Keeping Out the No Damage Pictures in a Minimal Impact Collision Case

By Ryan E. Hodge

The admission of photographs into evidence is left to the sound discretion of the trial court and will be reversed only for an abuse of discretion. The court may allow a witness to use a blackboard, map, model, diagram, chart, skeleton or photograph for the purpose of illustrating or demonstrating his testimony. *State v. Hatch*, 223 Kan. 783 (1978).). Photographs accurately portraying what they purport to show are admissible in evidence. This is universally recognized and needs no further discussion. It is only when photographs are distorted, inaccurate, or otherwise unfair that they are objectionable. *Ellis v. City of Kansas City*, 225 Kan 168, 175, 589 P2d 552 (1979).

Sounds easy enough. Pictures of cars without any damage are routinely admitted under this line of reasoning to the detriment of many plaintiff's. This article reviews the fallacy behind this reasoning.

Kansas statutes establish that "relevant evidence'" means evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence. K.S.A. 60-401(b) To meet this standard, evidence of impact speed or property damage would have to make the causation of plaintiff's injuries by the collision less probable. If counsel cannot show that it meets this standard, the evidence is irrelevant and, therefore, inadmissible because "evidence which is not relevant is not admissible."

Lacking a proven foundation for using crash damage or impact speed to draw inferences as to crash injuries, such evidence is both irrelevant and prejudicial and must be excluded under Kansas law.

Similarly, if evidence offered to show such a connection is inadmissible, the court is obliged to prevent counsel from arguing such issues to the jury. No rule governing oral argument is more fundamental than that counsel confine their argument to matters in evidence. *Clynos v. Jagoda*, 249 Kan. 473 (1991).

Pictures of the car in a low-impact collision mean nothing. The scientific literature on the subject of estimating impact force in a simple two-vehicle collision shows that such determinations are very difficult to make, even for scientists and engineers. *See, e.g.*, M. Robbins, et al., *Lack of Relationship Between Vehicle Damage and Occupant Injury*, TECHNICAL PAPER NO. 970494 (Society of Automotive Engineers, 1997); G. Siegmund, et al., *Characteristics of Specific Automobile Bumpers in Low-Velocity Impacts*, TECHNICAL PAPER 940916 (Society of Automotive Engineers, 1994); M. Bailey, et al., *Data and Methods for Estimating the Severity of Minor Impacts*, TECHNICAL PAPER 950352 (Society of Automotive Engineers, 1995); M. Freeman, et al., *A Methodologic Critique of the Literature Refuting Whiplash Syndrome*, SPINE, 24(1): 86-89 (1999); J. Smith, , *An Analysis of 72 Real World Impacts: An Initial Investigation into Injury and Complaint Factors*, TECHNICAL PAPER NO. 1999-01-0640 (Society of Automotive Engineers, 1999); D. Miller, *Low Velocity Impact, Vehicular Damage and Passenger Injury*, J. CRANIOMANDIBULAR PRACTICE, 16(4), 226 (1998).

Automobile safety issues in our country are regulated by the U.S. Department of Transportation (DOT). The National Highway Traffic Safety Administration, part of the DOT, has said the following regarding efforts to determine impact speed from property damage:

Is there a way to determine how fast a car was going during a rear end crash based on the damaged bumper(s)?

No. We do not collect any data that would be useful in determining the impact speed. Many parameters such as vehicle masses, the pre-impact velocity of both vehicles, impact angles, crush resistance, metallurgical fatigue, etc., affect how the bumpers behave during an impact. Each crash must be analyzed with respect to all

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of the parameters before an estimate can be made.

