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# EVALUATION OF 2005 LOUISIANA CRASH DATA REPORTED TO MCMIS CRASH FILE

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16. Abstract

This report is part of a series evaluating the data reported to the Motor Carrier Management Information System (MCMIS) Crash File undertaken by the Center for National Truck and Bus Statistics at the University of Michigan Transportation Research Institute. The earlier studies showed that reporting to the MCMIS Crash File was incomplete. This report examines the factors that are associated with reporting rates for the state of Louisiana.

MCMIS Crash File records were matched to the Louisiana Traffic Crash Report (TCR) file to determine the nature and extent of underreporting. Overall, it appears that Louisiana is reporting 56.6 percent of crash involvements that should be reported to the MCMIS Crash file.

Reporting rates vary by crash severity and vehicle type. Overall, about 79.6 percent of fatal involvements are reported, compared with 57.0 percent of injury/transported involvements, and 54.7 percent of towed/disabled involvements. Crashes involving large trucks such as tractor-semitrailers or doubles combinations were more likely to be reported than crashes involving small, single-unit trucks or buses. There did not appear to be much variation in reporting rates by the type of investigation agency (state police, parish, or city police), however.

Missing data rates are low for most variables, although rates are elevated for sequence of events variables, number of vehicles in the crash, and driver license class. Hazardous materials variables are also problematic, with some inconsistencies between data reported to the MCMIS file and recorded in the TCR.

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# SI* (MODERN METRIC) CONVERSION FACTORS

## APPROXIMATE CONVERSIONS TO SI UNITS

| Symbol | When You Know | Multiply By | To Find | Symbol |
|---|---|---|---|---|
| | | **LENGTH** | | |
| in | inches | 25.4 | millimeters | mm |
| ft | feet | 0.305 | meters | m |
| yd | yards | 0.914 | meters | m |
| mi | miles | 1.61 | kilometers | km |
| | | **AREA** | | |
| $in^2$ | square inches | 645.2 | square millimeters | $mm^2$ |
| $ft^2$ | square feet | 0.093 | square meters | $m^2$ |
| $yd^2$ | square yard | 0.836 | square meters | $m^2$ |
| ac | acres | 0.405 | hectares | ha |
| $mi^2$ | square miles | 2.59 | square kilometers | $km^2$ |
| | | **VOLUME** | | |
| fl oz | fluid ounces | 29.57 | milliliters | mL |
| gal | gallons | 3.785 | liters | L |
| $ft^3$ | cubic feet | 0.028 | cubic meters | $m^3$ |
| $yd^3$ | cubic yards | 0.765 | cubic meters | $m^3$ |
| | NOTE: volumes greater than 1000 L shall be shown in $m^3$ | | | |
| | | **MASS** | | |
| oz | ounces | 28.35 | grams | g |
| lb | pounds | 0.454 | kilograms | kg |
| T | short tons (2000 lb) | 0.907 | megagrams (or "metric ton") | Mg (or "t") |
| | | **TEMPERATURE (exact degrees)** | | |
| $^oF$ | Fahrenheit | 5 (F-32)/9<br>or (F-32)/1.8 | Celsius | $^oC$ |
| | | **ILLUMINATION** | | |
| fc | foot-candles | 10.76 | lux | lx |
| fl | foot-Lamberts | 3.426 | $candela/m^2$ | $cd/m^2$ |
| | | **FORCE and PRESSURE or STRESS** | | |
| lbf | poundforce | 4.45 | newtons | N |
| $lbf/in^2$ | poundforce per square inch | 6.89 | kilopascals | kPa |

## APPROXIMATE CONVERSIONS FROM SI UNITS

| Symbol | When You Know | Multiply By | To Find | Symbol |
|---|---|---|---|---|
| | | **LENGTH** | | |
| mm | millimeters | 0.039 | inches | in |
| m | meters | 3.28 | feet | ft |
| m | meters | 1.09 | yards | yd |
| km | kilometers | 0.621 | miles | mi |
| | | **AREA** | | |
| $mm^2$ | square millimeters | 0.0016 | square inches | $in^2$ |
| $m^2$ | square meters | 10.764 | square feet | $ft^2$ |
| $m^2$ | square meters | 1.195 | square yards | $yd^2$ |
| ha | hectares | 2.47 | acres | ac |
| $km^2$ | square kilometers | 0.386 | square miles | $mi^2$ |
| | | **VOLUME** | | |
| mL | milliliters | 0.034 | fluid ounces | fl oz |
| L | liters | 0.264 | gallons | gal |
| $m^3$ | cubic meters | 35.314 | cubic feet | $ft^3$ |
| $m^3$ | cubic meters | 1.307 | cubic yards | $yd^3$ |
| | | **MASS** | | |
| g | grams | 0.035 | ounces | oz |
| kg | kilograms | 2.202 | pounds | lb |
| Mg (or "t") | megagrams (or "metric ton") | 1.103 | short tons (2000 lb) | T |
| | | **TEMPERATURE (exact degrees)** | | |
| $^oC$ | Celsius | 1.8C+32 | Fahrenheit | $^oF$ |
| | | **ILLUMINATION** | | |
| lx | lux | 0.0929 | foot-candles | fc |
| $cd/m^2$ | $candela/m^2$ | 0.2919 | foot-Lamberts | fl |
| | | **FORCE and PRESSURE or STRESS** | | |
| N | newtons | 0.225 | poundforce | lbf |
| kPa | kilopascals | 0.145 | poundforce per square inch | $lbf/in^2$ |

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.
(Revised March 2003)

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# Evaluation of 2005 Louisiana Crash Data Reported to the MCMIS Crash File

## 1. Introduction

The Motor Carrier Management Information System (MCMIS) Crash file has been developed by the Federal Motor Carrier Safety Administration (FMCSA) to serve as a census file of trucks and buses involved in traffic crashes meeting a specified selection criteria and crash severity threshold. FMCSA maintains the MCMIS file to support its mission to reduce crashes, injuries, and fatalities involving large trucks and buses. It is essential to assess the magnitude and characteristics of motor carrier crashes to design effective safety measures to prevent such crashes. The usefulness of the MCMIS Crash file depends upon individual states transmitting a standard set of data items on all trucks and buses involved in traffic crashes that meet a specific severity threshold.

The present report is part of a series of reports evaluating the completeness and accuracy of the data in the MCMIS Crash file. Previous reports on a number of states showed underreporting due in large part to problems police officers experience in interpreting and applying the reporting criteria. The problems were more severe in large jurisdictions and police departments. Each state also had problems specific to the nature of its system. Some states also had overreporting of cases, often due to technical problems with duplicate records. [See references 3 to 14.] The states are responsible for identifying and reporting qualifying crash involvements. Accordingly, improved completeness and accuracy must ultimately reside with the individual states.

In this report, we focus on MCMIS Crash file reporting by Louisiana. In recent years, Louisiana has reported from 2,300 to 3,000 involvements annually to the MCMIS Crash file. According to the 2002 Vehicle Inventory and Use Survey, in 2002, Louisiana had almost 61,500 trucks registered, ranking 32nd among the states and accounting for 1.1 percent of all truck registrations.[1] Louisiana is the 24th largest state by population and generally falls 15th in terms of the number of annual truck and bus fatal involvements.

The method employed in this study is similar to previous studies.

1. The complete traffic crash report file (TCR file hereafter) from Louisiana was obtained for the most recent year available, 2005. This file was processed to identify all cases that qualified for reporting to the MCMIS Crash file.

2. All cases in the Louisiana TCR file—those that qualified for reporting to the Crash file as well as those that did not—were matched to the cases actually reported to the MCMIS Crash file from Louisiana.

3. Cases that should have been reported, but were not, were compared with those that were reported to identify the sources of underreporting.

4. Cases that did not qualify but which were reported were examined to identify the extent and nature of overreporting.

Police accident report (TCR) data recorded in Louisiana's statewide files as of September 21, 2006 were used in this analysis. The 2005 TCR file contains the computerized records of 300,362 vehicles involved in 157,509 crashes that occurred in Louisiana.

## 2. Data Preparation

The Louisiana TCR file and MCMIS Crash file each required some preparation before the Louisiana records in the MCMIS Crash file could be matched to the Louisiana TCR file. In the case of the MCMIS Crash file, the only processing necessary was to extract records reported from Louisiana and to eliminate duplicate records. The Louisiana TCR file required more extensive work to create a comprehensive vehicle-level file. The following sections describe the methods used to prepare each file and some of the problems uncovered.

### 2.1 MCMIS Crash Data File

The 2005 MCMIS Crash file as of August 21, 2006, was used to identify records submitted from Louisiana. For calendar year 2005 there were 2,699 cases. An analysis file was constructed using all variables in the file. The file was then examined for duplicate records (those involvements where more than one record was submitted for the same vehicle in the same crash; i.e., the report number and sequence number were identical). No such duplicates were found.

In addition, records were examined for identical values for accident date, time, crash county, and vehicle license plate number, even though their case numbers were perhaps different. One would not expect all of these variables to be identical between two cases. One such duplicate instance was found. Since both records appeared on the TCR file, the record with the latest upload and change dates was kept and the other excluded. After eliminating the duplicate record the resulting MCMIS file contained 2,698 records.

### 2.2 Louisiana Uniform Motor Vehicle Traffic Crash Report File

The Louisiana TCR data for 2005 (dated September 21, 2006) was obtained from the state of Louisiana. The data were contained in six Microsoft Access tables, representing accident, vehicle, and person information. The combined files contain records for 157,509 crashes involving 300,362 vehicles. Data for the TCR file are coded from the Louisiana Uniform Motor Vehicle Traffic Crash Report completed by police officers.

The TCR file was first examined for duplicate records. A search for records with identical case numbers and vehicle numbers found no such instances. In addition, inspection of case numbers verified that they were recorded in a consistent format, so there was no reason to suspect duplicate records based on similar, but not identical, case numbers (such as 4150523 and 415-523, for example). However, cases were also examined to determine if there were any records that contained identical time, place and vehicle/driver variables, even though their case numbers were different. Records from two different crashes would not be expected to be identical on all variables. To investigate this possibility, records were examined for duplicate occurrences based on the variables accident date, time, parish, driver license number and vehicle license plate number. A total of 995 duplicate instances were found, representing 492 unique occurrences of the examined variables.

Duplicate pairs (or triplicates) were examined more closely for any patterns that might explain why they were occurring. These records could be grouped into two categories: those where Accident Number differed, and those where Accident Number were identical. In the majority of cases, where crash time, location, vehicle and driver variables were the same, but Accident Number differed, one explanation could be that a vehicle was involved in two accidents at the same place and virtually at the same time. Once crash events are stabilized, subsequent crashes are reported as new crashes. If a vehicle is reported as being in a second crash after the first one has stabilized, one would expect accident date, location, driver and vehicle information to be identical, but accident time to vary by a couple of minutes or longer. However, in the case of these records, accident hour and minute are identical, suggesting they are in fact duplicate records. Further inspection revealed that in many cases accident number was very similar, but not identical between the two cases, such as 428078 and 4282078 where a 2 was inserted in the middle of the accident number, creating a duplicate record.

The pairs identified above were considered to be duplicates and one (or more) member(s) of each pair was excluded. Since there was a date indicating when the record was processed, the member of each pair with the earliest processing date was excluded, resulting in deletion of 503 records. The resulting TCR file has 299,859 records.

## 3. Matching Process

The next step involved matching records from the Louisiana TCR file to corresponding records from the MCMIS file. After removing duplicates, there were 2,698 Louisiana records from the MCMIS file available for matching, and 299,859 records from the Louisiana TCR file. All records from the Louisiana TCR data file were used in the match, even those that were not reportable to the MCMIS Crash file. This allowed the identification of cases in the MCMIS Crash file that should not have been reported.

Matching records in the two files requires finding combinations of variables common to the two files that have a high probability of uniquely identifying accidents as well as specific vehicles within an accident. Crash Number, which is the identifier used to uniquely identify a crash in the Louisiana TCR data, and Report Number in the MCMIS Crash file, are obvious first choices. Indeed, there appeared to be a correspondence between the two numbers. Crash Number in the Ohio TCR file is a twenty-digit character value, while in the MCMIS Crash file, Report Number is stored as a 12-character alphanumeric value, a combination of alphabetic characters and numbers. It appears that the report number in the MCMIS Crash file is constructed as follows: The first two columns contain the state abbreviation (LA, in this case), followed by ten digits. Since seven of these digits were consistent with the TCR Case Number, the last seven digits of the MCMIS Report Number and the first seven digits of TCR Case Number were extracted, and these two variables were used in the match.

