PRESENT: All the Justices

HOLIDAY MOTOR CORPORATION, ET AL.

v. Record No. 150391

SHANNON B. WALTERS

OPINION BY
JUSTICE ELIZABETH A. McCLANAHAN
September 8, 2016

FROM THE CIRCUIT COURT OF THE CITY OF ROANOKE
William D. Broadhurst, Judge

Holiday Motor Corporation, Mazda Motor Corporation, and Mazda Motor of America, Inc., (collectively "Mazda") appeal from a judgment entered on a $20 million jury verdict in favor of Shannon B. Walters, who sustained a serious cervical spine injury when her 1995 Mazda Miata convertible overturned while she was operating it with the soft top closed. Walters contends she was injured after the windshield header disconnected from the top and collapsed into the occupant compartment. She asserts that the design of the soft top's latching system was defective because the latches connecting the windshield header to the top were not designed to stay latched in a foreseeable rollover crash.

Mazda argues it had no duty to design or supply a soft top that provided occupant protection in a rollover crash and that, in any event, the opinion offered by Walters' expert that the soft top's latching system was defectively designed lacked a sufficient foundation. We agree and will reverse the judgment of the circuit court and enter final judgment for Mazda.

## I. BACKGROUND

### A. Facts Surrounding 2006 Rollover Crash

In June 2006, Walters was driving her 1995 Mazda Miata convertible along Virginia State Route 619, a two-lane highway in Bedford County. The Miata was equipped with a soft top that could be folded and stowed for open-air driving or unfolded and closed by connecting

the top to the windshield header (the curved steel bar running across the top of the windshield) by latches located on each side of the vehicle.[1] Walters was operating the Miata in the closed-top configuration with the latches engaged. Walters observed a large object that "basically covered [her] whole lane of travel" come toward her from the back of a pickup truck she was following. Seeing no traffic in the oncoming lane, Walters veered left across the road, off the highway, and up a slight grassy incline. The vehicle overturned and landed on its top with the driver's side pushed up against a tree. Walters testified that she did not lose consciousness during the accident and that her "first memory" of what happened was that her body was "light as a feather." She recalled having pain in her head, neck and right arm but could not feel or move her legs.

Michael Evans, who was also travelling on Route 619, came upon the same object in the road, hit his brakes, steered left, then pulled his vehicle onto the grass when he saw Walters' vehicle "up on the bank."[2] According to Evans, Walters' vehicle was "inverted, on its top, up against the tree," which "was against the driver's side." Because the vehicle was "resting on a slope," the driver's side "was closer to the ground than the passenger side." Evans testified that the "back of the convertible bows," or the beams across the top, "appeared to be holding the vehicle up, but the front of the hood and windshield . . . were flat on the ground."

Because Evans could not enter the vehicle through the driver's side, he broke the glass out of the passenger's side window, reached through the window, and opened the passenger's

[1] Each latch consists of two halves. The handle half of each latch is bolted to the curved steel bar at the leading edge of the soft top and the striker half is bolted to the bottom of the windshield header. To connect the latch, the handle is rotated so that a draw bar engages the striker and pulls the latch halves together.

[2] Evans testified that the object "look[ed] like a huge blue mattress" and he "later found out that it was a swimming pool." The driver of the truck carrying the swimming pool did not return to the scene and was not apprehended.

side door. He then crawled into the vehicle and turned off the ignition.[3] At that time, he noticed that the windshield header was separated from the soft top such that the top "was actually underneath of the windshield." Evans cut Walters' seat belt and lowered her to "where she was flat on the top." He then cut out the vehicle's acrylic rear window and crawled into the vehicle. He observed that Walters "had a head injury and was bleeding from like the top of her forehead." Because Walters told Evans she could not feel her legs, he was reluctant to move her. Evans held Walters' head stable and remained with her until emergency medical personnel arrived on scene.

B. Allegations Against Mazda

In Walters' second amended complaint, she contends that Mazda Motor Corporation and Mazda Motor of America, Inc. were negligent because they designed, manufactured, and placed into the stream of commerce the Mazda Miata convertible model, which was unreasonably dangerous for its ordinary and/or foreseeable use "in that it would not provide reasonable occupant protection in a foreseeable rollover while being used in its closed top configuration" due to defects in the "design of the A-pillar, windshield header, and the roof latching system" and in failing to warn of such danger.[4] Walters also contends that all defendants breached their warranties "that the subject vehicle was reasonably fit and safe for its ordinary and/or foreseeable purposes" and "was of merchantable quality throughout" for the same reasons. Walters claims that her injuries were proximately caused by these asserted acts of negligence and breaches of warranty.

C. Walters' Expert Testimony at Trial

[3] A birdcage containing kittens had been sitting on the passenger's seat. Evans removed the overturned birdcage from the vehicle before he crawled in to turn off the ignition.

[4] Mazda Motor Corporation designed and manufactured the vehicle; Mazda Motor of America, Inc. distributed the vehicle; and, Holiday Motor Corporation sold the vehicle.

