Anticipating Defenses in a DWI Crash Case

One - day training
for
Law Enforcement and Prosecutors

Instructor

John B. Kwasnoski is Professor Emeritus of Forensic Physics at Western New England University, Springfield, MA after thirty-one years on the faculty. He is a certified police trainer in more than twenty states, and has instructed prosecutors, police, and civil attorneys on more than 350 occasions in all fifty states. He is the crash reconstructionist on the "Lethal Weapon - DWI Homicide" team formed by the National Traffic Law Center to teach prosecutors how to utilize expert witness testimony and cross examine adverse expert witnesses. Prof. Kwasnoski has reconstructed more than 1,300 crashes, including multiple and single vehicle, pedestrian, motorcycle, and train crashes, and has given sworn testimony on more than 200 occasions; he has trained with the NYPD collision reconstruction unit since 2001, and continues to serve as a consultant to prosecutors nationwide on MV homicide cases. He has worked for more than twenty major insurers as a consultant/expert witness, and has conducted training for law enforcement on more than 400 occasions in all fifty states.

He has served as an expert in several cases of national significance including **S. Carolina v. Susan Smith** (a mother's drowning murder of her two children) in which he participated in the re-enactment of the drowning in a submerged automobile and the creation of a video used in the sentencing phase of the trial. He also reconstructed the multiple vehicle crash in Washington, DC in which a Russian embassy aide was charged with vehicular homicide (**U.S.A. v. Makharadze**) and subsequently pled guilty after being released from diplomatic immunity. He was the reconstructionist for the plaintiff in the case of **Ulm v. Ford Motor Co.** in which a Vermont jury awarded the plaintiff more than one million dollars.

Recently Prof. Kwasnoski recently authored Preparing Your MV Case for Trial, The Handbook of Collision Reconstruction, Courtroom Success, Kwasnoski's Little Red Book, Traffic Investigation Primer, Anticipating Defenses in a MV Crash Case, Low BAC Driver Impairment, Crash Reconstruction Basics for Prosecutors, and Large Truck Crash Recnstruction for Prosecutors for the National Traffic Law Center (which may be downloaded online at ndaa.org). Prof. Kwasnoski previously co-authored three best-selling books for Lexis Law Publishing: Investigation and Prosecution of DWI and Vehicular Homicide, Courtroom Survival, and The Officer's DUI Manual; and previously authored a widely used trial manual, Establishing Liability in Vehicular Accidents, which presents predicate questions to introduce the technical topics of crash reconstruction in a jury-friendly and convincing manner. Prof. Kwasnoski has published more than 60 journal and newsletter articles on collision reconstruction, and maintains an active speaking schedule nationwide.

His ***Online On-demand Digital Library*** contains more than twenty (20) hours of investigation/reconstruction information recorded at his "Lethal Weapon" presentations and more than sixty (60) pdf documents; membership to the Library can be purchased at

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Contents:

State v. Davison: Using a hypothetical to attack the BAC

If the impairment is not fully investigated the defense can construct a hypothetical that favors the defendant. The investigation should include:

1. **Number of ounces of beverage consumed** (not necessarily equal to the number ounces purchased by the defendant, or even the number of ounces served to the defendant). A common defense would be for the defendant to claim that he/she did not finish all of a drink or drink(s) and thus the amount consumed is different from the amount purchased or served to them. While this does not seem to be a significant amount, nonetheless it can alter the calculations that the State's toxicologist makes to reach an opinion and may provide ammunition for cross examination by the defense attorney.

2. Percentage of beverage that is ETOH. This may be found on the label of the bottle or can, or may be published in the literature, or may be determined in novel drinks by a testing laboratory. If the brand of beer is known, then it is important to identify the alcohol content of that specific brand, as the ETOH% may be useful to the toxicologist in estimating number of drinks consumed, validity of statements made to law enforcement, etc. The ETOH content of some common beers (taken from an industry publication) reveals some very significant differences among various commercial brands:

Brand	**ETOH %**
Budweiser	4.65
Colt 45	5.59
Coors	4.55
Genesee	5.03
Guinness	4.27
Haffenreffer	6.62
Kirin	6.06
McEwan's Ale	9.51
Michelob	4.8
Sam Adams	4.76
Schlitz Malt Liquor	5.90

It should be obvious that the potential differences may be significant. Toxicologists may use the term "standard drink", which is 4% beer in calculations in which the exact ETOH % is not known by the investigator(s). This may underestimate the predictions of BAC or other calculations; in fact, there are very few beers sold that have an ETOH% of 4% or less, so in most

cases the amount of ETOH consumed would be underestimated (by as much as 50%) if a "standard drink" were used in the calculations

.

3. **Food consumed while drinking**. This includes the type (fat, starch, protein), the quantity, and the eating pattern since food in the stomach may affect the absorption of ETOH and therefore the point when the drinker reached peak absorption.

4. **Drinking pattern**, particularly the time of the last drink. This can be very important when estimating BAC from calculations, reconstruction of the drinking history, or extrapolation from a test result back to the time of the crash.

5. **Body weight**. This is part of the Widmark calculation, and without complete information about the defendant's drinking behavior assumptions must be made by the toxicologist, and these assumptions may expose the expert to attack at trial. Police investigators must be aware of the importance of investigative information and the problems it can cause if information is lacking. The sources of this information include:

Other sources of information include:

The bar or place where the defendant received the beverage.
Friends who were drinking with the defendant.
Other people in the car with a suspected DWI/DUI driver.
Civilian witnesses who may have observed the defendant.
Serving people who may have observed the defendant's behavior while drinking.
Medical personnel, ambulance crews, others who had contact with the defendant
Hospital personnel who may have made observations of the defendant operator.

Actual Davidson facts (that were not fully discovered in the investigation):

- Defendant was drinking on an empty stomach
- Drinking started at 11:00 PM
- Last drink at 12:00 PM
- Crash at 1:00
- Four beers consumed (16 oz. each, 6% ETOH)
- Defendant weighs 180 lbs
- Elimination rate = .015 / hr (agreed to by both sides)

If known, these facts would show the defendant's BAC was 0.132 at time of the crash, but…

State v. Mitton Motorcycle operator injured when pick-up truck makes left turn as a motorcycle entered an intersection.

This file involves a motorcycle that struck a pick-up truck that was making a left turn into a secondary road. Contact was with the motorcycle striking the right front of the truck. At the time of the impact the truck had a green light, and a vehicle identified as W in the drawing was stopped next to a traffic island on a red light.

The operator of the truck, Keith Mitton, had a BAC of 0.17 based on blood drawn one hour after the crash. Toxicologist's report indicates his BAC to be descending at the time of the impact based on drinking history and other investigation.

The motorcycle operator also had ETOH in his system - hospital blood was analyzed and his BAC was determined to be 0.09 at the time of the collision.