Other variables that were available for matching at the accident level included Crash Date, Crash Time (hour/minute), and Crash Parish. A variable designating “city” could not be used, as the City Code on the MCMIS file was not recorded for all cases. Reporting Officer Number was also unrecorded in the MCMIS file.

Variables in the MCMIS file that could distinguish one vehicle from another within the same accident included Vehicle License Plate Number, Driver License Number, Vehicle Identification Number (VIN), Driver Age, and Driver Name. Vehicle License Plate Number and Driver License Number were available on the TCR file. VIN was present in the TCR data, but was unrecorded in 20.8% of cases; VIN was unrecorded in 9.7% of MCMIS cases. Driver Age in the MCMIS file (calculated from accident date and driver date of birth) was unrecorded 8.4% of the time, and Driver Age was unrecorded 7.9% of the time in the TCR file. Of the available variables identifying vehicles within the accident, Vehicle License Plate Number and Driver Name were the most reliable, as they had unrecorded rates of <5% in both files.

Four separate matches were performed using the available variables. In each match step, records in either file with duplicate values on all the match variables were excluded, along with records that were missing values on the match variables. The first match included the variables accident number, crash month, day, hour, minute, crash parish, VIN, driver license number and vehicle license plate number. The second match step dropped crash minute and VIN. The third match step matched accident number, crash month, day, crash parish, vehicle license plate number, and driver name. After reviewing the remaining non-matched cases, the fourth match used crash month, day, hour, crash parish, and vehicle license plate number. This process resulted in matching 97.3% of the MCMIS records to the TCR file.

See Table 1 for the variables used in each match step along with the number of records matched at each step.

**Table 1 Steps in MCMIS/Louisiana TCR File Match, 2005**

| Match step | Matching variables | Cases matched |
|---|---|---|
| Match 1 | accident number, crash month, day, hour, minute, crash parish, VIN, driver license number, vehicle license plate number | 1,947 |
| Match 2 | accident number, crash month, day, hour, crash parish, driver license number, and vehicle license plate number | 397 |
| Match 3 | accident number, crash month, day, crash parish, vehicle license plate number, and driver name | 170 |
| Match 4 | crash month, day, hour, crash parish, vehicle license plate number | 110 |
| Total cases matched | | 2,624 |

Matched records were verified using other variables common to the MCMIS and TCR file as a final check to ensure the match was valid. The above procedure resulted in 2,624 matches, representing 97.3% of the 2,698 non-duplicate records reported to MCMIS.

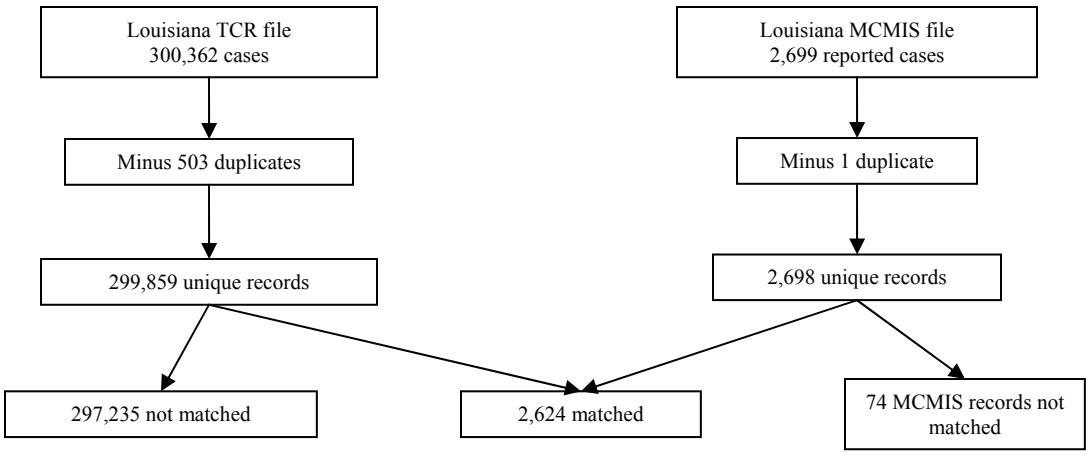


**Figure 1 Case Flow in MCMIS/Louisiana Crash File Match**

Of the 2,624 matched cases, 137 are not reportable (because they do not meet the MCMIS Crash file reporting criteria) and 2,487 are reportable. The next section discusses the problem of identifying reportable crash involvements in the Louisiana crash file.

## 4. Identifying Reportable Cases

The next step in data preparation is to identify records in the Louisiana data that qualified for reporting to the MCMIS Crash file. Records are identified using the information available in the computerized crash files that were sent by Louisiana. To identify reportable records, we use the information that is completed by the officers for all vehicles. That is, some police reports place certain data elements that are to be collected for the MCMIS file in a special section, with the instruction to the officer to complete that section if the vehicle and crash meets the MCMIS reporting criteria. But since we are attempting to evaluate the completeness of reporting, we attempt to identify all reportable cases, even those a reporting officer may have overlooked. For this purpose, we use the data that is completed for all cases. The goal of the selection process is to approximate as closely as possible the reporting threshold of the MCMIS file. The MCMIS criteria for a reportable crash involving a qualifying vehicle are shown in Table 2.

**Table 2 Vehicle and Crash Severity Threshold for MCMIS Crash File**

| | |
|---|---|
| Vehicle | Truck with GVWR over 10,000 or GCWR over 10,000,<br>or<br>Bus with seating for at least nine, including the driver,<br>or<br>Vehicle displaying a hazardous materials placard. |
| Accident | Fatality,<br>or<br>Injury transported to a medical facility for immediate medical attention,<br>or<br>Vehicle towed due to disabling damage. |

Louisiana crash data is very well suited to identifying crashes that are reportable to the MCMIS Crash file. The Louisiana TCR includes all the information to meet each of the criteria laid out in

Table 2, and the approach in the TCR is to collect most of the information needed to identify reportable crashes for all cases, not just the crashes that the officer recognizes as qualifying for reporting. In many states, the TCR includes a special CMV section along with a set of tests for the officer to apply to determine if the CMV section should be completed. But the Louisiana TCR is in many ways designed to relieve the officers of the burden of determining if a crash qualifies, and instead includes data elements that can be used to identify qualifying cases by applying a filter to the computerized data.

The vehicle type classification system used in Louisiana adopts the code levels used in the Safetynet data for trucks and buses. Figure 2 shows the graphics reproduced from the Louisiana Traffic Crash Report to help the officer classify vehicles by type. All the vehicle types in the MCMIS Crash file vehicle configuration are represented, except for triples, which are not permitted in Louisiana. The officer's instruction manual alerts the officer that the cells shaded blue denote vehicles that "may" require completing the truck/bus commercial vehicle section on a subsequent page of the TCR.[2] In addition to the vehicle configuration, the TCR also collects information on the number of axles, the number of tires, and the GVWR/GCWR (gross vehicle weight rating or gross combination weight rating). All are useful in identifying qualifying vehicles. GVWR/GCWR directly addresses weight rating criteria for the MCMIS file, and the combination of number of axles and number of tires can be used as a surrogate for identifying qualifying vehicles. In fact, prior to 1999, a qualifying truck was defined as having at least two axles and six tires.

In addition, the TCR includes a check box if a vehicle is transporting hazardous materials (hazmat), along with the 1-digit class of the hazmat, the 4-digit UN identification number, and whether a hazmat placard was displayed. This information is in a section that is filled out only for commercial trucks and buses, although it is completed for light vehicles as well. Finally, the TCR has a set of check boxes to indicate if the vehicle is used for commercial/business purposes, for personal use, or by any unit of government. This information is supposed to be collected for all vehicles involved in a crash.

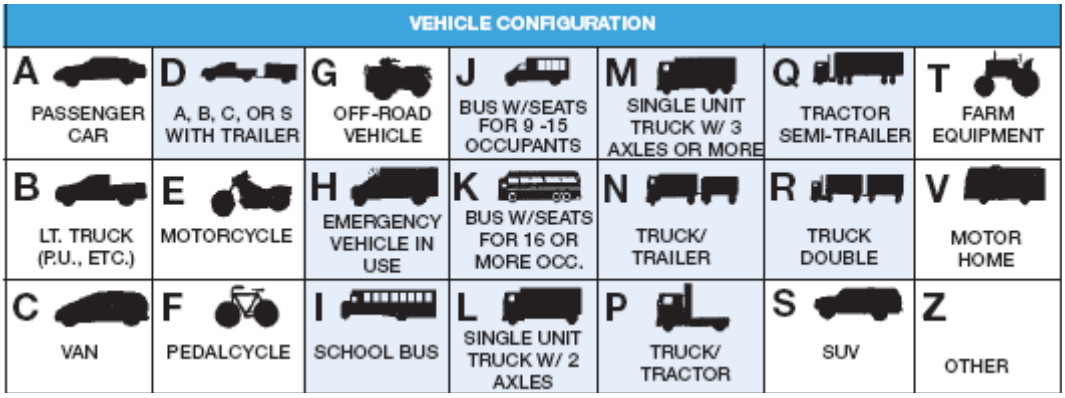


**Figure 2 Vehicle Configuration**

The Louisiana TCR also collects the needed information to apply the crash severity tests to identify crashes that qualify for the MCMIS Crash file. The injury criteria is any crash in which there is either a fatality or an injury transported for immediate medical attention. For each person involved in a motor vehicle crash, the TCR collects the severity of the injury (using the usual KABC0 scale), along with whether the person was transported to a medical facility and, if so, the

name of the facility. This information can be used precisely to identify crashes resulting in a fatality or an injured person transported for medical treatment. The TCR collects similar information on vehicles to identify crashes in which a vehicle was towed due to disabling damage. For each vehicle in a crash, the reporting officer records whether it was towed and the reason it was towed, including vehicle damage, the arrest of the driver, or an insurance violation. In addition, the officer records the name of the service that removed the vehicle.

Louisiana has taken the approach of collecting, for all vehicles in the crash, virtually all the information needed to identify crash involvements that meet the MCMIS Crash file reporting criteria. It should be acknowledged that there is a commercial vehicle section that has carrier name and address and the hazmat information, which is only supposed to be filled out for commercial vehicles that meet the vehicle type test,[1] but other than that section, all the information needed is part of the TCR that is completed for all vehicles. Thus, the reporting officer does not have the burden of recognizing a reportable crash by severity and by involvement of qualifying vehicles and filling out the appropriate form. All the vehicles and crashes can be identified (excepting only light vehicles transporting hazmat) using fields that are completed for all crashes.

If anything, there is almost too much information to identify reportable cases unambiguously. For some of the criteria there are multiple data elements that could be used, and for some variables the data are missing or inconsistent. The amount of missing or inconsistent data is not disproportionate, given that there were records for almost 300,000 vehicles in 2005. But it did require some care in developing a method for identifying reportable cases. The algorithm used to identify reportable vehicles is given in Appendix A, but the logic used in developing the algorithm will be discussed here.

For example, to identify qualifying trucks and buses, the available information includes the vehicle type variable, the number of axles and the number of tires, and the GVWR/GCWR of the vehicles. Vehicle type is almost sufficiently detailed by itself, because the classification scheme incorporates the MCMIS configuration categories. However, there are some vehicles that may be classified as light trucks which likely qualify if they are equipped with heavy-duty rear axles that bring their GVWR over 10,000 pounds. However, for vehicles coded as pickups or light trucks (code “B” in Figure 2 above), GVWR was coded zero or missing in 93.9% of the cases. GVWR is known to be difficult to determine accurately, and given the extent of missing data, it was judged not useable to identify vehicles that qualify for reporting to the MCMIS Crash file.

Louisiana also codes the number of axles and the number of tires, which can be used as a surrogate for a GVWR over 10,000 pounds. In fact, before 1999, the truck vehicle threshold for reporting was a vehicle with at least two axles and six tires. These vehicles can be identified using the variables that record the number of axles and the number of tires. Coding of these variables for light trucks and pickups is quite plausible. About 95 percent of pickups are coded two axle/four tires, which is expected. There is a handful of cases that are clearly erroneous (e.g., one axle/four tires, zero axles/zero tires, 12 axles/four tires, etc.), but about two percent are

[1] Printed on the form as “a vehicle … being used for commerce/business, & has a GVWR/GCWR in excess of 10,000 lbs., or has a hazmat placard, or is a bus with seating for nine or more including the driver. [emphasis in original]”

coded two axle/six tires—such pickups would very likely have a GVWR over 10,000 lbs. and thus meet the truck vehicle type criteria. Since such big pickups are increasingly used for personal use only, only two axle/six tire pickups that were identified as commercial vehicles were selected.

