United States Court of Appeals
For the First Circuit

Nos. 01-1693, 01-1694

MINERVA QUINTANA-RUIZ, ON HER OWN BEHALF AND IN REPRESENTATION OF HER MINOR DAUGHTER, INES M. REYES-QUINTANA,
Plaintiff, Appellee, Cross-Appellant,

v.

HYUNDAI MOTOR CORPORATION,
Defendant, Appellant, Cross-Appellee.

APPEALS FROM THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF PUERTO RICO

[Hon. Héctor M. Laffitte, U.S. District Judge]

Before

Selya and Lynch, Circuit Judges,
and Schwarzer,* Senior District Judge.

Leslie G. Landau with whom McCutchen, Doyle, Brown & Enersen, LLP, Lee G. Sullivan, Gibson, McAskill & Crosby, LLP, Brian P. Crosby, Graffam & Biaggi, and Keith A. Graffam were on the brief for Hyundai Motor Corporation.

Francisco Rebollo-Casalduc with whom Andrés Guillemard-Noble, Giselle Colón, and Nachman, Guillemard & Rebollo were on the brief for Minerva Quintana-Ruiz.

August 27, 2002

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* Of the Northern District of California, sitting by designation.

LYNCH, Circuit Judge. This product design case tests some of the limits of the minority rule, adopted by Puerto Rico and California, that the defendant bears the burden of proving that the utility of a product's design outweighs the risks. Aponte Rivera v. Sears Roebuck de P.R., Inc., 144 P.R. Dec. 830, 840 n.9, 1998 P.R.-Eng. 324486 n.9 (1998); Barker v. Lull Eng'r Co., 573 P.2d 443 (Cal. 1978). The question here is whether a jury may find for a plaintiff, injured when her airbag properly deployed in an auto accident, when the evidence is that the overall utility of the design exceeds the overall risk, there is no evidence of the existence of an alternative safer design, and the jury verdict is based either on a misunderstanding of the law or solely on the jury's rejection of the testimony of the experts retained by the defendant. We hold that such a jury verdict is not sustainable. It effectively, in these circumstances, either converts the defendant to the status of an insurer or creates liability based on a consumer expectation theory. Since neither of these outcomes is permissible under Puerto Rican law, we reverse and direct entry of judgment for defendant.

I. FACTS

Early in the morning of August 10, 1996, Ines Reyes-Quintana, then fifteen years old, was returning from a party in a 1996 Hyundai Accent. Reyes-Quintana's brother was driving the car and Reyes-Quintana was in the front passenger's seat. The Hyundai was in the left lane of a two-lane road. A Nissan station wagon, traveling at a substantially slower speed, crossed from the right

lane into the left lane, in front of the Hyundai. The Hyundai braked, leaving about 163 feet worth of skid marks on the road. The Hyundai then rear-ended the Nissan at a speed differential of about 30 miles per hour. The passenger-side airbag deployed, striking Reyes-Quintana's hand, which she had raised as if to brace herself.

The force of the airbag striking her arm fractured Reyes-Quintana's arm and wrist in four places. These were the only injuries Reyes-Quintana sustained in the accident.[1] The fractures required three surgeries, including the permanent attachment of two metal plates and sixteen metal screws. Reyes-Quintana has also experienced some permanent loss of strength and scarring in that arm. The Hyundai sustained significant damage, estimated at over $11,300.

II. TRIAL PROCEEDINGS

Only two experts testified on the airbag's design. Both experts were retained by the defendant, Hyundai. The plaintiff

[1] The parties contest whether Reyes-Quintana was wearing her seatbelt at the time of the crash. Reyes-Quintana maintains that she was, and that this was a factual question for the jury, which she says the jury must have found in her favor because they found that she was not comparatively negligent. The judge specifically instructed the jury that if it found that she was not wearing her seat belt and that contributed to her injuries, the jury should determine what percentage of the damages was attributable to the failure to wear the seat belt. Because the defendant's experts did not include any conclusions about whether Reyes-Quintana was wearing her seatbelt at the time of the crash in their reports, the judge forbade them from offering an opinion on this point at trial.

also offered the testimony of a medical expert to establish Reyes-Quintana's injuries.

A. Testimony of Dr. Martinez

Dr. Jose Martinez, formerly of Texas A & M University, testified as an accident reconstruction expert, providing the probable explanation of how the accident took place. He testified that the police reports showed 163 feet of braking marks before impact. Based on the damage sustained by the Hyundai, Dr. Martinez concluded that it was traveling thirty miles per hour faster than the Nissan at the point of impact. Based on this conclusion and the length of the skid marks, Dr. Martinez opined that the Hyundai had to be traveling at least 63 miles per hour before the driver began to brake.

Dr. Martinez explained the mechanics of accident reconstruction, a short summary of which is necessary in order to understand the issues in this case. Barrier equivalent velocity, referred to as BEV, is the speed at which a vehicle goes into a barrier, measured in miles per hour. BEV is used for setting the deployment level for airbags, and it is the measurement used in the relevant federal regulations. Delta V, a related but not identical concept, is the change in velocity of a vehicle, usually at the center of gravity, also measured in miles per hour. Generally, accident reconstruction experts measure the Delta V of the car environment, rather than that of a specific occupant. In accidents involving impact into a barrier, the BEV is often slightly less than the Delta V.

