls over subsequent to the impact as a result of centrifugal forces or other tripping mechanisms.

Other event

Used when circumstances exist that cannot be captured in the element values above (e.g., load shift, high winds).

Unknown object

Used when variable a vehicle rolled over and the cause of the rollover (tripping mechanism) cannot be determined.

Direction of Initial Roll

Element Values:

0 [No Rollover]

1 Roll right-primarily about the longitudinal axis

2 Roll left-primarily about the longitudinal axis

8 [Rollover-end-over-end]

9 Unknown roll direction

Remarks:

During a side-over-side rollover, generally the corner or roof rail with the maximum crush is the trailing side. Also, grass, dirt or damage to the wheels of the leading edge should be observed. This will be a good indication of a roll to the right or a roll to the left. Striations or directional gouge marks on the vehicle are a good indication of a vehicle's roll along the longitudinal or lateral axis. Physical evidence at the crash scene, including yaw marks, scuffing, or gouging will also provide insight into the direction of the initial roll. It will not be uncommon to combine both vehicle and scene evidence when determining the direction of the initial roll.

Roll right

Used when the vehicle rolls over with the right side leading. This is a clockwise rollover from the driver's view.

Roll left

Used when the vehicle rolls over with the left side leading. This is a counterclockwise rollover from the driver's view.

Estimated Distance From Trip to Final Rest (in Meters)

Element Values:

888 [No Rollover]

Enter to the nearest meter

-999 Unknown

-998 [End-over-end]

Range: 1-500+

500 includes any measured distance above 500 meters

Remarks:

The purpose of this variable is to determine the **estimated** distance from tripping point to the final rest position of the vehicle that rolled over. The measurement should be obtained along a linear path. Total distance in meters rounded to the nearest whole number, examples 41.4 m = 41 m or 41.5 m = 42 m.

This measurement should be measured in the field along the path of the vehicle and the final rest measurement should be taken to the center of gravity (CG) of the vehicle at final rest. The measurements should start from the end of the vehicles tire marks if any are observed.

In cases where an accurate estimate of the distance cannot be obtained, (i.e., vehicle rolled down a ravine or off a cliff) "Unknown" should be coded.

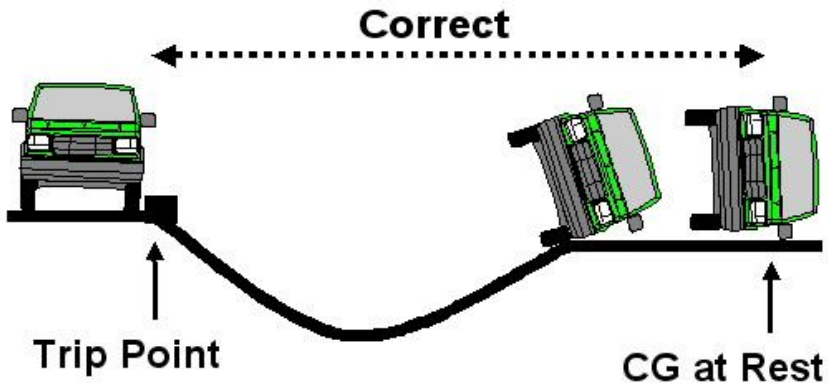
If a vehicle rolls and then slides to final rest, the entire distance from the point of trip to final rest will be measured.

In the situation where the vehicle overturns and climbs a positive embankment and stops, then gravity causes the vehicle to slide or roll down the embankment, code only the distance traveled during the initial roll, (i.e., distance up the embankment.).

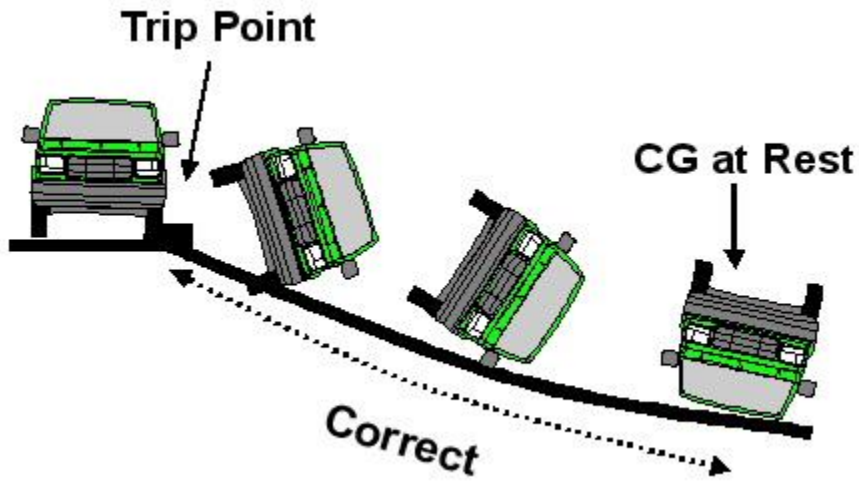
Unknown

Used when the technician could not determine the distance from initial point of roll to final rest.

Example 1



Example 2



Plane in Contact With Ground at Final Rest

ELEMENT VALUES:

(0) No Rollover

(1) Left side

(2) Right side

(3) Top

(4) Wheels

(9) Unknown

REMARKS:

This element value establishes the plane of the vehicle that is in contact with the ground at the completion of the rollover sequence (i.e., vehicle at final rest position).

CODE "1" (Left side) is used when the vehicle comes to rest on its left side.

CODE "2" (Right side) is used when the vehicle comes to rest on its right side.

CODE "3" (Top) is used when the vehicle comes to rest on its top structure.

CODE "4" (Wheels) is used when the vehicle comes to rest in an upright position.

CODE "9" (Unknown) is used when there is insufficient information to determine which plane of the vehicle was in contact with the ground at final rest.

Exterior Mirror Locations

ELEMENT VALUES:

(1) Mounted on doors only

(2) Mounted on front fenders only

(3) Mounted on door and front fenders

(8) Other locations

(7) No mirrors

(9) Unknown

REMARKS:

This element value establishes the locations of exterior mirrors mounted on the truck.

CODE "1" (Mounted on doors only) is used when there is an exterior side view mirror mounted on one or both cab doors.

CODE "2" (Mounted on front fenders only) is used when there is an exterior side view mirror mounted on one or both front fenders.

CODE "3" (Mounted on doors and front fenders) is used when there is an exterior side view mirror mounted on at least one door and front fender.

CODE "7" (No mirrors) is used when there are no exterior mirrors.

CODE "8" (Other locations) is used when exterior mirrors are mounted on locations other than the doors and fenders.

CODE "9" (Unknown) is used when there is insufficient information to determine if there are exterior mirrors and/or the locations of those mirrors.

Field of View Restriction/Blind Spots-Related

ELEMENT VALUES:

(1) Yes

(2) No

(9) Unknown

REMARKS:

This element value establishes links between the vehicle's mirror system and crash causation. It is recognized that the evaluation may represent a subjective input by the Researcher. However, the evaluation is essential, and the Researcher should use all available sources (i.e., vehicle inspection, driver interview, police report, and witness statements) to derive the final assessment.

CODE "1" (Yes) is used when there was a causal link between the vehicle's mirror system and crash occurrence.

CODE "2" (No) is used when the Researcher determines that there is no causal link between the vehicle's mirror system and crash occurrence.

CODE "9" (Unknown) is used when there is insufficient information to determine if a causal link existed.

Was Truck Sight Line to the Other Vehicle Clear

ELEMENT VALUES:

(1) Yes

(2) No, view obstructed by roadway curvature

(3) No, view obstructed by roadway grade

(4) No. view obstructed by roadside appurtenance (specify): _____

(5) No, other (specify): _____

(7) Not applicable

(9) Unknown

REMARKS:

This element value establishes the driver's sight line to the other vehicle in terms of being clear or being obstructed in some manner.

CODE "1" (Yes) is used when the driver's sight lines to the other vehicles is clear (i.e., not obstructed/blocked).

CODE "2" (No, view obstructed by roadway curvature) is used when the driver's sight line to the other vehicle is obstructed by horizontal curvature in the roadway.

CODE "3" (No, view obstructed by roadway grade) is used when the driver's sight line to the other vehicles obstructed by either a positive or negative roadway grade.

CODE "4" [No, view obstructed by roadside appurtenance (specify): _____] is used when the driver's sight line to the other vehicle is obstructed by a roadside appurtenance. These obstructions can be naturally occurring (trees, shrubs, tall grass, hedge, etc.) or can be manmade (guardrail, fence, building, signs, etc.). Specify the nature and location of the obstruction.

CODE "5" [No, other (specify): _____] is used when the driver's sight line to the other vehicle is obstructed by something not described in preceding categories. Specify the nature and location of the obstruction.

CODE "7" (Not applicable) is reserved for unusual circumstances (e.g., truck parked and not occupied).

CODE "9" (Unknown) is used when there is insufficient information to determine if the driver's sight line to the other vehicle was clear.

Was Truck View of the Other Vehicle Obscured

ELEMENT VALUES:

(1) Yes, obscured by sun glare

(2) Yes, obscured by headlight glare

(3) Yes, obscured by other glare (specify): _____

(4) Yes, obscured by dark (nighttime) viewing conditions

(5) Yes, obscured by other condition (specify): _____

(6) No

(7) Not applicable

(9) Unknown

REMARKS:

This element value establishes the driver's view of the other vehicle in terms of having a clear view or having a view that is obscured in some manner.

CODE "1" (Yes, obscured by sun glare) is used when the driver's view of the other vehicle is obscured by sun glare.

CODE "2" (Yes, obscured by headlight glare) is used when the driver's view of the other vehicle is obscured by headlight glare.

CODE "3" [Yes, obscured by other glare (specify): _____]is used when the driver's view of the other vehicle is obscured by some form of glare that is not related to the sun or headlight glare. Specify the source of the glare.

CODE "4" [Yes, obscured by dark (nighttime) viewing condition] is used when the driver's view of the other vehicle is obscured by dark viewing conditions. This circumstance should occur in a dark unlighted (i.e., no streetlights) area.

CODE "5" [Yes, obscured by other condition (specify): _____] is used when the driver's view of the other vehicle is obscured by a condition not described in preceding categories. Describe the condition.

CODE "6" (No) is used when the driver's view of the other vehicle is not obscured.

CODE "7" (Not applicable) is reserved for unusual circumstances.

CODE "9" (Unknown) is used when there is insufficient information to determine if the driver's view of the other vehicle is obscured.

Did Cab/Passenger Compartment Separate From Chassis

ELEMENT VALUES:

(1) Yes

(2) No

(9) Unknown

REMARKS:

This element value establishes if the cab/passenger compartment separated from the chassis during the crash sequence

CODE "1" (Yes) is used when the cab/passenger compartment separated from the chassis.

CODE "2" (No) is used when the cab/passenger compartment did not separate from the chassis.

CODE "9" (Unknown) is used when it is unknown if the cab/passenger compartment separated from the chassis.

Area of Greatest Cab/Passenger Compartment Intrusion

ELEMENT VALUES:

(0) No Intrusion

(1) Left side

(2) Right side

(3) Top

(4) Front

(5) Back

(9) Unknown

REMARKS:

This element value establishes the area of greatest intrusion to the passenger compartment or cab of the truck

Retroflective Tape Power Unit/Cargo Body

ELEMENT VALUES:

(0) No Tape

(1) Red/white per FMVSS 108

(8) Other pattern

(9) Unknown

REMARKS:

This element value establishes the use, presence, and color of tape markings to improve truck conspicuity. If no retroflective tape is present, code No Tape.

CODE "0" (No Tape) is used when no retroflective tape is present on the power unit/cargo body.

CODE "1" (Red/white per FMVSS 108) is used when retroflective tape is present and the tape pattern is red/white as specified in FMVSS 108.

CODE "8" (Other) is used when the color of the tape pattern is other than the red/white pattern specified in FMVSS 108.

CODE "9" (Unknown) is used when there is insufficient information to determine if the vehicle is taped, or to determine the color of the tape pattern.

Retroflective Tape Trailer

ELEMENT VALUES:

(7) No Trailer

(0) No Tape

(1) Red/white per FMVSS 108

(8) Other pattern

(9) Unknown

REMARKS:

This element value establishes the use, presence, and color of tape markings to improve truck conspicuity. If no retroflective tape is present, code No Tape.

CODE "0" (No Tape) is used when no retroflective tape is present on the trailer.

CODE "1" (Red/white per FMVSS 108) is used when retroflective tape is present and the tape pattern is red/white as specified in FMVSS 108.

CODE "8" (Other) is used when the color of the tape pattern is other than the red/white pattern specified in FMVSS 108.

CODE "9" (Unknown) is used when there is insufficient information to determine if the vehicle is taped, or to determine the color of the tape pattern.

Rear Underride Guard Power Unit/Cargo Body

ELEMENT VALUES:

(1) Yes

(2) No

(9) Unknown

REMARKS:

This element value establishes the presence of rear underride guard on the power unit/cargo body.