In addition, experts have studied whether the damage sustained in a collision can be used to calculate the force on target vehicles. The conclusion of one such study was:

> ***The amount of damage sustained by the car bears little relationship to the force applied.*** To take an extreme example: If the car was stuck in concrete, the damage sustained might be very great, but the occupants would not be injured because the car could not move forward, whereas, on ice, the damage to the car could be slight but the injuries sustained might be severe because of the rapid acceleration permitted.
> I. MacNabb, *Acceleration Extension Injuries of the Cervical Spine*, JOURNAL BONE/JOINT SURGERY 46:A 1797-99 (1964)

Scientific literature suggests numerous reasons why force in a low-impact collision cannot be meaningfully measured. For example, presence or absence of compression pistons in either vehicle will change the forces. The compression pistons help to dissipate the force of the collision before it reaches the occupants. A second example is bumper variability between individual cars regardless of age. Bumpers vary greatly in terms of their components and performance, even among cars of similar size and style. Juries asked to speculate about lack of damage to cars are asked to form conclusions that experts recognize cannot be made. *Clemente v. Blumenberg*, 183 Misc.2d 923, 934, 705 N.Y.S.2d 792 (1999) ("Using repair costs and photographs as a method for calculating the change in velocity of two vehicles at impact is not a generally accepted method in any relevant field of engineering or under the laws of physics." *See also Tittsworth v. Robinson*, 252 Va . 151 (1996), *Smelzer v. Norfolk & Western Railway Co.*, 105 F.3d 299 (6th Cir. 1997), *Yorston v. Bailey*, (CV 95-17659, Ariz.Super.Ct. (1997), *Pinsker v. Cohen* (CV 95-12419, Ariz.Super.Ct. (1997), *Clemente v. Blumenberg*, 705 N.Y.S.2d 792 (Sup. 1999), and *Schultz v. Wells*, 13 P.3d 846 (Colo.App. 2000)).

The actual equations that an engineer would use to determine force in any collision are as follows:

$$m_1v_1 + m_2v_2 = m_1u_1 + m_2u_2$$
[conservation of linear momentum]

$$u_2 - u_1 = -e\,(v_2 - v_1)$$
[defines coefficient of restitution]

For these equations, m = mass of vehicle, v = velocity at impact, u = post-impact velocity after vehicle separation, and e = coefficient of restitution (relationship of closing and separation velocity).

When a collision is perfectly elastic (e=1), the "kinetic energy of the two vehicle system is conserved." These equations can be simplified in cases where the target vehicle was stationary at the time of impact, so that $v_1 = 0$. If, in addition to the target vehicle being stationary at impact, we also know the collision was perfectly elastic, the equations can be additionally simplified as follows:

$$u_1 = 2v_2m_2/(m_1 + m_2)$$

$$u_2 = v_2(m_2 - m_1)/(m_1 + m_2)$$

By definition, the change in velocity, delta-v, of vehicle 1 is the post-impact velocity u_1 minus the velocity at impact v_1, or

$$(\text{delta-v})_1 = u_1 - v_1 = u_1 = 2v_2m_2/(m_1 + m_2)$$

In order to make these calculations, vehicle mass and velocity must be known. In a low-impact case, the velocity of the striking vehicle could range from 3–12 miles per hour. This represents an error factor in force calculation of in excess of 100%.

If there is damage to the vehicles, the calculation of delta-v is even more difficult, because we then have to calculate how much of the impact speed—if known—was dissipated by the impact and the crush damage. Once we know that crush damage has occurred, we must consider the unique crush characteristics of each vehicle to determine how much of the known impact speed was dissipated by crush damage.

Even if it were possible to compute how much energy is transferred from one car to another, it is usually impossible to determine how much of that energy is transferred to a particular occupant of a particular vehicle. To do such a calculation would have to include detailed information about how the occupant was seated, their head position relative to their headrest, and whether the person was angled and numerous other factors that are not normally known.

Some research has been done to calculate the amount of force imparted on an occupant by rear-end collisions of varying severity. For example, D.M. Severy, J.H. Mathewson and C.P. Bechtol, *Controlled Automobile Rear-End Collision: An Investigation of Related Engineering and Mechanical Phenomena*, CAN. SERVICES MED. J. 11:727, (1955), concluded that an 8 m.p.h. rear-end collision will accelerate a vehicle at 2 g's and the head of an occupant at 5 g's within 300 msec. In other words, the force imparted to the occupant's head was 2 ½ times the force imparted on the vehicle itself.

