HIGH COURT OF AUSTRALIA

FRENCH CJ,
BELL, KEANE, NETTLE AND GORDON JJ

ROBINSON HELICOPTER COMPANY INCORPORATED APPELLANT

AND

GRAHAM JAMES McDERMOTT & ORS RESPONDENTS

Robinson Helicopter Company Incorporated v McDermott
[2016] HCA 22
8 June 2016
B61/2015

ORDER

1. *Appeal allowed with costs.*

2. *Set aside the orders of the Court of Appeal of the Supreme Court of Queensland made on 19 December 2014, and in their place order that the appeal be dismissed with costs.*

On appeal from the Supreme Court of Queensland

Representation

S L Doyle QC with M T Hickey for the appellant (instructed by Meridian Lawyers)

W Sofronoff QC with M E Eliadis and C K George for the respondents (instructed by Shine Lawyers)

CATCHWORDS

Robinson Helicopter Company Incorporated v McDermott

Torts – Negligence – Personal injury – Breach of duty of care – Duty to take precautions against risk – Where first respondent seriously injured in crash of helicopter manufactured by appellant – Where crash resulted from defect caused by third party – Where helicopter subject to multiple routine inspections but defect not detected – Whether appellant's maintenance manual for helicopter provided sufficient instruction to facilitate detection of defect – Whether appellant breached duty of care.

Torts – Negligence – Causation – Where majority of Court of Appeal found multiple possible causes of damage suffered – Whether open to majority of Court of Appeal to find one particular possibility more likely to have occurred than other possibilities – Whether causation established by failure to take precautions against risk other than that which in fact occurred.

Appeal – Rehearing – Where primary judge drew inferences and made findings of fact based on lay and expert evidence – Whether majority of Court of Appeal erred by overturning primary judge's findings of fact.

Words and phrases – "causation", "contrary to compelling inferences", "glaringly improbable", "incontrovertible facts or uncontested testimony", "real review".

Civil Liability Act 2003 (Q), ss 9(1)(c), 12.
Civil Aviation Regulations 1988 (Cth), regs 31, 42V(1), 42ZC.

1 FRENCH CJ, BELL, KEANE, NETTLE AND GORDON JJ. This is an appeal from a judgment of the Court of Appeal of the Supreme Court of Queensland. It arises out of the crash of a Robinson R22 helicopter ("the helicopter") which resulted in the death of the pilot and in the first respondent ("Mr McDermott") suffering serious injuries. The essential question at first instance and on appeal was whether the Maintenance Manual for the helicopter ("the Manual") provided an adequate inspection procedure for the detection of the defect which caused the crash. At first instance, the primary judge (Peter Lyons J) dismissed Mr McDermott's[1] claims against the appellant ("Robinson"), in negligence and under the *Trade Practices Act* 1974 (Cth) ("the TPA"), holding that the Manual provided adequate instructions to identify the defect[2]. On appeal, a majority of the Court of Appeal (McMurdo P and Alan Wilson J) allowed the appeal, holding that the Manual did not provide adequate instructions to detect the defect and, ultimately, that Robinson was liable either in negligence or under the TPA[3]. Holmes JA dissented.

2 For the reasons which follow, the majority of the Court of Appeal erred in their interpretation of the evidence, and thus in overturning the judge's findings of fact, and also in relation to causation.

The facts

3 On 30 May 2004, Mr McDermott was a passenger in the helicopter, from which he was inspecting fences on a cattle station in the Northern Territory where he lived with his wife. During the course of the flight, the helicopter crashed and, as a result, the pilot was killed and Mr McDermott suffered serious injuries. The crash was caused by the failure of the helicopter's forward flex plate ("the flex plate").

4 The flex plate and associated parts had been removed and reassembled on 17 February 2004. After reassembly, but before the crash, the flex plate had been subject to two "100 hourly" inspections on 27 March 2004 and 12 May 2004. Such inspections were known as 100 hourly inspections because they were

---

1 Mr McDermott's wife and employer were also plaintiffs at first instance and are respondents in this appeal. References in this judgment to Mr McDermott are to be understood as referring to all three respondents.

2 *McDermott v Robinson Helicopter Company* [2014] QSC 34.

3 *McDermott v Robinson Helicopter Company Incorporated* [2014] QCA 357.

carried out approximately every 100 hours that the helicopter was in operation. After reassembly, but before the crash, the helicopter had also been subject to a number of routine pre-flight checks by pilots who flew the helicopter during that period.

The flex plate

5 The flex plate was part of the helicopter's drive system which transferred torque from the helicopter's engine to the main rotor gearbox, which in turn drove the main rotor shaft, causing the rotor blades to rotate. The flex plate operated as a universal joint coupling between the clutch yoke and the drive shaft. Its function was to allow the main rotor shaft to be aligned at a different angle from the engine drive shaft. The flex plate was made of thin, flexible metal in the approximate shape of a four-pointed star. At each point of the star there was a bolt (also known as a fastener) with a washer and nut to secure the flex plate between the clutch yoke and the drive shaft.

6 The flex plate was required to withstand considerable stress. Other things being equal, it was capable of withstanding the stress as long as each of the four bolts was tightened to the requisite degree. If, however, a bolt were not sufficiently tightened, it was likely to rotate, place stress on the bolt hole and generate cracks in the flex plate. In order to guard against a bolt becoming loose, the Manual required that each bolt and nut of the flex plate be fitted with a secondary fastener, called a palnut. A bolt fitted with a palnut could not become loose without the palnut becoming loose. Consequently any observable movement in a palnut, or the absence of a palnut, served as an indicator of possible bolt rotation.

7 It is not disputed that the flex plate failed and the crash occurred because, contrary to instructions given in the Manual, one of the four bolts securing the flex plate ("Bolt 4") was incorrectly assembled and, when so assembled, was not tightened to the requisite degree ("the defect"). Robinson did not cause the defect and it was not known who did. There was evidence from which the judge inferred that Bolt 4 was not tightened to the requisite degree when the flex plate and associated parts were removed and reassembled on 17 February 2004. The focus of these proceedings, however, was not so much on when and how the defect arose as upon whether the Manual provided sufficient instruction to facilitate detection of the defect at subsequent inspections.

Inspection procedures for the helicopter

8 At relevant times, the maintenance requirements for the helicopter were governed by the Civil Aviation Regulations 1988 (Cth) ("the Regulations"). Perforce of reg 42ZC, only certain classes of person were permitted to carry out maintenance work on the helicopter. One such class of person was licensed aircraft maintenance engineers ("LAMEs"). A LAME was a tradesperson who was sufficiently skilled and qualified to have been issued a licence pursuant to reg 31 of the Regulations. Each LAME who performed maintenance work on the helicopter was required by the Regulations to do so consistently with instructions given in the Manual[4]. Importantly, the Manual required that during 100 hourly inspections the LAMEs "verify security" of the flex plate. The 100 hourly inspections performed on the helicopter on 27 March 2004 and 12 May 2004 were conducted by LAMEs Mr Fisher and Mr Bray respectively.

