

CHAPTER 21

ACCIDENT INVESTIGATION AND RECONSTRUCTION¹

Wisdom ceases to be wisdom when it becomes too proud to weep, too grave to laugh, and too selfish to seek other than itself.

— Kahlil Gibran

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§ 21-1. Introduction.

While the majority of DUI arrests and police contacts do not involve serious injury or death, those that do are generally taken as a very serious matter by prosecutors, and in those instances these cases are difficult to defend.

There are several reasons why DUI fatality or serious bodily injury cases are difficult to defend and prepare properly for trial. The first reason centers on defense attorneys themselves. Most attorneys, while well-versed in the prosecution of DUIs and DUI law, have little knowledge or trial experience in the preparation of the numerous mathematical and engineering computations which may be involved in such cases.

While most witnesses, police officers, ambulance drivers, tow truck operators, and hospital personnel are eager to speak with the prosecution and give their opinions as to the defendant's possible impairment, driving patterns, etc., these same people will often not talk, or cooperate, with the defense.

Another important factor to be considered in this type of case is that the investigating officer(s) generally have many years of experience handling serious accidents of this nature. Most officers sent to investigate these type of accidents are often highly trained, well-qualified, and know what evidence is important for successful prosecutions.

Not only does the defense team have the qualifications of the investigator to deal with, but the prosecution is also generally well-versed and experienced in the handling of this type of case, with many jurisdictions placing their most qualified prosecutors in charge of such matters.

1. This section was prepared with the assistance of Rick Swope, an expert accident reconstructionist with Swope Reconstruction, P.O. Box 290547, Davie, Florida 33329-0547, (954) 476-7640. The author thanks Mr. Swope for his expertise and assistance.

The most important aspect of accident analysis is the physical evidence itself. A standard DUI case involving a breath test usually consists of the introduction and review of several documents that the prosecution has produced, the breath technician's license and background, and the breath reading itself. Generally, such evidence is not voluminous and takes little time to review.

A DUI manslaughter prosecution is an entirely different matter. A specially trained investigating officer usually arrives on the accident scene within the hour. Most likely the vehicles have not been moved, and once the lead investigator arrives, many things quickly occur.

The lead officer often makes a determination early on if some type of impairment by one or more (if applicable) of the operators is present. If the officer has a suspicion, based on a number of probable cause scenarios, that drinking or drug use has been involved, a blood or breath test will be initiated. The issue of what type of probable cause is needed is addressed in other parts of this book.²

Once the initial evaluation of the accident has been completed by the lead officer, the collection of physical evidence begins. Witness statements may be recorded at the scene or within a matter of days by the investigator. Photographs are taken at the scene, and in some cases videotaping of the scene is conducted as well. Measurements are taken of any markings on the roadway, such as skid marks, scuffs, gouges, or scratches which the officer may have located. cursory measurements are taken of the roadway and area. Most officers only measure what is needed at this time, as they can always come back the next day or two and complete a diagram of the scene. Since this type of accident is taken very seriously by the officers, and due to the fact that most drinking driver fatalities occur in the early morning hours when it is dark, a well-trained officer will not want to risk the chance of missing something and will come back at another time in the daylight to complete the measurements, and take additional daytime photos of the scene and area.

Once the scene has been measured and photographed, an initial inspection of the vehicle or vehicles will occur. The officer will make note of items such as the proper operation and usage of the seat belt, as well as any mechanical problems which may occur or are complained of by a driver. Once this is completed, the vehicles will be inventoried and moved by tow truck to a secure location where the officer can complete a more thorough inspection. Very few jurisdictions release the vehicles within twenty-four hours; however, it does occur on occasion.

Upon completion of the officer's at-scene investigation, witness statements, interview(s) of the suspect, and a more complete inspection of the vehicles follow, usually within one or two days.

2. See § 9-1, *infra*.

The investigating officer will now often concentrate on the report itself, as to fault, contributing error by either driver, and other factors suggesting what happened to cause the accident. If blood was taken at the scene or at the hospital, a blood analysis will usually be available to the officer within five to ten days. If a breath test was conducted, the investigator may know the suspect's impairment immediately.

