COLLISION DAMAGE ANALYSIS

Accident Reconstruction and Collision Damage Analysis are methods of investigation used to identify salient elements of motor vehicle collisions. Which method is appropriate for use depends on the magnitude of the collision event and the salient elements required to satisfy the assignment.

While this session deals with "low speed" collisions and minimal vehicle damage, it is important to define the differences between Accident Reconstruction and Collision Damage Analysis.

Accident Reconstruction is the diligent effort of a qualified investigator(s) to reverse-engineer a moderate or high speed collision event by application of proven scientific measures to post-collision evidence - with a goal of determining pre-collison conditions and the probable cause of a collision event. A successful reconstruction requires specific knowledge of all elements of the collision including:

Access to:

vehicle(s) in their post-collision condition,

all evidence available at the collision site - either gathered personally or acquired from an expert(s) documentation of scene conditions and on-scene photos.

Specific knowledge of:

vehicle(s) weight, dimensions and crush factors,

vehicle(s) post-collision location and orientation to one another and to the site,

point of impact,

pavement composition & conditions before & after the event - skid marks, drag factor, etc.,

orientation and identification of debris at scene,

weather & time of incident,

all possible witness & operator(s) input,

all official reports.

If sufficient evidence and resources are available, an Accident Reconstruction investigation can be an effective tool for establishing the probable cause of, and responsibility for, an accidental collision event of major proportions.

Damage Analysis is a diligent effort by a qualified investigator to determine the basic elements of a low-speed collision event by analytical consideration of the best evidence available - in light of the reported and/or actual facts of the collision event.

The term "low speed" refers to the relative speeds between two objects at the moment of first contact.

The reliability of a Damage Analysis is directly proportional to the quantity and quality of the evidence and inversely proportional to the percentage of the evidence from a third party source.

If sufficient evidence is available, a Damage Analysis investigation can/should confirm or refute the reciprocity of damage - between vehicles or between a vehicle and a fixed object - and establish parameters of probable contact speeds as a means to confirm or refute the scenario reported and its effects on vehicle occupants.

Damage Analysis can be a cost effective tool for determining the basic elements and credibility of a low speed or questionable collision event and should be as much a means of establishing the candor of the human element involved as it is the condition of the vehicle(s) involved before & after the collision.

A Damage Analysis should conclude whether the collision event occurred as reported or is unsupported by the evidence and possibly motivated by fraud.

Damage Analysis differs from other kinds of investigation - mainly in the experience and training of the investigator. The methodology simply; an analytical process enabled by an investigator's comparison of present conditions to benchmarks previously established by means of training, research and/or experience.

Minimum requirements:

1 - Knowledge of the collision scenario reported by operator(s). First hand interviews of participants by the investigator handling the analysis is the best means of acquiring this knowledge - but this is not a realistic scenario in the real world as participants in collisions under investigation by a Damage Analyst are often represented, or are not readily available for consultation.

The alternative is scrutiny of internal reports, file material and police reports to develop the reported facts of the collision event. On scene facts documented by a Police Report often fail to support contentions or damage which surfaces after-the-fact. Particular care should be taken to differentiate between a Police Report and operators reports which are often completed by an attorney after the fact. It is also prudent to determine if information on a police report is the first hand knowledge of an officer at the scene. We have seen many instances where an officer will draw a diagram or indicate areas of damage based only on the input of one operator - as the other vehicle had left the scene before the arrival of police.

2 - In Damage Analysis investigation, as in all automotive claims, the vehicle(s) are the best evidence available and as such should be exploited to the fullest by an investigator with automotive knowledge and understanding of the basic elements of investigation, and an awareness of the potential for fraudulent motivation for a claim.

First hand access to vehicles is essential if they are available and unrepaired. The credibility of a first hand inspection of damage is the main benefit, but even more important is the opportunity to identify conditions such as old damage, crude repairs and mechanical deficiencies which may have motivated the claim or augmented the damage. First hand inspection of damage and conditions is far more

credible to a judge or arbitrator than an opinion based on third party evidence.

Crudely repaired salvage vehicles are often used in staged collision claims. Their pre-DOL condition should be very apparent to an investigator.

