Collision Scene Photography

by Brad Silver*

Editor's Note: *In legal actions relating to alcohol-related crash investigation, photographs are a key evidentiary component. A picture is worth more than a 1,000 words in vehicular homicide cases. A crash scene is different from a typical homicide scene. Crash sites are open. An accident reconstruction instructor for 23 years, Brad Silver concentrates on the when, why, what, and how of accident reconstruction photography.*

The purpose of this article is not to teach the investigator how to operate a camera although some basic tips will be given. With the advent of automated, compact 35mm cameras and inexpensive digital cameras, nearly anyone, with a minimal amount of effort, can take quality photographs. Obviously the more complex the camera, the more that can be done with it, and the more time that must be spent to learn how to maximize its potential. This article concentrates more on when, what, and how the investigator should photograph a scene.

Reliable Evidence Source

Historically, for over 100 years, photographs have been an accepted, accurate, and reliable source of evidence in courtrooms. Photographs can preserve and store information more accurately than personal memory and can enhance the ability of the observer by documenting details that might otherwise be missed. (Kodak, "Using Photography to Preserve Evidence" (Pub. #M2) (1976).) Photographs enable the matching of an object to the damage that it caused: tire marks to the tire that left it or a fabric imprint to the clothing that made it. Certain types of photography, such as infrared, can reveal evidence not visible to the naked eye, thereby extending the observation abilities of the investigator.

When and what to photograph is complicated by the open nature of a crash scene. Even though operators of involved vehicles may be charged with crimes as serious as vehicular homicide, the crash scene is unlike a homicide scene. In homicide scenes the home or yard is cordoned off and access is strictly limited until a complete collection of evidence, photographs, and analysis is done. Crash scenes on the other hand are very open. Passing motorists stop to help; bystanders wander through or stand in the scene gawking; emergency fire personnel walk, drive, and work in the scene, spray down roads, move evidence, and cut vehicles apart; medical personnel remove clothing, victims, witnesses, and defendants from the scene; Department of Transportation vehicles salt or sand the road, destroying or obscuring evidence. While the homicide detective can control and take as much time as is needed, the traffic investigator is under pressure to collect and document evidence, clear the scene, and open the road. Frequently the investigating officer, in addition to the myriad of tasks required at the scene, will also have to document the scene through photographs as well as measurements. The sooner the photographs are taken the more likely they will depict the scene as found.

Photographic Routine

Whenever there is a crash, alcohol-related or not, that involves a fatality, serious personal injuries, a governmental entity, or significant property damage there should be photographs taken. This does not mean that the department must incur great expense in processing the photographs for there are a number of options available. The rolls of exposed film can be stored for possible criminal or civil litigation and processed when needed. The photographs can be processed but with only negatives and a proof sheet, saving the expense of producing sets of prints that may never be needed. With digital cameras, photographs can be stored on a disk or in a computer and viewed as needed without ever printing them. Digital cameras allow the photographer to view the picture immediately on the camera and decide to save it, or delete it and shoot again. Digital photos can be printed on inexpensive color printers in color or black and white. Digital technologies as well as scanning of traditional film pictures allow photos to be merged into reports and or sent via modem to the prosecutor or other investigators.

Secure Scene, Limit Access. Given the nature of the crash scene, the investigator must secure the scene as soon as possible and limit access as much as possible. Photographs should be taken as early in the investigation as permissible since the scene will deteriorate the longer it is active. For those departments relying on an evidence technician to take photos, this could result in a delay as long as an hour or more depending on where the collision occurs, the time of day, and traffic patterns. Important evidence may be lost while waiting for an evidence technician to arrive and take photographs. To counter this, patrol vehicles could be equipped with a simple camera. Responding officers could then shoot photos as soon as they arrived at the scene and document valuable evidence that might otherwise be lost while waiting for an evidence tech.

Familiarity With Equipment. No matter what approach is taken, the person taking the photographs should be familiar with the equipment that is to be used. This equipment should be kept in an appropriate environment, free from temperature extremes, dust, and moisture. Batteries for the camera and flash should be checked periodically and film supplies refreshed after each crash. Each investigator should develop their own routine for photographing a scene and follow it. This will insure that important shots or evidence are not missed.

