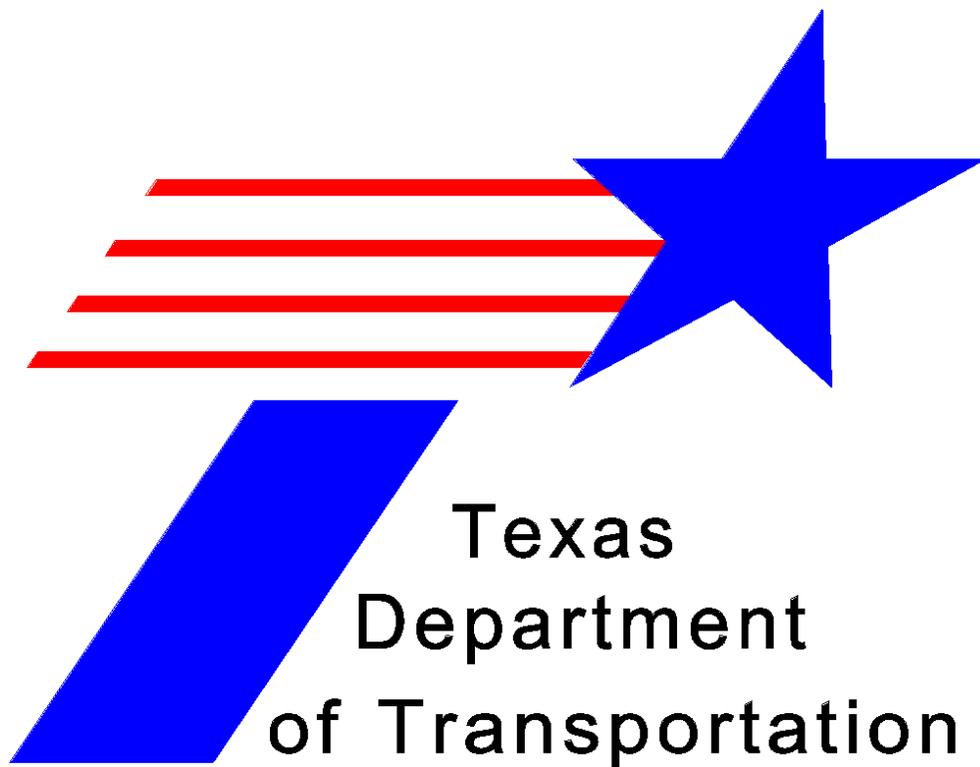


Highway Safety Improvement Program Manual



February 2015

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Manual Notice 2015-1

From: Carol T. Rawson, P.E.

Manual: *Highway Safety Improvement Program Manual*

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Purpose

The purpose of this manual revision is to:

- ◆ Remove information on the High Risk Rural Roads Program (HRRR) from Section 4 and throughout the manual. The passage of the Moving Ahead for Progress in the 21st Century Act (MAP-21) established special rules for the HRRR, but removed the HRRR funding from the Highway Safety Improvement Program (HSIP).
- ◆ Add information on Hazard Elimination Program (HES) safety emphasis areas.
- ◆ Update the HSIP Work Codes table that is linked to the manual.
- ◆ Perform minor edits for clarification and to improve accuracy throughout the manual.

Contents

Aside from the removal of the HRRR information and the addition and revision of the additional information outlined above, the contents of the *Highway Safety Improvement Program Manual* have not changed.

Supersedes

The revised *Highway Safety Improvement Program Manual* supersedes all prior versions of the *Highway Safety Improvement Program Manual* and the *Hazard Elimination Program Manual*, which the HSIP manual replaced in June of 2008.

Contact

Address questions concerning information contained in this manual to [Darren McDaniel](#) of the Traffic Operations Division, 512-416-3331

Archives

Past manual notices for the *Highway Safety Improvement Program Manual* are available in a [pdf archive](#).

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Chapter 1 — Highway Safety Improvement Program

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Section 1 — Overview

Introduction

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) raised the stature of the highway safety program by establishing highway safety improvement as a core program tied to strategic safety planning and performance.