The higher the Delta V is, the more serious the injuries are likely to be. Conversely, the lower the Delta V, the less serious the injuries are likely to be. The majority of accidents occur in the 10 to 15 Delta V range. Generally, accidents with a Delta V under 15 are considered to be of lower severity. Middle severity accidents are in the 15 to 25 Delta V range; above 25 is considered high severity. Dr. Martinez testified that a BEV of 15 "is where you start to get serious injuries, according to the statistics" and that is "where you want that air bag to go off." He also testified that even an accident referred to as "low severity" is not mild because, if you are unrestrained, such an accident can "put your head in the windshield" and cause serious injuries. Although he could not provide the specific percentiles of how many people would get hurt in an accident with a BEV under 14, he stated that "people do get hurt and will get hurt" in those types of accidents. Dr. Martinez testified that an accident with a BEV of 12 would cause an unbelted test dummy to go through the windshield. Based on his reconstruction of the plaintiff's accident, Dr. Martinez estimated the BEV of the accident at "14 to 16, or maybe thirteen and change" and the Delta V at "15 to 16, could be 15 to 17."

The airbag in this Hyundai model is designed to always deploy in accidents with a BEV of 12 or greater, and so the deployment of the airbag was in keeping with its intended design. Dr. Martinez testified that, in any American car with an airbag,

the airbag would have deployed in an accident of the type at issue here. Nothing in the cross-examination impeached any of these conclusions. The plaintiff's counsel attempted to make Dr. Martinez concede that Hyundai could have chosen an airbag design that would deploy at a higher BEV; Dr. Martinez responded that he did not know whether it was possible to create a design that would only deploy at a BEV of over 14 and still meet the federal performance standards.

The plaintiff's counsel also attempted to get Dr. Martinez to concede that he knew of studies indicating that airbag deployment at a BEV of less than 15 causes more injuries than it prevents; Dr. Martinez responded that he had no knowledge of such studies. No such studies were introduced. Dr. Martinez's overall conclusion was that, even at accidents with a BEV of 14 and less, the airbag "does more good than harm."

B. Testimony of Dr. Benedict

Dr. James Benedict, an expert in the response of the human body to acceleration and impact forces, such as in accidents, also testified. Specifically, he is an expert in biomechanical analysis, occupant kinematics, injury causation, and airbag performance. Although the defense retained Dr. Benedict, the plaintiff called him as a witness and presented his testimony. He testified that Reyes-Quintana's arm injuries were consistent with impact with the deploying passenger airbag. He estimated that her forearm was one to three inches from the dashboard at the time of the injury, based on the fact that forearm fractures rarely occur

when the arm is three or more inches away from the airbag. He also testified that even if the airbag had not deployed, Reyes-Quintana could have received the same fractures in her forearm.

According to Dr. Benedict's testimony, the airbag deploys when sensors in the car detect a change in acceleration level; the airbag is essentially "predictive in nature," in that it must predict the severity of the collision based on the initial change in acceleration. The airbag deploys in about one-fourth of the time it takes to blink an eye. Dr. Benedict testified that he knew of no way for an airbag to deploy more slowly and still provide the required protection. As for the Hyundai involved in this particular accident, Dr. Benedict testified that the airbag was designed to deploy in every accident with a BEV of 12 or higher(which he referred to as the "must fire" level), but because of variances in vehicle tolerances, could deploy at a BEV of as low as 8.9. He agreed that in any car in America in 1996, the airbag would deploy during a crash with a BEV of 15.

Like Dr. Martinez, Dr. Benedict testified that he would classify an accident occurring at zero to 14 or 15 Delta V as a low severity accident; an accident occurring at 15 to 25 Delta V as a moderate severity accident; an accident occurring at 25 to 35 Delta V as a severe accident; and any accident over 35 Delta V as very severe. He testified that these are "ranges," and the categorization may vary from expert to expert.

Dr. Benedict testified that the effects of a crash with a BEV of 15 could vary. Some occupants will emerge from such an accident with minor or moderate injuries, referred to as "AIS-I" or "AIS-II" injuries, in reference to the Abbreviated Injury Scale system for categorizing the severity of injuries. Perhaps as many as half of those involved in such crashes would walk away from the accident with no injuries. An unbelted individual without an airbag in the type of crash experienced by Reyes-Quintana, however, could hit and shatter the windshield, sustaining facial bone fractures, lacerations to the face, and perhaps neck injuries. Death could even result. Accidents with a Delta V of 15 account for twenty percent of all AIS-III or greater injuries. AIS-III injuries are severe, serious or critical, including injuries such as contusions to the lung or a penetrating injury to the skull, and may pose a threat to life.

Dr. Benedict acknowledged that there have been injuries and some deaths caused by deployment of airbags. At the same time, over six thousand lives had been saved by the presence of airbags. He characterized this as a "trade-off." Airbags are meant to protect the primary systems that keep people alive: the head, neck, spine, chest, heart, and lungs. Airbag systems are most effective in preventing these head, neck, and chest injuries, although they may increase the risk of less severe injuries in some crashes.

As he had with Dr. Martinez, the plaintiff's counsel attempted to get Dr. Benedict to admit that reports had concluded that, in low severity crashes, occupants are more likely to be

injured by the airbag than by the accident itself. Dr. Benedict responded that he knew of one study concerning driver's side airbags, but denied that he knew of any such conclusion. At no point did any expert testify that such a conclusion would be accurate.

The plaintiff's counsel attempted to focus Dr. Benedict's testimony specifically on a belted passenger's risk of injuries. On examination by the plaintiff, Dr. Benedict testified that "you can have significant injury in Delta Vs of 15, 14, 13," even when wearing a seat belt, although he conceded that "it's less likely wearing a seat belt" and the "probability of the head hitting something [when a passenger is wearing a seat belt] is low." According to Dr. Benedict, however, federal law requires that airbags be designed to protect unrestrained passengers as well as restrained passengers.

Quintana-Ruiz offered no evidence to contradict any of the evidence described.

