Products Liability

Tests and experiments not admissible unless substantial similarity is shown

by Roger T. Creager

Imagine a products liability case where a four-wheeler axle broke and in the crash the driver's arm was crushed. You represent the driver and bring suit against the four-wheeler manufacturer, U-Ride-Anywhere. Your investigation indicates that the axle broke even though the four-wheeler was being operated at a reasonable speed under normal off-road conditions. Your experts conclude that the axle broke because the type of metal used (Metal A) was simply too weak and brittle, and another type of metal (Metal X) would have been twice as strong, was entirely suitable for this use, and costs very little more. Your experts tell you that they have determined to a reasonable degree of professional certainty, using an extensive body of standard metallurgical strength and performance data, that Metal X would have withstood the forces and loads that foreseeably occurred in this particular case. It is clear from the fact of failure that Metal A did not in fact withstand those forces and loads. The lawsuit you have filed alleges that U-Ride-Anywhere failed to use reasonable care in the design of its product when it selected Metal A for the axle rather than Metal X.

During discovery, U-Ride-Anywhere produces data and evidence regarding tests they have performed over the years on the axle of their product. Those tests show that the axle was tested 1502 times under heavy stresses and loads and it never broke in any of those tests. U-Ride-Anywhere also produces post-accident testing done by its experts in a specific effort to reproduce the circumstances of this collision. In probing this testing evidence, both pre-accident company testing and post-accident expert testing, however, you discover that although the tests involved the same axle material and design and simulated **some** foreseeable conditions (a variety of stresses and loads), many of the conditions involved in the tests were different from those involved in your case. For example, your further discovery and study of the tests shows that in none of them was the axle mounted on the very same model of four-wheeler as was involved in your case. You also find that the precise weight and horsepower of the engine used in the four-wheelers involved in the tests differed from the weight and horsepower of the engine involved in this case. Also, in none of the tests was the axle tested in actual real-world conditions. All the tests were done under controlled conditions in a laboratory, which did not fully replicate many of the highly-variable conditions encountered in the real-world (i.e., varying angles of force and stress, varying torques, varying terrain, varying occupant load, a history of years of previous foreseeable use, etc.). Your experts say these and other differences are very important and render the test results unreliable for the purpose of proving the cause of the fracture that occurred in this particular case.

U-Ride-Anywhere and its experts intend to use the results of the 1502 tests and the post-accident testing to support their argument at trial that the axle did not break because the type of metal used was inherently too weak for this use (and thus a negligent design selection) but instead broke because the axle had pre-existing metal fatigue that must have been caused by improper maintenance and/or misuse. There is obviously a very real danger that this type of evidence, if it goes to the jury, will be very powerful or even fatal to the plaintiff on the issue of liability for negligent design in the selection of the type of metal for the axle.

A major goal of plaintiff's counsel, in pretrial motions and at trial, must be to preclude, or at least carefully and drastically limit, the use and introduction of this type of evidence at trial. Strong authority is available to support the plaintiff's position. Under well-established Virginia law, evidence of tests and experiments is generally inadmissible unless the tests or experiments were conducted under substantially the same circumstances and conditions as were involved in the incident at hand. The U-Ride-Anywhere test results are not admissible as evidence relevant to show the probable cause of failure in the particular incident involved. Although U-Ride-Anywhere performed 1502 pre-accident tests and its experts have performed some post-accident tests, U-Ride-Anywhere

has not shown and cannot show that the conditions involved in those tests were substantially the same as the conditions involved in this case. Rather, the conditions involved in the incident at issue in the particular case involved were substantially different from the conditions involved in the U-Ride-Anywhere tests.

The Virginia Supreme Court held in a leading products liability decision in 1979: "The results of experiments are not admissible in evidence unless the tests were made under conditions which were the same or substantially similar in essential particulars to those existing at the time of the accident."[1] In fact, the Virginia rule requiring the exclusion of the results of tests unless made under substantially the same conditions as the events at issue is one of the most well-established principles of Virginia evidence law. The rule has been forcefully applied by the Virginia Supreme Court in countless cases including the following decisions:

Richmond Passenger & Co. v. Racks
101 Va. 487, 490-91, 44 S.E. 709, 711 (1903)
Absent proof of a similarity of conditions and circumstances, the opinion testimony of an expert concerning the speed and stopping distances of railway cars was inadmissible for lack of a foundation.