Other research has shown that "in some cases the head may accelerate at up to 5 times the input acceleration."

Arthur C. Croft, D.C., M.S., DABCO, *Biomechanics*, in S.M. Foreman and A.C. Croft, WHIPLASH INJURIES, 59 (1988).

Even if speed of impact could be predicted from vehicle damage, and if speed of impact could help predict the energy transferred to any particular vehicle in any particular crash, and even if knowledge of that energy allowed accurate prediction of the amount of energy transferred to any individual occupant given their position in the vehicle, that knowledge still would not allow accurate predictions of whether and to what extent any particular person would be injured. This is because every individual person's susceptibility to injury varies.

Speaking in the broadest terms, an individual's susceptibility to injury is affected by such individual factors as height, weight, gender, age and medical history. C.H. Schutt, et al., *Neck Injury to Women in Auto Accidents: A Metropolitan Plague*, JAMA, 206: 2689-93 (1968); M.Y. Svensson, et al., *The Influence of Seat-Back & Head Restraint Properties on the Head-Neck Motion During Rear-Impact*, ACCIDENT ANALYSIS & PREVENTION, 29(2): 221-27 (1996); M. Sturzenegger, et al., *Presenting Symptoms & Signs After Whiplash Injury: The Influence of Accident Mechanisms*, NEUROLOGY, 688-93 (Apr. 1994); T. Matsushita, et al., *X-ray Study of the Human Neck Motion Due to Head Inertia Loading*, TECHNICAL PAPER NO. 942208 (Society of Automotive Engineers, 1994).

Other factors that affect the likelihood of injury include occupant's position in the car, body position, head position and rotation, awareness of the collision, presence of preexisting degenerative changes, and use of a seat belt. M. Sturzennegger and M. DiStefano, *The Effect of Accident Mechanisms and Initial Findings on the Long-Term Course of Whiplash Injury*, J. NEUROL. 242: 443-49 (1995); *also see* L. Jakobsson et. al., *Analysis of Head & Neck Responses in Rear-End Impacts: A New Human-Like Model*, VOLVO SAFETY REPORT (1994); Arthur C. Croft, D.C., M.S., DABCO, *Biomechanics*, in S.M. Foreman and A.C. Croft, WHIPLASH INJURIES, 67 (1988).

Because so many variables affect the risks that any individual will be injured in a crash, there is no way to make inferences about injury from crash damage. As Dr. Croft put it:

> The notion that one can calculate or predict the type or extent of soft tissue damage sustained by the occupant of a vehicle merely by calculating the G forces produced in the vehicle by the resultant collision should clearly be laid to rest.
> Arthur C. Croft, D.C., M.S., DABCO, Biomechanics, in S.M. Foreman and A.C. Croft, WHIPLASH INJURIES, 62 (1988).

Because there is no scientific or other factual basis for connecting damage to speed, speed to force imparted on a vehicle, force imparted on a vehicle to force imparted on an occupant, or force imparted on an occupant to injury, it is unsurprising that permitting a jury to speculate about injuries from crash damage invites naked speculation. Scholars have attempted to study the damage-to-injury connection. They have not found a relationship. B. Radanov et al., *Long-Term Outcome After Whiplash Injury: A 2-year Follow-Up Considering Features of Injury Mechanism and Somatic, Radiologic and Psychological Findings*, MEDICINE 74: 5, 281-96 (Sept. 1995) (amount of damage to, and speed of, vehicles not related to the severity of cervical injuries).

In fact, studies have shown that low-impact collisions generate enough force to easily cause injury to the human body In at least one study "[t]he results rigorously show that **in a no damage accident, the struck, or target, vehicle can obtain a delta-v of 10 MPH or greater, which is well into an injury producing range.**" S.D. Batterman and S.C. Batterman, *Delta-V, Spinal Trauma, and the Myth of the Minimal Damage Accident*, JOURNAL OF WHIPLASH & RELATED DISORDERS, 1:1, 41 (2002) (emphasis added).