Torque, torque wrenches and torque stripes

9 Torque is a measure of the twisting or rotational force acting upon an object. It was used in the Manual as a measure of the tightness of a bolt. Used as a verb in the Manual it referred to the action of applying torque to tighten the bolt. The Manual specified various degrees of torque (or tightness) required for the various bolts and other fasteners within the helicopter. Although bolts can be torqued with a range of tools, including spanners, the Manual provided for the use of a torque wrench. A torque wrench can be set to a particular torque setting so that when applied to a bolt it will tighten the bolt to that torque and no further.

10 Under the heading "1.300 FASTENER TORQUE REQUIREMENTS" the Manual provided that: "Fasteners shall be torqued to standard dry values listed in Section 1.320 unless otherwise specified." The torque setting for Bolt 4 was otherwise specified as 240 inch pounds. Section 1.310 of the Manual further provided that:

> "A secondary locking mechanism is required on all critical fasteners. B330 stamped nuts (palnuts) serve as the secondary locking mechanism ...
>
> ...
>
> Torque seal (paint) is applied to all critical fasteners after palnut installation in a stripe across both nuts and exposed bolt threads. The

---

4 Civil Aviation Regulations 1988 (Cth), reg 42V(1).

stripe should extend to the part being fastened to show bolt rotation. Any subsequent rotation of the nut or bolt can be detected visually."

Bolt 4 was a critical fastener.

11 The portion of the Manual pertaining to torque stripes was amended after the crash but, as the judge observed, there was no material difference between the two versions.

12 As was established at trial, and is apparent from the Manual, the purpose of a torque stripe is to signify that a fastener has been correctly torqued and to provide a visual indication of the possibility of a loss of torque and resulting bolt rotation. When applied correctly, the part of the stripe which is painted across the palnut, nut and bolt aligns with the part of the stripe which is painted on the horizontal clamped surface that the bolt is meant to fasten. A loss of torque leads to rotation of the bolt relative to the horizontal clamped surface with consequent misalignment between the sections of the stripe. The presence of that kind of misalignment is a visual indication of the possibility of a loss of torque and the consequent need for the fastener to be examined and re-torqued and a new torque stripe applied.

13 At trial, there was an issue as to whether a torque stripe is a sufficient indicator of a loss of torque. One suggestion, which the judge rejected as quite unlikely, was that the horizontal clamped surface to which the horizontal section of the stripe is applied might be so dirty or greasy that the stripe does not adhere to it and so is able to rotate with the vertical section of the stripe as the bolt rotates. There was, however, also evidence, which the judge accepted, that torque stripes may sometimes so deteriorate, chip or disappear in service that they cease to be a reliable indicator of whether a bolt has rotated. It will be necessary to say more of each of those possibilities later in these reasons.

The decision at first instance

14 The judge found that the Manual required a torque stripe to be applied to each of the four flex plate bolts following fitting of the palnuts, but that it was probable that a torque stripe was not applied to Bolt 4 when it was incorrectly assembled. His Honour found in the alternative that, if a torque stripe were applied to Bolt 4 when it was incorrectly assembled, it was "quite unlikely" that it was applied to a dirty or greasy surface, and, therefore, quite unlikely that the bolt could have rotated without the stripe breaking and misaligning.

15 The judge held that the explanation given in the Manual of the function of torque stripes, coupled with the instruction given in the Manual to "verify security" of the flex plate during 100 hourly inspections, was sufficient to convey to a LAME carrying out a 100 hourly inspection that it was necessary to look for a torque stripe on each flex plate bolt and, if it were "missing, damaged, or incomplete"[5], to take steps to determine whether the bolt was correctly torqued, to re-torque the bolt, and then to apply a fresh torque stripe.

16 The judge found that it was probable that Bolt 4 commenced rotating relatively shortly after it was incorrectly assembled but that it did not fail until more than 100 hours of subsequent operation. Consequently, if a torque stripe were not applied to Bolt 4 when it was incorrectly assembled, the absence of the torque stripe should have been sufficient to indicate to a LAME, if competently carrying out a subsequent 100 hourly inspection, that it was necessary to take steps to check whether the bolt was correctly torqued.

17 In the alternative, the judge found that, if a torque stripe were applied when Bolt 4 was incorrectly assembled, the stripe would have broken and misaligned relatively shortly afterwards; that the consequent misalignment between the relevant vertical and horizontal sections of the stripe would have been visible during the following 100 hourly inspections; and that its appearance should therefore have been sufficient to indicate to a LAME competently carrying out the subsequent 100 hourly inspections that it was necessary to take steps to check whether the bolt was correctly torqued.

18 The judge also considered possibilities that if a torque stripe had been applied it might have been incompletely applied, or it might have been difficult to see (by which the judge should be understood to have been referring to the possibility of a deteriorated torque stripe). The judge held that those possibilities were not materially different from a missing or misaligned torque stripe, because all such possibilities would have indicated to a LAME the need to take steps to check whether the bolt was correctly torqued.

19 It followed, the judge held, that it was not established that the Manual was inadequate to address the risk of flex plate failure resulting from an inadequately torqued bolt.

---

5 *McDermott v Robinson Helicopter Company* [2014] QSC 34 at [159].

The decision of the Court of Appeal

20 The majority of the Court of Appeal, McMurdo P and Alan Wilson J, held that the judge erred in finding that it was probable that a torque stripe was not applied when Bolt 4 was incorrectly assembled. In their Honours' view, there was not sufficient evidence to support the finding. They also held that there was error in the judge's reasoning in what they conceived to be an inconsistency between the judge's conclusion that it was probable that a torque stripe was not applied when Bolt 4 was incorrectly assembled and the judge's observation later in his Honour's reasons that the weight to be attributed to certain of the evidence given by Mr Fisher and Mr Bray was diminished by the fact that, if they had examined Bolt 4 as part of those 100 hourly inspections, the condition of the torque stripe would have indicated that Bolt 4 had rotated.

21 McMurdo P stated that she did not consider that the judge was correct in limiting the range of possibilities to a missing or misaligned torque stripe. In her Honour's view, it was possible that, when Bolt 4 was incorrectly assembled, the torque stripe was applied to a dirty or greasy surface such that the section of the stripe applied to that surface was able to rotate with the bolt. On that basis, her Honour held that the Manual was defective in failing to make clear to LAMEs "verifying security in the context of a periodic service that a visual inspection of torque stripes may not be sufficient to indicate whether critical fasteners like bolt 4 were correctly assembled"[6]. McMurdo P also found that, if the Manual had contained an additional simple instruction to check the torque of critical fasteners like Bolt 4 with "a torque wrench or a simple spanner"[7], the LAMEs would have followed that instruction and inevitably detected movement in the incorrectly assembled Bolt 4.

22 Like McMurdo P, Alan Wilson J found it was possible that, if a torque stripe were applied to Bolt 4, it was incorrectly applied so as not to adhere to both the bolt and the fixed component, and therefore that the horizontal section of the torque stripe was able to rotate with the bolt. His Honour observed that it was also possible for a torque stripe otherwise to deteriorate due to ageing,

---

6 *McDermott v Robinson Helicopter Company Incorporated* [2014] QCA 357 at [22].

7 *McDermott v Robinson Helicopter Company Incorporated* [2014] QCA 357 at [22].

fading or cracking, or by pieces chipping off, in a manner which would not necessarily indicate that "a defect"[8] existed.

