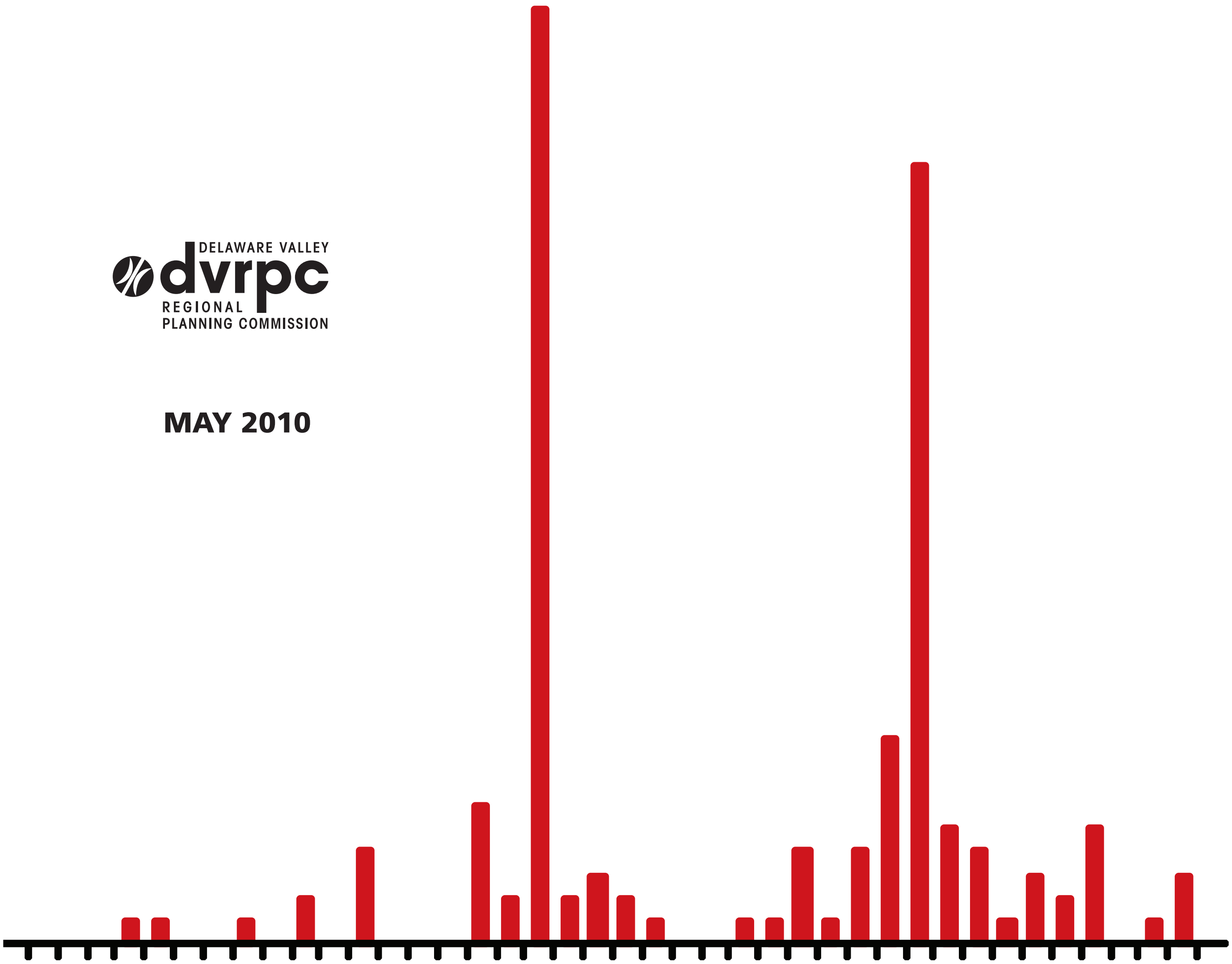
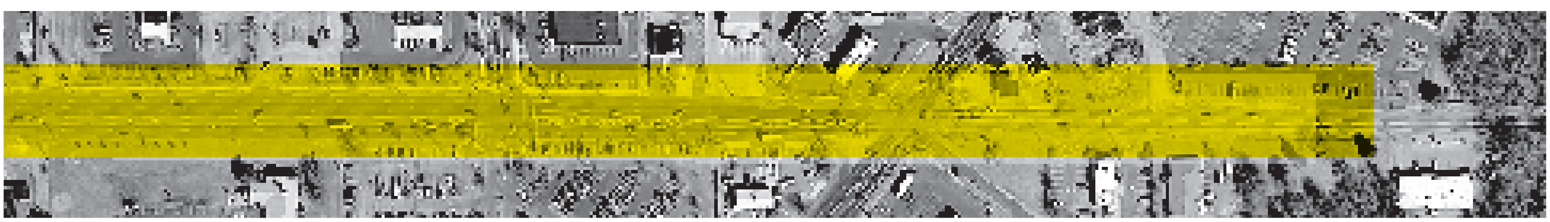


DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

MAY 2010



Using CRASH DATA to IMPROVE SAFETY

in the Delaware Valley

The Delaware Valley Regional Planning Commission is dedicated to uniting the region's elected officials, planning professionals, and the public with the common vision of making a great region even greater. Shaping the way we live, work, and play, DVRPC builds consensus on improving transportation, promoting smart growth, protecting the environment, and enhancing the economy. We serve a diverse region of nine counties: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey. DVRPC is the federally designated Metropolitan Planning Organization for the Greater Philadelphia Region — leading the way to a better future.

The symbol in our logo is adapted from the official DVRPC seal, and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole while the diagonal bar signifies the Delaware River. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey.

DVRPC is funded by a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Pennsylvania and New Jersey departments of transportation, as well as by DVRPC's state and local member governments. The authors, however, are solely responsible for the findings and conclusions herein, which may not represent the official views or policies of the funding agencies.

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Executive Summary

On an almost daily basis toward the close of 2009, newspaper articles decried the need for bans on cell phone use and texting while driving. This represents the latest concern in automobile safety. These articles often included a quote from someone who lost a loved one to a distracted driver, and just as often, included statistical evidence underlining the growing magnitude of the problem. Distracted driving, aggressive driving, drunken driving–these are all behaviors that beget automobile crashes, crashes that often end in injury or death. It is commonly held that 80 percent of all crashes are due to driver error.

Automobile crashes are also caused by other factors. Sun glare, poor intersection design, slippery roads, mechanical malfunctions, insufficient warning signs, inadequate lighting, and deteriorated pavement, among others, can all be contributing factors.

Regardless of cause, automobile crashes have resulted in 474 traffic fatalities in the Delaware Valley region per average year between 2005 and 2007. In 2008, 379 people lost their lives in traffic crashes in the nine-county region, a decrease of 30 percent from 2007. While this trend is encouraging, the numbers are still too high.

Nationally speaking, the United States has lost an average of 40,000 people per year on its highways during most of the last decade, though the number dropped significantly in 2009. Within this tragic loss, the numbers are skewed against younger drivers and older drivers, two groups often cited as representing the most vulnerable demographics. The associated economic impact of traffic crashes is estimated to cost the average American over $900 annually, not including the pain and suffering endured by the survivors.

Analyzing the details of a crash event helps to solve the crash mystery. Continually compiling these data bits allows trends to emerge. These trends hold the key as to why crashes are occurring—at a specific site, among a select demographic, or at a given time of day, etc.—by revealing the causal factors. Knowing the cause is the first step to identifying the solution.

Working closely with our partner agencies on both sides of the Delaware River, the Delaware Valley Regional Planning Commission (DVRPC) has developed a systematic, data-driven approach to crash analysis that has become a standard component in much of the transportation planning work that we do. Project-specific and region-wide work with safety data has advanced the cause and led to the development of a regional Safety Action Plan (Publication #09032). With goals and objectives designed to reduce crashes and fatalities in seven emphasis areas, the Plan is our guiding light leading to safer travel for all. Those seven emphasis areas are contributing factors in 96 percent of the road fatalities in the DVRPC region.

This report covers what a crash data user should know, with a focus on New Jersey and Pennsylvania. Terms are defined, the differences between the states are explored, and the various ways in which the data are used are discussed, including DVRPC's programs. The final chapter—Future Directions in Crash Data Management—highlights technological advancements in analysis designed to make data manipulation easier, and the results more reliable.

CHAPTER 1

Introduction

Why Crash Analysis Matters

Over the four-year period of 2005 to 2008, 1,802 people lost their lives on the roadways of the nine-county DVRPC region. Those deaths involved drivers, passengers, pedestrians and bicyclists, innocent bystanders, and others. Fortunately we have seen a gradual, though slight, decrease in automobile deaths over the period, with the most significant drop in 2008.

Though driver error is often the cause of crashes, there is still a great deal to be done in making automobile travel safer and thus reducing the opportunities for driver mistakes. One approach is to utilize best practices and proven safety techniques when designing roadway improvements. Educating the traveling public regarding necessary precautions, and encouraging them to practice safe driving techniques and to act responsibly as pedestrians and bicyclists, are all non-engineering approaches to improving safety. Increased law enforcement and policy initiatives are effective ways of discouraging potentially dangerous driving habits, holding responsible parties accountable for their actions, and supporting educational initiatives. DVRPC strives to support the “4 E’s” - engineering, enforcement, education, and emergency services, in policy and practice as part of the annual transportation safety work program; DVRPC also addresses policy and legislative approaches.

Each year, DVRPC has a robust and varied work program. Many of the work program projects include a consideration of crashes. Over time, crash analyses have become a standard component in much of DVRPC’s work. Examining crash data allows for the identification of trends which may reveal causal factors. It is in understanding why crashes occur that we can begin the discussion of how to prevent them, or at least reduce the resulting severity.

Through its strong relationships with state, county, and local partners, DVRPC’s crash analysis work provides a foundation for collaborating with study participants on the best strategies for reducing crashes, lessening injuries, and eliminating fatalities. DVRPC has also become an important regional stakeholder in the safety realm by serving as a facilitator to the Regional Safety Task Force (RSTF). The RSTF brings together a wide cross-section of professionals who understand and address various aspects of traffic safety and provides a forum to exchange information and network.

The remainder of this document discusses the details of crash data management and crash analysis at DVRPC. It also serves as a clearinghouse of information on our methods and procedures. Appendix B provides resources for further consideration.

C H A P T E R 2

What All Crash Data Users Should Know

Defining a Crash

Surprisingly, defining "crash" is slightly more nuanced than one might expect. Most commonly, a crash involves a driver smashing his or her vehicle into another vehicle. However, it can also be a vehicle collision with an object like a telephone pole or a stop sign, or with a pedestrian or animal. Even when a driver flips his vehicle without hitting anything at all, it is considered a crash. Regarding severity, crashes fall into three general categories: property damage only, injury, and fatal. Of course, an injury or fatal crash can result in multiple injured persons or fatalities.

Over time, practitioners have changed the way in which we refer to an accident. Throughout the world, the paradigm has shifted from viewing these events as *accidents*, which suggests inevitability, to *crashes*, suggesting they are in fact avoidable. To be fair, there will always be mechanical malfunctions or other anomalies which result in crashes. Perhaps these truly are accidents. Of course, the vast majority of crashes are accidental in a sense as drivers do not typically intend to crash, though driver error is commonly said to be responsible for 80 percent of all crashes.

A crash that occurs in a parking lot, driveway, or on other private land is considered a private property crash. Though these crashes are recorded by police, they are not typically considered in the analysis performed in planning and engineering studies of roadways.

Society has a tendency to leave out references to drivers when a crash occurs. For instance, when two vehicles collide we commonly refer to this as a car crash, as if the vehicles controlled themselves. It is not until there is foul play involved—a drunk driver, a speeding driver—that we attribute human behavior with causing the crash, for example "hit by a drunk driver". Although it may seem an inconsequential matter of semantics, the shift in terminology, and in thinking, from *car crash* to *driver crash* is another push toward acknowledging the huge responsibility of driving safely; this responsibility should not be taken lightly.

The Crash Databases

Differences and Similarities between the States

There are a few key differences between New Jersey and Pennsylvania regarding crash data. Both states have their own version of the police reporting form for a motor vehicle crash. In New Jersey, it is the NJTR1, and in Pennsylvania, the AA 500. Though there are some differences in the forms, there are more similarities. Both forms are included in Appendix C.

Both states also make a distinction between reportable and non-reportable crashes, and each have their own definition. If a person is injured or worse, the crash is automatically reportable in both states. New Jersey uses a threshold of damage costs for all non-injury crashes to determine if it is reportable. That is, if the responding officer determines that $500 of damage to property has occurred, it is then considered a reportable crash. In Pennsylvania, a vehicle must require towing from the scene in order for the crash to be considered reportable. Clearly these parameters yield more reportable crashes in New Jersey, and fewer in Pennsylvania. In both states, a reportable crash requires gathering much more information than the non-reportable crash.

Which Crash Records Make It Into the Database?

It is important to note that not every crash report is represented in the crash database. In both New Jersey and Pennsylvania, only reportable crashes are included in the databases, regardless of the road system on which they occurred. Non-reportable crash data must be acquired from local police departments. Although these crashes can occur anywhere, they are common on local or neighborhood streets where traffic volume and speed are typically lower.

In Pennsylvania, a crash that occurs in a parking lot, driveway, or on private development is not considered a reportable crash because it did not happen on a highway or traffic way that is open to the public. Although these non-reportable crashes may be recorded by police, they are not typically considered in the analysis performed for planning and engineering traffic studies involving public roadways.

New Jersey seeks out private property reports so that they can be removed from the database ensuring they will not be accidentally used in roadway studies. In addition, if a data verifier encounters a crash that the officer located to the highway, but which actually occurred on private property, the data is changed. Unlike Pennsylvania, these crashes are still considered in state totals regarding property damage, injuries and fatalities.

Generating the Crash Data

Once the people involved in the crash have received the necessary medical care, and the scene is under control, the police fill out the reporting form—the beginning of the crash data process.

The accuracy of the information collected at the scene determines the data's usefulness in identifying countermeasures.

Following the national trend, New Jersey and Pennsylvania have made strides in improving the quality and timeliness of crash data capture and transfer. Both are working toward electronic data entry for the officers in the field which saves them time, improves the accuracy of the data transfer, and cuts down on paperwork. Pennsylvania has more widespread use of electronic reporting forms than New Jersey, currently at 70–75 percent electronic transfer. Once the data is received by the states, all cases go through an editing and validation process to correct and verify the information.