Statistics from the Florida Department of Highway Safety and Motor Vehicles show that low-speed crashes, in which both vehicles are traveling less than 10 m.p.h., result in both injuries and fatalities. For example, in 1999, of 67,602 low-speed crashes reported, 55,973 injuries and 528 fatalities were reported. In other words, 83% of low-speed crashes resulted in injuries, and 0.7% resulted in fatalities.

Allowing defense counsel to introduce evidence such as vehicle photographs that show a low-speed or low-damage accident, and argue that the plaintiff could not have been hurt in the accident because of the low-speed impact or the minimal property damage involved is to demand that the jury speculate. Since science proves that damage cannot be used to determine impact speed, impact speed cannot be used to predict force imparted on the target vehicle, force imparted on the target vehicle cannot be used to predict force imparted on the vehicle occupant, and force imparted on the vehicle occupant cannot be used to predict injuries—either generally or in a particular case—the "common sense" of the jury surely does not permit jurors to make the same lengthy chain of inferences.

Despite the absence of any basis for making these inferences, liability insurers have devised and implemented national policies to defend MIST (minimal impact soft tissue) cases by asking jurors to engage in just such counter-factual speculation that "minor impacts" cannot cause injury. One of the basic tenets of the MIST strategy, which was originally developed as a profit-enhancing scheme by Allstate Insurance, is to make litigation of such cases too expensive for plaintiff attorneys.

Defense counsel asks the jury to use their common sense to know certain facts, such as:

- The photographs of the vehicles accurately depict the amount of the damage that occurred in the crash.

- The amount of damage seen in the photographs indicates that there was little force involved in the crash.

- No injury was possible given the minimal amount of force inferred from the photographs.

- No or very little treatment should have been necessary for any minimal injury that might have resulted from the crash.

- Injury beyond a temporary strain was not possible, and thus treatment

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beyond a few weeks was not reasonable or necessary.

These arguments are routinely allowed, are without basis in evidence and severely prejudice the plaintiff.

Courts have begun to recognize this prejudice. In *Hastie v. Dohar*, 2002 Ohio App. LEXIS 808 (Ohio Ct. App. 8th Dist. 2002), the trial court was found to have properly excluded exterior photographs because the photographs did not accurately depict the full extent of damage to the car and were unduly prejudicial. In *Hovis v. Hughes*, 2001 Del. Super., LEXIS 534 (2001), the court affirmed the exclusion of damage photographs in a MIST case. In *Hovis*, the photos were admitted in the initial trial, which resulted in a $1,000 plaintiff's verdict. On retrial, when the photos were excluded, plaintiff won a verdict of $80,000.

The *Hovis* court asserted that the different outcomes of these trials was evidence of the prejudicial nature of damage photographs in MIST cases. The disparity in the jury verdicts in this case is perhaps the best evidence of the highly prejudicial nature of photographic evidence in low-impact automobile accident cases.

Lacking a proven foundation for using crash damage or impact speed to draw inferences as to crash injuries, such evidence is both irrelevant and prejudicial and must be excluded under Kansas law. This is precisely the conclusion reached by the Delaware Supreme Court in finding that juror inferences about injuries from impact or damages necessarily involve unguided speculation and that the risk of such improper inferences "substantially outweighs" any probative value of such evidence. *Id.* at 42. As the Court found:

> As a general rule, a party in a personal injury case may not directly argue that the seriousness of personal injuries from a car accident correlates to the extent of the damage to the cars, unless the party can produce competent expert testimony on the issue. ***Absent such testimony, any inference by the jury that minimal damage to the Plaintiff's car translates into minimal personal injuries to the Plaintiff would necessarily amount to unguided speculation.*** *Davis v. Maute*, 770 A.2d 36, 42 (Del. 2001) (emphasis added).