A similar procedure was used to identify reportable vehicles within the category that identifies light vehicles pulling trailers, code "D" in Figure 2 above. Once again, the GVWR variable was judged too variable and difficult to code accurately given resources available to the reporting officer. The variable was missing for 27.3% of cases that were coded commercial vehicles. The variable was zero for another 40.5% of light vehicles with trailers. Accordingly the axle/tire count variables were used and a list of plausible combinations consistent with a GCWR over 10,000 lbs was developed. All power units were assumed to be two axle. Plausible truck/trailer combinations include 3x8 (2 axle, 6 tire light vehicle and 1 axle, 2 tire trailer), 4x8, (2 axle, 4 tire trailer) 4x10 (2x6 light vehicle and 2x4 trailer), 4x14 (2x6 light vehicle and 2x8 trailer). Other configurations of axles and tires were not considered plausible. There were a number of 5-axle/18-tire vehicles, a common axle/tire combination for tractor-semitrailers, but if true, that would indicate the vehicle type was miscoded. It is not possible to determine whether the vehicle type or axle/tire variables are correct, so those cases were excluded. Again, only light vehicles coded as operated as commercial vehicles were taken, because many light vehicles pull trailers for recreational purposes, particularly in a state like Louisiana which is well-known for its boating and other recreational opportunities.

The same approach was used to identify crashes in which at least one person was transported for immediate medical attention or at least one vehicle was towed due to disabling damage. Identifying crashes in which a person was transported for immediate medical attention will be discussed first. For each person involved in the crash, the severity of injury is coded, along with whether the person was transported to a medical facility, and the facility to which the person was transported. Both the variable that indicates whether a person was transported and the variable that indicates the facility to which the person was transported were consulted. There was some inconsistency and ambiguity. For example, about 15.6 percent of A injuries were coded "not transported," which seems high given that an A injury is defined as incapacitating. The variable was left blank for 9.7 percent of A injuries, and unknown for 0.9 percent. Cases coded "not transported" were accepted as such, but the reporting officer entered a medical facility name in the appropriate area in about 25 percent of the cases where he left the transported field blank. In other words, the officer did not use the check box on the TCR to indicate that the person was transported, but instead just entered the name of the medical facility.

Accordingly, to identify crashes in which a person was transported for medical attention, we took all crashes in which a person was injured and the transported field was checked "yes." In addition, we took cases in which the transported field was left blank, but the name of a valid medical facility was entered into that field. In some cases, the officer entered information in the medical facility field that indicated the person was <u>not</u> transported. For example, there were cases where the officer wrote "refused aid," "treated @ scene," or "not applicable." All such cases were excluded, leaving only those in which a person was injured <u>and</u> the transported field was check "yes," or the transported field was left blank but the name of a medical facility was entered in the transported to field on the TCR.

With respect to towed vehicles, the Louisiana TCR captures both an indication that a vehicle was towed, a reason for the towing, and a field for the name of the towing company. About 80 percent of the vehicles towed were towed because of vehicle damage. However, there are some vehicles which have a reason towed, but are not coded as being towed. The numbers are not large—only 2.4 percent of the vehicles coded towed due to vehicle damage. Nevertheless, if these vehicles were truly towed due to vehicle damage, the crashes would meet the severity threshold for reporting to the MCMIS Crash file. Since in these cases the two variables were not consistent, the field in which the officer recorded the name of the firm that towed the vehicle was used as a "tiebreaker" to confirm that a vehicle was indeed towed. In cases where the vehicle towed variable was not coded "yes," but the reason towed was coded "vehicle damage," if there was a valid name of a towing firm in the towed by field, the vehicle was considered to have been towed due disabling damage. In other words, if two of the three variables that record information about vehicle towing indicate that it was towed due to disabling damage, the vehicle was accepted as such, even if the third variable did not confirm.

Implementing this filter identified a total of 4,397 reportable cases in the Louisiana crash data in 2005. There were 4,397 vehicles—either a truck, bus, or vehicle transporting hazmat—involved in a crash that included either a fatality, at least one person transported for immediate medical attention, or at least one vehicle towed due to disabling damage.

**Table 3 Reportable Records in the Louisiana Crash File, 2005**

| Crash type | Total | % |
|---|---|---|
| Fatal | 147 | 3.3 |
| Injury transported for treatment | 1,971 | 44.8 |
| Vehicle towed due to damage | 2,279 | 51.8 |
| Total | 4,397 | 100.0 |

As Figure 1 above shows, there were 2,698 records reported to the MCMIS Crash file by Louisiana in 2005. Of these, 2,624 were matched to the Louisiana file, but 137 did not qualify for reporting, under the method developed to identify reportable cases discussed above. Almost all of the "not reportable" cases qualified under the crash severity threshold. Five of the cases included a fatality, 57 an injury transported for treatment, and 72 had at least one vehicle towed due to vehicle damage, leaving only three that did not meet the severity criteria. Most of the cases did not qualify because they did not meet the vehicle type criteria, according to the method of identifying reportable vehicles discussed above.

The largest group of the vehicles that were reported but not considered to be a reportable vehicle were light vehicles pulling a trailer. These vehicles could qualify if they had a GCWR over 10,000 pounds, as indicated by the number of axles and tires. (The GVWR/GCWR captured on the form was not used because of the amount of missing data and the inherent difficulty of coding accurately.) But they had axle/tire combinations that either indicated a light vehicle or were not plausible for the vehicle type. For example, fifteen light vehicles with trailers were reported as having five axles and 18 tires. This axle/tire combination is characteristic of a tractor-semitrailer, not a light vehicle with a trailer. If it were true for a light vehicle with a trailer, the

trailer would have to be 3 axles with 12 tires, not a plausible combination for a trailer pulled by a light vehicle. Since the vehicle type and axle/tire data are in conflict, it is not possible to decide which is accurate, so such cases were not identified as reportable. A similar argument holds true for all the other vehicles that were reported to the MCMIS Crash file but which did not qualify as reportable.

It is possible that the vehicles in reality do qualify as reportable, but there is not enough evidence in the coded crash data to be certain. They only amount to about 5 percent of all the cases reported by Louisiana, so including them is unlikely to alter the overall conclusions of this evaluation significantly. Yet they illustrate that, even with Louisiana crash reports, which seem to have all the variables needed to identify MCMIS-reportable cases with certainty, there is still a level of ambiguity because of the inconsistencies and inaccuracies that are inevitable in such a large file of data.

## 5. Factors Associated with Reporting

The process discussed in section 4 identified 4,397 crash involvements in the Louisiana crash report data from 2005 that qualified for reporting to the MCMIS Crash file. There were 2,698 records that actually were reported to the MCMIS Crash file, of which 2,624 were matched to the original record in the Louisiana crash file, and 74 could not. Of the 2,624 matched, 2,487 actually qualified for reporting for an overall reporting rate of 56.6 percent. In other words, 56.6 percent of cases that qualified for reporting to the MCMIS Crash file, actually were reported. The reporting rate might be somewhat higher if the 74 unmatched records could by some procedure be matched to a reportable record in the Louisiana crash file. But as discussed above in section 3, we were unable to find a matching record. If these 74 could be matched, the reporting rate would rise to 58.2 percent.

In this section we discuss the factors that are associated with the observed reporting rate. In this discussion, it is well to recall the unique features of the Louisiana crash report—the raw material available to build the crash file. Unlike many states, Louisiana incorporates as much as possible all the data elements necessary to identify reportable cases into the information collected for all cases. The vehicle type classification scheme includes all the configurations that the MCMIS Crash file itself uses to classify vehicles. The sections on persons and vehicles readily allow injured persons transported for treatment and vehicles towed due to damage to be identified. The only section which the reporting officer has to recognize as applying to the crash is the one that captures carrier information and hazardous materials vehicles. And the test to identify reportable vehicles is printed on the form itself and accurately captures the vehicle type criteria.

So the Louisiana TCR, in its very nature, minimizes the burden on the reporting officer to recognize qualifying crashes and complete the necessary data. The data necessary to upload to the MCMIS Crash file is collected for all vehicles, and the information needed to identify reportable crashes is, in theory, also collected for all vehicles. A computerized selection algorithm, similar to that developed for this evaluation, should be all that is necessary to identify reportable cases and to extract and upload the required data.

Reporting rates varied by the different levels of the selection criteria, and by some other factors, but no factor was identified that could explain completely the level of underreporting. Table 4

shows reporting rates, the number of unreported cases, and the proportion of unreported cases for each level of the MCMIS crash severity criteria. Traffic crashes that resulted in a fatality were reported at the highest rate, with almost 80 percent of such crash involvements reported. However, the two less-severe levels of crash severity were reported at a significantly lower rate, but at about the same rate for each. Injury/transported involvements were reported at a 57.0 percent rate and the towed due to damage involvements were reported at a rate only slightly lower, 54.7 percent. If the severity of the crash itself determined reporting, one would expect a linear relationship between severity and reporting rates, such that less severe involvements would be reported at a lower rate. But Table 4 indicates only two levels of rates, one for fatal involvements, and one for nonfatal involvements, however severe.

**Table 4 Reporting Rate by MCMIS Crash Severity, Louisiana 2005**

| MCMIS Crash Type | Reportable | Reporting rate | Unreported | % of total unreported |
|---|---|---|---|---|
| Fatal | 147 | 79.6 | 30 | 1.6 |
| Injury/transported | 1,971 | 57.0 | 848 | 44.4 |
| Towed due to damage | 2,279 | 54.7 | 1,032 | 54.0 |
| Total | 4,397 | 56.6 | 1,910 | 100.0 |

Table 5 shows that the two-level of reporting rates prevails even with more finely-grained measures of severity. In this table, crash severity is measured by the most severe injury in the crash, using the KABC0 scale. In this scale, incapacitating injuries are deemed severe, injuries that are evident but not incapacitating are called moderate, and complaint of pain is the least severe injury. Note that the rates for non-fatal crashes vary only between 53.4 percent (for the most severe non-fatal involvements) and 56.5 percent for involvements with only moderate injuries. But the rates are not different, in practical terms, for the least severe injury crashes or even those in which there is no injury. It appears that fatal crash involvements are treated with a high level of scrutiny, and that all non-fatal crashes are treated at the same level of scrutiny and one significantly lower than fatal crashes.

**Table 5 Reporting Rate by Police-Reported Crash Severity, Louisiana 2005**

| Police-reported Crash Severity | Reportable | Reporting rate | Unreported | % of total unreported |
|---|---|---|---|---|
| Fatal injury | 147 | 79.6 | 30 | 1.6 |
| Severe injury | 103 | 53.4 | 48 | 2.5 |
| Moderate injury | 733 | 56.5 | 319 | 16.7 |
| Complaint of pain | 1,755 | 56.4 | 765 | 40.1 |
| No injury | 1,659 | 54.9 | 748 | 39.2 |
| Total | 4,397 | 56.6 | 1,910 | 100.0 |

Rates also vary by vehicle type, but again, within a relatively narrow band. Reportable bus involvements are reported at a 48.5 percent rate, lower than the overall rate of 56.6 percent and the rate for trucks, 57.2 percent. Trucks, since they are the most common vehicle type, account

for 90.6 percent of unreported cases. But note that the reporting rate for light vehicles transporting hazardous materials is about the same as the overall rate and the rate for trucks. Typically, if vehicle type is a major determinant of reporting rates, one observes that uncommon vehicles, like light vehicles with hazmat, are reported at a much lower rate. However, the similarity of the rates between trucks and light, hazmat vehicles may be just a statistical artifact, since there are so few light hazmat involvements.

**Table 6 Reporting Rate by General Vehicle Type, Louisiana 2005**

| Vehicle type | Reportable | Reporting rate | Unreported | % of total unreported |
|---|---|---|---|---|
| Truck | 4,046 | 57.2 | 1,730 | 90.6 |
| Bus | 344 | 48.5 | 177 | 9.3 |
| Light veh. w/hazmat | 7 | 57.1 | 3 | 0.2 |
| Total | 4,397 | 56.6 | 1,910 | 100.0 |

Table 7 uses the much greater detail about vehicle type from the variable that classifies vehicles to illuminate the relationship between vehicle size and reporting rates. Typically, if human recognition and judgment on each case is critical in determining whether a case is reported, one expects that larger vehicles like tractor-semitrailers will be reported at a much higher rate than smaller vehicles. Table 7 provides some support for this explanation. Both tractor-semitrailer and tractor-double trailer combinations are reported at rates significantly higher than the overall rate, at 67.5 percent and 63.3 percent respectively. In contrast, two-axle single unit trucks (SUT) are reported at a 45.4 percent rate. Reportable involvements of larger buses, those with seating for 16 or more including the driver, were reported 55.2 percent of the time, in comparison with 34.0 percent of small, 9-15 seat buses. And reportable light trucks were reported at only a 3.7 percent rate.