23 Alan Wilson J rejected the possibility that failure to discover the defect might have been due to Mr Fisher or Mr Bray not sufficiently inspecting Bolt 4 at the two 100 hourly inspections immediately preceding the crash. His Honour considered that finding to be precluded by the absence of cross-examination of either man to the effect that he may have overlooked an absent or misaligned torque stripe.

24 Alan Wilson J held that, since the evidence of Mr Fisher and Mr Bray, and also the evidence of two pilots (Mr McKendry and Mr Lewis) who conducted the previously mentioned pre-flight checks of the helicopter not long before the crash, was that they could not recall seeing anything amiss, the only finding open to be made about the condition of the torque stripe on Bolt 4 at the relevant time was that, whatever its condition, it did not alert either Mr Fisher or Mr Bray or the pilots to the fact that Bolt 4 had lost torque and was rotating. In his Honour's view, it followed that a torque stripe was an inadequate means of guarding against bolt rotation.

25 On that basis, Alan Wilson J held that the Manual was defective in failing to warn that torque stripes were not an accurate indicator of loss of torque and in failing to state that bolt security "could only be confirmed by applying a torque wrench (with, or without, an adaptor tool) or, simply, a spanner"[9].

26 Alan Wilson J did not refer to the issue of causation as such, but, in view of the orders made by the Court of Appeal, it must be assumed that his Honour considered that it was the absence of such a warning from the Manual that caused the crash.

27 Like the judge, Holmes JA held it was likely either that there was no torque stripe present at the time of the 100 hourly inspections, or that there was a torque stripe present which was misaligned, incomplete or deteriorated.

---

8 *McDermott v Robinson Helicopter Company Incorporated* [2014] QCA 357 at [75].

9 *McDermott v Robinson Helicopter Company Incorporated* [2014] QCA 357 at [101].

28 Holmes JA found that, on the evidence, each of Mr Fisher and Mr Bray was at relevant times aware that, if he saw that there was no torque stripe on Bolt 4, or saw that there was a torque stripe which was misaligned, incomplete or deteriorated, he could have no confidence in the stripe as an indicator of bolt security, and that he would need to take action by checking that the bolt was tight – in Mr Fisher's case, with the use of a torque wrench and, in Mr Bray's case, with the use of a spanner. Her Honour reasoned accordingly that[10]:

> "The fact that others might regard the manual as conveying something different was immaterial. If Mr Bray and Mr Fisher understood that it was essential that anything less than a complete stripe required checking of the bolt's security, any failure of the manual to communicate that necessity to a wider audience could not be causative of [Mr McDermott's] damage."

29 On that basis, Holmes JA held that, whatever might have been the shortcomings of the Manual in the hands of other users, they did not cause Mr Fisher or Mr Bray to fail to detect that the torque stripe was missing or defective and they did not cause either man's failure to take further action to check that Bolt 4 was sufficiently torqued.

30 Holmes JA rejected the notion that the absence of cross-examination of Mr Fisher and Mr Bray to that effect precluded that conclusion. As her Honour said, given that Mr McDermott had alleged in his Statement of Claim and Robinson had admitted in its Defence that neither Mr Fisher nor Mr Bray carried out his 100 hourly inspection in a manner sufficient to detect the defect, and since Mr Fisher and Mr Bray each professed a lack of any specific recollection of having carried out the inspection, it was beside the point that neither of them was cross-examined to the effect that his failure to detect the defect was due to his failure sufficiently to inspect Bolt 4. The point was in issue and given that neither man had a specific recollection of the inspection it was open to conclude that they had not sufficiently inspected Bolt 4.

The appellant's contentions

31 Before this Court, Robinson contended that the majority of the Court of Appeal erred in rejecting the judge's finding that it was likely that there was no torque stripe on Bolt 4 when the two relevant 100 hourly inspections were carried

---

10 *McDermott v Robinson Helicopter Company Incorporated* [2014] QCA 357 at [40].

out. In Robinson's submission, there was sufficient evidence to sustain that inference, comprised of the probability (which was not disputed) that Bolt 4 was incorrectly assembled on 17 February 2004; the further fact (which was also not disputed) that Bolt 4 was so misassembled as to be incapable of being torqued to the specified degree, and therefore was not torqued to the specified degree; uncontested expert opinion evidence that the usual and expected procedure to be followed upon installation of a bolt like Bolt 4 is to apply a torque wrench once it is assembled, torque the bolt to the specified setting, and then apply a torque stripe as an indication that the bolt has been so torqued; and uncontested expert opinion evidence that it was inconceivable that a competent LAME would put a torque stripe on an assembly that was not properly torqued.

32 Robinson also contended that the majority erred in overturning the judge's finding that, if a torque stripe were applied to Bolt 4, it was quite unlikely that it was applied to a dirty or greasy surface such that the bolt could rotate without breaking the stripe. In Robinson's submission, it was indicative of the error that neither McMurdo P nor Alan Wilson J dealt at all with the substantial reasons which the judge gave for rejecting that possibility as quite unlikely.

33 Robinson further contended that the majority erred in holding that, because the Manual did not specifically direct LAMEs to apply a torque wrench or spanner to Bolt 4 during 100 hourly inspections, Robinson had breached its duty of care to Mr McDermott. In Robinson's submission, the majority failed to take into account that the Manual directed LAMEs to "verify [the] security" of Bolt 4; that the evidence was clear that both Mr Fisher and Mr Bray knew that Bolt 4 had to be torqued to the specified degree; and that the evidence was also clear that both men knew that the way to ascertain whether Bolt 4 was torqued to the specified degree was with the use of a torque wrench.

34 Robinson complained that the majority failed to confront evidence that Robinson had considered the possibility of including an express instruction in the Manual that during 100 hourly inspections each of the flex plate bolts should be re-torqued with a torque wrench, but had rejected the idea because of countervailing risks which might have been created by such an instruction. In Robinson's submission, the majority thereby erred in failing to consider, for the purposes of s 9(1)(c) of the *Civil Liability Act* 2003 (Q), why it was reasonable for Robinson not to include an instruction to check the security of the bolts with a torque wrench.

35 Robinson argued that the majority erred, too, insofar as they based their reasoning on evidence that another manufacturer of helicopters included an instruction in its service manual to check torque with a torque wrench during 100

hourly inspections. In Robinson's submission, the comparison was erroneous because it was made without reference to, and in disregard of, evidence that the other manufacturer's helicopter was of a different, older design, which employed older fastener technology, and so had maintenance requirements which were significantly different from the maintenance requirements of a Robinson R22 helicopter.

36 Finally, Robinson contended that the majority erred in concluding, without appropriate analysis of the evidence and without reference to Robinson's detailed submissions as to the lack of proof of causation, that the omission from the Manual of an express instruction to check the torque of the flex plate bolts with a torque wrench during 100 hourly inspections caused the helicopter to crash. In Robinson's submission, the judge was correct to find that the most likely cause of the crash was that Mr Fisher and Mr Bray failed to inspect Bolt 4 in the manner which both men knew to be required by the Manual.

The respondents' submissions

37 Mr McDermott argued that the majority of the Court of Appeal were bound to and did conduct a "real review"[11] of the evidence and of the judge's reasons and that they were right to conclude that the evidence did not support the judge's findings.