CODE "1" (Yes) is used when the power unit/cargo body is equipped with rear underride guard.

CODE "2" (No) is used when the power unit/cargo body is not equipped with rear underride guard.

CODE "9" (Unknown) is used when there is insufficient information to determine if the power unit/cargo body is equipped with rear underride guard.

Rear Underride Guard Trailer

ELEMENT VALUES:

(7) No Trailer

(1) Yes

(2) No

(9) Unknown

REMARKS:

This element value establishes the presence of rear underride guard on the trailer.

CODE "1" (Yes) is used when the trailer is equipped with rear underride guard.

CODE "2" (No) is used when the trailer is not equipped with rear underride guard.

CODE "9" (Unknown) is used when there is insufficient information to determine if the trailer is equipped with rear underride guard.

Side Underride Guard Power Unit/Cargo Body

ELEMENT VALUES:

(1) Yes

(2) No

(9) Unknown

REMARKS:

This element value establishes the presence of side underride guard on the power unit/cargo body.

CODE "1" (Yes) is used when the power unit/cargo body is equipped with side underride guard.

CODE "2" (No) is used when the power unit/cargo body is not equipped with side underride guard.

CODE "9" (Unknown) is used when there is insufficient information to determine if the power unit/cargo body is equipped with side underride guard.

Side Underride Guard Trailer

ELEMENT VALUES:

(7) No Trailer

(1) Yes

(2) No

(9) Unknown

REMARKS:

This element value establishes the presence of side underride guard on the trailer.

CODE "1" (Yes) is used when the trailer is equipped with side underride guard.

CODE "2" (No) is used when the trailer is not equipped with side underride guard.

CODE "9" (Unknown) is used when there is insufficient information to determine if the trailer is equipped with side underride guard.

FMCSA/MCSAP Truck Inspection Conducted

ELEMENT VALUES:

(0) No

(1) Yes, Level 1 inspection

(2) Yes, Level 2 inspection

(9) Unknown

REMARKS:

This element value describes if a FMCSA/MCSAP truck inspection was conducted, and if so, what level of inspection was conducted.

CODE "0" (No) is used when no FMCSA/MCSAP truck inspection was conducted.

CODE "1" (Yes, Level 1) is used when a FMCSA/MCSAP Level 1 truck inspection was conducted.

CODE "2" (Yes, Level 2) is used when a FMCSA/MCSAP Level 2 truck inspection was conducted.

CODE "9" (Unknown) is used when there is insufficient information to determine a FMCSA/MCSAP truck inspection was performed.

Brake Inspection Conducted

ELEMENT VALUES:

(0) No

(1) Yes

(9) Unknown

REMARKS:

This element value describes if a truck brake inspection was conducted.

CODE "0" (No) is used when no truck brake inspection was conducted.

CODE "1" (Yes is used when a truck inspection was conducted.

CODE "9" (Unknown) is used when there is insufficient information to determine a truck brake inspection was performed.

Presence of ESC

ELEMENT VALUES:

(1) Yes

(2) No

(9) Unknown

REMARKS:

This element establishes the presence of ESC in the vehicle.

Presence of RSC

ELEMENT VALUES:

(1) Yes

(2) No

(9) Unknown

REMARKS:

This element establishes the presence of RSC in the vehicle.

EDR Equipped/Obtained

ELEMENT VALUES:

(1) Yes, report obtained

(2) Yes, report not obtained

(3) No

(9) Unknown

REMARKS:

This element establishes the presence of EDR in the vehicle, and if the EDR report was obtained.

Avoidance Equipment Available

Element Values:

0	[Not Applicable]
15	Lane Departure Warning
1	Lane Keeping Support
17	Forward Collision Warning
16	Crash Imminent Braking
10	Dynamic Brake Support
11	Pedestrian Automatic Emergency Braking
13	Adaptive Cruise Control
3	Blind Spot Detection
4	Daytime Running Lights
9	Rearview Video System
12	Advanced Lighting
8	Automatic Crash Notification

Remarks:

The following elements are only collected for model year vehicles 2010 and newer:

Lane Departure Warning (LDW)

Is a system that alerts drivers when they unintentionally drift out of their lanes without a turn signal. LDW use a camera to monitor lane markings to detect when a vehicle is veering out of its lane of travel and alerts the driver through a haptic, visual, or audible alert so that the driver can steer the vehicle back into its lane. An active turn signal in the direction in which the vehicle is moving or driver braking will disable a LDW system.

Lane Keeping Support (LKS)

Uses information provided by sensors in a lane departure warning system (LDW) system to determine whether a vehicle is about to move out of its lane of travel. If so, LKS activates by correcting the steering, braking or accelerating one or more of the wheels, or a combination of both, resulting in the vehicle returning to its intended lane of travel.

Forward Collision Warning (FCW)

Uses forward facing sensors to detect when a vehicle is approaching a slower moving or stopped vehicle, or, in some cases, a stationary object, in its lane of travel. If vehicles get too close due to the speed of the rear vehicle, the FCW alerts the driver through a haptic, visual, or audible alert so that the driver can apply the brakes or steer the vehicle in an effort to avoid or mitigate the impending crash. It’s important to note that FCW systems do not take full control of the vehicle or keep the driver from operating it.

Crash Imminent Braking (CIB)

Systems provide automatic braking when forward-looking sensors indicate that a crash is imminent and the driver has not braked. If the driver does not take any action to avoid the crash, crash imminent braking (CIB) automatically applies the vehicle's brakes to slow or stop the car, avoiding the crash or reducing its severity.

Dynamic Brake Support (DBS)

Systems use sensors to determine when driver-applied braking is insufficient to avoid an imminent crash. In these situations, DBS automatically supplements the driver's braking.

Pedestrian Automatic Emergency Braking (PAEB)

Also known as frontal pedestrian impact mitigation braking—is a safety technology that provides automatic braking for vehicles when pedestrians are in the forward path of the vehicle's travel and the driver has taken insufficient action to avoid an imminent crash. PAEB systems typically use cameras, but some also use a combination of cameras and radar sensors.

Adaptive Cruise Control (ACC)

Uses a camera and/or sensors to automatically adjust the vehicle's speed to keep a pre-set distance from the vehicle in front of it.

Blind Spot Detection (BSD)

Uses sensors to monitor the blind spots on either side of the vehicle. The system alerts the driver with audio and/or visual signals whenever another vehicle is in that blind spot. Some systems have enhanced warnings when the driver is intentionally changing lanes and a vehicle is either in or is about to enter a blind spot in the lane into which the vehicle is about to move. Some systems also may activate the brake or steering controls to keep the vehicle in its lane.

Daytime Running Lamp (DRL)

Are steady burning identically colored lamps that are used to improve the conspicuity of a vehicle from the front and front sides when the regular headlamps are not required for driving. DRLs are automatically switched on when a vehicle is put in gear. Daytime running lamps are permitted but not required on passenger cars, multipurpose passenger vehicles (MPV), trucks, and buses in the United States. DRLs may be any pair of lamps on the front of the vehicle other than parking lamps or fog lamps. Each original equipment and replacement lamp used as a daytime running lamp (DRL), unless optically combined with a headlamp, must be permanently marked 'DRL' on its lens in letters not less than 3 mm high.

Rearview Video System (RVS)

Also known as a backup camera, is a video technology that helps prevent backover crashes by providing an image of the area directly behind the vehicle. When a driver shifts a vehicle into reverse, the RVS shows—either in the dashboard or in a small display in the rearview mirror—an image of the area behind the vehicle. The field of view includes a 10-foot by 20-foot zone directly behind the vehicle. Rearview video systems are not a replacement for mirrors or turning around to look; rather, they're an added safety tool for revealing hidden dangers.

Advanced Lighting

Vehicle lighting features designed to improve visibility and/or conspicuity. Advanced Lighting features include:

Automatic Beam Switching uses a camera to automatically switch the vehicle's headlight between high beams and low beams, depending on whether other vehicles are present. The driver still has the option to manually switch between low and high beams.

Automatic Leveling are self-leveling headlights that have an additional level sensor that determines if the car is tilted forward or back. For example, if a car is driving over a large bump, when the front of the car hits the bump, the lights lift up.

Dynamic Bending Lights are designed to make driving at night easier and safer. Instead of constantly shining straight ahead, Dynamic Bending Lights are designed to turn as the steering wheel does.

Amber rear turn signals are used in place of the traditional red turn signals.

Automatic Crash Notification (ACN)

Also known as Automatic Collision Notification. Automatically and wirelessly transmits a crash notification to a public safety answering point (PSAP) in the area of the crash. In most cases, when the ACN sensor detects either that an air bag has deployed or there's been a dramatic and sudden deceleration, the system automatically connects to an operator, who will then be able to communicate with passengers in the vehicle after a crash. The operator is also able to collect basic information from the vehicle, without passenger input, to provide to emergency responders so they can easily locate and reach the scene of the crash.

Avoidance Equipment Notes

Add any additional information relating to the crash avoidance equipment available on this vehicle. Include any details regarding avoidance equipment activation, etc.

Impact Speed

Element Values:

Code to the nearest kph (Note: 000 means less than 0.5 kph)

161 161 kph and above

999 Unknown

Remarks:

Code to the nearest kph; if the calculated speed is 50.5 kph, then round up to 51 kph.

Code "000" (000 kph) is used if the vehicle is traveling less than 0.5 kph.

Code "161" (161 kph and above) is used if the vehicle's speed is calculated to be equal to or exceeding 161 kph.

Code "999" (Unknown) is used if the impact speed is unknown or cannot be reasonably calculated.

Source of Speed and Distance Estimates

Element Values:

0 No speed or distances estimated

1 NHTSA calculation

2 Police calculation

3 Driver/witness/police estimates

4 EDR Image

Remarks:

Note: Code 1 takes precedence over code 2, and code 2 takes precedence over code 3. Code 4 (EDR image) takes precedence over any other codes.

Code "0" (No speed or distances estimated) is used when there is no speed or distances are estimated for this impact.

Code "1" (NHTSA calculation) is used when physical evidence was present at the accident site and sufficiently documented so speeds and distances for the striking vehicle could be computed.

Code "2" (Police calculation) is used when the police used physical evidence to estimate speeds and distances.

Code "3" (Driver/eyewitness/police estimates) is used either when there is no evidence present to determine speeds and distances, or there are mitigating circumstances so that a speed reconstruction is not possible. The only useable impact speed and distance estimates are those provided by the driver, an eyewitness or police estimates.

If more than one eyewitness provides estimated speeds and distances, code the average of the results.

Code "4" (EDR Image) is used when EDR information was provided and used to estimated speed and distance calculations.

Truck Notes

The Notes page provides a location to include any additional information relevant to the truck not captured in the preceding elements.

OTHER VEHICLE

Note: The Other Vehicle Form is completed for vehicles with Body Type NOT EQUAL 60-62, and 64-67.

For additional information see the 2018 FARS Coding and Validation Manual.

Vehicle Number

This element populated from FARS case.

Number of Occupants

This element populated from FARS case.

Unit Type

This element populated from FARS case.

Travel Speed

This element populated from FARS case.

Underride/Override

This element populated from FARS case.

Vehicle Removal

This element populated from FARS case.

Sequence of Events

This element populated from FARS case.

Most Harmful Event

This element populated from FARS case.

Rollover

This element populated from FARS case.

Rollover Initiation Location

This element populated from FARS case.

Vehicle Model Year

This element populated from FARS case.

Vehicle Identification Number

This element populated from FARS case.

Vehicle Make

This element populated from FARS case.

Vehicle Model

This element populated from FARS case.

Vehicle Body Type

This element populated from FARS case.

FARS Vehicle-Related Factors

This element populated from FARS case.

Fire

This element populated from FARS case.

EDR Equipped/Obtained

ELEMENT VALUES:

(1) Yes, report obtained

(2) Yes, report not obtained

(3) No

(9) Unknown

REMARKS:

This element establishes the presence of EDR in the vehicle, and if the EDR report was obtained.

Avoidance Equipment Available

Element Values:

0	[Not Applicable]
15	Lane Departure Warning
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Automatic Leveling are self-leveling headlights that have an additional level sensor that determines if the car is tilted forward or back. For example, if a car is driving over a large bump, when the front of the car hits the bump, the lights lift up.

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Avoidance Equipment Notes

Add any additional information relating to the crash avoidance equipment available on this vehicle. Include any details regarding avoidance equipment activation, etc.

Impact Speed

Element Values:

Code to the nearest kph (Note: 000 means less than 0.5 kph)

161 161 kph and above

999 Unknown

Remarks:

Code to the nearest kph; if the calculated speed is 50.5 kph, then round up to 51 kph.

Code "000" (000 kph) is used if the vehicle is traveling less than 0.5 kph.