Vehicles and/or parts can be examined with a view to establishing whether or not a mechanical defect was a contributory factor. As an example, it is not unusual for a tire deflation or blowout to be blamed as the cause of an accident, when the deflation may actually be a result of the collision as opposed to its cause. Examination of the tire often reveals evidence whether it deflated prior to impact or as a consequence of it.

Types of damage - Damage caused by a collision is either the result of direct contact with an object or vehicle or is induced by the contact.

Contact damage includes: rubbed-off paint or material (transfers), crushed or indented sheet metal and/or exterior components, tire rubber, road material, tree bark, human tissue or clothing. Imprints of headlight housings, wheel rims, bumpers, door handles, poles, trees or other fixed objects. The character of the surface defects can include striations from contact with surfaces such as concrete or corrugated metal.

Induced damage is the indirect result of the forces of the collision on the vehicle's structure. Damage to the drivetrain would fall into the Induced category unless the result of direct contact.

Glass damage can be telling. The front windshield is a lamination of two layers of glass sandwiching an adhesive membrane designed to keep the pieces in contact should the windshield be broken.

Windshield fracture lines radiate away from the contact which caused the fracture. The circular lines formed resemble a "spiderweb". Parallel fracture lines on a front windshield are the result of induced damage.

Tempered glass, used in side and rear windows, display no pattern when subjected to either contact or induced damage, it simply shatters into many pieces.

Vehicle-to-vehicle contacts - the investigator should look for reciprocal damage - the profile of damage on one vehicle matches the profile of that on another. Allowances must be made for handling damage and conditions that were present prior to the DOL, such as repairs from a prior collision, rust and existing old damage.

Many collisions actually involve more than one impact, i.e., the vehicle bounce after impact into a fixed object, or vehicles may rotate quickly after impact and contact each other a second time.

Vehicle to stationary object - An investigator can often determine what a vehicle struck by the profile of the damage and/or by interpretation of surface condition - imprints, transfers, embedded material. The top to bottom penetration caused by contact with a fixed object will often be uniform - which is not the case with vehicle to vehicle contact.

Hit while parked - tires & wheels often tell the story whether a vehicle was damaged while stationary or moving by circumferential or radial scratches, scuffs or gouges.

It may be possible to determine if the engine was running at the time of the collision by inspecting the engine's external moving parts - such as the belts, pulleys and fan for evidence of contact with stationary components.

It is usually possible to determine if body damage was applied from front to rear or rear to front, particularly if the contact which applied the damage overlaps adjacent panels. Inspection of the edges of the panels can reveal which way contact moved the metal.

Bulb analysis is reliable only if the vehicle has not been operated since the collision.

It is very important to determine if a vehicle involved in a hit & run scenario was operational prior to the DOL - as mechanical defects often motivate hit-while-parked claims.

Wheels and tires - are an important source of evidence in all of the above categories, particularly when a driver reports that a tire failure cause the collision. Careful inspection of the inside & outside of a tire's sidewalls, its tread and the wheel can reveal evidence whether the tire was inflated at the point of impact or not.

Tire damage can also be the result of handling after the collision. This can be seen in the form of flat tire or wobbly scuff marks.

Sudden deflations (blowouts) are characterized by ruptured (frayed), as opposed to cut, cord fibers. A blowout can occur before impact, during impact, or after impact but cuts or slits in the tire are contact damage.

Inspection of bulbs - if post-collision conditions have been preserved (battery disconnected and/or it can be established that brakes and lights have not been actuated) inspection of bulbs and their filaments can reveal whether they were illuminated when the collision contact occurred. The condition of the filament and the glass envelope of a light bulb can indicate whether it was hot/on at the time of a collision. Microscopic examination of a separated filament may determine the conditions under which it failed and establish whether headlights were on or brakes lights were illuminated.

Seat belts and their retractors can be examined to determine if they were in use and/or operational at the time of the collision. The interaction between seat belts and air bag systems should be identified for the model involved and factored into the equation. This data is available in the Mitchell Air Bag Quick Reference guide.

Some late model high end vehicles are equipped with gas operated pretensioning seat belts which are tied into the SDM (airbag) module and sensors in the seats which detect the seat's fore & aft position and the presence & weight of an occupant. When the SDM signals a deployment the seat belt pretensioners fire and tighten the belt proportional to the seat position and weight of the occupant.

