IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

KIMBERLY A. RAPP	:	CIVIL ACTION
v.	:	
GURDEV SINGH, G.S. FREIGHT LINES, INC., PABLO MOLINA, GILBERT EXPRESS, GREAT DANE TRAILERS, INC. and GREAT DANE LIMITED PARTNERSHIP	:	NO. 00-2741

MEMORANDUM

Dalzell, J. May 1, 2001

On August 21, 1998, Edwin R. Rapp, Jr. was driving his 1997 Mercury Sable station wagon eastbound on Interstate 78 in Berks County, Pennsylvania. Also in the car were his wife, Kimberly, who was seated in the front passenger seat, his five-year old son, Bradford, who was strapped into a car seat behind Edwin, and his four-year old daughter, Grace, who was on the floor of the rear seat behind Kimberly. Because of an earlier accident, traffic was stopped in the eastbound lanes at about 10:30 a.m., and the Rapp car came to a stop in the right hand lane behind a tractor-trailer owned by defendant Gilbert Express and operated by defendant Pablo Molina (the "Molina trailer"). The Molina trailer had been manufactured and sold by defendant Great Dane.

While the Rapp car was stopped behind the Molina trailer, another truck, a GMC owned by defendant G.S. Freight Lines and operated by defendant Gurdev Singh (the "Singh truck"), collided with the rear of the Rapp car, propelling it forward

into the rear of the Molina trailer. Edwin and Bradford died in the crash, while Kimberly and Grace, though injured, survived.

Kimberly Rapp, individually, as executrix of her husband's estate, administratrix of her son's estate, and on behalf of Grace, filed this action against Great Dane.[1] She alleges that the rear bumper guard on the Molina trailer was defective for failing to have a vertical attachment between the edges of the horizontal member and the rear corners of the trailer.

Before us is Great Dane's motion for summary judgment, to which Kimberly Rapp has responded, and Great Dane has replied. We held oral argument on April 24, 2001. In sum, Great Dane argues that Mrs. Rapp has failed to make a prima facie case because her proposed expert testimony fails to satisfy the Daubert[2] standards, as applied in Kumho Tire v. Carmichael, 526 U.S. 137 (1999) and Oddi v. Ford Motor Co., 234 F.3d 136 (3d Cir. 2000). As she conceded at oral argument, Great Dane's motion succeeds or fails based upon the admissibility of her experts' testimony.

For the reasons set forth below, plaintiff's experts do not pass Daubert muster, and, accordingly, we will grant Great Dane's motion for summary judgment.

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[1] As to the other defendants she alleges negligence. Defendants Gilbert Express and Pablo Molina have filed a separate motion for summary judgment that remains pending.

[2] Daubert v. Merrill Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993).

I. Overview of Federal Regulation of Rear Guards

There has been longstanding federal Government interest in the problem at the heart of Great Dane's motion. It will be helpful to our understanding and analysis briefly to summarize this history.

Accidents like the Rapps' are all too common. The National Highway Traffic Safety Administration[3] ("NHTSA") estimates that 11,551 rear-end crashes with trucks occur annually, resulting in about 423 passenger vehicle occupant deaths and over 5,000 non-fatal injuries. See 61 Fed. Reg. 2004 (Jan. 24, 1996). Trailers, although accounting for only 28% of registered heavy vehicles, account for 73% of these occupant fatalities and 82% of the injuries. Id. at 2006.

In 1953, the Interstate Commerce Commission ("ICC") -- whose duties pertinent to this matter now reside in the Federal Highway Administration ("FHWA") – promulgated the first regulation addressing the problem of "underride", which occurs when a passenger vehicle collides with the rear end of a trailer and slides under the trailer. This first standard required the use of a rear impact guard on trailers. Id.[4] The Federal Motor Carrier Safety Regulation 393.86 ("FMCSR 393.86") set the

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[3] A division of the United States Department of Transportation ("DOT").

[4] This underride can lead to what the agency refers to as "passenger compartment intrusion", in which the trailer itself invades the passenger space of a vehicle, often causing serious injury or death.

requirements for the rear guard (or, as it is sometimes called, the "ICC bar"), including specifications for maximum ground clearance and width.[5] NHTSA now promulgates safety standards for new motor vehicles, the Federal Motor Vehicle Safety Standards, which apply to vehicle manufacturers, including Great Dane. See 49 C.F.R. § 571.1; Def.'s Mot. at 6.