Both states are also working on technology to more accurately and easily geo-locate the crash event. In 2006, New Jersey collaborated with their state police to revamp the reporting form to include more details, and facilitated officer training on the new forms to ease implementation. Pennsylvania's reporting form has not gone through a similar update.

All of this work strives to capture the crash details as well as possible: these details will later be used by a planner, engineer, or other analyst in search of trends that may be addressed through improvement strategies.

New Jersey and Pennsylvania's Crash Databases

As mandated by the Federal Highway Administration (FHWA), each state must maintain a crash database for conducting analysis of crash locations. Once the data is logged by the police department, it is transferred to the state department of transportation, either electronically or by paper copies via mail. The vast majority of New Jersey's data is still obtained through a multi-step extraction and verification process that starts with paper reports, while 70-75 percent of Pennsylvania's data is electronically transferred. Both states have a system of checks and balances to ensure data accuracy, and both make new data available on an annual or semi-annual basis to DVRPC. In New Jersey and Pennsylvania, the databases are updated as information is received.

The Pennsylvania Department of Transportation's (PennDOT's) data is contained in a system called the Crash Data Analysis and Retrieval Tool (CDART), which replaced a legacy database called the Accident Records System, approximately three years ago. This system is proprietary and currently only accessible by PennDOT employees. PennDOT conducts crash analysis at both its central office and at each of its district offices. Upon request they provide data summaries and crash résumés—compilation of select details from each crash record—to both the public and their partner agencies. They also share the raw data with select partners. The public does not have access to PennDOT's raw data. DVRPC, through an agreement with PennDOT, receives yearly updates of their raw data for use in its work program projects.

The New Jersey Department of Transportation's (NJDOT's) Bureau of Safety Programs conducts all crash analysis used in transportation projects throughout the state. Working with the NJDOT Office of Information Services—the department that manages the crash database—the Bureau of Safety Programs conducts statewide and project-specific analyses. Through a contract with the state, Rutgers University's Transportation Safety Resource Center in the Center for Advanced Infrastructure Technology (CAIT), has developed a multi-layered, web-based crash analysis tool for use with the New Jersey crash database. Called Plan4Safety, this tool incorporates database and mapping functions into a single, easily customizable, comprehensive analysis tool. Its most advanced features (currently in development) are a counter-measure generator and a predictive modeling tool that will forecast the likely crash experience at a user defined location. New Jersey posts both raw data and a wide range of crash summaries on its Bureau of Safety Programs webpage, all of which is available for public consumption. The raw data is in a format that makes it easy for a database manager to download and use.

These two approaches—sharing all data publicly and/or sharing data selectively—can be found throughout the United States on a state by state basis. At whatever level of access available, it is important to note that states are sharing crash data and encouraging their partners to develop and pursue their own safety goals through analysis and advocacy.

DVRPC's Crash Database

DVRPC maintains a copy of each state's database for use in planning and engineering work program projects. The Commission accesses NJDOT's data directly from its website, while PennDOT's data is received from PennDOT Central Office on an annual schedule. In addition to the Oracle database that contains the raw data, DVRPC also maintains Geographic Information System (GIS) files of the crash records for mapping and additional analysis purposes. Though only as accurate as the database information, the GIS allows the analyst to examine crashes in a mapping context when overlaid onto aerial photographs. This sometimes reveals land uses and access designs that may be contributing to crash frequency.

DVRPC's Analysis Tools

Summary Tool

To make using the data easier, DVRPC's Technical Services staff has created an interface which produces a summary of crash data characteristics for a select roadway or road segment based on user-defined input criteria. Without specifying a roadway, the tool can produce results for a given county if more broad crash statistics are needed. The output of this tool is modeled after the standard summaries used by each of the states.

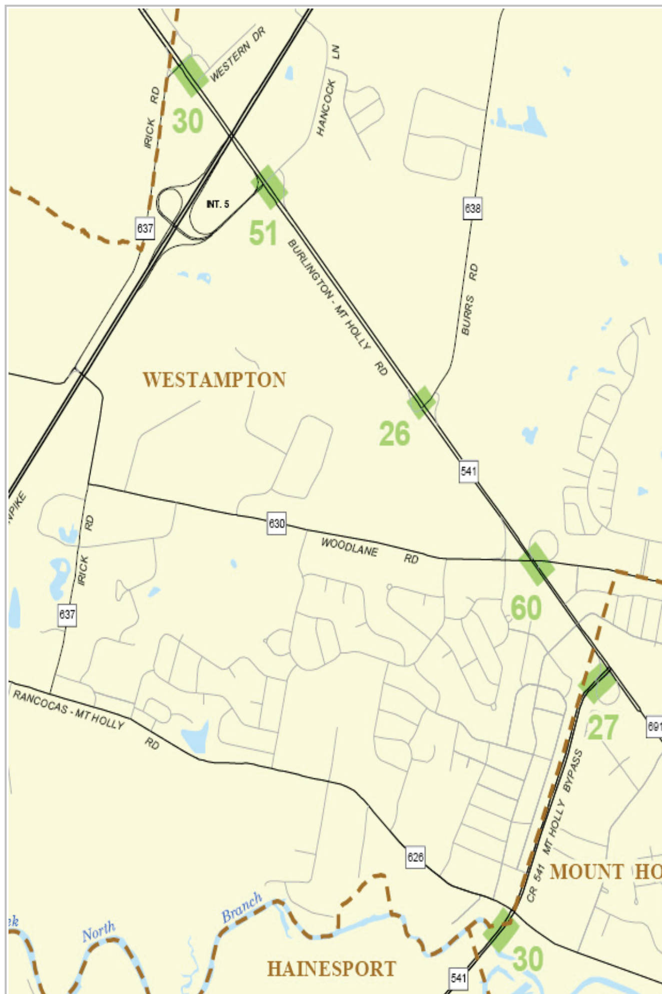
Comparing the crash characteristics of a given study area to statewide trends for similar facilities or conditions provides a context for determining the severity of the problem. For instance, when a select collision type accounts for a substantial percent of the crash total, it is interesting to know if that number is greater than or less than the statewide average. If greater, then it would be considered an overrepresentation, and cause for further analysis.

Cluster Finder

Another useful tool is DVRPC's cluster finder. This application is used on a single roadway to identify discrete clusters of total crashes based on the following user-defined criteria: cluster length, minimum number of crashes, and years of data; e.g.: 0.1 mile road segments where a minimum of 25 crashes occurred during the years 2006-2008. The algorithm searches through the database starting at the lowest segment number—as in mile post 0.0—and continues to the end, seeking roadway segments that meet the minimum specified crash totals. The search considers the segment length in the smallest increments used by the database in succession. If 0.1 mile was specified as the cluster length, the first segment for consideration would be 0.00 to 0.10, the next 0.01 to 0.11, next 0.02 to 0.12, and so on. If the minimum number of crashes is met in 0.00 to 0.10, it continues to search segments looking for fewer crashes, or more crashes. If fewer are found in the next segment (0.01–0.11), then the preceding cluster is stored for the resulting table. If more crashes are found in the next segment, then the search continues looking for the next segment with fewer. This yields the highest possible total crashes in a given segment without overlapping adjacent segments.

This process is very useful in the beginning of a crash analysis to identify crash concentrations for further investigation, for mapping, and/or diagramming. It also serves as a useful starting point when discussing crash-prone locations with the study team, often at the study kick-off meeting. DVRPC's cluster finder can also be found in NJDOT's Plan4Safety crash analysis tool. Additional functions were added to the tool by the developer, making it capable of analyzing entire roadway networks at one time, rather than being limited to a single facility.

In the map excerpt example on this page, the graphic depicts the identified clusters as green bars with the corresponding three-year crash total also in green. The tool was originally used to identify clusters of 24 or more crashes on 0.1 mile long segments. Upon review of the initial results by the study team, it was determined that the limits of select clusters should be changed to either narrow or expand the focus of the problem area.



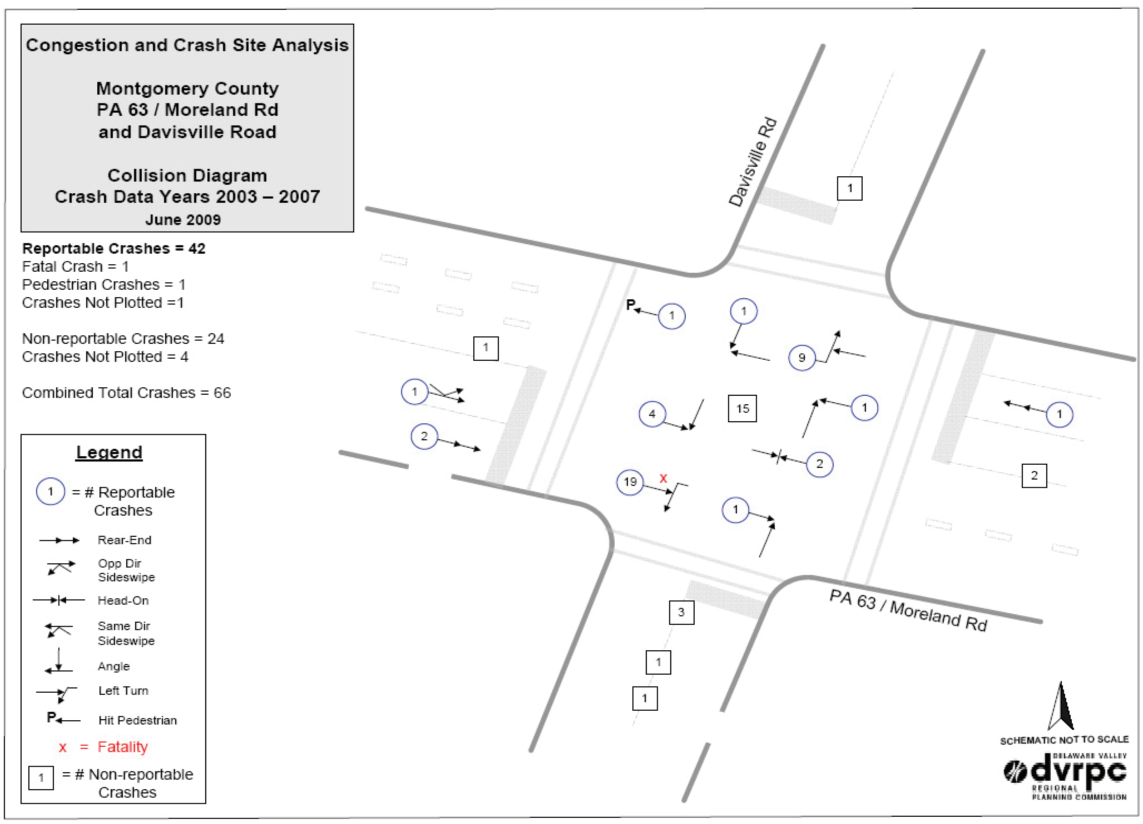
CR 541 Safety Corridor Study Crash Clusters

Collision Diagram

A collision diagram is a graphic representation of a crash concentration area, used typically for intersections. In addition to the database results, copies of the police reports are invaluable when creating a collision diagram. This is because the police report typically contains two pieces of information that the database currently does not: the police narrative and the police sketch. These items, when available, often answer questions raised by the data. The purpose of the diagram is to highlight driver actions or pre-crash movements that may be problematic and/or crash prone. The example in Figure 1 was taken from the final report of the *Montgomery County Congestion and Crash Site Analysis Program* (DVRPC publication #09015).

For instance, an intersection crash diagram may highlight a trend where northbound drivers are colliding with southbound drivers while attempting to turn left. Or it may show that several drivers experienced a hit-fixed-object crash at the same location within the study area, possibly a tree. The diagram helps summarize what is learned from the data in an easily understandable graphic that is very useful when working with both traditional and nontraditional partners.

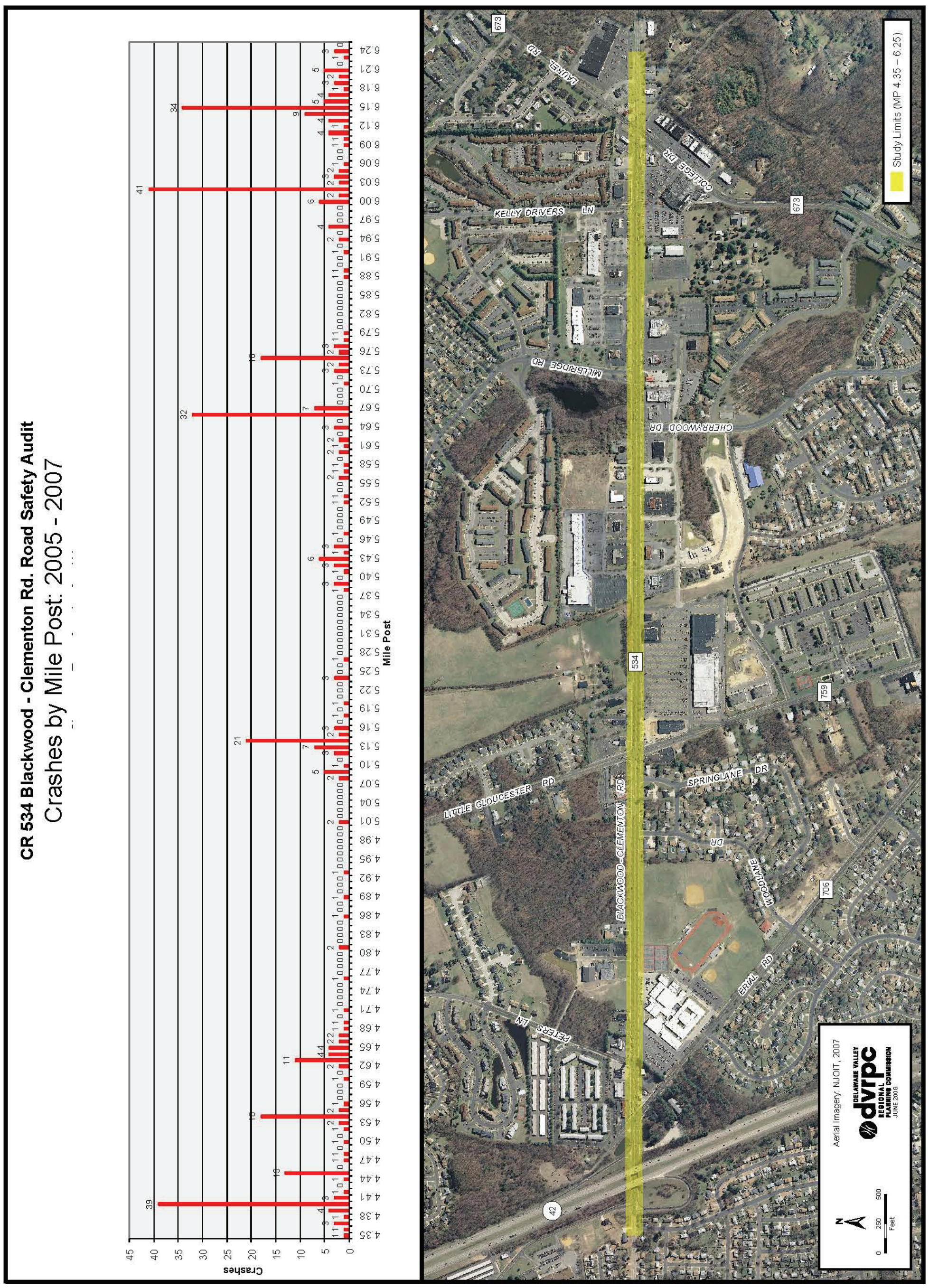
Figure 1: Montgomery County Congestion and Crash Site Analysis Project Collision Diagram



Frequency Chart

In its most basic form, a crash frequency chart shows the concentration of crashes along a study corridor according to roadway segment. This tool allows the analyst to account for every crash, or concentration of crashes, even if it falls short of the minimum threshold needed to be considered a cluster, which varies by study. Figure 2, taken from the *CR 534 Blackwood-Clementon Road Road Safety Audit* (DVRPC publication #09022), depicts the crash frequency chart scaled to match an aerial of the study corridor for examining potential land use implications.