38 In Mr McDermott's submission, the majority were also correct in holding that, because of the propensity of torque stripes to deteriorate over time, a torque stripe could not be regarded as a sufficient indicator that a bolt was incorrectly torqued, and thus that, whatever the condition of the Bolt 4 torque stripe at the time of the 100 hourly inspections, the only finding open on the evidence was that its condition was insufficient to alert Mr Fisher and Mr Bray to the fact that Bolt 4 was loose and rotating.

39 Mr McDermott contended that the majority were correct in holding that Robinson was negligent in failing to include an express instruction in the Manual that the security of Bolt 4 be verified with a torque wrench during 100 hourly inspections; and correct in holding that it was Robinson's failure to do so which caused the crash. In Mr McDermott's submission, given the way the case was

---

11 *Fox v Percy* (2003) 214 CLR 118 at 126 [25] per Gleeson CJ, Gummow and Kirby JJ; [2003] HCA 22.

run at trial, it was unnecessary for the majority to devote any greater analysis to the issue of causation than they did.

The majority's rejection of the judge's findings of fact

40 In summary, what emerged from the trial and as a result of the appeal was that, in theory, there were perhaps five possibilities regarding the absence or presence and condition of a torque stripe on Bolt 4 at the time of the relevant 100 hourly inspections. They were:

(i) the absence of a torque stripe, due to a failure to apply a torque stripe when the bolt was incorrectly assembled;

(ii) a misaligned torque stripe, resulting from a correctly applied torque stripe misaligning due to subsequent bolt rotation;

(iii) an incomplete torque stripe, resulting from the application of torque paint to only one relevant surface;

(iv) a deteriorated torque stripe, resulting from chipping or other deterioration in service; and

(v) a slipped torque stripe, resulting from a torque stripe being applied to a dirty or greasy surface so as to allow it to slip across the surface as the bolt rotated.

41 The judge found that possibility (i) was most likely and, in the alternative, that possibilities (ii), (iii) or (iv) (which his Honour referred to collectively as the possibility of a "damaged, or incomplete"[12] torque stripe) may have occurred.

42 By contrast, in the Court of Appeal, Alan Wilson J found that there was "only one possible finding open: that the condition of the torque stripe on Bolt 4 was *not* such as to alert any of them [the LAMEs and pilots] to the need to investigate further"[13]. That finding implicitly encompassed possibility (v). McMurdo P agreed with the reasons of Alan Wilson J and also explicitly entertained possibility (v).

---

12 *McDermott v Robinson Helicopter Company* [2014] QSC 34 at [159].

13 *McDermott v Robinson Helicopter Company Incorporated* [2014] QCA 357 at [78] (emphasis in original).

43 The fact that the judge and the majority of the Court of Appeal came to different conclusions is in itself unremarkable. A court of appeal conducting an appeal by way of rehearing is bound to conduct a "real review"[14] of the evidence given at first instance and of the judge's reasons for judgment to determine whether the judge has erred in fact or law. If the court of appeal concludes that the judge has erred in fact, it is required to make its own findings of fact and to formulate its own reasoning based on those findings[15]. But a court of appeal should not interfere with a judge's findings of fact unless they are demonstrated to be wrong by "incontrovertible facts or uncontested testimony"[16], or they are "glaringly improbable" or "contrary to compelling inferences"[17]. In this case, they were not. The judge's findings of fact accorded to the weight of lay and expert evidence and to the range of permissible inferences. The majority of the Court of Appeal should not have overturned them.

44 In order to demonstrate why that is so, it is convenient to deal in turn with the way the judge and the majority of the Court of Appeal approached the several possibilities.

(i) Missing torque stripe

45 Contrary to the reasoning of the majority of the Court of Appeal, there was evidence sufficient to found the judge's inference that it was likely that a torque stripe was not applied to Bolt 4 when it was incorrectly assembled. The instructions in the Manual for the assembly of Bolt 4 were not complex, even for a layperson. They were clearly written and accompanied by a readily comprehensible schematic diagram which identified the components that comprised the bolt assemblage and the order in which they were required to be assembled. Given the clarity of the instructions, and given that whoever

---

14 *Fox* (2003) 214 CLR 118 at 126 [25] per Gleeson CJ, Gummow and Kirby JJ.

15 *Devries v Australian National Railways Commission* (1993) 177 CLR 472 at 479-481 per Deane and Dawson JJ; [1993] HCA 78; *Fox* (2003) 214 CLR 118 at 128 [29] per Gleeson CJ, Gummow and Kirby JJ; *Miller & Associates Insurance Broking Pty Ltd v BMW Australia Finance Ltd* (2010) 241 CLR 357 at 381 [76] per Heydon, Crennan and Bell JJ; [2010] HCA 31.

16 *Fox* (2003) 214 CLR 118 at 128 [28] per Gleeson CJ, Gummow and Kirby JJ.

17 *Fox* (2003) 214 CLR 118 at 128 [29]. See also *Miller & Associates* (2010) 241 CLR 357 at 381 [76].

incorrectly assembled Bolt 4 did not follow them, it is probable that he or she did not consult the Manual. And, for that reason, it is also likely that he or she did not pay attention to the requirement stated in the Manual that Bolt 4 be tensioned to a torque of 240 inch pounds or to the requirement stated in the Manual that Bolt 4 be marked with a torque stripe to signify correct tensioning and as an indicator of subsequent bolt rotation. Accordingly, it was open to the judge to find, as his Honour did, that it was more probable than not that a torque stripe was not applied to Bolt 4; and, consequently, that if a LAME had examined Bolt 4 in accordance with the Manual as part of the following 100 hourly inspections, he or she would have understood that it was necessary to check it with a torque wrench, or at least a simple spanner, in order to gauge whether further examination was required.

(ii), (iii) and (iv) "Damaged or incomplete" torque stripe

46 Contrary also to the reasoning of the majority of the Court of Appeal, it was open to the judge to find, as his Honour did in the alternative, that if a torque stripe were applied when Bolt 4 was incorrectly assembled, the torque stripe would likely have misaligned a relatively short time after misassembly when the bolt (and thus the vertical section of the stripe) began to rotate relative to the horizontal surface; and thus that it would have been apparent to a LAME carrying out a subsequent 100 hourly inspection in accordance with the Manual that Bolt 4 was rotating, or at least that further investigation was required to exclude the possibility that it was rotating.

47 Certainly, as the majority of the Court of Appeal observed, there was evidence that torque stripes can and sometimes do deteriorate in a manner that is not necessarily indicative of a loss of torque. But, even so, as the judge found, the fact that the Manual identified the role of a torque stripe on a critical fastener, coupled with the instruction to "verify security" of the flex plate, was sufficient to convey to a LAME carrying out a 100 hourly inspection that it was necessary to look for a torque stripe on each critical fastener and, if it were missing, damaged (whether by misalignment or deterioration) or incomplete, to take steps to verify that the torque was as specified and then to reapply the torque stripe.