Since 1967, both the NHTSA and the FHWA have studied the underride issue to determine the performance criteria for an optimum rear impact guard standard. The key engineering challenge in designing such a guard involves a trade-off between the strength of a rear guard and its capacity to absorb energy. A rear guard that is too strong may prevent underride (and thus passenger compartment intrusion), but the effects of a sudden deceleration on the passengers of an impacting car can be severe (including death or serious injury).[6] See 61 Fed. Reg. 2004 (Jan. 24, 1996). On the other side, an energy absorbing rear guard will slow an impacting vehicle, but may allow excessive underride and passenger compartment intrusion. See id.

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[5] Under the version of FMCSR 393.86 in effect in 1997, when the Great Dane trailer at issue was manufactured, the bumper could be no higher from the ground than thirty inches, its horizontal width had to extend to within eighteen inches from the sides of the trailer, and it could be located no further forward, under the trailer, than twenty-four inches. 49 C.F.R. 393.86 (1997). The guard also had to be "substantially constructed" and "firmly attached." Id.

[6] During oral arguments, we referred to this principle as "the brick wall effect."

After a series of proposals and tests, on January 24, 1996 NHTSA authored a final rule establishing two Federal Motor Vehicle Safety Standards, FMVSS Nos. 223 and 224, effective as of January 26, 1998. FMVSS No. 223 establishes the equipment standard, setting forth the requirements that a rear impact guard must meet and specifying the procedures that NHTSA will use when testing a guard. FMVSS No. 224 establishes the vehicle standard, requiring a new trailer to be equipped with a guard that meets the equipment standard.

The final rule requires the guard to extend to within four inches of the sides of the trailer, have a ground clearance of no more than twenty-two inches, and be placed as close to the rear of the trailer as possible. 61 Fed. Reg. 2007. The static load test[7] requirements (to determine strength and energy absorption) provide that each vertical member must withstand a static load test of at least 22,480 pounds (and between the vertical members the guard must withstand at least 11,240 pounds), and the testing must displace the guard by at least five inches. Id.

II. Great Dane's Model Q Trailer

Although the Model Q trailer involved in the Rapp accident was manufactured before the effective date of the current regulation, the rear guard in fact exceeded the current

[7] During a static load test, the guard is mounted to a rigid test fixture, while force is slowly applied until the guard has been deflected by five inches. 61 Fed. Reg. 2007.

requirements for height, width, and location, as well as strength and energy absorption. See Def.'s Mot. at 9. Thus, the Q Model guard's ground clearance was no greater than twenty-two inches, its width extended to within four inches of the trailer sides, and it was placed at the extreme rear end of the trailer.

Great Dane also manufactures trailers whose rear guards contain additional vertical attachments that connect the rear corners of the trailer to either end of the horizontal bar. According to Great Dane, however, the strength and energy absorption capabilities of these vertical attachments are not known, and they are typically added at a customer's request to support an intermediate step between the horizontal bar and trailer cargo area. See Def.'s Mot. at 10.

Plaintiff contends that had the Q Model trailer been equipped with these vertical attachments, the Rapp car would have been deflected from the corner of the Molina trailer, thereby eliminating the passenger compartment intrusion of the right rear corner of the trailer. Edwin's and Bradford's lives would thus have been saved.[8]

[8] Although the parties dispute whether Edwin's death was caused by the passenger compartment intrusion or the initial impact with the Singh truck, at oral argument Great Dane conceded that Bradford died as a result of contact with the right rear corner of the trailer.

III. Legal Standards[9]

A. Enhanced Injury/Crashworthiness Claim

In cases where, as here, the plaintiff claims that the manufacturer of an allegedly defective product did not cause the accident, but rather increased the severity of the injuries sustained in the accident, courts have applied an "enhanced injury" or "crashworthiness" doctrine. See, e.g., Oddi v. Ford Motor Co., 234 F.3d 136 (3d Cir. 2000). Enhanced injury claims are a subset of products liability and impose liability on the manufacturer "not for causing the accident, but rather for failing to minimize the injuries or even increasing the severity of the injuries sustained in an accident brought about by a cause other than the alleged defect." Habecker v. Clark Equip. Co., 36 F.3d 278, 283 (3d Cir. 1994)("Habecker III").