C. Proceedings After Close of Evidence

After all the evidence had been introduced, Hyundai moved for judgment as a matter of law. The district court granted the motion on the plaintiff's failure to warn claim,[2] but denied it on the plaintiff's design defect claim.

[2] The judge held that federal law preempted any failure to warn claim, because the federal regulations specify what warnings manufacturers must provide.

In closing, the plaintiff's attorney argued that the "only question" for the jury was "whether the damages suffered by Ines [Reyes-Quintana] would have been less had the airbag not been in the car or not deployed in the car." He argued that the Delta V was around 15 and the BEV was in the 12 to 14 range, classifying the accident as a "minor collision,"[3] and that there should not be airbag deployment "at these speeds." In referring to Dr. Martinez, the plaintiff's attorney specifically said "believe him on just about everything." With regard to Dr. Benedict, the plaintiff's attorney said that "he knew what the truth was. He was an honest man."

The judge instructed the jury, in relevant part, that:

> Because a manufacturer of a product is not the insurer of all the damages its product may cause, you must weigh the evidence according to the following legal theories: Under the doctrine of product liability, a plaintiff may bring an action against a manufacturer who defectively designed a product, or in the alternative, failed to provide instructions or warnings.
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> Under the design theory, a plaintiff must establish that, first, the product failed to perform as safely as an ordinary consumer would expect when used in an intended or reasonably foreseeable manner; or the product's design is the proximate cause of the plaintiff's injury and the defendant failed to establish, in light of the relevant factors, that, on balance, the benefits of the challenged design outweigh the risk of danger inherent in such a design. . . .
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> . . . If you find that the benefits surpass the risks, then the defendants are not liable under this theory.

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[3] There was no evidence that the BEV could have been as low as 12. The expert testimony was that the BEV was "14 to 16, or maybe thirteen and change." The experts classified this accident as a "moderate" severity accident.

> On the other hand, if you find that the benefits do not surpass the risks, then you find for the plaintiffs.

After deliberations, the jury found for the plaintiff, and also found that the plaintiff bore no share of the comparative fault. The jury awarded $400,000 to Ines Reyes-Quintana (who had sued through her mother, plaintiff Quintana-Ruiz) and $150,000 in emotional distress damages to Reyes-Quintana's mother, plaintiff Quintana-Ruiz.

Hyundai again moved for judgment as a matter of law or, in the alternative, a new trial or remittitur of damages. The trial court denied the motions for judgment as a matter of law, but found the damages to be excessive and ordered a new trial unless the plaintiff accepted a remittitur to $90,000 of the emotional distress damages awarded to Quintana-Ruiz, the mother. The district court did not order remittitur of the $400,000 award to Reyes-Quintana. Quintana Ruiz v. Hyundai Motor Co., No. 98-1858 (D.P.R. Mar. 12, 2001). In denying the motion for judgment as a matter of law, the district court held that there was sufficient evidence for the jury to conclude "that the deployment of the airbag in an accident of this type was unwarranted given the risks posed by the high speed at which the airbag deploys" or that, given the evidence that airbags are designed to protect the upper body areas, "the jury may have reasonably found that the risk posed to other parts of the body, like plaintiff's arm, were too high and that the overall design was defective." Id., slip op. at 6. The district court further reasoned that, even if all the experts

testified that the utility of the airbag design outweighed the risk, "there was testimony from which the jury could have found that defendant's experts' testimony was biased and unreliable." Id. The judge also found that Hyundai had forfeited any claim of error regarding the consumer expectation test by not specifically objecting to its inclusion in the jury instructions, and that, regardless, the fleeting reference to consumer expectations in the jury instructions was harmless error.[4] Id. at 9.

III.

On appeal, Hyundai argues that there is insufficient evidence, as a matter of law, to support the jury verdict. We review the district court's denial of judgment as a matter of law de novo, reviewing the evidence in the light most favorable to the jury verdict to determine if the verdict is supported by the evidence. See Rodowicz v. Mass. Mut. Life Ins. Co., 279 F.3d 36, 41-42 (1st Cir. 2002). "We assume the veracity, however, of any admissions made and stipulations entered into by the party opposing the Rule 50 motion, see Fed. R. Civ. P. 36(b), as well as any evidence derived from disinterested witnesses that has not been contradicted or impeached." Alvarez-Fonseca v. Pepsi Cola of P.R. Bottling Co., 152 F.3d 17, 23 (1st Cir. 1998).

A. Evidence of Design Defect

[4] Hyundai had specifically opposed the consumer expectation theory in its pre-verdict motion for judgment as a matter of law, arguing that "the ordinary consumer has no knowledge or expectation as to how an airbag could or should perform" and therefore it is not a proper theory for a defect claim based on an airbag's design.