48 That conclusion was borne out by Mr Fisher and Mr Bray's evidence. Mr Fisher said that, as a LAME, he had seen many torque stripes and that they varied a lot, and that if he saw a deteriorated torque stripe after 50 or 100 hours of operation, "you would have to check the torque of the bolt, put the palnut back on, retorque stripe it". Mr Bray said that, in his experience, "[t]he torque stripe can come off", although they did not do so normally, and that if a torque stripe were missing on a critical fastener "you would probably remove the bolt ... and

inspect the area, make sure it was all correct, and torque the bolt up again". He added that, if a torque stripe were deteriorated, but not broken, "it shouldn't be a problem but you would still check the torque on that bolt if it was the critical part".

49 There was also expert opinion evidence to the same effect given by Dr Orloff, Mr Lay and Mr Ogier. Dr Orloff was a highly qualified aeronautical engineer who had worked for more than 13 years for the National Aeronautics and Space Administration (NASA) in the area of low-speed aircraft research. He was also a pilot with approximately 8,000 hours of flying time on both fixed wing and helicopter aircraft and he held a flight instructor's certificate for instructing in helicopters as well as a number of fixed wing ratings up to airline transport pilot. He had obtained his airframe and power plant mechanic's licence in 1979 and, in 1982, he had obtained the United States equivalent of the LAME qualification. At the time of the trial he remained active in the servicing and repair of fixed wing and helicopter aircraft. He gave evidence that it was standard practice in the industry for a mechanic to assemble something and, in doing so, to torque each thing in the correct order before applying the torque stripe to indicate that the specified torque had been achieved. He said that there was also an industry standard practice to investigate further if a torque stripe is missing, misaligned or cracked. On the subject of deterioration, he said that if a torque stripe is discoloured from age but it is perfectly intact and it appears to be adhering to the surface, it may be assumed that "everything is fine". But he said that if parts of the torque stripe had chipped or broken away due to age, "I would remove it, ... verify the torque, I would make sure the junction is okay, I would look at the parts and make sure they're all right, not cracked, not deteriorated themselves", and that "[i]t is basically industry standard practice on torque striping to do what I've just told you".

50 Mr Lay was an airframe and power plant mechanic who had also obtained the United States equivalent of the LAME qualification. He too was a helicopter pilot and had been so since war service in Vietnam. He said that from time to time in his experience in servicing helicopters, including Robinson R22 helicopters, he saw torque stripes that had deteriorated to some extent and he said that, if a torque stripe were broken, it was an alert to investigate further in order to determine why it is broken, especially where misaligned. If it looked to him like the torque stripe had cracked or broken on the bolt, he said he "would just remove the palnut and check the torque and then reapply the torque striping". If it looked to him like the torque stripe was missing, he agreed that would also be "an alert".

51 Mr Ogier, who was a LAME from the early 1960s until the early 1980s, said that, based on prior industry knowledge, it would cause him concern if there were no torque stripe at all because "[o]n a Robinson helicopter ... that's the methods [sic] used".

52 Just as significantly, none of the witnesses suggested that it would ever be appropriate for a LAME to ignore an absent, broken, incomplete or deteriorated torque stripe.

53 Contrary, too, to the majority's reasoning, the judge's finding – that, if a torque stripe were applied, the condition of the torque stripe, whether missing, damaged or incomplete, would have been adequate to alert a LAME to the need for further investigation – was not foreclosed by the fact that it was not put to Mr Fisher or Mr Bray in cross-examination that he had not adequately inspected Bolt 4. As Holmes JA reasoned, since it was alleged by Robinson and admitted by Mr McDermott that each man did not properly examine for and identify the defect[18]; since each man professed a lack of specific recollection of having carried out the relevant 100 hourly inspection[19]; and since Mr Fisher admitted that, although he would like to think it was not the case, it was possible that he had missed some telltale sign, there was nothing more which needed to be put to either witness. It was open to conclude that both of them may have done less than they should.

54 Alan Wilson J characterised Mr Fisher's admission – that it was possible that some telltale sign was missed – as "nothing more than an acknowledgement of human fallibility by an, otherwise, apparently honest witness"[20]. But the meaning to be attributed to an admission of that kind depends as much on the way it is stated as on its content; and, in this case, the judge had the significant advantage of seeing and hearing Mr Fisher make the admission[21]. The majority

---

18 *Seymour v Australian Broadcasting Commission* (1977) 19 NSWLR 219 at 224-225 per Glass JA (Reynolds JA agreeing at 220), 236 per Mahoney JA; *Trade Practices Commission v Mobil Oil Australia Ltd* (1984) 3 FCR 168 at 180.

19 *Trade Practices Commission v Mobil Oil Australia Ltd* (1984) 3 FCR 168 at 181; cf *R v Morrow* (2009) 26 VR 526 at 540 [50] per Redlich JA (Nettle JA agreeing at 528 [1], Lasry AJA agreeing at 550 [88]).

20 *McDermott v Robinson Helicopter Company Incorporated* [2014] QCA 357 at [79].

21 Cf *Fox* (2003) 214 CLR 118 at 129 [31] per Gleeson CJ, Gummow and Kirby JJ.

appear to have overlooked that advantage. Moreover, at an objective level, if the admission really were as anodyne as Alan Wilson J suggested, it is remarkable that Mr Fisher was not moved to say something further to the effect that, although anything was possible, he invariably took so much care in carrying out critical work like a 100 hourly inspection that he was confident that nothing was missed. To the contrary, however, although the Manual specifically required that the 100 hourly inspection be carried out "per Section 2.410" and directed the person performing the inspection to "[u]se checklist in Section 2.420 to ensure all items are complete" (the check list included more than 180 individual checks and processes), Mr Fisher agreed in cross-examination that he "didn't necessarily refer to the checklist because this was something that [he] knew", and similarly, he "wouldn't necessarily refer to the Maintenance Manual itself because [he] understood what was required". His practice was to complete the paperwork "at the end of the completion of the work" so as "not to interrupt the workflow".

55 In sum, the evidence supported an interpretation of Mr Fisher's admission as a genuine concession that he might have missed a significant telltale sign in the course of his 100 hourly inspection of the helicopter.

(v) Slipped torque stripe

56 The majority of the Court of Appeal did not refer to the judge's reasons for rejecting as quite unlikely the possibility that, if a torque stripe were applied to Bolt 4, it was applied to a dirty or greasy surface which enabled the bolt to rotate without misalignment of the stripe, and that, if it were, the stripe would have remained intact and, as it were, floating above the surface after 100 hours of the helicopter's operation. Nor did the majority give any reasons of their own for finding that the application of a torque stripe to a dirty or greasy surface was a realistic possibility, or that, if it were so applied, the stripe was likely to have remained intact, floating above the surface, after more than 100 hours of the helicopter's operation. In those respects their Honours did not give the respect and weight to the judge's analysis of the issue which it deserved[22].

57 The trial lasted for five weeks, during which close to 20 witnesses gave oral evidence. The judge alone had the opportunity of hearing and seeing those witnesses giving their evidence. There were also a very large number of exhibits,

---

22 *Warren v Coombes* (1979) 142 CLR 531 at 551 per Gibbs ACJ, Jacobs and Murphy JJ; [1979] HCA 9. See also Bell, "Appellate review of the facts", (2014) 39 *Australian Bar Review* 132 at 141.

including physical exhibits and extensive documentary exhibits, which only the judge had the opportunity to read and consider completely. The judge had the unique benefit of a viewing of two helicopters of the kind which crashed. And the judge alone had the opportunity to consider all of the evidence in its totality and to reflect at length upon its interaction.

