UNITED STATES DISTRICT COURT

DISTRICT OF MAINE

PAUL REALI,	)	
	)	
PLAINTIFF	)	
	)	
v.	)	**Civil No. 98-358-P-H**
	)	
MAZDA MOTOR OF AMERICA, INC. D/B/A MAZDA NORTH AMERICAN OPERATIONS AND, MAZDA MOTOR CORPORATION,	)	
	)	
DEFENDANTS	)	

AMENDED ORDER ON MOTIONS *IN LIMINE* AND DEFENDANTS' MOTION FOR SUMMARY JUDGMENT

The plaintiff, Paul Reali ("Reali"), was a front seat passenger in a 1992 Mazda Protegé automobile when it was rear-ended by a pickup truck. As a result, he suffered diffuse axonal injury, a form of mild traumatic brain injury. He has sued the defendants Mazda Motor of America, Inc. d/b/a Mazda North American Operations and Mazda Motor Corporation (collectively "Mazda") claiming that Mazda defectively designed the seat and thereby caused his injuries.

This Order addresses two motions *in limine* and a summary judgment motion filed by Mazda. The motions *in limine* seek to exclude expert testimony of Professor Mariusz Ziejewski and Terrell Schaefer. After reviewing the moving papers, the case law and the record assembled up to this point, I exclude certain, critical testimony of Ziejewski and Schaefer. In the absence of such testimony, Reali cannot survive Mazda's motion for summary judgment.

TESTIMONY OF PROFESSOR MARIUSZ ZIEJEWSKI

Reali offers the testimony of Professor Ziejewski, a biomechanical engineer, to prove two issues: first, that the forces created in this accident were sufficient to cause Reali's diffuse axonal injury; and second, that had Mazda employed an alternative seat design, Reali would not have suffered his injury. Mazda maintains that Ziejewski's testimony is based on computer simulations that are unreliable and irrelevant under the standards of Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579 (1993), and Kumho Tire Co. v. Carmichael, 526 U.S. 137 (1999).

1. Human Tolerance Levels

Both parties appear to accept that diffuse axonal injury is caused by high velocity, angular acceleration of the head and, consequently, the brain. Angular acceleration velocity is measured in radians per second squared ("rpss"). The parties disagree on the threshold level at which angular acceleration velocity leads to diffuse axonal injury. Reali maintains that it is 1,800 rpss. Mazda maintains that it is at least 4,500 rpss. In support of his figure, Reali cites a 1968 peer reviewed article authored by Dr. A. K. Ommaya and a National Highway Traffic Safety Administration ("NHTSA") report citing Dr. Ommaya's results. Mazda claims that Ommaya's article is outdated and contradicted by Ommaya's own testimony in at least one other trial, and that the NHTSA report pertains to the development of child crash test dummies. Mazda observes that Ziejewski has done no independent research on this subject and claims that Ziejewski is insufficiently familiar with the relevant literature.

I conclude on this record that Ziejewski may testify on human tolerance levels. Mazda concedes that an expert may render an opinion based on the relevant literature and I do not find that Ziejewski has insufficient familiarity with the literature. The reliability of Ziejewski's opinion is bolstered by the fact that a government agency apparently relies upon Ommaya's 1968 conclusions, the same conclusions on which Ziejewski's opinion relies. (Reali has submitted a copy of the Ommaya study; unfortunately, neither party has presented me with a copy of the NHTSA report.) Ommaya's study might be outdated, or NHTSA's report might have a tenuous connection to the issues in this case, but on the record as presented these assertions go to credibility, not admissibility.[1]

2. Accident Forces

Professor Ziejewski used a computer application called Articulated Total Body ("ATB") to understand the forces involved in the accident. ATB allows its user to model human body dynamics, a critical step in biomechanical analysis. An important data point in ATB modeling is Delta V, the change in the velocity of one object when struck by another. Ziejewski used a Delta V of 12 m.p.h. to run his two ATB simulations. Mazda argues that the 12 m.p.h. figure is unreliable because of the way in which Ziejewski derived that figure—making assumptions based on the vehicle bumper rating and partly through viewing photographs of the damaged automobile and estimating Delta V based on what he saw in the photographs.

[1] Because of my ruling, Reali's motion to strike Mazda's reply memorandum is **MOOT**. Whether Ommaya's testimony from another case is admissible in this matter is not an issue before me.

