

IN THE DISTRICT COURT OF THE UNITED STATES FOR THE
MIDDLE DISTRICT OF ALABAMA, SOUTHERN DIVISION

STEVEN D. FERGUSON,)	
)	
Plaintiff,)	
)	
v.)	CIVIL ACTION NO.
)	1:09cv635-MHT
LEAR SIEGLER SERVICES,)	(WO)
INC.,)	
)	
Plaintiff-Intervenor,)	
)	
v.)	
)	
BELL HELICOPTER TEXTRON,)	
INC.,)	
)	
Defendant.)	

OPINION AND ORDER

In this civil action, plaintiff Steven D. Ferguson seeks to recover damages from defendant Bell Helicopter Textron, Inc. for injuries that he sustained in a helicopter crash. Jurisdiction is proper under 28 U.S.C. § 1332 (diversity of citizenship). The case is currently before the court on Bell's motion to preclude Dr. John Cochran as an expert witness, which motion, for the reasons set forth below, will be denied.

I. Background

This action arises out of a July 16, 2007, crash of a Bell TH-67 helicopter that severely injured civilian flight instructor Ferguson. At the time of the accident, Ferguson was supervising a student pilot as he maneuvered the aircraft at a low altitude. Ferguson's second amended complaint alleges that an uncommanded-cyclic movement occurred, wrenching the cyclic controller from the student pilot's hand and causing him to lose control of the helicopter.

The cyclic controller is basically the helicopter's joystick. It controls the pitch angle of the rotor blades, which in turn dictates the lift that the blades generate and the direction the helicopter travels. An uncommanded-cyclic movement occurs when the cyclic controller moves without pilot input.

The Army investigated the crash and discovered barium contamination in the helicopter's servo actuators, which

assist the cyclic-control system (something akin to power steering). Ferguson alleges that the barium was introduced into the helicopter's hydraulic system by way of preservative fluid, known as "IAW MIL-H-6083" or simply "6083," that was used during the refurbishment and storage process. Barium residue from that fluid had previously been suspected of causing poppet-valve failure in the Air Force's fleet of UH-1 helicopters, and its use was thereafter curtailed by military regulations. But the TH-67 helicopters used at Fort Rucker were exempted from those regulations because they were built and maintained under civilian specifications.

Ferguson submits that the barium found in the crash helicopter's hydraulic system caused at least one of its actuators' spool-and-sleeve valves to become sticky. That stickiness allegedly was exacerbated by an overly forgiving filter that permitted an excessive amount of particulate matter to enter the helicopter's hydraulic system, break into smaller pieces, and ultimately wear

gouges into the metal. Eventually, Ferguson argues, the valve temporarily seized, forcing an abrupt uncommanded movement of the cyclic controller.

In support of that theory, Ferguson has offered, among other things, the deposition testimony, affidavit, and expert report of Dr. Cochran. Cochran is an aerospace engineer with a background in flight mechanics and dynamics. He investigated the crash and reached the same conclusion as the Army's own crash investigator: the combination of barium and particulate matter caused the accident. Bell has moved, pursuant to Federal Rule of Evidence 702, to preclude Ferguson from relying on Cochran's testimony.¹

1. The court is making its admissibility decision on the basis of the record already before it and without a hearing only because the parties have had an adequate opportunity to present evidence and both parties declined this court's invitation to hold a hearing on the issue. See Rudd v. Gen. Motors Corp., 127 F. Supp. 2d 1330, 1334 n.3 (M.D. Ala. 2001) (Thompson, J.) ("[T]his court will make the [Rule 702] admissibility decisions ... on the basis of the record already before it.").

II. Discussion

A. Legal Standard

The Federal Rules of Evidence govern the admissibility of expert testimony. See Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 587 (1993). Rule 702 provides:

"A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

(a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;

(b) the testimony is based on sufficient facts or data;

(c) the testimony is the product of reliable principles and methods; and

(d) the expert has reliably applied the principles and methods to the facts of the case."