Sample Routine

One routine that works well is the following:

1. Take a few minutes to "read the scene" and determine what is pertinent evidence; where the impact area is; if there are there gouge marks, tire marks, debris patterns, damage to fixed objects, etc.
2. The investigator will then want to clear the scene of all extraneous personnel, vehicles, and equipment and then begin shooting the scene. If emergency vehicle(s) cannot be moved at the time the pictures are being taken, take the pictures and reshoot those photos when the vehicle(s) have moved.

See PHOTOGRAPHY, next page

Brad Silver is an associate training technician for the New York State Division of Criminal Justice Services. He is an accident reconstructionist who has been an expert witness in over 100 cases nationwide.

PHOTOGRAPHY, from page 78

3. The photographer should begin at the approach path of one traffic unit, photographing the approach shots while walking into the impact area. The investigator should continue photographing pertinent evidence circling around the impact/final rest areas. Finally the photographer backs out the approach path of the other traffic unit, photographing that unit's approach views. This works well for still photography or video.
4. Once the walk through is complete, the photographer can then take additional shots that may have been missed or do close-up or sequence shots as needed.

What to Photograph

Things that are pertinent to the investigation and should be documented with photographs are:

- Approach paths of involved traffic units including lines of sight, any view obstructions that may be present, and shot at driver's eye level.
- Point of impact, if this can be established, as well as points of possible perception and actual perception (some of these may have to be shot or reshot on a subsequent day after some analysis).
- Eyewitness positions and views.
- Position of vehicles at their final rest—insure that these are uncontrolled final rest positions and not controlled rest positions (document both if able). If vehicles are to be moved before photos can be taken, mark wheel placements and photograph later.
- Position of victims—if the body is going to be moved, photograph if possible or mark the position for photographing at a later time.
- Overall view of scene.
- Close-ups or detail shots of damage or evidence at the scene.
- Photograph pertinent evidence—gouge marks, tire marks, fluid sprays or paths, debris fields, blood stains, tire prints, impressions, footprints, marks to road surface, damage or lack of damage on vehicles, interior of vehicles, scarring to fixed objects, furrows, points of take off and landing, incriminating evidence (such as beer bottles, joints, baggies, foil, weapons), any trace evidence such as fabric, hair, flesh, clothing worn by victims, soles of shoes, paint chips, broken pieces of vehicle, etc.
- Photograph any signing that precedes the crash scene, particularly regulatory, cautionary, and construction signs.
- Traffic control signals.
- Reference point that measurements are taken from.

General Information

The old adage "a picture is worth a 1,000 words" is no more appropriate than in a courtroom. The investigator can show in one photograph more detail than he could describe in thousands of words. Photographs allow the investigator to bring into court things that are not physically possible otherwise. (J. Auten, "Traffic Collision Investigation: Photographing the Crash Scene," Law and Order (Jan. 1988).) Photographs enable the jury to see what the investigator saw, what the involved parties could or should have seen, and depict damage more powerfully than mere words. The admissibility of such photographs is dependent on the investigator taking the right photographs in the right manner. The legal admissibility will be discussed in more detail later.

Not Substitutes for Notes, Measurements. Even though photographs are powerful in relaying information, they are not substitutes for accurate measurements and field notes. Photographs are used to supplement field notes not replace them. Trying to document measurements from photographs that were not taken in the field can be extremely difficult, time consuming, costly, and impossible in some cases.

Photographs Can Lie. Another old adage, "photographs don't lie," is not always true. Photographs can be doctored to represent something that did not take place. This has become so easy that it has reached the level of home entertainment. Teenagers with the aid of computer software are able to morph or alter photographs with minimal equipment. The advent of digital photography and computers now makes this a real possibility. This does not mean that computers cannot be used to enhance a photograph or bring out some special detail, but there should never be a case where a photograph is deliberately altered to depict something that did not occur. When using digital technology the digital photographs need to have a documentation trail that secures the original photographs from tampering and documents any subsequent generation photograph.