Figure 2: CR 534 Blackwood-Clementon Road RSA Crashes by Mile Post



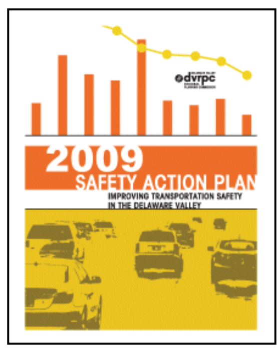
Safety in DVRPC's Annual Work Program

How the Safety Program Uses Crash Data and Crash Analysis

DVRPC has a robust and varied work program each year, and many of the projects thereof consider traffic crashes. Over time, crash analyses have become a standard component in much of DVRPC's transportation planning work. There are many annual tasks managed in the Office of Safety and Congestion Management that begin with the results of a comprehensive crash analysis which either provides locations for study, or identifies concentrations for detailed analysis within a study.

The following discusses each major safety-focused project undertaken by this office as well as those of other programs that utilize crash analyses. An electronic version of each report completed by the Office of Safety and Congestion Management can be found at http://www.dvrpc.org/transportation/safety. All reports that DVRPC produces can be found in electronic format on the DVRPC publications webpage, which is searchable by author, title, publication number or keyword at: http://www.dvrpc.org/asp/publicationsearch/.

Regional Safety Action Plan



In 2007, DVRPC produced its first Regional Safety Action Plan—a comprehensive data-driven analysis that identified key traffic safety focus areas for further investigation and planning. This analysis revealed concentrations of crash characteristics, such as age categories or collision types, where crash frequency is overrepresented in the DVRPC region.

In 2009, an analysis update was conducted which involved refreshing the data, and refocusing and streamlining the effort. The end product contains a set of seven emphasis areas, culled from 22 emphasis areas, and designated by the federal government for consideration in the states' mandated comprehensive Strategic Highway Safety Plan (SHSP). An emphasis area is a characteristic that is a contributing factor in fatalities such as aggressive driving or failure to wear a seatbelt. It is possible and often likely that a fatal crash was caused by several contributing factors. The Safety Action Plan includes an implementation table with 25 priority strategies as well as background on each emphasis area. The Safety Action Plan, which reflects priorities in both states, can also be found on the DVRPC website (*2009 Safety Action Plan*, DVRPC publication #09032).

The seven emphasis areas of the 2009 Plan are:

1. Curb Aggressive Driving
2. Reduce Impaired Driving
3. Keep Vehicles on the Roadway
4. Sustain Safe Senior Mobility
5. Increase Seat Belt Usage
6. Improve Intersections
7. Ensure Pedestrian Safety

In order for the Plan to effectively reduce crashes and fatalities, the strategies must result in action. Those actions will largely be the charge of key players working within strategic partnerships. The forum for this collaboration is the Regional Safety Task Force (RSTF). The RSTF played a significant role in the development of both the original plan and the update, and will be instrumental in the implementation of priority strategies.

Because the Plan is meant to be a living document, the database queries were designed to be easily replicated for future updates as new data becomes available and the Plan is revisited. This also allows for objective measurement of progress.

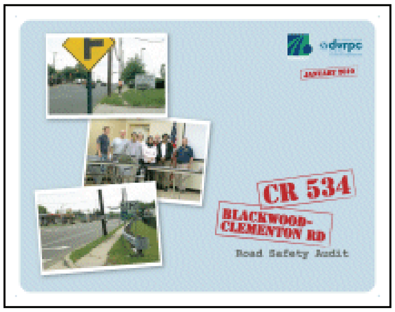
Regional Safety Task Force

Established in 2005, the RSTF brings together a multidisciplinary group of professionals to identify safety goals, strategies, and resources. The Task Force serves to build and maintain effective partnerships and is a forum for information exchange through networking, for examining emerging crash trends, and for showcasing mitigation best practices.

The RSTF has focused on the emphasis areas of the 2009 Plan by dedicating each meeting's agenda to a single emphasis area. Seeking to educate its members on the topic and facilitate action, each meeting highlights crash causes, existing efforts, developing new strategies, and refining existing ones to reduce crashes and fatalities related to each emphasis area. The first focused meeting, held in the fall of 2009, examined the pedestrian safety emphasis area and featured experts from each state who discussed the legal issues and rights of pedestrians and motorists at crossings. Pedestrian safety issues, especially regarding pedestrian crossings, are often clouded with misinformation and conjecture. The meeting allowed the group to hear from authorities on the subject in an open forum with an atmosphere of collaboration. The end product of this and each meeting of its type is a short list of action items aligned with the goals of the

Safety Action Plan. The appropriate task force members can then pursue these objectives, and the RSTF can track progress on these items.

Road Safety Audits



As defined by the FHWA, a Road Safety Audit (RSA) “is a formal safety performance examination of an existing or future road or intersection by an independent audit team.” An RSA can be used to evaluate a road segment with a history of crashes, or be applied to a project during the design phase to ensure safety is included in the implementation. DVRPC has developed a successful Road Safety Audit Program.

The audit program is an innovative approach to safety that utilizes a high level of coordination among various levels of government and traditional and nontraditional partners. The benefits of an RSA are many: low cost to conduct, short term and intensive, hands-on, and collaborative. Though the recommendations that result from an RSA can be wide-ranging, emphasis is placed on low cost, easy-to-implement improvements that yield a high safety benefit. These include signs, edge-line and center-line rumble strips, pavement markings, lighting, and pedestrian amenities.

RSAs are an excellent tool for examining the crash details and trends of a problem corridor, and brainstorming causes and improvement strategies with stakeholders. Local participation is essential to the process because it ensures buy-in by those that know the facility and will ultimately benefit from the improvements. The process allows the audit team members to take ownership of the recommended strategies. Local participants typically include municipal police, representatives from public works and/or community development, county planners, and sometimes community groups. Among the federal, state, and regional partners are transit agencies, DOTs, and bicyclist and pedestrian groups.

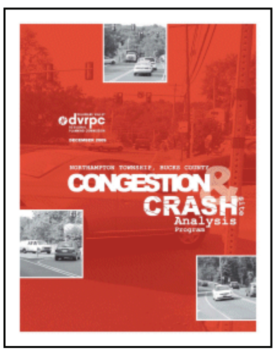
DVRPC’s RSA work has been focused on corridors and intersections exhibiting a history of high crash frequency. In Pennsylvania, DVRPC has conducted audits on state route corridors identified in the District 6-0 Highway Safety Improvement Program (HSIP)—a data-driven safety priority list of locations eligible for dedicated federal safety funds. With DVRPC as facilitator, PennDOT has fully embraced the RSA process, conducting audits on urban, suburban, and rural corridors in the region. PennDOT provides staff and consultants as participants which adds an expert component to the audit team.

In New Jersey, audits have been conducted primarily on county facilities identified through a crash data-driven analysis developed in-house by DVRPC staff. County partners review priority lists of high crash roadway segments and make suggestions for candidate corridors. This allows them to use this service effectively to either complement an existing effort, or to highlight the needs of a regionally significant corridor not currently slated for improvements. The New Jersey audit teams have a similar composition though typically the county is the roadway owner and the state serves as partner agency; this is reversed in Pennsylvania.

Though the basic components of each RSA event are fairly standard, the time needed to complete the process varies by location and length of study area. Longer corridors may require a three-day event as was the case with PA 10 in Chester County (Fall 2008), which combined two non-contiguous 10-mile roadway segments in the study. An intersection-focused audit can be completed in as little as a half-day. Although several of these have been undertaken by DVRPC in New Jersey, future RSAs will usually be conducted for segments of five miles or less.

Each audit event is comprised of three components. The day starts with the pre-audit meeting where the team is introduced to the RSA process, followed by an examination of study corridor characteristics, including traffic volumes, land use, crash statistics, mode split, and so forth. The theme of the event is collaboration, which begins during the pre-audit meeting as the team discusses crash trends and local conditions. Next is the field visit where the team examines conditions along the corridor, typically on foot. When conditions are unsafe for pedestrian travel, the team drives between focus areas and chooses the ground work at each location. There is no substitute for the intimate perspective of foot travel when examining the bicycle and pedestrian environment. Finally, the team retreats to the meeting room for the post-audit meeting to define problems and brainstorm improvement scenarios.

Congestion and Crash Site Analysis



The Congestion and Crash Site Analysis Program (CCSAP) is focused on narrowly defined roadway segments—typically isolated intersections—where crash history and congestion problems inhibit safe and efficient travel. In addition to crash analyses, this project also utilizes a modeling analysis to examine the level of service of signalized intersections. This tool allows the study team to establish a baseline of operations and test changes to an intersection’s timing and configuration in an effort to achieve the safest and most efficient operation. This process utilizes a study team composition similar to the RSA, though usually with a more significant local component and no federal representation. Again, local police serve as an invaluable resource when determining causal factors related to the crash experience.

After an initial informal field visit with stakeholders, the study participants gather for a kick-off meeting at which time the group discusses the problem location, reviews available data, and collaborates on potential improvement scenarios for the study team to consider. It is at this point that the study team conducts a more detailed evaluation of the crash data, often seeking paper copies of police crash reports (where available) in hopes of gaining knowledge of the vehicle patterns and driver behaviors that are resulting in crashes. Although all of the crash details from each police report are contained in the database, the police reports may have a diagram and/or a supporting narrative that helps explain anomalies in the data. The findings from this analysis guide the development of improvements for consideration by the study team.

At the end of the process a report is produced containing an overview of the study, the major findings, and committee-approved recommendations. Implementation is then the responsibility of the roadway owner (state or county).

High Risk Rural Roads

The High Risk Rural Roads (HRRR) Program is a federal initiative targeted at improving safety on roadway segments of rural character that have a functional classification of rural major or minor collector, or rural local road. According to the FHWA, approximately 60 percent of fatalities nationwide occur on rural roads. A component of each state's Highway Safety Improvement Program, HRRR provides funds for highway safety improvement projects on candidate routes where the accident rate for fatalities and incapacitating injuries exceeds the statewide average for those functional classes of roadway.

In New Jersey, DVRPC is partnering with NJDOT's Bureau of Safety Programs in administering the HRRR program. Working together, a priority list of qualifying roadway segments will be created for each New Jersey county to consider. The HRRR funds are currently underspent due in part to the financial burden of the preliminary engineering needed upon application submittal; this is the responsibility of the local jurisdiction (county). In response to this problem, DVRPC will be collaborating on engineering design templates that can be used for a variety of safety improvements. Using these templates will lessen the need for additional engineering, thus reducing the upfront costs to the county applicants. This collaborative strategy was developed in an effort to yield the highest possible utilization of these funds, thus improving safety at more locations.

PennDOT manages HRRR projects in-house and has utilized DVRPC to conduct RSAs on corridors from its list. A major reason PennDOT's approach differs from New Jersey's is because more qualifying rural roads are state-owned in Pennsylvania, while in New Jersey they are mostly county-owned.

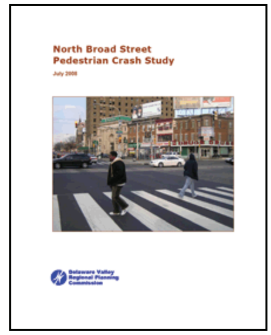
DVRPC is preparing a technical report on this work with HRRRs and local roads, which will also cover the states' programs. This document is anticipated for publication in Spring 2010.

Local Federal Aid Safety (New Jersey only)

Similar to the HRRR program, New Jersey makes available a set amount of funding to local roadway owners for safety improvement projects. These funds are allocated to the state's three metropolitan planning organizations (MPOs). While HRRR is targeted to qualifying rural roads only, the Local Federal Aid Safety money can be used on any non-state facility. The program is run in the same manner as HRRR but with somewhat different criteria. The two programs are so closely related that the North Jersey Transportation Planning Authority (NJTPA) MPO solicits candidate projects for both at the same time.

Other Studies that Use Crash Analysis

Corridor Studies

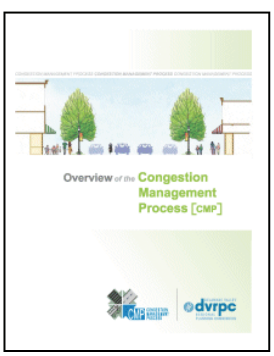


Each year, DVRPC undertakes corridor studies on various roadways throughout the region. A corridor study is an intensive and comprehensive examination of a roadway section that was identified through the Congestion Management Process, the Long Range Plan, or by request from a member government. The focus of these studies is typically a corridor that is experiencing conditions that cause it to perform poorly, such as congestion, crashes, or operational issues. A corridor can also be examined if it is experiencing development pressures, and a degradation of the transportation system is forecast. The crash analysis is a standard component in the corridor study because crashes are often the result of congestion, signal problems, access management issues, or mode conflicts. Vehicle crashes can also exacerbate existing problems by further delaying traffic and diverting through traffic onto parallel routes not suited for increased traffic volume.