James Mundo, an automotive engineer, was qualified as an expert witness in "automotive engineer crash management, safety management, including latches."[5] Mundo testified that there are three primary "load paths" that make up the structure of a "closed-top vehicle, a sedan kind of vehicle." The first load path is the frame of the vehicle.[6] The second load path is "the side of the vehicle" to "carry the load for components that would be on the sides of things for the car." The third load path is the "windshield area of the vehicle." These three load paths "carry the loads in the vehicle" and "if any part of this structure is disconnected, then it doesn't work as a system anymore." Mundo stated that when the load paths don't work together anymore, the results are "unpredictable" from an engineering point of view "if you get in a crash."

According to Mundo, a convertible vehicle (as distinguished from what Mundo described as a closed-top sedan type of vehicle) may be converted "from a three-load structure to a two-load structure." When a convertible is in a closed-top configuration, the latches are "the mechanism by which this roof is locked" so that the third load path is "continuous." When the "latches are connected, the design objective is [to] have a continuous load[,] three load path."

Mundo explained that automotive design engineers use a "right-hand rule" to guide their design of all automobile components.

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[5] Prior to trial, Mazda filed a motion in limine to exclude Mundo's testimony, which was denied by the circuit court. At trial, Mazda interposed objections throughout Mundo's testimony, many of which were overruled, and moved to strike his testimony at its conclusion. The circuit court took Mazda's motion to strike the testimony under advisement. After Walters presented her evidence, Mazda renewed its motion to strike the testimony of Mundo, which the circuit court continued to take under advisement. The circuit court ultimately denied Mazda's motion after Mazda presented its evidence. The circuit court also denied Mazda's motion to set aside the verdict, in which it asserted that Mundo's testimony should have been excluded and stricken.

[6] Mundo described a "load path" as an engineering concept referring to "a particular path" to "carry the load." For example, according to Mundo, the frame is a load path because engineers "can depend on [the frame] to "tie things to it" and "put the load."

> [E]ngineers have a coordinate system that's established in the design of an automobile, and it's called a right-hand rule. And what this is[,] it's the coordinates for the vehicle. And the thumb here is the up and down, the index is front to back, and the middle finger here is cross car.
>
> And so whenever we are talking about vibration,[7] when we are talking about the vehicle moving around, we can go to any component, any part of the car, any beam, any latch, and we can put the right-hand rule, put that there and say, "Is this thing moving in three cardinal directions, or is this thing not tied down in three cardinal directions?"

Mundo testified that a design engineer wants to have all three cardinal directions protected on latches because "whatever you are latching, you want to keep it connected for all foreseeable crashes." Mundo cited as an example a door latch, which is "connected in all three cardinal directions."

Mundo first examined Walters' vehicle in November 2012, over six years after the accident. He came to the conclusion that "the connections failed" in the load three path, which "allowed the windshield to go do its own thing and the roof to go do its own thing." Mundo used a roof latch removed from another 1995 Mazda Miata to demonstrate to the jury how the latch operated and how it could come apart in his hand.[8] By moving the latch parts in his hands,

[7] Mundo defined "vibration" as "the vehicle twisting, bending up and down, and moving around as a matchbox." Mundo testified that vibration "tends to do bad things for the occupants and do bad things for the structure of the vehicle."

[8] Mazda objected to the demonstration by Mundo stating that "the written record should reflect that the witness has one piece in his hand and the other piece in his hand." Mazda pointed out that these parts of the latch "are normally attached to steel windshield headers . . . and to a steel structure that forms the front of the soft top, and it's not in any way related." Mazda argued that it was "an experiment that does not in any way duplicate or even come close to the conditions that exist in a real vehicle." Mazda stated that because one side of the latch is screwed into the metal windshield header and the other side is screwed into the metal fore-structure of the roof, "[t]hey are screwed in by way of two screws which actually prevents them from being twisted in the way in which Mr. Mundo twisted them." The circuit court overruled the objection explaining that the jury was able to "make the distinction that this is not the latch's operation as it's attached to the vehicle." Mazda assigns error to the circuit court's ruling allowing Mundo's "demonstration of the alleged defect" through manipulation of the latch in his hands. Our holding renders it unnecessary for us to address this assignment of error.

Mundo testified he could "show that it's not locked in the vertical direction." Mundo explained that automotive design engineers use a design process called "failure mode and effects analysis" in which they "have to think about how can [a component part] fail" and "if it does fail, what's the effect." In performing this analysis, "an engineer sitting at a desk getting component parts is going to look at it with respect to how does it fail" and "he is going to work with it" and "check three cardinal directions." Mundo stated that "if I could take it apart by hand, that is something that is troubling from a failure mode with respect to the real world vehicle."

According to Mundo, it has been "state of the art" in the automotive industry since 1972 that "[i]f it's going to be latched, it's latched in three cardinal directions." Mundo compared the Mazda Miata roof latch to a Ford Mustang roof latch in which there is a "big, long, solid steel bar, and it's not chamfered.[9] It's a steel bar that goes into a hole. And when it's in there, it's not coming out." Mundo testified that "it is not reasonably prudent to not design into the latch mechanism all three cardinal directions with the top down just because it can be released and put back." "[W]ith the top up," stated Mundo, "we are trying to design a system that will get everybody to share in the way the loads are distributed throughout the vehicle."