Reali responds that Ziejewski's figure is based on a reliable analysis of the automobile by Ziejewski, a biomechanical engineer with 25 years experience, and that Mazda's complaint is a red herring because Mazda's own experts estimate that the Delta V could have been as high as 11 m.p.h.

I conclude that the 12 m.p.h. figure is unreliable. Under Daubert and Kumho Tire, I am to determine whether opinions are scientifically valid— derived from an application of the scientific method or methods that are accepted in the relevant field. See Daubert, 509 U.S. at 589; Kumho Tire, 526 U.S. at 151-52. Ziejewski derived the 12 m.p.h. figure in large part from eyeballing accident photographs. See Ziejewski Dep. at 36-17 to 38-15. Reali has produced no testimony or record evidence suggesting that this is an acceptable way to determine Delta V. Consequently, I find the 12 m.p.h. figure unreliable.

Reali's red herring argument does not save Ziejewski's Delta V opinion. Under Daubert, I must consider the methodology, not the results. See 509 U.S. at 590, 592-93. That Ziejewski's low end figure comes close to Mazda's experts' high end figure tells me very little about the validity of his method. Perhaps Ziejewski could be asked hypothetical questions regarding Mazda's 11 m.p.h. figure, but only if that figure is introduced at trial, an event that is uncertain. Even if such questions could be posed, the current record does not furnish an answer to them. At his deposition, Ziejewski refused to opine on the forces of the accident, given

a hypothetical Delta V figure, without running the computer simulation. See Dep. at 45-13 to 46-16.[2]

3. ATB Simulations

Professor Ziejewski relied upon two ATB simulations to render his opinions about the accident forces and about the forces that would have occurred with an alternative design. Mazda complains both that ATB is an unreliable way to test accident forces and that Ziejewski's results are irrelevant because he did not model the defects identified by Reali's car seat design expert, Terrell Schaefer, nor the

---

[2] The deposition reads:

> Q: [If] you assume with me that Mr. Rigol's opinion is that Delta V is 6 based on your methodology, that can't be correct. Correct?
>
> A: Again, I don't want to assume anything and comment on something that is not based on facts. I don't want to extend any further opinions in regard to his report and his findings without having a chance to review that.
>
> Q: If you assume with me Mr. Rigol's opinion is that Delta V is 6, if that Delta is the correct Delta V, would the forces of the collision be sufficient to cause brain damage under your analysis?
>
> A: Again, you cannot ask an engineer a question without redoing the analysis. For me to answer this question would be to go back and redo the analysis for different Delta V. You don't know. One thing I can tell you that as you decrease Delta V, you decrease the severity of impact. The fact or the relation between Delta V change and the forces on human body is not simply straight relation. Straight line relation. Nobody can tell you—answer your question without doing the analysis. The only thing I can tell you it would be lower than that.

Dep. at 45-13 to 46-16.

alternative design proposed by Schaefer. Reali responds that ATB modeling is reliable and that Ziejewski did model the Schaefer-identified defects.

A trial judge may exclude expert testimony that is irrelevant—testimony that does not fit with the facts of the case. See Daubert, 509 U.S. at 591-93; accord Bogosian v. Mercedes-Benz of No. America, Inc., 104 F.3d 472, 479 (1st Cir. 1997) (excluding as irrelevant expert testimony because in performing test the expert "did not, in any way, attempt to replicate the known facts surrounding the injury-producing event"). After reading the deposition testimony and studying the two expert reports, I am persuaded that neither ATB simulation modeled the defects identified by Schaefer. According to Reali, Schaefer testified that the car seat was defective because it failed in a rotational, non-uniform manner. See Pl.'s Opp'n Mem. to Defs.' Mot. for Summ. J. at 4. Specifically, Schaefer maintained that when Reali's car was struck from behind, the seat too easily rotated inward and collapsed backward. See Schaefer Dep. at 28-12 to 29-2. According to Schaefer, the twisting was the primary mode of failure. See id. at 154-13 to 154-21. But when Ziejewski ran his first ATB simulation to test whether the forces of the accident were sufficient to cause diffuse axonal injury, he did not model the twisting. See Ziejewski Dep. at 110-2 to 110-10. What he did was input a static, one-inch inward angulation of the seat and hold it constant throughout the simulation. See id. at 110-2 to 116-7. That tells the factfinder nothing about the forces allegedly caused by what Schaefer has identified as the defect in the Mazda seat and, in fact, might lead to confusion of the issues. Reali's seat design expert will say that the

