

UNPUBLISHED

**UNITED STATES COURT OF APPEALS  
FOR THE FOURTH CIRCUIT**

SALLY F. EDWARDS, Individually and  
Executrix of the Estate of Captain  
Robert Francis Edwards, Deceased;  
ROBERT FRANCIS EDWARDS, Sally F.  
Edwards, Executrix of the Estate of  
Captain Robert Francis Edwards;  
IAN ROBERT EDWARDS, Sally F.  
Edwards, as next friend and  
guardian of a minor under the age  
of 18 years; BRUCE NICOLAS  
EDWARDS, Sally F. Edwards, as next  
friend and guardian of a minor  
under the age of 18 years,  
*Plaintiffs-Appellants,*

v.

BELL HELICOPTER TEXTRON,  
INCORPORATED, a Delaware  
corporation,

*Defendant-Appellee.*

No. 02-1343

Appeal from the United States District Court  
for the Northern District of West Virginia, at Wheeling.  
Frederick P. Stamp, Jr., District Judge.  
(CA-98-18)

Argued: January 23, 2003

Decided: May 1, 2003

Before WILKINSON, MICHAEL, and KING, Circuit Judges.

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Affirmed by unpublished per curiam opinion.

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### COUNSEL

**ARGUED:** William Blakely, PIPER RUDNICK, L.L.P., Washington, D.C., for Appellants. Stephen K. Brunk, LAW OFFICES OF STEPHEN K. BRUNK, La Jolla, California, for Appellee. **ON BRIEF:** Philip L. Cohan, Cathy A. Hinger, PIPER RUDNICK, L.L.P., Washington, D.C.; James T. Crouse, MINEO & CROUSE, Raleigh, North Carolina; Arden J. Curry, II, PAULEY, CURRY, STURGEON & VANDERFORD, Charleston, West Virginia, for Appellants. Stephen M. LaCagnin, JACKSON & KELLY, P.L.L.C., Morgantown, West Virginia; Gretchen M. Callas, JACKSON & KELLY, P.L.L.C., Charleston, West Virginia, for Appellee.

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Unpublished opinions are not binding precedent in this circuit. See Local Rule 36(c).

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### OPINION

PER CURIAM:

Sally Edwards ("Mrs. Edwards"), individually and as executrix of the estate of Captain Robert Francis Edwards, and on behalf of her two minor children, brought this wrongful death action in the Northern District of West Virginia against Bell Helicopter Textron, Incorporated ("Bell"). Captain Edwards, an officer in the Marine Corps, was killed in a 1996 helicopter crash in Georgia. The trial jury returned its verdict in favor of Bell, and Mrs. Edwards has appealed, contending that the district court committed reversible error when it excluded certain evidence of Bell's liability. Because we are unable to say that the court abused its discretion in its resolution of the contested evidentiary issues, we affirm the judgment in favor of Bell.

## I.

## A.

On March 1, 1996, Captain Edwards was killed when the Bell AH-1W helicopter that he flew as a Marine Corps pilot (the "Edwards Helicopter") crashed near Columbus, Georgia. The crash was caused by the failure in flight of the craft's "tail rotor yoke" (the "Yoke").<sup>1</sup> Mrs. Edwards filed this wrongful death action against Bell in the Northern District of West Virginia in February of 1998, asserting multiple theories of liability.<sup>2</sup> Significantly, the parties agree that the Yoke failed from metal fatigue, resulting from an unduly low level of "compressive residual stresses" ("CRS"),<sup>3</sup> which caused the Yoke to separate from the Edwards Helicopter. Although Bell designed and built its tail rotor yokes for a 2200-flight-hour service life, the Yoke failed after only 728 flight hours. In the Joint Pretrial Order, Mrs. Edwards asserted that "[t]he material fact at issue in the litigation is what caused the low level of CRS[ ] that enabled fatigue to set in and destroy the strength of the [Yoke] on [the Edwards Helicopter]."