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Source of Speed and Distance Estimates

Element Values:

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2 Police calculation

3 Driver/witness/police estimates

4 EDR Image

Remarks:

Note: Code 1 takes precedence over code 2, and code 2 takes precedence over code 3. Code 4 (EDR image) takes precedence over any other codes.

Code "0" (No speed or distances estimated) is used when there is no speed or distances are estimated for this impact.

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Code "3" (Driver/eyewitness/police estimates) is used either when there is no evidence present to determine speeds and distances, or there are mitigating circumstances so that a speed reconstruction is not possible. The only useable impact speed and distance estimates are those provided by the driver, an eyewitness, or police estimates.

If more than one eyewitness provides estimated speeds and distances, code the average of the results.

Code "4" (EDR Image) is used when EDR information was provided and used to estimated speed and distance calculations.

Other Vehicle Notes

The Notes page provides a location to include any additional information relevant to the vehicle not captured in the preceding elements.

PRECRASH

For additional information see the 2018 FARS Coding and Validation Manual.

Vehicle Number-Precrash Level

This element populated from FARS case.

Contributing Circumstances, Motor Vehicle

This element populated from FARS case.

Trafficway Description

This element populated from FARS case.

Total Lanes in Roadway

This element populated from FARS case.

Speed Limit

This element populated from FARS case.

Roadway Alignment

This element populated from FARS case.

Roadway Grade

This element populated from FARS case.

Roadway Surface Type

This element populated from FARS case.

Roadway Surface Condition

This element populated from FARS case.

Traffic Control Device

This element populated from FARS case.

Traffic Control Device Functioning

This element populated from FARS case.

Initial Travel Lane

Element Values:

1	One
2	Two
3	Three
4	Four
5	Five
6	Six
7	Seven
8	Eight
98	Other
99	Unknown

Remarks:

This element assesses the location of the vehicle prior to the critical envelope. Select the attribute that best describes the predominant lane of the vehicle during that time period.

One

Right curb or road edge lane in direction of traffic flow.

Two

Second lane counting from right curb or road edge lane in direction of traffic flow.

Three

Third lane counting from right curb or road edge lane in direction of traffic flow.

Four

Fourth lane counting from right curb or road edge lane in direction of traffic flow.

Five

Fifth lane counting from right curb or road edge lane in direction of traffic flow.

Six

Sixth lane counting from right curb or road edge lane in direction of traffic flow.

Seven

Seventh lane counting from right curb or road edge lane in direction of traffic flow.

Eight

Eighth lane counting from right curb or road edge lane in direction of traffic flow.

Other

Used when the vehicle’s location prior to entering the critical crash envelope is a parking lane, shoulder, driveway access, wrong direction, or any area other than a travel lane for the appropriate flow of traffic.

Unknown

Used when the vehicle's travel lane prior to entering the critical envelope is unknown.

For additional information see the 2018 FARS Coding and Validation Manual.

Driver's Vision Obscured By

This element populated from FARS case.

Driver Distracted

This element populated from FARS case.

Pre-Event Movement

This element populated from FARS case.

Critical Pre-Crash Category

This element populated from FARS case.

Critical Pre-Crash Event

This element populated from FARS case.

Attempted Avoidance Maneuver

This element populated from FARS case.

Pre-Impact Stability

This element populated from FARS case.

Pre-Impact Location

This element populated from FARS case.

Crash Type

This element populated from FARS case.

Critical Reason for Critical Event

ELEMENT VALUES:

(000) Critical event not coded to this variable

DRIVER RELATED FACTOR:

Critical Non-Performance Errors

(100) Sleep, that is, actually asleep

(101) Heart attack or other physical impairment of the ability to act

(108) Other critical non-performance (specify): _____

(109) Unknown critical non-performance

Recognition Errors

(110) Inattention (i.e., daydreaming)

(111) Internal distraction

(112) External distraction

(113) Inadequate surveillance (e.g., failed to look, looked but did not see)

(118) Other recognition error (specify): _____

(119) Unknown recognition error

Decision Errors

(120) Too fast for conditions to be able to respond to unexpected actions of other roadway users (specify condition): _____

(121) Too slow for traffic stream

(122) Misjudgment of gap or other's speed

(123) Following too closely to respond to unexpected actions

(124) False assumption of other roadway user's actions

(125) Illegal maneuver

(126) Failure to turn on head lamps

(127) Inadequate evasive action (e.g., braking only, not braking and steering)

(128) Aggressive driving behavior

(138) Other decision error (specify): _____

(139) Unknown decision error

Performance Errors

(141) Panic/Freezing

(142) Overcompensation

(143) Poor directional control (e.g., failing to control vehicle with skill ordinarily expected

(148) Other performance error (specify): _____

(149) Unknown performance error

(199) Type of driver error unknown

VEHICLE-RELATED FACTOR:

(200) Tires/wheels failed

(201) Brakes failed

(202) Steering failed

(203) Cargo shifted

(204) Trailer attachment failed

(205) Suspension failed

(206) Lights failed

(207) Vehicle-related vision obstructions

(208) Body, doors, hood failed

(209) Jackknifed

(298) Other vehicle failure (specify): _____

(299) Unknown vehicle failure

ENVIRONMENT-RELATED FACTOR:

Highway-Related

(500) Signs/signals missing

(501) Signs/signals erroneous/defective

(502) Signs/signals inadequate

(503) View obstructed by roadway design/furniture

(504) View obstructed by other vehicles

(505) Roadway design – roadway geometry (e.g., ramp curvature)

(506) Roadway design – sight distance

(507) Roadway design – other

(508) Maintenance problems (potholes, deteriorated road edges, etc.)

(509) Slick roadways (low friction road surface due to ice, loose debris, any other cause)

(518) Other highway-related condition (specify): _____

Weather-Related

(521) Rain, snow

(522) Fog

(523) Wind gust

(528) Other weather-related condition (specify): _____

Other

(530) Glare

(531) Blowing debris

(538) Other sudden change in ambience (specify): _____

(999) Unknown reason for critical event

REMARKS:

This variable establishes the critical reason for the occurrence of the critical event. The critical reason is the immediate reason for this event and is often the last failure in the causal chain (i.e., closest in time to the critical precrash event).

Although the critical reason is an important part of the description of crash events, it is not the cause of the crash nor does it imply the assignment of fault. The concept of right-of-way and a number of other causal-related variables are coded in other locations on the Crash Event Assessment form. The primary purpose of the critical reason variable to enhance the description of crash events and to thus allow analysts to better categorize similar events.

The following general guidelines apply to coding the critical reason for the critical event:

- Generally, one critical reason is assigned per crash (NOTE: exception occurs in simultaneous events such as two vehicles entering an uncontrolled intersection at the same time).
- Coded to vehicle action/event that makes the collision available.
- Critical reason can be subjective in nature.
- Final selection is based on the preponderance of evidence.

The listing of critical reasons, as provided in this variable covers driver decisions and conditions; vehicle failures; and environmental conditions including weather, roadway condition, and highway design factors. In essence, this listing has been constricted to permit the choice of any of the three primary categories of contributors – vehicle, driver, and environment.

Three example scenarios are presented in the material below to demonstrate appropriate coding conventions in the critical reason variable.

- Example 1: A car drifts into the opposing lane and collides head-on with a truck. The car driver was fatigued and had fallen asleep. The critical event is this vehicle traveling over the lane line on the left side of travel lane (Code “20”) and the critical reason for the critical event is sleep, that is, actually asleep (Code “100”).

- Example 2: A truck turns left, across the path of an oncoming car at an intersection. The truck driver had a left turn arrow, observed the on-coming vehicle, and assumed that this vehicle would stop. The two vehicles subsequently collided left front to left front in the intersection. The critical event in this example is the truck's turn across the path of the on-coming vehicle (Code "25"). For the truck driver, the critical reason is coded as false assumption of other road user's actions (Code "124").

[NOTE: Timing issues can be very relevant to the scenario described in this example. Specifically, if the truck driver proceeded further through his intended left turn such that the truck was struck in the side (e.g., rear drive wheels of tractor), then the critical event and critical reason would be coded to the car driver.]

- Example 3: A truck fails to slow for traffic ahead. The traffic is stopped for a displayed red signal phase at an intersection. Most of the truck's brakes are out of adjustment and when the driver attempts to stop, the brakes are unable to stop the vehicle in time to avoid a front to rear impact sequence with the vehicle forward of the truck's position. The critical event in this example is other motor vehicle in lane other vehicle stopped (Code "50"). For the truck driver, the critical reason is coded as other vehicle failure (specify): brakes out of adjustment (Code "298"). It should be noted that brakes failed (Code "202") is not used in this example because the brakes failed code is reserved for sudden catastrophic failure.

[NOTE: It is recognized that timing issues and driver awareness issues can play a role in this scenario. For example, if the driver was attentive, was unaware of the vehicle's degraded braking capability, and had intended to complete a "normal" stop, then the non-disabling vehicle problem (Code "04") or this vehicle decelerating (Code "28") elements may be more appropriate selections for the truck's critical precrash event designation.]

The primary intent of the critical reason variable is to provide more detail about what happened in the crash sequence. For example, in the case (example 2) where the truck driver exercised his right-of-way and turned left in front of approaching traffic, the critical reason "false assumption" indicates that the driver saw the on-coming traffic, but did not verify that the approaching vehicle was going to stop. The critical event is determined independent of the legal system and in this case, is the left turn initiated by the truck driver. The critical reason provides the explanation for the turn. In this case, the critical reason is that the turning driver thought that the approaching vehicle was going to stop (a false assumption).

CODE "000" (Critical event not coded to this vehicle) is used when the critical event is coded to the other vehicle involved in the crash sequence. For example, the critical reason for the truck driver involved in example 1 above is coded "000".

DRIVER-RELATED FACTOR

Critical Non-Performance Errors

These elements capture situations in which the driver is incapacitated for some reason and is no longer consciously in control of the vehicle.

CODE "100" (Sleep, that is, actually asleep) is used in situations where the driver is asleep and no longer consciously in control of the vehicle. The element is not used when the driver's judgment, reactions, or perception are impaired as a result of fatigue.

CODE "101" (Heart attack or other physical impairment to the ability to act) is used when the driver is incapacitated due to some form of physical impairment such as a heart attack, seizure, fainting, blackout, etc. Use of this element implies that the driver relinquished steering control.

CODE "108" [Other critical non-performance (specify): _____] is used to indicate other major forms of non-performance. A driver who passes out as a result of alcohol or drug is classified using this element along with an annotation specifying the specific source of the non-performance.

CODE "109" (Unknown critical non-performance) is used when scene evidence, other driver statements, or witness statements indicate that this driver was not functioning, but the specific reason for the non-performance cannot be determined.

Recognition Errors

These elements refer to situations in which the driver is conscious and functioning, but fails to perceive and react to a situation that requires driver action to avoid a collision. This set of elements captures situations in which a perception error of some type is the immediate reason for the critical event.

CODE "110" [Inattention (i.e., daydreaming)] is used when the driver fails to recognize a situation that demands a response because his/her attention has wandered from the driving task for some non-compelling reason. In this circumstance, the driver is typically focusing on internal thoughts (i.e., daydreaming, problem solving, worrying about family problem, etc.) and not focusing attention on the driving task.

CODE "111" (Internal distraction) is reserved for crashes in which the driver fails to recognize a situation requiring a response because his/her attention is directed to some event, object, person, or activity inside the vehicle. Relevant examples include tuning the radio, adjusting the heat/cooling system, engaging in a conversation with a passenger, using a cell phone, retrieving fallen objects, reading books/magazines/maps/invoices, etc.

CODE "112" (External distraction) is reserved for crashes in which the driver fails to recognize a situation requiring a response because his/her attention is directed to some event, object, person, or activity outside the vehicle. Relevant examples include searching for a street address, construction activity, looking at a building or scenery, looking at a sign, looking at a previous crash site, etc. Distractions are distinguished from inattention in that distractions induce the driver to focus attention on the distraction. This category takes precedence over the next category (Inadequate surveillance). If, for example, a driver fails to look because he/she is distracted, code external or internal distraction as appropriate.

CODE "113" [Inadequate surveillance (failed to look, looked but did not see)] is used when the driver is in a situation where he/she is required to look to safely complete a maneuver and either fails to look in the appropriate place or looks, but does not see. Examples include lane changes and turns at intersection where the driver looks in the required directions, but fails to recognize approaching traffic. Inattention, internal distraction, and external distraction all take precedence over this category. Use the inattention/distraction categories if the driver is not attentive to the driving task for any of these reasons. If, however, the driver is paying attention to the driving task and is in a situation that requires surveillance of surrounding traffic and the driver fails to do so, the "inadequate surveillance" category should be used.

CODE "118" [Other recognition error (specify): _____]is used when there is a delay in recognition or a failure to recognize that is not described in preceding categories.