Mundo testified that, in his opinion, the windshield header and soft top became disconnected in the crash because the latches came "undone." He further testified that the latches came undone because "the up and down is dependent on that tiny little nub that was in there, and it wasn't sufficient to hold it and it came apart." In Mundo's opinion, the latch was defectively designed because the pin and hole "are chamfered" so that "it's easy for [the pin] to move and pop right out of [the hole]." According to Mundo, if "the connection had remained

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[9] A "chamfer" is defined as "the surface formed by cutting away the angle at the intersection of two faces of a piece of . . . metal: a beveled edge" or "a small groove" or "furrow" in such material. Webster's Third New Int'l Dictionary 372 (1993). "Chamfered" describes a piece of material which has been so cut. *Id*.

connected, then the front end of the roof structure would have performed just like the back end of the roof structure," which did not collapse. In order to reach his opinion, Mundo stated it was unnecessary for him to do testing

> [b]ecause the issue at hand is that the joints were not connected, and there was no damage to the devices that were doing the connecting. *And the crash spoke for itself. There it is. It's not connected*. And that's really ofttimes the way engineers like to look at it. That's a field crash test, if you will, a real world crash test out on the nation's highways. And that test speaks for itself. It came apart.

(Emphasis added.) Mundo also stated that based on a cost of 20 to 25 cents per pound of steel for components, it would have cost Mazda 10 cents per latch to manufacture a latch that would follow the "right-hand rule."[10]

Mundo testified that he did not apply any safety standards other than the "right-hand rule." Mundo confirmed that he did not rely on any automotive engineering papers, literature or written standards to support his opinion. He stated he did not perform a vibration analysis of the vehicle and did not attempt to calculate any of the vibrations that the vehicle underwent during the crash. Mundo also stated that he did not conduct any studies to determine under what circumstances vibration will cause the roof latches to part. He testified that he performed no testing of a Mazda Miata soft top or latch or testing of any kind in connection with this case except for his courtroom "demonstration that [the latch] comes apart . . . by disengaging the latching mechanism."

Mundo acknowledged that he performed no testing or analysis of the Ford latching system that he compared to the latch on the Mazda Miata. He testified that he does not know

[10] Mazda argues that the circuit court erred in overruling Mazda's objections to Mundo's testimony regarding the cost of an alternative design because the testimony "was speculative and lacked a sufficient foundation." Our holding renders it unnecessary for us to address the assignment of error pertaining to this argument.

how much weight the Ford latching system will support if the latches are connected. He also testified that he doesn't know how much weight the Mazda latching system will support when the latches are connected. Furthermore, he declined to say that the Ford Mustang latching system was a reasonably safe alternative, as indicated during the following colloquy:

> Q Have you performed any tests of the Ford system?
>
> A No.
>
> Q Have you perform[ed] any analysis of the Ford system?
>
> A No.
>
> Q Do you know how much weight the Ford system will support if the latches are connected?
>
> A I don't know the answer to that. I didn't – I wasn't asked to calculate the weights and the forces for the –
>
> Q Don't know. Do you know how much weight the Mazda system will support when the latches are connected?
>
> A If we are just talking static and putting a weight on the roof?
>
> Q Have you done that calculation?
>
> A No.
>
> Q All right, thank you. Do you know how much – have you done any calculations to determine the weight bearing capacity of any aspect of the Mazda or the Ford?
>
> A No.
>
> Q How would you show that a system is reasonably safe? Wouldn't you have to run tests?
>
> A Tests and/or – you mean physical tests? There is also computer analyses that can be done.
>
> Q And you haven't done any tests or computer analyses of the Ford system, have you.

A No, I have not.

Q So you are not here to try to suggest to the jury that that system is reasonably safe, are you?

A That's correct.

Q Thank you.

A I am telling you that it has design features, not that it's the go-to design. It's just the features to point out the difference between the locking pins.

Q And how strong the pins and the latches are in the Ford system is not something you have undertaken to analyze, true?

A True. I wasn't asked to do that.

Mundo admitted that a roof system that remains connected, and even a roof system that has no latches, can be crushed. He agreed he had seen that many times with a variety of vehicles involved in rollover incidents.

Mazda moved to strike Mundo's testimony at trial, contending that "the upshot of Mr. Mundo's testimony is simply this: That . . . he thinks the latches came undone, and latches ought not come undone in foreseeable rollover crashes." During argument, the circuit court questioned Walters' counsel regarding the basis for Mundo's opinion that the latch design was defective:

Q What is his testimony – the defect that he has established?

A The defect that he has established is that the knob that connected –

Q Knob that goes into the hole in the latch was, quote, too short. In comparison to what?

A In comparison to what is acceptable in the –

Q To the Ford latch, right?

A That's more an example.

Q But he compared it to the Ford latch, and he doesn't even know if the Ford latch will hold, according to his own testimony.