## B.

## 1.

At trial, the parties offered competing theories on the cause of the

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<sup>1</sup>A "tail rotor yoke" connects the two tail rotor blades of a helicopter to the craft's drive shaft. The tail rotor and its associated components serve a vital longitudinal balance function. If any major portion of the tail rotor, such as the yoke, is lost in flight, a helicopter's center of gravity shifts forward, causing the aircraft to become "nose heavy" and uncontrollable.

<sup>2</sup>When the complaint was filed, Mrs. Edwards resided in New Martinsville, West Virginia. Although the fatal crash occurred in Georgia, venue was proper in the Northern District of West Virginia because Bell is subject to personal jurisdiction there. *See* 28 U.S.C. § 1391(c).

<sup>3</sup>CRS strengthen a tail rotor yoke and enhance its resistance to metal fatigue. A layer of CRS is created during a tail rotor yoke's manufacturing process, through a controlled bombardment of a yoke's surface with tiny pellets, a process referred to as "shot peening."

Yoke's fatally low CRS level. According to the evidence, there are several ways for a tail rotor yoke to lose its CRS, including (1) defective shot peening; (2) mishandling; (3) excessive static bending loads;<sup>4</sup> or (4) gradual dynamic relaxation during normal flight.<sup>5</sup>

Bell's theory of defense was that the Yoke's CRS loss was the fault of the Marine Corps. It contended that the Yoke, used previously on a different helicopter, had experienced a "static bending load" in 1993 when that prior helicopter was accidentally towed into the blade of a larger aircraft (the "Towing Incident"). Following the Towing Incident, the Yoke was removed from the prior helicopter, visually inspected, and installed on the Edwards Helicopter. In support of its contention that the Towing Incident had caused the Yoke's CRS loss, Bell relied on the Marine Corps' investigation of the fatal crash. That investigation found that the Towing Incident had "caused a weakness/problem to develop over time in the [Y]oke. . . . This weakness/problem in the [Y]oke went undetected and ultimately resulted in the [Y]oke assembly failing/fracturing in flight."<sup>6</sup>

Mrs. Edwards presented competing theories for the cause of the Yoke's CRS loss, based upon the opinions of her two experts, Drs. Thomas Butler and Oddvar Bendiksen. Dr. Butler testified that the Yoke's CRS loss was caused by either (1) improper shot peening during manufacture, or (2) mishandling. While Dr. Butler was able neither to identify the more likely of these two possible causes, nor to say whether it was Bell or the Marine Corps that was responsible for any mishandling, he ruled out the Towing Incident as a cause of the fatal crash. Dr. Bendiksen, by contrast, testified that the Yoke's CRS loss was due to gradual dynamic relaxation. He also testified, consis-

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<sup>4</sup>The term "static bending load" refers to any force applied against a tail rotor assembly when a tail rotor blade is not rotating. Examples of static bending loads include high wind gusts and static ground strikes (such as when a tail rotor yoke is struck by a vehicle).

<sup>5</sup>"Gradual dynamic relaxation" occurs when high stresses are induced in a tail rotor yoke during high-speed forward flight.

<sup>6</sup>Mrs. Edwards did not sue the Marine Corps. See *Feres v. United States*, 340 U.S. 135, 146 (1950) (holding that members of military cannot maintain tort suits against Government for injuries that "arise out of or are in the course of activity incident to service").

tent with Dr. Butler, that the Towing Incident did not cause the Yoke's CRS loss.

2.