SAFETEA-LU established the Highway Safety Improvement Program (HSIP) as a core program, separately funded for the first time, with flexibility provided to allow states to target funds to their most critical safety needs. The HSIP requires states to develop and implement a Strategic Highway Safety Plan (SHSP). The purpose of the SHSP is to identify and analyze highway safety problems and opportunities, include projects or strategies to address them, and evaluate the accuracy of data and the priority of proposed improvements. The goal is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads.

The [Texas SHSP](#) identifies the serious crash types that the HSIP will focus on in order to meet the state's goals and objectives of reducing fatal and serious injury crashes in Texas.

The passage of the Moving Ahead for Progress in the 21st Century Act (MAP-21) in 2012 reaffirmed commitment to the national safety program. MAP-21 strengthens the SHSP and establishes special rules for older drivers and pedestrians.

MAP-21 also establishes special rules for High Risk Rural Roads (HRRR) but removes the funding set aside for the HRRR program from the HSIP.

Program Funding

The HSIP is federally funded. Program funds are eligible to cover 90 percent of project construction costs. The remaining 10 percent of project construction costs must be covered by state or local participation. Authorization to receive federal funds is found in Title 23, United States Code (23 U.S.C.), Section 148. The federal requirements outlining the HSIP structure are found in the Code of Federal Regulations (CFR), Title 23, Section 924.7.

Program Categories

The Texas HSIP includes a safety construction program known as the Hazard Elimination (HES) program.

The HES program focuses on construction and operational improvements for locations both on and off the state highway system.

The HES program is administered by the Texas Department of Transportation (TxDOT) Traffic Operations Division (TRF) and is part of the TxDOT Unified Transportation Program (Category 8). TRF identifies potential highway safety project locations and works with the districts to develop projects as funds are available. Questions regarding the HSIP should be addressed to the TRF, Traffic Engineering (TE) Section.

Eligible Work Types

Projects funded in the HSIP will be limited to improvements that address the serious crash types identified in the most current Texas SHSP.

There are also some items of work that may address a serious crash type, but that are not eligible for HSIP funding. Some types of work ineligible for HSIP funding are:

- ◆ bridge replacement
- ◆ general maintenance (maintenance of roadways, signs, signals, pavement markings, markers, etc.).

Confidentiality of Data

Federal statute 23 USC 409 makes data and reports confidential if they are compiled for the purpose of evaluating the safety of federal-aid highways. Data used in the HSIP should not be released. Any written request must be routed through the TxDOT Office of General Counsel (OGC).

Section 2 — Design Guidelines

Introduction

The design guidelines presented in this section are intended to aid in planning Highway Safety Improvement Program (HSIP) projects. Work types are assigned based on the information provided by the district during the project proposal process. Only work types programmed for the safety project will be considered “the scope.” The design guidelines reference portions of the [Roadway Design Manual](#) and establish items of work not eligible for HSIP funding. These guidelines offer sufficient flexibility while retaining safety as the essential element of all HSIP projects.

Design Guidelines

Freeway Projects and Non-Freeway “New Location or Reconstruction” Projects. All roadway elements affected by the scope of the approved HSIP safety improvement must comply with the “[New Location and Reconstruction \(4R\) Design Criteria](#)” found in the *Roadway Design Manual* (Chapter 3). Enhancements to features outside the scope of the HSIP project are at the district’s option and are to be funded using district funds under a separate Control-Section Job ([CSJ](#)).

Non-Freeway “Rehabilitation or Restoration” Projects. All roadway elements affected by the scope of the approved HSIP safety improvement must comply with the “[Non-Freeway Rehabilitation \(3R\) Design Criteria](#)” found in the *Roadway Design Manual* (Chapter 4). Enhancements to features outside the scope of the HSIP project are at the district’s option and are to be funded using district funds under a separate [CSJ](#).

“Safety Treat Fixed Objects” Projects. Projects whose primary scope of work is “Safety Treat Fixed Objects” must comply with the “Horizontal Clearance” criteria found in the “[Non-Freeway Rehabilitation \(3R\) Design Criteria](#)” found in the *Roadway Design Manual* (Chapter 4). The designer should provide clearance greater than that required whenever reasonably practicable.

For all projects, the geometric design must meet the applicable 4R or 3R criteria or retain the existing roadway conditions (lane widths, shoulder widths, etc.) as a minimum.