CODE "119" (Unknown recognition error) is used when it can be established that the driver failed to perceive or comprehend the surrounding situation/circumstances, but the precise reason cannot be established.

Decision Errors

These elements are used for situations in which the driver correctly perceives the necessary information to avoid a collision, but chooses an incorrect action or chooses to take no action.

CODE "120" [Too fast for conditions to be able to respond to unexpected actions of other road users (specify): _____] is used when the subject vehicle is proceeding at a speed that is greater than a reasonable standard of safe driving. Whether a vehicle's speed is excessive is a subjective evaluation, though there are scenarios where most analysts would agree. For example, a driver who is driving much faster than the rest of the traffic stream would probably be coded here, as would a driver who fails to slow down when encountering snowy or slippery conditions. On the other hand, if the driver clearly slows for a slick road condition and is making an attempt to negotiate the road safely, but still loses control due to the slippery condition, choose the slippery road element (Code "509") from the listing under environmental-related factors.

[NOTE: There is a tendency to over use this element that can be traced to the inherent subjectivity associated with this element. To determine if the speed is excessive, compare the estimated value to a reasonable standard of safe driving. If there is evidence that the driver was attempting to proceed at a safe speed, but failed, consider whether other element values might be more appropriate. For example, if a truck driver is negotiating an exit ramp at a speed well under the posted limit, but the truck rolls over, the sign/signals inadequate designation (Code "502") or the road design-roadway geometry designation (Code "505") might be more appropriate.

CODE "121" (Too slow for traffic stream) is used when the subject vehicle is traveling at a speed that impedes traffic flow. On interstate roadways, the estimated travel speed should be less than the minimum speed limit for that roadway system. For other roadway types, the travel speed in question should be at least 10 mph (16.1 mph.) below the posted speed limit.

CODE "122" (Misjudgment of gap or other's speed) is used in situations where a driver misjudges the length of a gap or the speed of an on-coming vehicle and pulls out or turns inappropriately. An example is a driver making a left turn who misjudges the gap in approaching (head-on) traffic and executes the turn at the wrong time. Another example is a driver turning right from a driveway onto a road. This driver misjudges the speed of traffic approaching from his left and pulls out into the path of this traffic.

CODE "123" (Following too closely to respond to unexpected actions) is used for situations in which one vehicle is following another vehicle so closely that even if the following driver is attentive to the actions of the vehicle ahead, he/she could not avoid a collision in the circumstance when the lead driver brakes suddenly.

CODE "124" (False assumption of other road user's actions) applies when a driver takes an action or fails to act based on an assumption of another driver's behavior that proves to be false. A typical example would be a left turn with the right-of-way where the turning driver assumes the on-coming vehicle will yield the right-of-way (e.g., example 2 in preceding discussion). Another example is a driver waiting to pull out into traffic who sees an approaching vehicle that is signaling to turn. The driver assumes the approaching vehicle will turn before reaching the vehicle's position and pulls out. The signaling vehicle, however, does not turn and collides with the vehicle pulling out. A final example for this element is the case in which one vehicle stops to allow another vehicle to pull out from a driveway and proceed across the stopped vehicle's path. The driver pulling out assumes that there is no moving traffic in lanes beyond the stopped vehicle and is subsequently struck by through traffic in these lanes (e.g., good Samaritan crash scenario).

CODE "125" (Illegal maneuver) is used for maneuvers that are illegal and clearly unsafe. Examples include turning from the wrong lane, going straight in a turn lane, going the wrong way on a one-way street, and passing at an unsafe or improper location.

CODE "126" (Failure to turn on head lamps) applies to the situation where a driver fails to turn on the vehicle's headlights during periods of reduced visibility and is unable to see properly. Examples include the circumstance where a driver is proceeding down a dark roadway at night without headlights and fails to see a pedestrian crossing the vehicle's path. Periods when headlights should be activated include inclement weather (e.g., rain, snow, sleet, and fog).

CODE "127" (Inadequate evasive action, e.g., braking only, not braking and steering) is used in situations when the collision could have been avoided if the driver executes a reasonable evasive maneuver. For example, if a collision can be avoided by braking and steering, but the driver locks the brakes and thus is unable to steer, this element is the appropriate code. This element is somewhat subjective in that the test for applicability is a "reasonable standard" of defensive driving.

CODE "128" (Aggressive driving behavior) applies to specific patterns of behavior that include speeding, tailgating, weaving, red-light running, and abrupt speed changes. Patterns of behavior directed at other motorists such as gestures (including obscene), flashing lights, horn honking, and deliberately obstructing the path of others are particularly relevant. If the driver engages in these activities and the immediate action that results in the critical event does not fit into any of the other listed categories, use of this element is appropriate.

CODE "138" [Other decision error (specify): _____] applies to decision errors that are not described in preceding categories. An annotation that specifies the decision error type is required.

CODE "139" (Unknown decision error) is used when it is evident that a decision error has been committed, however, there is insufficient information to determine the precise nature of the error. Use of this code often reflects the lack of detailed interview data.

Performance Errors

These elements are used in situations where the driver correctly sees the need to maneuver his/her vehicle, but is unable to act (freezes), acts impulsively, acts improperly (panics), or displays inadequate skills to maneuver the vehicle (such as over-steer or under-steer). The errors in this category are related to the driver's performance rather than the driver's decisions or perceptions.

CODE "141" (Panic/freezing) is used in situations in which a collision might be avoided if the driver does not either panic or freeze. Panic refers to irrational and impulsive actions that obviously do not assist the effort of crash avoidance (e.g., driver taking hands off steering wheel and screaming). Freezing refers to drivers who cannot move or cannot think of an evasive maneuver and, therefore, do nothing.

CODE "142" (Overcompensation) is used in situations in which a driver overreacts to a situation requiring some adjustment in the velocity or path of the subject vehicle. A typical example is a driver running partly off the road to the right and overcorrecting to the left into on-coming traffic.

CODE "143" (Poor directional control, e.g., failing to control vehicle with skill ordinarily expected) applies to situations in which the driver fails to maintain the degree of vehicle control ordinarily expected of a good driver. It is not intended for situations when a high degree of skill is required. This element is probably most applicable to unskilled, novice drivers or older drivers with degraded skills. In situations where there is evidence that the driver is not maintaining control as a result of inattention or distraction, those codes should be used.

CODE "148" [Other performance error (specify): _____] is used for errors in vehicle control that are not described in preceding elements of this category. An annotation is required to specify the performance error type.

CODE "149" (Unknown performance error) is used when it is evident that a performance error has been committed, but the precise nature of the error cannot be determined.

CODE "199" (Type of driver error unknown) is used when there is evidence that a driver-related factor is the critical reason, but the nature of the driver factor cannot be more precisely determined. For example, if it cannot be determined if the driver looked but failed to see (recognition error) or misjudged a gap (decision error), then "199" is the appropriate element selection. (NOTE: This circumstance occurs most frequently when there is a lack of detailed interview data.)

VEHICLE-RELATED FACTOR

These elements capture vehicle failures or deficiencies that immediately lead to the critical event. Use these elements when the driver perceives the need to take action, chooses a reasonable course of action, but the vehicle failure prevents success. These elements are also used where the vehicle failure itself produces the critical event such as a steering axle tire blowout.

There will be cases where the driver knows that he/she is operating a defective vehicle. For example, the driver may know that the pressure in the vehicle's tires is too low. After operating the vehicle at speed for a period of time, heat buildup in the tires causes a tire failure, the blowout produces loss of control, and the vehicle collides with other traffic. Code the tire failure (Code "200") as the critical reason and note in the narrative and in the Driver-Related Decision Factor section (Variable 43) that the driver knew he/she was operating a vehicle with low tire pressure.

Vehicle failure or deficiency is judged in comparison with the manufacturer's specifications or the legal requirements in the Federal Motor Carrier Safety Regulations (FMCSR). Typically, for trucks, a deficiency noted here will also be noted in the Level 1 vehicle inspection report.

CODE "200" (Tire/wheels failed) refers to catastrophic failures such as blowouts and wheel separations.

CODE "201" (Brakes failed) is used if the vehicle's brakes suddenly fail. If the brakes are still functional, but out of adjustment and failed to stop the vehicle in time to avoid the collision, use other vehicle failure (Code "298") with an appropriate annotation.

CODE "202" (Steering failed) is used when there is a sudden loss of steering associated with component failure in the steering system.

CODE "203" (Cargo shifted) is used when it can be established that cargo shift was the precursor to the critical event rather than one of the effects of the event. It should be noted that drivers are typically unaware whether cargo shift caused a rollover or was the consequence of a rollover. Therefore, the specific roll of cargo shift will have to be determined from other sources such as vehicle inspection results or witness reports. It is expected that cargo shift as a critical reason will often be associated with tie down failure, improper loading, or cargo slosh in a partially loaded tanker. For example, a flatbed loaded with crushed cars enters a curve to the right at a reasonable speed. The cargo shifts to the left and pulls the trailer over. Tie downs for the crushed cars are inadequate and witnesses report that the cargo was swaying before the truck entered the curve. In this case, cargo shifted (Code "203") may be appropriate. However, if the truck had a van trailer loaded with general freight and the truck was observed entering the curve at a high rate of speed, the driver may report cargo shift, but the cargo shift in this case is more likely the result of the rollover than the cause of the rollover.

CODE "204" (Trailer attachment failed) is used when trailer attachments (e.g., hitches) fail and there is either a separation of units or a loss of control.

CODE "205" (Suspension failed) is used when a failure occurs in the suspension system. This failure must be traced to a subsequent loss of control or other collision-related event (i.e., jackknife, rollover, etc.).

CODE "206" (Lights failed) is used when there is a sudden failure of the lighting system that subsequently leads to crash involvement.

CODE "207" (Vehicle-related vision obstructions) is used when the driver's field of view is obstructed by improperly loaded cargo or unusual vehicle modifications. This element is not intended to capture the driver's inability to see traffic in the "blind spots" around the vehicle.

CODE "208" (Body, doors, hood failed) is used when vehicle components fail and lead to subsequent crash involvement. An example is a hood flying up, obstructing the driver's vision, and resulting in a subsequent loss of control.

CODE "209" (Jackknifed) is used when there is a sudden unexplained jackknife that precipitates crash involvement. Generally, jackknife will be the result of some previous vehicle control action. For example, a driver brakes heavily on wet pavement and as a result, the truck jackknifes. In these cases, the critical reason would be whatever leads to the braking and the critical event would be loss-of-control due to jackknife. An example where this element is appropriate as the critical reason is as follows. A tractor-semi trailer is proceeding along a snow-covered Interstate roadway in the right lane. A passenger car begins to pass the combination in the left lane. As the car moves alongside the tractor-semi trailer, the combination begins to jackknife, precipitating the crash. The truck driver does not appear to have initiated any action that could have caused the jackknife (i.e., no braking/steering inputs). In this circumstance, element "209" is an appropriate selection.

CODE "298" [Other vehicle failure (specify): _____] is used in cases of vehicle failure where the specific failure is not described in preceding elements. It is also used in circumstances where the vehicle does not meet legal requirements for repair, but if the repairs had been completed, the driver would have been able to avoid the collision. For example, if the truck's brakes are out of adjustment and the driver would have avoided the collision had the brakes been adjusted properly, this is the proper element. An annotation is required to indicate the nature of the vehicle problem.

CODE "299" (Unknown vehicle failure) is used when it is clear a vehicle failure of some type produced the critical event, but the nature of the failure cannot be determined.

ENVIRONMENTAL-RELATED FACTOR

These factors are all related to roadway design, construction, maintenance, condition, or weather-related conditions.

Highway-Related

CODE "500" (Signs/signals missing) is used when signs/signals are called for, but either have been removed or not yet installed. Signs/signals removed as a result of theft/vandalism are included in this element.

CODE "501" (Signs/signals erroneous/defective) is used when signs or signals are erroneous/defective and a functioning driver is misled by the signs, precipitating the critical event. Specifically, if the signs/signals had been correct or functioning properly, the driver would have the information needed to avoid the collision.

CODE "502" (Sign/signals inadequate) is used in situations where sign/signals do not provide sufficient information to a conscious and conscientious driver. For example, signs in or preceding a construction zone where traffic flow is modified may not provide enough information about traffic flow changes such that even an attempt to operate safely may not be

enough to avoid a collision. Signs on ramps tend to be a second example. Posted speeds on entrance/exit ramps generally indicate safe speeds for automobiles. The safe speed for a truck can be considerably lower than the posted speed.

CODE "503" (View obstructions by roadway design/furniture) is applicable where permanent roadside features such as billboards, signal supports, guardrails, or other similar objects block the vision of a driver to the extent that he/she is unable to see sufficiently to operate safely.

CODE "504" (View obstructed by other vehicles) is used if the driver's view is blocked by legally parked vehicles, the driver proceeds cautiously, but is still unable to avoid the collision as a direct result of his/her obstructed view.