Although the typical crashworthiness case involves an injured party suing the manufacturer of the vehicle in which she was a passenger, Mrs. Rapp agrees that "some hybrid of the

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[9] A summary judgment motion should only be granted if we conclude that "there is no genuine issue as to any material fact and that the moving party is entitled to judgment as a matter of law," Fed. R. Civ. P. 56(c). In a motion for summary judgment, the moving party bears the burden of proving that no genuine issue of material fact is in dispute. See Matsushita Elec. Indus. Co. Ltd. v. Zenith Radio Corp., 475 U.S. 574, 585 n.10 (1986), and all evidence must be viewed in the light most favorable to the nonmoving party. See id. at 587. The mere existence of some evidence in support of the nonmoving party will not be sufficient for denial of a motion for summary judgment; there must be enough evidence to enable a jury reasonably to find for the nonmoving party on that issue. Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 249 (1986).

crashworthiness doctrine is applicable" in this case. Pl.'s Resp. at 7 n.3.[10]

"To establish a cause of action on a theory of crashworthiness, a plaintiff must show: (1) the design of the product was defective; (2) an alternative, safer design that was practical existed; (3) what injuries, if any, the plaintiff would have received had the alternative design been used; and (4) the defective design caused or exacerbated specific injuries." Oddi, 234 F.3d at 143 (footnotes omitted).[11]

Great Dane argues that plaintiff cannot, without the testimony of her experts, meet the elements of defect, alternative design or enhanced injury.

B. Standards for Admissibility of Expert Testimony

Fed. R. Evid. 702 provides:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

With respect to the admissibility of expert evidence, our Court of Appeals has recently stated:

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[10] See also Garcia v. Rivera, 160 A.D.2d 274, 276-77 (N.Y. App. Div. 1990)(applying enhanced injury doctrine to an underride case).

[11] Because this is a diversity case, Pennsylvania products liability law applies. See Oddi, 234 F.3d at 143 n.7 (citing Padillas v. Stork-Gamco, Inc., 186 F.3d 412, 413 (3d Cir. 1999)).

> The Supreme Court amplified the operation and scope of Rule 702 in Daubert v. Merrill Dow Pharmaceuticals, Inc. []. There, the Court held that scientific knowledge requires
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> > an inference or assertion . . . derived by the scientific method. Proposed testimony must be supported by appropriate validation–i.e., "good grounds," based on what is known. In short, the requirement that an expert's testimony pertain to "scientific knowledge" establishes a standard of evidentiary reliability.
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> Id. at 590, 113 S. Ct. 2786. Rule 702 thus "clearly contemplates some degree of regulation of the subjects about which an expert may testify." Id. at 589, 113 S. Ct. 2786. Consequently, the Court established a "gatekeeping role for the [trial] judge." Id. at 597, 113 S. Ct. 2786.
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> > [T]he trial judge must determine at the outset, pursuant to Rule 104(a), whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue. This entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue.
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> Id. at 592-93, 113 S. Ct. 2786. The proponent must satisfy this burden "by a preponderance of proof." Id. at 593 n.10, 113 S. Ct. 2786.

Oddi v. Ford Motor Co., 234 F.3d 136, 144 (3d Cir. 2000) (footnote omitted).

Our Court of Appeals, considering Daubert in conjunction with an earlier Third Circuit opinion, has concluded

that eight factors are relevant in assessing the admissibility of expert scientific evidence:

> (1) whether a method consists of a testable hypothesis; (2) whether the method has been subjected to peer review; (3) the known or potential rate of error; (4) the existence and maintenance of standards controlling the technique's operation; (5) whether the method is generally accepted; (6) the relationship of the technique to methods which have been established to be reliable; (7) the qualifications of the expert witness testifying based on the methodology; and (8) the non-judicial uses to which the method has been put.

Oddi, 234 F.3d at 145 (quoting In re Paoli R.R. Yard PCB Litig., 35 F.3d 717, 742 n.8 (3d Cir. 1994)).

Moreover, the expert's testimony must "fit" -- that is, it must assist the trier of fact -- and "[a]dmissibility thus depends in part upon 'the proffered connection between the scientific research or test result to be presented and the particular disputed factual issues in the case.'" Oddi, 234 F.3d at 145 (quoting Paoli, 35 F.3d at 743).

On the other hand, a proponent of expert evidence need not prove to the court that the expert assessments are correct, but rather must demonstrate by a preponderance of the evidence that they are reliable, which is to say that the "particular opinion is based on valid reasoning and reliable methodology," Oddi, 234 F.3d at 146 (quoting Kannankeril v. Terminix Int'l, Inc., 128 F.3d 802, 806 (3d Cir. 1997)).