The trial court must therefore serve as a gatekeeper. Daubert, 509 U.S. at 597. Doing so requires it to make both a "relevance" and a "reliability" determination,

disallowing expert testimony that is either unreliable or unhelpful to the trier of fact. Id. at 589.

The Supreme Court has provided a non-exclusive list of factors that may guide the trial judge's Rule 702 decision, including whether a theory can be or has been tested, whether it has been subjected to peer review or publication, and whether it has gained widespread acceptance within a relevant community of experts. Id. at 593-594. Those factors are not, the Supreme Court has emphasized, a "definitive checklist" but should instead be understood as nondispositive considerations that may shape the trial judge's "flexible inquiry" under Rule 702. Id. at 594; see also Kumho Tire Co. v. Carmichael, 526 U.S. 137, 149 (1999); United States v. Paul, 175 F.3d 906, 910-11 (11th Cir. 1999) (affirming the admission of a handwriting expert's testimony without specifically applying or reviewing the Daubert factors, and explaining that "Daubert's list of specific factors neither necessarily nor solely applies to all experts or in every

case"). Consistent with this understanding, the advisory committee notes for Rule 702 explain that the 2000 amendment, while an endorsement of the Daubert conception of the trial judge as gatekeeper, was not intended to "codify" the specific factors it identified.

That is especially true in cases dealing with technical, engineering, or experienced-based testimony. In Kumho Tire, the Supreme Court explained that a Daubert-style analysis should not be used to disfavor expert testimony grounded in experience or engineering practice, rather than in pure scientific theory:

"Engineering testimony rests upon scientific foundations, the reliability of which will be at issue in some cases. In other cases, the relevant reliability concerns may focus upon personal knowledge or experience.... [T]here are many different kinds of experts, and many different kinds of expertise. Our emphasis on the word 'may' [in the question presented, whether a trial judge may apply the Daubert factors to nonscientific testimony] thus reflects Daubert's description of the Rule 702 inquiry as a flexible one.... [T]he gatekeeping inquiry must be tied to the facts of a particular case."

526 U.S. at 150 (internal citations and quotation marks omitted). To that end, Rule 702's advisory committee notes explain that, "Nothing in this amendment is intended to suggest that experience alone--or experience in conjunction with other knowledge, skill, training or education--may not provide a sufficient foundation for expert testimony."

In sum, Rule 702 makes clear that this court is obliged to screen expert testimony to ensure that it stems from both a sufficient factual basis and a reliable methodology appropriately applied to those facts. In doing so, however, the trial judge must avoid usurping the role of the trier of fact:

"[The revised rule] is not intended to authorize a trial court to exclude an expert's testimony on the ground that the court believes one version of the facts and not the other.... [T]he rejection of expert testimony is the exception rather than the rule. Daubert did not work a seachange over federal evidence law, and the trial court's role as gatekeeper is not intended to serve as a replacement for the adversary

system. Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence."

Fed. R. Evid. 702, advisory committee notes, 2000 amendment (internal citations and quotations omitted).

The Eleventh Circuit has distilled that obligation into a "rigorous three-part inquiry" where the trial court considers whether: "(1) the expert is qualified to testify competently regarding the matters he intends to address; (2) the methodology by which the expert reaches his conclusions is sufficiently reliable ...; and (3) the testimony assists the trier of fact, through the application of scientific, technical, or specialized expertise, to understand the evidence or to determine a fact in issue." Rosenfeld v. Oceania Cruises, Inc., 654 F.3d 1190, 1193 (11th Cir. 2011) (internal quotation marks omitted). The burden is on the proponent of expert testimony to establish that those requirements have been

met by a preponderance of the evidence. Kilpatrick v. Breg, Inc., 613 F.3d 1329, 1335 (11th Cir. 2010).

B. Application

Bell challenges Cochran's testimony on two grounds. First, it argues that he lacks the familiarity with servo actuators necessary to testify as an expert in this case. Second, it submits that, even if Cochran were qualified as an expert, his conclusions are unreliable and therefore his testimony must be precluded. The court addresses those assertions below.