CODE "505" [Road design – roadway geometry (e.g., ramp curvature)] is used for roadway designs that deviate from AASHTO standards, where the design deficiency results in a collision, even though the driver is adhering to a reasonable standard of safe driving. If the road design conforms to AASHTO standards, but the signage is inadequate, use element "502".

CODE "506" (Road design – sight distance) is used when the road design does not meet AASHTO standards with respect to sight distance requirements. An example of this circumstance is a roadway that does not meet the AASHTO standard for sight distance within a marked passing zone. A second example might be the placement of an intersection with respect to a bridge structure such that a driver at an intersection cannot see for enough down the cross street to determine if it is safe to proceed (i.e., driver's view is obstructed by the bridge structure).

CODE "507" (Road design – other) is used for all other roadway design problems that produce the critical event and that are not described in either of the two preceding elements.

CODE "508" [Maintenance problems (potholes, deteriorated road edges, etc.)] is used when road defects are the immediate cause of a loss of control event. For example, a blowout due to striking a pothole that results in a subsequent loss of control is coded using this element. Similarly, a loss of control that is directly attributable to a deteriorated road is also coded using this element.

CODE "509" [Slick roads (low friction road surface due to ice, loose debris, any other cause)] is appropriate when a driver, operating in accordance with a reasonable standard of safe driving hits a patch of "black ice" and loses control. Similarly, if a driver knows that the road is slick and is attempting to proceed with due caution but loses control or is unable to stop or slow safely, this element is also an appropriate selection.

CODE "518" [Other highway-related condition (specify): _____] is used for all other highway-related conditions that are not described in preceding elements. An annotation is required to specify the relevant condition.

Weather-Related

CODE "521" (Rain, snow) is used in cases involving sudden/heavy rainfalls or "white-outs" during snowstorms when the precipitation obstructs the driver's view. If, however, it has been raining or snowing for a period of time and the driver does not conform to the changed conditions (i.e., operates at an unreasonable speed for the given conditions), then element "120" might be a more appropriate selection as the critical reason.

CODE "522" (Fog) is used when a driver suddenly encounters fog and cannot slowdown in time to operate safely. If, however, the driver is outdriving his line of sight for a period of time, then element "120" might be a more appropriate selection as the critical reason.

CODE "523" (Wind gust) is used when a wind gust causes a driver to lose control or causes the driver to swerve from his/her intended path.

CODE "528" [Other weather-related condition (specify): _____] is used for all other weather-related conditions that produce a critical event. An annotation is required to specify the weather condition.

CODE "530" (Glare) is used for both sunlight and headlight glare that obstructs the driver's vision. Use of this code implies that the glare is sudden, and the driver does not have time to adjust. An example is a driver executing a left turn who is prevented by sun glare from detecting approaching traffic.

CODE "531" (Blowing debris) is used when blowing debris either obstructs the driver's view or causes the driver to swerve the vehicle to avoid the debris.

CODE "538" [Other sudden change in ambience (specify): _____] is used for all other sudden changes in the driving environment that produce or lead to a critical event.

CODE "999" (Unknown reason for critical event) is used when there is insufficient information to determine a reason for the critical event.

Shoulder Surface Type

ELEMENT VALUES:

(0) No stabilized shoulder

(1) Concrete

(2) Bituminous (asphalt)

(3) Brick or block

(4) Slag, gravel, or stone

(5) Dirt

(8) Other (specify): _____

(9) Unknown

REMARKS:

This variable establishes stabilized shoulder presence at the crash site and the type of available shoulder surface. A shoulder is defined as that part of a trafficway that is (1) contiguous with the roadway for emergency use, (2) for accommodation of stopped road vehicles, and (3) for lateral support of the roadway structure.

Contiguous surfaces fall into two categories - - stabilized and unstabilized. Stabilized means that: (1) the surface was paved with Portland cement (concrete) or a bituminous course surface on a granular or improved base, or (2) the earth has been covered with a gravel or other granular material. Unstabilized means that the surface is composed of natural earth, with or without turf. **For this program, only stabilized shoulder types are coded.**

The accommodation criteria, noted above, is considered satisfied if a minimum of two (2) feet (0.1 meters) of the area contiguous to the roadway is provided as a stabilized shoulder.

Stabilized shoulders are coded as present even if not usable at the time of the crash due to ambient conditions such as plowed snow, parked vehicles, etc.

Pedestrian/bicycle lanes that exist between the roadway and improved shoulder, or outside but contiguous with the improved shoulder should be considered as extra shoulder width.

If the lateral cross section of the shoulder contains more than one surface type, use the other (specify): _____ element and specify surface types moving from the edge of the roadway to the outside edge of the shoulder (e.g., asphalt and gravel). As a rule, element 5 (Dirt) would only be used in circumstances where dirt had been spread over an improved granular shoulder base. Unstabilized dirt shoulders as not coded in this variable.

CODE "0" (No stabilized shoulder) is used when there is no stabilized shoulder contiguous to the travel lanes for this vehicle's travel direction or the stabilized shoulder in less than two feet (0.61 meters) in width.

CODE "1" (Concrete) is used when the stabilized shoulder contiguous to the travel lanes for this vehicle's travel direction is comprised of concrete and is greater than two feet (0.61 meters) in width.

CODE "2" [Bituminous (asphalt)] is used when the stabilized shoulder contiguous to the travel lanes for this vehicle's travel direction is comprised of asphalt and is greater than two feet (0.61 meters) in width.

CODE "3" (Brick or block) is used when the stabilized shoulder contiguous to the travel lanes for this vehicle's travel direction is comprised of brick or block and is greater than two feet (0.61 meters) in width.

CODE "4" (Slag, gravel, or stone) is used when the stabilized shoulder contiguous to the travel lanes for this vehicle's travel direction is comprised of any of these materials and is greater than two feet (0.61 meters) in width.

CODE "5" (Dirt) is only used when the stabilized shoulder contiguous to the travel lanes for this vehicle's travel direction is comprised of a dirt surface. In this circumstance, the dirt must be spread over a stabilized granular base and the shoulder must exceed two feet (0.61 meters in width.

CODE "8" [Other (specify): _____] is used when the stabilized shoulder surface that is contiguous to the travel lanes for this vehicle's travel direction is comprised of a material that is not identified in preceding codes or when the shoulder surface is comprised of a combination of the preceding material types. Specify surface types by moving from the edge of the roadway to the outside edge of the shoulder.

CODE "9" (Unknown) is used when there is insufficient information to establish either stabilized shoulder presence or shoulder surface type.

Shoulder Width

ELEMENT VALUES:

(0) No stabilized shoulder

(1) < 1 meter

(2) > 1 meter ≤ 2 meters

(3) > 2 meters ≤ 3 meters

(4) > 3 meters

(9) Unknown

REMARKS:

This variable establishes the width of the stabilized shoulder available to this vehicle. In circumstances where there are edgelines, measure shoulder width from the center of the edgeline to the outside edge of the shoulder. Where there is no edgeline, measure from the outside edge of the roadway to the outside edge of the shoulder. To qualify as a stabilized shoulder, measured shoulder width must exceed two feet (0.61 meters).

CODE "0" (No stabilized shoulder) is used in the circumstance where there is no stabilized shoulder, or the stabilized shoulder is less than two feet (0.61 meters) in width.

CODE "1" (< 1 meter) is used when the width of the stabilized shoulder is greater than 0.61 meters but less than one meter.

CODE "2 (> 1 meter ≤ 2 meters) is used when the measured shoulder width is greater than one meter but less than or equal to two meters.

CODE "3" (> 2 meters ≤ 3 meters) is used when the measured shoulder width is greater than two meters but less than or equal to three meters.

CODE "4 (> 3 meters) is used when the measured shoulder width is greater than three meters.

CODE "9" (Unknown) is used when there is insufficient information to determine shoulder presence and/or width in the direction of travel of this vehicle.

Rumble Strip Initial Travel Lane

Element Values:

0 [No driver present]

1 None

2 Left rumble strip present

3 Right rumble strip present

4 Left and right rumble strip present

99 Unknown

Remarks:

Rumble strips are pavement irregularities installed to warn drivers of lane or roadway departures. This element captures the presence of rumble strips adjacent to the vehicles initial travel lane along the direction of travel during the pre-event movement phase of the crash.

Rumble strips are an effective countermeasure for reducing lane and roadway departure crashes. The noise and vibration produced by rumble strips alert drivers when they leave the traveled way. Rumble stripes is the term used for rumble strips painted with a retroreflective coating to increase the visibility of the pavement edge at night and during inclement weather conditions.

Please be careful not to confuse raised pavement travel lane markers (Bott Dots) with rumble strips. These are generally used as lane or roadway edge markers and in gore areas and are NOT considered rumble strips.

Types of Rumble Strips

- Center line rumble strips are an effective countermeasure to reduce head-on collisions and opposite-direction sideswipes (often referred to as cross-over or cross- center line crashes). Center line rumble strips are primarily used to warn drivers whose vehicles are crossing center lines of two-lane, two-way roads. These will typically be left rumble strips for this element.
- Shoulder rumble strips are an effective means of reducing run-off-the-road crashes. They are primarily used to warn drivers when they have drifted from their lane. Edge line rumble strips are a variation on shoulder rumble strips and place the pavement marking within the rumble strip, improving the visibility of the marking. These are more commonly used on roads with narrow shoulders. Shoulder rumble strips will typically be right rumble strips for this element.
- Transverse rumble strips are used to alert drivers of an unexpected change in the roadway, such as the need to change lanes, slow down or stop, or changes in the roadway alignment. These rumble strips are not intended to reduce run-off-road crashes. Typical locations for these rumble strips are on approaches to intersections, toll plazas, horizontal curves, and work zones. Transverse rumble strips ARE NOT considered rumble strips for this element.

No rumble strip present

Used when there is no rumble strip present in this vehicle's initial travel lane.

Left rumble strip present

Used when there is a rumble strip present adjacent to the left side of the initial travel lane.

Right rumble strip present

Used when there is a rumble strip present adjacent to the right side of the initial travel lane.

Left and right rumble strip present

Used when there is a rumble strip present adjacent to the left and right side of the initial travel lane.

Rumble Strip Road

Element Values:

0 [No driver present]

1 None

2 Left rumble strip present

3 Right rumble strip present

4 Left and right rumble strip present

99 Unknown

Remarks:

Rumble strips are pavement irregularities installed to warn drivers of lane or roadway departures. This element captures the presence of rumble strips in the vehicles road along the direction of travel during the pre-event movement phase of the crash.

Rumble strips are an effective countermeasure for reducing lane and roadway departure crashes. The noise and vibration produced by rumble strips alert drivers when they leave the traveled way. Rumble stripes is the term used for rumble strips painted with a retroreflective coating to increase the visibility of the pavement edge at night and during inclement weather conditions.

Please be careful not to confuse raised pavement travel lane markers (Bott Dots) with rumble strips. These are generally used as lane or roadway edge markers and in gore areas and are NOT considered rumble strips.

Types of Rumble Strips

- Center line rumble strips are an effective countermeasure to reduce head-on collisions and opposite-direction sideswipes (often referred to as cross-over or cross- center line crashes). Center line rumble strips are primarily used to warn drivers whose vehicles are crossing center lines of two-lane, two-way roads. Center line rumble strips ARE NOT considered left side rumble strips for this element. This element is focused on rumble strips for the road and not the initial travel lane.
- Shoulder rumble strips are an effective means of reducing run-off-the-road crashes. They are primarily used to warn drivers when they have drifted from their lane. Edge line rumble strips are a variation on shoulder rumble strips and place the pavement marking within the rumble strip, improving the visibility of the marking. These are more commonly used on roads with narrow shoulders.
- Transverse rumble strips are used to alert drivers of an unexpected change in the roadway, such as the need to change lanes, slow down or stop, or changes in the roadway alignment. These rumble strips are not intended to reduce run-off-road crashes. Typical locations for these rumble strips are on approaches to intersections, toll plazas, horizontal curves, and work zones. Transverse rumble strips ARE NOT considered rumble strips for this element.

No rumble strip present

Used when there is no rumble strip present in this vehicle's road.

Left rumble strip present

Used when there is a rumble strip present adjacent to the left side of the road.

Right rumble strip present

Used when there is a rumble strip present adjacent to the right side of the road.

Left and right rumble strip present

Used when there is a rumble strip present adjacent to the left and right side of the road.

Line Type Right

Element Values:

0	[No driver present]
1	None
2	Solid White
3	Solid Yellow
4	Dotted/Dashed White
5	Dotted/Dashed Yellow
6	Raised Pavement Marker
99	Unknown

Remarks:

Line markings are used to convey messages to roadway users. They indicate which part of the road to use and indicate where passing is allowed. This element describes the travel lane line type during the pre-movement phase of the crash.