automobile was defective because the seat twisted and collapsed. However, that defect is not what Ziejewski studied. He studied the forces created when the seat did not twist and, apparently, did not collapse. This poor fit between the first ATB simulation and the accident troubles me. Nevertheless, I would be inclined to allow Ziejewski to testify about the first ATB simulation because, he explained, even in the absence of dynamic twisting, the force of the accident was sufficient to cause diffuse axonal injury and, had he modeled dynamic twisting, the force would have increased. See Ziejewski Dep. at 110-20 to 111-9.[3] (Mazda failed to challenge Ziejewski's opinion that the force would rise as the model grew more precise.) However, the entire ATB exercise is suspect because of the 12 m.p.h. Delta V input, which I have rejected as being unreliable. Accordingly, Ziejewski may not testify about simulation 1.

Ziejewski may not testify about simulation 2 for the same reason. Additionally, I note that Ziejewski changed only one factor in simulation 2.

---

[3] The deposition reads:

> Q; What did you include in your simulation with respect to twisting?
>
> A: I did not include the dynamic deflection of the seats since there's no reliable data that would allow me to do that. If you're comfortable with that position because it gives you the minimum value of angular acceleration of the head, of the person sitting in the seat like this one it would include the dynamic rotation, twisting of the seat, the angular acceleration would be greater. Even with my assumption, I am showing the forces were sufficient to cause brain damage. I don't worry about the additional elements.

Ziejewski Dep. at 110-20 to 111-9.

Specifically, he made the headrest three times stiffer, an arbitrary figure. See Ziejewski Dep. at 94-19 to 95-11. His results might demonstrate that an alternative design would decrease angular acceleration to a point below harmful forces, but they do not say anything about the alternative design recommended by Schaefer—namely, installing dual as opposed to single recliner mechanisms in the seats.[4]

Reali devoted much of his briefing to impugning the methodology employed by, and conclusions of, Mazda's expert, Lawrence Thibault, claiming that Thibault's methodology was no better. The effort is misguided. The issue presented by Mazda's motion *in limine* is whether Ziejewski's testimony satisfies the reliability and relevance standards of Daubert and Kumho Tire. To resolve that issue, I consider whether Ziejewski's opinions are scientifically valid and relevant to the issues before me. The propriety of Thibault's methods and conclusions never enter the equation. Reali could have filed a motion *in limine* to limit or exclude Thibault's testimony. That would have been another matter and would have compelled me to measure Thibault's work against the Supreme Court standards, as I have done with Ziejewski's work here.

[4] Reali argues that Ziejewski also testified about the effects of stiffening seat backs, but that does not remedy Reali's problems: Schaefer never recommended stiffer seats; he only recommended a dual recliner mechanism. And even if Schaefer did recommend stiffer seats, Ziejewski's testimony regarding seat stiffness would not be enough. Ziejewski did say that a stiffer seat back provides better protection. See Dep. at 109-3 to 109-5. But, when pressed for a basis for this opinion, he only reiterated that it was accepted by the industry and supported by 30 years of studies that he did not identify. See id. at 109-11 to 110-1. When asked whether a stiffer seat back would have decreased the forces in this accident, Ziejewski twice said, "I don't know." See id. 97-3 to 97-14.

Mazda's motion to limit or exclude Ziejewski's testimony is therefore **GRANTED IN PART AND DENIED IN PART** as follows: Professor Ziejewski may testify that the threshold for diffuse axonal injury is 1,800 rpss. He may not testify that the car seat, because it was defective, caused angular acceleration at a force sufficient to cause diffuse axonal injury. Nor may he testify that a stiffer head rest would have lessened or prevented the injury.[5]

TESTIMONY OF TERRELL SCHAEFER

Reali offers the testimony of Terrell Schaefer, a car seat design expert, to prove that the Mazda seat, as designed, was defective and that feasible alternative designs that would have made the seat non-defective were available. Schaefer's opinion regarding seat collapse and twisting was based on the results of a test that Schaefer performed on two exemplar seats from a 1992 Mazda Protegé. The test involved a gradual application of force to the exemplar seats through a bar placed across the seat back cushion, 16 inches above the seat bottom cushion. Mazda attacks not only the validity of the test and the usefulness of its results, but also the opinions based on it. Schaefer performed no tests to demonstrate that his recommended alternative design—a dual recliner seat—would have lessened or prevented Reali's injuries.