In fatality cases, based upon the autopsy report(s) being prepared by the medical examiner, and after the primary information has been obtained, the officer prepares a report of the accident. This report in some jurisdictions can be extremely detailed, with reports commonly being over one hundred pages in length, while in other jurisdictions reports may consist of five to ten pages, such as "saw drunk, drunk was speeding resulting in an accident, arrested same."

When the defense attorney receives such a traffic (homicide) report, the accident scenario and report must be carefully analyzed, not only as to content, but as to how the investigator reached his or her opinions in the case.

For instance, many officers believe that if a person is making a lefthand turn in front of opposing traffic, and is involved in an accident with an oncoming car, the turning driver is always at fault, no matter the circumstance. My questions to such officers always center on the argument "what if the oncoming car is exceeding the posted speed limit?" Most officers will respond that even if the oncoming vehicle is traveling one hundred miles per hour, the vehicle making the lefthand turn is still at fault. Obviously, most reasonable persons would not agree, but many officers cannot get over this initial hurdle. Quite a few accident cases center on this issue, which is why I am using this example.

Once the initial homicide report is reviewed and evaluated by the attorney, issues in the case are generally clear, assuming that impairment is the issue. Obviously, countless types of driving that caused or contributed to the cause of the accident can be evident, such as speeding, running a traffic control device, improper lane usage, and so on.

A replication of the accident site is generally available through the depiction of a scale diagram prepared by the officer. This diagram usually contains measurements, physical evidence observed or collected by the officer, the officer's opinion how the vehicles came together at the time of the collision, and where the vehicles came to rest after the initial impact. A review of the photos and an inspection of the accident scene itself will lead the attorney to an understanding of the site layout, environmental factors, and the like.

§ 21-2. Do I Visit the "Scene of the Accident"?

I am constantly asked by attorneys if it is necessary that they themselves visit the scene of the accident. The answer of course is simple. I have no idea how anyone could prepare themselves properly to assist, cross-examine, or be

familiar with the crash without visiting and evaluating the accident scene itself. A visit to the site with the client, witnesses, accident reconstructionist, or any other necessary parties can be extremely important. Meeting with the client and witnesses at the scene of the accident can be very valuable in assisting me as to where and what a particular person might see or not see, his or her plane of view, traffic flow, and any other conditions that may exist.³

While at the scene, the attorney can evaluate what has been alleged in the traffic (homicide) report. Photographs will assist in checking and rechecking positions of vehicles, physical evidence and environmental factors the officer may have cited in his or her report. If the report has been completed in a relatively short time from the time of the accident, police markings and physical evidence may still be at the scene. Additional photographs should be taken by the attorney if a reconstructionist has not yet been retained, since these photos can be used at a later time to confirm and evaluate police photos and measurements.

§ 21-3. Do I Hire an Expert?⁴

At some point, the attorney must make the decision as to whether an accident reconstruction expert should be retained. It is obvious that numerous factors come into play, with money being only one consideration. Since a vehicular homicide case involving a DUI is extremely time-consuming and difficult to defend, the attorney's fees are much higher than a simple misdemeanor DUI case. Many clients also have a considerable amount of money to expend on other matters, such as the repair of their vehicle, insurance troubles, possible loss of their license and ability to earn an income, etc.

Many articles, books, journals and publications have addressed the retaining of an expert witness and what type of qualifications one should or must have. Criminal cases are an area in which many reconstructionists do not wish to be retained to give opinions.⁵

One of the areas of concern for most experts is the fact that it is not generally a good idea to make enemies of the investigating officers from one or more police agencies, because the officer who conducts the criminal investigation for a defendant is the same officer who can become a friend when working a

3. In civil cases, an attorney may have the luxury of meeting with the investigating officer. In most criminal cases, however, unless working for the prosecution, the officer will often decline to meet with the defense attorney. Most departments have strict policies forbidding their officers from meeting with defense attorneys without a subpoena while a criminal investigation or prosecution is still in progress.