A No. What he said was that that was an example, an illustrative example of how – and I think he was pretty clear on this. They said, "Is this it?" He said, "No, I am using this as an example to show the design feature, not the design."

Q So what is the standard of the industry for the length of the insertion –

A The standard in the industry –

Q – as testified to?

A – for the length of insertion is sufficient so that when it is put in an ordinary – if it's put in the situation that it will stop the latch from coming apart in all three cardinal directions, and this will –

Q Under all circumstances.

A Of the latch, yeah. You know, without breaking. I mean, the – he said there is no breaking of this thing. In other words, we don't have any broken parts with the latch.

Q No, it was structurally sound as far as what the evidence is.

A Structurally sound. So I think the standard of the industry is that in the absence of – of being such a huge bad crash that would, you know, cause a structural problem, it just should not just come apart.

Walters called an osteopathic physician specializing in sports medicine, Dr. Per Gunnar Brolinson, to provide an expert opinion regarding the cause of her injury. Over Mazda's objection, Brolinson, was qualified as a medical expert "to provide medical and biomedical/biomechanical causation opinion testimony." Brolinson expressed an opinion that during the rollover crash, the windshield header "came down, after pressure, on the top of [Walters'] head." According to Brolinson, Walters then "went into extreme flexion" resulting in a "fracture-dislocation, tearing of the soft tissue, and movement of the cervical spine, C6 on C7, which put pressure on the spinal cord." As indicated by the following colloquy, Brolinson could not say at what point during the crash (whether before or after the latch disengagement) the

injury occurred or how much intrusion into the occupant compartment needed to be avoided to prevent the injury:

> Q It's true, isn't it, that you don't know how much space was between Ms. Walters' buttocks and her seat when the injury occurred?
>
> A That's correct.
>
> Q And you don't know how many degrees of roll when the injury occurred?
>
> A That's correct.
>
> Q And by that, I am talking about degrees of roll of the vehicle, correct?
>
> A That's correct.
>
> Q And it's true that you don't know how much movement of Ms. Walters' head was necessary to cause her injury even under your hyperflexion theory, correct?
>
> A That's correct.
>
> Q You can't quantify the amount of flexion that Ms. Walters sustained, even if we were to accept your theory, true?
>
> A That's correct.
>
> Q And it's true, isn't it, that you don't know how much head room compromise would need to have been avoided in order to prevent this injury, assuming we accept even your theory?
>
> A That's correct. [11]

[11] The circuit court overruled Mazda's objection to Brolinson's qualification to provide an opinion on the cause of Walters' injury and denied Mazda's motion to strike Brolinson's testimony. On appeal, Mazda argues that Brolinson lacked the requisite expertise to render an opinion regarding the cause of Walters' injury because he has no "knowledge, training, skill, or experience identifying the mechanism of [neck fractures] generally" or injuries sustained "in a violent rollover car crash." Mazda also contends that Brolinson lacked any foundation for his opinion because there was no physical evidence of contact between Walters' head and the windshield header or any support in medical literature for his opinion that extreme neck flexion could cause the type of injury Walters sustained. Our holding renders it unnecessary for us to address the assignments of error pertaining to the admission of Brolinson's testimony.

## II. ANALYSIS

### A. Duty to Provide Occupant Rollover Protection

Mazda argues that it owed no legal duty to design the soft top or the latches to provide occupant rollover protection because it is not the intended or foreseeable purpose of a convertible soft top, including the latching system, to provide such protection. Mazda points out that there was no evidence that Mazda or any car manufacturer designs soft tops or latches to provide occupant rollover protection, that consumers expect a soft top to provide occupant rollover protection, or that there exists any industry standard or custom to design soft tops or their latches to provide such protection.[12]

Walters contends that Mazda sold a dual-purpose product. According to Walters, when the top was in use, it was a foreseeable purpose of the top and latching mechanism to provide the same occupant rollover protection as a sedan with a permanent roof structure. Walters specifically asserts that it was "a fundamental and intended purpose" of the latches to "keep any part of the structure from intruding into the occupant compartment and creating a hazardous environment." Thus, she argues, "the latches failed their intended safety purpose of keeping the structures connected and thus away from the occupant."

The issue of whether a manufacturer of a soft top convertible owes a legally recognized duty to design or supply a soft top or its latching system to provide occupant rollover protection is a threshold question that we determine as a matter of law. *See Jeld-Wen, Inc. v. Gamble*, 256 Va. 144, 147, 501 S.E.2d 393, 396 (1998) (stating that the dispositive issue on appeal, which involves a determination as a matter of law, is whether a manufacturer of an ordinary window

[12] Mazda argued that it owed no duty to design its soft top or latches to provide rollover occupant protection in its motion to strike made at the conclusion of Walters' evidence, its motion to strike renewed at the conclusion of all evidence, and its motion to set aside the verdict.

screen owes a duty to manufacture the screen to act as a body restraint); *see also* 1 Dan B. Dobbs, Paul T. Hayden & Ellen M. Bublick, The Law of Torts § 164, at 526 (2d ed. 2011) ("Judges rather than juries determine whether the defendant was under a duty of care at all and if so what standard of care applied. That is to say that the standard of care and existence of a duty to use care are matters of law and are determined by legal rules.").