Bell v. Kenney
181 Va. 24, 29, 23 S.E.2d 781 (1943)
Defendants conducted an experiment in which defendants placed four persons on the front seat of an automobile and two on the back and claimed that a person sitting on the back seat was unable to see whether the lights of an approaching car were dimmed or whether the approaching car was traveling on the right or left of the center of the highway; the Supreme Court held that the results of the test were "irrelevant as evidence" because the record did not show that the weight, height, size, and position of the passengers were the same as those involved in the collision.

Doss v. Rader
187 Va. 231, 236-237, 46 S.E.2d 434 (1948)
Trial court erred in allowing into evidence results of tests purporting to show the audibility of a vehicle approaching an intersection where the collision occurred; the Supreme Court held that "the admission of the evidence of these tests was improper and prejudicial. The conditions were not the same. The collision occurred on a damp, foggy day in January, while the tests were made in October, when, the evidence shows, a strong wind was blowing and the atmospheric conditions were quite different. Then, too, nearly two years had elapsed between the date of the collision and the date when the tests were made, and in the meantime the Rader car had been sold and a new engine had been installed therein."

Lane v. Hampton, Adm'r
197 Va. 46, 49, 87 S.E.2d 803 (1955)
Results of visibility test were without probative value since "[t]he experiment was made during daylight, while the accident occurred on a dark night. At the time of the experiment the witness was on the lookout for an object which he knew had been placed on the highway for the purpose of being seen, while under the circumstances of the accident the defendant was unaware of the presence of his friend's body in the road. Plainly, under such circumstances, the evidence of this test and observation was improper and without probative value on the issue before the jury."

Transit Company v. Brickhouse, Adm'r
200 Va. 844, 848, 108 S.E.2d 385 (1959)
"The defendant also objected and assigned error to the evidence of the experiment made to show the supposed line of vision of the driver of the bus and the map filed by the engineer to illustrate the result. The experiment was based on the height of the eyes of a person 5 feet 11 inches tall as he sat in the driver's seat of one of defendant's busses parked at the carbarn. The height of the person driving the bus involved in the accident was unknown, as was his sitting posture in the bus as it was in motion through the traffic. The parked cars were to his right, not straight ahead, as was the car in the experiment, which could have been either lower or higher than the parked cars. These uncertain elements could have made the actual view of the driver very different from the hypothetical view produced by the experiment. The experiment was based on elements and conditions some of which were and others of which could have been quite different from those existing at the time of the accident, and was therefore inadmissible in evidence."

Grasty v. Tanner
206 Va. 723, 727, 146 S.E.2d 252 (1966)
Expert opinion regarding speed of car was inadmissible; Supreme Court noted that "[t]here were certain variables which he did not consider in arriving at his opinion regarding the speed of the Grasty car at the time of the impact. He assumed, without evidence to support his assumptions, that the combined weight of the three occupants was 400 pounds, and that there was no extra weight in the trunk of the car. He did not take into consideration the amount of gasoline in the tank of the automobile."

Habers v. Madigan, Adm'r
213 Va. 485, 488, 193 S.E.2d 653 (1973)
Results of tests regarding visibility of taillight were inadmissible; the Supreme Court explained that "[i]n the present case the experiment was made a year after the collision occurred under conditions and circumstances substantially dissimilar to

those prevailing at the time of the occurrence here involved. Before the taillight was removed from the tractor-truck it was a part of its over-all electrical system which was connected to two 6-volt batteries, while at the time the experiment was conducted the evidence shows that jumper cables were used to connect the taillight to one 12-volt battery. There was expert testimony that at the time of the accident the taillight on the tractor-truck could have received its power from the tractor-truck batteries, the alternator, or both. Two moving vehicles were involved at the time of the accident, while in the test Howell was standing on the shoulder of the road looking for a stationary light he knew was in the northbound right-hand lane of the highway. Nor did the placing of the taillight on a chair in the highway provide the same background that prevailed at the time of the accident. Since the experiment was conducted under conditions which were substantially dissimilar in essential particulars to those existing at the time of the accident, the evidence was inadmissible and it was prejudicial to Habers' case. It thus constituted reversible error to admit in evidence the results of this experiment."