Design Considerations

At the beginning of the HSIP project proposal process, highway designers should analyze crash data to identify the specific safety problems that might be corrected and follow the suggested design process in the *Roadway Design Manual* ([Chapter 4, Section 3](#)).

Design Exceptions or Design Waivers

When the HSIP design guidelines cannot be met, the current design exception or design waiver process established in the *Roadway Design Manual* ([Chapter 1, Section 2](#)) must be followed.

Section 3 — Hazard Elimination Program

Introduction

The Hazard Elimination (HES) Program is part of the Highway Safety Improvement Program (HSIP). The basic objective of the HES Program is to reduce the number and severity of crashes. The program objectives are accomplished through “highway safety projects.”

Eligible Roads

HES projects may be for locations both on and off the state highway system.

Nature of Hazard Elimination Projects

HES projects may accomplish any of the following:

- ◆ correct or improve high-hazard locations
- ◆ eliminate roadside obstacles
- ◆ treat roadside obstacles
- ◆ improve highway signing and pavement marking
- ◆ install traffic control or warning devices at locations with a high number of crashes.

These projects may range from spot-safety improvements and upgrading of existing conditions to new roadway construction.

HES program safety emphasis areas include:

- ◆ barriers
- ◆ curve improvements
- ◆ grade separations
- ◆ intersection improvements
- ◆ off-system improvements
- ◆ rumble strips
- ◆ widening.

Program Process Overview

The following table summarizes the process by which highway safety projects obtain HES program funding.

Hazard Elimination Program Funding Process

Step	Responsible Party	Action
1.	TRF	Using the most current Strategic Highway Safety Plan (SHSP), the program safety emphasis areas are identified.
2.	TRF	Identifies potential project locations that qualify for improvements in the identified program emphasis areas using the three most current years of crash data.
3.	District	Evaluates each identified location to determine if the project is feasible and to verify that appropriate countermeasures addressing the location's safety needs have not already been implemented or scheduled for construction.
4.	District	Works with area offices and local governments to gather additional location information and to identify any potential locations that may have been excluded due to incomplete or inaccurate crash and roadway data.
5.	District	For projects determined to be feasible, conducts a field evaluation to determine the appropriate countermeasure and develop a detailed estimate.
6.	District	Completes and submits HSIP project containing requested data to the Texas Department of Transportation (TxDOT) Traffic Operations Division (TRF) along with the necessary backup data (typical sections, layouts, etc.) in response to the program call.
7.	TRF	Analyzes the proposed highway safety projects for HSIP eligibility, data accuracy, and conformance with design standards.
8.	TRF	Analyzes each eligible project's Safety Improvement Index (SII) and puts the projects in priority order based on the results.
9.	TRF	Places projects in the HSIP according to priority and appropriated federal funding; then sends listing of highway safety projects selected for funding in the HSIP to the districts.
10.	District	Sets projects up in the Design/Construction Information System (DCIS) in the assigned work program and may include qualifying projects in the Transportation Improvement Program (TIP) as appropriate.
11.	District	Notifies TRF of potential overrun of an HES project's authorized funds prior to Plans, Specifications and Estimates (PS&E) submittal.
12.	District	Submits PS&E for HES projects to TRF in accordance with standard PS&E submission schedule. >> See the <i>Plans, Specifications, and Estimate Preparation Manual</i> (Chapter 1, Section 3) for details on PS&E procedures.

Hazard Elimination Program Funding Process

Step	Responsible Party	Action
13.	TRF	Handles overruns of project authorized funds at the divisional PS&E review stage in accordance with the current TxDOT policy. >> See Commission Minute Order 106788, March 28, 1996, or subsequent revisions.

Section 4 — Project Submission

HSIP Specific Rules

As a condition of obligating Federal Highway Safety Improvement Program (HSIP) funds, a state is required to submit an annual report to the Federal Highway Administration (FHWA) that describes the progress on safety improvement projects and their contribution to reducing roadway fatalities, injuries, and crashes. In order to comply with these requirements and to maintain the integrity of the program-selection process, the following HSIP-specific rules must be adhered to and considered prior to project proposal submission:

Leveraging of Project Estimate Not Allowed. The estimate provided by the district must be for the entire construction cost of the project. Districts cannot add district funds to the requested amount in order to “leverage” the cost of the project. All items must be included in the submitted estimate.