Walters does not claim that a defect in the Miata caused the rollover crash; rather, Walters seeks to hold Mazda liable for failing to design the soft top latching system to provide occupant protection during the rollover crash. In Virginia, there is no duty on the part of vehicle manufacturers to design or supply a crashworthy vehicle. *See Slone v. General Motors Corp.*, 249 Va. 520, 525-26, 457 S.E.2d 51, 53-54 (1995) (expressly rejecting the "crashworthiness" doctrine).[13] Therefore, if a duty to design convertible soft tops to provide occupant rollover protection exists, it must be found within the scope of a vehicle manufacturer's duty to exercise reasonable care to design a product that is reasonably safe for the purpose for which it is intended. *See id.* (stating that instead of injecting the doctrine of "crashworthiness" into our well-settled jurisprudence, we will apply the product liability principles articulated in our precedent).

Our well-settled jurisprudence establishes that the manufacturer of a product is only under a duty "to exercise ordinary care to design a product that is reasonably safe for the purpose for which it is intended." *Turner v. Manning, Maxwell & Moore, Inc.*, 216 Va. 245, 251, 217

[13] We have previously defined a crashworthy vehicle as "one which, in the event of a collision, resulting accidentally or negligently from the act of another and not from any defect or malfunction in the vehicle itself, protects against unreasonable risk of injury to the occupants." *Slone*, 249 Va. at 525 n.*, 457 S.E.2d at 53 n.* (internal quotation marks and citation omitted). The "crashworthiness" doctrine "concerns the dangers posed by the vehicle occupants' collision with the interior of the vehicle upon collision, or the intrusion of moving or standing objects, upon collision, into the passenger area." *Id.* (internal quotation marks and citation omitted).

S.E.2d 863, 868 (1975). Similarly, "an implied warranty of general merchantability [arises] when the product is being used in the manner intended for it. The implied warranty does not apply when the product is being used in a manner or for a purpose for which it was not intended." *Id.* at 252, 217 S.E.2d at 869; *see also Dorman v. State Indus., Inc.*, 292 Va. 111, 123, 787 S.E.2d 132, 139 (2016). Thus, "the standard of safety of goods imposed on . . . the manufacturer of a product is essentially the same whether the theory of liability is labeled warranty or negligence. The product must be fit for the ordinary purposes for which it is to be used." *Logan v. Montgomery Ward & Co.*, 216 Va. 425, 428, 219 S.E.2d 685, 687 (1975).

The determination of whether a vehicle manufacturer owes a duty to design a convertible soft top to provide occupant rollover protection, therefore, requires that we consider whether such protection is the intended or reasonably foreseeable use given the inherent characteristics, market purposes, and utility of a convertible soft top. "After all, it is a commonplace that utility of design and attractiveness of the style of the car are elements which car manufacturers seek after and by which buyers are influenced in their selections." *Dreisonstok v. Volkswagenwerk, A.G.*, 489 F.2d 1066, 1072 (4th Cir. 1974). "Foreseeability [of harm], it has been many times repeated, is not to be equated with duty." *Id.* at 1070. Accordingly, while the possibility that a convertible may be involved in a rollover accident is undoubtedly foreseeable, "[c]ommon knowledge of a danger from the foreseeable misuse of a product does not alone give rise to a duty to safeguard against the danger of that misuse." *Jeld-Wen, Inc.*, 256 Va. at 149, 501 S.E.2d at 397. "To the contrary, the purpose of making the finding of a legal duty as a prerequisite to a finding of negligence, or breach of implied warranty, in products liability is to avoid the

extension of liability for every conceivably foreseeable accident, *without regard to common sense or good policy*." *Id.* (emphasis added) (internal quotation marks and citation omitted).[14]

In contrast to vehicles with a permanent roof structure, soft top convertibles provide the owner with a roof that can, with relative ease, be retracted and stowed for an open-air driving experience or closed to protect the occupants from the outside elements such as wind and rain. The absence of a permanent roof structure necessarily diminishes the level of occupant rollover protection. Not only is this characteristic of a convertible "readily discernible to any one using the vehicle," it is "the unique feature of the vehicle." *Dreisonstok*, 489 F.2d at 1074 (noting that the unique design of the Volkswagen microbus reduced the space between the front of the vehicle and driver's compartment so as to provide the maximum amount of cargo or passenger space). "If a person purchases a convertible . . . he cannot expect – and the Court may not impose on the manufacturer the duty to provide him with – the exact kind of protection in a roll-over accident as in the standard American passenger car." *Id.* at 1075 (internal quotation marks omitted) (comparing a microbus to a convertible and stating that "[t]he distance between the