Investigation:

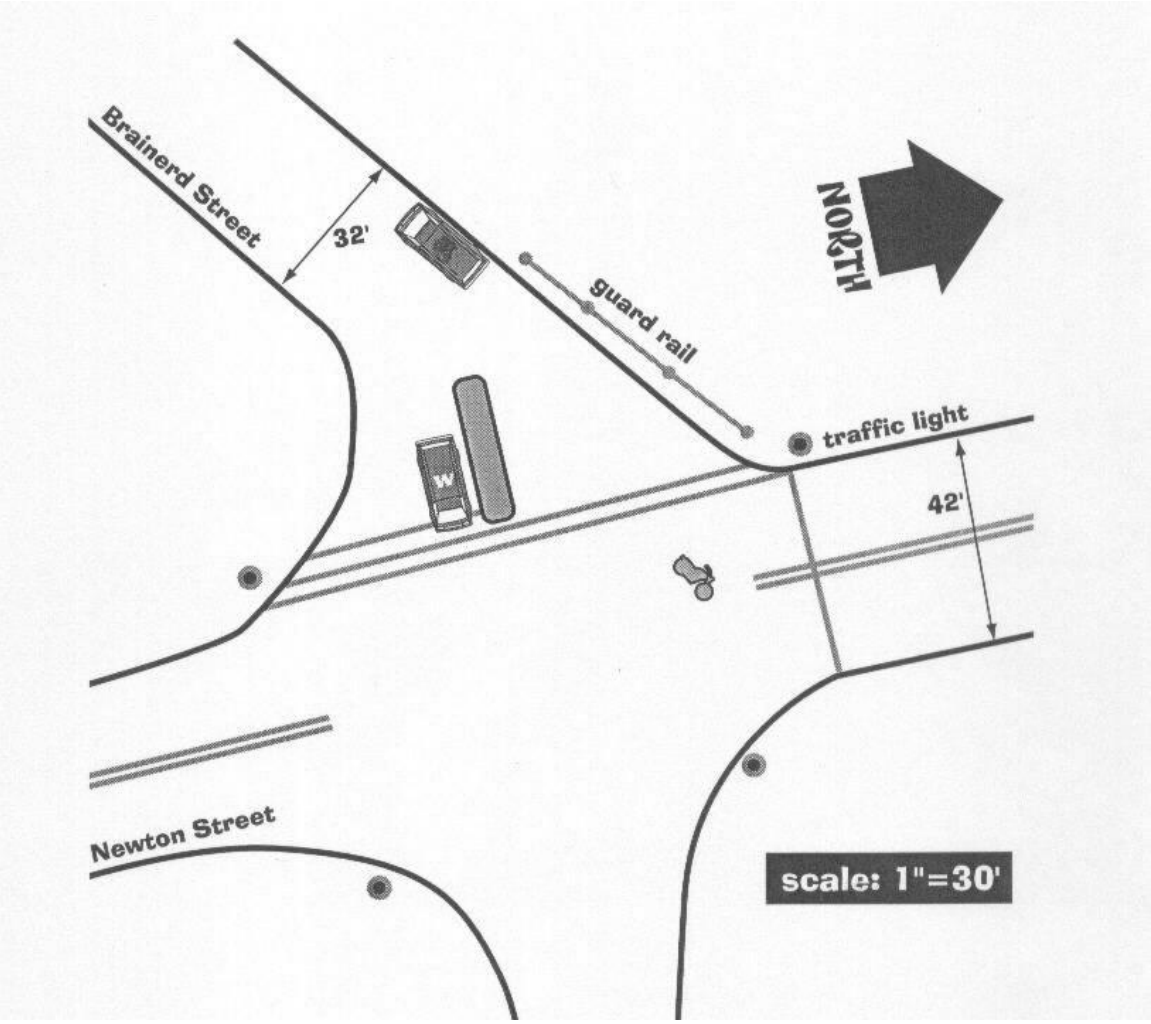
The operator of the MC was conscious at the scene and told police he was traveling South when the truck suddenly made a left turn in front of his vehicle. He attempted to avoid collision by steering to the right slightly, but could not avoid the impact. The road surface was wet and no skid marks or scuff marks were shown in the police report. The collision occurred after dark. There were several street lights at the intersection, but there was no other ambient light. Police did not revisit the scene the next day when the road surface was dry to look for tire mark or other evidence.

Motorcycle operator statement (given at scene before being transported to hospital):

I was going South at about 25 mph when this guy just turned left in front of me. I was too close to him to do anything, but I tried to turn away from him. There just wasn't enough time and I crashed right into him. He didn't even see me. I looked right at him as he was turning and said to myself "I know there's going to be a crash". The next thing I knew I got thrown off my bike and when I woke up the EMT's were helping me and I felt real sore all over, especially on my left side. This guy wasn't even looking. He just pulled right in front of me.

Police report:

"Vehicle #1 was making a left turn from Newton onto Brainerd, Vehicle #2 was going straight when they came in contact with each other."
"Citation to operator of MV#1for improper left turn."



- NIGHT
- LIGHT RAIN
- NB PICK-UP TRUCK MAKES LEFT TURN ON GREEN LIGHT
- MOTORCYCLE COLLIDES WITH TRUCK
- MOTORCYCLE FALLS ON LEFT SIDE WITHIN INTERSECTION
- TRUCK PULLS OVER AND STOPS
- EYE WITNESSES IN VEHICLE AT TRAFFIC ISLAND
- MC OPERATOR PAID BAR TAB NINE MINUTES PRIOR TO CRASH

STATEMENT:

CIVILIAN WITNESSES (stopped at traffic island, waiting for signal)

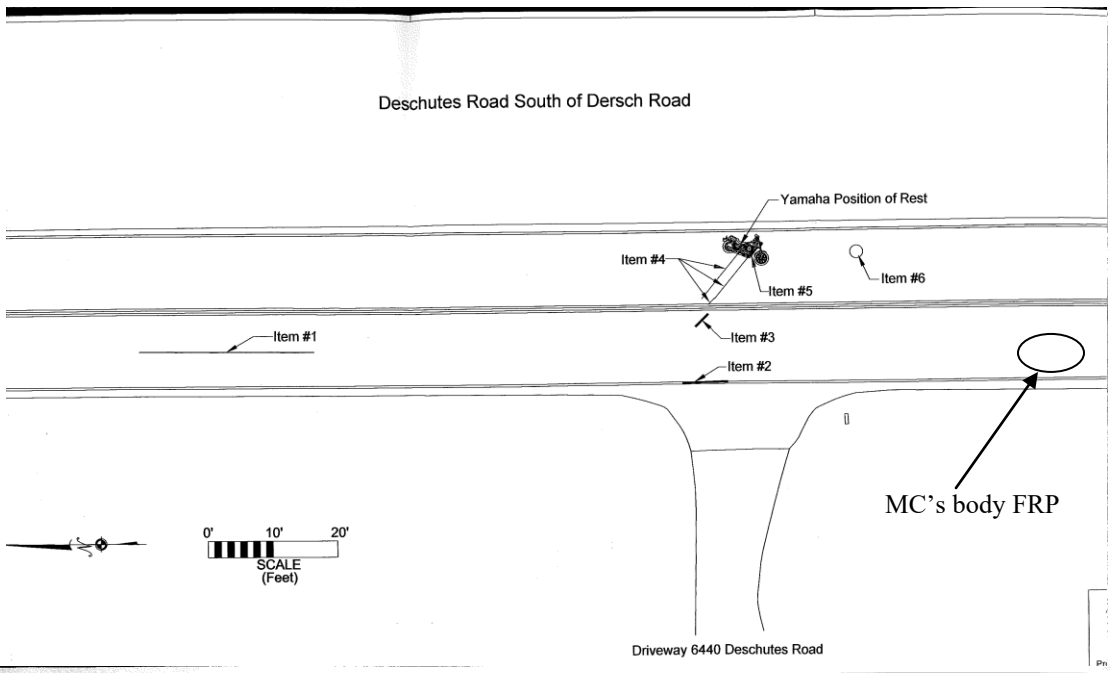
- As we were stopped, Clint (truck operator) turned left in front of us.
- He had his signal on, and wasn't going very fast.
- As he was turning, his truck suddenly bounced, and he went forward into the steering wheel.
- We never saw the MC before the crash.