Using the databases and tools available in-house, DVRPC staff can easily gather summary and cluster information to begin the analysis process. This allows the study team to gather history on multiple years of data and search for trends. The cluster tool allows the user to pinpoint corridor sections of any length where crashes are concentrated, setting the stage for a more detailed evaluation of each cluster.

Before the creation of the safety program, crash analyses were typically a component of other studies, like corridor studies. With increasing emphasis on safety at the federal and state levels, crash work has been elevated to a planning process somewhat like the Congestion Management Process or the Pavement Management Process.

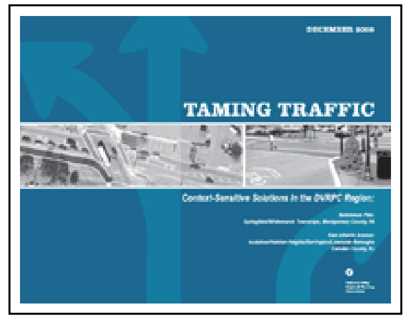
Congestion Management Process



A Congestion Management Process (CMP) is a systematic approach to managing congestion that provides information on transportation system performance. It recommends a range of strategies to minimize congestion and enhance the mobility of people and goods. These multimodal strategies include, but are not limited to, operational improvements, travel demand management, policy approaches, and additions to capacity.

The causes of recurring congestion are many. Vehicle crashes cause congestion, but are typically considered non-recurring events. Major road segments with high crash rates are sometimes described as having “recurring non-recurrent congestion”, which is why crash rate is a criterion in CMP analysis. Together with other criteria, the presence of a high crash rate roadway section will increase the priority of a facility in the process. The CMP crash rate criteria identifies qualifying segments that meet or exceed the following threshold: two times the average crash rate by functional class. This is compared to the data for the DVRPC counties in that state. Timely and accessible crash data is needed in order to do this work effectively.

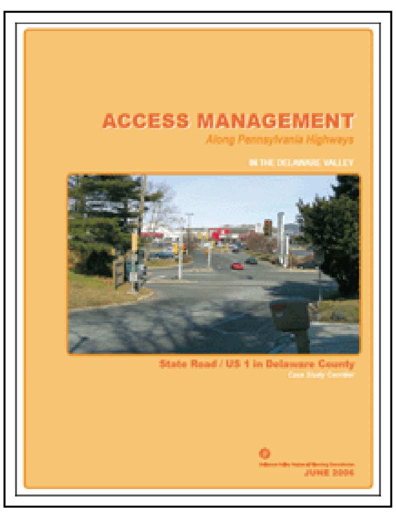
Taming Traffic



Taming Traffic (DVRPC publication #08044),a joint effort of DVRPC's Office of Smart Growth and the Office of Safety and Congestion Management, focuses on the application of context sensitive solutions (CSS) principles and best practices, including traffic calming. Each year two locations are chosen—one in New Jersey and one in Pennsylvania—where the quality of life is being negatively impacted by traffic. Implementing CSS and traffic calming strategies is an excellent way to manage traffic while creating or enhancing mobility options without compromising access.

An important component to this effort is assessing the crash experience. This is especially important in places where pedestrians or bicyclists have been involved in crashes, which the baseline crash analysis performed for this study puts into context. It is important to note that a location can have few recorded crashes, but a high potential for them. The perception of safety, or lack of, is a credible consideration for pedestrians. It can be enough to discourage walking and/or biking in a town where it otherwise should be a comfortable and safe alternative to driving. In this situation, the improvements are considered to have proactive safety benefits.

Access Management



Planning for the coordinated access of development is an important technique that has many benefits, including improved safety (*Access Management Along Pennsylvania Highways in the Delaware Valley*, DVRPC publication #06020). Access management can prolong or improve the operation and efficiency of a roadway. By eliminating turning movements at driveways, reducing the number of driveways, making driveways more uniform, and spacing signals appropriately, the opportunity for crashes is effectively reduced as the number conflict points is reduced and better regulated. Alternatively, the more opportunities there are to turn along a corridor, the greater the number of conflict points. A crash analysis in this case establishes a baseline of crash experience for use in determining the safety benefit of implementing an access management plan or making access management improvements at select locations.

Other Crash Analysis Tasks

DVRPC’s Office of Safety and Congestion Management is often called upon to assist with crash analysis on other in-house work program projects, as well as by partner agencies on external work. Recent in-house examples include:

- Bicycle and Bus Conflict Study;
- Truck Crash Analysis, and
- Pedestrian Crash Analysis and Pedestrian Safety Audit.

DVRPC’s Internal Working Group on Safety

In an effort to encourage coordination on safety-related activities and to inform staff of the work of DVRPC’s Safety Program, we maintain an informational exchange group. This group, consisting of managers and staff who work with crash data, meets informally on an annual basis.

CHAPTER 4

Future Directions in Crash Data Management

New Practical Applications at DVRPC

DVRPC is enhancing an objective approach to identifying candidate crash locations for consideration by our county and state partners as locations for study in our work program projects. In the past, the aim was for candidate project locations to be generated using a database analysis, but often they were proposed by our partners which may or may not have resulted from an objective analysis. By using a data-driven method we will be guaranteeing that the candidate locations have a demonstrated crash history. This does not mean locally generated candidate project locations will not be considered, but merely provides a statistical starting point from which to begin the conversation. Alternatively generated candidates will require a data screening.

In addition, DVRPC plans to continue providing assistance to our member governments and safety partners. In the past we have provided preliminary crash analyses for problem verification for a variety of initiatives. This work will continue and we hope to expand upon the range of safety services we are able to provide.

This year will also mark the first publication of an annual crash fact memo modeled after similar publications produced by each of the states and our national safety partners. This document will serve as a resource of regional crash statistics updated on an annual basis. Though the general format and basic contents will be repeated each year, flexibility will be built into the document to allow new findings to be highlighted. The first installment is slated for publication in the summer of 2010.

Safety Action Plan Crash Summaries

In an effort to further integrate the Safety Action Plan into our work program projects, DVRPC is incorporating an emphasis area summary option to its in-house crash database summary tool. The purpose of this function will be to allow a comparison between project-level crash statistics and the emphasis area statistics on a per state basis. By entering route number, study area limits, and data years, the tool will produce a crash data summary for each of the seven emphasis areas as defined in the Safety Action Plan. This additional layer of analysis can be used to determine if the study location is over or under represented as compared to the emphasis area statistics for the DVRPC counties of its state. For example, PA 100 would be compared to the Pennsylvania-side emphasis area statistics.

Intersection Safety Implementation Plan - Federal Highway Administration

The FHWA has offered to provide the states with intersection safety technical assistance in developing a statewide Intersection Safety Implementation Plan (ISIP). They estimate that this Plan will reduce intersection fatalities by 12 to 20 percent. To date, nine states have already participated in this process (Indiana, Georgia, Tennessee, Louisiana, Arizona, Florida, South Carolina, Mississippi, and Missouri) with Louisiana and South Carolina having already implemented their ISIPs. Early results from Louisiana have shown a 15 percent reduction in intersection fatalities.

This program differs from others by utilizing a systematic approach focusing on a large number of intersections, which when combined, represent a majority of the intersection crash total. Considered a “bottom up” approach, it breaks from the traditional “top down” approach which gives attention to only a few intersections having the highest crash totals. This results in a geographically narrow expenditure of resources. The systematic approach makes improvements to a much greater number of locations but at a lower level of investment.

PennDOT has embraced this FHWA program. The Pennsylvania Bureau of Highway Safety and Traffic Engineering (BHSTE) has provided intersection crash data to FHWA’s consultant for analyses and summaries. These summaries will be used to set an intersection crash reduction goal for the state. To advance the program, PennDOT’s Central Office held a two-day workshop in late summer 2009 to provide an overview of the effort and discuss strategy, in particular:

- Reach consensus on the set of countermeasures, deployment levels, costs, and impacts in terms of fatality reduction needed to achieve the intersection goal;
- Map out the strategic issues and actions needed to successfully implement the countermeasures;
- Develop a systematic approach for low cost safety improvements.

Implementation of this program has not yet been scheduled as of this document’s publication date.

Comprehensive Crash Analysis Tools

The evolution of systematic crash analysis has begotten two major efforts, one at the national level and the other at the state level in New Jersey. Both have yielded state-of-the-art web-based software tools which allow practitioners to perform spatial and analytical analyses with crash data. Each includes countermeasure and predictive modeling components that allow the user to develop data-driven solutions.

SafetyAnalyst

On the national level, FHWA has created a tool called SafetyAnalyst. As stated on the web site (http://www.safetyanalyst.org), “SafetyAnalyst provides a set of software tools used by state and local highway agencies for highway safety management,” further stating, “SafetyAnalyst incorporates state-of-the-art safety management approaches into computerized analytical tools for guiding the decision-making process to identify safety improvement needs and develop a system-wide program of site-specific improvement projects.“ This sophisticated tool performs statistical analyses, incorporates network screening layers and models, and includes visual analytical tools (GIS).

This federally driven effort is guided by a steering committee of state representatives from approximately 25 percent of the United States, each of which was required to make a financial contribution to the project. Neither New Jersey nor Pennsylvania is participating in the software development; DVRPC is the only MPO to have participated. Since the tool is designed for use by state DOTs, DVRPC participated as an auditor only.

The only drawback to this federal initiative is that the effort was slowed down by the provision that it accommodate each of the disparate crash data structures employed by the participating states. As stated in the following section, New Jersey decided to create its own tool which is nearing completion at the time of this publication. That their tool need only accommodate one data structure type has helped expedite the development. PennDOT is still considering which route to take regarding a comprehensive support tool of this type since their CDART system offers fewer features than either Safety Analyst or Plan4Safety.

Plan4Safety

Plan4Safety is a decision support tool created for NJDOT. It is a multi-layered decision support program for transportation engineers, planners, enforcement, and decision-makers in New Jersey's transportation and safety agencies to analyze crash data in geospatial and tabular forms. More than identifying crash hot spots which merit further investigation, Plan4Safety integrates statewide crash data with roadway characteristic data, calculates statistical analyses, incorporates network screening layers and models, and includes visual analytical tools (GIS), similar to SafetyAnalyst.

DVRPC has been fortunate to serve on the technical steering committee along with other MPO representatives and several offices of NJDOT. With that came a first look at each new layer upon completion. In addition, DVRPC developed a cluster finder tool which was transferred to the development team and is now one of many standard components featured. Plan4Safety is now available to public sector planners, engineers, and police officers, etc. all the way down to the municipal level, as well as those in academia. Government and education professionals can get started by visiting: http://cait.rutgers.edu/tsrc/plan4safety.

Crash Modification Factors

Crash Modification Factors (CMF) are a set of resources developed by FHWA to assist practitioners in their decision-making process. As described on their Crash Modifications Factors Clearinghouse website (www.cmfclearinghouse.org), “a CMF is a multiplicative factor used to compute the expected number of crashes after implementing a given improvement.” The term CMF has largely replaced CRF, or Crash Reduction Factor, though they are still used somewhat interchangeably in the field of traffic safety. Whereas CRFs provided a *percentage crash reduction estimate* for a particular countermeasure, CMF’s provide an *expected crash reduction number*. Plainly put, a CMF can report how many fewer total crashes and head-on crashes can be expected from implementing center-line rumble strips, for example.

Both proven and unproven countermeasures have been compiled by the FHWA, previously only available in a printed desktop reference. This document has been replaced by the on-line searchable database at the clearinghouse website (above) and it is available for free to the public. These references are very comprehensive and present the CMFs for each countermeasure under all available scenarios, including crash type, crash severity, control type, and traffic volumes, among others. Each CMF is also given a range of effectiveness where available.

Predictive Modeling (Plan4Safety, Safety Analyst)

A predictive model is made up of a number of predictors or variable factors that are likely to influence future behavior or results, in this case regarding crashes at a specific location. In order to predict the likely crash experience, roadway data is collected which will be used to simulate a location type including intersection geometry, lane widths, signal type, and traffic volumes. Using this data in addition to the crash history, a statistical model is formulated from which predictions are made. As more data becomes available, the model can be validated to test and improve the accuracy of its predictions. The model may employ a simple linear equation or a complex neural network, mapped out by sophisticated software. Both Plan4Safety and Safety Analyst include this feature.

Essentially, predictive modeling will help planners and engineers test what would likely happen if certain strategies are applied, or how crash frequency is likely to change in the future at a given location.

Highway Safety Manual - American Association of State Highway and Transportation Officials (AASHTO).

Slated for publication in 2010, AASHTO will be releasing the Highway Safety Manual (HSM). Intended for use by roadway owners, planners, engineers, and safety professionals, this manual will assist practitioners as they consider improvements to existing roadways or as they are planning, designing, or constructing new roadways. As stated on the AASHTO website, “The

HSM will present information on roadway safety fundamentals, the safety management process, models for estimating the expected safety performance of a specific facility, and crash modification factors for estimating the expected effectiveness of individual infrastructure-based countermeasures. The publication of the Manual is the result of a decade of research and development efforts of AASHTO, FHWA, and the Transportation Research Board (TRB).” To assist users with the HSM, AASHTO, FHWA, and TRB have collaborated on training programs, user guides, and outreach materials which will be made available to agencies across the country.