**Table 7 Reporting Rate by Police-Reported Vehicle Type, Louisiana 2005**

| Vehicle type code | Reportable | Reporting rate | Unreported | % of total unreported |
|---|---|---|---|---|
| Light truck | 107 | 3.7 | 103 | 5.4 |
| Van | 1 | 0.0 | 1 | 0.1 |
| Light truck w/trailer | 67 | 44.8 | 37 | 1.9 |
| Off road vehicle | 1 | 100.0 | 0 | 0.0 |
| School bus | 192 | 48.4 | 99 | 5.2 |
| Bus seats 9-15 | 47 | 34.0 | 31 | 1.6 |
| Bus seats 16+ | 105 | 55.2 | 47 | 2.5 |
| SUT w/2 axles | 927 | 45.4 | 506 | 26.5 |
| SUT w/3+ axles | 458 | 59.8 | 184 | 9.6 |
| Truck/Trailer | 456 | 53.9 | 210 | 11.0 |

| Vehicle type code | Reportable | Reporting rate | Unreported | % of total unreported |
|---|---|---|---|---|
| Truck/Tractor | 513 | 62.0 | 195 | 10.2 |
| Tractor Semitrailer | 1,491 | 67.5 | 485 | 25.4 |
| Truck Double | 30 | 63.3 | 11 | 0.6 |
| Other | 1 | 0.0 | 1 | 0.1 |
| Missing data | 1 | 100.0 | 0 | 0.0 |
| Total | 4,397 | 56.6 | 1,910 | 100.0 |

As noted above, the Louisiana TCR includes an area to record commercial vehicle carrier and hazmat cargo information for vehicles that meet the MCMIS vehicle type criteria. This section is reproduced in Figure 3 below. Preceding the CMV section is a set of check boxes, to indicate use of the vehicle. One of the types is "commercial/business," and one would expect that checking this box would be highly associated with extracting reportable cases for upload to the MCMIS Crash file.

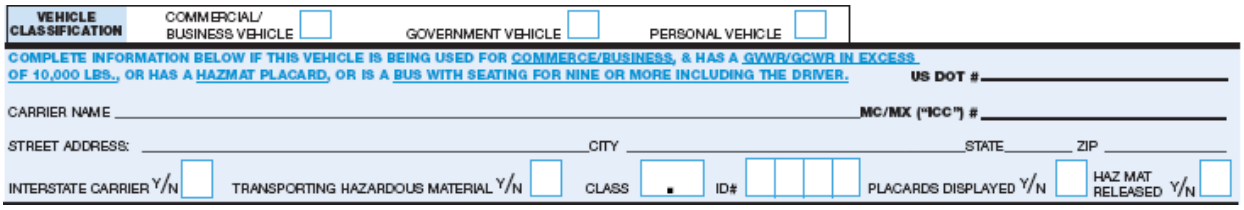


**Figure 3 Commercial Vehicle Section from Louisiana Uniform Motor Vehicle Traffic Crash Report**

However, while the reporting of reportable cases with a CMV indicator checked is higher than where it is not checked, the difference is not great, and over three-fourths of the unreported cases had the CMV indicator checked. Table 8 shows that 60.8 percent of reportable cases that had the CMV indicator checked "yes" were reported, while only 33.0 percent of cases where it was left blank were reported. Actually, the indicator probably should have been checked in virtually all the reportable cases, since they are virtually all trucks or buses, and no doubt operated commercially. Nevertheless, even though the rate is somewhat higher than the overall rate, clearly checking the CMV indicator is not decisive, since 76.4 percent of the unreported cases also were checked as CMVs.

**Table 8 Reporting Rate by Commercial Vehicle Indicator, Louisiana 2005**

| Commercial Vehicle indicator | Reportable | Reporting rate | Unreported | % of total unreported |
|---|---|---|---|---|
| Not checked | 673 | 33.0 | 451 | 23.6 |
| Checked | 3,724 | 60.8 | 1,459 | 76.4 |
| Total | 4,397 | 56.6 | 1,910 | 100.0 |

Reporting rates do not vary significantly by the type of investigating agency. There are three primary levels of investigating agencies—State police, city police, and parish sheriffs. If reporting rates depended critically on the training and actions of the reporting officer, one would expect that reporting rates would vary by the type of investigating agency. But in Louisiana, all three of the primary types of reporting agencies have reporting rates that are very similar to each other and very similar to the overall rate. Table 9 shows that the rate for each agency type varies between 55.0 percent and 57.7 percent. Thus, it does not appear that the type of agency investigating is a significant factor in reporting rates.

**Table 9 Reporting Rate by Investigating Agency, Louisiana 2005**

| Investigating agency | Reportable | Reporting rate | Unreported | % of total unreported |
|---|---|---|---|---|
| State | 2,280 | 56.4 | 994 | 52.0 |
| City | 1,524 | 57.7 | 645 | 33.8 |
| Parish | 560 | 55.0 | 252 | 13.2 |
| Other | 29 | 44.8 | 16 | 0.8 |
| Unknown | 4 | 25.0 | 3 | 0.2 |
| Total | 4,397 | 56.6 | 1,910 | 100.0 |

From the structure of the Louisiana TCR and from some of the results thus far, it appears that whether a reportable crash involvement is extracted and uploaded to the MCMIS Crash file does not depend on the reporting officer recognizing that a crash meets the reporting requirements. However, the rates may be affected by some factor in the processing of the reports. Table 10 examines indirectly whether delays in processing contributes to the reporting rate. FMCSA requires that all reportable cases be uploaded through the SafetyNet system within 90 days of the crash; the version of the MCMIS Crash file used in this analysis was created in August of 2006, so all reportable crashes for 2005 should have been uploaded by the August date of the MCMIS file used. If there are delays in reporting cases, one would expect to see lower reporting rates for more recent months.

Table 10 shows reporting rates by month of crash. Reporting rates are lower in the more recent months of November and December. Reportable crashes in November of 2005 were reported at a 49.4 percent rate, and only 35.6 percent of December 2005 crashes had been reported. It is likely that this reflects some delay in processing records. However, the reporting rate was also low for February and August, at 49.8 percent and 42.9 percent respectively, and notably higher in March, April, and May. It is possible that there is both a delay in processing reportable cases, in addition to some seasonal activities in certain months that contribute to delays in processing reportable cases. The slightly lower rate in August may be due to the devastation of Hurricane Katrina, but it is a tribute to the state that subsequent months showed a return of the reporting rate to the earlier pattern.

**Table 10 Reporting Rate by Police-Reported Crash Severity, Louisiana 2005**

| Month | Reportable | Reporting rate | Unreported | % of total unreported |
|---|---|---|---|---|
| January | 330 | 57.6 | 140 | 7.3 |
| February | 277 | 49.8 | 139 | 7.3 |
| March | 362 | 70.2 | 108 | 5.7 |
| April | 318 | 74.2 | 82 | 4.3 |
| May | 336 | 67.3 | 110 | 5.8 |
| June | 333 | 63.7 | 121 | 6.3 |
| July | 340 | 60.0 | 136 | 7.1 |
| August | 329 | 42.9 | 188 | 9.8 |
| September | 364 | 56.3 | 159 | 8.3 |
| October | 562 | 56.6 | 244 | 12.8 |
| November | 447 | 49.4 | 226 | 11.8 |
| December | 399 | 35.6 | 257 | 13.5 |
| Total | 4,397 | 56.6 | 1,910 | 100.0 |

Reporting also varies by other factors. So far it has been shown that reporting varies by factors related to the case selection criteria. Involvements that are clearly serious, such as fatal involvements, and clearly involve big trucks, like tractor-semitrailers or doubles combinations, are more likely to be reported than less serious crashes and smaller vehicles. It also is the case that reportable involvements of clearly interstate carriers are more likely to be reported than where that is not so clear. This pattern is consistent with the hypothesis that the selection process is biased toward interstate carriers rather than intrastate carriers, since FMCSA is charged with regulating carriers in interstate commerce. Table 11 shows that reportable cases were reported at a higher rate where the driver was licensed in some state other than Louisiana (and thus by definition in interstate commerce), 62.9 percent to 55.7 percent for Louisiana-licensed drivers. The reporting rate is much lower where driver license state is unknown, but relatively few cases are affected.

**Table 11 Reporting Rate by Driver License State, Louisiana 2005**

| Driver License State | Reportable | Reporting rate | Unreported | % of total unreported |
|---|---|---|---|---|
| Louisiana | 2,854 | 55.7 | 1,265 | 66.2 |
| Other | 1,340 | 62.9 | 497 | 26.0 |
| Unknown | 203 | 27.1 | 148 | 7.7 |
| Total | 4,397 | 56.6 | 1,910 | 100.0 |

Vehicle registration state also indicates that the vehicle is in interstate commerce, at least if the vehicle is registered outside of the state. Table 12 shows that the reporting rate is somewhat higher for vehicles registered out-of-state than in-state vehicles, but the difference is not marked. There is a slight tendency for the reportable crashes of vehicles that are clearly interstate to be reported at a higher rate, but the difference does not account for the overall rate of reporting and is not practically significant.

**Table 12 Reporting Rate by Vehicle Registration State, Louisiana 2005**

| Vehicle registration state | Reportable | Reporting rate | Unreported | % of total unreported |
|---|---|---|---|---|
| Louisiana | 2,579 | 56.3 | 1,126 | 59.0 |
| Other | 1,649 | 62.6 | 616 | 32.3 |
| Unknown | 169 | 0.6 | 168 | 8.8 |
| Total | 4,397 | 56.6 | 1,910 | 100.0 |

The next table considers the base state of the carrier and is worth comparing with Table 12. Base state of the carrier is recorded in the CMV area of the TCR, which, the reader will recall, is only filled out if the officer determines that the vehicle involved meets the MCMIS criteria. (Please see Figure 3.) Table 13 shows reporting rates, number of unreported cases, and the percent of unreported cases accounted for by the reportable crashes of carriers based in Louisiana and those based outside of Louisiana. Reporting rates are in practical terms identical for Louisiana and non-Louisiana carriers. In addition, reporting rates for both are markedly higher than the overall average. This is possible because the reporting rate for reportable cases where carrier state is unknown is only 4.3 percent and because carrier state is unknown in 16.3 percent of reportable cases. On the other hand, about a third of reportable cases for which carrier base state is recorded were not reported. Thus, it appears that filling in carrier address state is *necessary* but not *sufficient* for a reportable case to be reported. We also checked whether the carrier's name, base city, and base zip code were recorded and the results were very similar to those shown in Table 13.

**Table 13 Reporting Rate by Carrier Address State, Louisiana 2005**

| Carrier State | Reportable | Reporting rate | Unreported | % of total unreported |
|---|---|---|---|---|
| Louisiana | 1,818 | 64.9 | 638 | 33.4 |
| Other | 1,830 | 69.7 | 554 | 29.0 |
| Unknown | 720 | 4.3 | 689 | 36.1 |
| Total | 4,397 | 56.6 | 1,910 | 100.0 |

Table 14 makes the point more directly. Among reportable cases that were reported, almost 99 percent had the carrier state information filled in. The same is true for carrier name, city, and zip, but those tables are not shown here. Among cases that were not reported, only 63.9 percent had that information completed by the officer who completed the TCR. Clearly, completing the

CMV section is key to reporting, but there is still a large number of reportable cases that did have the CMV section filled in, which nonetheless were not reported.

**Table 14 Carrier State Completed by Reporting, Louisiana 2005**

| | Reported | | Not Reported | | Total Reportable | |
|---|---|---|---|---|---|---|
| Carrier State | N | % | N | % | N | % |
| Present | 2,456 | 98.8 | 1,221 | 63.9 | 3,677 | 83.6 |
| Missing | 31 | 1.2 | 689 | 36.1 | 720 | 16.4 |
| Total | 2,487 | 100.0 | 1,910 | 100.0 | 4,397 | 100.0 |

Examining the patterns of underreporting suggests that whether a reportable case is extracted for reporting depends on actions at different points in the data collection process. Entering information in the CMV section is the first threshold that must be met. The officer must recognize that a vehicle meeting the MCMIS Crash file qualification is involved in the crash. Then a secondary selection process is applied. In this process, fatal crashes are more likely to be recognized as reportable, and the largest trucks are more likely to be reported.