58 As the judge observed, only one of the expert witnesses referred to the possibility of a torque stripe being applied to a dirty or greasy surface. That was Mr Ogier, who had not practised as a LAME in approximately 30 years and had no experience in the servicing of Robinson R22 helicopters. Mr McDermott did not cross-examine any of the other expert witnesses as to whether he agreed it was a possibility. It was also unclear what Mr Ogier conceived would be the result of such a possibility. In his report of 25 August 2012, Mr Ogier said that:

> "In general, torque stripe compound (paint or lacquer) is difficult to adhere to surfaces unless they are clean (from oil[,] water and other like contaminants), and dry at the time of application. The compound is designed to be brittle and crack. Depending on the thickness of the stripe it may not break but rather slip as the surface below it moves. If the stripe is relatively thin it may not fill a void as direction changes between surfaces and therefore is made to support its own weight with *the potential for it to crack under vibration in service*." (emphasis added)

That could mean that, if a torque stripe were applied to a dirty or greasy surface, it might not crack, or it could mean that, because the stripe would be required to support its own weight, it would be likely to crack. But in a subsequent Conference Call Report of 30 August 2012, Mr Ogier added that:

> "The stripes can slip over time if the surface they are placed on is contaminated with oil or water. I am inclined to agree with Mr Lay's experience because that's what I see in the helicopters in the Australian fleet; missing, partially applied, broken and correctly applied stripes."

That suggests that, if a torque stripe were applied to a dirty or greasy surface in such a way as to be able to float above it, over time, and certainly within 100 hours of operation, the rotation and vibration would likely result in a missing, misaligned or incomplete stripe – or, as the judge put it, a stripe which is missing, damaged, or incomplete – which would act as a sufficient indicator to a LAME of the need to take steps to determine whether the torque was adequate and to re-apply the torque stripe.

59 Furthermore, as the judge said, if the person who misassembled Bolt 4 had been sufficiently familiar with the role that the Manual assigned to a torque stripe, it was quite unlikely that that person would apply the stripe to a dirty or greasy surface.

60 The majority should have recognised that it was open to the judge to conclude as he did.

The significance of the pilots' evidence

61 Counsel for Mr McDermott contended that it was apparent from the evidence of one of the helicopter pilots, Mr McKendry, who carried out pre-flight checks and flew the helicopter shortly before the flight on which it crashed, that the condition of the torque stripe on Bolt 4 was not sufficient to warn of the possibility that Bolt 4 was rotating. The evidence of the other pilot who flew the helicopter during the relevant period was that he did not look for torque stripes.

62 Although Mr McKendry had no specific recollection of carrying out the pre-flight checks in question, he stated that his usual practice was to use a light and a mirror to look for the presence of palnuts and to observe the condition of the torque stripes, and, if he observed a broken torque stripe, to report it to a LAME. Counsel for Mr McDermott submitted that, since it was apparent that the judge had accepted Mr McKendry as a credible and reliable witness concerning his usual practice for the inspection of palnuts, it would be illogical for the judge not also to accept Mr McKendry as a credible and reliable witness concerning his usual practice for the inspection of torque stripes. In counsel's submission, it followed that the judge should have found it was probable that, whatever the condition of the torque stripe on Bolt 4 when Mr McKendry inspected it, it was incapable of indicating that Bolt 4 was or might be rotating. And, in counsel's submission, when that evidence was combined with Mr Fisher and Mr Bray's testimony of their usual practices during a 100 hourly inspection, and with the expert evidence of the many ways in which torque stripes may deteriorate in service without necessarily signifying bolt rotation, it appeared probable, and the judge should logically have inferred, that when Mr Fisher and Mr Bray inspected Bolt 4 during the 100 hourly inspections preceding the crash, the condition of the torque stripe was equally incapable of indicating that Bolt 4 was or might be rotating.

63 Those submissions should be rejected. The judge did not specifically refer to Mr McKendry's evidence of his usual practice of looking for broken torque stripes. But, in dealing with whether it was likely that a palnut had been fitted to Bolt 4, his Honour said that it appeared to him that it would be easier for a pilot

to detect a missing palnut than to detect a crack in, or misalignment of, a torque stripe. Hence, his Honour accepted that, if the palnut were missing, it was likely that Mr McKendry would have discovered that it was missing. By contrast, it appears implicit in his Honour's reasoning that, because it was harder for a pilot to detect a crack in, or misalignment of, a torque stripe than to detect a missing palnut, his Honour did not accept that Mr McKendry would necessarily have observed a misaligned torque stripe. And the likelihood of that being so is fortified by the judge's further observation, later in his reasons, that "the failure of a pilot to detect that [the torque stripe] was broken (or, perhaps, missing) does not demonstrate inadequacy in the inspection carried out by the pilot"[23].

64 Just as importantly, whether or not Mr McKendry should be taken to have looked for a broken torque stripe, there was no evidence that he would have looked for a missing torque stripe, still less that he did so during the pre-flight checks in question. Nor was there evidence as to what significance he might have attributed to a missing torque stripe if he had observed one to be missing. And as has been seen, it is more likely that a torque stripe was not applied to Bolt 4 and so was missing at the time of the pre-flight checks than that one was present and misaligned. It is true, as counsel for Mr McDermott submitted, that Mr McKendry was not cross-examined as to whether he would have attributed any significance to a missing torque stripe. But it was not for Robinson to establish that he would or would not have attributed any significance to it. It was for Mr McDermott to exclude the possibility that he may not have considered it to be significant[24].

No inconsistency in the judge's reasons

65 Counsel for Mr McDermott emphasised what the majority of the Court of Appeal identified as error in the judge's reasoning in what were said to be two inconsistent findings: first, that it was probable that a torque stripe was not applied when Bolt 4 was incorrectly assembled, and hence that the LAMEs conducting the two subsequent 100 hourly inspections, Mr Fisher and Mr Bray, had failed to detect its absence; and secondly, that the weight to be attributed to certain of the evidence given by Mr Fisher and Mr Bray was diminished by the fact that, if they had examined Bolt 4 as part of those 100 hourly inspections, the

---

23 *McDermott v Robinson Helicopter Company* [2014] QSC 34 at [233].

24 *Tabet v Gett* (2010) 240 CLR 537 at 578 [111] per Kiefel J (Hayne and Bell JJ agreeing at 564 [65]); [2010] HCA 12.

condition of the torque stripe would have indicated that Bolt 4 had rotated. According to the majority, the latter statement contradicted his Honour's earlier finding that it was probable that a torque stripe was not applied to Bolt 4.

66 In truth, however, there was no contradiction. The judge made that latter observation in response to a contention by Robinson that it was probable that palnuts were missing from some of the flex plate bolts when the relevant 100 hourly inspections were carried out, and thus that Mr Fisher and Mr Bray were negligent in failing to detect their absence. As part of his analysis of that possibility, the judge referred to evidence of Mr Bray that it was his usual practice, when he observed that a palnut was missing, to take out the relevant bolt and make a thorough inspection of it; and also to evidence of Mr Fisher that it was his usual practice to check for missing palnuts and, if one were missing, to use a torque wrench to check the torque of the bolt. His Honour observed that the weight to be given to that evidence was[25]:

> "affected by the fact that each of them failed to detect the condition of the torque stripe for Bolt 4, which, on my findings must have at the time of their inspections indicated that Bolt 4 had rotated."