While the decisions discussed above were in the specific context of scientific, as opposed to technical, expert

evidence, in Kumho Tire Co. v. Carmichael, 526 U.S. 137 (1999), the Supreme Court held that Daubert's general principles apply to all expert testimony introduced pursuant to Rule 702. Kumho, 526 U.S. at 147-48. Kumho held that a court may use the Daubert factors in evaluating non-scientific expert testimony, but also noted that these factors do not form any sort of definitive checklist, Kumho, 526 U.S. at 150.[12]

With respect to the gap between an expert's scientific information and his conclusions, our Daubert analysis is largely restricted to the expert's methodology, and not to the conclusions, Oddi, 234 F.3d at 146.

> Nonetheless, "conclusions and methodology are not entirely distinct from one another." General Elec. Co. v. Joiner, 522 U.S. 136, 146, 118 S. Ct. 512 (1997). A court "must examine the expert's conclusions in order to determine whether they could reliably flow from the facts known to the expert and the methodology used." Heller v. Shaw Indus. Inc., 167 F.3d 146, 153 (3d Cir. 1999). "A court may conclude that there is simply too great a gap between the data and the opinion proffered." Joiner at 146, 118 S. Ct. 512; see also In re TMI Litigation, 193 F.3d 613, 682-83 (3d Cir. 1999), opinion amended by 199 F.3d 158 (3d Cir.), cert. denied sub nom. General Public Utilities Corp. v. Abrams, – U.S. –, 120 S. Ct. 2238 (2000) and Dolan v. General Public Utilities Corp., – U.S. – , 120 S. Ct. 2238, (2000).

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[12] "[A] judge assessing a proffer of expert . . . testimony under Rule 702 should also be mindful of other applicable rules," in particular Rules 703 (discussing the sort of evidence upon which expert opinions may be based), 706 (discussing court-appointed experts), and 403 (discussing exclusion of otherwise relevant evidence). Daubert, 509 U.S. at 595.

Id.

With the Oddi factors in mind, we now turn to the expert testimony.

IV. The Expert Testimony[13]

A. Steven M. Schorr

Mr. Schorr, a forensic and accident reconstruction engineer, opined in his December 18, 2000 preliminary report:

> 1. The collision between the front of the GMC [Singh] truck and the rear of the stopped Mercury occurred with the Principle Direction of Force (PDOF) acting on the Mercury primarily from rear to front, with a slight component of force from right to left.
>
> 2. The change in velocity of the Mercury, as a result of the impact by the GMC truck, was approximately 25 miles per hour.
>
> 3. The Mercury was pushed forward and to the right as a result of the contact by the GMC truck. The movement resulted in contact between the left side of the Mercury and the right rear of the stopped tractor-trailer. This collision occurred with the Mercury moving at a speed of less than 25 miles per hour.
>
> 4. The physical evidence indicates that the impact and subsequent intrusion by the right rear corner of the Great Dane trailer into the left side of Mercury resulted in fatal injuries to the left side occupants, while the right side occupants survived the collision.
>
> 5. The presence of an underride bar on the rear of the Great Dane trailer that would have connected the end of the bar to the

[13] For the purposes of deciding this motion, we will assume that all three of plaintiff's experts are "qualified" to testify under Fed. R. Evid. 104(a).

> corners of the trailer would have changed the distribution of the impact force and reduced the intrusion into the left side occupant compartment of the Mercury. This would have prevented the intrusion-related injuries described.
>
> 6. The operator of the GMC truck had more than enough time and distance to perceive, react and avoid the stopped mercury.

Ex. O, Pl.'s Resp. (Steven Schorr Report dated December 18, 2000 at 9)(hereinafter "Schorr Report").

Before reaching his conclusions, Schorr inspected the Rapp vehicle twice to take photographs and make detailed measurements. He also studied the engineering specifications of the 1997 Mercury Sable. Pl.'s Resp. at 23-25; Ex. E, Pl.'s Resp. (Schorr Dep. at 31-32, 122-23)(hereinafter "Schorr Dep."). Schorr obtained crush stiffness coefficients by reviewing test data for similar model cars under similar impact configurations and had an outside vendor, Neptune Engineering, compile the test data. Schorr Dep. at 121-22. With the compiled measurements, stiffness coefficients and vehicle specifications, Schorr obtained a crush profile for the Rapp car using a computer program (AutoCAD). Schorr Dep. at 19-20. Schorr also generated AutoCAD crush profiles for the Singh truck and Molina trailer. Schorr Dep. at 17-18; Pl.'s Resp. at 24.