## 6. Data Quality of Reported Cases

In this section, we consider the quality of data reported to the MCMIS crash file. Two aspects of data quality are examined. The first is the amount of missing data. Missing data rates are important to the usefulness of a data file because records with missing data cannot contribute to an analysis. The second aspect of data quality considered here is the consistency of coding between records as they appear in the Louisiana Crash file and in the MCMIS Crash file. Inconsistencies can indicate errors in translating information recorded on the crash report to the values in the MCMIS Crash file.

Table 15 shows missing data rates for selected, important variables in the MCMIS Crash file. Missing data rates are generally quite low, with a handful of exceptions. On most fundamental, structural variables, such as date, time, number of fatalities and number of injuries, missing data rates are either zero or extremely low. Missing data rates for some other variables are higher. Variables relating to driver licensing are missing for 2.0 to 16.4 percent of cases. Road access is missing for only 0.3 percent, and citation issued for only 2.0 percent. Trafficway type is missing for 1.3 percent of cases. Weather is not recorded in 0.1 percent of cases. Vehicle Identification Number (VIN) is missing in only 9.7 percent, and missing data rates for vehicle license state and vehicle license number are negligible. On the other hand, number of vehicles and the four event variables are missing in all cases.

**Table 15 Missing Data Rates for Selected MCMIS Crash File Variables, Louisiana 2005**

| Variable | Percent unrecorded | Variable | Percent unrecorded |
|---|---|---|---|
| Report number | 0.0 | Fatal injuries | 0.0 |
| Accident year | 0.0 | Non-fatal Injuries | 0.0 |

| Variable | Percent unrecorded | Variable | Percent unrecorded |
|---|---|---|---|
| Accident month | 0.0 | Interstate | 3.2 |
| Accident day | 0.0 | Light | 0.3 |
| Accident hour | 0.0 | Event one | 100.0 |
| Accident minute | 0.0 | Event two | 100.0 |
| County | 0.0 | Event three | 100.0 |
| Body type | 4.8 | Event four | 100.0 |
| Configuration | 1.3 | Number of vehicles | 100.0 |
| GVWR class | 0.5 | Road access | 0.3 |
| DOT number* | 9.7 | Road surface | 0.2 |
| Carrier state | 0.0 | Road trafficway | 1.3 |
| Citation issued | 2.0 | Towaway | 0.0 |
| Driver date of birth | 8.1 | Truck or bus | 0.0 |
| Driver license number | 7.7 | Vehicle license number | 1.7 |
| Driver license state | 7.7 | Vehicle license state | 0.0 |
| Driver license class | 16.4 | VIN | 9.7 |
| Driver license valid | 2.0 | Weather | 0.1 |

* Counting cases where the carrier is coded interstate.

| Hazardous materials variable | Percent unrecorded |
|---|---|
| Hazardous materials placard | 0.0 |
| Percentages of hazmat placarded vehicles only: | |
| Hazardous cargo release | 0.0 |
| Hazardous materials class (1-digit) | 11.1 |
| Hazardous materials class (4-digit) | 0.0 |
| Hazardous materials name | 100.0 |

There is some inconsistency between the hazmat placard and the other variables that record information about hazmat. The table above shows information about the recording of hazmat variables only for the 27 vehicles that are coded as displaying a hazmat placard. Missing data rates appear reasonably low, except for the hazmat name. However, the low rates of missing data for hazmat-placarded vehicles mask inconsistencies between the data elements. There are 113 records for which hazmat placard is coded “N” but which have a valid hazmat class number coded. In addition, the hazmat name is missing for all cases in which hazmat placard is coded “Y,” but a 4-digit hazmat number (rather than a name) is coded for 41 cases for which hazmat placard is “N.” The 4-digit hazmat number is coded for all 27 cases for which hazmat placard is “Y,” and also for 64 cases in which placard is “N.” Without access to the underlying TCRs, it is not possible to determine which information is correct.

We also compared the values of variables in the MCMIS Crash file with the value of comparable variables in the Louisiana crash file. The purpose of this comparison is to identify any errors in translating variables from the values in the state crash file to the values required for Safetynet. Louisiana has adopted in many instances the same code levels for certain variables as are used in the MCMIS Crash file, though Louisiana uses an alphabetic system to identify code levels. Using alphabetic levels requires translation where numeric codes are used for comparable variables in MCMIS.

Table 16 shows the coding of vehicles in the MCMIS Crash file and the record as it appears in the Louisiana Crash file. The consistency between coding in the two files is very good. There is no systematic mismatch that indicates a problem in translating codes from one system to the other. The shaded cells mark cases where the configuration is coded inconsistently between the two files. Only about 1.4 percent of the cases are inconsistent. The most frequent mismatch is the 28 cases coded as a two-axle SUT in the Louisiana file that are coded truck trailer in the MCMIS file. There are also seven cases coded as a light truck or pickup in the Louisiana file that are marked as truck-trailer in MCMIS. The fewness of inconsistent cases indicates that this is likely a problem with manual coding, rather than computer translation.

**Table 16 Vehicle Configuration in Louisiana and MCMIS Crash Files, 2005**

| Vehicle configuration | | | |
|---|---|---|---|
| MCMIS Crash file | Louisiana Crash file | Cases | % |
| Bus (seats 9-15, incl. dr.) | Bus seats 9-15 occs | 16 | 0.6 |
| Bus (seats >15, incl. dr.) | School bus | 93 | 3.5 |
| | Bus seats 16+ occs | 59 | 2.2 |
| | SUT w/2 axles | 1 | 0.0 |
| SUT, 2-axle, 6-tire | SUT w/2 axles | 386 | 14.7 |
| SUT, 3+ axles | SUT w/3+ axles | 274 | 10.4 |
| Truck trailer | Lt. truck (p.u., etc.) | 7 | 0.3 |
| | Lt. veh. w/trailer | 86 | 3.3 |
| | SUT w/2 axles | 28 | 1.1 |
| | Truck/trailer | 246 | 9.4 |
| Truck tractor (bobtail) | Truck/tractor | 318 | 12.1 |
| Tractor/semitrailer | Tractor semitrailer | 1,007 | 38.4 |
| Tractor/double | Truck double | 19 | 0.7 |
| Unk heavy truck>10,000 | Lt .truck(p.u., etc.) | 1 | 0.0 |
| | Emergency veh-in use | 19 | 0.7 |
| | SUT w/2 axles | 7 | 0.3 |
| | Other | 24 | 0.9 |
| Missing data | Motorcycle | 1 | 0.0 |
| | Pedalcycle | 1 | 0.0 |

| Vehicle configuration | | Cases | % |
|---|---|---|---|
| MCMIS Crash file | Louisiana Crash file | | |
| | Off road vehicle | 4 | 0.2 |
| | SUV | 2 | 0.1 |
| | Motor home | 1 | 0.0 |
| | Missing data | 24 | 0.9 |
| Total | | 2,624 | 100.0 |

Of more interest is the number of cases that are coded truck/tractors. There are 318 such cases, amounting to 12.1 percent of all the submitted cases. These vehicles should all be "bobtail" tractors. The illustration on the TCR showing the vehicle (reproduced in Figure 2) clearly shows a bobtail tractor. The proportion of vehicles coded as bobtail tractors is quite high. In UMTRI's Trucks Involved in Fatal Accidents (TIFA) data, bobtails amount to only about 2 percent of trucks. In all cases reported to MCMIS in 2005, about 2.7 percent were coded as truck/tractors. It is likely that the overrepresentation of bobtails in the Louisiana is a coding error, but that cannot be definitively determined here.

There were also only minor inconsistencies in some other variables examined. Comparison of the cargo variables showed that all truck cargo bodies were coded consistently in both files. However, there was some inconsistency in the coding of the cargo body for buses, though the explanation is likely that officers did not consider buses to have a cargo body. Of the 168 vehicles coded as buses in MCMIS, 59 were coded as "no cargo body" in the Louisiana data and cargo body was left blank for another 20. In less than half (82) of the cases were buses coded with a bus cargo body in both files.

Light condition is coded identically in the two files, with the exception of one level. The Louisiana TCR light condition variable has a level for "dark, street lighting at intersection only." All such cases were coded, "dark, unknown road lighting" in the MCMIS file. There were 60 such cases. Arguably, the cases should have translated as "dark, lighted" in MCMIS, since there was lighting, although only at intersections. Alternatively they could have been assigned an "other" code. But one might argue that coding them "unknown" on road lighting is an error, since lighting was known. This is a simple translation problem that is readily fixed.

Another translation problem exists for the number of vehicles variable. Complete data is available in the Louisiana file, yet all cases are missing data in the uploaded MCMIS Crash file. Again, a simple programming fix would remedy this problem.

Inconsistency was more of a problem for the variables covering the transport of hazardous materials in the crash. It was observed above that there was some inconsistency in the coding of the MCMIS Crash file hazmat variables. Not surprisingly there was also some problems in translating data from the Louisiana file to the MCMIS Crash file. Table 17 shows how the presence of a hazmat placard is coded in the MCMIS Crash file and in matching records in the Louisiana file. In MCMIS, the variable is coded "Y" or "N," while in the Louisiana file, 1 indicates the vehicle displayed a placard and 0 indicates it did not. Note that in 120 cases (shaded

cells) records in the file are inconsistent. The MCMIS Crash file has 27 records where hazmat placard is coded "Y," while the Louisiana file has 131 reportable cases indicating a hazmat placard. Since some cases are consistent, it is less likely that this difference is explained by a simple programming error. However, the information is readily available in the Louisiana data, so the problem should be able to be fixed.

**Table 17 Hazmat Placard in Louisiana and MCMIS Crash Files, 2005**

| Hazardous Materials Placard | | Cases | % |
|---|---|---|---|
| MCMIS Crash file | Louisiana crash file | | |
| N | 0 | 2,485 | 94.7 |
| N | 1 | 112 | 4.3 |
| Y | 0 | 8 | 0.3 |
| Y | 1 | 19 | 0.7 |
| Total | | 2,624 | 100.0 |

There is also an inconsistency in the variables that code whether hazmat cargo was released during the crash. The MCMIS Crash file shows no cases in which hazmat cargo was released. However, the Louisiana data shows 20 reportable cases in which hazmat was spilled during the crash. Again, it is not possible to know why this error in translation occurred.

## 7. Summary and Discussion

In many ways, Louisiana has a crash report that should facilitate reasonably accurate and complete reporting to the MCMIS Crash file. The variables on the form—filled in for all vehicles and all crashes—provide enough information to approximate the selection criteria for the MCMIS file. The Louisiana vehicle type variable classifies vehicles using the categories that are also used in the MCMIS file. There is some ambiguity among light vehicles, since some pickups have heavy-duty rear axles and some light truck/trailer combinations qualify, but the large majority of vehicles that qualify are directly and cleanly identifiable just using the vehicle type codes.

Selecting qualifying crash severities is less straightforward but also fairly clean. Crashes in which at least one person, injured in the crash, is transported for immediate medical attention can be identified because for each person in the crash, the officer records the injury level, whether the person was transported, and where the person was transported is coded. As discussed above, there are some cases where whether the person was transported was left blank but the name of a medical facility was recorded. So there is some minor inconsistency among the variables, some residual ambiguity, which is not surprising in a large data file collected by many different people. But overall, the data are there to identify injury/transported crashes. The situation is the same for determining crashes in which a damaged vehicle was towed. The necessary variables are present, there is a small amount of missing data and inconsistency between the variables, but not enough to significantly affect the ability to identify such crashes.

Overall, Louisiana reports an estimated 56.6 percent of the cases that qualify for reporting to the MCMIS Crash file. Given the uncertainties discussed above, this probably varies in a range of a few percent. The minor uncertainties cannot explain the extent to which the reporting rate differs from full reporting. For example, the number of crashes in which an injured person is transported increases only by 1.2 percent if an injured person is considered to have been transported if the transported variable is left blank but a valid medical facility is listed. The extent to which reporting to the MCMIS Crash file falls short of full reporting must be explained by other causes.

Underreporting is typically related to problems in applying the MCMIS reporting threshold criteria—that is, reporting rates are usually lower for less severe crashes and smaller vehicles. This holds true in Louisiana but in a distinctive way. For example, fatal involvements are reported at a rate that is much higher than the overall rate: 79.6 percent. But all other involvements are reported at about the same rate. Crashes in which the most severe injury was an A-injury (incapacitating and the most serious injury after fatal injury) are reported at about the same rate as crashes in which there was no injury, but a vehicle was towed due to disabling damage. Reportable A-injury crashes were reported at a 53.4 percent rate, and no-injury but towaway crashes were reported at a 54.9 percent rate. In other words, there seems to be one system of reporting for fatal crashes and a different one for all other crash severities.