Include all Proposed Corrective Actions. When identifying the “Proposed Corrective Action” for each proposal, give a detailed description of all corrective action to be performed. Work types are assigned based on the information provided. Only work types programmed will be considered “in scope,” and this is the only work that can be done as part of the safety project. Work considered incidental to the primary work type will not have a separate work code assigned, but the work will be allowed (for example, widening a roadway to install a left-turn lane or extend drainage structures, re-striping an overlay project, etc.). If additional non-incidental work is required or desired, it will be considered “out of scope” and will be funded by the district under a separate Control-Section Job ([CSJ](#)).

Projects Are Location Specific. Project selection is based on the crash history, traffic volumes, and roadway geometrics at the specified location. The project parameters need to be accurately identified in order for the project to be programmed correctly. When defining project parameters, consideration should be given to including distance for project approaches and tapers, as necessary. HSIP projects are not eligible for non-site specific contracts.

Deadline for Letting. Due to the nature of HSIP projects (safety), the project must be let to contract in a timely manner. Based on category letting volumes, the Texas Department of Transportation (TxDOT) Traffic Operations Division (TRF) will work with the districts to determine the earliest fiscal year the project can be let. Once a project is approved for letting in a fiscal year, every effort should be made to meet this date. Federal safety funds not obligated by the federal lapse date are forfeited by the state.

No Local Let. HSIP projects are not eligible for local letting. All HSIP projects must be let by TxDOT's competitive bid process.

Field Evaluation

Before a project is submitted for funding consideration, a field evaluation should be done to determine the existing conditions at the proposed project site. This helps avoid the submittal of work that has already been constructed and provides the information necessary for a complete and accurate estimate. The district's planning office should be involved in the review of all project proposals before submittal in order to determine if the improvement is already scheduled for construction under another program.

Off-System Project Proposals

Off-system projects are eligible for funding under the federal HSIP. When a project located off the state highway system is selected for funding, the local municipality is required to provide 10 percent of the total project cost in matching funds.

The district should have a system in place to notify local municipalities within their district when a call for project proposals is issued. The district should evaluate and consider the eligibility and viability of safety projects suggested by the local municipality. If the project proposal meets the requirements of the HSIP and is considered competitive by the district, it should be submitted to TRF for funding consideration.

All off-system project proposals are to be handled through the responsible district office. All questions and comments concerning project submission will be directed to the district, not the local municipality.

Off-system project proposals are evaluated and ranked along with on-system proposals using the same rules, guidelines, and requirements.

Off-system projects are not eligible for local letting. All HSIP projects are required to be let by TxDOT's competitive bid process.

Improvements made with federal funds through the HSIP are required to be in place and maintained by the local municipality for a minimum of 10 years.

Section 5 — Using the Safety Improvement Index

Introduction

Each eligible proposed highway safety project is subjected to a benefit-cost analysis. The formula used for this purpose is the Safety Improvement Index (SII).

The SII Formula

In its most basic form, the SII is the ratio of the cost of preventable crashes that have occurred at a location to the cost of constructing the proposed improvement. The SII incorporates adjustments to provide additional benefit for:

- ◆ locations experiencing increasing traffic over the project life
- ◆ improvements that will reduce maintenance costs
- ◆ projects expected to have long service lives over which construction costs can be amortized.

The SII formula is as follows:

$$S = \frac{R(C_f F + C_i I)}{Y} - M$$

$$Q = \left(\frac{A_a - A_b}{A_b} \div L \right) S$$

$$B = \frac{S + \frac{1}{2}Q}{1.06} + \sum_{i=2}^L \left[\frac{(S + \frac{1}{2}Q) + (i-1)Q}{(1.06)^i} \right]$$

$$\text{SII} = \frac{B}{C}$$

where:

- ◆ S = annual savings in preventable crash costs (equal to crash cost savings per year less annual maintenance costs)
- ◆ R = crash reduction factor (see following subsection for explanation)
- ◆ F = number of preventable fatal and incapacitating injury crashes (see following subheading for explanation)
- ◆ C_f = cost of a fatal or incapacitating injury crash (see following subheading for explanation)
- ◆ I = number of preventable non-incapacitating injury crashes (see following subheading for explanation)

- ◆ C_i = cost of a non-incapacitating injury crash (see following subheading for explanation)
- ◆ Y = number of years of crash data
- ◆ M = change in annual maintenance costs for the proposed project relative to the existing situation
- ◆ Q = annual change in crash cost savings
- ◆ A_a = projected average annual Average Daily Traffic (ADT) at the end of the project service life
- ◆ A_b = average annual ADT during the year before the project is implemented
- ◆ L = project service life (see following subheading for explanation)
- ◆ B = present worth of project benefits over its service life
- ◆ C = initial cost of the project.