Air bags - whether a deployment or a non deployment event occurred or not can be significant indication of conditions prior to a collision contact as deployment is dependent on whether a decelerometer within the Sensing and Diagnostic Module (SDM) has sensed a deceleration even between 1 & 2 Gs to activate an algorithm (AE) which monitors the rate of negative acceleration (deceleration) on the vehicles lateral (X) axis within a predetermined time frame and was from a

direction within program parameters for a deployment of front bags - essentially a triangle with the front fender tips and center console as its corners. The AE event is recorded as a non deployment, and record of it is permanently stored only in the event of a deployment.

Airbag systems deploy based upon predictive algorithms which look at what is happening to determining when & if a deployment should occur. Programing parameters, of necessity, allow a tolerance area but all operate on the principals of deceleration and angle of incidence within a short time frame (JERK).

In instances where the damage seems to warrant a deployment but none occurred, an experienced reconstructionist should be able to determine if collision circumstances warranted a deployment. A soft collision, like with a steel guard rail or a narrow pole may not have caused sufficient deceleration over a short enough time to warrant a deployment.

In the early days of air bag installation and use, crash sensors in the forward ends of the front fenders were employed and the air bag modules contained large capacitors to fire the air bags from the electrical energy stored in the capacitors in the event that impact damage took the vehicle's battery out of service early in the collision sequence. Those modules typically contained a small memory chip, which would record certain parameters at the time of the crash, for the purpose of allowing post-crash investigators to evaluate the efficiency of the air bag system and other safety-related components. In General Motors vehicles, and very recently some Ford models, that module has evolved into the Sensing and Diagnostic Module (SDM) which contains an Event Data Recorder (EDR).

The primary purpose of the current SDM is to fire the air bags, but it also has within the EDR a non-volatile memory (EEPROM) which can be interrogated for hexadecimal data values recorded seconds or milliseconds before and/or after an enablement - depending on the capability of the module. Since air bag deployment needs to be anticipatory rather than reactive, the SDM’s algorithm decides if the air bags and seat belt pretensioners will be needed and deploys them when appropriate conditions have been met. When predetermined parameters for deployment are met (sufficient Jerk), the algorithm goes into action (an enablement) and the EDR records input data at that instant and locks it after the deployment commands are completed. The EDR can also record data for a non-deployment, in which the algorithm was enabled but no deployment occurred.

The data contained in the EDR is a great asset to an investigator, but is not a substitute for a reconstruction. Interrogation of the module can produce data that may not be verifiable by post-collision examination, but is otherwise unavailable.

DATA AVAILABLE FROM SOME EDRS

Vehicle speed (in five one second intervals preceding impact)
Engine speed (in five one second intervals preceding impact)
Brake status (in five one second intervals preceding impact)
Throttle position (in five one second intervals preceding impact)
Driver’s Seat belt on/off - status
Passenger’s airbag enabled or disabled - status
Airbag Warning lamp - status
Time from impact to airbag deployment
Maximum Delta-V for a near-deployment event

Delta-V vs. time for frontal airbag deployment event
Time from impact to time of maximum Delta-V
Time between near-deploy and deploy event (if within 5 seconds)
Ignition cycle at event
Current Ignition cycle (some)

Dual stage air bags - Manufacturers have recently adopted the use of dual stage air bags which perform at two levels dependent on crash severity.

Air bags of a vehicle reportedly parked or stationary when hit should not be deployed.

Vehicle deformation - crush factors, contact damage, paint or material transfers and surface marks on body components and tires can be evaluated, interpreted and related to the operators' reports - particularly useful in analysis of hit & run collisions.

Tools - a damage analyst should be equipped with measuring devices for reference, a magnet, a portable floor jack and jack stands, powerful lighting, ground cloths or a piece of carpet to lay on, sufficient hand tools, magnetic or adhesive arrows, tire marking crayons, a powerful magnifying glass or scope, a rubber hammer and appropriate hand tools - to support his good quality photographic equipment. His computer must be online and equipped with Photoshop or a comparable application and the means to process digital photos and write them to a CD archive.