67 Evidently, the judge's reference to "my findings" in the latter context was a reference to both of his principal findings: *scil*, it was probable that the torque stripe was missing; and, in the alternative, if a torque stripe were present, it would have misaligned shortly after installation. Hence the significance of his Honour's holding, quoted in full earlier in these reasons, that, whether the torque stripe was "missing, damaged, or incomplete"[26], it would have been sufficient to indicate to a LAME the need to investigate further. Perhaps it would have been more accurate to say "might have rotated" rather than "had rotated". But such minor infelicity as that may represent is not an inconsistency or contradiction, properly understood.

68 Alan Wilson J suggested that the contradiction was put beyond doubt by a later reference by the judge to "my earlier findings". But that is not the case either. The judge made the later reference to "my earlier findings" when dealing with a further submission by Robinson that, if the torque stripe were present and broken (misaligned), the fact that it was broken should have been detected by the deceased helicopter pilot in the course of his mandated pre-flight checks; and,

---

25 *McDermott v Robinson Helicopter Company* [2014] QSC 34 at [202].

26 *McDermott v Robinson Helicopter Company* [2014] QSC 34 at [159].

therefore, that the pilot's failure to detect the break caused or contributed to the crash. His Honour rejected that submission as follows[27]:

> "If the submissions for Robinson on this issue are correct, then on each occasion after the torque stripe broke (which, on my earlier findings, was relatively shortly after Bolt 4 was incorrectly assembled), the pilot should have detected the condition of the torque stripe. In other words, on each of these occasions, the pre-flight inspection required by the [Pilot's Operating Handbook] was carried out inadequately. There is, in my view, a substantial degree of improbability about this."

69 There was no contradiction because it is apparent that "findings" in this latter context was used in a different sense from that described earlier. As has been remarked, in the earlier context of what competent LAMEs would have perceived, "findings" logically referred to both the finding that it was probable that a torque stripe was not applied and the alternative finding that, if a torque stripe were applied, it was probable that it misaligned shortly after installation. By contrast, in the latter context of the judge's rejection of the submission that the deceased pilot should have observed that the torque stripe applied to Bolt 4 had broken, the reference to "my earlier findings" can logically only have meant those of his Honour's earlier findings that bore on the alternative possibility that a torque stripe was applied to Bolt 4 but had broken by the time of the pre-flight check.

70 To use "findings" in a different sense in the latter context did not contradict the judge's earlier finding that it was probable that a torque stripe was not present. It reflected that, in order to deal with the latter submission, it was necessary for the judge to assume that the torque stripe was present (as was posited by the submission). For the purposes of addressing that submission, the conclusion that the torque stripe was broken when the pilot undertook the pre-flight check was based on his "earlier findings" that, if it were present, the torque stripe would have broken shortly after installation.

An alternate approach?

71 In addition to its complaints about the findings of fact made by the majority of the Court of Appeal, Robinson submitted that there was error in the

---

27 *McDermott v Robinson Helicopter Company* [2014] QSC 34 at [234].

failure of the majority of the Court of Appeal to consider s 9(1)(c) of the *Civil Liability Act*. Section 9(1)(c) provides that:

> "A person does not breach a duty to take precautions against a risk of harm unless –
>
> ...
>
> (c) in the circumstances, a reasonable person in the position of the person would have taken the precautions."

72 Robinson argued that it was not shown to have acted unreasonably because there was evidence that applying a torque wrench to Bolt 4 at each 100 hourly inspection could give rise to countervailing risks; and, in the same vein, Robinson contended that the fact that another helicopter manufacturer included such an instruction in its manual was irrelevant because that helicopter used older technology and required a significantly different maintenance regime from that required by the Robinson R22 helicopter.

Whether unreasonable not to require check with torque wrench

73 It is not clear that the majority failed to consider Robinson's submission that there was good reason for Robinson to eschew including a direction in the Manual to check the security of the bolts with a torque wrench as part of the 100 hourly inspection or the consequential submission that, perforce of s 9 of the *Civil Liability Act*, there was no breach of duty in failing to include that instruction. Robinson relied on evidence of its technical representative Mr Cox to the effect that the reason why the Manual did not include an express instruction to check the torque of the flex plate bolts with a torque wrench was a combination of difficulty of access, potential damage while a LAME was working in the area, and risk of an additional error being introduced. But in answer to questions put to him in cross-examination, Mr Cox agreed that, compared to the catastrophic consequences which occurred in this case, the risk of causing damage by applying a torque wrench would be relatively minimal. There was also uncontested evidence given by Dr Gilmore, a mechanical engineer called by Mr McDermott, that to check the torque of the flex plate bolts would be a relatively rapid procedure, using a short open-end adaptor of the kind shown in the Manual, which would not require disassembly of the joint.

74 Alan Wilson J referred to all of that evidence. Consequently, although his Honour did not mention s 9 of the *Civil Liability Act* as such, it appears implicit that, because of Dr Gilmore's evidence, his Honour did not consider that the

considerations mentioned by Mr Cox were sufficient reason for Robinson not to include a direction to check the torque of the flex plate bolts with a torque wrench.

Whether comparison with other manufacturer relevant

75 There is more substance, however, in Robinson's complaint that the majority erred in basing their conclusion on the fact that another manufacturer, Schweizer, required that the torque of the bolts on its 269C-1 model helicopter be checked with a torque wrench.

76 Mr Cox gave detailed evidence, to which the majority did not refer, to the effect that the fastener technology used in the Schweizer helicopter was AN-style hardware which dated from the 1950s and which is torqued to approximately only half of the torque applied to the more modern NAS hardware employed in Robinson helicopters. In addition, Dr Orloff gave uncontradicted evidence that the Schweizer helicopter was of a totally different design which did not employ a flex plate, idle pulley or clutch cable. The latter evidence carried particular weight because, apart from being a highly qualified aeronautical engineer and a licensed airframe and power plant mechanic, Dr Orloff had owned and serviced his own Schweizer helicopter for a number of years.

77 Perhaps the majority considered that, despite the differences between the Schweizer helicopter and the Robinson R22 helicopter, the approach followed by Schweizer was a relevant point of comparison. But, in the absence of any explanation of why the differences did not render the comparison irrelevant, the majority's bare statement of conclusion that the comparison was pertinent is untenable.

No breach of duty of care

78 For those reasons, it should be concluded that it was open to the judge to find, as he did, either that there was no torque stripe applied to Bolt 4 when the bolt was incorrectly assembled on 17 February 2004 or, if there were a torque stripe completely applied to Bolt 4 at that time, that it would have cracked shortly afterwards and thus would have been misaligned (and potentially deteriorated) at the time of each of the two 100 hourly inspections immediately preceding the crash. Consequently, it was probable that, if Mr Fisher or Mr Bray had properly inspected Bolt 4 in accordance with the Manual, they would have seen the absence of a torque stripe or a torque stripe in such a condition as would have alerted them to the need for further examination. And, had they conducted such a further examination, it would have revealed that Bolt 4 was or might be rotating.