Obtaining SII Data

Before calculating the SII, the “Proposed Corrective Action” must be translated into “work codes.” The HSIP Work Codes Table (contained in Section 7 of this manual) provides the work codes that correspond to various descriptions of work. The table also provides associated definitions, reduction factors, service lives, applicable maintenance cost, and preventable crash codes (see following explanation).

The data necessary to calculate each project’s SII can be obtained from the sources shown in the following table.

Sources for SII Data

Data Item	How It Is Obtained
<p>R — Crash Reduction Factor</p> <p>NOTE: The reduction factor represents the percentage reduction in crash costs or severity that can be expected as a result of the improvement.</p>	<p>From the Highway Safety Improvement Program (HSIP) Work Codes Table (contained in Section 7 of this manual).</p> <p>NOTE: If the project is represented by more than one work code, Texas Department of Transportation (TxDOT) Traffic Operations Division (TRF) program administrators derive a composite reduction factor.</p>
<p>F — Number of fatal and incapacitating injury crashes</p> <p>I — Number of non-incapacitating injury crashes</p>	<p>The HSIP Work Codes Table shows “Preventable Crash” codes. Preventable crashes are those with defined characteristics that may be affected by the proposed improvement as described by the work code. The codes correspond to numeric codes assigned in the Crash Records Information System (CRIS) to the indicated variable. Information is collected from the peace officer’s crash report and converted into a coded format. The Preventable Crash Decoding Table (Section 8 of this manual) can be used to interpret the codes and determine the number of each type of crash. Three years of preventable crash data are used. The program call specifies the years used.</p>

Sources for SII Data

Data Item	How It Is Obtained
<i>C_f</i> — Cost of a fatal or incapacitating injury crash <i>C_i</i> — Cost of a non-incapacitating injury crash	The average cost of each type of crash is based on the comprehensive cost figures provided by the National Safety Council. The program call provides the cost figures used each year.
<i>L</i> — Project service life	From the HSIP Work Codes Table found in Section 7 of this manual. NOTE: If the project is represented by more than one work code, TRF program administrators base the project service life on the primary work.

SII Results

A project with an SII greater than or equal to 1.0 is considered cost effective. Projects with an SII of less than 1.0 will not be considered for funding.

NOTE: The SII does not establish the need or lack of a need for a project. The SII formula compares costs of preventable crashes to costs of construction; it provides no evaluation of the appropriateness of the type of construction.

The SII was designed as a comparison device for project prioritization and should **not** be used as a measure for independent projects.

SII Calculator Available

To open an Excel-based program for calculating a project's SII, click on the following link:

[SII_calc.xls](#)

NOTE: All fields are protected except for the input fields.

NOTE: "Cost" amounts subject to change on an annual basis.

Section 6 — Obtaining Crash Data

Introduction

Analysis of crash data is the foundation of transportation safety and planning and is a key component of the Texas Department of Transportation's (TxDOT's) roadway safety programs. On October 1, 2007, the responsibility of collecting crash data was transferred from the Texas Department of Public Safety (DPS) to TxDOT. The Traffic Operations Division (TRF) is responsible for the management and maintenance of the Crash Records Information System (CRIS).

CRIS is a PC-based application that contains spatial and reporting components designed to be used by TxDOT personnel to obtain and analyze crash data. Each TxDOT district has personnel licensed to have access to CRIS.

Source of Crash Data

Texas Transportation Code (§550.062) requires law enforcement organizations to report traffic crashes to TxDOT no later than the 10th day after the date of the crash when a crash:

- ◆ is investigated by a law enforcement officer **and**
- ◆ results in injury to or death of a person, or damage to the property of any one person, to the apparent extent of \$1,000 or more.