For the purposes of resolving Mazda's motion, I assume without deciding that Schaefer's testing protocol satisfies Daubert and Kumho Tire, and that he

[5] Mazda has also moved for the exclusion of an animated simulation videotape, prepared by Ziejewski, that illustrates body and brain movement in a rear end collision. See Defs.' Mot. at 11-12. I do not address this portion of the motion because it is not dispositive of Ziejewski's competence to testify.

could testify that the seat was defective because it collapsed and twisted too easily.[6]

Nevertheless, Mazda attacks Schaefer's opinion that a dual recliner mechanism in the seat would have prevented twisting and collapsing and, consequently, would have lessened or prevented Reali's injuries. Mazda says that this Schaefer opinion is wholly unsupported. Reali responds that "Schaefer states throughout his deposition that had the seat had a dual recliner mechanism, which cost [sic] 4-5 U.S. dollars to produce and install, the seat would have failed uniformly, not rotationally." Pl.'s Opp'n Mem. at 7, 10. I see no such statement in Schaefer's testimony. Even if I did, I would not permit Schaefer to offer that opinion at trial unless it was supported by reliable data. All I have is Schaefer's assertion—unsupported by citation to studies, tests or statistics—that certain model cars that employ the dual recliner mechanism are safer. That is not enough.

Mazda's motion to limit or exclude Schaefer's testimony is **GRANTED IN PART**: Schaefer may not testify that dual recliner seats are safer than single recliner seats.[7]

---

[6] Mazda also contends that Schaefer's testimony is tainted because it relies on opinions about how much load, or force, a seat should withstand before collapsing and how much a seat can twist before it is considered defective. According to Mazda, those opinions are unsubstantiated in the literature and at odds with government and industry standards. For the purpose of resolving Mazda's motion, I assume without deciding that Schaefer could give these opinions at trial.

[7] Indeed, Schaefer's testimony is that single recliner seats are not inherently defective. See Dep. at 28-19 to 28-21.

MAZDA'S MOTION FOR SUMMARY JUDGMENT

In a products liability case the plaintiff has the burden of proof on causation. Further, in Maine, a plaintiff in a design defect case must prove that an alternative design is feasible and safer. See St. Germain v. Husqvarna Corp., 544 A.2d 1283, 1285 (1988) (quoting Stanley v. Schiavi Mobile Homes, Inc., 462 A.2d 1144, 1148 (Me. 1983). Because Professor Ziejewski's opinion is based on accident forces that cannot be supported on this record, Reali cannot demonstrate that the defectively designed seat caused his injuries. Because there is no scientifically valid basis for Schaefer's opinion that a dual recliner seat would have prevented or lessened Reali's injuries and no argument that a stiffer headrest should have been provided (the second simulation done by Ziejewski), Reali cannot prove that a safer, alternative design exists. Reali has failed to raise a genuine issue of triable fact on either causation or alternative designs and, therefore, Mazda is entitled to summary judgment. Mazda's motion for summary judgment is **GRANTED**.

SO ORDERED.[8]

DATED THIS 12TH DAY OF JULY, 2000.

_____
D. BROCK HORNBY
UNITED STATES CHIEF DISTRICT JUDGE

[8] Because I grant summary judgment, three other motions *in limine* filed by Mazda are **MOOT**.

U.S. District Court
District of Maine (Portland)
Civil Docket for Case #: 98-CV-358

PAUL REALI plaintiff	PETER J. DETROY, III, ESQ. TERRY A. FRALICH, ESQ. NORMAN, HANSON & DETROY P. O. BOX 4600 PORTLAND, ME 04112-4600 (207) 774-7000 LAWRENCE J. SMITH, ESQ. JEFF MCDONALD, ESQ. LAWRENCE J. SMITH & ASSOCIATES 1010 COMMON STREET, SUITE 3020 NEW ORLEANS, LA 70112-2401 (504) 524-6165
v.	
MAZDA MOTOR OF AMERICA d/b/a MAZDA NORTH AMERICAN OPERATIONS defendant	ROBERT H. STIER, ESQ. BYRNE J. DECKER, ESQ. PIERCE, ATWOOD ONE MONUMENT SQUARE PORTLAND, ME 04101-1110 (207) 791-1100
MAZDA MOTOR CORPORATION defendant	ROBERT H. STIER, ESQ. BYRNE J. DECKER, ESQ. (see above)