Prior to trial, Bell moved to exclude from evidence all references to a modification that Bell had made in the design of the tail rotor yokes of its helicopters. This modification was the introduction of a "yielding" version of the craft's flapping stop,<sup>7</sup> and it resulted from a Bell study conducted following the 1987 crash of a different model of Bell helicopter. In 1992, after the conclusion of the Bell study, the company's Safety Board noted that two types of Bell helicopters, the 214ST and the AH-1W (both of which used the same tail rotor yoke), were vulnerable to CRS loss from unwitnessed static bending loads, possibly resulting from improper tie-down procedures for the tail rotor assembly. The Safety Board recommended to Bell's engineering department that it redesign the tail rotor's "flapping stop" on the 214ST helicopter. The purpose of the redesigned flapping stop was to permit it to bend when a sufficient static bending load was placed on the tail rotor yoke to produce CRS loss. This yielding flapping stop (the "YFS") was to serve as a "visual cue" to maintenance personnel of an unwitnessed static bending load. If maintenance personnel discovered a bent YFS, the tail rotor yoke could be promptly tested for CRS loss through a process known as "X-ray diffraction."<sup>8</sup> The Safety Board's recommendation for installation of a YFS was limited to the Bell model 214ST helicopter. The Safety Board did not recommend installation of a YFS on Bell's model AH-1W (the model of the Edwards Helicopter) because it believed that, due to the different flight loads<sup>9</sup> typically placed on that model, "dimensional inspections"<sup>10</sup>

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<sup>7</sup>When not rotating, a tail rotor yoke and blade assembly will sometimes teeter from one side to the other. A tail rotor's "flapping stop" limits how far the tail rotor assembly can teeter from side to side when the tail rotor is not turning. It serves no purpose while the tail rotor is rotating.

<sup>8</sup>The process of "X-ray diffraction" is the only method by which CRS loss can be detected. X-ray diffraction is a technique in which X-rays are bombarded onto a tail rotor yoke. The shape of the X-ray pattern is dependent upon the level of CRS on the tail rotor yoke.

<sup>9</sup>Flight loads include, *inter alia*, the weight of the aircraft, its mission profiles, and its maneuvers.

<sup>10</sup>A "dimensional inspection" consists of the taking of various measurements of the tail rotor yoke to determine if the yoke has been bent.

would adequately detect whether a tail rotor yoke had experienced an unwitnessed static bending load that might have caused CRS loss.

Bell first tested the YFS in November of 1993, and in 1994 it obtained approval from the Federal Aviation Administration for YFS installation on its 214ST helicopters. Between 1994 and the fatal crash of the Edwards Helicopter in 1996, two other Bell helicopters crashed due to failed tail rotor yokes.<sup>11</sup> Approximately a month after the March 1, 1996, crash of the Edwards Helicopter, Bell recommended to the Marine Corps that it install the YFS on its AH-1W helicopters.

Bell's motion sought to exclude from evidence all information pertaining to the YFS (the "YFS evidence"). It contended that the YFS evidence was irrelevant to the issues to be considered by the jury. Bell maintained that YFSs are useful only in the detection of unwitnessed static bending loads, and that both of Mrs. Edwards's experts had opined that a static bending load was not the cause of the Yoke's CRS loss. As such, the failure to install a YFS on the Edwards Helicopter could not have been related to the fatal crash.

Mrs. Edwards responded that her theories of liability were not dependent on the particular cause of the Yoke's CRS loss. Instead, she maintained that she intended to prove to the jury that the Edwards Helicopter was unreasonably susceptible to metal fatigue because it was dependent on CRS. Mrs. Edwards asserted that the YFS evidence would show that Bell knew of the unreasonable dangers associated with the tail rotor yokes on its CRS-reliant helicopters.