On the other hand, it appears that the size of the vehicle is significantly associated with reporting rates, which is typically observed when cases are selected through case-by-case judgment (as when an officer applies the criteria in the field) rather than through the application of a computer algorithm. The highest reporting rates were observed for the largest trucks. Tractor-semitrailers and tractor-doubles combinations were reported at 67.5 and 63.3 percent rates, respectively. Big, three-axle SUTs were reported at a 59.8 percent rate, while two-axle SUTs were reported at a 45.4 percent rate. Consistent with this interpretation, buses were reported at a lower rate than trucks overall (48.5 to 57.2 percent) and large, 15+ passenger buses were reported at a higher rate (55.2 percent) than smaller, 9-15 passenger buses (34.0 percent).

However, interestingly, the type of reporting agency did not appear to have a significant effect on reporting rates. In many other states, the state police usually have a meaningfully higher reporting rate than county sheriffs or city police departments. But in Louisiana, all levels of enforcement—state police, parish, and city police—report cases at about the same rate. This suggests that a main influence on reporting is at the state level, not officers in the field. The two-level reporting rates by crash severity similarly suggests that factors at the state level are decisive.

In states in which officer-level factors are primary, it is commonly observed that out-of-state vehicles and companies are reported at a higher rate than in-state. The hypothesis is that officers more readily recognize vehicles that are clearly in interstate commerce (as evidenced by their out-of-state registration) to be appropriate for the Federal crash database. However, in Louisiana, it was observed that the reporting rates did not differ dramatically by vehicle registration state. Non-Louisiana plates were only somewhat more likely to be reported than Louisiana vehicles, 62.6 percent to 56.3 percent.

When carrier address was considered, it was found that the reportable crashes of both Louisiana-based carriers and non-Louisiana carriers were reported at a higher rate than the overall reporting

rate. The spaces to collect carrier address are located in the CMV section, which the officer is reminded to fill out if the vehicle meets the MCMIS Crash file criteria. Almost 70 percent of the reportable crashes of carriers based outside of Louisiana were reported, while almost 65 percent of Louisiana-based carriers were reported. These rates compare with the overall rate of 56.6 percent. How can this be? Because only 4.3 percent of the reportable cases for which carrier state was unknown were reported, and carrier state was unknown for 720 of the 4,397 reportable cases. It appears that filling in the information in the CMV section is virtually necessary for reporting, but it is not sufficient. There is still a second level of review and selection, as evidenced by the fact that about two-thirds of unreported cases had information entered into the CMV section.

Missing data rates on reportable cases are generally low, with some notable exceptions. Driver license class is missing for 16.4 percent of cases, and the number of vehicles variable and all four sequence of events variables are missing. This is likely easily fixable since the number of vehicles and sequence of events is available in the Louisiana crash file. Some inconsistencies and missing data was observed for variables that contain information on hazardous materials. Most cases that have valid 4-digit and 1-digit codes for hazmat type and class are coded as not displaying a hazmat placard. It is unlikely that a large proportion of hazmat carriers are not showing the placard. Hazmat name is also missing in all cases.

It was also noted incidentally that the proportion of vehicles coded as “truck tractors,” which also are known as bobtail tractors, seems unusually high, about six times the size of the proportion of bobtails in other crash files. This is likely a systematic coding error, possibly at the field level, and should be addressed, if it is a genuine error.

Consistency between the data in the Louisiana crash file and the MCMIS Crash file was also checked. Inconsistency can occur if there are errors in formatting or translation of coding systems when records are transmitted to the MCMIS file. In addition, there can be inconsistency if changes are made to records in one file, but not to the other. Generally, coding of comparable variables in the two files was consistent, though a small number of problems were detected. About 1.4 percent of records differed on coding of vehicle type between the two files. Since specific code values were not always in disagreement, these errors are more likely related to changes in the Louisiana crash file that were not replicated in the MCMIS file, or data entry. A likely translation problem was noted in the light condition variable. The Louisiana crash file has a level to identify cases with lighting at intersections only, while the MCMIS Crash file does not include such a level. All such records were recorded in the MCMIS file as “unknown lighting.” These cases might better have been coded as “dark, lighted” since there were street lights at the intersection, or “other.”

Louisiana has adopted a crash form that is well-suited to collecting the MCMIS Crash file data. It has all the essential elements to identify reportable crashes, and uses code levels for the most important data elements that are consistent with the same variables in the MCMIS Crash file. This makes translation to the required code levels easy. In addition, it is our judgment that Louisiana has wisely taken the approach of minimizing the burden on the reporting officer in recognizing reportable crashes. Instead, all the most important data for the MCMIS Crash file are collected for all crashes. There is only one section that specifically applies only to MCMIS vehicles, the CMV section in which carrier information is collected. It turns out that section is

crucial to uploading the records to MCMIS, because very few records were uploaded that did not have the section filled out. But clearly there is another stage of selection, since a large fraction of cases that should have been reported but were not, had information in the section. So the reporting officer did his part, but the cases were omitted apparently in the secondary selection step at the state level.

Finally, it appears that the problems could be fixed without any changes in the Louisiana forms or approach at the reporting officer level. Without knowing the system used by Louisiana to identify and upload records, it is not possible to do more than speculate, but it appears to us that Louisiana is well-positioned to use computer algorithms to identify reportable cases and thus to significantly improve its reporting rate.

## 8. References

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13 Blower, D., and Matteson, A., Evaluation of Washington Crash Data Reported to MCMIS Crash File. University of Michigan Transportation Research Institute, Ann Arbor, Michigan. June 2006. Sponsor: Federal Motor Carrier Safety Administration, U.S. D.O.T.

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## Appendix A Selection Algorithm to Identify Reportable Records

Selection algorithm used in selecting vehicles that meet MCMIS vehicle type criteria:

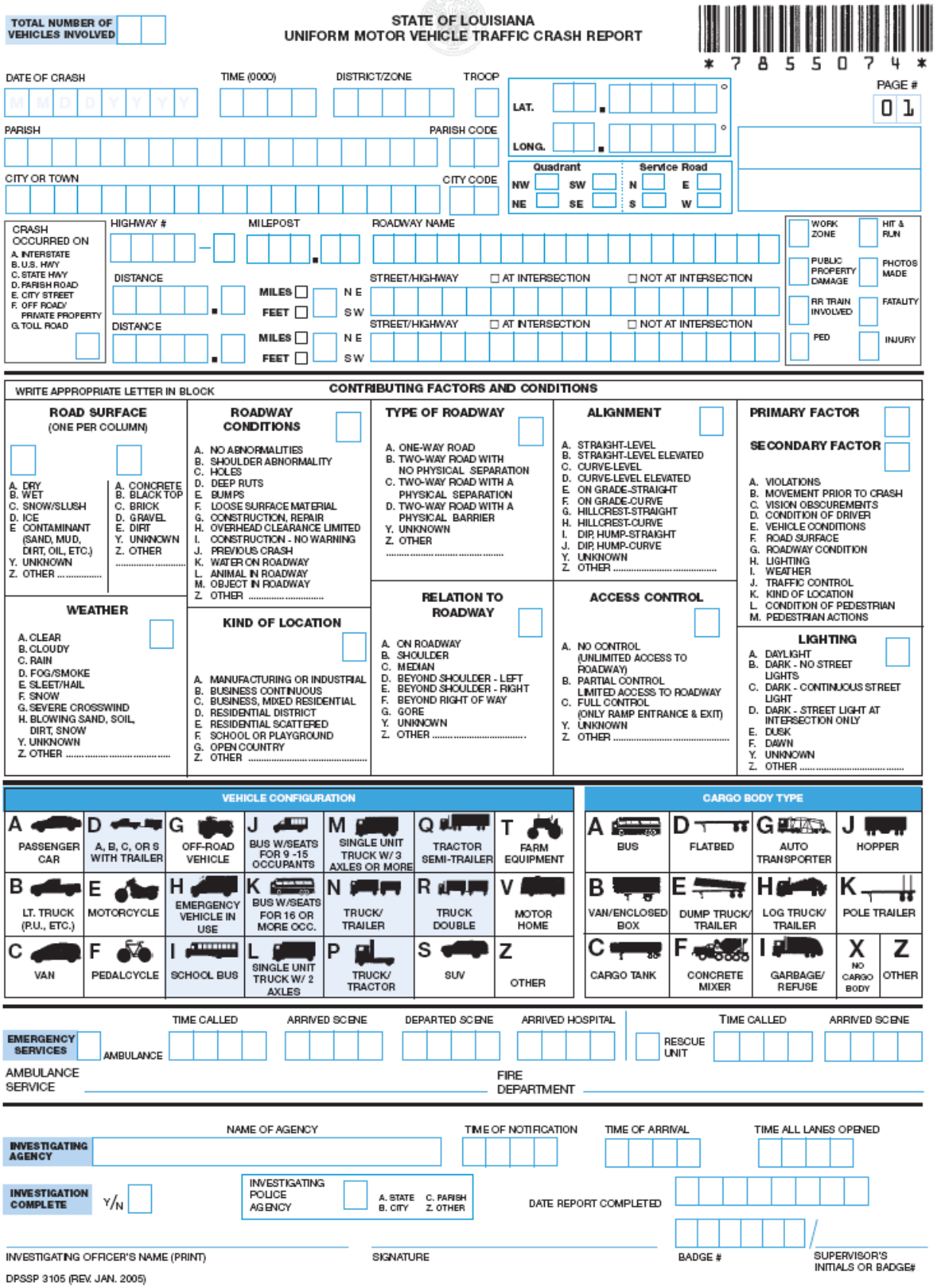
| Variable name | Definition |
|---|---|
| veh_type_cd | Vehicle type code |
| num_axles | Number of axles |
| comm_bus_veh | Commercial vehicle flag |
| num_tires | Number of tires |

```
Vehicle type (veh_type) definition

 1='truck'
 2='bus'
 3='hazmat'
 8='other';

 if veh_type_cd in('L','M','m','N','P','Q','R') then veh_type=1;
 else if veh_type_cd in('I','J','K','j') then veh_type=2;
 else if veh_type_cd='B' and comm_bus_veh=1 and num_axles=2 and num_tires=6
then veh_type=1;
 else if veh_type_cd in('D','d') and comm_bus_veh=1 and num_axles=4 and
num_tires in(8,10,14) then veh_type=1;
 else if veh_type_cd in('D','d') and comm_bus_veh=1 and num_axles=3 and
num_tires=8 then veh_type=1;
 else if utb_haz_mat_plac=1 then veh_type=3;
 else veh_type=8;
 format veh_type veh_typef.;
```

## Appendix B Louisiana Uniform Motor Vehicle Traffic Crash Report



TOTAL NUMBER OF VEHICLES INVOLVED

STATE OF LOUISIANA
UNIFORM MOTOR VEHICLE TRAFFIC CRASH REPORT

* 7 8 5 5 0 7 4 *

DATE OF CRASH (M M D D Y Y Y Y) TIME (0000) DISTRICT/ZONE TROOP

LAT. ° ' "
LONG. ° ' "

PAGE # 01

PARISH PARISH CODE

CITY OR TOWN CITY CODE

Quadrant: NW SW NE SE
Service Road: N E S W

CRASH OCCURRED ON
A. INTERSTATE
B. U.S. HWY
C. STATE HWY
D. PARISH ROAD
E. CITY STREET
F. OFF ROAD/ PRIVATE PROPERTY
G. TOLL ROAD

HIGHWAY # MILEPOST ROADWAY NAME

DISTANCE MILES FEET N E S W STREET/HIGHWAY ☐ AT INTERSECTION ☐ NOT AT INTERSECTION

DISTANCE MILES FEET N E S W STREET/HIGHWAY ☐ AT INTERSECTION ☐ NOT AT INTERSECTION

WORK ZONE HIT & RUN
PUBLIC PROPERTY DAMAGE PHOTOS MADE
RR TRAIN INVOLVED FATALITY
PED INJURY

WRITE APPROPRIATE LETTER IN BLOCK

### CONTRIBUTING FACTORS AND CONDITIONS

**ROAD SURFACE** (ONE PER COLUMN)

| | |
|---|---|
| A. DRY | A. CONCRETE |
| B. WET | B. BLACK TOP |
| C. SNOW/SLUSH | C. BRICK |
| D. ICE | D. GRAVEL |
| E. CONTAMINANT (SAND, MUD, DIRT, OIL, ETC.) | E. DIRT |
| Y. UNKNOWN | Y. UNKNOWN |
| Z. OTHER | Z. OTHER |