Under Puerto Rican tort law governing design defect claims, if the plaintiff proves that "the product's design is the proximate cause of the damage," the burden shifts to the defendant to prove that "the benefits of the design at issue outweigh the risk of danger inherent in such a design." Aponte Rivera v. Sears Roebuck de P.R., Inc., 144 P.R. Dec. 830, 840 n.9, 1998 P.R.-Eng. 324486 n.9 (1998); see also Collazo-Santiago v. Toyota Motor Corp., 149 F.3d 23, 25-26 (1st Cir. 1998); Rivera Santana v. Superior Packaging, Inc., 132 P.R. Dec. 115, 129 & n.9, 1992 P.R.-Eng. 754830 (1992). This rule, which follows California law as established in Barker v. Lull Eng'r Co., 573 P.2d 443 (Cal. 1978), is a minority rule. Compare, e.g., Vineyard v. Empire Mach. Co., 581 P.2d 1152, 1154 (Az. App. 1978) (rejecting burden shifting); Armentrout v. FMC Corp., 842 P.2d 175, 183 (Colo. 1992) (same); Kallio v. Ford Motor Co., 407 N.W.2d 92, 95-96 (Minn. 1987) (same); Wilson v. Piper Aircraft Corp., 579 P.2d 1287, 1287-88 (Ore. 1978) (same); Ray v. Bic Corp., 925 S.W.2d 527, 532-33 (Tenn. 1996) (same), with Keogh v. W.R. Grasle, Inc., 816 P.2d 1343, 1346 (Ala. 1991) (following Barker); Ontai v. Straub Clinic & Hosp. Inc., 659 P.2d 734, 739-40 (Haw. 1983) (same). The rationale articulated for this burden shifting is that "most of the evidentiary matters which may be relevant to the determination of the adequacy of a product's design under the 'risk-benefit' standard e.g., the feasibility and cost of alternative designs . . . involve technical matters peculiarly within the knowledge of the manufacturer." Barker, 573 P.2d at 455. The goal of the Barker rule, therefore, was to

"lighten the plaintiff's burden" in proving a design defect, id. at 456, not to radically expand the scope of products considered defective by design.

In this case, the defendant concedes that the plaintiff has met her burden of establishing that the airbag was the proximate cause of Reyes-Quintana's injuries. The question is whether the defendant has met its burden of showing that the benefits accruing from the airbag's design outweigh the risks.

The defect claimed in this case is that the airbag was designed to deploy at a BEV of 14, the BEV level of the crash in this case. Both parties agree that the airbag operated exactly as it was intended and that the challenged design aspect was a conscious design decision, rather than an unforeseen consequence (for instance, a premature or unexpected deployment) of the airbag's design. Cf. Collazo-Santiago, 149 F.3d at 25-26 (challenged design aspect involved whether airbag could have been better designed to minimize injuries when it did deploy).

In Collazo-Santiago, another case from Puerto Rico involving a design defect claim based on airbag-related injuries, we noted that "[a]s identified in Barker, factors to be considered by the jury" in evaluating whether the defendant has met its burden of establishing that the design benefits outweighed its risks include:

> the gravity of the danger posed by the challenged design, the likelihood that such a danger would occur, the mechanical feasibility of a safer alternative design, the financial cost of an improved design, and the adverse consequences to the product and to the consumer that would result from an alternative design.

Id. at 25 (quoting Barker, 573 P.2d at 455). The Puerto Rico Supreme Court has also quoted this language approvingly. Rivera Santana, 1992 P.R.-Eng. 754830 n.9.

1. Risk Utility Balancing

There is little guidance from the Puerto Rico Supreme Court on how the risk-utility test should be applied. The case that first adopted the rule, Rivera Santana, 1992 P.R.-Eng 754830, was resolved on another ground -- the manufacturer's failure to warn of the inherently dangerous nature of the product. A subsequent case reiterating the risk-utility rule, Aponte Rivera, 1998 P.R.-Eng. 324486, was also resolved on a failure to warn theory.

The plaintiff's attorney argued in his closing that the question was "whether the damages suffered by Ines [Reyes-Quintana] would have been less had the air bag not been in the car or not deployed in the car." That, however, is not the correct question in a design defect case. The question posed by the plaintiff's attorney unfairly stacks the deck in the risk-utility equation -- when the question is based on the plaintiff's particular circumstances, the "risk" of injury is 100%, as the plaintiff in question has by definition been injured, and therefore the risk will almost always outweigh the utility for that particular plaintiff in that particular instance. Similarly, the trial court's conclusion that, given the evidence that airbags are designed to protect the upper body areas, "the jury may have reasonably found that the risk posed to other parts of the body,

like plaintiff's arm, were too high and that the overall design was defective," Quintana Ruiz, slip op. at 6, misstates the test. The issue is not whether the design posed too great a risk to the passenger's arm, or any one specific body part.

Instead, the question for the jury was whether, generally, the benefits imposed by the airbag's challenged design aspect (here, the fact that the passenger side airbag deploys in accidents with a BEV in the range of 14 to 16) outweigh its risks. In this inquiry, the jury should have considered the risk and utility to unbelted passengers, as well as the risk to belted passengers. The evidence was that unbelted passengers receive a considerable utility from airbags in such accidents, as, absent the airbag, there is a substantial risk of severe facial, head and spinal injuries.[5]

There was much evidence presented at trial on the risks posed by, and the utility created by, airbag deployment at a BEV of 14. The uncontradicted evidence was that the benefits outweighed the risks. No expert testified that the risk of harm posed to passengers by airbags in accidents with a BEV of 14 exceeded the benefits of airbags deploying in those types of crashes. In fact, both Dr. Martinez and Dr. Benedict testified that they knew of no studies coming to such a conclusion. Dr. Martinez specifically

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[5] Reyes-Quintana herself admitted that, until just prior to the accident, she was not wearing her seatbelt. Had the accident occurred at an earlier point in the evening, when she was not belted, she would have benefitted tremendously from the airbag deployment.

testified that, at accidents with a BEV of 14 and under, the airbag "does more good than harm." The evidence was that airbags are designed to prevent the most serious types of injuries and therefore to preserve lives, although the cost of preserving these lives may be an increased risk of injuries of a less serious variety in some crashes.

The plaintiff's argument that these serious injuries do not occur in the type of accident she had was not supported by the evidence. The evidence was that 20% of all AIS-III injuries occur at a Delta V of 15 or below -- therefore, a significant percentage of serious injuries are the result of these "moderate" severity accidents. Reyes-Quintana had the benefit of the protection against these types of injuries afforded by the airbag. She did not suffer any head, face or brain injuries, precisely the types of injuries an airbag protects against in an accident with a Delta V of 15.