The district court considered Bell's motion in limine at a pre-trial hearing on May 23 and 24, 2001. In assessing the admissibility of the YFS evidence, the court heard from Drs. Butler and Bendiksen regarding any relationship between the YFS and their theories of how the fatal crash occurred. Dr. Butler testified expressly that the YFS would not have detected the Yoke's CRS loss, whether that loss was due to mishandling or to improper shot peening. And Dr. Bendiksen

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<sup>11</sup>These two crashes did not involve the Bell AH-1W or 214ST models, but they did involve helicopters with tail rotor yokes similar to the Yoke on the Edwards Helicopter.

never suggested that the YFS could have identified CRS loss from gradual dynamic relaxation. In short, neither expert testified that installation of a YFS on the Edwards Helicopter would have helped to prevent the fatal crash. The court then ruled the YFS evidence irrelevant, because it did "not see that the absence of the [YFS] as ultimately designed was delineated or defined as a use defect giving rise to a notice cause of action under a strict liability tort." In so ruling, the court excluded the YFS evidence from Mrs. Edwards's case-in-chief, reserving the right to reconsider the relevance of that evidence to counter any theories or evidence presented by Bell.<sup>12</sup>

3.

During its opening statement, Bell's counsel asserted that "the evidence at trial [would] reveal . . . that [the Yoke was] the only tail rotor yoke that ever failed [on any AH-1W helicopter] or 214ST helicopter. In his trial testimony, Dr. Bendiksen testified that, based on his statistical analysis of the rate of metal fatigue in the AH-1W tail rotor yokes, he would have expected two to three failures of the tail rotor yokes in the AH-1W fleet "up to this point." On cross-examination, he acknowledged that, as of the time of trial, the Yoke on the Edwards Helicopter was the only failure of which he was aware.

Following Dr. Bendiksen's testimony, Mrs. Edwards again sought admission of the YFS evidence. She contended that the door had been opened for the YFS evidence by Bell's opening statement that there had been no other tail rotor yoke failures on the AH-1W or the 214ST, coupled with the testimony elicited from Dr. Bendiksen on cross-examination. She maintained that the YFS evidence was relevant to why no other tail rotor yokes had failed after the crash of the Edwards Helicopter, and that such evidence was proper rebuttal. The court disagreed, however, finding that "sufficient evidence [had not

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<sup>12</sup>Although the court excluded the YFS evidence, it permitted introduction of evidence on previous helicopter crashes that had been caused by failed tail rotor yokes, as well as notes from Safety Board meetings and other Bell documents regarding tail rotor yoke failures that were due to low CRS levels. These documents were redacted to exclude all references to the YFS.

been] presented that would permit [it] to change [its] ruling" excluding the YFS evidence.<sup>13</sup>

4.

On June 11, 2001, after a nine-day trial, the jury returned its verdict in favor of Bell on all theories of liability. Mrs. Edwards has appealed, asserting that the court abused its discretion in excluding the YFS evidence. We possess jurisdiction pursuant to 28 U.S.C. § 1291.

II.

We review the rulings of a district court on the admission or exclusion of evidence for abuse of discretion. *Westberry v. Gislaved Gummi AB*, 178 F.3d 257, 261 (4th Cir. 1999). A trial court abuses its discretion in excluding evidence only if its "conclusion is guided by erroneous legal principles, or rests upon a clearly erroneous factual finding," or if, after considering all the evidence, a reviewing court possesses a "definite and firm conviction that the court below committed a clear error of judgment in the conclusion it reached upon a weighing of the relevant factors." *Id.* (internal quotations omitted). Even if we "might have ruled differently on the matter in the first instance," *United States v. Dickerson*, 166 F.3d 667, 678 (4th Cir. 1999), *rev'd on other grounds*, 530 U.S. 428 (2000), we are constrained by "a significant measure of appellate deference to the judgment calls of trial courts," *United States v. Pittman*, 209 F.3d 314, 316 (4th Cir. 2000); *see also United States v. Mason*, 52 F.3d 1286, 1289 (4th Cir. 1995) ("Under the abuse of discretion standard, this Court may not substitute its judgment for that of the district court; rather, we must determine whether the court's exercise of discretion, considering the law and the facts, was arbitrary or capricious.").

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<sup>13</sup>The court noted that Mrs. Edwards may have waived the door-opening argument by failing to timely object to Bell's opening statement and its cross-examination of Dr. Bendiksen. Nevertheless, the court ruled on the merits of Mrs. Edwards's contention.