[14] Existence of duty is an issue that is separate and distinct from its breach. In order to establish a breach of duty in a product liability action, the plaintiff bears the burden of proving the product contained an unreasonably dangerous condition that existed when the product left the defendant's hands. "A product is unreasonably dangerous if it is defective in assembly or manufacture, unreasonably dangerous in design, or unaccompanied by adequate warnings concerning its hazardous properties." *Morgen Indus., Inc. v. Vaughan*, 252 Va. 60, 65, 471 S.E.2d 489, 492 (1996). To sustain a claim for negligent design, a plaintiff must show that the manufacturer failed to meet objective safety standards prevailing at the time the product was made. "When deciding whether a product's design meets those standards, a court should consider whether the product fails to satisfy applicable industry standards, applicable government standards, or reasonable consumer expectations." *Redman v. John D. Brush & Co.*, 111 F.3d 1174, 1177-78 (4th Cir. 1997); *see also Alevromagiros v. Hechinger Co.*, 993 F.2d 417, 420 (4th Cir. 1993) ("In determining what constitutes an unreasonably dangerous defect, a court will consider safety standards promulgated by the government or the relevant industry, as well as the reasonable expectations of consumers.").

front and the passenger compartment is minified in order to provide additional cargo or passenger space just as the convertible is designed to provide openness").[15]

In connection with examining the duty of a vehicle manufacturer to design a convertible soft top to provide rollover protection, we note that when the Mazda Miata was manufactured in 1995, there were no government or automotive industry safety standards in existence requiring that convertible soft tops provide protection from intrusion of the roof system into the occupant compartment during a rollover crash. While the National Highway Transportation Safety Administration ("NHTSA") established "strength requirements for the passenger compartment roof" of specified vehicles, it expressly excluded convertibles from such requirements.[16] *See* Federal Motor Vehicle Safety Standard ("FMVSS") No. 216, 49 C.F.R. § 571.216(S3)(c). The stated purpose of FMVSS No. 216 "is to reduce deaths and injuries due to the crushing of the roof into the occupant compartment in rollover crashes." *Id.* at (S2). The roof over the front seat area specifically includes the windshield header.[17]

In 2009, the NHTSA upgraded its safety standard on roof crush resistance "[a]s part of a comprehensive plan for reducing the risk of rollover crashes and the risk of death and serious

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[15] In *Dreisonstok*, the Fourth Circuit Court of Appeals assumed Virginia would adopt the "crashworthiness" doctrine and, therefore, would impose upon vehicle manufacturers a general duty to design a reasonably "crashworthy" vehicle. 489 F.2d at 1069-70. Nevertheless, in holding that the manufacturer of the microbus was entitled to judgment as a matter of law, the court aptly noted: "It is entirely impermissible to predicate a conclusion of negligent design simply because a vehicle, having a distinctive purpose, such as the microbus, does not conform to the design of another type of vehicle, such as a standard passenger car, having a different nature and utility." *Id.* at 1075.

[16] Under FMVSS No. 201, a convertible is defined as "a vehicle whose A-pillars are not joined with the B-pillars (or rearmost pillars) by a fixed, rigid structural member." 49 C.F.R. § 571.201(S3). This definition was made applicable to FMVSS No. 216, *see* 74 Fed. Reg. 22,348, and is now incorporated into FMVSS No. 216a, *see* 49 C.F.R. § 571.216a(S4).

[17] Under FMVSS No. 216, the roof over the front seat area includes the "windshield trim," which is defined as the "molding of any material between the windshield glazing and the exterior roof surface, including material that covers part of either the windshield glazing or exterior roof surface." 49 C.F.R. § 571.216(S4).

injury in those crashes." 74 Fed. Reg. 22,348. The NHTSA continued to exclude convertibles, including retractable hard top convertibles, from the FMVSS No. 216 requirements. *See id*; *see also* 49 C.F.R. § 571.216a (providing the upgraded standard on roof crush resistance). Explaining its reason for excluding convertibles from the roof crush resistance standard, the NHTSA stated:

> We believe that to establish a roof crush requirement on vehicles that do not have a permanent roof structure would not be practical from a countermeasure perspective. A convertible roof would have to be strong enough to pass the quasi-static test, yet flexible enough to fold into the vehicle. Since we are not aware of any such designs, we do not agree with Advocates [who disagreed with excluding convertibles from FMVSS No. 216] on this point. We also note that new rollover and ejection requirements for convertibles are outside the scope of this rulemaking.

74 Fed. Reg. at 22,375. Even as to folding hardtops and removable hardtops, the NHTSA noted that "[t]hese roof systems are not intended as significant structural elements but are designed primarily to provide protection from inclement weather, improve theft protection and are generally offered as a luxury item." *Id.* Furthermore, the NHTSA expressed its belief that "consumers readily recognize that [these roof systems] will afford occupants limited protection in a rollover." *Id.*[18] Accordingly, there continues to be no government or automotive industry safety standards requiring convertible soft tops to provide occupant rollover protection.

[18] Walters argues that consideration of FMVSS No. 216, and in particular the exclusion of convertibles from its roof crush requirements, is inappropriate because this case is about defective latches, not a defective roof. Walters' argument is a non sequitur. It is the absence of a permanent roof structure that requires use of latches to connect the top to the windshield. And it is this inherent feature of a convertible – the absence of a fixed, rigid structural member to connect the A-pillars (which frame the vehicle's windshield) to the B-pillars (which frame the vehicle's rear window) – that makes roof crush requirements impractical for convertibles. Furthermore, Walters' effort to make a distinction between the roof and the latches is unavailing since the basis of her claims for negligence and breach of implied warranty of merchantability is that the Miata "would not provide reasonable occupant protection in a foreseeable rollover while being used in its closed top configuration." Occupant protection in a rollover crash is the precise issue addressed by FMVSS No. 216.