DIGITAL PHOTOGRAPHY

I had been reluctant to make the move to digital photography because of its questionability as evidence - until I discovered that Kodak has developed a proprietary process that retains the original read only image. Two of our investigators are currently using Kodak cameras and we anticipate a complete switch to this format this year. The client receives professional 4" X 6" prints along with a CD and we will archive the original images with our file on the original CD.

The following documentation was recently sent to me from Kodak Technical Support in response to my request for documentation of the unalterable nature of the Kodak file format:

"Regarding the Integrity of Data as Captured in the Kodak DCS Digital Image File Format.

The Kodak **DCS Digital Image File Format** offers a high degree of integrity and is immune from tampering without detection. The file format, sometimes referred to as Raw or Archive image data, is a format derived from the TIFF (Tagged Image File Format) standard, utilizing custom tags that will not be understood by standard software packages on the market today.

This Archive image data is not accessible for editing by normal software, and it's our belief that any tampering of this raw data will be readily apparent when the image data is processed through our standard Acquire Plug-in or TWAIN Data Source software modules. The tampering would appear as misplaced pixels (picture elements) that do not appear aligned correctly. The pixels in question may also appear in different colors, different densities, or lacking critical detail (soft appearance).

When the image is Acquired, it is brought into memory of the host

software application by a process called interpolation, which creates pixels using a complex algorithm and creates an Acquired file that is three times the original size of the Kodak Archive file. During interpolation, 50% of the green pixels are created, 75% of the red and blue pixels are created. The original Kodak Archive file is only used to read image data from, and is not changed during this process. Normal color processing of data is required to render a high-quality representation of the original scene. These all influence the creation of the Acquired file, but leave the original Archive data intact.

Additionally, during image capture in our DCS cameras the image data is read from the sensor, and two sizes of thumbnail or down sampled image data are created. These thumbnail files represent the image as captured and process internally to the camera; any tampering of the raw image data would show different results when compared to the thumbnail images.

The custom TIFF tags used by Kodak also record the date and time as set internally to the camera. These tags are maintained throughout the copying process, and provide a reference to the time of original capture. The internal clock chip will maintain good time accuracy. A calculation error may cause every year to experience the date of February 29, instead of limiting the date to only valid leap years. This can be corrected by checking the camera date on March 1 and correcting it if it is found to be in error.

Should the original Kodak Archive file be copied to a computer storage media such as CD-ROM (Compact Disc-Read Only Memory), the file may serve as a original record of the data and be examined without ability to tamper with it's original structure. Normal procedures for storage of evidence should be followed, to maintain control and access of the physical disc media.

ANALYSIS BY FILE REVIEW

Questionable aspects of a low speed collision claim often do not arise until the opportunity for a first hand inspection of one or both of the vehicles has passed. At this point, scrutiny of good quality photographs and appraisals can be a basis for meaningful analysis of damage - if the analyst has a strong comprehension of, and experience with, physical damage appraisals and supplements and an awareness of the implications of disparities between appraisals and creative estimates by skillful body shop estimators, and it can be demonstrated that the analysis was based on the best available evidence.

A review of third party material from a client's file must be supported by knowledge of the collision scenario reported by participants - and as a package - compared with the analyst's experience with, and knowledge of, similar collisions under real world circumstances and crash testing.

Care must be taken to avoid the perception that an opinion on a change in velocity at impact or a contact speed was determined strictly by analysis of photographs and repair costs (appraisal) - which is, justifiably in our view, not a viable or generally accepted means of calculating speed or change in velocity between bullet & target vehicles in a rear end collision.

Appraisals as a source of evidence or absence of damage. Of the many factors to be considered in an analysis performed without benefit of access to the vehicles is the source and quality of the appraisals.

The dollar amount of repair cost is unacceptable as an indicator of the contact speed that caused it. It is not unusual to find a supplement three times as much as the original appraisal of damage to a vehicle which displays little or no visible damage or evidence of a collision - and has been involved in a collision scenario with a vehicle with no apparent damage and no operator injury.

A skillful body shop estimator can easily add 6 - 10 hours of R & R, analysis and pull time to repair to a survey of a unibody vehicle involved in a bumper to bumper collision - thus developing what might have been a $500.00 bumper cover repair into what appears to be a substantial amount of damage.