1. Cochran is Qualified to Testify About Barium's Effect on Servo Actuators: Ferguson must show that Cochran is qualified to testify about the specific issue presented in this case: whether a combination of barium and particulate matter created a temporary sticking of one of the crash helicopter's servo actuators, causing an uncommanded-cyclic movement. In order to carry that burden, Ferguson points to evidence of Cochran's

education, training, and experience, as well as to the investigation he conducted into this and other similar accidents. Taken as a whole, the court finds by a preponderance of the evidence that Cochran is a qualified expert in this case.

Cochran has the relevant education that one would expect from an expert in this field. He holds both a bachelor's and a master's degree in Aerospace Engineering from Auburn University, as well as a doctorate in Aerospace Engineering from the University of Texas at Austin. This makes him well-versed in the mechanics of flight and gives him the educational background necessary to investigate and draw conclusions about the design and functioning of a helicopter's component parts.

Cochran's education led to a career in teaching. He currently serves as the head of the Department of Aerospace Engineering at Auburn University, where he has designed and taught courses on aerospace engineering, dynamics of flight, helicopter dynamics and control, and

viscous aerodynamics. He has also taught courses on designing and simulating hydraulic systems and conducted substantial research into problems with the servo actuators on the Boeing 737 as well as general research into helicopter flight dynamics.² In addition to his

2. Some of the facts recited above are drawn from Cochran's affidavit. Bell argues that Cochran's affidavit "is a sham" and should be stricken. Reply in Support of Mot. to Preclude (Doc. No. 149) at 2-11. While this court has the authority to strike an affidavit that contradicts previously given deposition testimony without providing an explanation for the apparently contradictory assertions, Lane v. Celotex Corp., 782 F.2d 1526, 1529-30 (11th Cir. 1986), doing so would be inappropriate in this case. "[E]very discrepancy contained in an affidavit does not justify a district court's refusal to give credence to such evidence." Id. at 1530 (internal quotation marks omitted). In this case, most of the apparent discrepancies are not actually irreconcilable and therefore the deposition and the affidavit are not "inherently inconsistent." Id. Where contradictions do exist, the court finds that they were more likely than not the result of unclear questioning during the deposition (i.e., instances where Cochran apparently believed that he was being asked about the specific servo actuator at issue in this case, while the questioner intended to ask a more general question) and were not due to an attempt by Cochran to help Ferguson avoid summary judgment by offering an untrue sworn affidavit. The court therefore declines to strike the affidavit and will instead let the jury determine (continued...)

academic and teaching pursuits, Cochran is a licensed professional engineer in the State of Alabama.

Cochran's extensive background in the mechanics and dynamics of helicopter flight has qualified him as an expert in numerous helicopter-crash cases, some of which also involved Bell helicopters. One such case focused on the hydraulic controls of a Bell 206 helicopter (the civilian equivalent of the TH-67 helicopter at issue here) and their impact on helicopter flight. Another involved a close examination of the servo actuators in a Bell OH-58 helicopter, while yet another dealt with a "hard over" apparently caused by a malfunctioning servo actuator in a Sikorsky UH-60 helicopter.³

(...continued)

Cochran's credibility. See id. (noting that it is typically the jury's responsibility to "resolv[e] questions of credibility").

3. The parties debate whether the UH-60 uses an electric or a hydraulic servo actuator. The court sees no reason to resolve that factual dispute at this time.

In anticipation of his work on this case, Cochran conducted extensive research into the potential effects of barium and particulate matter on servo actuators. He reviewed the available academic literature, investigated the servo actuator allegedly responsible for the crash, and considered the Army's report finding a causal connection between the presence of both barium and particulate matter in the crash helicopter's servo actuators and the accident. That investigation enabled Cochran to apply his general expertise in the area of helicopter mechanics and flight to the specific issues raised in this case.