The photographer must keep in mind that while an undoctored photograph does not lie, it can certainly be shot in such a way that it will either intentionally or unintentionally distort or misrepresent the scene being photographed. Telephoto lenses will compress the depth of field and wide angle lenses create photographs that distort the portions of image that are further from the center of the photograph. Tilting the camera side to side can make an incline appear level and a level surface appear inclined. Shooting down or up at a scene will compress or elongate the image being photographed. The camera should always be held level on the horizontal plane and perpendicular to the vertical plane unless there is a special reason for doing otherwise. Whenever the camera is moved off the appropriate plane the photographer should be ready to explain the reason and any resulting distortion.

Driver, Witness Perspective. Photographs that are taken to represent what a driver or witness saw or could have seen should be shot under similar conditions and positions experienced by that person. The height at which the photograph is to be taken is determined by what perspective the photographer is attempting to show. If it is the perspective of the operator of a motor vehicle, it should be shot at the eye level of the operator seated in the vehicle. If it is the eye level of a driver seated in a tractor trailer, the height may be seven to eight feet above the ground as opposed to 36 to 40 inches for an automobile driver. To show proper lines of sight and possible obstructions caused by the vehicle structure, photographs should be shot from the inside of the vehicle in question or its sibling. If it is the perspective of a witness, then it should be shot from the alleged position and eye level of the witness. If glare is an issue, it should be shot at the time of day that the collision occurred and under the same lighting conditions.

See PHOTOGRAPHY, next page

PHOTOGRAPHY, from page 79

Depth Distortion. The investigator must remember that the photograph is a two-dimensional representation of a three-dimensional reality. This means that depth is often distorted in photographs. Objects in the foreground and background may appear closer or further apart than they really are. To correct this, the photographer must take additional shots at right angles to the object(s) to show the proper depth relationship between objects. When using a SLR camera, the preferred lens is a 50mm lens, which will take a photo that represents what the normal eye would see in sharp focus. The area that would be considered peripheral vision would not be included. Lenses of greater or shorter length will distort what the viewer would actually be able to see.

Identification. As with any piece of evidence, photographs must be identified by date, time, location, name of case, case number, and photographer's name. (R.W. Rivers, *On-Scene Traffic Accident Investigators' Manual* (1981).) Additionally, the investigator will want to identify on the field sketch from where the photographs were taken or the relative camera position. The more crucial the evidence, the greater the need for complete documentation of the photographic process. When using a camera with interchangeable lenses, the lens type and aperture opening (aperture opening determines the size of a "hole" or opening that the light can pass through to the film) should be recorded. The general position and direction of the photograph as well as the height of the camera should be recorded as well.

Shoot Multiple Rolls. When photographing a scene it is not uncommon for multiple rolls of film to be shot. Additionally, investigators may go from one scene to the next and wind up with numerous rolls of film. There have been occasions when film sent out for developing is separated from the order. To prevent the loss of film and insure that the roll of film is easily matched to the case, the first shot on each roll should be of an ID sheet. ID sheets bear the case number, case name, name of photographer, and agency name. With ID shots, the film, when developed, will identify to whom the film belongs and who shot it. Then no matter what happens to the photographer or the film, it will be easily linked to the proper case. ID cards can be a simple sheet of paper with handwritten data or can be preprinted with spaces to fill in the specific information. There are companies that produce ID sheets in pads with a gray scale and color scale along the sides. This enables the photograph to be color adjusted to insure that the colors in the photographs are true representations of what was photographed.

Digital Photography. Digital cameras utilize memory cards to store the images. Depending on the quality of the photograph desired, digital cameras allow the photographer to choose the detail or number of pixels to be recorded. The image size selected—usually 640 X 480 for email purposes, up to 2560 X 1920 for very fine prints—will determine the number of images that can be stored on the card. The photographer should check this setting before starting the photo process as it will affect the number and quality of the photos taken. Once photos have been taken, the original photos should be downloaded and secured as the original file and "locked" so they cannot be altered or overwritten. Subsequent copies of the photographs can then be made and distributed as needed. If photographs are viewed and disseminated before being secured, the possibility exists that they may be tampered with or altered. The secured original file is crucial to digital photographs since there is no "negative." The original file becomes the equivalent of the negative for 35mm film.