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### III.

Mrs. Edwards first asserts that the YFS evidence was relevant both to her failure-to-warn claim and to her claims against Bell for strict liability and negligent defective design. She next contends that the district court abused its discretion by excluding the YFS evidence on rebuttal. We address each of these contentions in turn.

#### A.

##### 1.

Pursuant to the law of Georgia, which governs here, a manufacturer with knowledge of a danger from its product has the duty to provide an adequate warning of such danger to the product's users. *Battersby v. Boyer*, 526 S.E.2d 159, 162 (Ga. Ct. App. 1999). Mrs. Edwards contends that the YFS evidence was relevant to Bell's knowledge of the danger of CRS loss in the tail rotor yokes on the helicopters that it manufactured. She maintains that, had Bell warned the Marine Corps of the problem of CRS loss, the Corps would have discovered the CRS loss in the Edwards Helicopter. Specifically, Mrs. Edwards asserts that, had Bell issued its March 29, 1996, Military Alert Bulletin (the "MAB") prior to the crash of the Edwards Helicopter, the fatal crash would have been prevented, because the YFS installation *process*, in which the Marine Corps would have engaged on receipt of the MAB, would have detected the Yoke's CRS loss.

To establish a failure-to-warn claim under Georgia law, a plaintiff must show that the defendant had a duty to warn, that it breached such duty, and that the breach was a proximate cause of the plaintiff's injury. *See Powell Duffryn Terminals, Inc. v. Calgon Carbon Corp.*, 4 F. Supp. 2d 1198, 1203 (S.D. Ga. 1998); *Daniels v. Bucyrus-Erie Corp.*, 516 S.E.2d 848, 850 (Ga. Ct. App. 1999). In the context of the Edwards Helicopter crash, Bell's development of the YFS is relevant to its knowledge of the consequences of CRS loss to tail rotor yokes resulting from static bending loads. However, neither of Mrs. Edwards's expert witnesses contended that the Yoke's CRS loss was due to a static bending load. Dr. Butler opined that the Yoke's CRS loss was due either to improper shot peening or to mishandling "at some point before it got on the helicopter." Dr. Bendiksen testified

that the likely cause of the Yoke's CRS loss was a "gradual dynamic relaxation," which occurs during normal flight when the tail rotor is rotating. Importantly, neither expert suggested that a YFS would have detected CRS loss from improper shot peening, mishandling, or gradual dynamic relaxation.

While Mrs. Edwards seems to recognize that the YFS would not itself have detected any of the forms of CRS loss that her husband's helicopter may have experienced, she nonetheless maintains that Bell's failure to timely issue the warning contained in the MAB was a proximate cause of the Edwards Helicopter crash. This contention is without merit. The MAB recommended, *inter alia*, (1) the immediate review of each tail rotor yoke's historical records to determine if it had been involved "in any prior static or dynamic incidents which could have induced a bending load into the yoke"; (2) a dimensional inspection of each tail rotor yoke to determine if it had been subjected to excessive bending loads; and (3) installation of a YFS on each AH-1W helicopter. Mrs. Edwards asserts that, had the MAB been issued prior to the fatal crash, the Marine Corps would have learned of the CRS loss on the Edwards Helicopter. The district court admitted the MAB into evidence in a redacted form, editing out only the mention of the YFS (the "Redacted MAB"). Because Mrs. Edwards's experts never opined that installation of the YFS on the Edwards Helicopter would have detected the Yoke's CRS loss under any of their theories of the fatal crash, and because the relevant portions of the MAB were admitted in redacted form,<sup>14</sup> we are unable to conclude that the court abused its discretion in its initial exclusion of the YFS evidence with respect to the failure-to-warn claim.

2.

