

Presenting Science and Animation to the Jury

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You have been called immediately after a serious accident to investigate and defend the trucking company and its driver. You employ your firm's emergency response team. You investigate the site. You may employ an engineer, a reconstructionist, a biomechanical engineer, safety expert, a maintenance expert, and possibly a products expert if the Level 1 inspection suggests a parts failure or defect as a proximate cause. Your reconstructionist employs his computer expert to download the electronic control module from the tractor, as well as the plaintiff's vehicle. The data shows the tractor's traveling speed and braking functions as well as other mechanical data. The download from the plaintiff's vehicle shows the vehicle's speed, braking, air bag deployment, steering angle and likely seat-belt use. A review of the police report shows the police photos, special studies and supplements to the report as well as the roadway diagram and the impacts and debris measurements. Now that you have all of this, what do you do with it? How should you prepare this information?

Prepare for Trial

You want to prepare this information to serve as admissible evidence. Use this evidence to prove your theory of the accident, the material facts to support the client's view and story of its non-liability.

Standards of Admissibility

This paper is not intended to include a debate over standards of admissibility. Those standards can be generally referenced in *Frye v. United States*, 293 F.1013 (D.C. Cir., 1923) ("Frye standard") and *Daubert v.*

Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993) ("Daubert standard"). It should be noted that, while many states claim to follow *Frye*, their standards differ. State laws do not uniformly apply the *Frye* standard. For example, Arizona followed the *Frye* standard until 2011, when the Arizona Supreme Court changed to the *Daubert* standard and amended Arizona Rule of Evidence 702. Under the *Frye* standard, an expert's opinion must be "generally accepted within the scientific community" before it is admissible. Under the *Daubert* standard, the expert must explain his methodology of reaching an opinion and that the expert has chosen a reliable method and followed it. Foundationally, this is shown under *Daubert* by testimony that the method has been tested for reliability, subject to peer review, a rate of error in the theory, existence of any standards and controls, and whether there is any general acceptance of the technique or methodology by the relevant scientific community. *Daubert* focuses on relevance and reliability, whereas the *Frye* standard is based upon a test of "general acceptance" in the scientific community. The *Daubert* standard places upon the trial judge a "gate-keeping responsibility"; a broader role in determining admissibility. *Daubert* would allow expert testimony if it is relevant and reliable, regardless of general acceptability by the scientific community. But enough said here on applicable standards. Unless you are in Federal Court you need to check your state standards.

Raw Is Better

Raw data cannot be cross-examined. It is the strongest of evidence. Even in a bad accident scenario, raw scientific evidence is very strong proof, so use it. If your truck's

download is at all positive, then use it. If the download from the plaintiff's vehicle helps your defense on proximate cause or injuries (i.e., seatbelts, maintenance, airbags, etc.), use it.

Steps That Matter Don't Forget the Site

Is the site or topography, critical to your case? Use drone technology to map out the relevant sections of the roadway. A video of road marks or damage (i.e., gouges, skid-marks, debris) can then be used for two important purposes: First, you want to use the investigating officer's supplementary reports and his measurements, diagrams, debris placement and identification and roadway markings to a jury for its credibility. The investigating officers many if not most times, make very good witnesses. Your reconstructionist can then rely on his measurements or diagrams to corroborate his own. The drone measurements check accuracy. You can establish them as being exact, not just within a reasonable degree of certainty. The more reliable your facts, the more persuasive is your proof. The drone may have laser capability—getting exact data cannot be subject to cross-examination. Secondly, the video or laser shots can be transferred as an exact reproduction by a trained videographer. Reconstruction can be argued as a "simulation" of the actual accident. Reconstructionists in conjunction with an animator can scan the exact or replacement vehicles so that the same make

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vehicles can be used in the animation. The more accurate the more persuasive.

Foundations

Federal Rules of Evidence 702 on Experts and Federal Rule 902 (13) and (14) allow for admissibility of computer-generated data or digital evidence.

The ECM of the truck-tractor is an electronic-controlled module. It is referred to by others with acronyms such as ECU (electronic control unit) and EDR (event data recorder), but they all refer to the "black box" data recorder stored inside the motor vehicle.

As of 2011, the Federal Rules of Evidence 902 have been amended to add §§ 13 and 14 and can be relied upon to authenticate ECM data.

(13) Certified Records Generated by an Electronic Process or System

A record generated by an electronic process or system that produces an accurate result, as shown by a certification of a qualified person that complies with the certification requirements of Rule 902(11) or (12). The proponent must also meet the notice requirements of Rule 902(11).

(14) Certified Data Copied from an Electronic Device, Storage Medium, or File

Data copies from an electronic device, storage medium, or file, if authenticated by a process of digital identification, as shown by a certification of a qualified person that complies with the requirements of Rule 902(11) or (12). The proponent also must meet the notice requirements of Rule 902(11).