APPENDIX A

Abbreviations and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
BHSTE	Bureau of Highway Safety and Traffic Engineering (PennDOT)
CAIT	Rutgers University's Center for Advanced Infrastructure Technology
CCSAP	Congestion Crash Site Analysis Program
CDART	Crash Data Analysis and Retrieval Tool
CMF	Crash Modification Factors
CMP	Congestion Management Process
CRF	Crash Reduction Factors
CSS	Context Sensitive Solutions
DVRPC	Delaware Valley Regional Planning Commission
FHWA	Federal Highway Administration
GIS	Geographic Information System
HRRR	High Risk Rural Roads
HSIP	Highway Safety Improvement Program
ISIP	Intersection Safety Implementation Plan
MPO	Metropolitan Planning Organization
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NJDOT	New Jersey Department of Transportation
NJTPA	North Jersey Transportation Planning Authority
HSM	Highway Safety Manual
PennDOT	Pennsylvania Department of Transportation
P4S	Plan4Safety
RSA	Road Safety Audit
RSTF	Regional Safety Task Force
TRB	Transportation Research Board
TSRC	Transportation Safety Resource Center (Rutgers University)
VMT	Vehicle Miles Traveled

APPENDIX B

Resources

National Highway Traffic Safety Administration (NHTSA)

NHTSA, the clearinghouse for safety-related information to the public, is part of the U.S. Department of Transportation. The agency's mission is to save lives, prevent injuries and reduce traffic-related health care and other economic costs. As such, NHTSA functions as both an information source and an investigatory body. The NHTSA website contains links to crash statistics, vehicle and equipment recalls, laws/regulations and guidance, and vehicle safety research: http://www.nhtsa.dot.gov.

NJDOT's Annual Safety Report

Approximately 750 people lose their lives on average per year on New Jersey's roadways with thousands more injured. Titled *Driving Down Deaths*, this document identifies strategies and actions for reducing fatalities and injuries on New Jersey's roadways. A host of raw crash data and summary information can be found at NJDOT's Bureau of Safety Programs webpage: http://www.state.nj.us/transportation/refdata/accident.

Pennsylvania's Crash Fact Book

In 2008, there were 125,327 reportable traffic crashes in Pennsylvania. These crashes claimed the lives of 1,468 people and injured another 88,709 people. To add some perspective, the 2008 total reportable traffic crashes are the lowest total since 1951 when 123,088 crashes were reported. Each year PennDOT produces an installment of the *Pennsylvania Crash Facts and Statistics* report, a statistical review of reportable motor vehicle crashes in the Commonwealth of Pennsylvania. This report covers the who, what, where, and when of crashes and serves as a handy reference for safety practitioners. Electronic copies are available at http://www.dot.state.pa.us/Internet/Bureaus/pdBHSTE.nsf/BHSTEHomepage?OpenFrameset.

DVRPC's Safety Web Page

DVRPC's Office of Transportation Safety and Congestion Management maintains a web page dedicated to safety which includes projects from the annual work program, the Regional Safety Task Force, and numerous state and federal safety resources: http://www.dvrpc.org/Transportation/Safety.

APPENDIX C

New Jersey Police Crash Reporting Form - NJTR1

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State of New Jersey Police Crash Investigation Report NJTR-1

Use Code 00 for Unknown.

Use Code 99 for Other.

Explain Other in Crash Description

Also, Explain Items Marked with asterisk (*) in Crash Description

If an Item Does Not Apply, Enter a Dash (-)

NOTE:
Boxes 1 - 7 must be completed for all pages of the report.

Boxes 8-22 and 96-105 are only required on page 1 of the report.

All other information is completed as necessary.

96 **Road Divided By**
01 Barrier Median 02 Curbed Median 03 Grass Median 04 Painted Median 05 None

97 **Temporary Traffic Control Zone**
01 None 02 Construction Zone 03 Maintenance Zone 04 Utility Zone 05 Incident Zone

98 **Light Condition**
01 Daylight 03 Dusk 05 Dark (no street lights) 07 Dark (street lights on, spot)
02 Dawn 04 Dark (street lights off) 06 Dark (street lights on, continuous)

99 **Road System**
01 Interstate 03 State/Interstate Authority 05 County 07 Municipal 09 Private Property
02 State Highway 04 State Park or Institution 06 Co Auth, Park or Inst 08 Mun Auth, Park or Inst 10 US Govt Property

100 **Road Character**
01 Straight and Level 03 Straight at Hillcrest 05 Curve and Grade
02 Straight and Grade 04 Curve and Level 06 Curve at Hillcrest

101 **Road Surface Type**
01 Concrete 02 Blacktop 03 Gravel 04 Steel Grid 05 Dirt

102 **Road Surface Condition**
01 Dry 02 Wet 03 Snowy 04 Icy 05 Slush 06 Water (Standing/Moving) 07 Sand, Mud, Dirt 08 Oil

103 **Environmental Condition**
01 Clear 03 Snow 05 Overcast 07 Blowing Snow 09 Severe Crosswinds
02 Rain 04 Fog/Smog/Smoke 06 Sleet/Hail/Freezing Rain 08 Blowing Sand/Dirt

104 **Total Number of Motor Vehicles Involved in Crash**

105 ***Crash Type***

with Other MV as First Event
01 Same Direction (Rear End)
02 Same Direction (Side Swipe)
03 Right Angle
04 Opposite Direction (Head On, Angular)
05 Opposite Direction (Side Swipe)
06 Struck Parked Vehicle
07 Left Turn / U Turn
08 Backing
09 Encroachment

with Below as First Event
10 Overturned
11 Fixed Object
12 Animal
13 Pedestrian
14 Pedalcyclist
15 Non-fixed Object
16 Railcar -vehicle

106 Veh 1 / 107 Veh 2 **Oversize/Overweight Permit ? (Comm Veh Only)**
01 Yes 02 No

108 Veh 1 / 109 Veh 2 **Vehicle Type**

Passenger Vehicles (01-19)
01 Car/Station Wagon/Minivan
02 Passenger Van (< 9 Seats)
03 Cargo Van (10K lbs or less)
04 Sport Utility Vehicle
05 Pickup
06 Recreational Vehicle
07 All Terrain Vehicle
08 Motorcycle
09 (reserved)
10 any previous w/Trailer
11 Moped
12 Streetcar/Trolley
13 Pedalcycle
19 Other Pass Vehicle

Trucks / Bus (20-30)
20 Single Unit (2 axle)
21 Single Unit (3+ axle)
22 Light Truck w/Trailer
23 Single Unit Truck w/Trailer
24 Truck Tractor (Bobtail)
25 Tractor Semi-Trailer
26 Tractor Double
27 Tractor Triple
29 Other Truck
30 Bus / Large Van (9 or more Seats)

110 Veh 1 / 111 Veh 2 **Vehicle Use**
01 Personal
02 Business/Commerce
03 Government
04 Responding to Emergency
05 Machinery in Use

112 Veh 1 / 113 Veh 2 **Special Function Vehicles**
01 Work Equipment *
02 Police
03 Military
04 Fire/Rescue
05 Ambulance
06 Taxi/Limo
07 Veh Used as School Bus
08 Veh Used as Other Bus
09 School Bus
10 Transit Bus
11 Other Bus
12 Veh Used as Snowplow
13 Vehicle Towing Another Veh

114 Veh 1 / 115 Veh 2 **Cargo Body Type (Comm Veh Only)**
01 Bus (9-15 seats)
02 Bus (> 15 seats)
03 Van/Enclosed Box
04 Cargo Tank
05 Flatbed
06 Dump
07 Concrete Mixer
08 Auto Transporter
09 Garbage/Refuse
10 Hopper (grain,gravel,chips)
11 Pole (trailer)
12 Intermodal Chassis
13 No Cargo Body

116 Veh 1 / 117 Veh 2 **Direction of Travel of Vehicle**
01 North 02 East
03 South 04 West

Which Vehicle Occupied
1 Vehicle 1 B Pedalcycle
2 Vehicle 2 P Pedestrian O Other

Position In/On Vehicle
01 Driver 02 thru 09 Passengers
10 Cargo Area 11 Riding/Hanging on Outside

	11	
1	2	3
4	5	6
7	8	9
	10	
	11	

(11 on each side)

Ejection From Vehicle
01 Not Ejected 03 Ejected
02 Partial Ejection 04 Trapped

Victim's Physical Condition
01 Killed
02 Incapacitated
03 Moderate Injury
04 Complaint of Pain

Location of Most Severe Physical Injury
01 Head
02 Face
03 Eye
04 Neck
05 Chest
06 Back
07 Shoulder / Upper Arm
08 Elbow / Lower Arm / Hand
09 Abdomen / Pelvis
10 Hip / Upper Leg
11 Knee / Lower Leg / Foot
12 Entire Body

Type of Most Severe Physical Injury
01 Amputation
02 Concussion
03 Internal
04 Bleeding
05 Contusion/Bruise/Abrasion
06 Burn
07 Fracture / Dislocation
08 Complaint of Pain

Refused Medical Treatment 1 Yes 2 No

Safety Equipment
01 None
02 Lap Belt
03 Harness
04 Lap Belt & Harness
05 Child Restraint
06 Helmet
07 (reserved)
08 Airbag
09 Airbag & Seatbelts
10 Safety Vest (Ped only)

Airbag Deployment
01 Front 07 Other
02 Side 08 Multiple

Age **Sex** **Avail** **Used** **Hosp Code**

83 84 85 86 87 88 89 90 91 92 93 94 95

Websites for :

Crash References -
http://www.state.nj.us/transportation/refdata/accidents/policeres/shtm

Insurance Codes -
5 digit NAIC - http://www.nj.gov/dobi/data/inscomp.htm
3 digit MVC - http://www.state.nj.us/mvc/numeric.pdf

Hospital Codes
- http://www.state.nj.us/health/ems/jems.pdf

Overlay Page 1 of 2

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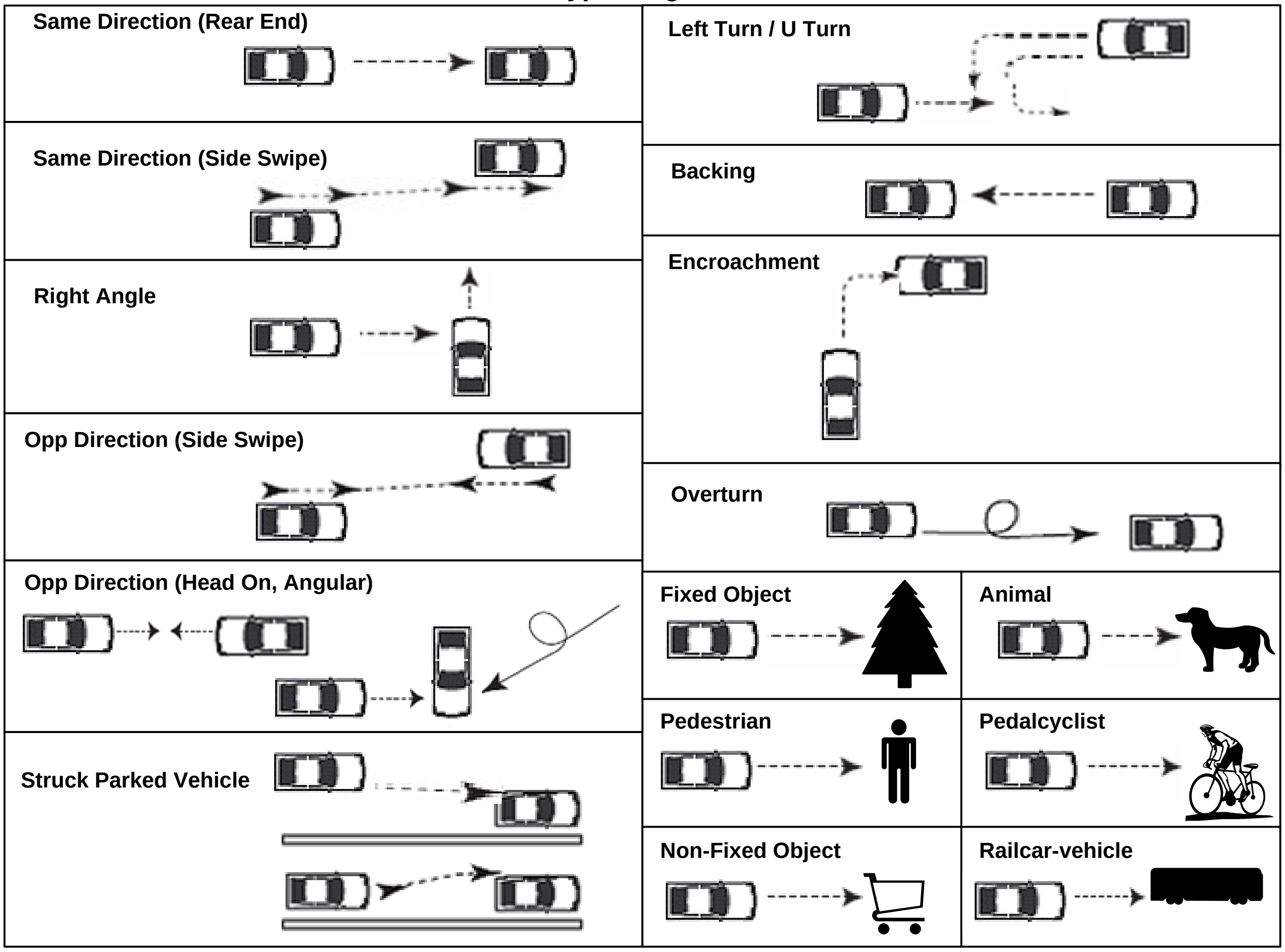
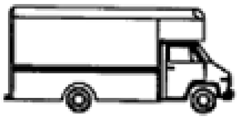
Cutting at designated positions will permit arrows on each side to be displayed when the appropriate overlay is paged. It will also permit the first overlay to be slightly longer than the second for easy paging.
Printing should be done Portrait, Duplex, Flip on Short Edge