Much of the plaintiff’s examination of Dr. Benedict concerned whether the airbag would deploy at a BEV of 8.9, and with the fact that Hyundai does not warn consumers that airbags may cause serious bodily injury. Neither of those topics was material to the risk-utility questions before the jury. It was undisputed that the BEV (and Delta V) were well above 8.9 (and therefore a design choice to make the airbag deploy at a BEV of 8.9 could not be a proximate cause of the plaintiff's injuries). And, because the matter of labels is so extensively regulated by federal law, there was no viable claim for failure to warn.

Many products, like airbags, involve a "trade off" between the benefits offered to the consumer and the risk created by the product. The risk-utility balancing test is designed to avoid converting the manufacturer into the insurer of every harm that arises out of a product from which the consumer derives utility. The Puerto Rico Supreme Court has emphasized that "[t]he manufacturer . . . is not the insurer of every damage his products may cause." Aponte Rivera, 1998 P.R.-Eng. 324486; accord Rivera Santana, 1992 P.R.-Eng. 754830 (same language) (quoting Mendoza v. Cerveceria Corona, Inc., 977 P.R.R. 487, 499 (1969)); see also Barker, 573 P.2d at 456 (noting that this test "stop[s] short of making the manufacturer an insurer for all injuries which may result from the use of its product"). The plaintiff is entitled to compensation only if the challenged design aspect does more harm than good, overall, for the consumer.

2. Alternative Design

An important part of the risk-utility test is the question of whether there is a mechanically feasible safer alternative design.[6] See Barker, 573 P.2d at 455; Rivera Santana, 1992 P.R.-Eng. 75830 n.9.

There are at least three views of how the existence, or non-existence, of a mechanically feasible alternative design fits into the risk-utility balancing test: 1) a showing of an alternative design is the sine qua non of a design defect claim,

[6] The trial court's instructions to the jury did not include instructions on alternative design. Neither party objected to this omission.

meaning that a plaintiff cannot prevail even if the risk exceeds the utility unless there is a showing of alternative design, see J. Henderson Jr. & A. Twerski, Achieving Consensus on Defective Product Design, 83 Cornell L. Rev. 867, 883-84 (1998); 2) the plaintiff cannot prevail if there is no showing of a feasible alternative design, unless the risk so far outweighs the utility that no reasonable person would market the product, see id.; Restatement (Third) of Torts: Product Liability, § 2 cmt. b (1998) ("[P]roduct sellers may be subject to liability even absent a reasonable alternative design when the product design is manifestly unreasonable."); and 3) it is not necessary to show the existence of an alternative design if the risk outweighs the utility, but if the actual utility exceeds the actual risk, then the plaintiff may still prevail if there is a showing of a feasible alternate design that would achieve the same utility with a lesser degree of risk,[7] see Prosser & Keeton on Torts, § 99 at 699 (W. Keeton et al. eds., 5th ed. 1984). It is not clear what view the Puerto Rico courts would follow, but none of the three approaches assists the plaintiff. As discussed above, the evidence shows that the actual utility of an airbag deploying at a BEV of 14 outweighs the actual risk posed by such an airbag. Therefore, even under the third view of alternate design (the most plaintiff-friendly view),

[7] This approach has been criticized as limiting market choice -- a fully-informed consumer may wish to have the option of a design that has a slightly higher risk level than another design, but has the advantage in other areas, such as aesthetics. See Henderson & Twerski, supra, at 886.

Quintana-Ruiz cannot prevail unless there is a feasible alternative design.

Even taking this third view, it is well-established that the inquiry into the "mechanical feasibility" of an alternative design must be determined based on the universe of existing technology at the time of manufacture and design (or possibly the time of sale),[8] not some future development leading to a potentially feasible possibility. See Prosser & Keeton on Torts, supra, § 99, at 701 ("The courts have almost universally held that the feasibility of designing a safer product must be determined as of the time the product was designed.");[9] Restatement (Third) of

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[8] The Puerto Rico courts have not resolved the issue of whether the alternative design must be feasible at the time of the product's design and manufacture, or at the time of the product's sale. The Restatement (Third) and Prosser and Keeton on Torts, as cited above, take divergent approaches. There are competing policy interests -- on the one hand is the possibility that a manufacturer may continue to sell an outmoded design long after a safer alternative becomes feasible, while on the other hand is the absolutely inevitable lag time between when a product is designed and when it is sold and the fact that technology may develop during that lag time. There is no need to resolve this question here, as it makes no difference for the plaintiff's case. There was no showing of any feasible safer alternative design at the time of the airbag's design or at the time the car was sold.

[9] Prosser and Keeton on Torts also says that:

> An alternative design that was not utilized is to be considered as feasible when a reasonable person would conclude that the (1) magnitude of the danger-in-fact that could have been avoided by such alternative design in the (2) utilization of the scientific technological know-how reasonably available to the defendant outweighed the (1) financial cost of guarding against such avoidable danger, (2) the impairment of the benefits, and (3) any new danger-in-fact that would have been created by the alternative design.

Prosser and Keeton on Torts, supra, § 99, at 700.

Torts: Product Liability, supra, § 2 cmt. f ("[Q]ualified expert testimony on the issue suffices, even though the expert has produced no prototype, if it reasonably supports the conclusion that a reasonable alternative design could have been practically adopted at the time of sale.").