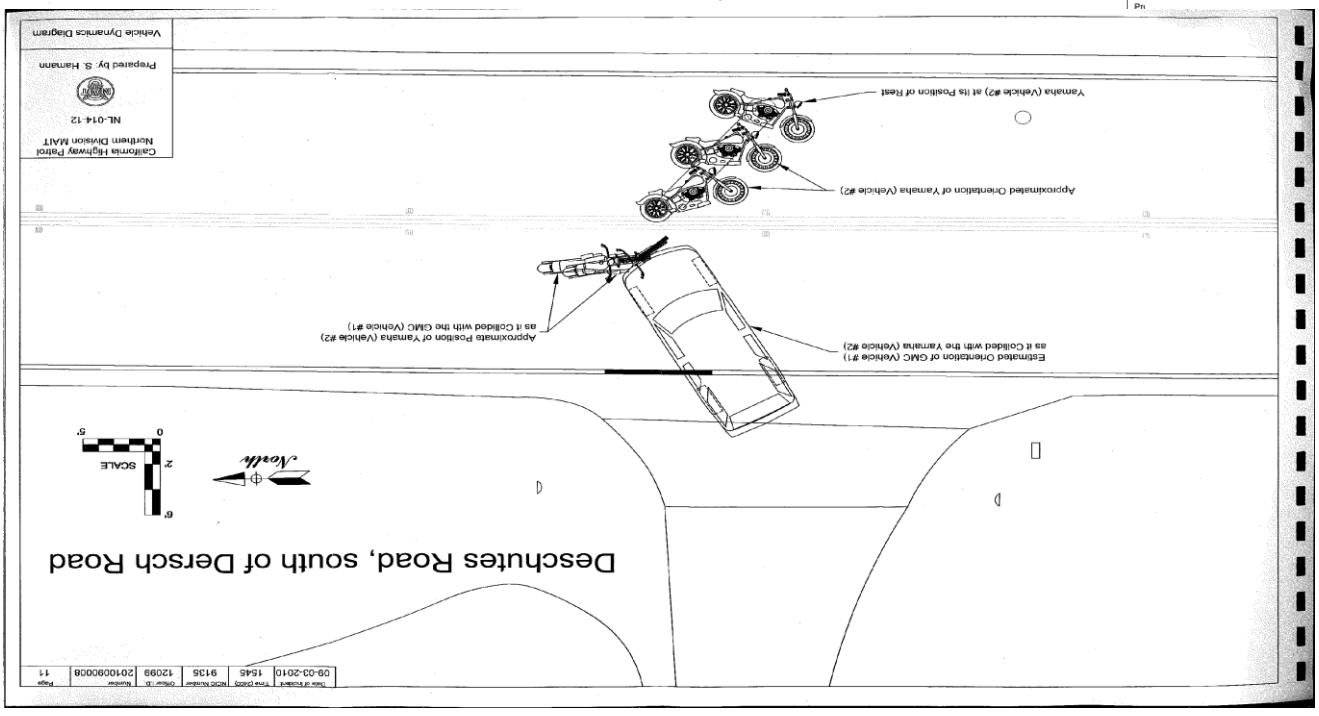
CA v. Meridian

Two expert opinions – no calculations?

CHP Report: A GMC exited driveway into the path of an oncoming motorcycle. MC put down 27 ft long rear-wheel skid, then impacted GMC and MC fell to ground, sliding to final rest position.

This is a classic case in which one expert has a completely different opinion from the other expert. In this case the disagreement is the point of impact location, and the issue can be resolved without any numerical calculations, by applying Newton's Laws to the physical evidence.





STATE OF CALIFORNIA
DEPARTMENT OF CALIFORNIA HIGHWAY PATROL
MULTIDISCIPLINARY ACCIDENT INVESTIGATION TEAM NARRATIVE/DIAGRAM
CHP 558D (Rev. 3-99) OPI 061 *(MAIT use only)*

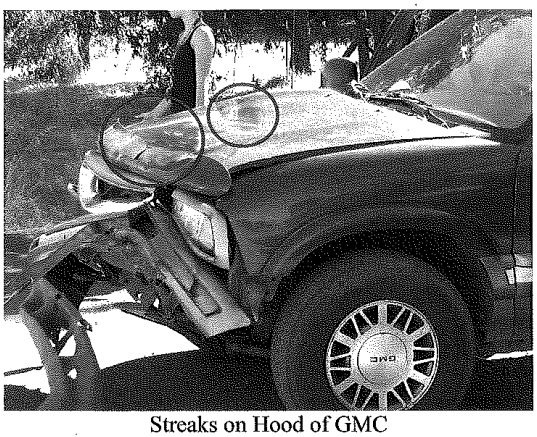
DATE OF INCIDENT *(MONTH-DAY-YEAR)*	TIME *(2400)*	NCIC	OFFICER I.D.	NUMBER	PAGE
09-03-2010	1545	9135	12099	2010090008	16

Analysis and Opinion – Physical Evidence Descriptions (continued)

Physical Evidence in Area Photographs

Photographs taken by CHP Redding Area personnel at the collision scene were examined and physical evidence that aided in determining the area of impact was identified.

The hood of the GMC was covered with a layer of dirt. The following photograph shows streaks of cleaned areas on the leading edge and right side of the hood.



Streaks on Hood of GMC

The left leading edge of the hood of the GMC had contact damage to the rear of the broken bug deflector. The source of this contact damage was most likely the right handle bar of the Yamaha. There was no other contact damage observed to the hood from the Yamaha.

The streaks of cleaned areas were likely created as Whitestone engaged with the GMC and was ejected from the Yamaha.

Pedestrian avoidance calculation, based on PRT assumed in calculation

Scenario A: Posted speed = 35 mph, defendant's speed = 51 mph
Road drag factor = 0.75
Pedestrian steps off curb and walks a distance of 12 ft before being struck
Pedestrian walking speed assumed to be 5.4 ft/sec (from published charts, using the high end of the range of walking speeds)
Backing up the defendant's car and determining distance available to avoid collision (PFPP)– defendant's vehicle would have been 166 ft from the area of impact when the pedestrian started walking across the street

If the defendant had been operating at the posted speed, calculate the total stopping distance with f = 0.75, S = 35 mph, and PRT = 1.5 seconds find the total stopping distance

$$X_s = 1.447\ S\ t + S^2 / 30\ f$$

Was the total stopping distance greater or less than the 166 ft available to avoid the crash?

Scenario B: Posted speed = 35 mph, defendant's speed = 51 mph
Road drag factor = 0.75
Pedestrian steps off curb and walks a distance of 12 ft before being struck
Pedestrian walking speed assumed to be 5.4 ft/sec (from published charts, using the high end of the range of walking speeds)
Backing up the defendant's car and determining distance available to avoid collision (PFPP)– defendant's vehicle would have been 166 ft from the area of impact when the pedestrian started walking across the street

If the defendant had been operating at the posted speed, calculate the total stopping distance with f = 0.75, S = 35 mph, and PRT = 2.5 seconds find the total stopping distance

$$X_s = 1.447\ S\ t + S^2 / 30\ f$$

Was the total stopping distance greater or less than the 166 ft available to avoid the crash?

Transportation Research Record 904

Driver Perception-Reaction Time: Are Revisions to Current Specification Values in Order?

KEVIN G. HOOPER AND HUGH W. McGEE

Driver Characteristic

The current American Association of State Highway and Transportation Officials (AASHTO) standard for stopping-sight distance is in part based on a driver characteristic of brake reaction (P). More precisely, it should be identified as the perception-brake-reaction time. The American Association of State Highway Officials (AASHO) (1) states that "perception time is the time required for motor vehicle operators to come to the realization that the brakes must be applied. It is the time lapse from the instant an object is visible to the driver to the instant he realizes that the object is in his path and that a stop must be made." The brake reaction time is "the time required to apply brakes". This was formerly labeled as the perception-intellection-emotion-volition (PIEV) time.

The current AASHTO specification for this driver characteristic is 2.5 s. As specified in the AASHO Policy on Geometric Design of Rural Highways (1), this value was determined from an assumed perception time of 1.5 s and a brake-reaction time of 1.0 s. The values do not relate to any specific percentile of driver performance but, rather, were selected as being "large enough to include the time taken by nearly all drivers under most highway conditions."