It is very difficult for any appraiser to challenge a qualified shop on the need for this type of diagnosis - and it is foolhardy to even attempt it after-the-fact from photos and appraisals.

INJURY POTENTIAL

A Damage Analyst without specific medical training is unqualified to render an opinion on injuries, but should be qualified by specific training and experience to formulate a credible, defensible opinion on contact speeds and the resultant potential for disruption of occupants of collision vehicles - citing the evidence which led to an opinion that the collision event under investigation falls within a speed category.

Consideration of the conclusion of a damage analysis in light of medical reports, history and examinations can support a claimant where justified - but also can alert to fraudulent or excessive claims of injury where unjustified.

A Damage Analyst should be intimately familiar with the large and growing body of published results of testing by credible Experts - testing done specifically to establish benchmarks for the human body's ability to withstand the force of a low speed collision.

Investigators wide use of published results of such testing to evaluate the injury potential of collisions has proven many of the theories and formulae used by a reconstructionist.

Deceleration formulas have been proven by skid testing vehicles and comparing the known data with the skid test results. Formulas have been proven through actual testing in which vehicle's are rolled off a ramp - the takeoff height and angle and the flight distance precisely measured for insertion into the proper formulas and results of compare to the known ramp speed thus proving the formula.

In all collisions, the relationship of occupant kinematics (motion) to collision events are subject to the basic laws of physics:

During a collision, occupants of a motor vehicle are subject to Newton's laws of motion. If the vehicle (target) is struck from behind an occupant will experience the sensation of moving backward into the seat - followed by a rebound. Conversely, an occupant of the impacting (bullet) vehicle will experience the sensation of motion to the front from the vehicle's sudden deceleration on impact.

Occupant movement from vehicle collision forces is predictable, but the question of resultant injury is another matter altogether.

LOW SPEED CRASH TESTING

Considerable crash testing with human occupants has been done in an effort to establish parameters of the human body's susceptibility to injury.

Prominent among them are:

McConnell et al - (SAE papers 93089,952724)

Szabo et et al (SAE paper 94053)

West et al (Accident Reconstruction Journal 1993 May '93)

Robert De Banks et al (Biodynamic Research Corporation - IASIU Albert Canada , 4/17/00)

McConnell et al - Whitman McConnell, M.D. "Injuries Resulting From Low Speed Rear-End Collisions" - as a consultant (since 1990) to Biodynamic Research Corporation, Dr. McConnell designed, conducted and participated-in two series of live occupant rear-end crash tests. Occupants in the target vehicles in the second set of tests (1993) experienced a change in velocity (Delta V) of 5 to 6.8 mph. Instruments recorded a peak acceleration of 4.5g. Eleven volunteer BRC employees and the Doctor himself participated in multiple rear-end collisions during the two series of crash tests with 4 different type bullet vehicles including a pickup truck. All front and rear seat occupants of the vehicles were wearing instrumentation and were kept unaware of exactly when the bullet vehicle would be released from its ramp to roll into them at a precise, predetermined speed.

All participants reported that any discomfort they may have experienced from their involvement in the multiple collisions disappeared within two days. At no time was cervical hyperextension or hyperflexion observed in the test subjects.

In a 1997 Affidavit Dr. McConnell stated that "this work has been accepted and referenced by multiple authors and referred to as pioneering work in the area of biomechanics. Our findings have since been replicated many times by other researchers using human test subjects in low-velocity rear end collision testing.

The experimental protocols for the two series were not designed to be, nor did they need to be, statistically based studies similar to those required to address problems such as drug efficacy and side effects or the risk/benefit ratio of one type of surgical procedure over another for the general public."

He went on to say "had statistical validity been the only benchmark utilized for validation by the scientific method, the hypothesis that gravity affects all subjects would have had to wait, and would be waiting still, unaccepted until a statistically significant sample of all possible objects here on planet earth and in the rest of the universe were dropped in a gravity field and dutifully tallied that indeed, it too fell, all the while awaiting the one odd subject that didn't."

This affidavit was Dr. McConnell's response to academic criticism that his study was not statistically sound because a small group of BRC employees were used as subjects.