The court finds that Cochran has extensive knowledge of aerodynamics, servo actuators, and helicopter flight. Moreover, he has spent considerable time applying that knowledge to the particular issue in this case: whether barium deposits and particulate contamination of a TH-67's hydraulic system caused the uncommanded-cyclic movement allegedly experienced by Ferguson just prior to

the crash. The court therefore easily concludes that he has sufficient knowledge, skill, experience, training, and education to be qualified as an expert in this case.

For its part, Bell makes two main arguments, each of which fails to undermine this court's finding that Cochran is a qualified expert in this case. First, it submits that Cochran is unqualified to testify as an expert because he has not done any independent laboratory testing of hydraulic-servo actuators. But laboratory testing is not the *sin quo non* of expertise, see Hudgens v. Bell Helicopters/Textron, 328 F.3d 1329, 1342-44 (11th Cir. 2003) (permitting reliance on tests conducted by others, but finding error in the misapplication of those tests to the helicopter crash at issue); see also Hodges v. Mack Trucks Inc., 474 F.3d 188, 194-95 (5th Cir. 2006) (affirming district court's qualification of an expert who had not personally tested the allegedly defective door latch), and, in the context of engineering testimony, sufficient knowledge of the subject matter can

come from a variety of sources. Here, Cochran is relying on his own substantial experience in the field as well as investigations conducted by others that he thoroughly reviewed.⁴ That Cochran failed to test the servo actuator at issue in this case does not undermine his qualifications to opine about the potential for barium and particulate matter to cause one to malfunction, and any question about whether he appropriately applied the relevant data in reaching his conclusions goes to the reliability of his testimony (which the court addresses below), not to his expertise.

Bell next contends that Cochran cannot be qualified as an expert on the functioning of hydraulic-servo actuators because he has not participated in their

4. This distinguishes United States v. Paul, 175 F.3d 906, 912 (11th Cir. 1999), on which Bell heavily relies, since the proposed expert in that case lacked a background in the subject matter (handwriting analysis) and was therefore no more qualified "than a lay person who read ... articles [on the topic]." Here, as discussed above, Cochran has the necessary background to understand and apply the relevant literature in a way that a lay person does not.

design. The general premise underlying this assertion lacks merit: car mechanics often testify to the cause of engine failure, even when they did not design the failed component, see, e.g., Salter v. Westra, 904 F.2d 1517, 1520 (11th Cir. 1990), and gun experts can testify to rifle mechanics and design, even when they had no role in developing the parts at issue, see, e.g., Peterka v. McNeil, 532 F.3d 1199, 1202 (11th Cir. 2008). Nor is it true in this particular case. Here, Cochran will not be testifying to the design process, but rather to the potential effects of barium and particulate matter on a servo actuator's moving parts. Therefore, he need not be an expert on precisely how and why the TH-67's servo actuators take the form that they do; he need only be able to testify to whether the purported contaminants could have caused a malfunction. Cochran possesses the relevant knowledge, skill, education, and training to make such a determination, and therefore his lack of design experience does not preclude him from testifying.

That the person who actually designed the TH-67's hydraulic system might be a more convincing expert is not enough to prevent Cochran from being qualified to testify on the subject. Otherwise, parties would have the onerous (if not insurmountable) burden of identifying (and then, presumably, competing for) the most qualified person in the field, rather than simply choosing from among the many adequate experts readily available.⁵

2. Reliable Scientific Evidence Supports Ferguson's Theory of the Case: "[T]he trial judge must have considerable leeway in deciding in a particular case how to go about determining whether particular expert testimony is reliable." Kumho Tire, 526 U.S. at 141, 152. Indeed, a district court may even decide that

5. Bell's remaining arguments on this issue range from the factually inaccurate (its assertion that Cochran claims to have done no analysis of hydraulic-servo actuators) to the irrelevant (its assertion that Cochran has never handled a fully assembled TH-67 servo actuator). Because each argument fails to undermine Cochran's qualification as an expert in this case, the court finds no need to address them seriatim.

nonscientific expert testimony (like that of an engineer) is reliable based solely "upon personal knowledge or experience.'" Am. Gen. Life Ins. Co. v. Schoenthal Family, LLC, 555 F.3d 1331, 1338 (11th Cir. 2009) (quoting Kumho Tire, 526 U.S. at 150). While this is undoubtedly a close case, the court finds that Ferguson has met his burden of establishing the reliability of Cochran's proposed testimony. That proposed testimony is grounded in published peer-reviewed research and the conclusions that he reaches are consistent with those of the Army's own internal investigation of the crash.