The *Davis* court characterized the trial court's decision as follows:

> Specifically, the trial court held that, because none of the medical experts expressed an opinion on this subject, defense counsel was 'not permitted to say—well you couldn't get a bad injury from this type of an accident.' *Id.* at 40.

In affirming this ruling concerning defense counsel's argument, the Davis court noted:

> ***Counsel may not argue by implication what counsel may not argue directly.*** Applying this principle to the present case, defense counsel's characterization of the accident as a "fender-bender" was improper. By playing down the seriousness of the accident, Maute's counsel unmistakably suggested—without support in expert testimony—that the accident could not have caused serious personal injury to Davis. *Id.* at 40-41 (emphasis added).

A subsequent Delaware superior court, applying *Davis*, provided the following analysis of the MIST defense. *Sloan v. Clemmons*, 2001 Del. Super. LEXIS 535 (2001).

> Here, as in most MIST cases, the defendant wishes to make a two pronged argument: (1) the minimal damage to the plaintiff's vehicle reflects minimal force of impact; and (2) minimal impact indicates minimal resulting injuries. *Id.* at *11.

Reflecting on pre-*Davis* cases, the

court noted, "There was a time when photographs of the vehicles involved in an accident...were front and center in almost every MIST case tried in this Court." *Id.* at *6.

In deciding to exclude the impact and damage evidence in the case before it, the *Sloan* court noted:

> The Court's decision here recognizes that the ***correlation between vehicle damage and force of impact involves more than common sense,*** even common sense informed by medical training. ***To make the correlation between vehicle damage and force of impact requires specialized training and experience in the science of motor vehicle crashes. Absent this foundation, photographs depicting vehicle damage are not admissible to support a correlation between vehicle damage and impact or vehicle damage and injury.*** Other evidence regarding the extent of damage to the vehicles likewise is inadmissible absent the requisite expert foundation.
> *Id.* at *12-13 (emphasis added).

To make the correlation between vehicle damage and force of impact requires specialized training and experience in the science of motor vehicle crashes.

In *Dicosola v. Bowman*, 794 N.E.2d 875 (Ill. Ct. App. 2003), the trial court granted plaintiff's motion to exclude photographs of the apparent minimal damage to plaintiff's vehicle and evidence of the dollar amount of vehicle damage and prohibited defendant from arguing, without expert testimony, that a correlation existed between the amount of damage to the vehicle and the extent of plaintiff's injuries. The Court of Appeals upheld this exclusion and analyzed it by analogy to the reasons for requiring expert medical testimony on medical causation. This court has explained that the rationale for requiring a defendant to introduce this expert testimony is "to avoid what amount[s] to the jury forming medical opinions." *Hawkes v. Casino Queen, Inc.*, 336 Ill. App. 3d at 1008, 785 N.E.2d at 518 (2003). The same principles apply to the relationship between damage to a plaintiff's vehicle and the nature and extent of a plaintiff's personal injuries. *Id.* at 881.

Thus, such evidence must be excluded to avoid juror speculation. Kansas follows this rule regarding causation. Expert testimony is required on injury causation in Kansas. *Watkins v. McAllister*, 30 Kan.App.2d 1255 (2002) (summary judgment was properly granted to defendants because the plaintiff failed to present expert evidence to establish causation); *Sharples v. Roberts*, 249 Kan. 286 (1991) (plaintiff failed to provide evidence of causation necessary to maintain his action); *Bacon*, 243 Kan. 303; *Webb*, 223 Kan. 487; *Collins v. Meeker*, 198 Kan. 390, 424 P.2d 129 (1967); *Heany*, 23 Kan.App.2d 583. Strong reliance must be placed on expert, rather than lay, testimony for determining causation. *Pope v. Ransdell*, 251 Kan. 112 (1992).

Excluding photographs in a car wreck case is a difficult task. But on low-impact collisions, the inference that is supposedly based on common sense simply does not exist. ❖