Although Walters attempted to establish a safety standard that would impose upon manufacturers of convertibles a duty to design soft tops to provide occupant rollover protection, her expert, Mundo, only testified as to a general engineering principle he referred to as a "right-hand rule" applicable to all automobile components, including latches. The "right-hand rule," however, does not specify any standard for rollover protection for occupants of soft top convertibles that is recognized in the automotive industry. Mundo did not testify as to any industry standard or custom to design the soft tops or latches to provide occupant rollover protection. He also did not identify any force requirements for a convertible soft top roof system in general or any required level of crush resistance promulgated by the automotive industry.[19] Certainly, Walters did not present evidence through Mundo or otherwise that any automobile manufacturer designs or markets a soft top convertible to provide occupant rollover protection. In essence, Walters' assertion, unsupported by industry standards or custom, that the soft top should stay latched to the windshield header in all foreseeable rollovers seeks to impose upon manufacturers the duty to design a rollover-proof convertible when a soft top is in use. Yet, it is well-settled that "[t]he manufacturer is not an insurer and is not required to design and market an accident-proof product." *Turner*, 216 Va. at 251, 217 S.E.2d at 868; *see also Dorman*, 292 Va. at 123, 787 S.E.2d at 139.

In short, we believe that imposing a duty upon manufacturers of convertible soft tops to provide occupant rollover protection defies both "common sense" and "good policy." *Jeld-Wen, Inc.*, 256 Va. at 149, 501 S.E.2d at 397. There are no safety standards in existence, promulgated

[19] The safety standard for roof crush resistance set forth in FMVSS No. 216 requires that when a large steel plate (or platen) is used to apply force to the leading edge of the roof in accordance with the stated procedures, the distance that the test plate has moved from the point of contact must not exceed 127 mm (5 inches). *See* 49 C.F.R. § 571.216(S5). As noted, convertibles are excepted from this standard and Mundo did not point to any alternative standard for convertibles that has been recognized in the automotive industry.

either by the government or the automotive industry, that require convertible soft tops, including their latching mechanisms, to provide occupant rollover protection. Indeed, the NHTSA has expressly excepted convertibles from the roof crush standard because it is unaware of any convertible top that could meet such a standard. There is certainly no evidence that Mazda or any other manufacturer of convertibles in fact designs or markets soft tops to provide occupant rollover protection or that consumers reasonably expect such protection. To the contrary, the marketable feature of the soft top convertible is the absence of a permanent roof structure. The absence of this structural component is not only obvious but chosen by consumers who desire the flexibility of a soft top that can be easily detached, folded, and stowed for an open-air driving experience or closed and latched to the windshield header for a quieter ride without exposure to the outside elements. The use of a convertible soft top, including its latches, for occupant rollover protection is neither its purpose nor an intended or reasonably foreseeable use.

For these reasons, we hold that no duty extended to Mazda to design the soft top, including its latches, so that it would provide occupant rollover protection. *See Jeld-Wen, Inc.*, 256 Va. at 150, 501 S.E.2d at 397 (holding, as a matter of law, no duty extended to defendant to manufacture ordinary window screen to act as childproof restraint). Therefore, we will reverse the judgment of the circuit court and enter final judgment in favor of Mazda.

B. Admission of Mundo's Opinion

Even if Mazda owed a duty to design the soft top to provide occupant rollover protection, which we hold it did not, we also conclude that Mundo's opinion that the soft top's latching system was defectively designed was inadmissible.

"Expert opinion may be admitted to assist the fact finder if such opinion satisfies certain requirements, 'including the requirement of an adequate factual foundation.'" *Hyundai Motor*

*Co. v. Duncan*, 289 Va. 147, 154, 766 S.E.2d 893, 897 (2015) (quoting *Forbes v. Rapp*, 269 Va. 374, 381, 611 S.E.2d 592, 596 (2005)); *see* Code §§ 8.01-401.1 and -401.3; Va. R. Evid. 2:702 and 2:703; *Countryside Corp. v. Taylor*, 263 Va. 549, 553, 561 S.E.2d 680, 682 (2002). We review the circuit court's decision to admit expert opinion using an abuse of discretion standard and, therefore, will reverse the circuit court's decision "only upon a finding of abuse of that discretion." *Hyundai Motor Co.*, 289 Va. at 155, 766 S.E.2d at 897. A circuit court, though, "has no discretion to admit clearly inadmissible evidence." *Id.* (quoting *Harman v. Honeywell Int'l, Inc.*, 288 Va. 84, 92, 758 S.E.2d 515, 520 (2014)).