Using all of this information, Schorr calculated change in velocity, angle of impact, principal direction of force, moment of inertia, crush depth, and energy dissipation of the vehicles during the course of the accident. Schorr Dep. at 135-

36. And, based upon these calculations, Schorr created accident reconstruction diagrams. Pl.'s Resp. at 25 (citing Ex. Z).

During his deposition, Schorr testified with respect to the rear guard as follows:

> A. The fact is putting that guard there you are preventing the vehicle from underriding. So, again, intuitively you are trying to prevent underride accidents, you are putting something there that resists the underride so necessarily it makes sense.
>
> Q. Would these attachments make the guards stronger than guards without such vertical attachments?
>
> A. Very likely.
>
> Q. And is it possible to make guards too strong?
>
> A. Well, you have the trade-off, of course, of the danger of the underride versus the danger of the increased strength and that becomes a cost benefit.
>
> Q. To the extent you increase strength you also increase the possibility of deceleration injuries, don't you?
>
> A. That would make sense.
>
> Q. You have no data that you can site [sic] to me today or that you've looked at that tells us whether the addition of these vertical attachments, in fact, makes the guards less safe?
>
> A. I don't have any data, no.

Schorr Dep. at 86-87.

When asked how the presence of vertical attachments would have altered the degree of penetration into the Rapp vehicle, Schorr testified that:

> Well, you have a situation where the [Mercury] Sable is sliding forward and rotating when it impacts the right rear corner. The energy that the Sable has at that impact is being basically applied in two

> areas, where the underride guard is and where the right corner of the trailer is. You had that longitudinal guard, that vertical strut there. What you are doing is you are increasing the linear area using the same energy. So you are distributing the energy differently across the side of that vehicle. And by doing that you are necessarily, especially on the shallow angle that you have, you are necessarily providing less energy and, therefore, the less energy the less crush.

Schorr Dep. at 87-88.

Schorr did not know the degree of deformation the right corner guard experienced, if any, during the impact with the Rapp vehicle. Schorr Dep. at 89. Nor could he quantify the deformation that would have happened had the guard been equipped with vertical attachments:

> Q. If vertical attachments of the type that you have described were connected to that guard, would that guard have deformed during this accident?
>
> A. May have.
>
> Q. To what degree?
>
> A. I don't know.
>
> Q. What assumption have you made with respect to energy absorption contributed by the guard during this accident, energy absorption contributed by the guard to the Rapp vehicle?
>
> A. I don't know how much the guard was deformed so I didn't really include that.
>
> Q. You do not know how much energy absorption would be contributed by deformation of a guard with vertical attachments of the type you described, correct?
>
> A. That's correct.

Schorr. Dep. at 89-90 (objections omitted).

Specifically, as to the difference in crush to the Rapp vehicle had the trailer been equipped with a vertical attachment, Schorr stated that, "I can't quantitatively give you a number, that's what we are working on on that additional analysis that we talked about. I think you are going to have a significantly less amount of intrusion as a result of taking this force and distributing it along the side door at the shallow angle that we believe it contacted." Schorr Dep. at 90.

Later in his deposition, Schorr testified with respect to the vertical attachments:

> Q. Why do you say the degree of penetration would be somewhere between the outside of the door and the roof rail using that as the plane of reference?
>
> A. Why do I say that?
>
> Q. Yes. If the bumper had vertical attachments of the type you have described.
>
> A. Because I believe that the distribution of that energy over a wider or longer cross-sectional area, linear area, 19 inches, essentially, from the bottom of the trailer to where the bar is, I believe that that's going to absorb and distribute enough of that energy that you are not going to have the same kind of intrusion. You have actually something now to absorb that energy, which is the door, as opposed to the door only having a small point of force absorbing that energy and the rail and the corner of the trailer being able to enter the car with ease.
>
> Q. Is that opinion, that the degree of crush would be somewhere between the exterior plane and the plane defined by the undeformed roof rail based upon any testing?
>
> A. No.
>
> Q. Is it based upon any data in the scientific literature pertaining to underride accidents?