Crash Data and the HSIP

The Highway Safety Improvement Program (HSIP) uses three years of crash data to perform a cost benefit analysis (SII) on all proposed safety projects. The years of data being used in a specific program are identified in the call for project proposals. Only crashes occurring in those years are used in the SII calculation (see Section 5 for information on the SII).

Crash data is **one** of the tools used by engineers and roadway safety professionals to identify potential highway safety improvement projects. Once locations of concern have been identified, crash data, along with traffic and roadway geometric data, is reviewed to determine appropriate countermeasures.

CRIS is the official state database for traffic crashes occurring in Texas. The HSIP only considers crashes that have been submitted to TxDOT and input into CRIS.

Section 7 — HSIP Work Codes Table

The HSIP work codes used in the SII calculation described in Section 5 of this manual can be found in the [HSIP Work Codes Table](#) posted on the Traffic Planning Publications Page of the TxDOT website. To access the tables, click on the link above.

Section 8 — Preventable Crash Decoding

Introduction

The Preventable Crash Decoding Table in this section can be used to interpret the codes in the Highway Safety Improvement Program (HSIP) Work Codes Table found in Section 7 of this manual.

Part of Roadway No. 1 Involved

1	Main/Proper Lane	6	Detour
2	Service/Frontage Road	7	Other
3	Entrance/On Ramp	8	Transitway
4	Exit/Off Ramp	9	Transitway Ramp
5	Connector/Flyover		

Roadway Related

1	On roadway
2	Off roadway
3	Shoulder
4	Median

Intersection Related

1	Intersection
2	Intersection related
3	Driveway access
4	Non-intersection

First Harmful Event**Collision of a motor vehicle with:**

1	Pedestrian	5	Pedalcyclist
2	Another motor vehicle in transport	6	Animal
3	RR train	7	Fixed object
4	Parked car	8	Other object

Other than a collision:

9	Other non-collision
10	Overturn

Vehicle Movements & Manner of Collision**Two motor vehicles approaching at an angle:**

10	Both going straight
11	One straight, one backing
12	One straight, one stopped
13	One straight, one right turn
14	One straight, one left turn
15	Both right turn
16	One right turn, one left turn
17	One right turn, one stopped
18	Both left turn
19	One left turn, one stopped

Two motor vehicles going same direction:

20	Both going straight – rear end
21	Both going straight – sideswipe
22	One straight, one stopped
23	One straight, one right turn
24	One straight, one left turn
25	Both right turn
26	One right turn, one left turn
27	One right turn, one stopped
28	Both left turn
29	One left turn, one stopped

Two motor vehicles going opposite directions:

30	Both going straight
31	One straight, one backing
32	One straight, one stopped
33	One straight, one right turn
34	One straight, one left turn
35	One backing, one stopped
36	One right turn, one left turn
37	One right turn, one stopped
38	Both left turn
39	One left turn, one stopped

Two motor vehicles — other:

40	One straight, one entering or leaving parking space
41	One right turn, one entering or leaving parking space
42	One left turn, one entering or leaving parking space
43	One entering or leaving parking space, one stopped
44	Both entering or leaving parking space
45	Both vehicles backing
46	All others

Movement of vehicle in other than motor-with-motor crashes:

1	Vehicle going straight
2	Vehicle turning right
3	Vehicle turning left
4	Vehicle backing
5	Other

Object Struck

00	No code shown is applicable
01	Vehicle overturned
02	Vehicle hit hole in road
03	Vehicle jackknifed
04	Person fell or jumped from vehicle
09	Vehicle hit train on tracks parallel to road – no crossing
10	Vehicle hit train moving forward
11	Vehicle hit train backing
12	Vehicle hit train standing still
13	Vehicle hit train – action unknown
20	Vehicle hit highway sign
21	Vehicle hit curb
22	Vehicle hit culvert – headwall
23	Vehicle hit guardrail
24	Vehicle hit railroad signal pole or post
25	Vehicle hit railroad crossing gates
26	Vehicle hit traffic signal pole or post
27	Vehicle hit overhead signal light, wires, sign, etc.
28	Vehicle hit work zone barricade, cones, signs or material
29	Vehicle hit luminaire pole
30	Vehicle hit utility pole
31	Vehicle hit mailbox
32	Vehicle hit tree or shrub
33	Vehicle hit fence
34	Vehicle hit house, building or building fixture
35	Vehicle hit commercial sign
36	Vehicle hit other fixed object
37	Vehicle hit bus stop structure
38	Vehicle hit work zone machinery or stockpiled materials
39	Vehicle hit median barrier