The Committee notes for these rules should be reviewed. The amendments to the Rules set forth a procedure by which parties can authenticate certain electronic evidence other than through testimony of a foundation witness. The amendments provide a procedure under which parties can determine in advance of trial whether a real challenge to authenticity can be made. Nothing in the amendments is intended to limit a party from establishing authenticity

of electronic evidence on any other ground provided in the Rules, through judicial notice, or by a qualified foundational expert. The certification must contain information that would be sufficient to establish authenticity with that information provided by an expert witness or other witness at trial in any event. If the certification is insufficient, then authenticity is not established. The Rules specifically call for the authenticity foundation that satisfies Rule 901(b) (9) to be established by a certification rather than a live witness. Certification requirements are not intended to prove Rule 803(6) (business records exception to hearsay) but simply to establish authentication—the admissibility requirements of authenticity. Certification does not preclude objection to the information produced as being unreliable. Authentication establishes only that the output came from a computer. Cross-examination or a challenge may require technical information about the system or process at issue, including possibly retaining forensic technical expert.

Rule 902(14) calls for a procedure to authenticate data copied from an electronic device, storage medium or electronic file other than through the testimony of a live foundation witness. Committee notes reference that data copied from electronic devices, storage media, and electronic files are ordinarily authenticated by "hash value". A "hash value" is a number that is often represented as a series of characters and is produced by an algorithm based on the digital context of a drive, medium or file. If the "hash value" for the original and copy are different, then the copy is not identical or a duplicate. The amendment allows self-authentication by certification of a qualified person that she has checked the "hash value" of the proffered item and that it is identical to the original. Certification under this rule only establishes that the proffered item is authentic. An opponent remains free to object to admissibility on other grounds such as hearsay, relevance, etc.

The foundation for the animator can be successfully done through Federal Rules of Evidence 702 and 703 and the animation or simulation, though subject to scrutiny by both opposing counsel and the court, can be admitted under Federal Rules 901

(authentication). The data, its extraction and preparation will be presented by an expert witness who should testify that it was derived from methods or standards reasonably relied upon by experts in the field. Federal Rules of Evidence 701 and 703. Keep in mind that if the animation is to demonstrate or illustrate an expert's opinion or theory, the foundational requirements will be less. Under Federal Rules 401 and 403, you must show authentication, relevance, fairness, and accuracy in representing the event and that the probative value outweighs any possible unfair prejudice. If an animation is offered purely as demonstrative evidence, while it can be shown to the jury during the trial, it will not later be available to the jury during deliberation.

If the animation is offered as a simulation, it is being proffered as substantive evidence, the foundational requirements should include as a minimum how the data was collected, the accuracy to its percentage of the data, that the computer or data-collecting device was functioning properly, the input and output is sufficiently accurate to a reasonably high degree, and the computer program used is reliable or generally accepted and regularly used among experts or scientists in the field and is valid for this purpose.

Also, in either case, through discovery or voluntarily, you should provide a copy to opposing counsel so that all objections or motions to bar the animation or simulation's use, such as by a motion in limine, are heard well before trial. Errors might then be corrected.

For example, animations as evidence was discussed under Arizona law in the case of *Bledsoe v. Salt River Valley Water Users' Ass'n*, 179 Ariz. 469, 880 P.2d 689 (Div. 2 1994). There, the court was asked to admit computer simulation of an accident. The trial court allowed the video, indicating that the fact that there was no foundation as to how it was prepared was immaterial. The Appellate Court disagreed. The Plaintiff, who proffered the video, claimed that it was simply a pedagogical device, a training device, and the court recognized that the videotape computer simulation depicted an expert's opinion as to how the accident happened, the location of lighted and

darkened areas at the time and the effect of alternate or additional lighting. *Id* at 692, 472. The court held that the plaintiffs were required to lay the appropriate foundation for those opinions and that the defendant was entitled to cross-examine the expert about them. The VCS was not allowed to be used in closing arguments. As to the standard, the court held:

Accordingly, we hold that although the evidentiary use of computer simulations is generally permissible (case omitted), their use is dependent on satisfying the usual foundational requirements for other demonstrative evidence. At a minimum, the proponent must show that the computer simulation fairly and accurately depicts what it represents, whether through the computer expert who prepared it, or some other witness who is qualified to so testify, and the opposing party must be afforded an opportunity for cross-examination. In some instances, the proponent may also be required to show that:

- (1) The computer is functioning properly;
- (2) the input and underlying equations are sufficiently complete and accurate (and disclose to the opposing party, so that they may challenge them); and
- (3) the program is generally accepted by the appropriate community of scientists.