**ROADWAY CONDITIONS**
A. NO ABNORMALITIES
B. SHOULDER ABNORMALITY
C. HOLES
D. DEEP RUTS
E. BUMPS
F. LOOSE SURFACE MATERIAL
G. CONSTRUCTION, REPAIR
H. OVERHEAD CLEARANCE LIMITED
I. CONSTRUCTION - NO WARNING
J. PREVIOUS CRASH
K. WATER ON ROADWAY
L. ANIMAL IN ROADWAY
M. OBJECT IN ROADWAY
Z. OTHER

**TYPE OF ROADWAY**
A. ONE-WAY ROAD
B. TWO-WAY ROAD WITH NO PHYSICAL SEPARATION
C. TWO-WAY ROAD WITH A PHYSICAL SEPARATION
D. TWO-WAY ROAD WITH A PHYSICAL BARRIER
Y. UNKNOWN
Z. OTHER

**ALIGNMENT**
A. STRAIGHT-LEVEL
B. STRAIGHT-LEVEL ELEVATED
C. CURVE-LEVEL
D. CURVE-LEVEL ELEVATED
E. ON GRADE-STRAIGHT
F. ON GRADE-CURVE
G. HILLCREST-STRAIGHT
H. HILLCREST-CURVE
I. DIP, HUMP-STRAIGHT
J. DIP, HUMP-CURVE
Y. UNKNOWN
Z. OTHER

**PRIMARY FACTOR**

**SECONDARY FACTOR**
A. VIOLATIONS
B. MOVEMENT PRIOR TO CRASH
C. VISION OBSCUREMENTS
D. CONDITION OF DRIVER
E. VEHICLE CONDITIONS
F. ROAD SURFACE
G. ROADWAY CONDITION
H. LIGHTING
I. WEATHER
J. TRAFFIC CONTROL
K. KIND OF LOCATION
L. CONDITION OF PEDESTRIAN
M. PEDESTRIAN ACTIONS

**WEATHER**
A. CLEAR
B. CLOUDY
C. RAIN
D. FOG/SMOKE
E. SLEET/HAIL
F. SNOW
G. SEVERE CROSSWIND
H. BLOWING SAND, SOIL, DIRT, SNOW
Y. UNKNOWN
Z. OTHER

**KIND OF LOCATION**
A. MANUFACTURING OR INDUSTRIAL
B. BUSINESS CONTINUOUS
C. BUSINESS, MIXED RESIDENTIAL
D. RESIDENTIAL DISTRICT
E. RESIDENTIAL SCATTERED
F. SCHOOL OR PLAYGROUND
G. OPEN COUNTRY
Z. OTHER

**RELATION TO ROADWAY**
A. ON ROADWAY
B. SHOULDER
C. MEDIAN
D. BEYOND SHOULDER - LEFT
E. BEYOND SHOULDER - RIGHT
F. BEYOND RIGHT OF WAY
G. GORE
Y. UNKNOWN
Z. OTHER

**ACCESS CONTROL**
A. NO CONTROL (UNLIMITED ACCESS TO ROADWAY)
B. PARTIAL CONTROL LIMITED ACCESS TO ROADWAY
C. FULL CONTROL (ONLY RAMP ENTRANCE & EXIT)
Y. UNKNOWN
Z. OTHER

**LIGHTING**
A. DAYLIGHT
B. DARK - NO STREET LIGHTS
C. DARK - CONTINUOUS STREET LIGHT
D. DARK - STREET LIGHT AT INTERSECTION ONLY
E. DUSK
F. DAWN
Y. UNKNOWN
Z. OTHER

**VEHICLE CONFIGURATION**

| | | | | | | |
|---|---|---|---|---|---|---|
| A PASSENGER CAR | D A, B, C, OR S WITH TRAILER | G OFF-ROAD VEHICLE | J BUS W/SEATS FOR 9 -15 OCCUPANTS | M SINGLE UNIT TRUCK W/ 3 AXLES OR MORE | Q TRACTOR SEMI-TRAILER | T FARM EQUIPMENT |
| B LT. TRUCK (P.U., ETC.) | E MOTORCYCLE | H EMERGENCY VEHICLE IN USE | K BUS W/SEATS FOR 16 OR MORE OCC. | N TRUCK/ TRAILER | R TRUCK DOUBLE | V MOTOR HOME |
| C VAN | F PEDALCYCLE | I SCHOOL BUS | L SINGLE UNIT TRUCK W/ 2 AXLES | P TRUCK/ TRACTOR | S SUV | Z OTHER |

**CARGO BODY TYPE**

| | | | | |
|---|---|---|---|---|
| A BUS | D FLATBED | G AUTO TRANSPORTER | J HOPPER | |
| B VAN/ENCLOSED BOX | E DUMP TRUCK/ TRAILER | H LOG TRUCK/ TRAILER | K POLE TRAILER | |
| C CARGO TANK | F CONCRETE MIXER | I GARBAGE/ REFUSE | X NO CARGO BODY | Z OTHER |

EMERGENCY SERVICES ☐ AMBULANCE — TIME CALLED — ARRIVED SCENE — DEPARTED SCENE — ARRIVED HOSPITAL
☐ RESCUE UNIT — TIME CALLED — ARRIVED SCENE

AMBULANCE SERVICE _____ FIRE DEPARTMENT _____

INVESTIGATING AGENCY — NAME OF AGENCY — TIME OF NOTIFICATION — TIME OF ARRIVAL — TIME ALL LANES OPENED

INVESTIGATION COMPLETE Y/N ☐

INVESTIGATING POLICE AGENCY ☐ A. STATE B. CITY C. PARISH Z. OTHER

DATE REPORT COMPLETED

INVESTIGATING OFFICER'S NAME (PRINT) SIGNATURE BADGE # SUPERVISOR'S INITIALS OR BADGE#

DPSSP 3105 (REV. JAN. 2005)

**OFFICER'S NARRATIVE:** DESCRIBE ANY UNUSUAL CIRCUMSTANCES ASSOCIATED WITH CRASH, INCLUDING OFFICER'S OBSERVATIONS AND OPINIONS. INCLUDE WITNESS NAMES, ADDRESSES, PHONE NUMBERS, ETC.

IF NECESSARY, INDICATE DAMAGE TO PUBLIC OR PRIVATE PROPERTY (WITH OWNER'S NAME & ADDRESS) AT THE END OF THE NARRATIVE.

PAGE # 02

**REFER TO EACH BY VEHICLE NUMBER**

| NON-COLLISION WITH MOTOR VEHICLE | REAR END | HEAD-ON | RIGHT ANGLE | LEFT TURN | LEFT TURN | LEFT TURN | RIGHT TURN | RIGHT TURN | SIDESWIPE SAME | SIDESWIPE OPPOSITE | OTHER | MANNER OF COLLISION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J | K | Y | |

NORTH

VEH # OR PEDESTRIAN

STATE OF LOUISIANA
UNIFORM MOTOR VEHICLE TRAFFIC CRASH REPORT
VEHICLE/PEDESTRIAN

COMPUTER NUMBER – PAGE #

CONF | CARGO BODY TYPE (see page 1 for selections) | YEAR | MAKE | MODEL | # DOORS | # AXLES | # TIRES

V.I.N. | VEHICLE TOWED (A. YES B. NO C. LEFT AT SCENE) | REMOVED BY

LICENSE PLATE: YEAR | STATE | NUMBER | TYPE | GVWR/GCWR | REASON TOWED (A. VEHICLE DAMAGE B. DRIVER ARRESTED C. INSURANCE VIOLATION Z. OTHER)

TRAILER DESCRIPTION: YEAR | MAKE | TYPE | LICENSE PLATE: YEAR | STATE | NUMBER

VEHICLE CLASSIFICATION: COMMERCIAL/BUSINESS VEHICLE | GOVERNMENT VEHICLE | PERSONAL VEHICLE

COMPLETE INFORMATION BELOW IF THIS VEHICLE IS BEING USED FOR COMMERCE/BUSINESS, & HAS A GVWR/GCWR IN EXCESS OF 10,000 LBS., OR HAS A HAZMAT PLACARD, OR IS A BUS WITH SEATING FOR NINE OR MORE INCLUDING THE DRIVER.

US DOT #

CARRIER NAME | MC/MX ("ICC") #

STREET ADDRESS: | CITY | STATE | ZIP

INTERSTATE CARRIER Y/N | TRANSPORTING HAZARDOUS MATERIAL Y/N | CLASS | ID# | PLACARDS DISPLAYED Y/N | HAZ MAT RELEASED Y/N

NAME (LAST, FIRST, MI) OF DRIVER PEDESTRIAN | DATE OF BIRTH (M M D D Y Y Y Y)

| POSITION | EJECTION | TRAPPED/EXTRICATED | AIR BAG | OCC PROT SYS | SEX | RACE | AGE | INJURY |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

STREET ADDRESS | TELEPHONE #

CITY | STATE | ZIP

STATE | CLASS | ENDORSEMENTS | DRIVER'S LICENSE NUMBER | INSTRUCTED TO EXCHANGE INFORMATION? Y/N | NAME OF FACILITY

TRANSPORTED TO MEDICAL FACILITY (A. YES B. NO C. REFUSED AID Y. UNKNOWN)

PEDESTRIAN ONLY | UPPER BODY CLOTHING LIGHT DARK | LOWER BODY CLOTHING LIGHT DARK | SEX | RACE | AGE | INJURY CODE

OWNER'S NAME (LAST, FIRST, MI OR COMPANY NAME) | Same as Driver | TELEPHONE #

STREET ADDRESS

CITY | STATE | ZIP

INSURANCE CO. NAME (NOT AGENCY NAME) | POLICY NUMBER | EXPIRATION DATE

AGENT'S NAME/ADDRESS | PHONE #

OCCUPANT'S NAME (LAST, FIRST, MI)

| POSITION | EJECTION | TRAPPED/EXTRICATED | AIR BAG | OCC PROT SYS | SEX | RACE | AGE | INJURY |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

STREET ADDRESS | TRANSPORTED TO MEDICAL FACILITY (A. YES B. NO C. REFUSED AID Y. UNKNOWN) | NAME OF FACILITY

CITY | STATE | ZIP

OCCUPANT'S NAME (LAST, FIRST, MI)

| POSITION | EJECTION | TRAPPED/EXTRICATED | AIR BAG | OCC PROT SYS | SEX | RACE | AGE | INJURY |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

STREET ADDRESS | TRANSPORTED TO MEDICAL FACILITY (A. YES B. NO C. REFUSED AID Y. UNKNOWN) | NAME OF FACILITY

CITY | STATE | ZIP

**CODES**

| SEATING POSITION | EJECTION | TRAPPED OR EXTRICATED | AIRBAG | OCCUPANT PROTECTION SYSTEM USED | INJURY |
|---|---|---|---|---|---|
| A - FRONT SEAT-LEFT SIDE (MOTORCYCLE DRIVER)<br>B - FRONT SEAT-MIDDLE<br>C - FRONT SEAT-RIGHT SIDE<br>D - SECOND SEAT-LEFT SIDE (MOTORCYCLE PASSENGER)<br>E - SECOND SEAT-MIDDLE<br>F - SECOND SEAT-RIGHT SIDE<br>G - THIRD ROW-LEFT SIDE (MOTORCYCLE PASSENGER)<br>H - THIRD ROW-MIDDLE<br>I - THIRD ROW-RIGHT SIDE<br>J - SLEEPER SECTION OF CAB (TRUCK)<br>K - PASSENGER IN OTHER ENCLOSED PASSENGER OR CARGO AREA (NON-TRAILING UNIT)<br>L - PASSENGER IN OTHER UNENCLOSED PASSENGER OR CARGO AREA (NON-TRAILING UNIT)<br>M - PASSENGER ON TRAIN OR STREETCAR<br>N - TRAILING UNIT<br>O - RIDING ON VEHICLE EXTERIOR (NON-TRAILING UNIT)<br>Y - UNKNOWN | A - NOT EJECTED<br>B - TOTALLY EJECTED<br>C - PARTIALLY EJECTED<br>Y - UNKNOWN | A - NOT TRAPPED<br>B - TRAPPED/EXTRICATED<br>C - TRAPPED/NOT EXTRICATED<br>Y - UNKNOWN | A - DEPLOYED<br>B - NON DEPLOYED<br>C - NON-DEPLOYED/SWITCH OFF<br>D - NOT APPLICABLE<br>Y - UNKNOWN | A - NONE USED-VEHICLE OCCUPANT<br>B - SHOULDER BELT ONLY USED<br>C - LAP BELT ONLY USED<br>D - SHOULDER AND LAP BELT USED<br>E - CHILD SAFETY SEAT IMPROPERLY USED<br>F - CHILD SAFETY SEAT USED<br>G - HELMET USED<br>Y - RESTRAINT USE UNKNOWN | A - FATAL<br>B - INCAPACITATING/SEVERE<br>C - NON-INCAPACITATING/MODERATE<br>D - POSSIBLE/COMPLAINT<br>E - NO INJURY |