(1) A Policy on Geometric Design of Rural Highways. AASHTO, Washington, DC

What might happen when you use a range of PRT values

Braking starts 60 ft before impact with jogger

PRT range is 0.75 – 1.5 seconds (Olson, 1996)
defendant's vehicle speed is 58 mph
posted speed = 45 mph
drag factor of road = 0.80

Using 1.5 sec PRT

a) What is the distance from the impact where the PFPP occurred if the driver's PRT = 1.5 sec?

ans. $d = 1.47(58)(1.5) + 60 =$ **187.89 ft** this is the distance available to avoid the collision

b) What is the total stopping distance (at the posted speed) if the driver's PRT = 1.5 sec?

$X_s = 1.447\ S\ t + S^2 / 30\ f$

What might happen when you use a range of PRT values

Braking starts 60 ft before impact with jogger
PRT range is 0.75 – 1.5 seconds (Olson, 1996)
defendant's vehicle speed is 58 mph
posted speed = 45 mph
drag factor of road = 0.80

Using .75 sec PRT

a) What is the distance from the impact where the PFPP occurred if the driver's PRT = .75 sec?

ans. $d = 1.47(58)(.75) + 60 =$ **123.9 ft** this is the distance available to avoid the collision

b) What is the total stopping distance (at the posted speed) if the driver's PRT = .75 sec?

$$X_s = 1.447\ S\ t + S^2 / 30\ f$$

Which end of the PRT range is most favorable to the defendant?

Case 41. Long PRT Asserted by Defense Expert

The police reconstruction expert was able to determine the speed of the defendant's vehicle to be 13 mph over the posted speed. Using an assessment of the available sight distance made at the scene the police expert opined that there was a 200 ft sight distance for the defendant to avoid this collision. At the posted speed this was sufficient to avoid the collision. This opinion included a PRT of 1.5 seconds for the defendant (had he not had a .18 BAC), which the officer described as the 90th percentile PRT value for this situation.

Defense expert's report:

"It is this expert's opinion that there was insufficient distance for the defendant to take an effective evasive action in this case, because for this situation (unlighted roadway with no ambient lighting, unalerted operator not expecting pedestrians walking in the roadway) a PRT of as much as 6 seconds could occur. The officer used a PRT value of 1.5 seconds, which in my opinion does not fit this situation, and based on the shorter PRT he was able to show that there was sufficient sight distance for the defendant to take an evasive action and actually stop his vehicle before reaching the pedestrians. The possibility of a longer PRT is consistent with published literature in the field of human factors, in which test data often includes a value as high as 4 to 5 seconds for PRT. Using a PRT value of 5 seconds the total stopping distance would be greater, and this collision was unavoidable."

Case 1. Skid marks start after pedestrian impact - defense expert opines that speed was not a cause of the pedestrian fatality, and collision could not be avoided.

Defense expert's report:

Using a generally accepted pedestrian walking speed of 8 ft/sec the pedestrian would have traversed the 11 ft from the curb to the POI in approximately

$$t = 11 \text{ ft} / 8 \text{ ft/sec} = 1.37 \text{ sec}$$

Using the accepted time-distance equation, at the point when the pedestrian left the curb the defendant's vehicle would have been a distance of

$$d = 1.47 (40 \text{ mph })(1.37 \text{ sec }) = 80.5 \text{ ft}$$

from the POI. The total stopping distance at the posted speed of 25 mph on this road surface is 82 ft; therefore, at this point 80.5 ft from the POI the defendant's vehicle had already passed the "point of no escape" and the defendant could not stop his vehicle before reaching the POI of this collision. The cause of this collision was solely the entry of the pedestrian into the roadway into the path of the oncoming defendant's vehicle.

Case 7. Stopping distance is greater than visibility distance - collision is unavoidable.

Defense expert's report:

The police report of this incident includes a determination that the defendant's vehicle was approximately 220 ft from the POI when the defendant operator could first perceive the pedestrian's presence in the roadway. This is based on the estimated speed of the defendant's vehicle based on skid mark evidence. The collision occurred on a dry road surface, with clrear visibility. However, the statement by police that "this collision could have been avoided if the defendant had been operating at the posted speed of 50 mph" is based on an assumed perception-reaction time and other assumptions. This statement does not accurately reflect the accepted stopping distance for the posted speed published in the state's own driver's education manual.

The New Hampshire Driver's Manual, 2001 edition, p. 44 states that the total stopping distance for a vehicle traveling at a speed of 50 mph is 243 ft. Thus, the defendant's vehicle, if operating at 50 mph would not have been able to stop within the visibility distance of 220 ft determined by police to be the point of first perception of the pedestrian by the defendant. Clearly, this accident was unavoidable, even at the posted speed of 50 mph, because it was the careless entry into the roadway by the pedestrian that resulted in her own death.

NH Driver's Manual 2001, p.44

Speed, mph	Reaction distance, ft.	Braking distance, ft.	Total Stopping Distance. Ft.
50	55	188	243
55	***60.5***	***244***	***304.5***
60	66	300	366
65	***71.5***	***377.5***	***449***
70	77	455	532

People of NY v. Charnetski: left turn in front of oncoming motorcycle

An example of a defense expert report that is mathematically overwhelming,

Calculation of travel of center of rear axle and center of front axle:

Steering ratio 14.5

Wheelbase 110 in. = 9.167 ft.

Track width front and rear = 62.9 in = 5.24 ft

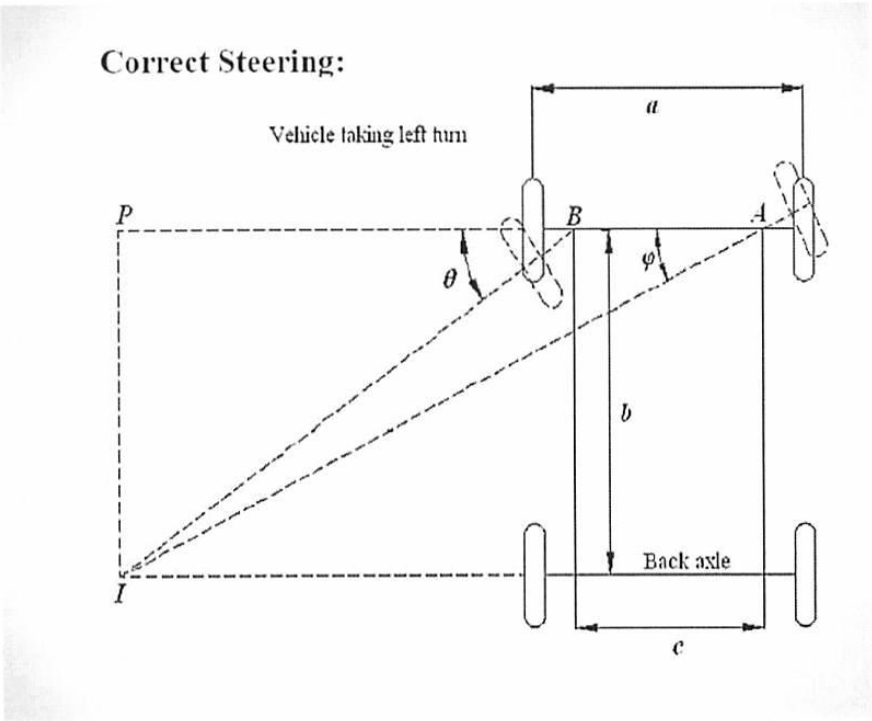
Turning diameter = 35.8 ft.