4. For more discussion about the topic of the expert witness, please see Chapter 15, *infra*.

5. But cf. *State v. McConnell*, 449 S.E.2d 778 (S.C. App. 1994) (defendant's expert witness precluded from testifying as to accident reconstruction of motorcycle accident that concluded that the deceased was the actual operator of the vehicle).

complicated and potentially lucrative civil case. If the investigator works a case where his work discredits the investigation, the officer and his partners may not be so quick to meet with the investigator on the next case.

In searching for your expert, word of mouth is obviously an extremely reliable indicator. When receiving a name from another attorney, ask what type of case it was the expert reconstructed, how long it took the reconstructionist to complete his evaluation, how well the expert did before the jury, and how much the work cost. One of the most important aspects I am concerned with is how available the expert is to the attorney. A main concern should be the ability to communicate with your reconstructionist. I am not talking about the expert returning your phone call in three minutes, but did he return your call in a relatively timely fashion? Is correspondence received and answered quickly, and is the expert asking for documents to review, such as photographs, depositions and other items?

In speaking with an individual who recommends the expert, you should also ask what type of exhibits were prepared, and did they adequately convey what the expert was trying to get across to the jury. Obviously, there are countless other areas you may wish to inquire about, but those just mentioned are of greatest concern.

Remember that the fee for this type of reconstruction will no doubt be considerable, so you should research and do some work of your own prior to hiring the expert. Ask for a *curriculum vitae*, publications, educational experience, engineering experience, degrees, prior law enforcement background, teaching background, and who the expert has worked for in the past. All of this information will greatly assist you in selecting the proper expert to handle your particular case.

One other factor to note. How important is prior police experience, particularly in traffic homicide work? The problem with most individuals who call themselves "reconstructionists" is that they have never worked an accident on-scene. While the fact that an expert has never worked an accident or crime scene right after it occurred, from beginning to end, certainly does not preclude him from reconstructing the case, one who has will often have a much better understanding of your case and what may have been overlooked at the site. Decide what is most important to your case: an engineer or a former police investigator.

If you decide to hire an expert, it is important to hire the expert as soon as possible in order that the case may be carefully evaluated and prepared prior to trial. Do not wait until the case is going to trial in a few weeks!

§ 21-4. Sharing the Information.

Once you have assembled your file, you should make all information available to the expert to assist him. But remember that in most parts of the country, anything that is in an expert's file must be made available to the prosecution in discovery. Expert witnesses do not have a work-product privilege if listed as a defense witness, so if an expert reviews a document in his analysis, then this document must be included in his file and turned over to the prosecution.⁶

Obvious documents to be given to the expert include all discovery received from the prosecution, such as police reports, measurements, photos, witness statements, and any physical evidence that may have been collected by the investigating officers. If evidence is being held by the police, you may at some point request that your expert be allowed to visually inspect this evidence.

Once this information is received and reviewed by the expert, the actual reconstruction of the case will begin. In many cases involving a motor vehicle death, the police and prosecution may hold one or more of the vehicles for evidence until after the trial. It is essential that the reconstructionist personally inspect the vehicles in order to perform his own measurements, photographing and visual inspections. This is not to be confused with destructive testing (testing which will damage or change the vehicle). At this point, a proper evaluation can be made by the expert in determining angles of impact, crush analysis, seating positions, occupant restraint use and other factors which may come into play for a proper reconstruction. If any type of mechanical failures are observed or hypothesized, the reconstructionist can advise you, and it will then be up to you to make the proper motions to conduct a full-scale inspection and analysis of the vehicle.⁷

At some point early in the investigation by the expert, he will make a site visit. Initial measurements of the scene will be made, observations of any marks or physical evidence remaining will be recorded, and measurements contained in the police officer's report will be analyzed and checked. Normally, a scale diagram of the scene will be prepared which will later be used for motion hearing, trial testimony or both. A scale diagram will assist the reconstructionist in several fashions.