In the circumstances where a solid AND dotted/dashed line is present (i.e., legal passing on a two-lane divided roadway), select the first line a vehicle would cross. If both a painted line AND a raised pavement marker is present, select the appropriate painted line type.

Solid White

A continuous white lane line that marks the right edge of the roadway or separates lanes of traffic moving in the same direction.

Solid Yellow

A continuous yellow line that separates traffic flowing in opposite directions. A solid yellow line indicates that passing is prohibited.

Dotted/Dashed White

A series of broken white line segments at regular intervals. A dashed white line indicates that lane changes are allowed.

Dotted/Dashed Yellow

A series of broken yellow line segments at regular intervals. A dashed yellow line indicates that passing is allowed.

Raised Pavement Marker

A device with a height of at least 10 mm (0.4 in) mounted on or in a road surface that is intended to be used as a positioning guide or to supplement or substitute for pavement markings.

In some states raised pavement markers are commonly used in lieu of painted strips for marking roads. These markers may be white or yellow, depending on the specific application, following the same basic colors of their analogous white and yellow painted lines. Three types of raised

pavement markings are used to form roadway lines. It is believed that these types of roadway markings are the hardest for an LDW sensor system to process. Type A and Type AY are non-reflective circular domes that are approximately 4 in (10 cm) in diameter and approximately 0.7 in (1.8 cm) high. Type C and D are square markings that are retro reflective in two directions measuring approximately 4 x 4 x 0.5 in (10 x 10 x 5 cm), and Type G and H that are the same as C and D only retro reflective in a single direction.

Line Type Left

Element Values:

0	[No driver present]
1	None
2	Solid White
3	Solid Yellow
4	Dotted/Dashed White
5	Dotted/Dashed Yellow
6	Raised Pavement Marker
99	Unknown

Remarks:

Line markings are used to convey messages to roadway users. They indicate which part of the road to use and indicate where passing is allowed. This element describes the travel lane line type during the pre-movement phase of the crash.

In the circumstances where a solid AND dotted/dashed line is present (i.e., legal passing on a two-lane divided roadway), select the first line a vehicle would cross. If both a painted line AND a raised pavement marker is present, select the appropriate painted line type.

Solid White

A continuous white lane line that marks the right edge of the roadway or separates lanes of traffic moving in the same direction.

Solid Yellow

A continuous yellow line that separates traffic flowing in opposite directions. A solid yellow line indicates that passing is prohibited.

Dotted/Dashed White

A series of broken white line segments at regular intervals. A dashed white line indicates that lane changes are allowed.

Dotted/Dashed Yellow

A series of broken yellow line segments at regular intervals. A dashed yellow line indicates that passing is allowed.

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A device with a height of at least 10 mm (0.4 in) mounted on or in a road surface that is intended to be used as a positioning guide or to supplement or substitute for pavement markings.

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pavement markings are used to form roadway lines. It is believed that these types of roadway markings are the hardest for an LDW sensor system to process. Type A and Type AY are non-reflective circular domes that are approximately 4 in (10 cm) in diameter and approximately 0.7 in (1.8 cm) high. Type C and D are square markings that are retro reflective in two directions measuring approximately 4 x 4 x 0.5 in (10 x 10 x 5 cm), and Type G and H that are the same as C and D only retro reflective in a single direction.

Roadway-Related Factors

ELEMENT VALUES:

(Code up to four elements.)

(00) No roadway condition factors

(01) Traffic signs/signals missing

(02) Roadway view obstructions including factors or devices like signal boxes

(03) View obstructed by other vehicle

(04) Roadway geometry (crossover)

(05) Roadway geometry (curve)

(06) Road sight distance insufficient

(07) Lane delineation problem (not present, worn, etc.)

(08) Narrow shoulders

(09) Narrow road

(10) Ramp speed

(11) Roadway condition (potholes, deteriorated road edges, etc.)

(12) Slick surface (low friction value due to icy condition, loose debris, or any other cause)

(13) Road under water

(14) Road washed out

(97) No driver present

(98) Other roadway problem (specify): _____

(99) Unknown

If element 04 [Roadway geometry (crossover)] is selected and crash site involves a crossover, record:

Median width = ___ ___ ___ . ___ m

Inside shoulder width = ___ ___ ___ . ___ m

Median:

___ ___ ___ . ___ ft x 0.3048 = ___ ___ ___ . ___m

Shoulder:

___ ___ ___ . ___ ft x 0.3048 = ___ ___ ___ . ___m

999.7 Not applicable

999.9 Unknown

If element 05 [Roadway geometry (curve)] is selected, and crash site is located in a curve or is associated with a curve, record the radius of curvature:

Radius =___ ___ ___ . ___m

___ ___ ___ . ___ ft x 0.3048 = ___ ___ ___ . ___m

999.7 Not applicable

999.9 Unknown

If element 06 (Road sight distance insufficient) is selected, record the measured sight distance.

Sight Distance = ___ ___ ___ ___ . ___m

___ ___ ___ ___. ___ ft x 0.3048 = ___ ___ ___ ___. ___m

AASHTO Recommended Sight Distance

___ ___ ___ ___ . ___m

___ ___ ___ ___. ___ ft x 0.3048 =___ ___ ___ ___. ___m

REMARKS:

This element value establishes the presence of roadway-related factors that may be relevant to crash occurrence. Select and enter up to two elements.

CODE "00" (No roadway-related factors) is used when there are no roadway-related factors relevant to this crash. This designation is also used to fill in unused coding clocks (i.e., less than four factors are coded).

CODE "01" (Traffic signs/signals missing) is used when traffic signs/signals have been removed from this designated location and are not physically present. The removal can be associated with either a repair function or vandalism.

CODE "02" (Roadway view obstructions including factors or devices like signal boxes) is used when there is a view obstruction associated with roadway design including such added devices as signal boxes, signal light support poles, guardrails, and crash cushions.

CODE "03" (View obstructed by other vehicle) is used when the driver's view is obstructed by an intervening vehicle.

CODE "04" [Roadway geometry (crossover)] is used when roadway geometry, in the form of a crossover, is relevant to this crash. In this circumstance record the median width and include shoulder width.

CODE "05" [Roadway geometry (curve)] is used when roadway geometry, in the form of a curve, is relevant to this crash. If the crash site is located in a curve or is associated with a curve, record the radius of curvature. This value is determined as follows:

$$R = \frac{C^2}{8m} + \frac{m}{2}$$ where R = Radius of curvature

C = chord length, and

m = value of middle ordinate.

These measurements are provided in the Researcher's measurement log.

CODE "06" (Road sight distance insufficient) is used when the measured sight distance on this roadway does not meet the standard specified in AASHTO. For reference purposes, material generated for GV39 [Sight line restriction (this vehicle)] is reproduced at the end of this listing as NOTE A.

CODE "07" [Lane delineation problem (not present, worn, etc.)] is used when this driver encounters difficulty as a result of lane delineation. The delineation markings in this circumstance may not be present, may be worn (i.e., reduced visibility), or may be covered in some manner (i.e., gravel, debris, etc.).

CODE "08" (Narrow shoulders) is used when this driver experiences a problem as a result of the shoulder that is not sufficiently wide. While circumstances will vary depending on location, shoulder width should be less than 1.5 meters to qualify for this designation.

CODE "09" (Narrow road) is used when this driver experiences a problem as a result of insufficient roadway width. While circumstances will vary depending on the type of roadway, two lane roadways should be less than 20 feet (6.1 meters) in width to qualify for this designation.

CODE "10" (Ramp speed) is used when the posted ramp entrance/exit speed is inappropriate. This includes circumstances where the posted speed is adequate for one class of vehicle but is too high for another class of vehicle (e.g., adequate for automobiles, but too high for large trucks).

CODE "11" [Roadway condition (potholes, deteriorated road edges, etc.)] is used when the driver encounters a problem as a result of a roadway maintenance condition. Specific areas of concern include potholes, deteriorated/broken road edges, washboard areas, and depression where a localized area of the surface has sunk several inches or more.

CODE "12" [Slick surface (low friction value due to icy condition, loose debris, or any other cause)] is used when the driver encounters a low friction surface most commonly associated with an icy condition. There are several other circumstances that can also be associated with a pronounced reduction of friction values. These include loose gravel/sand spread over a paved surface and oil build-ups. Typically, wet surfaces are not included in this designation unless the moisture adds to an existing condition such as an oil build-up.

CODE "13" (Road under water) is reserved for the circumstance where at least one travel lane is completely covered with water.

CODE "14" (Road washed out) is used when a portion of the roadway collapses/washes away as a result of exposure to running water.

CODE "97" (No driver present) is used when there is no driver in the driver's seated position at the time of the crash.

CODE "98" [Other roadway problem (specify): _____] is used when the driver encounters a roadway problem that is not described in preceding elements. Specify the nature of this problem.

CODE "99" (Unknown) is used when there is insufficient information to determine if a roadway-related factor is relevant to this crash.

NOTE A

Sight Line Restriction Guideline

This variable establishes sight line restrictions for the driver of this vehicle. Recommended sight distances for various design circumstances have been selected from the AASHTO manual that states, "The ability to see ahead is of the utmost importance in the safe and efficient operation of a vehicle on a highway - - -. For safety on highways the designer must provide sight distance of sufficient length that drivers can control the operation of their vehicles to avoid striking an unexpected object on the travel way. Certain two-lane highways should also have sufficient sight distance at frequent intervals and for substantial portions of their length. Conversely, it normally is of little practical value to provide passing sight on two-lane urban streets or arterials".

Based on the above assessment, AASHTO provides guidance for a number of sight distance considerations. This program will focus on three of the AASHTO guidelines as follows:

- Table 3-1: Stopping Sight Distance
- Table 3-2: Stopping Sight Distance on Grades
- Table 3-7: Passing Sight Distance for Design of Two-Lane Highways

Tables 3-1 to 3-7 have been derived from the AASHTO manual. Table 3-1 specifies minimum stopping sight distance requirements. For this program, the design speeds specified in the table should be assumed to represent the posted/statutory speed limit at the crash site. Indicated table values satisfy both wet and dry conditions.

Table 3-1. Stopping Sight Distances (Wet Pavements)

Design Speed (mph)	**Stopping Sight Distance (Rounded for Design)**	
	Feet	**Meters**
15	80	24.38
20	115	35.05
25	155	47.24
30	200	60.96
35	250	76.20
40	305	92.96
45	360	109.72
50	425	129.54
55	495	150.88
60	570	173.74
65	645	196.60
70	730	222.50

Design Speed (mph)	Stopping Sight Distance (Rounded for Design)	
75	820	249.93
80	910	277.37

Sight distance requirements shown in Table 3-1 assume level surfaces. Adjustments to these specifications associated with grades are shown in Table 3-2.

Table 3-2. Stopping Sight Distance on Grades

Design Speed (mph)	Increase for Downgrades Correction in Stopping Distance						Decrease for Upgrades Correction in Stopping Distance					
	3%		6%		9%		3%		6%		9%	
	ft	m	ft	M	ft	m	ft	m	ft	M	ft	m
15	80	24.38	82	24.99	85	25.91	75	22.86	74	22.55	73	22.25
20	116	35.36	120	36.58	126	38.40	109	33.22	107	32.61	104	31.70
25	158	48.16	165	50.29	173	52.73	147	44.81	143	43.59	140	42.67
30	205	62.48	215	65.53	227	69.19	200	60.96	184	56.08	179	54.08
35	257	78.33	271	82.60	287	87.48	237	72.24	229	69.80	222	67.67
40	315	96.01	333	101.50	354	107.90	289	88.09	278	84.73	269	81.99
45	376	114.60	400	121.92	427	130.15	344	104.85	331	100.89	320	97.54
50	446	135.94	474	144.48	507	154.53	405	123.44	388	118.26	375	114.30
55	520	158.50	553	168.55	593	180.75	469	142.95	450	137.16	433	131.98
60	598	182.27	638	194.46	686	209.10	538	163.98	515	156.97	495	150.88
65	682	207.87	728	221.89	785	239.27	612	186.54	584	178.00	561	170.99
70	771	235.00	825	251.46	891	271.58	690	210.31	656	199.95	631	192.33
75	866	263.96	927	282.55	1003	305.72	772	235.31	736	224.33	704	214.58
80	965	294.13	1035	315.47	1121	341.68	859	261.82	817	249.02	782	238.01

Minimum passing sight distance requirements associated with the design of rural two-lane highways are shown in Table 3-7. A degree of caution is required when interpreting these design distances. Specifically, AASHTO does not specify that the table sight distance recommendations be maintained over the full length of the roadway. As indicated in the opening paragraph to this discussion, two lane rural highways should have sufficient sight distances “at frequent intervals and for substantial portions of their length”. For this program, the specification will be assumed to apply to “passing zones”. In effect, if it is legal for the subject vehicle to be passing at this

location then the total length of the passing zone should meet or exceed AASHTO specifications. If these criteria are satisfied, there is no sight restriction.