Featherall v. Firestone
219 Va. 949, 960, 252 S.E.2d 358 (1979)

Results of experiments showing that lid blew off when soft drink dispensing system was pressured were inadmissible; the Supreme Court noted that "the record shows that the lid in place at the time of the accident had been used over a considerable period of time, perhaps as much as two months, in a cleaning process when a cleansing solution, not cola syrup, was in the syrup tank. Such fact makes the condition of the test lid apparently clogged by syrup substantially different from the accident lid which had been subjected to a prolonged cleaning process. The result of a test conducted under such conditions was thus inadmissible. . . . The record also showed, however, that a difference of 1/32 inch existed between the size of the tested Cornelius lid and the accident lid."

Thorpe v. Commonwealth
223 Va. 609, 614, 292 S.E.2d 323 (1982)

Expert testimony based upon results of tests was inadmissible since the evidence did not show that the "condition of the truck, its brakes, its tires, or the manner in which the weight of its load was distributed" was the same as in the collision.

Mary Washington Hosp. v. Gibson
228 Va. 95, 99, 319 S.E.2d 741 (1984)

Results of tests showing drainage of water across sidewalk were inadmissible since "there was insufficient proof that there had not been minute, but significant, changes in elevation of the various sidewalk blocks that may have altered the "drainage pattern" of the sidewalk area during the critical period."

Reynolds v. Riggs
234 Va. 653, 363 S.E.2d 713 (1988)

Results of visibility tests were inadmissible where there were differences from the circumstances involved in the collision.

Swiney v. Overby
237 Va. 231, 377 S.E.2d 372 (1989)

Expert testimony regarding stopping distances was inadmissible since the actual condition of the brakes on the truck involved in the collision was not in evidence and was thus a missing variable.

Runyon v. Geldner
237 Va. 460, 464, 377 S.E.2d 456 (1989)

Expert testimony regarding cause of fall on driveway was inadmissible since it was based upon an inspection of the driveway at a time when its condition was not shown to have been substantially identical to the time of the fall.

Ford Motor Co. v. Phelps
239 Va. 272, 277, 389 S.E.2d 454 (1990)

In a product liability action, evidence regarding performance of product in other similar incidents is not admissible "substantively as 'corroboration,'" i.e., as evidence on the substantive issue of what caused the product in question to fail or malfunction.

Tittsworth v. Robinson
252 Va. 151, 475 S.E.2d 261 (1996)

Since challenged expert testimony was speculative, founded upon assumptions lacking a sufficient factual basis, relied upon dissimilar tests and contained too many disregarded variables, it was unreliable as a matter of law and the trial court erred in admitting it.

Decisions of Virginia federal courts have taken substantially the same position as the Virginia state courts. Even though evidentiary issues arising in cases pending in federal court are, of course, primarily governed by the *Federal Rules of Evidence*, the federal decisions involving cases arising in Virginia have often cited Virginia state-law decisions. For example, in a 2005 decision by the U.S. District Court for the Western District of Virginia, *Evans v. Medtronic, Inc.*,[2] the plaintiff attempted to offer testimony from her expert who concluded, based on certain tests he had performed, that the electronic lead implanted in the plaintiff's back could not have been damaged in the manner described by the witnesses unless it was defectively manufactured. The federal district court, citing *Featherall*, excluded the testimony because the tests did not involve substantially the same conditions as the real-life events. The court noted that in the test the lead was subjected to only a tugging force, while in real life the lead could have experienced different types of forces ("bending, torsion, crimping and/or compression forces").[3]