Cochran will testify that the uncommanded-cyclic movement allegedly experienced by Ferguson was caused by "transient 'sticking' of one of the spools in the control valves of the lateral main rotor cyclic control servo actuators of the accident helicopter." Cochran Expert Report (Doc. No. 144, exh. A-2) at 4. That "sticking," he submits, occurred because of (1) "the presence of barium dinonylnaphthalene sulfonate (BDNNS) in the

hydraulic fluid" and (2) "the presence of particulate contamination in the hydraulic fluid."⁶ Id. at 5. Both of those potential contributing causes find support in the academic literature and other reliable evidence that Cochran relied on in reaching this conclusion.

The key peer-reviewed study that Cochran relies on was written by Shashi K. Sharma and is entitled "Rust Inhibitor Contamination-Related Problems in Military Aircraft Hydraulic Systems." That paper investigated the link between valve failure in the servo actuators of the UH-1 helicopter and the presence of residual 6083 preservative fluid. It found that the failed poppet valves--but not those in working condition--had a sticky film on their surface that, upon investigation, turned out to be barium deposits left behind when the 6083 fluid was flushed from the hydraulic system. The Sharma Study

6. Non-principal contributing factors allegedly include the frequent use of this helicopter in hover-flight conditions and feedback forces from the main rotor.

also explained an ongoing investigation tending to show that barium attracts particulate matter, which attaches to the sticky film.⁷ In the end, the study found "very persuasive" evidence that sticky barium in the servo actuators caused those devices to fail and that "contamination of the operational hydraulic fluid with the preservative fluid containing [barium] has resulted in the operational malfunctions of some aircraft servovalves." It further suggested that stuck valves can be eliminated by minimizing the amount of "preservative fluid in the aircraft hydraulic system."

The Army's crash investigator, Dr. Kevin Minor, reviewed that study while trying to identify the cause of Ferguson's helicopter crash. He also conducted numerous tests of the servo actuators from both the crash helicopter and nearly a dozen other TH-67 helicopters

7. Another peer-reviewed study Cochran relied on, Hydraulic Valve Problems Caused by Oil Oxidation Products by Akira Sasaki, concludes that particulate matter can cause valve failure in spool-and-sleeve valves.

that had experienced uncommanded-cyclic movements while in use at Fort Rucker. He discovered that the servo components "exhibited a very sticky feel," Minor Dep. (Doc. No. 165-12) at 36:8-22, and, when the o-rings from those actuators were removed, he found a sticky sheen on their surfaces that had "white particulates stuck to it," Id. at 53:1-2. Further analysis showed that the crash helicopter's servo actuators had "excessive particle count[s,] especially in the 5-10 and 10-25 micron range." Minor Report (Doc. No. 165-11) at 3.⁸ As the servo actuators moved, those particles "gouged the surfaces of the spool and sleeve resulting in trench-like features parallel to the direction of motion." Id. at 9.

According to Minor, "All of the evidence observed suggested that [barium] had precipitated out of the 6083 fluid and formed on the outside surfaces of the spools

8. The court makes no evidentiary ruling on the admissibility of this report and references it only as an example of the reliable evidence Cochran used to reach his conclusions about the cause of the accident.

and the inside surfaces of the sleeves [of the servo actuators]." Id. at 7. His crash report and deposition testimony explain that, based on his review of the literature and the tests he conducted, the presence of barium and excessive particulate matter in the servo actuators caused the crash.