Szabo, Thomas J. et al, "Human Occupant Kinematic Responses to low Speed Rear-End Impacts"

results of multiple rear-end crash tests with five human subjects in a parked vehicle impacted at 10 mph. He reported that four of the subjects reported headaches immediately after the tests - but none of the test subjects were injured.

West et al, “Low Speed Rear-End Collision Testing Using Human Subjects - in-line rear end vehicle-to-vehicle crash tests with 6 volunteer male subjects between the ages of 32 & 39. Each volunteer went through 10-12 impacts at speeds of up to 10 mph. Two of the volunteers reported neck discomfort that lasted for one to two days. None were injured.

Robert Banks, “Injury Potential From Low Velocity Impacts/Collisions” - a paper presented to the the IASIU at a seminar during April of 2000 in Calgary, Alberta. The presentation described research he and others conducted into the area of injury sustained in low impact collisions. He documented 28 exposures of human subjects to multiple low speed rear-end collisions and 25 exposures of human subjects to multiple low speed frontal collisions. The collisions produced a Delta-V between 3 & 6 mph. His group of 11 medical doctors and three engineering Ph.D s found that the threshold for mild cervical muscle strain to be a Delta-V slightly over 5 mph but below this change the test subjects were uninjured. They further found that the instance of lower back injury is unlikely in a low velocity collision due to the relatively low back differential motion provided by the advancing seat back. None of his subjects reported any low back discomfort.

In the area of Temporomandibulaf Joint (TMJ) Injury they found insufficient forces present to result in TMJ injury.

Matsushita T, Sato TB, Hirabayashi K, Fujimura S, Asuzuma T & Takatori T. X-Ray Study of the Human Neck Motion Due to Head Inertia Loading. SAE Paper 942208, 1994. Twenty-six test healthy volunteers (4 female) ages 22-61 years analyzed in 4 frontal, 3 side, and 19 rear end crashes from 1.6 to 3.6 mph. MRI done prior to testing. Insurance study.

Used an Ito Seiki 3KGM-JM50 crash dummy in one rear-end test. Sled used with pendulum. Total sled impact duration was short at 55 msec (100 msec typical for car). Seats from 1991 Honda Today, 1988 Toyota Crown, and a 1991 Nissan Pulsar. Two females used in rear-end tests. High speed X-ray study (90 fps) done on human neck. EMG used in tests.

Hyperextension did not occur in any test. Head acceleration began at 100 msec. Three male subjects tested at the same 3.6 kmh and were all relaxed had 3.2, 5.1, and 5.4 g’s of head acceleration (41% difference). One subject had head rotated resulting in SCM pain. One leaning forward occupant had low back ache. For 26 test subjects 6 volunteers (23%) reported mild discomfort after test that lasted 2-4 days. Frontal crash testing found significant differences seen in belted versus unbelted volunteer. In unbelted occupant no change in shape of cervical curve due to no torso restraint. Jaw protrusion seen in belted cases. Exam done prior but no examination by a physician performed after testing.

Zaborowski AB. Human Tolerance to Lateral Impact with Lap Belt Only, SAE Paper 640843, 1964. Thirty-seven male Air Force volunteers ages 20-42 years. Volunteers were subjected to 50 lateral impacts at an average impact G of 3.25 to 9.02 for durations of 100-300 msec. The laboratory seat was propelled on a sled to the left side at speeds of 15-17 kmh (9.32-10.56 mph) and then stopped suddenly. All subjects tensed before the test except one subject. Muscle tensing reduced motion of subjects. Half of the subjects had symptoms at 6.25 average g’s or more. The symptoms resolved within days and were mostly headaches, neck, shoulder or hip pain. Two subjects were relaxed and hit

their heads on side plate. One volunteer was unconscious for 2 minutes. Had examinations done by physician before and after testing.

TSI Incorporated - A report by TSI Incorporated, a Canadian Accident Reconstruction firm specializing in low speed collisions, describes their extensive testing and their published findings from 96 exposes to real world collision forces that the subject involved in the collisions experience no lasting effects from the crash testing. There were no injuries and only two cases of minor discomfort that disappeared within 24 hours after testing. Their testing included the results of 48 collisions involving eight subjects with contact speeds between 5 & 9 mph.