Mrs. Edwards also contends that the YFS evidence is relevant to

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<sup>14</sup>Mrs. Edwards also asserts on appeal that the redaction of Bell's documents to exclude mention of the YFS effectively re-crafted those documents, misleading the jury into believing that Bell had fully informed the Marine Corps of the dangers associated with CRS loss on tail rotor yokes. Even if Bell withheld information regarding the YFS from the Marine Corps, however, such was not a proximate cause of the fatal crash under any of Mrs. Edwards's theories.

her claims of strict liability and negligent defective design. She asserts that the YFS evidence, showing a non-implemented pre-accident design modification, was admissible to demonstrate that (1) the original design of the Yoke was defective, and (2) there was an available and feasible alternative design for the Yoke.

In order to prevail on either her strict liability claim or her negligent defective design claim, Mrs. Edwards was required to demonstrate that a design defect was a proximate cause of the injuries alleged. See *Ogletree v. Navistar Int'l Transp. Corp.*, 535 S.E.2d 545, 548 (Ga. Ct. App. 2000). Neither of Mrs. Edwards's experts testified that the YFS would have detected the Yoke's CRS loss from improper shot peening, mishandling, or gradual dynamic relaxation. Nor did either expert suggest that the Yoke's CRS loss was due to a static bending load. Because a YFS only detects static bending loads, the fact that the Edwards Helicopter was not equipped with the YFS — an "alternative design" — could not have contributed to the fatal crash. Accordingly, the court did not abuse its discretion in ruling that the YFS evidence was irrelevant to the proof of Mrs. Edwards's strict liability and negligent defective design claims.

#### B.

Finally, Mrs. Edwards contends that the district court abused its discretion in refusing to admit the YFS evidence as rebuttal to Bell's theory that the Towing Incident caused the Yoke's CRS loss, and also as rebuttal to Bell's "absence of accidents" contention in its opening statement to the jury.

Bell asserted that the Marine Corps' failure to dimensionally inspect the Yoke following the Towing Incident ultimately caused the fatal crash. Mrs. Edwards maintains that the YFS evidence should have been admitted because, even if the Towing Incident caused the Yoke's CRS loss, the *process* of installing the YFS on the AH-1W helicopters would have led the Marine Corps to detect the Yoke's CRS loss, and thus would have prevented the fatal crash. Mrs. Edwards contends that Bell also "opened the door" to admission of the YFS evidence by asserting to the jury that, aside from the Yoke on the Edwards Helicopter, no AH-1W or 214ST tail rotor yoke had ever failed. In particular, she asserts that information regarding Bell's

recommendation to the Marine Corps that it install YFSs, in conjunction with the evidence of Bell's recommendations that historical record review and dimensional inspections be conducted on all AH-1W tail rotor yokes, would have shown the jury why there had not been a greater number of failed tail rotor yokes. By denying her the opportunity to present the YFS evidence, Mrs. Edwards maintains, the court prevented her from countering Bell's assault on her theory that the AH-1W helicopters were unreasonably susceptible to metal fatigue.

The court, however, admitted evidence of certain aspects of the YFS installation process that were relevant for rebuttal purposes. The MAB made three recommendations for all AH-1W tail rotor yokes: (1) historical record review; (2) dimensional inspections; and (3) installation of YFSs. The Redacted MAB contained only two of the three recommendations, i.e., historical record review and dimensional inspections. In the context of this case, those two recommendations, rather than the redacted recommendation of YFS installation, constituted the relevant part of the MAB. The historical record review and the dimensional inspection of the tail rotor yokes, even if the Towing Incident caused the fatal CRS loss, are the only two recommendations which might have enabled the Marine Corps to detect such loss. Those recommendations, contained in the Redacted MAB, provided the jury with a possible explanation for the dearth of failed tail rotor yokes following the crash of the Edwards Helicopter. Because the relevant aspects of the MAB were admitted into evidence, we are unable to conclude that the court abused its discretion in excluding the YFS evidence for rebuttal purposes.

#### IV.

For the foregoing reasons, we affirm the judgment of the district court.

*AFFIRMED*