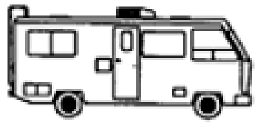
Crash Type Diagrams

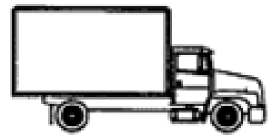


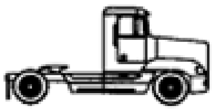
1. **Same Direction (Rear-end)**- Two vehicles moving one behind the other and collide, regardless of what movements either vehicle was in the process of making. This would include a collision in which the leading vehicle spun out and became turned 180 degrees around such that the resulting same direction collision had it strike front end to front end with the following vehicle.
2. **Same Direction (Sideswipe)**- Two vehicles moving alongside each other and collide, with at least one of the vehicles being struck on the side. This type would include a collision resulting from one of the vehicles making an improper turn such as a left from the right lane or vice-versa or turning right from the appropriate outside lane and striking a vehicle passing on the right shoulder.
3. **Right Angle**- Two vehicles approaching from non-opposing angular directions collide, typically resulting as one vehicle failed to either stop or yield right of way from a Stop or Yield sign, ran a red light, or was not cleared from the intersection upon the onset of the conflicting movement's green signal.
4. **Opposite Direction (Head-on/Angular)**- Two vehicles approaching opposite directions and intending to continue in opposite directions collide in a frontal or angular manner as a result of one or both vehicles crossing the painted or unpainted centerline or divided median of the roadway. This includes a collision resulting from one vehicle traveling the wrong way down a divided highway.
5. **Opposite Direction (Sideswipe)**- Two vehicles approaching opposite directions and intending to continue in opposite directions collide in a sideswiping manner as a result of one or both vehicles crossing the painted or unpainted centerline or divided median of the roadway. This also includes a collision resulting from one vehicle traveling the wrong way down a divided highway.
6. **Parked Vehicle**- A crash involving a vehicle in transport striking a parked vehicle within the roadway or in a parking lot.
7. **Left Turn/U Turn**- Two vehicles approaching from opposite directions collide as a result of at least one vehicle attempting to make a left or U turn in front of the opposing vehicle.
8. **Backing**- This type of crash, previously labeled as "Other" type, is defined as any multi-vehicle collision when at least one vehicle was in the act of backing.
9. **Encroachment**- Previously labeled as "Other" type crash, but frequently mislabeled as an angle crash due to the approach directions of one of the turning vehicles and a stopped, starting or slowing vehicle on an adjacent approach, this crash defines the collision of two adjacent approach vehicles whose paths are unintended to come in conflict, but collide as a result of one or both vehicles over- or under-turning.
10. **Overturned**- A crash in which a vehicle overturns on or off the roadway without first having been involved in some other type single or multiple vehicle crash. This includes motorcycle crashes in which the operator loses control of and drops bike, but had not initially struck another motor vehicle, fixed or non-fixed object, animal, pedacyclist or pedestrian.
11. **Fixed Object**- A crash in which the primary collision involved a single vehicle and a fixed object.
12. **Animal**- A crash involving a vehicle striking any animal, including a deer. However, a deer crash could also be so-named for specific identification of this more common type animal crash within the appropriate box on the Police Crash Report form.
13. **Pedestrian**- A crash involving a vehicle and pedestrian in which the collision between the two is the first event and also took place within the road proper. This type includes a vehicle colliding with someone walking their bicycle in the roadway.
14. **Pedalcycle**- A crash involving a vehicle and a bicycle that is in the act of being ridden or stopped in the roadway, but currently mounted by the cyclist.
15. **Non-fixed object**- Excluding the single motor vehicle type crashes defined in numbers 10-14 above, this type implies any crash initially involving a single vehicle and object not considered a fixed or permanent condition of the highway like ruts, bumps, sink- or potholes or other miscellaneous stationary or airborne road debris such as garbage, tree limbs, fallen-off parts of other vehicles, broken and scattered signs/posts, etc.
16. **Railcar-vehicle**- Any crash involving a vehicle and a train, trolley, light transit or other type railcar that occurred within a roadway right-of-way or at an at-grade intersection.
99. **Other**- This category encompasses all other categories of single and multi-vehicle crashes that are not defined above. These include, but are not limited to, all other non-collision events such as immersion, cargo loss, separation of units, fire/explosion, and run-off road incidents (whereby damage is caused to the vehicle, but nothing else was physically struck during or following the act of leaving the highway).
00. **Unknown**

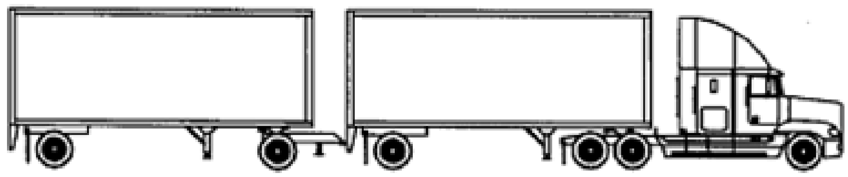
Vehicle Type / Cargo Body Type

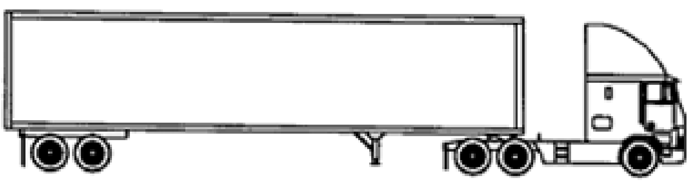

Cargo Van

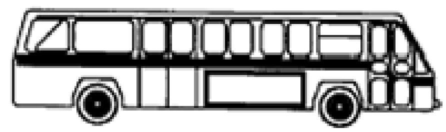

Recreational Vehicle


Single Unit (2 Axle)

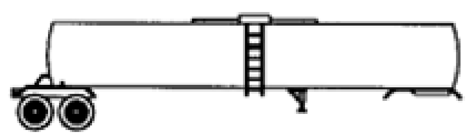

Truck Tractor

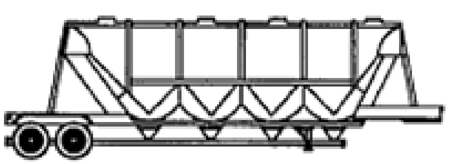

Tractor Double

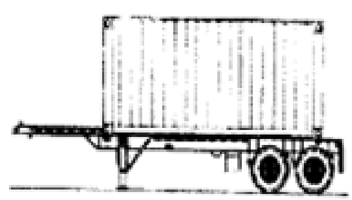

Tractor Semi-Trailer

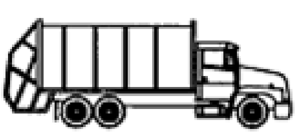

Bus (> 15 seats)

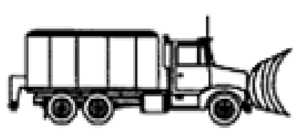

Flatbed


Cargo Tank


Hopper (grain/gravel)


Intermodal Chassis


Garbage/Refuse


Snowplow


Concrete Mixer

New Jersey Police Crash Investigation Report

Page ____ of ____ ☐ Fatal ☐ Reportable ☐ Non-Reportable ☐ Change Report

96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117

1 Case Number
2 Police Dept of — Code
3 Station/Precinct
4 Date of Crash (mm dd yy)
5 Day of Week: Su M Tu W Th F Sa
6 Time (use 2400 hrs)
7 Municipality Code
8 Total Killed
9 Total Injured
10 Crash Occurred On : — Road Name — Dir
11 Speed Limit
12 Route No. — Suffix
13 Milepost
14 ☐ At intersection with
15 ☐ Feet ☐ Miles
16 ☐ N ☐ E ☐ S ☐ W of :
17 Cross Road Name
18 Speed Limit
19 Ramp ☐ To: ☐ From:
20 Route/Name ☐ NB ☐ EB ☐ SB ☐ WB
21 Latitude
22 Longitude

118a 118b 119a 119b

23 Veh No | 24 Policy No. | 25 Ins Code
☐ Parked ☐ Ped ☐ Pedalcyclist ☐ Resp to Emergency ☐ Hit & Run
26 Driver's First Name — Initial — Last Name | 29 Sex
27 Number and Street | 30 Eyes
28 City — State — Zip
31 State | 32 Drivers License No | 33 DOB mm dd yy | 34 Expires mm yy
35 Owner's First Name — Initial — Last Name ☐ Same As Driver
36 Number and Street
37 City — State — Zip
38 Make | 39 Model | 40 Color | 41 Year | 42 Plate No. | 43 State
44 VIN | 45 Expires
46 Vehicle Removed To ☐ Driven ☐ Left at Scene ☐ Towed ☐ Impound ☐ Disabled | 47 Authority ☐ Owner ☐ Driver ☐ Police

53 Veh No | 54 Policy No. | 55 Ins Code
☐ Parked ☐ Ped ☐ Pedalcyclist ☐ Resp to Emergency ☐ Hit & Run
56 Driver's First Name — Initial — Last Name | 59 Sex
57 Number and Street | 60 Eyes
58 City — State — Zip
61 State | 62 Drivers License No | 63 DOB mm dd yy | 64 Expires mm yy
65 Owner's First Name — Initial — Last Name ☐ Same As Driver
66 Number and Street
67 City — State — Zip
68 Make | 69 Model | 70 Color | 71 Year | 72 Plate No. | 73 State
74 VIN | 75 Expires
76 Vehicle Removed To ☐ Driven ☐ Left at Scene ☐ Towed ☐ Impound ☐ Disabled | 77 Authority ☐ Owner ☐ Driver ☐ Police

120 121 122 123 124 125

48 Alcohol/Drug Test
Given : ☐ No ☐ Yes ☐ Refused
Type : ☐ Breath ☐ Blood ☐ Urine
Results: 0.__ __ % ☐ Pending
49 Hazardous Material: On Board ☐ Spill ☐ — Name or Placard No.
50 Carrier No. ☐ USDOT ☐ Other *
51 Commercial Vehicle Weight
☐ ≤ 10,000 lbs
☐ 10,001 - 26,000 lbs
☐ ≥ 26,001 lbs
52 Carrier name

134 Crash Diagram (NOT TO SCALE)
Indicate North

78 Alcohol/Drug Test
Given : ☐ No ☐ Yes ☐ Refused
Type : ☐ Breath ☐ Blood ☐ Urine
Results: 0.__ __ % ☐ Pending
79 Hazardous Material: On Board ☐ Spill ☐ — Name or Placard No.
80 Carrier No. ☐ USDOT ☐ Other *
81 Commercial Vehicle Weight
☐ ≤ 10,000 lbs
☐ 10,001 - 26,000 lbs
☐ ≥ 26,001 lbs
82 Carrier name

126 127 128a 128b 128c 128d 129a 129b 129c 129d

135 Crash Description

130 131

136 Damage To Other Property

132

Oper. | 137 Charge ☐ Multiple Charges | 138 Summons No. | Oper. | 139 Charge ☐ Multiple Charges | 140 Summons No.

133

141 Officer's Signature | 142 Badge No. | 143 Reviewed By — Badge No. | 144 Case Status ☐ Pending ☐ Complete

	83	84	85	86	87	88	89	90	91	92	93	94	95	Names & Addresses of Occupants - If Deceased, Date & Time of Death
A														
B														
C														
D														
E														

VOID VOID VOID VOID

NJTR-1 (R3/06)

Police Copy

New Jersey Police Crash Investigation Report

Motor Vehicle Crash Description

Police Dept: ______________________ Code: _______

Station: _________________________ Case No: ______________

(Refer to vehicle by number)

ALL INVOLVED	Veh Occ	Pos In/On	Eject	Phys Cond	Age	Sex	Loc Inj	Type Inj	Ref Med	Equip Avail	Equip Used	Bag Depl	Hosp Code	
	83	84	85	86	87	88	89	90	91	92	93	94	95	Names & Addresses of Occupants - If Deceased, Date & Time of Death
F														
G														
H														
I														
J														

135 Crash Description

NJTR-1A (rev. 03/2006)

Officer's Signature

Badge Number

Page ________ of ________

New Jersey Police Crash Investigation Report Motor Vehicle Crash Diagram	Police Dept: ______________________ Code: _______ Station: ________________________ Case No: ______________

134 Crash Diagram (NOT TO SCALE)

Indicate North

NJTR-1B (rev. 03/2006)

____
Officer's Signature

____
Badge Number

Pennsylvania Police Crash Reporting Form - PA AA 500

COMMONWEALTH OF PENNSYLVANIA
POLICE CRASH REPORTING FORM

AA 500 1

Case Closed ◯ Yes ◯ No

Reportable Crash ◯ Yes ◯ No

Page

Crash Number

P0938432

1 Police Agency Data

Incident Number | Police Agency | Patrol Zone

Agency Name | Precinct | Investigation Date (MM-DD-YYYY)

Dispatch Time *(mil)* | Arrival Time *(mil)* | Investigator | Badge Number

Reviewer | Badge Number | Approval Date (MM-DD-YYYY)

2 Crash Data

County | County Name | Municipality | Municipality Name

Crash Date (MM-DD-YYYY) | Crash Time *(mil)* | No of Units | People | Injured | Killed*

*If > 00 complete Form F

Day of Week: ◯ Sun ◯ Thu ◯ Mon ◯ Fri ◯ Tue ◯ Sat ◯ Wed ◯ Unk

Workzone *(If Yes, Complete Form M, Section 29)* ◯ Yes ◯ No

School Bus Related ◯ Yes ◯ No

School Zone Related ◯ Yes ◯ No

Notify PENNDOT Maintenance ◯ Yes ◯ No

3 Loc Type

Intersection Type: ◯ Midblock ◯ 4 Way Intersection ◯ "T" Intersection ◯ "Y" Intersection ◯ Traffic Circle/ Round About ◯ Multi-Leg Intersection ◯ On Ramp ◯ Off Ramp ◯ Crossover ◯ Railroad Crossing ◯ Other

**Special Location*

* See Overlay

4 Principal Road

Route Number | Segment (Optional) | Travel Lanes | Speed Limit

Street Name | Street Ending

Orientation: ◯ North ◯ South ◯ East ◯ West ◯ Unknown

House Number (if applicable)

For Mid-block crashes only. Use postal House Number and make sure Principal Roadway Street Name is filled in if using this option

Route Signing: ◯ Interstate (Not Turnpike) ◯ Turnpike (East/West) ◯ Turnpike Spur ◯ State Highway ◯ County Road ◯ Local Road or Street ◯ Private Road ◯ Other/ Unknown

Sample

5 Intersecting Road

Use For Intersection Crashes

Route Number | Segment (Optional) | Travel Lanes | Speed Limit

Street Name | Street Ending

Orientation: ◯ North ◯ South ◯ East ◯ West ◯ Unknown

Route Signing: ◯ Interstate (Not Turnpike) ◯ Turnpike (East/West) ◯ Turnpike Spur ◯ State Highway ◯ County Road ◯ Local Road or Street ◯ Private Road ◯ Other/ Unknown

6 Distance From Landmark

Use For Mid - Block Crashes

Please Enter Information for ***BOTH*** Landmarks if Using This Option

Landmark 1: Intersecting Rt Num Or Mile Post | Or Segment Marker

Or Intersecting Street Name | St Ending

Ramp Use Only: ◯ North ◯ South ◯ East ◯ West

Landmark 2: Intersecting Rt Num Or Mile Post | Or Segment Marker

Or Intersecting Street Name | St Ending

Ramp Use Only: ◯ North ◯ South ◯ East ◯ West

Feet

Or Miles

Distance From Crash Scene to Landmark 1 *(For Crash between Landmark 1 and Landmark 2)*