Cochran, himself a trained engineer, reviewed Minor's study and the related academic literature and likewise concluded that the combination of barium and particulate matter contaminating the crash helicopter's servo actuators caused the accident. The evidence that he relied on in reaching that conclusion (a combination of peer-reviewed articles and experimentation conducted by others) is reliable and he applied it in a manner consistent with engineering principles. Moreover, it is consistent with the conclusion reached by Minor's independent analysis. Therefore, in this case, the court's gatekeeping function is best served by admitting Cochran's testimony.

Bell points out that Cochran did not conduct any tests of the crash helicopter's servo actuators and he relies heavily on studies conducted by others. But that "is not fatal" to the admissibility of Cochran's testimony: It only requires that this court focus more intently on "the basic methodology employed to reach the conclusions." Kilpatrick, 613 F.3d at 1336-37. In this case, it would be technically difficult and prohibitively expensive for Cochran to have recreated in a laboratory the conditions leading to the accident.⁹ He therefore

9. See, e.g., Maiz v. Virani, 253 F.3d 641, 665-66 (11th Cir. 2001) (rejecting defendant's argument that expert's testimony was unreliable because expert adopted a theory "that was essentially unverifiable"); Abrams v. Ciba Specialty Chems. Corp., 2010 WL 779276, at *7 n.13 (S.D. Ala. Mar. 2, 2010) (Steele, C.J.) ("And to the extent that Dr. Scates' opinions are derived from literature review, witness interviews and data analysis, they are not automatically rendered unreliable by their non-susceptibility to empirical verification."); Tiller v. Ford Motor Co., 2006 WL 166530, at *10 (M.D. Fla. Jan. 21, 2006) (Corrigan, J.) (finding that, even though it "would be next to impossible" to test the expert's theory, "his extensive training and experience renders his opinion reliable"); McMickens v. Volkswagen of Am., Inc., 2003 WL 25682172, at *4 (S.D. Ala. Feb. 21, 2003) (continued...)

reasonably relied on peer-reviewed articles that established the underlying premises for his conclusions and applied those studies to Minor's tests and conclusions about the cause of the accident. Because those sources are methodologically sound and because Cochran applied them to his work in a manner consistent with engineering principles, the fact that he did not conduct the testing himself does not preclude him from testifying in this case.

Bell also asserts that the Sharma Study, because it dealt with poppet valves, rather than spool-and-sleeve valves, cannot support Cochran's conclusions. But, "in most cases, objections to the inadequacies of a study are more appropriately considered an objection going to the weight of the evidence rather than its admissibility." Hemmings v. Tidyman's Inc., 285 F.3d 1174, 1188 (9th Cir.

(...continued)
(Butler, J.) (rejecting plaintiff's argument that, since the air bag was lost and it was therefore "impossible to test the reliability of" the proposed expert testimony, the testimony was unreliable).

2002); see also Quiet Tech. DC-8, Inc. v. Hurel-Dubois UK Ltd., 326 F.3d 1333, 1345 (11th Cir. 2003) (noting that, typically the "failure to include variables will affect the analysis' probativeness, not its admissibility" (internal quotation marks omitted)). Both Minor and Cochran concluded that the evidence from the Sharma Study--which found that barium is sticky and can effect valve functioning--applies to spool-and-sleeve valves. The court agrees: Barium's stickiness is in no way dependent on the type of valve it is stuck to. Moreover, the ample evidence that its presence in spool-and-sleeve valves is correlated with accidents, combined with Minor's testing-backed conclusion that the presence of barium in the crash helicopter's servo actuators was a contributing cause of the crash, is a sufficient basis for Cochran to reliably identify barium as a cause of the accident. It will be up to a jury to decide whether Cochran's testimony is entitled to less weight because it

relies in part on studies of poppet valves, rather than
spool-and-sleeve valves.

For the foregoing reasons, it is ORDERED that
defendant Bell Helicopter Textron, Inc.'s motion to
preclude John Cochran as an expert witness (doc. no. 132)
is denied.

DONE, this the 28th day of March, 2012.

/s/ Myron H. Thompson
UNITED STATES DISTRICT JUDGE