It will provide the expert with a view of how the police investigated and analyzed the accident, as well as the plotting of all physical evidence recorded in the traffic homicide report. The reconstructionist can use this information to ascertain if the police officers are correct in important things such as the point of impact, plotting of physical evidence, layout of the intersection, traffic control

6. For a possible way around this problem, take a look at the expert witness engagement letter at APPENDIX H.

7. It should be noted, however, that mechanical failure of a motor vehicle is extremely rare.

device placement and what the officer indicated occurred at the site of the collision. In many cases, the police diagram will not be to scale, but only a representation of the accident scene. The officer(s) will however take measurements which can be plotted on the scale diagram. Most likely, the expert will also obtain a coefficient of friction of the roadway, which will be used at another time, specifically for speed calculations.

After the site visit and inspection, the expert generally obtains the information necessary to assist him in evaluating the case and getting a picture of what may have occurred. It is doubtful that any formal opinions will be reached at this time, but if any physical evidence is still remaining, this of course will be measured and evaluated.

On numerous occasions, I have found mistakes in the police investigation, and the majority of these mistakes are made at the scene. The most common error made by the investigating officers is the inability to locate distinguishing marks that can properly identify the individual vehicles, and if these marks are identified, to correctly label them.

In one such accident, the individual was driving a pickup truck which was loaded, and pulling a trailer with a suspected inadequate braking system. The pickup truck skidded a considerable distance before making contact with a vehicle that did not yield the right-of-way, striking the vehicle in the left front door. The investigating officer in this case not only misidentified the braking distance of the vehicle (this was confirmed through measurements and photographs), but also misidentified the trailer braking actions as well. The photographs in this case clearly showed no braking of the trailer, thus the speed estimates by the officer were off considerably.

At some point after the initial work has been performed and evaluated by the expert, the actual reconstruction will begin. Vehicle inspections are a great asset to the expert and if the cars are available or can be located, measurements and photographs are a must. Many times in serious injury cases involving drinking drivers, contributory factors can assist the defending attorney greatly. Cases where an occupant is ejected or not wearing a seat belt/shoulder harness and is killed or injured may not have ended so drastically had the occupant restraint system been used. A tire that deflates at highway speeds can contribute to an accident or incident with a motor vehicle. These are just a couple of examples why an inspection is so important to the accident reconstructionist for his evaluation. If the cars are not available, then information contained in the police report, most likely unfavorable to your client, is the only available information. The obtaining of vehicle statistics for review will also be done by the expert witness.

Since the reconstruction expert will work on his opinions as to analyzing the case, the attorney should be able to quickly recognize several areas of a homicide report and evaluate these areas. This evaluation will easily allow the

attorney to have a reasonable idea of what the police are alleging and what type of factors to look for, or to direct the expert to a highlighted area. This understanding not only will assist the attorney in reviewing his client's file, but will assist in cross-examination of opposing witnesses and police officers. Although many of the formulas used by the reconstructionist are technical and somewhat difficult to figure mathematically for those who have been out of the math loop since high school or college, some are very easy to use and should assist the attorney in several areas.

§ 21-5. Time and Distance.

In accident reconstruction, two areas are the essence of every case: time and distance. If the expert witness can correctly identify these two areas, over half of the work is already completed. In the majority of the cases, speed is a concern, or at least an issue. Speed of course does not have to concern only the defendant's vehicle; it many times can concern the other vehicle(s) as well.

Speed issues relate in most cases to the cause of the accident. If your client was exceeding the posted speed limit, how fast was he actually traveling? If running a red light, striking a vehicle in the rear, running off the roadway, crush damage to another vehicle, and countless other scenarios are involved, speed is generally the overriding concern and the one on which the police will focus much of their investigation. In addition, most traffic homicide investigators will place their speed estimate in the report, many times with little information as to how they arrived at the speed alleged. Even in cases where excessive speed is not involved, the police may indicate that the defendant driver failed to react properly and should have had more than sufficient time to react and avoid this accident. It is easy to observe that speed issues should be familiar to the attorney, who in turn should have an understanding of the time and distance issues in the case.