7 GPS

Latitude: Degrees | Minutes | Seconds

Longitude: — Degrees | Minutes | Seconds

8 TCD

Traffic Control Device: ◯ Not Applicable ◯ Flashing Traffic Signal ◯ Traffic Signal ◯ Stop Sign ◯ Yield Sign ◯ Active RR Crossing Controls ◯ Passive RR Crossing Controls ◯ Police Officer or Flagman ◯ Other Type TCD ◯ Unknown

TCD Functioning: ◯ No Controls ◯ Device Not Functioning ◯ Device Functioning Improperly ◯ Device Functioning Properly ◯ Emergency Preemptive Signal ◯ Unknown

9 Lane Closure

Lane Closed *(If "Not Applicable", skip rest of the Lane Closure section)*: ◯ Not Applicable ◯ Partially ◯ Fully ◯ Unknown

Lane Closure Direction: ◯ North ◯ South ◯ East ◯ West ◯ North and South ◯ East and West ◯ All (N,S,E,W)

Traffic Detoured: Yes ◯ No ◯ Unknown ◯

Esti. Time Closed: ◯ < 30 Min. ◯ 30-60 Min. ◯ 1-3 hrs ◯ 3-6 hrs ◯ 6-9 hrs ◯ > 9 hours ◯ Unknown

FORM # AA-500 (12/02)

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POLICE CRASH REPORTING FORM

AA 500 2

Police Use Only

Page:

Crash Number

P0938432

Sample

10 Unit Info

Type Unit: ◯ Motor Vehicle in Transport ◯ Hit & Run Vehicle ◯ Illegally Parked ◯ Legally Parked ◯ Non - Motorized ◯ Pedestrian ◯ Pedestrian on Skates, in Wheelchair, etc ◯ Disabled From Previous Crash ◯ Train ◯ Phantom Vehicle

(If "Pedestrian" or "Pedestrian on Skates, in Wheelchair, etc", Complete Form M, Section 28)

Commercial Vehicle ◯ Yes ◯ No

(If Yes, Complete Form C)

11 Vehicle Driver / Pedestrian Information

Unit No | **First Name** | **MI** | **Date of Birth** (MM-DD-YYYY)

Delete? ◯

Last Name | **Telephone Number**

Address / City / State | **Zip**

Driver License Number | **State** | **Class**

Alcohol/Drugs Suspected
◯ No ◯ Illegal Drugs ◯ Medication
◯ Alcohol ◯ Alcohol and Drugs ◯ Unknown

Driver or Pedestrian Physical Condition
◯ Apparently Normal ◯ Illegal Drug Use ◯ Fatigue ◯ Medication
◯ Had Been Drinking ◯ Sick ◯ Asleep ◯ Unknown

Alcohol Test Type
◯ Test Not Given ◯ Breath ◯ Other
◯ Blood ◯ Urine ◯ Unknown if Test Given

Primary Vehicle Code Violation

Charged? ◯ Yes ◯ No

Alcohol Test Results
0.
◯ Test Refused ◯ Unknown Results
◯ Test Given, Contaminated Results

Driver Presence
1=Driver Operated Vehicle
2=No Driver
3=Driver Fled Scene
4=Hit and Run
9=Unknown

Owner/Driver
00=Not Applicable
01=Private Vehicle Owned/ Leased by Driver
02=Private Vehicle Not Owned/Leased by Driver
03=Rented Vehicle
04=State Police Vehicle
05=PENNDOT Vehicle
06=Other State Gov Veh
07=Municipal Police Veh
08=Other Municipal Government Vehicle
09=Federal Gov Veh
98=Other
99=Unknown

12 Vehicle Information

Same as Driver ◯ | **Owner First Name** | **Owner Last Name or Business Name** *(If Pedestrian, skip this Section)*

Address / City / State / Zip | **Vehicle Make** | ***Make Code** (see overlay)

VIN | **Model Year** | **Vehicle Model**

License Plate | **Reg. State** | **Est. Speed** | **Vehicle Towed** ◯ Yes ◯ No | **Towed By**

Insurance ◯ Yes ◯ No ◯ Un-known | **Insurance Company** | **Policy No**

Trailing Unit No. of Trailing Units:

Type Unit
1=Towing Pass. Veh
2=Towing Truck
3=Towing Utility Trailer
4=Mobile/Modular Home
5=Camper
6=Full Trailer
7=Semi-Trailer
8=Other
9=Unknown

Tag No | **Tag Year** | **Tag St**

Direction of Travel | ***Vehicle Position** | ***Movement** | *See Overlay

Vehicle Color
01=Blue
02=Red
03=White
04=Green
05=Black
06=Yellow
07=Silver
08=Gold
09=Brown
10=Orange
11=Purple
12=Other
99=Unknown

Vehicle Type
01=Automobile
02=Motorcycle
03=Bus
04=Small Truck
(If "02", Complete Form M, Section 26)
(If "20" or "21", Complete Form M, Section 27)
05=Large Truck
06=SUV
07=Van
10=Snowmobile
11=Farm Equip
12=Construction Equip
13=ATV
18=Other Type Spec Veh
19=Unk. Type Spec Veh
20=Unicycle, Bicycle, Tricycle
21=Other Pedalcycle
22=Horse & Buggy
23=Horse & Rider
24=Train
25=Trolley
98=Other
99=Unknown

Special Usage
00=Not Applicable
01=Fire Veh
02=Ambulance
03=Police
08=Other Emergency Vehicle
11=Pupil Transport
12=Commercial Passenger Carrier
13=Taxi
21=Tractor Trailer
22=Twin Trailer
23=Triple Trailer
31=Modified Veh
99=Unknown

Initial Impact Point
00=Non-Collision
01-12=Clock Points
13=Top
14=Undercarriage
15=Towed Unit
99=Unknown

Damage Indicator
0=None
1=Minor
2=Functional
3=Disabling
9=Unknown

Gradient
1=Level
2=Uphill
3=Downhill
4=Bottom of Hill
5=Top of Hill
9=Unknown

Road Alignment
1=Straight
2=Curved
9=Unknown

FORM # AA-500 (12/02)

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POLICE CRASH REPORTING FORM

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Police Use Only

Page

Crash Number

P 0938432

People Information

A *Person Type:*
1=Driver
2=Passenger
7=Pedestrian
8=Other
9=Unknown

B *Sex:*
F =Female
M=Male
U =Unknown

C *Injury Severity:*
0=Not Injured
1=Killed
2=Major Injury
3=Moderate Injury
4=Minor Injury
8=Injury, Unk Severity
9=Unknown if Injury

D *Seat Position:*
00=Not A Passenger/Occupant
01=Driver - All Vehicles
02=Front Seat Middle Position
03=Front Seat Right Side
04=Second Row - Left Side Or Motorcycle Passenger
05=Second Row - Middle Position
06=Second Row - Right Side
07=Third Row Or Greater - Left Side
08=Third Row Or Greater - Middle Position
09=Third Row Or Greater - Right Side
10=Sleeper Section of Truckcab
11=In Other Enclosed Passenger Or Cargo Area
12=In Open Area (Back Of Pickup, Etc.)
13=Trailing Unit
14=Riding On Vehicle Exterior
15=Bus Passenger
98=Other
99=Unknown

E *Safety Equipment One:*
00=None Used / Not Applicable
01=Shoulder Belt Used
02=Lap Belt Used
03=Lap And Shoulder Belt Used
04=Child Safety Seat Used
05=Motorcycle Helmet Used
06=Bicycle Helmet Used
10=Safety Belt Used Improperly
11=Child Safety Seat Used Improperly
12=Helmet Used Improperly
90=Restraint Used, Type Unknown
99=Unknown

F *Safety Equipment Two:*
00=None Used / Not Applicable
01=Front Air Bag Deployed (For This Seat)
02=Side Air Bag Deployed (For This Seat)
03=Other Type Air Bag Deployed
04=Multiple Air Bags Deployed
05=Motorcycle Eye Protection
06=Bicyclist Wearing Elbow/Knee/Pads
10=Air Bag Not Deployed, Switch On
11=Air Bag Not Deployed, Switch Off
12=Air Bag Not Deployed, Unk Switch Setting
13=Air Bag Removed (Prior To Crash)
19=Unknown If Air Bag Deployed
99=Unknown

G *Ejection:*
0=Not Applicable
1=Not Ejected
2=Totally Ejected
3=Partially Ejected
9=Unknown

H *Ejection Path:*
0=Not Ejected / Not Applicable
1=Through Side Door Opening
2=Through Side Window
3=Through Windshield
4=Through Back Door
5=Through Back Door Tailgate Opening
6=Through Roof Opening (Sunroof/ Convertible Top Down)
7=Through Roof Opening (Convertible Top Up)
9=Unknown

I *Extrication:*
0=Not Applicable
1=Not Extricated
2=Extricated By Mechanical Means
3=Freed By Non - Mechanical Means
8=Other
9=Unknown

13 **EMS Agency:** ______ **Medical Facility:** ______

14 **Unit No** | **Person No** | **Delete?** | **Date of Birth** (MM-DD-YYYY) | A | B | C | D | E | F | G | H | I

Sample

Name / Address / Phone

☐ **Same as Operator**

EMS Transport ◯ Yes ◯ No

Unit No | **Person No** | **Delete?** | **Date of Birth** (MM-DD-YYYY) | A | B | C | D | E | F | G | H | I

Name / Address / Phone

☐ **Same as Operator**

EMS Transport ◯ Yes ◯ No

Unit No | **Person No** | **Delete?** | **Date of Birth** (MM-DD-YYYY) | A | B | C | D | E | F | G | H | I

Name / Address / Phone

☐ **Same as Operator**

EMS Transport ◯ Yes ◯ No

Unit No | **Person No** | **Delete?** | **Date of Birth** (MM-DD-YYYY) | A | B | C | D | E | F | G | H | I

Name / Address / Phone

☐ **Same as Operator**

EMS Transport ◯ Yes ◯ No

Unit No | **Person No** | **Delete?** | **Date of Birth** (MM-DD-YYYY) | A | B | C | D | E | F | G | H | I

Name / Address / Phone

☐ **Same as Operator**

EMS Transport ◯ Yes ◯ No

Unit No | **Person No** | **Delete?** | **Date of Birth** (MM-DD-YYYY) | A | B | C | D | E | F | G | H | I

Name / Address / Phone

☐ **Same as Operator**

EMS Transport ◯ Yes ◯ No

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POLICE CRASH REPORTING FORM

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Police Use Only

Page

Crash Number

P 0712998

General Crash Information
(If more than 2 Units only complete once)

15

Crash Description
0=Non-Collision, 1=Rear End, 2=Head On, 3=Rear to Rear (Backing), 4=Angle, 5=Sideswipe (Same Direction), 6=Sideswipe (Opposite Direction), 7=Hit Fixed Object, 8=Hit Pedestrian, 9=Other/Unknown

Relation to Roadway
1=On Travel Lanes, 2=Shoulder, 3=Median, 4=Roadside, 5=Outside Trafficway, 6=In Parking Lane, 7=Gore (Ramp Intersection), 9=Unknown

Illumination
1=Daylight, 2=Dark - No Street Lights, 3=Dark - Street Lights, 4=Dusk, 5=Dawn, 6=Dark - Unknown Roadway Lighting, 8=Other

Weather Conditions
1=No Adverse Conditions, 2=Rain, 3=Sleet (Hail), 4=Snow, 5=Fog, 6=Rain & Fog, 7=Sleet & Fog, 8=Other, 9=Unknown

Road Surface Conditions
0=Dry, 1=Wet, 2=Sand, Mud, Dirt, Oil, 3=Snow Covered, 4=Slush, 5=Ice, 6=Ice Patches, 7=Water - Standing or Moving, 8=Other

Unit(s) Event Information

16

Unit No

Harm Event | L/R | Most? | Utility Pole Number

1
2
3
4

Please Put Events in Sequential Order

Unit No

Harm Event | L/R | Most? | Utility Pole Number

1
2
3
4

Please Put Events in Sequential Order

Harmful Events (Harm Event)
01=Hit Unit 1
02=Hit Unit 2
03=Hit Unit 3
04=Hit Unit 4
05=Hit Unit 5
06=Hit Other Traffic Unit
07=Hit Deer
08=Hit Other Animal
09=Collision With Other Non Fixed Object
11=Struck By Unit 1
12=Struck By Unit 2
13=Struck By Unit 3
14=Struck By Unit 4
15=Struck By Unit 5
16=Struck By Other Traffic Unit
21=Hit Tree Or Shrubbery
22=Hit Embankment
23=Hit Utility Pole
24=Hit Traffic Sign
25=Hit Guard Rail
26=Hit Guard Rail End
27=Hit Curb
28=Hit Concrete Or Longitudinal Barrier
29=Hit Ditch
30=Hit Fence Or Wall
31=Hit Building
32=Hit Culvert
33=Hit Bridge Pier Or Abutment
34=Hit Parapet End
35=Hit Bridge Rail
36=Hit Boulder Or Obstacle On Roadway
37=Hit Impact Attenuator
38=Hit Fire Hydrant
39=Hit Roadway Equipment
40=Hit Mail Box
41=Hit Traffic Island
42=Hit Snow Bank
43=Hit Temporary Construction Barrier
48=Hit Other Fixed Object
49=Hit Unknown Fixed Object
50=Overturn/Roll Over
51=Struck By Thrown Or Falling Object
52=Pot Holes Or Other Pavement Irregularities
53=Jackknife
54=Fire In Vehicle
58=Other Non-Collision
99=Unknown Harmful Event

17

First Harmful Event in the Crash — Unit No | Harm Event
Most Harmful Event in the Crash — Unit No | Harm Event

Do not repeat this information on multiple pages

Contributing Information

18

Environmental / Roadway Potential Factors (E/R) 1 2 3
00=None
01=Windy Conditions
02=Sudden Weather Conditions
03=Other Weather Conditions
04=Deer In Roadway
05=Obstacle On Roadway
06=Other Animal In Roadway
07=Glare
08=Work Zone Related
11=Slippery Road Conditions (Ice/Snow)
12=Substance On Roadway
13=Potholes
14=Broken Or Cracked Pavement
15=TCD Obstructed
16=Soft Shoulder Or Shoulder Drop Off
28=Other Roadway Factor
29=Other Environmental Factor
99=Unknown