Table 3-7. Passing Sight Distance for Design of Two-Lane Highways

Design Speed	Assumed Speeds		Minimum Passing Sight Distance Rounded	
	Passed Vehicle	Passing Vehicle		
(mph)	(mph)	(mph)	Feet	Meters
20	18	28	710	216.41
25	22	32	900	274.32
30	26	36	1090	332.23
35	30	40	1280	390.14
40	34	44	1470	448.06
45	37	47	1625	495.30
50	41	51	1835	559.31
55	44	54	1985	605.03
60	47	57	2135	650.75
65	50	60	2285	696.47
70	54	64	2480	755.91
75	56	66	2580	786.39
80	58	68	2680	816.87

FIELD APPLICATION

Most of the sites evaluated for sight distance restrictions in this program will be evaluated with respect to braking sight distance requirements. The only situation that will be evaluated with respect to passing sight distance requirements will involve a crash sequence that occurs on a two-lane highway and involves at least one vehicle that was attempting to complete a passing maneuver at the time of the crash.

As a general rule, check measurements to verify compliance with AASHTO recommendations with respect to braking sight distance will not be required. Visual verification that the site meets or exceeds AASHTO standards is sufficient. In this circumstance, the Researcher selects element 2 (No), indicating that there is no sight distance restriction. NOTE: Remember to adjust minimum required braking sight distance provided in Table 3-1 if a grade is present. Specific distance requirements are provided in Table 3-2.

CRITERIA FOR MEASURING SIGHT DISTANCE

Sight distance is the distance along a roadway that an object of a specified a height is continuously visible to the driver. This distance is dependent on the height of the driver's eye above the road surface, the specified object height above the road surface, and the height of sight obstructions within the line of sight.

For sight distance measurements for passenger vehicles, the height of the driver's eye is considered to be 3.5 feet (1.07 m) above the road surface. For large trucks, the driver's eye height ranges from 6 to 8 feet (1.83 to 2.44 m) and is assumed to be 7.6 feet (2.32 m) for measurement purposes.

For stopping sight distance measurements, the height of the object is assumed to be 2 feet (0.61 m). For passing sight distance measurements, the height of the object is assumed to be 3.5 feet (1.07 m).

Weather-Related Factors

ELEMENT VALUES:

(Code up to four elements.)

(0) No weather-related factors

(1) Rain

(2) Snow

(3) Fog

(4) Wind gust

(5) Hail

(6) Sleet

(7) No driver present

(8) Other (specify): _____

(9) Unknown

REMARKS:

This element value establishes the presence of weather-related factors that may have had a bearing on crash occurrence. Select and enter up to four elements that are relevant to this crash.

CODE "0" (No weather-related factors) is used when there are no adverse weather conditions relevant to the crash. This designation is also used to fill unused coding spaces (i.e., less than four factors coded).

CODE "1" (Rain) is used when it is raining at the time of the crash.

CODE "2" (Snow) is used when it is snowing at the time of the crash.

CODE "3" (Fog) is used when the driver is operating in fog at the time of the crash.

CODE "4" (Wind gust) is used when a wind gust occurs prior to the crash and has some relevance to the crash.

CODE "5" (Hail) is used when the driver is operating in hail at the time of the crash.

CODE "6" (Sleet) is used when the driver is operating in sleet at the time of the crash.

CODE "7" (No driver present) is used when there is no driver in the driver's seated position at the time of the crash.

CODE "8" [Other (specify): _____] is used when there is a relevant weather-related factor that is not described in preceding elements. Specify the nature of this factor.

CODE "9" (Unknown) is used when there is insufficient information to determine if weather-related factors are relevant to the crash.

Other Environmental Factors

ELEMENT VALUES:

(Code up to four elements.)

(0) No other factors

(1) Glare

(2) Blowing debris

(3) Smoke

(7) No driver present

(8) Other sudden change in ambience (specify): _____

(9) Unknown

REMARKS:

This element value establishes the presence of a range of additional environmental factors that may have a bearing on crash occurrence. Select and enter up to four elements that are relevant to this crash.

CODE "0" (No other factors) is used when there is no evidence that factors of this type are relevant to the crash. This designation is also used to fill unused coding spaces (i.e., less than for factors coded).

CODE "1" (Glare) is used when glare in some form is relevant to this driver. Examples include headlight glare, sun glare, and reflected glare (i.e., sun reflecting off a windshield or other metal component).

CODE "2" (Blowing debris) is used when this driver is exposed to some form of blowing debris. Examples include paper, cardboard boxes, and tree limbs.

CODE "3" (Smoke) is used when the driver's view is obscured by the presence of smoke (e.g., smoke from a grass fire, house fire, or forest fire).

CODE "7" (No driver present) is used when there is no driver in the driver's seated position at the time of the crash.

CODE "8" [Other sudden changes in ambience (specify): _____] is used when this driver experiences a problem as a result of sudden change in ambience. Specify the nature of this factor.

CODE "9" (Unknown) is used when there is insufficient information to determine if environmental factors of this type are relevant to the crash.

Traffic Flow Interruption Factors

ELEMENT VALUES:

(Code up to four elements.)

(0) No traffic flow factors

(1) Previous crash nearby

(2) Construction work zone

(3) Emergency vehicle approaching

(4) Rush hour congestion

(8) Other (specify): _____

(9) Unknown

REMARKS:

This element value establishes the presence of traffic flow interruption factors that may have a bearing on driver performance/crash occurrence. Up to four factors may be selected and entered.

CODE "0" (No traffic flow factors) is used when there are no traffic flow factors relevant to the crash. This designation is also used to fill in unused coding spaces (i.e., less than four factors are coded).

CODE "1" (Previous crash nearby) is used when traffic flow at the crash site is interrupted by a previous crash located near this site.

CODE "2" (Construction work zone) is used when traffic flow is interrupted as a result of the crash site being located in a construction work zone.

CODE "3" (Emergency vehicle approaching) is used when traffic flow at the crash site is interrupted as a result of an emergency vehicle approaching from either direction.

CODE "4" (Rush hour congestion) is used when traffic flow at the crash site is interrupted as a result of rush hour traffic congestion.

CODE "8" [Other (specify): _____] is used when traffic flow at the crash site is interrupted as a result of a factor not described in preceding elements. Describe the reason for the interruption.

CODE "9" (Unknown) is used when there is insufficient information to determine if there is a traffic flow interruption that is relevant to this crash.

Driver Fatigue

ELEMENT VALUES:

(1) Driver fatigued

(2) Driver not fatigued

(7) No driver present

(9) Unknown if driver fatigued

REMARKS:

This element value assesses driver fatigue at the time of the crash. The assessment is based on an evaluation of the driver's current and preceding sleep schedules, current and preceding work schedules, and a variety of other fatigue-related factors including recreational and non-work activities. This assessment reflects the Case Reviewer's best judgment with respect to this issue and is based on all available information inputs.

CODE "1" (Driver fatigued) is used when available support information indicates that the driver has not received adequate sleep, is tired/fatigued due to extended work hours, is tired/fatigued due to strenuous recreational activities or strenuous non-work activities, or is tired/fatigued due to a combination of factors.

CODE "2" (Driver not fatigued) is used when there is no information indicating that the driver exhibited symptoms of fatigue and support information indicates that rest and work intervals were within reasonable bounds.

CODE "7" (No driver present) is used when there is no driver in the driver's seated position at the time of the crash.

CODE "9" (Unknown if driver fatigued) is used when there is insufficient information to determine if the driver was fatigued at the time of the crash.

Driver Illness

ELEMENT VALUES:

(Code up to three factors.)

(0) No illness

(1) Heart attack

(2) Seizure (epilepsy-related)

(3) Seizure (other source)

(4) Blackout (diabetes-related)

(5) Blackout (other source)

(6) Severe cold/flu symptoms

(7) No driver present

(8) Other (specify): _____

(9) Unknown

REMARKS:

This element value establishes the possibility of an illness influence on the driver's performance. Major medical problems (i.e., heart attack, seizure) should have medical verification.

CODE "0" (No illness) is used when the driver is not ill. This designation is also used to fill in unused spaces (i.e., there are less than three reportable factors).

CODE "1" (Heart attack) is used when the driver has a medically verified heart attack during the precrash phase.

CODE "2" [Seizure (epilepsy-related)] is used when the driver has a medically verified epileptic seizure during the precrash phase.

CODE "3" [Seizure (other source)] is used when the driver has a medically verified seizure, that is not related to epilepsy, during the precrash phase.

CODE "4" [Blackout (diabetes-related)] is used when the driver has a blackout during the precrash phase and this event can be traced to a medically diagnosed diabetic condition (e.g., driver blacks out as a result of insulin shock).

CODE "5" [Blackout (other source)] is used when the driver has a blackout during the precrash phase, and this event is not related to a diabetic condition.

CODE "6" (Severe cold/flu symptoms) is used when the driver is operating the vehicle while experiencing severe cold/flu symptoms that influence his/her driving performance.

CODE "7" (No driver present) is used when there is no driver in the driver's seated position at the time of the crash.

CODE "8" [Other (specify): _____] is used when the driver experiences an illness or physical symptoms that are not described in preceding elements. An annotation is required to specify the nature of the illness/symptoms.

CODE "9" (Unknown) is used when there is insufficient information to determine if the driver experienced an illness during the precrash phase.

Pre-First Harmful Event Maneuver (PRE-FHE)

Element Values:

0	[No driver present]
1	No pre first harmful event sequence
2	Lane departure-left side
3	Lane return-left side
4	Lane departure-right side
5	Lane return-right side
6	Roadway departure-left side
7	Roadway return-left side
8	Roadway departure-right side
9	Roadway return-right side
10	Other (specify)
99	Unknown

Remarks:

This variable describes lateral vehicle movements along the vehicle's trajectory between the end of the pre-event movement phase and the first harmful event. For the purposes of this variable, lateral movement components are defined as lane departures/returns, roadway departures/returns, and a limited number of other motions (i.e., non-contact power unit jackknife and trailer swing). If the vehicle changed lanes before the critical envelope, this should not be included.

Power unit jackknife and trailer swing events that result in contact between the vehicle's units are excluded because these types of events are considered harmful events.

Roadway or lane departure includes any tire/wheel departing roadway or travel lane. When an in- transport vehicle legally parked on the roadside/parking lane is struck, this is considered a Roadway Departure for the vehicle striking the legally parked vehicle.

In cases where a lane departure/return also represents a roadway departure/return, the maneuver should be classified in the roadway category. Specifically, road designated element values take precedence over lane designated element values. Code every lane/roadway departure and return.

Since the technician will sequence all lateral movements, certain attributes may be used multiple times.

If there are no lateral movement components between the end of the pre-event movement phase and the initiation point of the first harmful event, this variable should be coded No pre-first harmful event maneuver sequence. For example, if an inattentive driver suddenly realizes that traffic forward of his position is stopped, applies heavy braking inputs causing the vehicle to skid forward to impact without departing its travel lane, then code No pre-first harmful event maneuver sequence.

No pre-first harmful event sequence

Used when there are no lateral movement components in this vehicle's trajectory prior to the first harmful event.

Lane departure-left side

Used when this vehicle departs the left side of the travel lane prior to the first harmful event. If the lane departure also represents a road departure, code this event in the road departure category.

Lane return-left side

Used when the subject vehicle returns to the left side of the travel lane, after a previous departure, prior to the first harmful event. If the lane return also represents a road return, code this event in the road return category.

Lane departure-right side

Used when this vehicle departs the right side of the travel lane prior to the first harmful event. If the lane departure also represents a road departure, code this event in the road departure category.

Lane return-right side

Used when the subject vehicle returns to the right side of the travel lane, after a previous departure, prior to the first harmful event. If the lane return also represents a road return, code this event in the road return category.

Roadway departure-left side

Used when this vehicle departs the left side of the roadway prior to the first harmful event.

Roadway return-left side

Used when the subject vehicle returns to the left side of the roadway, after a previous road departure, prior to the first harmful event.

Roadway departure-right side

Used when this vehicle departs the right side of the roadway prior to the first harmful event.

Roadway return-right side

Used when the subject vehicle returns to the right side of the roadway, after a previous road departure, prior to the first harmful event.

Other (specify)

Used when the subject vehicle experiences a lateral movement component that is not described in preceding elements. Non-contact power unit jackknifes, and trailer swings are included in this attribute. For Example: When the subject vehicle leaves its initial roadway, and enters a different roadway (i.e., travels through the median) use this attribute (Example 4 below).

No driver present

Used when there is no driver present in the vehicle at the time of the crash.

Unknown

Used when there is insufficient information to determine the subject vehicle's trajectory between the end of the pre-event movement phase and the initiation point of the first harmful event or when there is insufficient information to determine specific lateral movement components.