Turning radius = 17.9 ft

Lock to lock turns = 2.94

Front wheel max angle average (2.94x360/2)/14.5 = 36.50 degrees)

Turning circle radius determined as follows:



DEFENDANT'S EXHIBIT C 11

After four (4) pages of mathematical calculations…

$$x_r\left(s_{r,final}\right) = -0.0122(18.60) - 0.1300(16.18) - 0.3737(14.13) - 0.5230(12.08)$$
$$= -0.2269 - 2.103 - 5.280 - 6.318$$
$$= -13.93 \text{ ft.}$$

The additional distance to front end is $b\sin\left(\phi_4\right) = 9.17(0.5230) = 4.80$ ft. Thus

$$x_{front}\left(s_{r,final}\right) = x_r\left(s_{r,final}\right) - b\sin\left(\phi_4\right) = -13.93 - 4.80 \text{ ft.}$$
$$= -18.73 \text{ ft.}$$

A key assumption in this calculation is that travel in last steering angle of 7.24 degrees occurred for a full ½ second before impact. By this assumption the center of the rear axle would be 13.93-5.75 = 8.18 ft. past the center-line and the car front axle center would be 12.98 ft. beyond the road centerline. This is clearly incorrect sine it puts the rear of the car more than 8 feet beyond the center line and the front more than 2 feet beyond the shoulder white line. Thus including one full time step of ½ second is too much and thus, the impact likely occurred much less than ½ second after the last reading. This is important because the change in transverse distance is largest with the last time step. If we take only 40% of the last time step or 0.2 seconds in all the calculations, then we get

$$\phi\left(s_{r,final}\right) = \frac{1}{9.17}\left[0.112 + 1.084 + 2.317 + (0.4)1.543\right]$$
$$= 0.0122 + 0.1182 + 0.2527 + 0.0673$$
$$= 0.4504 \text{ radians}$$
$$= 25.8 \text{ degrees}$$

Likewise

$$x_r\left(s_{r,final}\right) = -0.0122(18.60) - 0.1300(16.18) - 0.3737(14.13) - (0.40)0.4353(12.08)$$
$$= -0.2269 - 2.103 - 5.280 - 2.104$$
$$= -9.71 \text{ ft.}$$

The additional lateral distance to the front end is $b\sin\left(\phi_4\right) = 9.17(0.435) = 3.99$ ft. Thus

$$x_{front}\left(s_{r,final}\right) = x_r\left(s_{r,final}\right) - b\sin\left(\phi_4\right) = -9.71 - 3.99 \text{ ft.}$$
$$= -13.70 \text{ ft.}$$

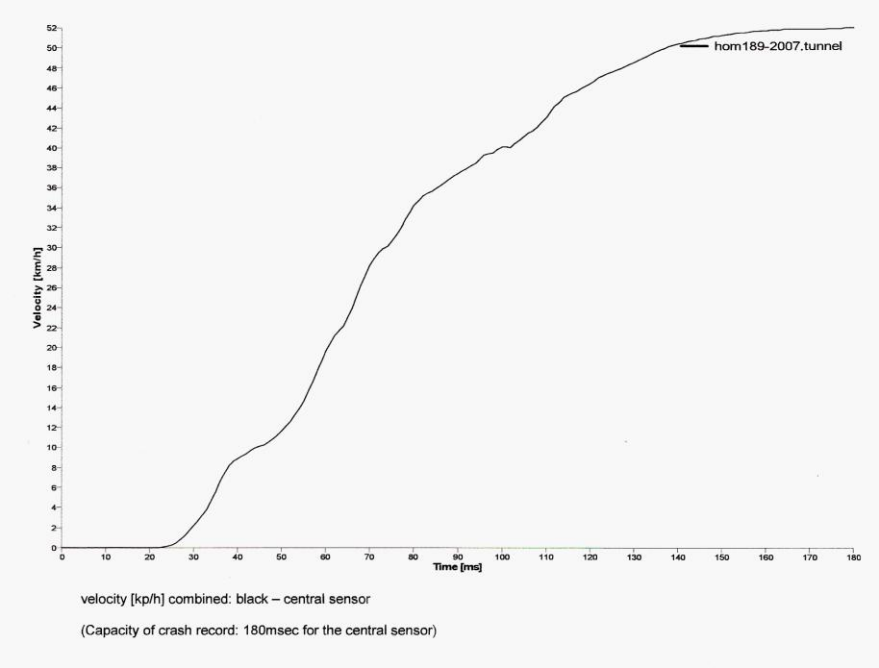
Assuming a beginning point of 5.75 ft. from the centerline then we have

$$\Delta x_f\left(s_{r,final}\right) = -13.70 + 5.75 = -7.95 \text{ ft.}$$

This agrees well with the NYSP Investigator motorcycle impact location of 7.73 ft. to the right of the center-line, but is still a foot too far since the impact point was more than a foot left of the license plate center. Thus the last time increment is likely closer to 0.15 seconds

Case 20. Defense expert opines about interpretation of EDR download from defendant's vehicle.

Case facts: Four vehicles are stopped at an intersection, waiting for traffic signal to change. Defendant's vehicle crashes into stopped vehicles, pushing all the vehicle forward EDR from defendant's vehicle is downloaded by manufacturer (Land Rover). Download of graph of ΔV is shown below.



Defense expert's report:

The issue of vehicle speed is clearly resolved by the download of the data recorder from the defendant's vehicle. "If the EDR download contains all the crash information, the ΔV graph clearly shows a total ΔV of 52 km/hr or equivalently 32 mph for the vehicle speed of the defendant's vehicle at impact." This data is more reliable than an impact speed that could be constructed from other methodologies, including momentum or crush analysis, which this author has not attempted.

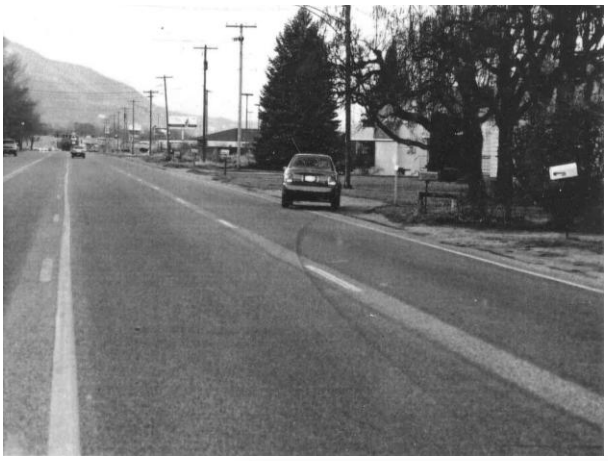
Case 4. Pedestrian was struck by vehicle that braked to a stop after striking the pedestrian.

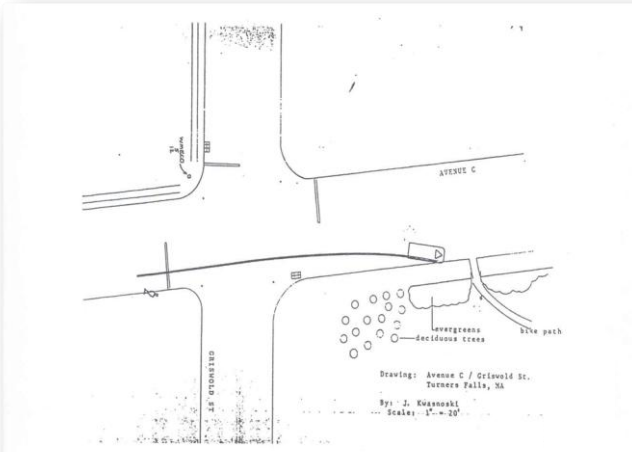
Defense Expert's Report:

An Eastbound 2017 Mazda operated by David Wilson, a 20 yr-old male, struck an 11-yr old pedestrian who had exited a stopped school bus and was crossing the street to go to her home, which was directly on the other side. The street is a two lane roadway, in good repair, with a posted speed of 25 mph. The drag factor was measured using a sled to be .60. The single skid mark started after the impact and was 127 ft in length, with only the right front tire marking the roadway. No brake marks were found from the rear tires or the left front tire, and therefore a braking efficiency (BE) of 25% was used for the speed estimate. Using the investigative information the speed was determined to be

$$S = \sqrt{30\, f\, d\, (BE)} = \sqrt{(3\ 0\ )(\ .60\ )(\ 127\ )(\ .25\ )} = 23 \text{ mph}$$

It is clear that Mr. Wilson was not operating at an excessive speed, and there is no evidence of any negligence on the part of the operator of the motor vehicle in this case. This is an unfortunate accident caused by the girl's failure to look for oncoming traffic before starting to cross the street.