Let's address first the easiest of the speed issues, which deals in feet per second. In this example I will use a speed of 45 miles per hour. With a calculator, simply punch in 45 and multiply this number by 1.466.⁸ Your answer should be 65.97 feet per second. Now, do this with any other speed you wish, such as 60 miles per hour. By again using 1.466 times 60, your answer is 87.96 feet per second.

Why is the converting of miles per hour to feet per second so important? We have already discussed the importance of issues relating to speed. As indicated previously, time and distance are the essence of accident reconstruction; therefore the attorney must also be aware of simple issues as well. As an example, we will assume that your client has been charged with traveling at 50

⁸. You arrive at the number 1.466 by taking the number of feet in a mile (5280) and dividing it by the number of seconds in an hour (3600).

miles per hour in a posted 30-mile-per-hour zone. It is important that you understand what type of distance the driver is covering at 50 miles per hour. A driver going 50 miles per hour is traveling at 73.3 feet per second. Therefore, if the driver is approaching an intersection and a traffic signal changes from green to yellow (normally, yellow lights will stay cautionary for four seconds), the driver will be traveling at 73.3 feet per second, i.e., 50 miles per hour. Where is your driver when the light changes to yellow? If the light is a four-second yellow, your driver is up to 293.2 feet away when the light goes from green to yellow. This will give you some idea as to where your driver was and how much time was available for him to stop.

Obviously, there are countless scenarios which occur in accidents, but a brief understanding of feet per second analysis will give you an understanding of what may or may not have occurred at the accident site.

To further understand the use of feet per second, you must also be aware of some time factors. Although many accident reconstruction books, manuals and journals indicate several different analogies as to calculating reaction times, I tend to concentrate on the following aspects.

A driver proceeding down the road is constantly on the lookout for hazards on and off the road, around the area he or she is traveling. The driver is judging traffic signs, signals, traffic control devices, as well as hundreds of other visual data. In the past several years, drivers are contending with other factors as well, primarily the use of cellular phones. I cannot count the number of times I have literally been run off the road by individuals on cell phones who were paying little or no attention to their path of travel. I am not aware of any statistics to indicate the number of accidents caused by cell phones; however, I am sure the numbers would be surprising.

A driver tends to reach reaction time in several fashions. One factor is what is known as *pre-perception time*. A driver may observe or perceive some type of possible hazard ahead of his path of travel, yet this particular hazard, or possible hazard, has not yet arisen as a problem. An example would be a child who is quite some distance off the roadway. The driver sees the child, yet the child is not near the roadway and it appears as if the child will not approach or enter the road. The child has been perceived by the driver, yet the driver need take no action at this time. As long as the child remains in the general area he was observed by the driver, or continues to move further from the roadway, no action will be taken by the driver.

If, however, the child begins to run or approach the roadway, then the driver continues to watch and process what is occurring. This situation may cause the driver to initiate a subtle reaction, such as letting up on the gas and beginning to slow down. The driver has reacted, but not as an emergency reaction. Therefore, we have different phases: pre-perception, perception, and reaction time. The general standard duration for these phases is 1.0 to 1.75 seconds. Obviously,

there are other factors that can change this, such as age, the event itself, and, of course, impairment. However, as a general gauge, most reconstruction experts will use the 1.0 to 1.75 seconds indicated above.

Impairment however is another issue entirely. It generally is not disputed that alcohol causes the reaction times of individuals to increase. The question a reconstruction expert is always asked in his analysis of an accident where alcohol is a factor is how much more time would it take the impaired person to react versus the unimpaired person. This question is difficult to answer or address.