California courts as well have accepted the principle that feasibility is determined in light of the technology extant at the relevant time. See Brown v. Superior Court, 751 P.2d 470, 478 (Cal. 1988) ("Barker contemplates a safer alternative design is possible . . . ."); cf. Buccery v. Gen. Motors Corp., 60 Cal. App. 3d 533, 547 (1976) ("[A]ny product so designed that it causes injury when used or misused in a foreseeable fashion is defective if the design feature which caused the injury created a danger which was readily preventable through the employment of existing technology at a cost consonant with the economical use of the product."). In Aguayo v. Crompton & Knowles Corp., 183 Cal. App. 3d 1032 (1986), the plaintiff attempted to introduce evidence that the defendant's successor had instituted a safer alternative design in subsequent versions of the product. The appeals court upheld the district court's ruling excluding the evidence. Noting that while "[p]laintiff's experts had described how this alternate safety system would operate using technology available at the time of manufacture [of the original machine]" which "does have a tendency to show it is feasible," the plaintiff's "offer of proof omitted facts that would show that the knowledge and technology

used to manufacture and design the [original] machine was the same used to produce the [proffered] machine." Id. at 1038-39.

In light of this, the Barker burden-shifting rule potentially puts defendants in an impossible situation with regard to alternative designs -- that of trying to prove a negative (that there is no alternative design that was feasible at the relevant time that would not cause greater risk). Barker itself, and the Puerto Rico cases adopting it, say only that the burden lies with the defendant of proving that the overall utility exceeds the overall risk, not that the burden is on the defendant to prove the impossible.[10] The courts of Puerto Rico will ultimately have to sort through the precise role played by evidence of alternative design.

In this case, no expert presented any evidence that there was any alternative design that would have posed less of a risk to passengers while still providing the same level of protection. In fact, the expert testimony was just the opposite. The only alternative design suggested by the plaintiff was an airbag with a higher deployment level (presumably a deployment level at a BEV greater than 16, given that the expert testimony placed the BEV of

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[10] In some instances, the plaintiff may bear some degree of burden -- whether of production or of proof -- with regard to the subsidiary issue of alternative design. For instance, it is conceivable that once the defendant proves that the design's actual utility exceeds actual risk, the burden may shift back to the plaintiff to prove that an alternative design exists that would make liability possible. Or alternatively, the plaintiff may bear a burden of production with regard to an alternative design, thereby giving the defendant something to prove or disprove. For purposes of this case, it is not necessary for us to clarify these gray areas.

this accident at between 14 and 16). The expert testimony effectively refuted this as a feasible alternative that would decrease overall risk to passengers. "[F]easibility [is] not the sole issue, for another relevant consideration [is] whether an alternative design of the car, while averting the particular [harm here], would have created a greater risk of injury in other . . . situations." Barker, 573 P.2d at 456. Expert testimony established that a deployment trigger above a BEV of 12 would leave many individuals unprotected from serious injuries of AIS-III and higher.

Further, Dr. Benedict testified that airbags cannot be designed to trigger at one specific BEV level. Rather, because of variations in cars, any one design will result in a range of deployment levels. If a designer wants an airbag to definitely deploy at a BEV of 12 (what Dr. Benedict referred to as a "must fire" level), the airbag will sometimes deploy at as low as a BEV of 8.9. The plaintiff's suggestion in closing arguments that Hyundai should have designed a bag that would deploy at a BEV of 16 and above, but never at a BEV of 14 or 15, is inconsistent with the evidence presented at trial on mechanical feasibility.

In addition, federal regulations governing the design of airbags must factor into the jury's consideration of whether there is any feasible alternative design. The National Highway Traffic Safety Administration has mandated that airbags be designed to protect unbelted occupants, as well as belted occupants. 49 C.F.R. § 571.208, S5.1 (2001). This evidence was before the jury.

Although, "states may impose liability under their products liability statutes even if the manufacturer or seller meets the minimum federal standards," Rivera-Santana, 1992 P.R.-Eng. 754830, an alternative design cannot be considered feasible if it would require the manufacturer to run afoul of federal standards. In fact, a state law claim that attempts to impose requirements that conflict with the federal standards would most likely be preempted by federal law. See Geier v. Am. Honda Motor Co., 529 U.S. 861, 871 (2000); Wood v. Gen. Motors Co., 865 F.2d 395, 408-10 (1st Cir. 1988).

On our review of the evidence, no rational jury could have concluded on these facts that the risks of the airbag design outweighed the benefits.

B. Expert Testimony

The district court alternatively upheld the jury verdict on the basis that the defendant bore the burden of proof and that the jury was free to reject the defendant's experts' testimony as biased. The only "bias" was that Hyundai paid the experts' consulting fees (including compensation for time spent testifying), and that both experts primarily, although not exclusively, work for the defense side in such cases.

Under the burden-shifting rule as stated by Puerto Rico (albeit without consideration of the factors discussed here), a plaintiff need not present any evidence regarding the risk or utility of the product, or even regarding the design of the product. Aponte Rivera, 1998 P.R.-Eng. 324486 n.9; Rivera Santana

v. Superior Packaging, Inc., 1992 P.R.-Eng. 754830. From this, the plaintiff argues that when a plaintiff does not present her own expert testimony and convinces the jury to disregard the defense experts' testimony, a plaintiff can prevail on her design defect claim simply by showing that the product caused her injury.

The district court thought its alternative ground was compelled by Collazo-Santiago, 149 F.3d 23. See Quintana Ruiz, slip op. at 6 & n.17. For the reasons outlined below, we disagree.