40	Vehicle hit end of bridge (abutment or rail end)
41	Vehicle hit side of bridge (bridge rail)
42	Vehicle hit pier or support at underpass, tunnel or overhead sign bridge
43	Vehicle hit top of underpass or tunnel
44	Vehicle hit bridge crossing gate
45	Vehicle hit attenuation device
49	Vehicle hit by falling/blowing rocks from a truck
50	Vehicle hit fallen trees or debris on road
51	Vehicle hit object from another vehicle in road
52	Vehicle hit previously wrecked vehicle
53	Vehicle hit toll booth
54	Vehicle hit other machinery
55	Vehicle hit other object
56	Vehicle hit concrete traffic barrier
57	Vehicle hit delineator or marker post
58	Vehicle hit retaining wall
59	Vehicle hit HOV lane gate
60	Vehicle hit guard post
61	Fire hydrant
62	Ditch (long narrow excavation dug in earth)
63	Embankment (a raised strip of land or berm)
64	Not Applicable
65	Not Reported

Bridge Detail

1	Vehicle retained on bridge or overpass
2	Vehicle went through rail
3	Vehicle went over rail
4	Crash involved underpass
5	Vehicle went between parallel structures
6	Structure not hit
7	Result Unknown
8	Not Applicable
9	Not Reported

Other Factor

00	No code shown is applicable
01	Lost control or skidded (icy or slick road, etc.)
02	Passenger interfered with driver
03	Attention diverted from driving (delayed perception or lack of alertness)
04	Open door or object projecting from vehicle
05	Foot slipped off clutch or brake
06	Gusty winds
07	Vehicle passing or attempting to pass on left
08	Vehicle passing or attempting to pass on right
09	Vehicle changing lanes
10	One car parked improper location
11	One car forward from parking
12	One car backward from parking
13	One car entering driveway
14	One car leaving driveway
54	Not Applicable
55	Not Reported
56	Road rage

Vision obstructed by:

16	Standing or parked vehicle	21	Headlight or sun glare
17	Moving vehicle	22	Hillcrest
18	Embankment or ledge	23	Trees, shrubs, weeds, etc.
19	Commercial sign	24	Other visual obstructions
20	Highway sign		

Vehicle swerved or veered from intended course:

25	Reason not specified
26	For surface or visibility
27	For officer, watchman, flagman, or traffic control device (unable to stop, etc.)
28	Avoiding pedestrian, pedalcyclist, etc. in road
29	Avoiding animal in road
30	Avoiding object in road
31	Avoiding vehicle stopped or moving slowly in traffic lane
32	Avoiding vehicle entering road
33	Avoiding vehicle from opposite direction in wrong lane
34	Avoiding previous crash
35	Avoiding vehicle passing, changing lanes

Vehicle slowing, stopping, or stopped on road:

36	Reason not specified
37	Because of surface or visibility
38	For officer, watchman, flagman, or traffic control device
39	For pedestrian, pedalcyclist, etc. in road
40	For animal in road
41	For object in road
42	For traffic
43	To avoid vehicle entering road
44	To avoid vehicle from opposite direction in wrong lane

45	To avoid previous crash
46	To make right turn
47	To make left turn

School bus related crash:

48	School bus related crash
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Construction related:

49	Within posted road construction zone (not related to crash)
50	Within posted road construction zone (related to crash)
51	In other construction maintenance area (not related to crash)
52	In other construction maintenance area (related to crash)

Beach related:

53	Crash occurred on a beach
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Light Condition

0	Unknown	4	Darkness – lighted
1	Daylight	5	Dusk
2	Dawn	6	Darkness, unknown lighting
3	Darkness – not lighted	8	Other

Surface Condition

0	Unknown	6	Ice
1	Dry	7	Muddy
2	Wet	8	Other
3	Standing Water	9	Snow
4	Snowy/Icy	10	Sand, Mud, Dirt
5	Slush		

Vehicle Body Style

87	Truck - Tractor
91	Semitrailer