Likewise, in a 2001 decision by the same federal district court, *Green v. Ford Motor Co.*,[4] the court excluded testimony and evidence regarding the results of Ford's testing purporting to show that the fire caused by an ignited fuel tank would be concentrated toward the back of the truck rather than the front of the exemplar truck. Eyewitnesses said that the fire at issue had been concentrated toward the front of the truck. The defendant's test evidence thus tended to refute the contention of the plaintiffs' expert that the fire at issue originated at the subject vehicle's fuel tank. The federal court excluded the evidence because the conditions involved in the test were not substantially the same as the conditions involved in the events at issue. The actual events occurred on an asphalt road but the test was done on concrete. The actual events involved a vehicle which veered from the road at a high rate of speed before rolling on its side and sliding to a stop, but the exemplar vehicle used in the test was carefully lowered on its side from a stationary position before being ignited. The test involved a vehicle that had not been operating for a significant period of time prior to the test, but the actual events involved a vehicle that had been operating continuously for some time. The court held that these differences provided "sufficient grounds for exclusion under the substantial similarity standard."[5] Importantly, the court also refused to allow Ford to introduce a videotape of the test results on the theory that it was intended "merely to illustrate general scientific principles underlying their expert's opinion."[6] The court ruled that the evidence had to be excluded completely because "there exists a substantial risk of misinterpretation by the jury."[7]

It is also well-established in Virginia that evidence which is affected by assumptions and missing variables is not admissible.[8] The U-Ride-Anywhere testing appears to involve at least some, perhaps many, dissimilar test conditions and disregarded and missing variables. The results of the testing should be excluded from evidence on that ground as well.

U-Ride-Anywhere might argue that all of the differences between its testing and real-world conditions can be brought out on cross-examination, and should not be grounds for excluding the evidence entirely. U-Ride-Anywhere will perhaps argue that the plaintiff's challenges to the testing evidence can be considered by the jury in evaluating the weight to give to the evidence. The decisions of the Supreme Court of Virginia establish, however, that it is the role of the Court, not the jury and not the proffering experts, to determine whether the tests at issue were conducted under circumstances substantially the same as those involved in the incident in question. The Court must act as the gatekeeper and make that important threshold evidentiary determination. If the substantial similarity requirement is not met, the evidence must be excluded. The numerous differences between the circumstances of the U-Ride-Anywhere tests and the circumstances involved in this case show that the test results should be excluded if offered to show that cause of the failure in this case.

The Supreme Court of Virginia has made clear that the trial court must act as the "gatekeeper" charged with the responsibility of limiting testimony to its proper bounds. It is "for the trial court, not the jury, to decide whether the proper and sufficient foundation had been laid for the introduction of" testimony.[9] The admissibility of evidence presents a "strictly legal question" for decision by the Court.[10] Because the test results and testimony based thereupon are not admissible the jurors should never hear them. The evidence would be improperly and profoundly prejudicial since it would invite the jurors to infer that if the axle did not fail in the 1502 tests by U-Ride-Anywhere they would not have failed in this incident unless the axle had been improperly maintained or misused and had become fatigued and weakened. Yet, no such inference can be properly drawn because the test conditions differed in numerous respects from the conditions involved in this case. The test results are therefore not probative or relevant to the issue of the cause of the failure in this case. Moreover, introduction of the test results would be highly prejudicial since it would invite the jurors to conclude that it showed that the axle did not fail because the metal chosen was too weak, even though that is exactly what the testing does not reliably show since the test conditions differed from the incident.