Possible Vehicle Failures (V)
00=None
01=Tires
02=Brake System
03=Steering System
04=Suspension
05=Power Train
06=Exhaust
07=Headlights
08=Signal Lights
09=Other Lights
10=Horn
11=Mirrors
12=Wipers
13=Driver Seating/Control
14=Body, Doors, Hood, Etc
15=Trailer Hitch
16=Wheels
17=Airbags
18=Trailer Overloaded
19=Unsecure/Shifted Trailer Load
20=Improper Towing
21=Obstructed Windshield
99=Unknown

Unit No 1 2
Unit No 1 2

Driver Action (D)
00=No Contributing Action
01=Driver Was Distracted
02=Driving Using Hand Held Phone
03=Driving Using Hands Free Phone
04=Making Illegal U-Turn
05=Improper/Careless Turning
06=Turning From Wrong Lane
07=Proceeding W/O Clearance After Stop
08=Running Stop Sign
09=Running Red Light
10=Failure To Respond To Other Traffic Control Device
11=Tailgating
12=Sudden Slowing/Stopping
13=Illegally Stopped On Road
14=Careless Passing Or Lane Change
15=Passing In No Passing Zone
16=Driving The Wrong Way On 1-Way Street
17=Careless Or Illegal Backing On Roadway
18=Driving On The Wrong Side Of Road
19=Making Improper Entrance To Highway
20=Making Improper Exit From Highway
21=Careless Parking/Unparking
22=Over/Under Compensation At Curve
23=Speeding
24=Driving Too Fast For Conditions
25=Failure To Maintain Proper Speed
26=Driver Fleeing Police (Pol Chase)
27=Driver Inexperienced
28=Failure To Use Specialized Equip
92=Affected By Physical Condition
98=Other Improper Driving Actions
99=Unknown

Unit No 1 2 3 4
Unit No 1 2 3 4

Pedestrian Action (P)
00=None
01=Entering Or Crossing At Specified Location
02=Walking, Running, Jogging, Or Playing
03=Working
04=Pushing Vehicle
05=Approaching Or Leaving Vehicle
06=Working On Vehicle
07=Standing
98=Other
99=Unknown

Unit No | Unit No

19

Indicated Prime Factor
Do not repeat this information on multiple pages

E/R V D P

Unit No | Factor Code

If E/R is the Prime Factor Type, leave Unit No blank

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COMMONWEALTH OF PENNSYLVANIA
POLICE CRASH REPORTING FORM

AA 500 5

Police Use Only

Page

Crash Number

P0938432

20 Diagram

21

Witness Name	Address	Phone
1		
2		

22 Witness and Narrative

Narrative and additional witnesses:

Accident Investigation Notification Issued? ◯ Property Damage ◯

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COMMONWEALTH OF PENNSYLVANIA
POLICE CRASH REPORTING FORM

AA 500 F

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Page

○ New
○ Change/ Continuation

Crash Number

S A M P L E

24 **Road Surface Type**
- ○ Concrete
- ○ Blacktop
- ○ Brick or Block
- ○ Slag, Gravel or Stone
- ○ Dirt
- ○ Other
- ○ Unknown

Special Jurisdiction
- ○ No Special Jurisdiction
- ○ National Park
- ○ Military
- ○ Indian Reservation
- ○ College/University Campus
- ○ Other Federal Sites
- ○ Other
- ○ Unknown

Please complete Unit Information for ***each*** unit involved in a ***fatal*** crash. Do not repeat the information in the fields above on multiple pages.

25 Unit Information

Unit No

Driver Restrictions Compliance
- ○ No Restrictions/ Not Applicable
- ○ Restrictions Complied With
- ○ Restrictions Not Complied With
- ○ Compliance Unknown
- ○ Not a Pennsylvania Driver
- ○ Unknown Compliance

Driver Endorsement Compliance
- ○ None Required
- ○ Required - Complied With
- ○ Required - Non Compliance
- ○ Required - Compliance Unknown
- ○ Not a Pennsylvania Driver
- ○ Unknown Compliance

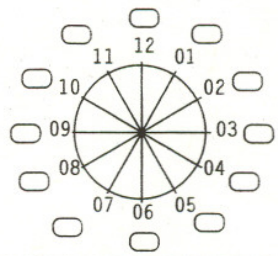
Driver License Compliance
- ○ Not Licensed
- ○ Not Required for Vehicle Class
- ○ No Valid License for Class
- ○ Valid License for Class
- ○ Unk if CDL or CDL Required
- ○ Not a Pennsylvania Driver
- ○ Unknown

Drug Test Type
- ○ None
- ○ Blood
- ○ Urine
- ○ Other
- ○ Unknown if Test Given

Drug Test Results - (Up to Four Results)

0 = No Test Given
1 = No Drug Reported
2 = Marijuana
3 = Cocaine
4 = Opiates
5 = Amphetamines
6 = PCP
8 = Other
9 = Unknown Test Results

Principle Impact Point
- ○ Non-Collision
- ○ Top
- ○ Undercarriage
- ○ Towed Unit
- ○ Unknown



Avoidance Maneuver
- ○ No Avoidance Maneuver
- ○ Braking - Skid Marks Evident
- ○ Braking - No Skid Marks, Driver Stated
- ○ Braking - Other Evidence
- ○ Steering - Evidence or Driver Stated
- ○ Steering and Braking Evidence or Stated
- ○ Other Avoidance Maneuver
- ○ Inconclusive
- ○ Unknown

Under Ride Indicator
- ○ No Underride or Override
- ○ Underride, Compartment Intrusion
- ○ Underride, No Compartment Intrusion
- ○ Underride, Compartment Intrusion Unknown
- ○ Override, Other Vehicle
- ○ Unknown if Underride or Override

Sample

Emergency Use
- ○ Not in Emergency Use
- ○ Lights Flashing
- ○ Siren Sounding
- ○ Both Lights and Siren
- ○ Unknown

25 Unit Information

Unit No

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- ○ Restrictions Complied With
- ○ Restrictions Not Complied With
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- ○ Towed Unit
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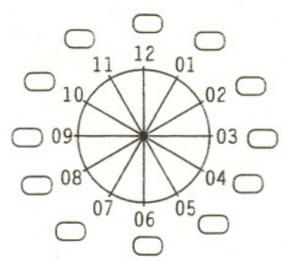

Avoidance Maneuver
- ○ No Avoidance Maneuver
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- ○ Braking - No Skid Marks, Driver Stated
- ○ Braking - Other Evidence
- ○ Steering - Evidence or Driver Stated
- ○ Steering and Braking Evidence or Stated
- ○ Other Avoidance Maneuver
- ○ Inconclusive
- ○ Unknown

Under Ride Indicator
- ○ No Underride or Override
- ○ Underride, Compartment Intrusion
- ○ Underride, No Compartment Intrusion
- ○ Underride, Compartment Intrusion Unknown
- ○ Override, Other Vehicle
- ○ Unknown if Underride or Override

Emergency Use
- ○ Not in Emergency Use
- ○ Lights Flashing
- ○ Siren Sounding
- ○ Both Lights and Siren
- ○ Unknown

COMMONWEALTH OF PENNSYLVANIA
POLICE CRASH REPORTING FORM

AA 500 M

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Page

New

Change/ Continuation

Crash Number

S A M P L E

For Answers to the below (except for Engine Size and Helmet Type) use the following codes: Y = Yes N = No U = Unknown

26 **Motorcycle**

Unit No

Engine Size: CC

Motorcycle Has? **The Driver Has?**

- Passenger
- MC Education
- Saddle Bag and/ or Trunk
- Trailer

Driver Protection ?

- Eye Protection
- Long Sleeves
- Long Pants
- Over Ankle Boots

Helmet Type

0 = No Helmet
1 = Full Helmet
2 = 3/4 Style
3 = Half Helmet Style
9 = Unknown

- Helmet Stay On?
- Helmet has DOT or Snell Designation

Passenger Protection ?

- Eye Protection
- Long Sleeves
- Long Pants
- Over Ankle Boots

Helmet Type

0 = No Helmet
1 = Full Helmet
2 = 3/4 Style
3 = Half Helmet Style
9 = Unknown

- Helmet Stay On?
- Helmet has DOT or Snell Designation

27 **Pedalcycles**

Unit No

Use Codes
Y = Yes
N = No
U = Unknown

- Passenger?
- Helmet?
- Head Lights?
- Rear Reflectors?

Unit No

Use Codes
Y = Yes
N = No
U = Unknown

- Passenger?
- Helmet?
- Head Lights?
- Rear Reflectors?

28 **Pedestrian**

Unit No

Pedestrian Signals

- Yes
- No
- Not at Intersection

Pedestrian Clothing

- Light
- Dark
- Reflective
- Unknown

Pedestrian Location

01 = Marked Crosswalks at Intersection
02 = At Intersection - No Crosswalks
03 = Non-Intersection Crosswalks
04 = Driveway Access
05 = In Roadway
06 = Not in Roadway
07 = Median
08 = Island
09 = Shoulder
10 = Sidewalk
11 = < 10 Feet Off Road
12 = > 10 Feet Off Road
13 = Outside Trafficway
14 = Shared Paths/Trails
99 = Unknown

Unit No

Pedestrian Signals

- Yes
- No
- Not at Intersection

Pedestrian Clothing

- Light
- Dark
- Reflective
- Unknown

Pedestrian Location

01 = Marked Crosswalks at Intersection
02 = At Intersection - No Crosswalks
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08 = Island
09 = Shoulder
10 = Sidewalk
11 = < 10 Feet Off Road
12 = > 10 Feet Off Road
13 = Outside Trafficway
14 = Shared Paths/Trails
99 = Unknown

29 **Work Zone**

Work Zone Type

- Construction (Long Term)
- Maintenance (Short Term)
- Utility Company
- Other

Where in Work Zone ?

- Before 1st Work Zone Warning Sign
- Advance Warning Area
- Transition Area
- Activity Area
- Termination Area
- Other

Work Zone Speed or Advisory Limit

Workers Present

- Yes
- No
- Unknown

Law Enforcement Officer Present

- Yes
- No
- Unknown

Special Work Zone Characteristics

(Mark all that apply. If not involved or unknow, leave blank)

- Lane Closure?
- Road Closed with Detour?
- Work on Shoulder or Median?
- Intermittent or Moving Work?
- Flagger Control?
- Other

List all Warning Signs in Narrative

Additional M-Page Information

FORM # AA 500M (12/02)

COMMONWEALTH OF PENNSYLVANIA
POLICE CRASH REPORTING FORM

AA 500 C

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Page:

◯ New

◯ Change/ Continuation

Crash Number

SAMPLE

Commercial Vehicle Information

23

Unit No

Number of Axles (Code Number of Axles or '99' for unknown)

Carrier Phone ( ) -

Carrier Name

Address

GVWR

Oversize Load
◯ Yes ◯ No
◯ Unknown

City

State

Zip

USDOT#

ICC #

PUC #

Cargo Body Type
◯ Not Applicable
◯ Van/Enclosed Box
◯ Cargo Tank
◯ Flat Bed
◯ Dump
◯ Concrete Mixer
◯ Auto Transport
◯ Garbage/Refuse
◯ Bus
◯ Other/Unknown

Hazardous Material
◯ Yes ◯ No

Enter 1-digit hazardous material class

Release Indicator 1 = No Release 2 = Release Occurred 9 = Unknown

Vehicle Configuration
◯ Not Applicable
◯ Passenger Car - Only Record if HazMat Placard Displayed
◯ Light Truck (Van, Mini-Van, Panel, Pickup or SUV with HazMat Placard)
◯ Single Unit Truck (2 Axles, 6 Tires)
◯ Single Unit Truck (3 or More Axles)
◯ Single Unit Truck (Unknown Number of Axles)
◯ Truck/Trailer(s)
◯ Truck Tractor (Bobtail)
◯ Tractor/Semi-Trailer(s)
◯ Medium/Heavy Truck - Cannot Classify
◯ Small Bus (Seats 9-15 People, Including Driver)
◯ Bus (Seats More Than 15 People, Including the Driver)
◯ Other
◯ Unknown

Commercial Vehicle Information

23

Unit No

Number of Axles (Code Number of Axles or '99' for unknown)

Carrier Phone ( ) -

Carrier Name

Address

GVWR

Oversize Load
◯ Yes ◯ No
◯ Unknown

City

State

Zip

USDOT#

ICC #

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Cargo Body Type
◯ Not Applicable
◯ Van/Enclosed Box
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◯ Flat Bed
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◯ Auto Transport
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◯ Bus
◯ Other/Unknown

Hazardous Material
◯ Yes ◯ No

Enter 1-digit hazardous material class

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Vehicle Configuration
◯ Not Applicable
◯ Passenger Car - Only Record if HazMat Placard Displayed
◯ Light Truck (Van, Mini-Van, Panel, Pickup or SUV with HazMat Placard)
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◯ Single Unit Truck (3 or More Axles)
◯ Single Unit Truck (Unknown Number of Axles)
◯ Truck/Trailer(s)
◯ Truck Tractor (Bobtail)
◯ Tractor/Semi-Trailer(s)
◯ Medium/Heavy Truck - Cannot Classify
◯ Small Bus (Seats 9-15 People, Including Driver)
◯ Bus (Seats More Than 15 People, Including the Driver)
◯ Other
◯ Unknown

FORM # AA-500C (12/02)

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Publication Title: Using Crash Data to Improve Safety in the Delaware Valley

Publication Number: 09020

Date Published: May 2010

Geographic Area Covered: DVRPC's nine-county region: Burlington, Camden, Gloucester, and Mercer counties in New Jersey, and Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania

Key Words: Accidents, crashes, fatalities, injuries, safety, transportation, data, analysis, cluster finder, summary, Plan4Safety, Safety Analyst, strategic highway safety plan, highway safety improvement program

Abstract: Vehicle crashes have resulted in 474 traffic fatalities in the Delaware Valley region per average year between 2005 and 2007. In 2008, 379 people lost their lives in traffic crashes in the nine-county region, a decrease of 30 percent over 2008. While this trend is encouraging, the numbers are still too high.

This report details what a crash data user should know, with a focus on New Jersey and Pennsylvania. Terms are defined, the differences between the states are explored, and the various ways in which the data is used are discussed, including DVRPC's programs. The final chapter—Future Directions in Crash Data Management—highlights technological advancements in analysis designed to make data manipulation easier, and the results more reliable.

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