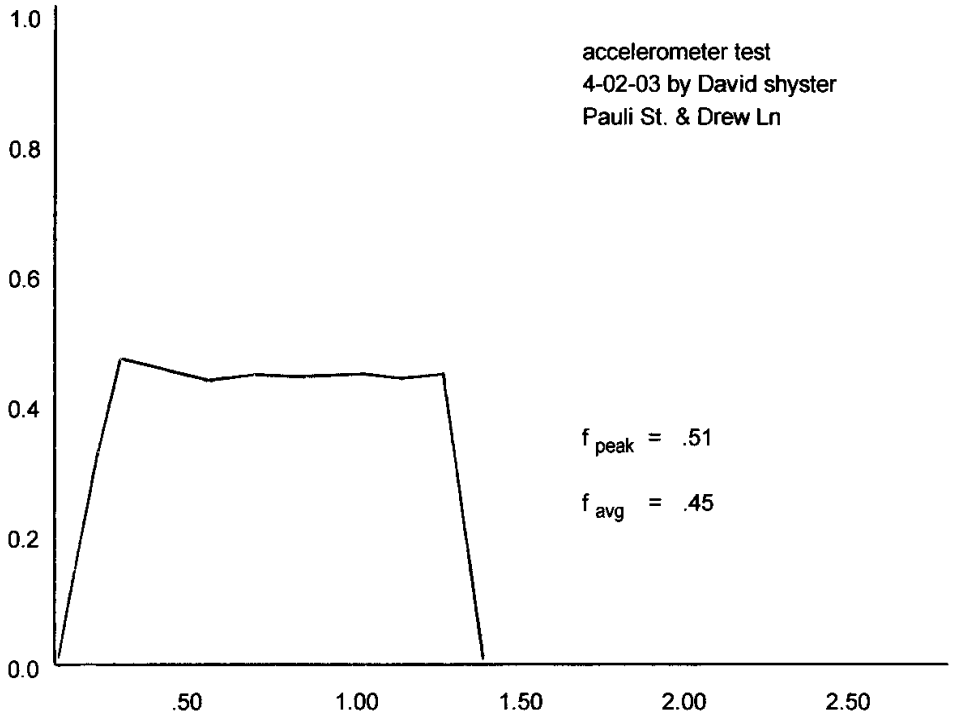


Case 5. Defense expert challenges Police drag sled measurement

Defense expert's report:

The vehicle operated by Mr. Jameson put down skid marks averaging 112 ft in length, in this area with a posted speed of 40 mph. This investigator was able to return to the scene of the collision approximately four weeks after the accident to make measurements of the friction of the road surface using a sophisticated electronic measuring instrument called an accelerometer. The accelerometer was attached to an exemplar vehicle and skid tests were performed to determine the average drag factor value in the area where the skid marks were made by the Jameson vehicle. A printout of one of the accelerometer tests is shown here.

Based on this test this author was able to estimate a speed for the Jameson vehicle of approximately 38 mph at the start of the skid marks. This instrument is considered by those in the engineering field to be more accurate than the "drag sled" device used by police investigators, which yielded a drag factor measurement of .84, which this author does not accept as accurate. It was this incorrect value of .84 that yielded the speed estimate of 53 mph reported by police, which is much too high for this road surface. Based on the author's personal measurements made with the accelerometer the estimated speed of 38 mph is within the posted speed at this site. There is no indication that excessive speed was a factor in this unfortunate pedestrian accident.



Drag sled validation reference:

"Determining Coefficient of Friction with the Apple iPod Touch"
Blue Ridge Transportation Safety Board Regional Crash Investigation Team, 2009

Request a copy of this report by contacting Prof. Kwasnoski
kwasnoski@aol.com

Test Results- Coefficient of Friction

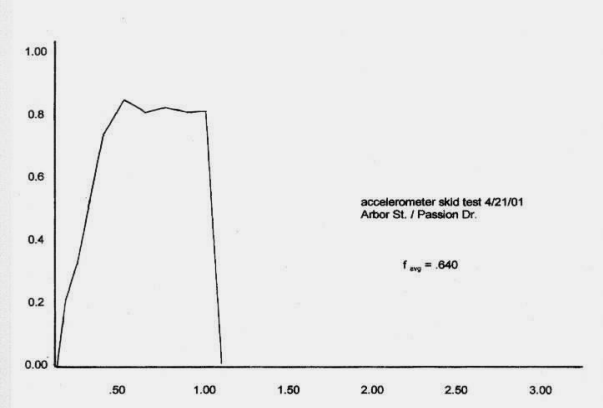
	Skid 1 35 MPH	Skid 2 32 MPH	Skid 3 36 MPH	Skid 4 35 MPH	Skid 5 38 MPH
VC4000	.81	.82	.80	.82	.82
Drag Sled	.77	.77	.79	.77	.77
iPod Touch	.79	.80	.78	.79	.79

As the results above show, the 'iPod Touch' with the 'Dynolicious Log Box' app produced a consistent coefficient of friction within tolerance when compared to the VC4000 and drag sled. We believe that these tests help validate the use of the 'iPod Touch' in skid tests for determining coefficient of friction. However, as mentioned previously, each crash team member should utilize the 'iPod Touch' in conjunction with other recognized methods during skid tests in a training environment to develop their own familiarity with the device as well as credibility for the results.

Case 21. Defense expert opines as to defendant's speed based on f tests done by defense expert.

Defense expert's report:

This investigator was able to return to the scene of the collision approximately three weeks after the accident to make measurements of the friction of the road surface using a sophisticated electronic measuring instrument called an accelerometer. The accelerometer was attached to an exemplar vehicle and tests were performed to determine the average drag factor value in the area where the skid marks were made by the defendant's vehicle. A printout of one of the accelerometer tests is shown below.



Based on this test, which shows a drag factor of .64, the author was able to estimate a speed for the defendant's vehicle to be approximately 66 mph at the start of the skid marks. This instrument is considered by those in the engineering field to be more accurate than the "drag sled" device used by police investigators, which yielded a drag factor measurement of .85, which this author does not accept as accurate. The appearance of the microtexture of the road surface to the naked eye is not consistent with other high f surfaces this investigator has studied in the past. It was this value of .85 that yielded the speed estimate of 76 mph reported by police, which in my opinion is much too high for this road surface. It is this author's opinion that excessive speed was not a causative factor in this collision.

Case 6. Air bag does not deploy - defense expert opines non-deployment is evidence of low impact speed in pedestrian fatality

Defense expert's report:

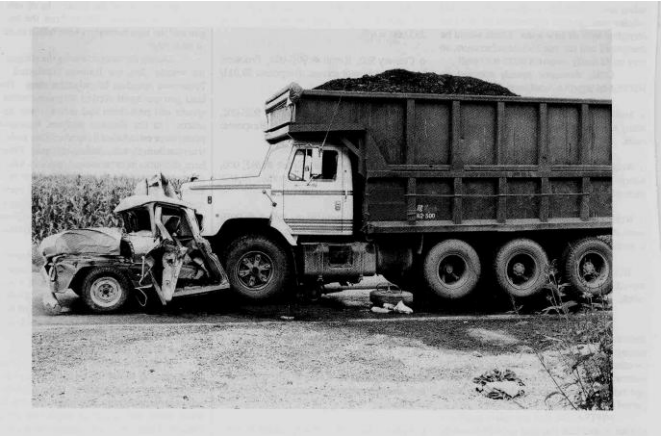
The author personally inspected the vehicle operated by the defendant, involved in this pedestrian accident on January 2, 2003. Of particular interest is the fact that the air bags on the vehicle did not deploy as a result of the impact. This is significant because the air bags are set to deploy when a threshold impact speed of 11 mph is exceeded. This is based on the manufacturer's own literature and specifications, which were obtained from the internet by the author. (1) The sensors mounted on the frame of the defendant's vehicle are inertial linear sensors that are placed so as to sense forward speed, and to react and ignite the air bag inflation system at an impact speed of 11 mph or more.