Vehicle Photographs

Photographs depicting vehicles at the scene should be shot at right angles to the roadway to show the proper relationship of the vehicle to the roadway. The number of photographs necessary to document this relationship is up to the discretion of the investigator. One rule applies: More is better. Whenever vehicles are photographed at the scene there should be an overall shot with identifying landmarks included in the photo to relate the vehicle to the overall scene. Subsequent shots of just the vehicle should include a landmark that relates the vehicle to the scene.

Include License, Registration Sticker. Photographs of the vehicle should include the license plate and/or registration sticker. When taking flash-supported photographs of reflective surfaces such as glass or a license plate the picture should be taken slightly off a right angle. This will prevent flash back or burnout on the film, which would render the license plate or subject illegible. If the camera has a detachable flash, the flash can be held at a slight angle while the camera is held at a right angle to the license plate.

Photographing Damage. To properly photograph vehicle damage requires a significant number of shots. Should the investigator be severely limited in the number of shots that can be taken, the "two best" shot rule would apply. (J.S. Baker, *Traffic Accident Investigation Manual* (1986).) This entails taking two shots at a 45-degree angle from opposing corners of the vehicle. An example would be taking a shot from the right front corner that will include the front and right sides of the vehicle. The second shot would be from the left rear inclusive of the rear and left sides of the vehicle. Which corner the picture is taken from depends on which corner will best show the damage sustained by the vehicle.

When more than two photographs can be taken, four photos, one for each side of the vehicle should be taken. Additionally, eight shots should be made: four shots front to back and back to front, down each side of the vehicle; and four shots left to right and right to left, across the front and back ends of the vehicle. When close-up shots of any pertinent damage or evidence on the vehicle is necessary, an incremental or progressive series of photographs should be taken. The first photo would be the overall side shot, followed by a half or third of the vehicle side shot, followed by a close-up. When necessary a very close or detail shot may be taken.

Vehicle Interior. Photographs of the interior of the vehicle are important to show intrusion and occupant contact inside the vehicle. Occupant contact can be used to support the analysis of the direction of force placed on a vehicle, who was seated where, and whether occupants were properly restrained. It should be noted here that even if certain areas of the interior or exterior of the vehicle do not exhibit damage they should be photographed to prove that exact point. Lack of damage may be used to disprove

See PHOTOGRAPHY, page 90

PHOTOGRAPHY, from page 80

spurious defense issues. It is quite possible that 24 shots or more could be taken of each vehicle. Again, more is better.

Overall Scene Photos

Scene photographs are shot to show the relationship of the traffic unit approach paths and lines of sight. There should be some overall shots of the scene to tie it all together. These shots can be made from a long distance to encompass the entire scene or may be made with a wide-angle lens. The photograph may be made from a high vantage point such as a tall building, an aerial shot from a plane or helicopter, a bridge overpass, or a bucket truck.

The individual approach paths of the traffic units, any view obstructions they may have encountered, and lines of sight should be shot. In these photos there should be landmarks or reference points that will tie the photos to the overall scene. This is true for every photograph taken. Each photo should be linked to another that will eventually allow the placement of that photo relative to the overall scene. If the crash occurs at night then the approach shots and overall scene photos should be shot again during daylight.

Prioritize Scene Photos. Scene photos should be prioritized by the investigator. Take crucial shots first and then supplement with secondary nice-to-have shots. This will prevent losing crucial shots because the evidence has been moved or there is no more film. Initial scene photos should be shot at right angles to the roadways first and then supplemented with additional angle shots as needed. The ABS marks, skid mark shadows, bodies, and fluid patterns that may evaporate are some of the crucial shots needed. Debris fields, large pieces of vehicles, fluid paths, damage to fixed objects and other pertinent evidence that should be documented may rank lower on the photo priority list.