> A. No. I have not found -- we are in the process of checking that. I have not found anything that mirrors what we are talking about today.
>
> Q. Is it based upon any calculations?
>
> A. Again, those are the calculations that we talked about on those yellow sheets that we are trying to put together as a result of work that was asked to be done.
>
> * * *
>
> Q. Is it based upon anything else other than your intuitive belief as an engineer?
>
> A. No.

Schorr. Dep. at 159-161 (objections omitted).

B. Byron Bloch

Byron Bloch, an auto safety design consultant, was retained to testify as to the design defect. In his preliminary expert report dated December 20, 2000, Bloch opined:

> A well-designed truck underride prevention guard could and should have been installed at the rear of the subject Great Dane trailer. Irrespective of whatever may have caused the car-into-trailer collision, the Mercury Sable stationwagon Celica coupe would have been prevented from penetrating or underriding beneath and into the rigid structures at the rear of the trailer. The designed-in frontal crush zone of the Mercury Sable stationwagon would have enabled a safer "ride-down" of Edwin Rapp and Bradford Rapp within the decelerating vehicle. The safety belt that she was wearing, and the collapsible steering column would have further helped to restrain her and allow for her safer deceleration without forceful impact to her head, and Edwin Rapp and Bradford Rapp would not have incurred such severe injuries.

Byron Bloch Report dated December 20, 2000 at 5 (hereinafter "Bloch Report").[14]

With respect to Bloch's area of expertise, Bloch testified that:

> In a particular accident I have done not the computerized, mathematical type of reconstruction, but a more what I would call an accident assessment or evaluation, understanding the basic speeds and angles and offsets that are involved in collisions and inspecting the accident vehicle or vehicles, plural, as to points of contact and penetration, witness marks of head injury, impact zones, things like that. So the kind of accident reconstruction is more vehicle performance related rather than mathematical or computer analysis related. But it is a type of accident reconstruction.

Ex. K, Pl.'s Resp. (Bloch Dep. at 144)(hereinafter "Bloch Dep.").

The following exchange occurred during Bloch's deposition, with respect to energy absorption:

> Q. You have no knowledge of the amount of energy absorbed by the side of the Rapp vehicle in this accident, do you?
>
> A. No. I didn't care to know the amount of theoretical calculations to try to approximate the transfers of energy. The key issue has nothing to do with the transference of energy, but rather having a harpoon-like rear corner of a trailer to penetrate into the occupant survivor space. It would cloud the issue to try to talk about theoretical calculations of transferrings of energy.

Bloch Dep. at 64 (objections omitted).

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[14] Bloch's report is not included as an exhibit to any of the summary judgment papers, although both parties allude to his report, either in their pleadings, or during his deposition. We will separately file Bloch's report.

Later still, Bloch testified that "one can make clearly evaluations of rear guard designs that have blatant defects or deficiencies in them, such as total failure to protect the rear corners of the trailer. You don't need a crash test program to determine that defect." Bloch Dep. at 141.

C. Michael Kleinberger, Ph.D

Plaintiff retained Dr. Kleinberger, an injury biomechanics consultant, to report on the injury enhancement Edwin and Bradford suffered. In his January 22, 2001 report, Dr. Kleinberger opined that:

> In summary, it is my opinion that the injuries sustained by Kimberly and Grace Rapp and the deaths of Edwin and Bradford Rapp were proximately caused by the accident on 8/21/98. Furthermore, it is my opinion that the reported injuries, including the fatal injuries to the left side occupants, were caused by the impact with the Great Dane trailer and not by the initial rear impact from the GMC truck. The fatal injuries sustained by Edwin and Bradford Rapp were a direct result of the intrusion of the lower right rear corner of the trailer into the occupant space of the Sable and not by intrusion of the door into their bodies as in a typical side impact collision. If an improved underride guard design had been used, the amount of intrusion would have been reduced and both Edwin and Bradford Rapp would have survived this collision. These opinions are based on my experience and knowledge of automotive occupant safety and are made within a reasonable degree of biomechanical and engineering certainty.

Ex. G, Pl.'s Resp. (Michael Kleinberger Report dated January 22, 2001 at 6).