The failure of the air bags to deploy is evidence that the defendant's vehicle speed was low at the point of impact, and that there is no evidence of excessive speed being a factor in the causation of this collision.

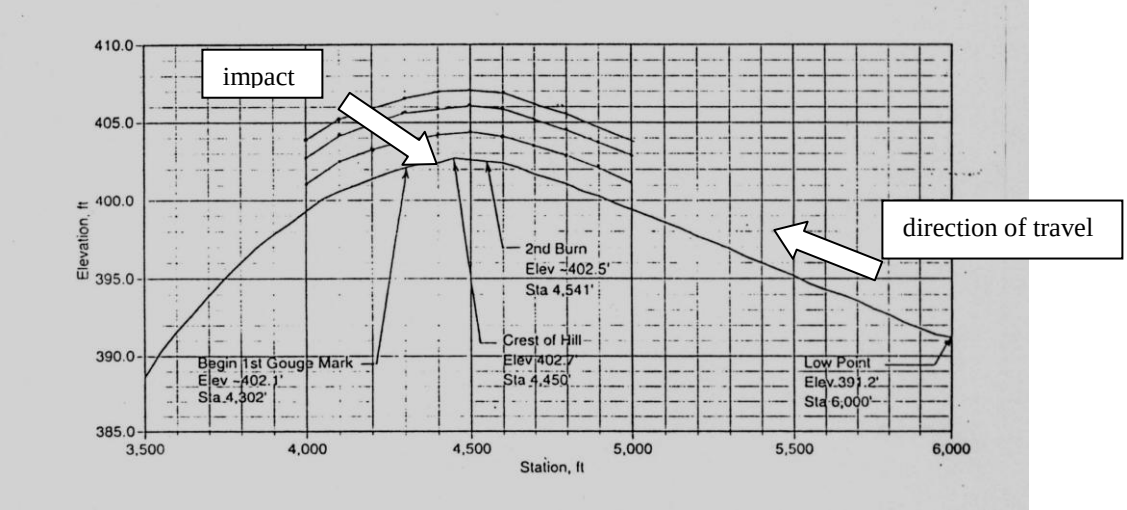
(1) Quote from manufacturer's internet site:
"Most auto manufacturers have chosen a range of 8-14 mph frontal barrier impact speed for the airbag deployment threshold. This particular vehicle has air bags employing a deployment threshold of 11 mph."

Case 31. Sight distance approaching impact in a work zone.

Defense expert's report:



"As the defendant's vehicle approached the stopped line of traffic (from right to left in the drawing) in the work zone area the defendant had limited sight distance because of the crest of the hill. There is some question of the signs placed to alert drivers of the upcoming work zone, specifically the absence of a warning sign of the upcoming traffic stoppage. The author, utilizing a Total Station surveying instrument, was able to reconstruct a profile of the hill to show the limited sight distance afforded to the defendant. That profile drawing is shown below.



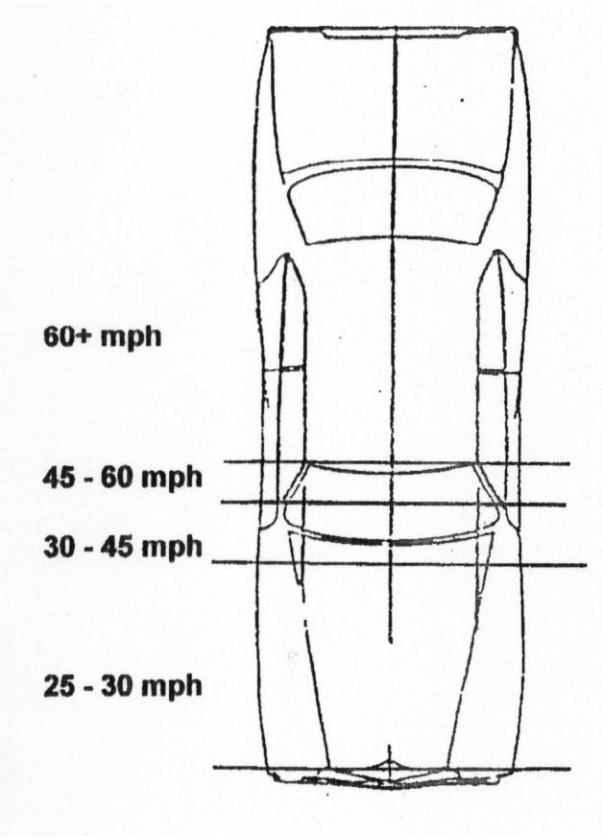
It is the author's opinion that it was the improper set-up of the work zone that created this dangerous situation, into which the defendant's vehicle entered. The collision was unavoidable because of the limited sight distance created by the crest of the hill.

Case 35. Head strike position on windshield used to estimate impact speed in pedestrian fatality – People of NY v. Joe Gray

In a pedestrian impact in which four people were killed (including an unborn baby) the State's expert determined the speed of the defendant's vehicle at impact was between 51 and 55 mph by using five different pedestrian throw equations to analyze the distance from the POI to the FRP of the bodies. The pedestrians included two teenagers and a small boy; the tallest teenager was shorter than 5 ft in height.

Defense expert's report:

The pedestrian head strike on the windshield of the defendant's vehicle was at the base of the windshield. Using a head strike chart developed by IPTM the strike location corresponds to an impact speed of approximately 30 mph. Had the vehicle been traveling at a speed of 50 mph the head strike would have been expected to be much higher on the windshield, as shown by the head strike chart that is published in the reconstruction literature. Based on the head strike location, the impact speed of the defendant's vehicle is in the range of 30 -35 mph."



Investigative activities to avoid defense challenges

1. The officer walked the scene looking for road defects - potentially exculpatory evidence.

2. Witness locations were shown on the scale drawing of the scene to assist the prosecutor, the jury, and the witness.

3. The rolling wheel used to make measurements was checked by comparison with a 100 ft tape measure before and after it was used at the scene. (Other measuring devices were checked against a standard.)

4. The scale used to pull the drag sled was checked for calibration accuracy by the local Dept. of Weights and measures

5. Multiple measurements were made, and the one most favorable to the defendant was used in the calculations.

6. A scale drawing was taken back to the scene to confirm several measurements in the drawing, thus avoiding an attack by defense on the accuracy of the drawing.

7. The scene of a night crash was revisited during the day to look for additional evidence that might not have been observable at night.

8. A photograph showing the witness' perspective was taken to help everyone understand what the witness could see and where she was located.

9. The officer took an important witness back to the scene to re-interview him. The officer finds that sometimes the witness is able to give more information the next day.

10. The officer had the defendant do several other filed sobriety tests in addition to the three that are standard policy; this gave the officer additional information regarding impairment.

11.. The officer interviewed the witness with the witness standing where she was when she observed the crash - this improves her ability to recall.

12. The officer checked to see if there had been any recall notice(s) on the defendant's vehicle that would suggest a mechanical failure - there were none. The vehicle(s) involved in the collision were photographed extensively, both outside and inside the vehicle(s).

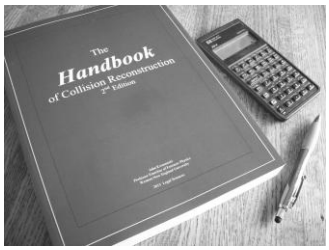
13. Tire mark evidence was photographed close-up to show any characteristics of the tire marks in addition to their overall appearance, length, orientation on the roadway, etc.

Resources for Prosecutors and Law Enforcement

www.legalsciences.com/SHOP

The Handbook of Collision Reconstruction

2nd Edition



Actual case studies
Investigation checklists
Predicate questions
Trial testimony tips

"Explains collision reconstruction concepts in "plain speak".