Show True Length of Tire, Gouge Marks. When photographing long tire or gouge marks, take photos from both ends of the mark and at right angles to show the true length of the mark. A photograph shot from one end of a long mark will make it appear perhaps five or six feet long when in reality it is 20+ feet long. Taking photographs at a right angle to the mark will provide the proper perspective. On extremely long marks it may be necessary to take a series of shots at right angles to encompass the entire length of the mark.

Close-Ups

When shooting close-up photos of a scene or a vehicle it must be preceded by a series of photos starting with the overall scene/vehicle and stepping down to the detail or close-up shot. Each successive photo should have an identifier from the previous shot to link each shot in the sequence. A single close-up of a paint chip in gravel or a small gouge in the pavement is useless if there are no sequential shots that tie it to the overall scene.

When shooting detail or close-up shots it is important to have a scale next to the object being photographed. A gouge in the road may be one-inch or one-foot, but unless there is something in the photo to provide a scale representation, the significance of the photo may be lost. A tape measure, scaled ruler, coin, or clipboard may provide the reference scale. Preferred is a ruler or tape measure, but in the absence of such the investigator should use their best judgment. Certainly, when trying to tie a skid mark to a tire, a scaled ruler laid across the mark and then held against the tire will show the relationship of the tread to the pattern found in the tire mark. (Typical scales used in forensic work will suffice.) When a photo is to include a scale device be sure to photograph the same shot without the scale to prevent the defense from arguing that the scale hides some exculpatory evidence or alters the scene to their detriment.

It is permissible to photograph a witness standing at or pointing out a spot where they saw a pedestrian get hit as long as the photograph is used to show that and not as a representation of what the motorist could have seen.

Legal Issues

Posed photographs are admissible if they are taken to merely illustrate or highlight something at the scene. For example, it is permissible to photograph a witness standing at or pointing out a spot where they saw a pedestrian get hit as long as the photograph is used to show that and not as a representation of what the motorist could have seen. Posing a person over the hood of a car to show what happened to a pedestrian as he was struck would not be acceptable. Including a scale in a photo is acceptable if there is a photograph without the scale as well. In all photographs try to avoid having any shadow or extraneous equipment in the shot. Avoid your shadow, feet, camera bag, patrol car, or other extraneous objects in the photo. (D.R. McGrew, *Traffic Accident Investigation and Physical Evidence* (1976).) Objections will be raised by opposing counsel that the photo does not represent the scene and that the extraneous objects may hide or obscure other evidence.

Contrived Photographs. If evidence has been moved and is subsequently replaced and then photographed to represent the evidence as it was found, that would not be admissible. This is a contrived photograph. There is no way of knowing exactly where the evidence was originally or its exact orientation. A witness could be photographed pointing to the area where they found a piece of evidence, but the evidence cannot be placed there and photographed. Should it be necessary for the investigator to alter evidence during the investigation, it should be carefully documented. For example, during the investigation it is necessary to bend a damaged fender out of the way to enable taking a photo of a damaged lamp. The investigator should first photograph the fender unaltered, then photograph again after it has been altered. The investigator should note that the vehicle has been altered and why.

Freelance Photographers. Police have a right to photograph any evidence at a scene and in fact anyone can take photographs at a collision scene. Photographers other than police can be limited in their access to a scene if they are interfering with the police investigation. They

See PHOTOGRAPHY, next page

PHOTOGRAPHY, from page 90

cannot be prevented from photographing from an established perimeter. While freelance photographers may be somewhat of a nuisance, many times they have provided shots missed by police that have subsequently aided an investigation. In hit and run investigations, police will need permission or a warrant to enter a person's property to examine and photograph a vehicle. But if the vehicle is visible from the property line it is proper to use a telephoto lens to photograph the vehicle without permission.

Witnesses by Themselves. When presented in court, photographs should be acknowledged as fair representations and not exact copies of the scene. Photographs are representations not copies. A photocopy of a typed letter is as close to a copy as a picture can come. Scene photographs represent a two-dimensional view of a three-dimensional reality. Due to the shape of the lens, all photographs have some distortion the further from the center of the print you look. Additionally, the print, unless it is processed as a full negative print, has had some of the exposure cropped out. In spite of this, photographs are considered witnesses by themselves. Unless there is some special or technical purpose for having the photographer testify, the photographs can be admitted by another person. That person must be able to state that the photograph is a fair and accurate representation of what they viewed at the scene, even though they did not take the photo.