Collazo-Santiago was also an airbag design defect case under the Puerto Rico burden-shifting rule, in which this court upheld a jury verdict for the plaintiff where the jury, in a particular context, rejected the defense expert's testimony. The plaintiff has argued that Collazo-Santiago established a flat rule that a jury may reject the testimony of an expert witness on a subject requiring expert testimony solely on the basis of the jury's conclusion that the expert is biased in a case where the defendant, as a matter of law, bears the burden of proof on the issue. We describe the law in this area and apply it in the context of the case where the burden of proof is put on the party whose expert's testimony is rejected.

The question on appeal is whether there was sufficient evidence to justify the jury's rejection of the expert's testimony on grounds of bias. A jury is not "at liberty, under the guise of passing upon the credibility of a witness, to disregard his testimony, when from no reasonable point of view is it open to doubt." Chesapeake & O. Ry. Co. v. Martin, 283 U.S. 209, 216

(1931); see also Sonnentheil v. Christian Moerlein Brewing Co., 172 U.S. 401, 408 (1899); Chicago, Rock Island & Pac. Ry. Co. v. Howell, 401 F.2d 752, 754 (10th Cir. 1968) ("The fundamental rule which makes the jury the sole judge of the weight and credibility of testimony is subject to the caveat that testimony concerning a simple fact, capable of contradiction, not incredible, and standing uncontradicted, unimpeached, or in no way discredited by cross-examination, must be permitted to stand."). See generally C. Wright & A. Miller, 9A Federal Practice and Procedure § 2527, at 286 (1995).

In Chesapeake & O. Ry. Co., the Supreme Court reversed a jury verdict based on the jury's rejection of a witness's testimony where

> A reading of [the testimony] discloses no lack of candor on [the witness's] part. It was not shaken by cross-examination . . . . Its accuracy was not controverted by proof or circumstances, directly or inferentially; and it is difficult to see why, if inaccurate, it readily could not have been shown to be so. The witness was not impeached; and there is nothing in the record which reflects unfavorably upon his credibility.

283 U.S. at 216. The only possible basis for questioning the witness's credibility in Chesapeake & O. Ry. was that he was an employee of the defendant. This, the Court held, was not sufficient evidence to support a jury verdict based solely on the rejection of his testimony. Id.

This rule accords with the standard for reviewing grants or denials of judgments as a matter of law, where generally we accept as true "any evidence derived from disinterested witnesses that has not been contradicted or impeached," Alvarez-Fonseca, 152

F.3d at 23. Cf. Kasper v. St. Mary of Nazareth Hosp., 135 F.3d 1170, 1173 (7th Cir. 1998) ("When a case turns on credibility, neither side is entitled to judgment as a matter of law unless objective evidence shows that it would be unreasonable to believe a critical witness for one side.").

Generally, a jury may not reject testimony that is uncontradicted and unimpeached (directly, circumstantially, or inferentially) unless credibility is at issue,[11] as "[c]redibility determinations are uniquely within the jury's province." United States v. Calderon, 77 F.3d 6, 10 (1st Cir. 1996). Juries, for instance, may reject uncontradicted, unimpeached testimony when it is improbable, inherently contradictory, riddled with omissions, or delivered in a manner giving rise to doubts. See Quock Ting v. United States, 140 U.S. 417, 420-21 (1891). There must otherwise

[11] Wright and Miller characterize the Second Circuit as disagreeing with the rule that juries may not reject uncontradicted and unimpeached evidence from disinterested witnesses. Wright & Miller, supra, at 286. The Second Circuit has expressed the view that juries should be able to reject even uncontradicted evidence because "the liar's story may seem uncontradicted to one who merely reads it, but it may be 'contradicted' in the trial court by his manner, his intonations, [and] his grimaces." Broad. Music, Inc. v. Havana Madrid Rest. Corp., 175 F.2d 77, 80 (2d Cir. 1949); see also Purcell v. Waterman S.S. Corp., 221 F.2d 953, 954 (2d Cir. 1955) (per curiam) (noting that "there is no rule that the testimony of witnesses must be accepted if they are not contradicted and if their credibility is not impeached" because the witness's testimony may be "of no probative weight at all because of his address, his bearing and his apparent lack of intelligence."). Even were we to view this case through that lens, these concerns are directed at cases where credibility is at issue, which is not the case here. There was no evidence, direct or circumstantial, to suggest that the witnesses' credibility was in doubt, and the plaintiff's counsel vouched for the credibility of the experts.

be some affirmative evidence in the record to put the witness's credibility in doubt. See Wright & Miller, supra, at 288.

The Supreme Court's seminal opinion in Sonnentheil v. Christian Moerlein Brewing Co., 172 U.S. 401 (1899), is helpful in sketching the contours of this rule. Sonnentheil is usually quoted as holding that "the mere fact that the witness is interested in the result of the suit is deemed sufficient to require the credibility of his testimony to be submitted to the jury as a question of fact." Id. at 408. This rule must be understood in context. The central issue in Sonnentheil was whether creditors were guilty, or aware, of fraud in the making of a deed. Id. at 409. The uncontradicted testimony at issue was provided by the creditors themselves, who quite obviously had a personal interest in the outcome of the case. The Court observed that fraud cases are uniquely within the province of the jury's credibility determinations, as "[p]arties contemplating a fraud frequently pursue . . . devious courses to conceal their designs." Id. at 410. Finally, the Court noted that there was much circumstantial evidence that "there [was] a strong probability" that the creditors were aware of the fraud. Id. at 413. As a result, the Court, while noting that "the jury had no right to arbitrarily disregard the positive testimony of unimpeached and uncontradicted witnesses," held that "[u]nder the peculiar circumstances of this case, it was not error to submit [the question of fraud] to the jury." Id. at 408, 414.