DPSSP 3106

PAGE #

WRITE APPROPRIATE LETTER IN BLOCK

## CONTRIBUTING FACTORS AND CONDITIONS

### VISION OBSCUREMENTS
A. RAIN, SNOW, ETC. ON WINDSHIELD
B. WINDSHIELD OTHERWISE OBSCURED
C. VISION OBSCURED BY LOAD
D. TREES, BUSHES, ETC.
E. BUILDING
F. EMBANKMENT
G. SIGN BOARDS
H. HILLCREST
I. PARKED VEHICLES
J. MOVING VEHICLES
K. BLINDED BY HEADLIGHTS
L. BLINDED BY SUNGLARE
M. DISTRACTED BY NEON LIGHTS IN FIELD OF VIEW
N. NO OBSCUREMENTS
Y. UNKNOWN
Z. OTHER

### VIOLATION
A. EXCEEDING STATED SPEED LIMIT
B. EXCEEDING SAFE SPEED LIMIT
C. FAILURE TO YIELD
D. FOLLOWING TOO CLOSELY
E. DRIVING LEFT OF CENTER
F. CUTTING IN, IMPROPER PASSING
G. FAILURE TO SIGNAL
H. MADE WIDE RIGHT TURN
I. CUT CORNER ON LEFT TURN
J. TURNED FROM WRONG LANE
K. OTHER IMPROPER TURNING
L. DISREGARDED TRAFFIC CONTROL
M. IMPROPER STARTING
N. IMPROPER PARKING
O. FAILED TO SET OUT FLAGS, FLARES
P. FAILED TO DIM HEADLIGHTS
Q. VEHICLE CONDITION
R. DRIVER CONDITION
S. CARELESS OPERATION
T. IMPROPER BACKING
U. NO VIOLATIONS
Y. UNKNOWN
Z. OTHER

### TRAFFIC CONTROL
A. STOP SIGN
B. YIELD SIGN
C. RED SIGNAL ON
D. YELLOW SIGNAL ON
E. GREEN SIGNAL ON
F. GREEN TURN ARROW ON
G. RIGHT TURN ON RED
H. LIGHT PHASE UNKNOWN
I. FLASHING YELLOW
J. FLASHING RED
K. OFFICER, FLAGMAN
L. RR CROSSING, SIGN
M. RR CROSSING,SIGNAL
N. RR CROSSING, NO CONTROL
O. WARNING SIGN (SCHOOL, ETC.)
P. SCHOOL FLASHING SPEED SIGN
Q. YELLOW NO PASSING LINE
R. WHITE DASHED LINE
S. YELLOW DASHED LINE
T. BIKE LANE
U. CROSSWALK
V. NO CONTROL
Y. UNKNOWN
Z. OTHER

### CONDITION OF DRIVER/PED
A. NORMAL
B. INATTENTIVE
C. DISTRACTED
D. ILLNESS
E. FATIGUED
F. APPARENTLY ASLEEP/BLACKOUT
G. DRINKING ALCOHOL - IMPAIRED
H. DRINKING ALCOHOL - NOT IMPAIRED
I. DRUG USE - IMPAIRED
J. DRUG USE - NOT IMPAIRED
K. PHYSICAL IMPAIRMENT (EYES, EAR, LIMB)
Y. UNKNOWN
Z. OTHER

### DRIVER DISTRACTION
A. CELL PHONE
B. OTHER ELECTRONIC DEVICE (PAGER, PALM PILOT, NAVIGATION DEVICE, ETC.)
C. OTHER INSIDE THE VEHICLE
D. OTHER OUTSIDE THE VEHICLE
E. NOT DISTRACTED
Y. UNKNOWN

### REASON FOR MOVEMENT
A. TO AVOID OTHER VEHICLE
B. TO AVOID PEDESTRIAN
C. TO AVOID ANIMAL
D. TO AVOID OTHER OBJECT
E. PASSING
F. VEHICLE OUT OF CONTROL, NOT PASSING
G. VEHICLE OUT OF CONTROL, PASSING
H. FOR TRAFFIC CONTROL
I. DUE TO CONGESTION
J. DUE TO PRIOR CRASH (COLLISION)
K. DUE TO DRIVER CONDITION
L. DUE TO DRIVER VIOLATION
M. DUE TO VEHICLE CONDITION (FAILURE)
N. DUE TO PAVEMENT CONDITION
O. HIGH WIND
P. NORMAL MOVEMENT
Y. UNKNOWN
Z. OTHER

### PEDESTRIAN ACTIONS
A. CROSSING, ENTERING ROAD AT INTERSECTION
B. CROSSING, ENTERING ROAD NOT AT INTERSECTION
C. WALKING IN ROAD – WITH TRAFFIC
D. WALKING IN ROAD – AGAINST TRAFFIC
E. SLEEPING IN ROADWAY
F. STANDING IN ROADWAY
G. GETTING ON OR OFF OTHER VEHICLE
H. PUSHING, WORKING ON VEHICLE IN ROAD
I. OTHER WORKING IN ROADWAY
J. PLAYING IN ROADWAY
K. NOT IN ROADWAY
Y. UNKNOWN
Z. OTHER

### SEQUENCE OF EVENTS/HARMFUL EVENTS

NON COLLISION
A. OVERTURN/ROLLOVER
B. FIRE/EXPLOSION
C. IMMERSION
D. JACKKNIFE
E. CARGO/EQUIPMENT LOSS OR SHIFT
F. FELL/JUMPED FROM MOTOR VEHICLE
G. THROWN OR FALLING OBJECT
H. EQUIPMENT FAILURE (BLOWN TIRE, BRAKE FAILURE, ETC.)
I. SEPARATION OF UNITS IN TRANSPORT
J. RAN OFF ROAD RIGHT
K. RAN OFF ROAD LEFT
L. CROSSED MEDIAN/CENTERLINE
M. DOWNHILL RUNAWAY
N. OTHER NON-COLLISION

COLLISION WITH PERSON, MOTOR VEHICLE, OR NON- FIXED OBJECT
O. PEDESTRIAN
P. PEDALCYCLE
Q. RAILWAY VEHICLE (TRAIN, ENGINE)
R. ANIMAL
S. MOTOR VEHICLE IN TRANSPORT
T. PARKED MOTOR VEHICLE
U. STRUCK BY FALLING, SHIFTING CARGO OR ANYTHING SET IN MOTION BY MOTOR VEHICLE
V. WORK ZONE/MAINTENANCE EQUIPMENT
W. OTHER NON-FIXED OBJECT

COLLISION WITH FIXED OBJECT
X. IMPACT ATTENUATOR/CRASH CUSHION
Y. BRIDGE OVERHEAD STRUCTURE
Z. BRIDGE PIER OR SUPPORT
AA. BRIDGE RAIL
BB. CULVERT
CC. CURB
DD. DITCH
EE. EMBANKMENT
FF. GUARDRAIL FACE
GG. GUARDRAIL END
HH. CONCRETE TRAFFIC BARRIER
II. OTHER TRAFFIC BARRIER
JJ. TREE (STANDING)
KK. UTILITY POLE/LIGHT SUPPORT
LL. TRAFFIC SIGN SUPPORT
MM. TRAFFIC SIGNAL SUPPORT
NN. OTHER POST, POLE, OR SUPPORT
OO. FENCE
PP. MAILBOX
QQ. OTHER FIXED OBJECT (WALL, BUILDING, TUNNEL, ETC.)
YY. UNKNOWN

1st
2nd
3rd
4th

MOST HARMFUL EVENT

### MOVEMENT PRIOR TO CRASH
A. STOPPED
B. PROCEEDING STRAIGHT AHEAD
C. TRAVELING WRONG WAY
D. BACKING
E. CROSSED MEDIAN INTO OPPOSING LANE
F. CROSSED CENTER LINE INTO OPPOSING LANE
G. RAN OFF ROAD (NOT WHILE MAKING TURN AT INTERSECTION)
H. CHANGING LANES ON MULTI-LANE ROAD
I. MAKING LEFT TURN
J. MAKING RIGHT TURN
K. STOPPED PREPARING TO, OR MAKING U-TURN
L. MAKING TURN, DIRECTION UNKNOWN
M. STOPPED, PREPARING TO TURN LEFT
N. STOPPED, PREPARING TO TURN RIGHT
O. SLOWING TO MAKE LEFT TURN
R. SLOWING TO MAKE RIGHT TURN
Q. SLOWING TO STOP
R. PROPERLY PARKED
S. PARKING MANEUVER
T. ENTERING TRAFFIC FROM SHOULDER
U. ENTERING TRAFFIC FROM MEDIAN
V. ENTERING TRAFFIC FROM PARKING LANE
W. ENTERING TRAFFIC FROM PRIVATE LANE OR DRIVEWAY
X. ENTERING FREEWAY FROM ON RAMP
Y. LEAVING FREEWAY VIA OFF RAMP
Z. OTHER OR UNKNOWN

### VEHICLE CONDITION
A. DEFECTIVE BRAKES
B. DEFECTIVE HEADLIGHTS
C. DEFECTIVE REAR LIGHTS
D. DEFECTIVE SIGNAL LIGHTS
E. ALL LIGHTS OUT
F. DEFECTIVE STEERING
G. TIRE FAILURE
H. WORN OR SMOOTH TIRES
I. ENGINE FAILURE
J. DEFECTIVE SUSPENSION
K. NO DEFECTS OBSERVED
Y. UNKNOWN
Z. OTHER

### VEHICLE LIGHTING
A. HEADLIGHTS ON
B. HEADLIGHTS OFF
C. DAYTIME RUNNING LIGHTS
Y. UNKNOWN

### TRAFFIC CONTROL CONDITIONS
A. CONTROLS FUNCTIONING
B. CONTROLS NOT FUNCTIONING
C. CONTROLS OBSCURED
D. LANE MARKING UNCLEAR OR DEFECTIVE
E. NO CONTROLS
Y. UNKNOWN

### ALCOHOL/DRUG INVOLVEMENT

ALCOHOL/DRUGS SUSPECTED
A. NEITHER ALCOHOL NOR DRUGS
B. YES-ALCOHOL
C. YES-DRUGS
D. YES-ALCOHOL AND DRUGS
Y. UNKNOWN

ALCOHOL
A. TEST REFUSED
B. NO TEST GIVEN
C. TEST GIVEN, RESULTS PENDING
D. TEST GIVEN, BAC . g%

DRUGS
A. TEST NOT GIVEN
B. TEST GIVEN, RESULTS PENDING
C. TEST REFUSED
D. DRUGS REPORTED (SPECIFY IN NARRATIVE)

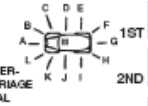
AFFIX BLOOD ALCOHOL KIT LABEL HERE

(OR ENTER BLOOD ALCOHOL KIT NUMBER)

| DIRECTION BEFORE CRASH | | FINAL LOCATION | DISTANCE TRAVELED | SPEED | | SKIDMARK DATA (FEET) | | | |
|---|---|---|---|---|---|---|---|---|---|
| HEADED | ON HIGHWAY, STREET OR DRIVE | OF VEHICLES | AFTER IMPACT | EST. | POSTED | FR | FL | RR | RL |
| N E S W | | | | | | | | | |

### DAMAGE TO VEHICLE

AREA DAMAGED




N- UNDER-CARRIAGE
O- TOTAL
P- OTHER
Q- NONE
Y- UNKNOWN

EXTENT OF DEFORMITY
1ST
2ND
3RD
A- NONE
B- VERY MINOR
C- MINOR
D- MINOR/MODERATE
E- MODERATE
F- MODERATE/SEVERE
G- SEVERE
H-VERY SEVERE
Y-UNKNOWN

CITATION NO | VEH. | PED. | R.S. OR ORD. NO

NOTICE OF INSURANCE VIOLATION

INVESTIGATING OFFICER'S INITIALS

DPSSP 3106 (REV. JAN. 2005)