If a gouge or tire mark must be highlighted to enhance its visibility, the photo must be shot before and after the highlighting to prevent the issue of "altered evidence" being raised. When the exact color of a vehicle or object is important it will be necessary to have a properly developed and color adjusted print to be admissible. For this a photographer will need to testify. In such photographs it is important to take an additional photograph with a gray/color scale in the photograph with the object. This will allow the lab to color adjust the photograph for actual color. ■

READING, from page 87

keys to freedom and the tremendous responsibility of using them safely. Alas, a new study by the Johns Hopkins Bloomberg School of Public Health and the National Highway Traffic Safety Administration might put the kibosh on those Sweet Sixteens—at least the car-receiving aspect of them. Researchers have determined that states with the most comprehensive graduated licensing programs have significantly reduced the amount of fatal traffic crashes involving 16-year-old drivers.

Graduated Driver Licensing (GDL) programs exist in many varieties across the nation. The report evaluated those that included at least five specific components of modified licensing, including having a minimum intermediate driver's license application age of 16, a waiting period of at least three months between receiving one's learner permit and obtaining an intermediate license, nighttime driving and passenger limitations, among others. It determined their effectiveness in reducing fatal crashes among 16-year-old drivers by using data from the 1994-2004 NHTSA Fatality Analysis Reporting System and the U.S. Census Bureau. By comparing the results with those of states without GDL programs, researchers found that states with the strictest GDL programs (those having at least seven components) cut the amount of 16-year-old driver fatalities by more than 20%. For drivers aged 20 to 24 and 25 to 29 in states with strict GDL programs, data did not reveal a decline in fatal crashes among those age groups. Drivers in their twenties were analyzed in the report because they were too old to have passed through a GDL program to acquire their licenses. The reduction in fatal crash rates among 16-year-olds but not 20-somethings suggest that the efficacy of GDL programs is their presence, not the effect they may have in improving one's driving skills nor the overall driving environment.

What does all of this mean? While that new sedan might look swell parked in the driveway with the oversize bow, it might stay there until the gleeful 16-year-old blows out the candles next year—or the year after. Limiting young, inexperienced drivers' exposure to the roads also means limiting their chances of dying in a crash. On the other hand, it means that precious freedom is being curtailed, too.

Available from: NHTSA Headquarters, 400 Seventh Street, SW, Washington, DC 20590; (888) 327-4236; http://www.nhtsa.gov.

Legislation Across the Nation

The following is a brief analysis of the latest implementations in public policy and legislation across the United States.

Bill Allows Mandatory Blood Alcohol Testing

by Joe Kafka, Associated Press
Aberdeen (SD) News (Jan. 18, 2006)

The South Dakota State Senate Judiciary Committee has approved a bill that would make South Dakota the first state in the nation to require mandatory blood alcohol testing of all motorists believed to be under the influence of alcohol, according to the Associated Press. As current South Dakota law stands, drivers are not required to submit to blood alcohol testing until their third impaired driving offense or if they are suspected of vehicular homicide or battery. Should drivers refuse testing on their first or second offense, they are subject to up to a year's revocation of their license unless they plead guilty. Drunk driving is presently the only crime in South Dakota for which suspected offenders are not obligated to turn in evidence of their intoxication. State Senator Lee Schoenbeck, a proponent of the bill, argues that making blood alcohol testing mandatory will aid prosecutors in getting drunk driving convictions. Without such significant scientific evidence, juries are hesitant to turn in a guilty verdict.

The passage of such a bill would become a benchmark in anti-impaired driving legislation. How it may affect the frequency of drunken driving crimes has yet to be seen, but it would signify an imperative victory for traffic safety advocates.

Available from: http://www.aberdeennews.com/mld/aberdeennews/news/13654510.htm.

Senate Sends Teen Drinking Bill to Governor (MO)

by Associated Press
Columbia Tribune (May 14, 2005)

See READING, next page