Pre-FHE Examples

Example 1

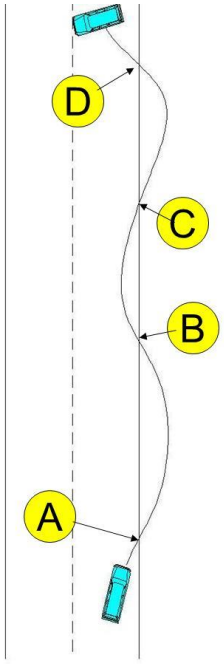
Example 1

A- Roadway departure- right side

B- Roadway return- right side

C- Roadway departure- right side

D- Roadway return- right side



Example 2

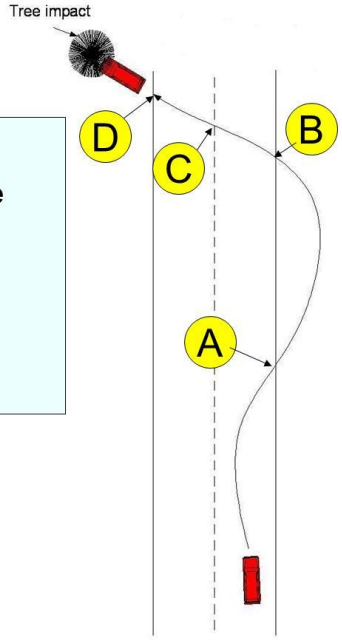
Example 2

A- Roadway departure- right side

B- Roadway return- right side

C- Lane departure- left side

D- Roadway departure- left side



Example 3

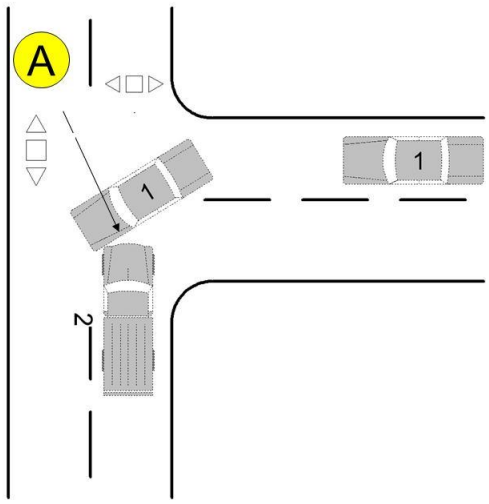
Example 3

V1

A- No pre-first harmful event sequence

V2

A- No pre-first harmful event sequence



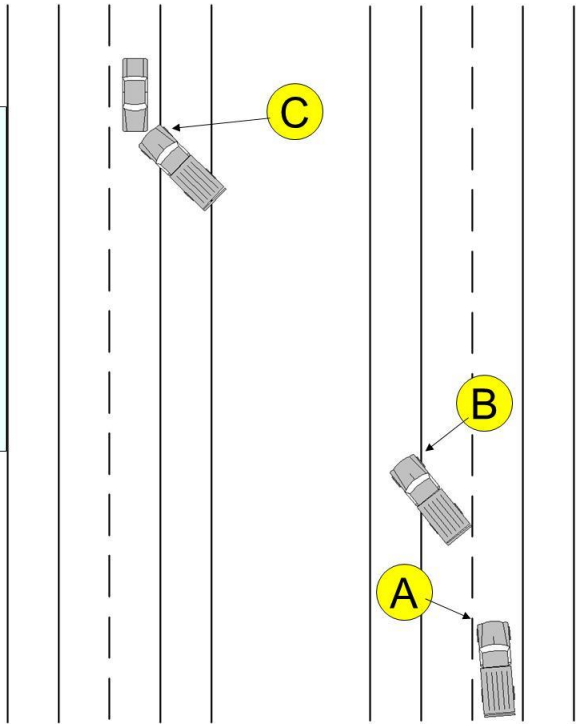
Example 4

Example 4

A- Lane departure- left side

B- Roadway departure- left side

C- Other



Precrash Notes

The Notes page provides a location to include any additional information relevant to precrash not captured in the preceding elements.

DRIVER

For additional information see the 2018 FARS Coding and Validation Manual.

Vehicle Number - Driver Level

This element populated from FARS case.

Driver Presence

This element populated from FARS case.

Driver ZIP Code

This element populated from FARS case.

Violations Charged

This element populated from FARS case.

Speeding-Related (FARS definition)

This element populated from FARS case.

Condition (Impairment) at Time of Crash

This element populated from FARS case.

FARS Driver-Related Factors

This element populated from FARS case.

Non-CDL License Type/Status

This element populated from FARS case.

Commercial Motor Vehicle License Status

This element populated from FARS case.

Compliance with CDL endorsements

This element populated from FARS case.

License Compliance with Class of Vehicle

This element populated from FARS case.

Compliance with License Restrictions

This element populated from FARS case.

Driver Height

This element populated from FARS case.

Driver Weight

This element populated from FARS case.

Previous Recorded Crashes

This element populated from FARS case.

Previous Recorded Suspensions, Revocations, and Withdrawals

This element populated from FARS case.

Previous DWI Convictions

This element populated from FARS case.

Previous Speeding Convictions

This element populated from FARS case.

Previous Other Moving Violation Convictions

This element populated from FARS case.

Date of First Crash, Suspension, Conviction

This element populated from FARS case.

Date of Last Crash, Suspension, Conviction

This element populated from FARS case.

Driver Notes

The Notes page provides a location to include any additional information relevant to the driver not captured in the preceding elements.

PERSON

For additional information see the 2018 FARS Coding and Validation Manual.

Vehicle Number- Person Level

This element populated from FARS case.

Person Number

This element populated from FARS case.

Age

This element populated from FARS case.

Sex

This element populated from FARS case.

Person Type

This element populated from FARS case.

Injury Severity

This element populated from FARS case.

Seating Position

This element populated from FARS case.

FARS Person-Related Factors

This element populated from FARS case.

Restraint Usage

This element populated from FARS case.

Air Bag Deployed

This element populated from FARS case.

Ejected

This element populated from FARS case.

Ejection Path

This element populated from FARS case.

Extrication

This element populated from FARS case.

Police Reported Alcohol Involvement

This element populated from FARS case.

Alcohol Test Status/Type/Result

This element populated from FARS case.

Police Reported Drug Involvement

This element populated from FARS case.

Drug Toxicology Status/Specimen/Results

This element populated from FARS case.

Person Notes

The Notes page provides a location to include any additional information relevant to the person not captured in the preceding elements.

PERSON (Not a Motor Vehicle Occupant)

For additional information see the 2018 FARS Coding and Validation Manual.

Vehicle Number- Person Level

This element populated from FARS case.

Person Number

This element populated from FARS case.

Age

This element populated from FARS case.

Sex

This element populated from FARS case.

Person Type

This element populated from FARS case.

Injury Severity

This element populated from FARS case.

AVOIDANCE

Critical Reason for Critical Event Assigned to Medium Truck

ELEMENT VALUES:

(1) Yes

(2) No

(9) Unknown

REMARKS:

This element value establishes if the Critical Reason for the Critical Event in the crash was assigned to a medium truck.

CODE "1" (Yes) is used when the Critical Reason for the Critical Event was assigned to a medium truck.

CODE "2" (No) is used when the Critical Reason for the Critical Event was assigned to another vehicle in the crash.

CODE "9" (Unknown) is used when the Critical Reason for the Critical Event was unknown.

Forward Collision Warning Helpful- Medium Truck

ELEMENT VALUES:

0 No

1 Possible

2 Probable

9 Unknown

REMARKS:

This element value establishes the likelihood the technology would have been helpful in preventing or mitigating the severity of the crash.

CODE "0" (No) is used when it is determined the technology would not have been helpful in this crash.

CODE "1" (Possible) is used when it is determined the technology possibly could been helpful in this crash.

CODE "2" (Probable) is used when it is determined the technology probably would have been helpful in this crash.

CODE "9" (Unknown) is used when it cannot be determined if the technology could have been helpful in this crash.

Automatic Braking Helpful- Truck

ELEMENT VALUES:

0 No

1 Possible

2 Probable

9 Unknown

REMARKS:

This element value establishes the likelihood the technology would have been helpful in preventing or mitigating the severity of the crash.

CODE "0" (No) is used when it is determined the technology would not have been helpful in this crash.

CODE "1" (Possible) is used when it is determined the technology possibly could been helpful in this crash.

CODE "2" (Probable) is used when it is determined the technology probably would have been helpful in this crash.

CODE "9" (Unknown) is used when it cannot be determined if the technology could have been helpful in this crash.

Lane Departure Warning Helpful- Medium Truck

ELEMENT VALUES:

0 No

1 Possible

2 Probable

9 Unknown

REMARKS:

This element value establishes the likelihood the technology would have been helpful in preventing or mitigating the severity of the crash.

CODE "0" (No) is used when it is determined the technology would not have been helpful in this crash.

CODE "1" (Possible) is used when it is determined the technology possibly could been helpful in this crash.

CODE "2" (Probable) is used when it is determined the technology probably would have been helpful in this crash.

CODE "9" (Unknown) is used when it cannot be determined if the technology could have been helpful in this crash.

Lane Keeping Helpful- Medium Truck

ELEMENT VALUES:

0 No

1 Possible

2 Probable

9 Unknown

REMARKS:

This element value establishes the likelihood the technology would have been helpful in preventing or mitigating the severity of the crash.

CODE "0" (No) is used when it is determined the technology would not have been helpful in this crash.

CODE "1" (Possible) is used when it is determined the technology possibly could been helpful in this crash.

CODE "2" (Probable) is used when it is determined the technology probably would have been helpful in this crash.

CODE "9" (Unknown) is used when it cannot be determined if the technology could have been helpful in this crash.

Blind Spot Helpful- Medium Truck

ELEMENT VALUES:

0 No

1 Possible

2 Probable

9 Unknown

REMARKS:

This element value establishes the likelihood the technology would have been helpful in preventing or mitigating the severity of the crash.

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CODE "1" (Possible) is used when it is determined the technology possibly could been helpful in this crash.

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CODE "9" (Unknown) is used when it cannot be determined if the technology could have been helpful in this crash.

Forward Collision Warning Helpful- Other Vehicles

ELEMENT VALUES:

0 No

1 Possible

2 Probable

9 Unknown

REMARKS:

This element value establishes the likelihood the technology would have been helpful in preventing or mitigating the severity of the crash.

CODE "0" (No) is used when it is determined the technology would not have been helpful in this crash.

CODE "1" (Possible) is used when it is determined the technology possibly could been helpful in this crash.

CODE "2" (Probable) is used when it is determined the technology probably would have been helpful in this crash.

CODE "9" (Unknown) is used when it cannot be determined if the technology could have been helpful in this crash.

Automatic Braking Helpful- Other Vehicles

ELEMENT VALUES:

0 No

1 Possible

2 Probable

9 Unknown

REMARKS:

This element value establishes the likelihood the technology would have been helpful in preventing or mitigating the severity of the crash.

CODE "0" (No) is used when it is determined the technology would not have been helpful in this crash.

CODE "1" (Possible) is used when it is determined the technology possibly could been helpful in this crash.

CODE "2" (Probable) is used when it is determined the technology probably would have been helpful in this crash.

CODE "9" (Unknown) is used when it cannot be determined if the technology could have been helpful in this crash.

Lane Departure Warning Helpful- Other Vehicles

ELEMENT VALUES:

0 No

1 Possible

2 Probable

9 Unknown

REMARKS:

This element value establishes the likelihood the technology would have been helpful in preventing or mitigating the severity of the crash.

CODE "0" (No) is used when it is determined the technology would not have been helpful in this crash.

CODE "1" (Possible) is used when it is determined the technology possibly could been helpful in this crash.

CODE "2" (Probable) is used when it is determined the technology probably would have been helpful in this crash.

CODE "9" (Unknown) is used when it cannot be determined if the technology could have been helpful in this crash.

Lane Keeping Helpful- Other Vehicles

ELEMENT VALUES:

0 No

1 Possible

2 Probable

9 Unknown

REMARKS:

This element value establishes the likelihood the technology would have been helpful in preventing or mitigating the severity of the crash.

CODE "0" (No) is used when it is determined the technology would not have been helpful in this crash.

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CODE "2" (Probable) is used when it is determined the technology probably would have been helpful in this crash.

CODE "9" (Unknown) is used when it cannot be determined if the technology could have been helpful in this crash.

Blind Spot Helpful- Other Vehicles

ELEMENT VALUES:

0 No

1 Possible

2 Probable

9 Unknown

REMARKS:

This element value establishes the likelihood the technology would have been helpful in preventing or mitigating the severity of the crash.

CODE "0" (No) is used when it is determined the technology would not have been helpful in this crash.

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CODE "9" (Unknown) is used when it cannot be determined if the technology could have been helpful in this crash.

Avoidance Assessment Notes

The Notes page provides a location to include any additional information relevant to the person not captured in the preceding elements.

DOT HS 813 355
August 2022

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

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