In this case, there is no such evidence as would support a jury's rejection of the experts' testimony. The experts, although paid by the defendants on an hourly basis, had no financial or personal interest in the outcome of the case. Nor is there a claim of fraud on the part of the expert witnesses. The only "bias" is in their retention by the defense. In Chesapeake & O. Ry., the Supreme Court held that the fact that the witness was an employee of the defendant was not a sufficient basis for the jury to reject his testimony. 283 U.S. at 216. Here, the witnesses were paid outside experts, a much weaker basis on which to find their testimony lacked credibility. There was no evidence, circumstantial or direct, tending to show that they were not credible witnesses. The testimony was not improbable, inconsistent, or otherwise facially unbelievable. In short, there is nothing in the record to support the jury's rejection of the experts' testimony.

The general rule that a jury verdict cannot be based solely on the jury's rejection of the other side's uncontradicted testimony applies with particular force to expert testimony on matters outside of lay competence. While juries may decide what weight to give to the testimony of expert witnesses, they are not "at liberty to disregard arbitrarily the unequivocal, uncontradicted and unimpeached testimony of an expert witness where . . . the testimony bears on technical questions . . . beyond the competence of lay determination." Webster v. Offshore Food Serv., Inc., 434 F.2d 1191, 1193 (5th Cir. 1970) (internal citation

omitted); see also Bearman v. Prudential Ins. Co., 186 F.2d 662, 665 (10th Cir. 1951) (same). There is no doubt the subject matter here required expert testimony.

The idea that the jury could base a verdict simply on rejection of expert testimony here is also inconsistent with the rule that consumer expectations cannot be the basis of liability in a case involving complex technical matters. A jury in such a case must rely on expert testimony and cannot substitute its own experience.

A consumer expectations theory was not available to the plaintiff here.[12] "Barker . . . made clear that when the ultimate issue of design defect calls for a careful assessment of feasibility, practicality, risk and benefit, the case should not be resolved simply on the basis of ordinary consumer expectations." Soule v. Gen. Motors Corp., 882 P.2d 298, 305 (Cal. 1994) (holding that the consumer expectations test was not appropriate for a claim that a car was defective because the wheel assembly detached in accident). The California Supreme Court has held that "the consumer expectations test is reserved for cases in which the everyday experience of the product's users permit a conclusion that the product's designs violated minimum safety assumptions." Id. at 308. The court specifically observed that "the ordinary consumer

[12] The district court erroneously instructed the jury on the consumer expectation theory. But Hyundai failed to object after the instruction was given and therefore failed to preserve its objection. See Gray v. Genlyte Group, Inc., 289 F.3d 128, 133-34 (1st Cir. 2002). Accordingly, our reversal of the jury verdict is not based on this ground.

of an automobile simply has 'no idea' how it should perform in all foreseeable situations, or how safe it should be made against all foreseeable hazards." Id. In one airbag design defect suit, a California appellate court held that:

> The deployment of an air bag is, quite fortunately, not part of the "everyday experience" of the consuming public. Minimum safety standards for air bags are not within the common knowledge of lay jurors. Jurors are in need of expert testimony to evaluate the risks and benefits of the challenged design. . . . [I]n designing air bags there are tradeoffs involving complex technical issues.

Pruitt v. Gen. Motors Corp., 72 Cal. App. 4th 1480, 1483-84 (Cal. App. 1999).[13]

The Collazo-Santiago court found that "the plaintiff adduced sufficient evidence for the jury to find that the defendant's expert was an interested witness." 149 F.3d at 28. Thus, the decision rested not on an absolute rule but, rather, on an assessment of the weight of the relevant evidence. Collazo-Santiago presents a litany of facts casting doubt on the defendant's expert's credibility. Collazo-Santiago differed from this case in several ways. The plaintiff in Collazo-Santiago

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[13] Another California appellate court, however, has held that a consumer expectations theory was available in a design defect case challenging the relative placement of the airbag and the windshield. See Bresnahan v. Chrysler Corp., 32 Cal. App. 4th 1559 (1995). In general, the question of whether a consumer expectation theory is available depends not on the challenged product itself, but on the complexity of the alleged defect; "[f]or example, the ordinary consumers of modern automobiles may and do expect that such vehicles will be designed so as not to explode while idling at stoplights, experience sudden steering or brake failure as they leave the dealership, or roll over and catch fire in two-mile-per-hour collisions." Soule, 882 P.2d at 308 n.3.

marshaled extraordinary evidence of expert bias. The expert not only was being paid by the defendant, but had previously been employed by the defendant as a design engineer. At the time of trial, the expert was earning the vast majority of his income by testifying for that particular defendant or its affiliates and had, in fact, testified for them thirty-six times in the two year period preceding the trial. Id. at 27-28.[14]

In contrast to Collazo-Santiago, this is not a case where the veracity or the reliability of the expert testimony was in doubt or the expert testimony did not cover a material point. In fact, the plaintiff emphasized the veracity and reliability of the experts. The plaintiff called Dr. Benedict as her own witness. In referring to Dr. Martinez, the plaintiff's attorney specifically said, "believe him on just about everything." With regard to Dr. Benedict, the plaintiff's attorney said that "he knew what the truth was. He was an honest man." The fact that the defendant paid the experts' fees cannot alone establish bias to overcome plausible and uncontradicted evidence that the design benefits outweighed any risks. That is particularly so where the non-paying party encourages the jury to accept both experts as credible. The defendant proffered reliable expert testimony that indicated that the utility of the design outweighed the risk, and the jury could not simply disregard such testimony.

[14] We do not suggest that these facts conclusively establish bias.

IV. CONCLUSION

The verdict is vacated and the case remanded with instructions that judgment be entered for the defendant. No costs are awarded.