When a reconstruction involving an impaired individual is involved, several factors are looked at very closely. When looking at the accident scene, the absence or indication of evasive action is extremely important. If skid marks or other physical evidence are present, this of course indicates that the operator perceived whatever the hazard may have been, and did in fact react. When a reaction is present from the impaired operator, the reconstructionist must evaluate if the reaction was proper. An example would be an impaired driver who, approaching a green light, skids to a stop prior to entering the intersection. Obviously, this indicates a reaction, but an improper one. *If the impaired driver begins to brake but still collides with another vehicle, the expert should analyze the reaction of the operator. An example would be a vehicle that pulls out in front of the impaired operator.* The reconstructionist will evaluate the times and distances as well as the speeds involved. During this type of reconstruction analysis, the reconstructionist first makes an analysis assuming the driver to be unimpaired. If an unimpaired driver would have been unable to avoid this same collision, then the fact of alcohol affecting the impaired driver may be minimal.

Reaction times are also areas where experts go to extreme corners of a given range in an attempt to prove or disprove a point. The perception reaction times discussed earlier of 1.0 to 1.75 seconds are generally under normal conditions, meaning that no adverse conditions are present such as rain, snow, an alert operator, or the like. A driver's reaction time in a vehicle vs. pedestrian crash at night may range as high as three seconds.

We now know the basic perception and reaction times for unimpaired drivers; therefore, we must have some type of gauge for the impaired driver. Additional factors that must be looked at consist of age, emotional stresses or indications of stress, any disabilities an operator may have, and any other factors that you become aware of during your investigation of a case.

Countless studies of alcohol have been performed and evaluated over the last fifty years. However, few actual studies have been done regarding the reaction time of operators involved in crashes with a particular blood alcohol content level. What is readily known is that alcohol affects judgment and vision, often reducing peripheral vision, and that a driver at night will experience increased night blindness as his blood alcohol content level rises. Studies have shown that

as this level increases, the likelihood of an accident increases as well. The following chart is an estimate based on various studies from the National Highway Traffic Administration:⁹

BAC	Accident Increase
0.05%	2 times normal risk
0.08%	6 times normal risk
0.11%	10 times normal risk
0.15%	25 times normal risk
0.17%	50 times normal risk

Although the listed chart is only an average based on previous studies, it is a good indicator to evaluate and assist you in your case preparation.

What is the reaction time that a reconstruction expert should use in evaluating a case? This is an often-asked question, and one where answers vary greatly. Based on the above study and his experience, noted accident reconstructionist Rick Swope uses the following formula.¹⁰

BAC Level	Reaction Time
0.05%	1.0 to 1.5 seconds
0.08%	1.0 to 2.0 seconds
0.10%	1.0 to 2.0 seconds
0.15%	2.0 to 2.50 seconds
0.20%	2.50 to 3.0 seconds

As indicated previously, these numbers are not scientific and are based on Mr. Swope's studies of alcohol and impaired subjects. Various papers and materials list some times that are shorter, and some times that are longer. Each case should be dealt with as a separate issue.

While most accidents that involve serious injuries or death need an expert to give an opinion as to what actually occurred, the attorney should make a decision early in the case as to what type of assistance be needed. If the prosecution is slow in delivering information and evidence to you, an effort must be made to obtain the information as quickly as possible, since most evidence on the roadway evaporates or is destroyed quickly. As a precaution, good accident

9. See RUDOLPH LIMPET, MOTOR VEHICLE ACCIDENT RECONSTRUCTION AND CAUSE ANALYSIS (Michie, 4th ed. 1994) at 543.

10. Mr. Swope bases his formulas on Chapter 28 of Limpert's MOTOR VEHICLE ACCIDENT RECONSTRUCTION AND CAUSE ANALYSIS, as well as on years of personal research.

scene photographs should be taken quickly, as well as photographs of the vehicles involved. Once this is done, a reconstructionist can at the least use these photos to assist in the reconstruction of the accident at a later date.

The information discussed in this chapter should assist you in the initial review of the case. Just as an attorney is needed to assist a defendant charged with a serious crime, a professional reconstructionist can be used to detail and help in the preparation of your case for trial. Many times, due to the physical evidence, police report, witness statements, and other factors, the testimony that an accident reconstructionist can give may not be helpful. At this point, the expert may assist the defense team in providing questions for the witnesses, investigating officers and opposing expert witnesses.