In this case, because the plaintiff elected not to satisfy even the minimal foundational requirements, the trial court erred in allowing it to be shown to the jury even in closing argument. *Id* at 693, 473.

The *Bledsoe* court went on to state, "A respected evidence treatise comments as follows regarding photographs and videotapes that represent such a staged reproduction of the facts:"

Here the extreme vividness and verisimilitude of pictorial evidence is truly a two-edged sword. For not only is the danger that the jury may confuse art with reality particularly great, but the impressions

generated by the evidence may prove particularly difficult to limit ...

McCormick on Evidence, Section 214 at 19 (John W. Strong ed., 4th Edition, 1992).

Since seeing is believing, and demonstrative evidence appeals directly to the senses of the trier of fact, it is today universally felt that this kind of evidence possesses an immediacy and reality which endow it with a particularly persuasive affect. *Bledsoe* at 694, 474.

As a consequence, the certification streamlining of Federal Rules 902(13) and (14) may best be used by the practitioner with ECM data. In the case of the admission of reports and other written data it is best to be prepared to call your expert. From a practical standpoint, an expert witness who can not only explain content, but the science and render opinions and bases therefore, can readily be employed in front of a jury to be a foundational witness. This all adds to the credibility of your case.

When producing the animation, make sure that you show more than one scene. Show it from overhead, a side angle, and if your defense is that the plaintiff was the proximate cause of the accident, show from inside the plaintiff's vehicle. The best animations are "built" in my view in front of the jury. Show the topography of the site being built, the computer method used, the measurements shown and the source data. Then build the road evidence by showing the measurements, debris, or damage to the road, such as gouge marks, burn damage, damaged roadway signs, skid marks, and oil trails. Then build the vehicles from the laser data. Then show the animation or simulation. This way, you show construction of your animation and therefore your video not once, but multiple times. The jury will be with you building your evidence and case. If what you build is credible, based on exact data or measurements, you build credibility with the jury. They will give credibility to your experts and your theory of the accident.

A final piece of advice is that if the animation is to illustrate your expert's opinion or to show a certain scientific principle, the foundational test is less than if you intend to

recreate the accident where a much higher degree of accuracy and therefore credibility of the data from the actual event will be necessary. This is so because you are re-creating the actual event. If admitted as a simulation, the jury can take it into the jury room and play it again for themselves. Animations can be made from fact witnesses' testimony; simulations definitely call upon scientific principles data and expert testimony.

Order of Witnesses

While every trial lawyer knows that there can be scheduling issues, especially with expert witnesses, the best order to present your case would be first to call those witnesses needed to admit critical or material facts for not only your legal defense, but also for your experts' opinions. So, start with necessary eye-witnesses and with the reporting and investigating officers. Not all state courts allow police reports into evidence as business or other records under their rules of evidence. Because those measurements and diagrams are important, call the investigating officer to admit those specific calculations, measurements and diagrams into evidence.

If ECM data has been downloaded, your expert, who performed that function, should then be called as a witness. The report could have been authenticated by certification earlier. Your download expert will have to testify as to his credentials, the program used to download, the reliability of the program, its generally accepted use, its accuracy, how the data was assembled and compiled, and how to read the report. Have him explain the report, and have him focus on the material sections providing data for your case. Have him emphasize that the data is exact.

The ECM reports are admissible under Federal Rules 901 (with witness) or 902 by certification, so enter the report as substantive evidence.

Some plaintiffs' vehicles require O.E.M.s to perform the download. You will have to pay a fee to the OEM and if the vehicle has sustained substantial damages, an exemplar vehicle will be needed, whose computer system will be used to run and download the data. The OEM engineer then becomes your expert, but here, if this is

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supervised by the plaintiff or his expert, it may be admissible by stipulation.

Next, you would call your animator to lay the necessary foundations for his production. You will need to have him testify about his qualifications, his computer programming, where and what data he used, the input and then output animation, and the accuracy of the animation. He does not testify on conclusions or give opinions on what is shown to support any of your legal defenses. He is there to establish that the animation or simulation is accurate, highly credible, and reliable

under the Federal Rules.

Lastly, to pull all of this together, you call your experts on reconstruction, biomechanical, safety or product issues, first establishing expert qualifications, next, their opinions, and then the basis of their opinions. Have the jury hear this first. Then go through their testimony bit by bit, establishing what the expert did, how he did it, what data and facts he bases his opinions upon, the scientific resources and computer models he used, and the reliability of the science he has applied perhaps due to its acceptance among others

in the scientific community. Then, lastly, his disagreements with the plaintiffs' experts and why those opinions and conclusions should be disregarded.

Conclusion

This article offers a roadmap of practical advice on presenting trucking accident cases to a court or jury when using scientific data and animations. Visual evidence is much easier for jurors to comprehend, and as we all know if a juror understands your proof they will more readily believe it. 