Expert opinion that is founded upon assumptions having no basis in fact is inadmissible. *See Hyundai Motor Co.*, 289 Va. at 155, 766 S.E.2d at 897; *CNH America LLC v. Smith*, 281 Va. 60, 67, 704 S.E.2d 372, 375 (2011); *Vasquez v. Mabini*, 269 Va. 155, 159-60, 606 S.E.2d 809, 811 (2005). Therefore, the "[f]ailure of the trial court to strike such testimony upon a motion timely made is error subject to reversal on appeal." *CNH America*, 281 Va. at 67, 704 S.E.2d at 375.

Mundo's opinion that the Mazda Miata soft top latching mechanism was defective in design was premised on at least two unfounded assumptions. First, his opinion was based on an assumption that the latches would not have disconnected if they had been designed differently.[20] There was no evidentiary foundation for any such assumption. Although Mundo testified that the latches came "undone" because they were not sufficiently designed to hold in vertical movement, he was not able to say under what circumstances vibration would cause the latches to

[20] Mundo did not articulate what this alternative design would be. As noted previously, Mundo did not specify any particular standard or design to which soft top latches should conform. He discussed the Ford Mustang latch "to point out the difference between the locking pins" but testified he did not consider the Ford latching system as "the go-to design." Rather, Mundo's opinion was that automobile latches in general should be designed according to the "right-hand rule" and should stay connected for all foreseeable crashes.

part, and indeed, did not even calculate the vibrations the vehicle underwent during the crash or the forces and weight to which the vehicle was subjected. While Mundo described a "failure mode and effects analysis" in which an engineer will examine component parts to consider how they might fail, he performed no testing or analysis of the Mazda latching system.[21] Furthermore, though Mundo compared the design of the Mazda latching system to that of the Ford Mustang, he performed no testing or analysis of the Ford latching system and could not say that the Ford latches would have remained connected in this crash. His declaration that "the crash spoke for itself" did not supply the necessary foundation for his opinion. In sum, Mundo's assumption that the latches would not have disengaged had they been designed according to the "right-hand rule" was pure speculation.

Mundo's opinion that the latching mechanism was defective was also premised on his unfounded assumption that the front end of the roof structure would not have collapsed if the latches had remained connected.[22] Mundo testified that he did not know how much weight the Mazda latching system (to create the continuous third load path he described) would support when the latches were connected. He confirmed that he had done no calculations to determine the weight bearing capacity of any aspect of the Mazda Miata. Mundo agreed that while one would need to run physical tests or computer analyses to makes such determinations, he had not done so. Mundo conceded that the collapse of the roof system could occur in rollover crashes even when a convertible's latches stay connected. In fact, Mundo testified that permanent roof structure systems (those without latches) could be, and have been, crushed in rollover accidents.

[21] The demonstration Mundo conducted with a Mazda latch removed from another 1995 Mazda Miata did not purport to show how any other design could have withstood the crash but merely displayed to the jury his ability to take apart the latch by manipulating it in his hand.

[22] According to Mundo, if "the connection had remained connected, then the front end of the roof structure would have performed just like the back end of the roof structure," which did not collapse.

There was simply no basis for his assumption that the front end of the roof structure would not have collapsed during the rollover crash if the latches had remained connected.

Because Mundo's opinion that the Mazda Miata latching system was defectively designed lacked an adequate foundation, the circuit court abused its discretion in admitting it. Mundo's opinion supplied the only support for Walters' claim that the vehicle was unreasonably dangerous. Thus, the inadmissibility of Mundo's opinion was fatal to Walters' claims for negligence and breach of implied warranty of merchantability and provides a separate and independent basis for entering judgment as a matter of law for Mazda. *See Hyundai Motor Co.*, 289 Va. at 157, 766 S.E.2d at 898 ("Because [an expert's] opinion supplied the only support for the [plaintiffs'] claim that the vehicle was unreasonably dangerous, the inadmissibility of [his] opinion as a matter of law is fatal to the [plaintiffs'] claim and entitles [defendant] to judgment as a matter of law.").[23]

## III. CONCLUSION

For the foregoing reasons, we will reverse the judgment of the circuit court and enter final judgment for Mazda.

*Reversed and final judgment.*

[23] Mazda also contends that, aside from the issues of duty and admissibility of the expert testimony, Walters failed to present evidence of an unreasonably dangerous condition or that any such condition proximately caused Walters' injury. As we have stated, a plaintiff must show that the manufacturer failed to meet objective safety standards prevailing at the time the product was made to sustain a claim for negligent design. In addition, a plaintiff must prove that the unreasonably dangerous condition actually caused the injury. "The proximate cause of an event is that act or omission which, in natural and continuous sequence, unbroken by an efficient intervening cause, produces that event, and without which that event would not have occurred." *Wells v. Whitaker*, 207 Va. 616, 622, 151 S.E.2d 422, 428 (1966). Notably, neither of Walters' experts in this case could say at what point during the rollover crash the latches disconnected or whether the latches disconnected before Walters was injured. And there was no evidence that Walters' injury would not have occurred even if the latches had remained connected. Our holding, however, renders it unnecessary for us to address Mazda's arguments pertaining to proof of an unreasonably dangerous condition and causation of Walters' injury.