Two of the test subjects reported mild transitory neck discomfort described as “a feeling like I slept awkwardly.”

In both cases the pain was gone within 24 hours after the onset. No volunteer felt it necessary to take over-the-counter pain medication or anti-inflammatory medication and none of the subjects sought medical attention for the transitory discomfort they experienced.

Bumper cars - TSI also conducted tests with the same instrumentation used in the vehicle crashes won operators of Madrid (brand) bumper cars in an amusement park. It is significant that they recorded forces comparable to their testing with vehicles and a peak deceleration force of 4.5g.

OPPOSING OPINIONS

There are opposing opinions by experts retained by plaintiff counsel and by Ph.D, DC (Chiropractor) Reconstructions from organizations such as the Personal Injury Training Institute (WWW.personalinjurytraining.com) who attempt to discredit any and all testing done related to the relationship between collision speeds and personal injury by proclamations such as Dr. Jeffrey A. States statements “Vehicle damage has no bearing on occupant injuries. Period.” and “There is an unwritten belief that the higher the collision speeds the greater the risk of injury. This is simply a myth.”

The 2003 publication, Low-Speed Automobile Accidents by Alan Watts, PH.D, contains an affidavit by Steven Drum, legal administrator for the Society of American Engineers (SAE) wherein he is placed on the record that articles published by the SAE are not subjected to Peer Review or Statistical or Methodological scrutiny and are the opinion and position only of the author - not the SAE.

This affidavit was solicited by attorneys representing the plaintiff in Druz V. State Farm Mutual, Arizona Civil Action CV 95-21280 in 1997 in an attempt to discredit a 1996 SAE Technical Papers by Thomas Szabo and Judson Wheeler - Human Subject Kinematics and Electromyographic Activity During Low Speed Rear Impacts and 4 other SAE papers concerning the relationship of injury to collision speed.

The Watts publication also contains Affidavits by Mark Reiser, Ph.D an Associate Professor of Statistics at Arizona State University.

Professor Reiser was retained by plaintiff counsel in the same case concerning Peer Review and to offer his opinion on the testimony of a Reconstructionist named Robert D. Anderson, who had cited the published results of testing by SAE papers by Szabo, MacInnis, McConnell and West as the basis for his conclusions concerning injury potential.

Professor Reiser averred that the papers were not subject to Scientific Peer Review and stated his opinion that their conclusions concerning injuries & collision speeds were statistically impossible to relate to the general population's reactions to similar situational testing.

In subsequent affidavits in the same trial, Professor Reiser indicated that the conclusions of each of the Defense's experts were invalid for one reason or another and concluded with an opinion that "The methods by which Mr. Anderson reaches his conclusions regarding the probability of injury concerning (the plaintiff) are not scientific methods generally accepted in the Scientific Community. The methods utilized by Mr. Anderson are based on studies (the SAE papers) that lack sound methodological design and statistical analysis."

Richard Hinrichs, Ph.D another Associate Professor at Arizona State university provided an Affidavit supporting the conclusions of Mark Reiser about Robert D. Anderson's report and the studies his analysis was based on.

The internet has hundreds of sites on the subject.

CONCLUSION

The bottom line on all of this is that in some high value cases, Accident Reconstructionists who have rendered opinions on Injury Potential based on well-regarded published reports of the results of crash resting with human occupants, are being rebutted by testimony from Ph.D academics who attack the credibility of the references (reports) used to reach a conclusion - on the basis of their statistical and methodological deficiencies.

The courts generally are allowing Reconstructionists to testify to the level of their field of expertise - but no further.

There is no question that controversy and expert v expert battle will continue in the Reconstruction Field.

Experts are also being subjected to Frye and Daubert/Kumho hearings to determine the boundaries of their qualifications to testify. I feel that this is a very positive trend which will ultimately weed out those in the field who will testify to any opinion that supports a client whether they have the basis for actual expertise in the area or not.

The bottom line is that Collision Damage Analysis is a cost effective and powerful investigative tool - primarily because of its ability to separate the wheat from the chaff, but also because of the fact that well-supported conclusions of an expert constitute an objective basis for evaluation of a claim.