With respect to his knowledge of an "improved underride guard", Kleinberger testified that:

> A. What I'm referring to there is that if the intrusion into the occupant space had been reduced, the likelihood of them receiving these injuries would have been greatly reduced.
>
> Now, I don't believe I am opining in that paragraph the relationship between the design of the underride

> guard and the amount of intrusion. Those opinions are based on the other experts in this case.
>
> Q. So that I'm clear then, you have in mind no particular design of a underride guard when you write that passage?
>
> A. Right. I am relying on the other experts in this case to discuss that matter.
>
> Q. That matter being an alternative design that would reduce the amount of intrusion?
>
> A. Correct.

Ex. P, Pl.'s Resp. (Kleinberger Dep. at 73).

V. Discussion

At oral argument, plaintiff claimed there were four primary distinctions between her case and Oddi.[15] First, while the experts in Oddi failed to examine other bread truck designs, plaintiff's expert, Schorr, analyzed schematics of the Rapp vehicle and photographs of alternative rear impact guards. Second, in Oddi there was no evidence of an alternative design,

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[15] In Oddi, plaintiff was injured after the bread truck he had been driving struck a guard rail and bridge abutment. Oddi, 234 F.3d at 141. Plaintiff retained two experts, an accident reconstruction engineer and a biomechanical engineer, to render opinions in support of his claim that the bread truck was defectively designed because (1) its front bumper allowed the underside of the truck to ride up onto the guardrail and strike the bridge abutment, and (2) the flooring of the truck cab bent up during the accident, injuring his legs. Id. at 156. Oddi's accident reconstruction expert proposed hypothetical alternative designs that he believed would have prevented Oddi's injuries, but did not perform any calculations or scientific analyses to support these conclusions. Id. The district court deemed the expert testimony inadmissible and granted summary judgment in favor of the defendant. On appeal, the Third Circuit affirmed, holding that the expert "used little, if any, methodology beyond his own intuition." Id. at 158.

whereas here we know that rear guard rails with vertical attachments exist. Next, unlike Oddi, where there was no enhanced injury evidence, plaintiff's expert, Kleinberger, testified that Edwin and Bradford would have survived the crash had the passenger compartment intrusion been minimized. Lastly, Mrs. Rapp contends that the experts in Oddi performed no measurements or calculations, in contrast to her experts who performed extensive measurements, calculations, and analyses.

Although we agree that Schorr, in particular, undertook a seemingly rigorous analysis of the accident as it happened, we are aware of no measurements, calculations, or analyses done with respect to the hypothetical accident in which the trailer rear guard is equipped with vertical attachments between the horizontal member and the rear corners of the trailer. Several times during oral argument, plaintiff suggested that the evidence of what would have happened had the Molina trailer been equipped with vertical attachments was as simple as "high school physics". Notwithstanding, Mrs. Rapp readily agreed that the issue of defect with respect to this rear guard requires expert testimony.

Great Dane argues that the experts' calculations and crash analyses go to the impact between the Singh truck and the rear of the Rapp car, rather than between the Rapp car and the Molina trailer. Therefore, although Schorr performed many calculations, he failed to undertake any relevant calculations. Moreover, Great Dane contends that the strength and energy absorption of any proposed vertical attachment are critical to

any analysis, and the experts' failure to account for this undermines their Daubert/Kumho viability.

As stated above, an expert's proposed testimony must "fit", and its admissibility "thus depends in part upon 'the proffered connection between the scientific research or test result to be presented and particular disputed factual issues in the case.'" Oddi, 234 F.3d at 145 (citing Paoli, 35 F.3d at 743). Although we ought not evaluate an expert's conclusions, we must, consistent with Oddi, at least examine the conclusions "in order to determine whether they could reliably flow from the facts known to the expert and the methodology used." Heller v. Shaw Indus. Inc., 167 F.3d 146, 153 (3d Cir. 1999)(cited in Oddi, 234 F.3d at 146).

Here the dispute involves what effect, if any, vertical attachments would have had on the accident and its consequences on the Rapps. Yet the underlying data involve only the mechanics of the accident as it happened and does not reflect, in even the barest of terms, what would have happened with the addition of a vertical attachment. These data thus in no way illuminate the problem at the heart of Mrs. Rapp's case against Great Dane, which is the degree of enhancement the allegedly defective rear guard added to her husband's and son's injuries.[16]

For example, during Schorr's deposition, he resorted to his intuition to surmise that vertical attachments would have

[16] At oral argument, her counsel conceded that the putative defect had no enhancement effect on her or her daughter.

prevented underride. See Schorr Dep. at 86-87, supra. Although he acknowledged that adding vertical attachments would very likely increase the strength of the rear guard, he did not factor in this added strength -- and its own injury-enhancing potential -- to his analysis. See id.