Prof. John Kwasnoski is a nationally recognized police and prosecutor trainer and one of the authors of the NHTSA "Lethal Weapon" course. This book is a must for those who want to improve their trial presentations, and add to their ability to explain technical collision reconstruction concepts in "plain speak". It is the perfect complement to a reconstructionist's "number crunching", and will make you a more effective witness at trial.
The Handbook of Collision Reconstruction, 8.5" x 11", 484 pages …….. $ 70 + S/H

Preparing Your MV Case for Trial This text offers suggestions for strengthening your case, preparing your own expert witness, and strategies for cross examining the defense expert reconstruction witness….$18

Courtroom Success A supplement to the Courtroom Success course that contains additional materials, including extensive transcripts of police cross examination. ….$18

Kwasnoski's Little Red Book: A Primer on Collision Reconstruction A readable foundational text for those who want a primer on collision reconstruction. Patterned after Prof. Kwasnoski's Lethal Weapon lectures, and including additional materials and references. This book is for prosecutors and officers who want to gain a new perspective on the science of collision reconstruction, or who are preparing for trial. ….$18

Anticipating Defenses in MV Crash Cases This text is broken down by type of collision along with many suggestions of general defenses that could occur in almost any type of MV case. A must have for both prosecutors and investigators. ….$18

Low BAC Driver Impairment A review of the scientific literature that gives prosecutors a powerful tool for direct examination on the effects of alcohol, and a valuable resource for cross examining the defendant's toxicology expert. This is an invaluable aid in cross examining toxicology experts. ….$18

Traffic Crash Investigation Primer An overview of the investigative activities in a MV crash case for those who are not trained technical investigators, but who prosecute MV cases. ….$18

The Physics of Automobile Crashes This was the text used in the freshman course "Physics for Law Enforcement" at Western New England University, and includes the fundamentals of the science of crash reconstruction. The perfect text for reviewing the scientific foundation of crash reconstruction methodology and testimony. 267 pages - softbound….$39

WITNESS ACCURACY: How good are you as an eyewitness?

1. What part of the vehicle struck the utility pole?

   ___ left front ___ right front ___ center of front

2. Which side of the vehicle came up first during the rolling motion?

   ___ driver's side ___ passenger's side ___ don't know

3. How far was it from the impact with the utility pole to the start of the rollover?

   ___ ft

4. Did you at any time during the collision see the driver ejected from the vehicle?

   ___ YES ___ NO

5. In what position was the vehicle when it came to its final rest?

   ___ on its wheels ___ on its roof ___ on the driver's side

   ___ on the passenger's side

6. What part of the vehicle was facing you when it came to rest?

   ___ front ___ rear ___ driver's side ___ passenger's side

7. What was the distance from the utility pole to the final rest of the vehicle?

   ___ ft

8. What was the speed of the vehicle when it hit the pole?

   ___ mph

9. How many times did the vehicle roll over?

   ___ less than one ___ one ___ more than one ___ more than two

10. What color was the vehicle?

    ___black ___red ___blue ___green ___white

Defense challenges or attempts to suppress the EDR evidence:

Challenge to witness qualifications: difference between a witness certified as a "technician" and one certified as an "analyst".

Did not use most recent version of the CDR software – how does that affect the data? What is the remedy?

EDR speeds were not corroborated by a reconstruction, video evidence, eye witness observations, vehicle damage, etc.

EDR was not secured and made available to defense.

Vehicle computer was not checked to see if it was re-calibrated for any post-production vehicle modifications.

Wheel sensor speeds may not be the same as actual vehicle speeds (airborne motion, tire slippage, tire wear, etc.)

Defense asserts that if one piece of EDR data is invalid or missing it invalidates all the data – NOT TRUE

The EDR data is from a different crash.

State has not proven that the EDR data was from the defendant's vehicle.

Search warrant or chain of custody issues?

EDR report can be altered before it is printed. (ordinarily the CDX file would belie this, but Hyundai and Kia downloads produce a pdf file, which ***can be altered***).

Defense expert asserts that the cumulative ΔV is the same as the impact speed – may not be true.

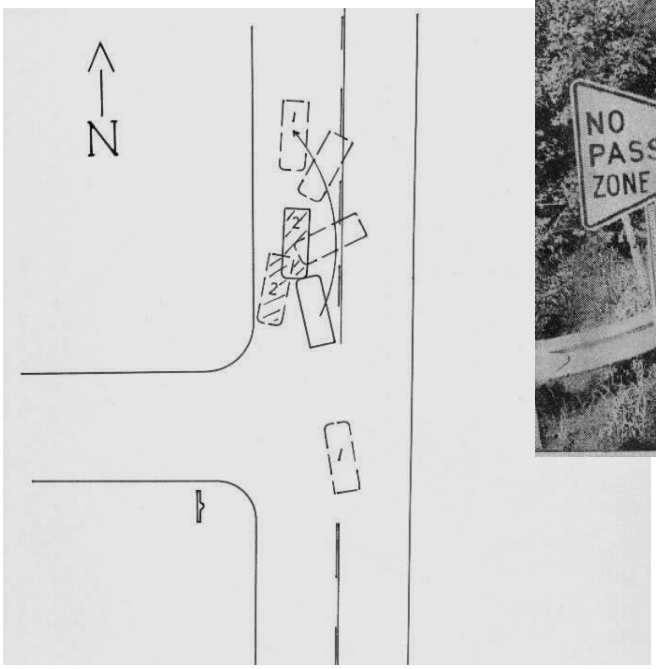
ΔV may have vector properties and may not be simply the same as vehicle speeds. (If forward and lateral ΔVs are reported there may be a vector sum required.)

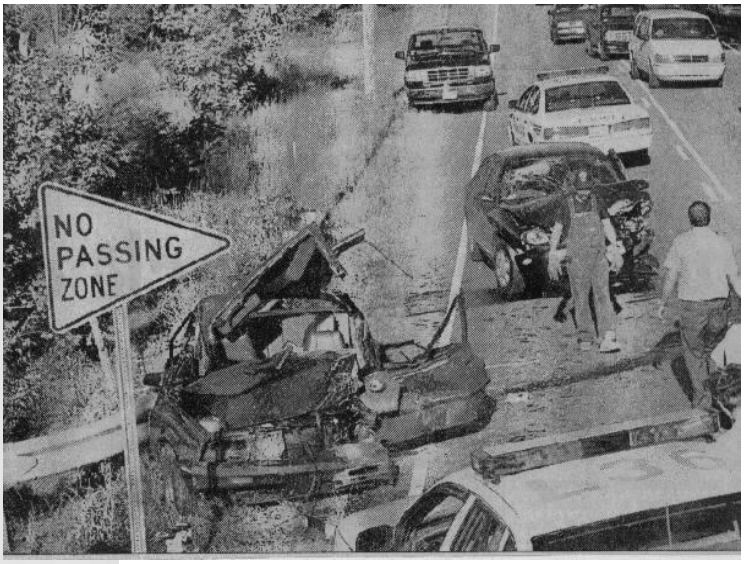
ΔV data in the EDR report does not match the change in speed (during the collision) that is calculated by the State's reconstructionist (this will happen if the reconstruction is conservative)

The EDR has a limited amount of recording time for impact data, and may not have captured the data from the entire crash.

WHAT ARE SOME POTENTIAL DEFENSES IN THIS COLLISION?

Identify five (5) potential defenses for the operator of the Northbound vehicle that crossed the center line and collided with the Southbound vehicle, causing the death of the operator of the SB vehicle. No passengers in either vehicle, road condition: dry.





MV#1 traveling Northbound crosses center line and collides with Southbound MV#2, causing death of operator of MV#2. Suspected operator of MV#1 has 0.21 BAC one hour after crash.

1. _____

2. _____

3. _____

4. _____

5. _____