The testing evidence should also be excluded because it unnecessarily lengthens and complicates the trial to allow direct testimony and cross-examination regarding matters which ought to have been excluded in the first place. Indeed, if cross-examination were sufficient to overcome the effect of inadmissible testimony, there would be no need for the numerous decisions of the Supreme Court of Virginia carefully limiting the nature and scope of the evidence that may properly be admitted into evidence. The Supreme Court of Virginia has again and again held that trial courts have committed reversible error by allowing evidence and testimony which ought to have been excluded.[11]

In some cases, a manufacturer may argue that this type of testing evidence is relevant to some other issue in the case. For example, if the case includes a claim that the manufacturer failed to use reasonable care in testing its product, the manufacturer will argue that it must have some ability to introduce evidence regarding the testing it performed. The manufacturer might also argue that the testing it performed is relevant to the overall issue of negligent design, *i.e.*, whether it used reasonable care in deciding what type of metal to use for the axle. In a proper case and under particular circumstances, these arguments presumably will have merit. Clearly, however, plaintiff's counsel will need to

work hard to enlist the aid of the Court in imposing careful limitations upon the nature and extent of the use of this type of evidence at trial – the evidence simply is not relevant and is not admissible to show why the axle failed in this particular instance since the testing did not involve substantial similar conditions. Obviously, if this type of testing evidence is introduced for any arguably proper purpose, the danger that it will be used by the defense or even just considered by the jury for improper purposes is great, and if that occurs the evidence obviously may have a powerful, and improperly prejudicial effect. Therefore, even where the evidence is offered for purportedly proper purposes, counsel and the Court should be vigilant to guard against the clear danger of improper prejudicial effect. There are many ways this can be undertaken, and the best options will depend upon the particular facts of and issues in the case. For example, defense counsel could be cautioned against any *voir dire*, opening statement, witness questioning on direct- or cross-examination, or closing argument that in any way implies that the 1502 tests show that the metal in this incident did not fail because it was too weak as designed. The Court may want to consider limiting the manner in which, and the extent to which, the testing evidence is introduced. It may be unavoidably necessary, in view of all the issues in the case, for the jury to know that the metal was tested under various circumstances and did not fail. The Court may decide, however, that the jury should not be shown graphic video footage of the testing, because that would primarily serve to invite to reach the unwarranted and improper conclusion that the metal would not have broken in this case if the vehicle had been properly maintained. A cautionary instruction could perhaps be considered, although plaintiff's counsel and judges understandably worry about whether cautionary instructions are effective, and even whether they sometimes do more harm (in drawing further attention to the material) than good. In any event, a well-grounded challenge to testing evidence may go a long way towards persuading the Court to preclude, or at least carefully and tightly restrict, the introduction of this type of dangerous evidence.

Endnotes

1. *Featherall v. Firestone Tire and Rubber Co.*, 219 Va. 949, 959, 252 S.E.2d 358, 365 (1979).
2. 2005 U.S. Dist. Lexis 17739 (W.D. Va. 2005).
3. 2005 U.S. Dist. Lexis 17739 at * 63.
4. 2001 U.S. Dist. Lexis 20680 (W.D. Va. 2001).
5. 2001 U.S. Dist. 20680 at *15.
6. 2001 U.S. Dist. 20680 at *6.
7. *Id*.
8. *Tittsworth v. Robinson*, 252 Va. at 155, 475 S.E.2d at 261 ("In sum, the challenged expert testimony is speculative, is founded upon assumptions lacking a sufficient factual basis, relies upon dissimilar tests, and contains too many disregarded variables. Consequently, we hold that the testimony is unreliable as a matter of law, and, therefore, the trial court erred in admitting it.") (footnotes omitted).
9. *CSX Transportation, Inc. v. Casale*, 250 Va. 359, 367, 463 S.E.2d 445, 449 (1995).
10. "In summary, the question before the trial court was one of the admissibility of evidence, not its weight - a strictly legal question." *Id* at 367, 463 S.E.2d at 450.
11. *See, e.g., Keesee v. Donigan*, 259 Va. 157, 161, 524 S.E.2d 645, 647 (2000) (trial court committed reversible error in an automobile crash negligence case in allowing an accident reconstruction expert to testify concerning "average" driver perception and reaction times absent evidence that a party fell within the average range; expert testimony cannot be based upon assumptions without evidentiary foundation); *Tittsworth*, 252 Va. 151, 475 S.E.2d 261 (trial court erred in admitting expert testimony regarding forces of collision and causation of injuries where experts failed to consider all pertinent variables and relied upon results of dissimilar tests).

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