In essence, Schorr and Bloch ignore decades of federal agency studies regarding the delicate balance between strength and energy absorption for rear trailer guards. Although, to be sure, Great Dane's conformity with these minimum safety requirements does not bar plaintiff's strict liability claims, see, e.g., Pokorny v. Ford Motor Co., 902 F.2d 1116, 1121 (3d Cir. 1990), we look to the decades of research as evidence that rear trailer guard design is by no means a matter of simple "high school physics".

For example, an NHTSA study on Heavy Truck Rear Underride Protection conducted at the Vehicle Research and Testing Center included a crash test using a very strong ("rigid") guard. See 61 Fed. Reg. 2007. "Although underride in this crash test was minimal, occupant compartment forces generated during the crash were significant, with onboard dummy readings indicating a potential for serious driver chest injuries". Id. By contrast, a similar crash test using the current minimally compliant guard allowed more underride than the rigid guard, but generated "occupant compartment forces low enough that they posed essentially no potential for life-threatening occupant injuries." Id.

Absent a similarly principled consideration of the competing strength/energy absorption concerns for a vertical attachment, plaintiff's expert testimony lacks the fundamental "fit" required under Daubert and its progeny. As NHTSA's studies demonstrate, the balance between strength and energy absorption is an elusive and vexing one. "It should be recognized, therefore, that impact guards cannot be optimized for all situations." 61 Fed. Reg. 2009. Therefore, we cannot allow Schorr to testify as to his conclusion, based solely on "high school physics", that increasing the linear area between the rear corner of the trailer and the edge of the horizontal member would improve the overall safety of the trailer guard to the extent that it would have had a cognizable benefit for the Rapps (or others similarly situated).

Similarly, Bloch intuitively believes that the exposed corner of the rear trailer guard acts as a "harpoon", Bloch Dep. at 64, supra, and that the addition of the vertical attachments would have safely deflected the Rapp vehicle. Yet he performed no calculations regarding the proposed deflection or the energy transference during impact. According to Bloch, one can intuitively, and without the need for testing, perceive a "blatant" defect, such as having exposed corners on a rear trailer guard. However, the fact that both parties agree that we need an expert to describe this alleged defect suggests that more than conclusory intuition must be brought to bear on this difficult problem.

Having reviewed plaintiff's photographs of trailers with vertical attachments, we agree with Mrs. Rapp that these vertical attachments make the rear guard appear to offer greater protection than the horizontal member alone provides. However, our intuition, like Schorr's or Bloch's, is not, on the record before us, supported by any Daubert-satisfying methodology addressing the relative safety or desirability of adding the vertical attachments.[17] Such untutored intuition simply will not carry the day in the post-Daubert/Kumho legal world, at least as applied to this hard problem that has occupied federal safety authorities for over forty years.

Although Mrs. Rapp attempts to distinguish this case from Oddi, we in fact see a striking similarity. Oddi's expert "did not know how much [force] was required to bend the bumper or penetrate the floor, or how much force the bumper or floor could withstand. His hypothesis about adding a 'wedge' or bracket to bumper was likewise without support as he did not determine the tensile strength or gauge of whatever metal should be incorporated into his alternative design. Accordingly, there was no way of knowing if his suggested alternative would better protect the cab's occupant, or if the suggested modifications

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[17] As for Kleinberger, he relies entirely on Schorr and Bloch with respect to the design flaws. For the purposes of this motion, we assume that his methodology meets the Daubert requirements as to enhanced injury (i.e., that he has a reliable basis for concluding that Bradford and Edwin would have survived the accident if the rear corner of the trailer had not invaded the left side passenger compartment area of the Rapp car).

were practical." Oddi, 234 F.3d at 158. Likewise here, neither of plaintiff's experts even proposed -- much less tested -- a vertical attachment design with any specificity, with respect to its measurements, its materials, its strength, or its energy absorption capabilities.

Under Oddi, therefore, plaintiff has failed to establish by a preponderance of the evidence that her expert testimony with respect to the addition of vertical attachments is based upon "valid reasoning and reliable methodology." Oddi, 234 F.3d at 146 (internal quotations omitted). Absent such expert testimony, plaintiff cannot establish that the Q Model rear guard was defective, or that the proposed rear guard with vertical attachments constitutes a safer design. Accordingly, we will grant Great Dane's motion for summary judgment.