Thus, as Holmes JA held, whatever other inadequacies there might or might not have been in the Manual, it was not shown to have been inadequate to convey to Mr Fisher and Mr Bray that Bolt 4 needed attention. The judge was right to hold that it was not shown that the contents of the Manual fell short of what was required to discharge Robinson's duty of care in the circumstances of this case.

Causation

79 Having found that Mr McDermott had not established that Robinson breached its duty of care to him, the judge did not consider it necessary to deal with the question of causation. Equally, having concluded that the judge was not in error in holding that there was no breach of duty, it is, strictly speaking, unnecessary for this Court to consider causation. In deference, however, to the substantial arguments which were advanced on the issue, it is appropriate to say something brief about it.

80 As has been seen, the judge's conclusion that Robinson was not shown to have breached its duty of care to Mr McDermott depended in part on his Honour's finding that it was quite unlikely that, if a torque stripe were applied, it was applied to a dirty or greasy surface in a manner which permitted the horizontal section of the stripe to rotate with the bolt and thereby convey the impression that Bolt 4 was not rotating. But it should be understood that even if that were accepted as a realistic possibility, Mr McDermott would still have failed to establish causation.

81 The majority of the Court of Appeal concluded that, if the application of a torque stripe to a dirty or greasy surface were a realistic possibility, there would have been four possibilities, namely:

(1) that a torque stripe was not applied when the bolt was incorrectly assembled;

(2) that a torque stripe was correctly applied and misaligned so as to provide an adequate indication of bolt rotation;

(3) that a torque stripe was incorrectly applied, so as not to adhere to both the bolt as well as the fixed components, so that the torque stripe could move with the rotating bolt and not crack; and

(4) that a torque stripe was correctly applied but due to ageing, fading or chipping had to some degree deteriorated.

The majority did not conclude, however, and it cannot be inferred from the evidence, that possibility (3) was any more likely to have occurred than any of the other possibilities. At best from Mr McDermott's point of view, possibility (3) might be viewed as no less likely to have occurred than any of the others; and, for the reasons given by the judge, and reiterated by Holmes JA in the Court of Appeal, the Manual was adequate to deal with each of the other possibilities.

82 On the assumption that it was a realistic possibility that a torque stripe was incomplete or applied to a dirty or greasy surface in a manner that permitted the horizontal section of the stripe to rotate with the bolt and thereby create a deceptive appearance of bolt security, it might have been concluded that Robinson owed a duty of care to take reasonable care to avoid that risk eventuating. It might also have been considered that Robinson breached its duty of care by failing to include a direction in the Manual that flex plate bolts be checked with a torque wrench at each 100 hourly inspection. But, since the Manual was adequate to cover possibilities (1), (2) and (4), and it was not established that possibility (3) was any more likely to have occurred than any of the other possibilities, it could not be concluded that the breach of duty in failing to provide for possibility (3) was causative of the crash[28].

83 Counsel for Mr McDermott argued to the contrary that, if there had been a requirement in the Manual to verify the torque of the flex plate bolts with a torque wrench during 100 hourly inspections, it was probable that that requirement would have been complied with. Thus, regardless of which of possibilities (1) to (4) in fact occurred, it was apparent that it was Robinson's breach of duty in failing to require that the bolts be re-torqued which caused the crash.

84 That argument should be rejected. Essentially, it amounts to saying that, if a manufacturer recommends a simple procedure adequate for detection of a fault that in fact occurs, but does not recommend a more sophisticated procedure necessary to detect not only the fault that in fact occurs but also another fault that was a foreseeable possibility but that did not in fact occur, and, as a result of the user failing to adhere to the recommended procedure, the fault that in fact occurs is not detected, the manufacturer should nonetheless be held liable to the user for the consequences of the user's failure to discover the fault that in fact occurs. The logic of that is hardly self-evident.

---

28 *Tabet* (2010) 240 CLR 537 at 589 [151] per Kiefel J (Hayne and Bell JJ agreeing at 564 [65]).

85 Conceivably, if a manufacturer recommended the more sophisticated procedure, the user might be more likely to follow the sophisticated procedure than the recommended procedure, possibly because the recommendation of the more sophisticated procedure may heighten the user's appreciation of the potential risks of failing to do what was recommended. On that basis, it might be conjectured that, because of the manufacturer's failure to recommend the more sophisticated procedure, the user would be deprived of a chance of avoiding the damage that the recommendation of the more sophisticated procedure may have avoided. But, in this case, there are at least two reasons why an argument of that kind is bound to fail.

86 First, at the level of principle, this Court has set its face against recovery of loss of a chance in the law of negligence relating to personal injuries[29]. Although proof of causation may sometimes entail the robust, pragmatic drawing of inferences[30], especially where there are a number of possible causes and there is difficulty in ascertaining which of them was the cause of damage suffered[31], proof of causation still requires proof on the balance of probabilities that the alleged breach of duty was the cause of the damage suffered[32].

87 Secondly, at a factual level, such evidence as there was on the matter pointed against the likelihood that Mr Fisher and Mr Bray would have been any

---

29 *Tabet* (2010) 240 CLR 537 at 563 [61]-[62] per Gummow ACJ, 588-589 [150]-[151] per Kiefel J (Hayne and Bell JJ agreeing at 564 [65]); *Badenach v Calvert* [2016] HCA 18 at [38] per French CJ, Kiefel and Keane JJ.

30 *Betts v Whittingslowe* (1945) 71 CLR 637 at 649 per Dixon J; [1945] HCA 31; *Wilsher v Essex Area Health Authority* [1988] AC 1074 at 1090 per Lord Bridge of Harwich (Lord Fraser of Tullybelton, Lords Lowry, Griffiths and Ackner agreeing at 1092); *Tabet* (2010) 240 CLR 537 at 558 [42] per Gummow ACJ; cf *Chappel v Hart* (1998) 195 CLR 232 at 242 [23], 243-244 [26] per McHugh J; [1998] HCA 55.

31 See, eg, *Birkholz v R J Gilbertson Pty Ltd* (1985) 38 SASR 121 at 129-130 per King CJ, 138-139 per Matheson J, 144-145 per Bollen J.

32 *Civil Liability Act*, s 12; *Tabet* (2010) 240 CLR 537 at 578 [111] per Kiefel J (Hayne and Bell JJ agreeing at 564 [65]). Cf *McGhee v National Coal Board* [1973] 1 WLR 1 at 4-5 per Lord Reid, 5-7 per Lord Wilberforce; [1972] 3 All ER 1008 at 1010-1011, 1011-1013; *Birkholz* (1985) 38 SASR 121 at 130, 132 per King CJ, 146 per Bollen J.

more assiduous in adhering to a recommendation that they check the torque of the bolts with a torque wrench than they were in examining the torque stripes in accordance with the Manual. Although each of them gave evidence that he was familiar with the Manual, and that he followed it, both of them said that they did so without necessarily looking at the Manual and Mr Fisher said that he did not make use of the check list. Neither of them said that he would have been any more likely to adhere to a recommendation that he check the bolts with a torque wrench than he was likely to conduct a thorough examination of the torque stripes for indications of possible bolt rotation.

Conclusion

88 In the result, the appeal should be allowed with costs. The orders of the Court of Appeal should be set aside. In lieu, it should be ordered that the appeal to the Court of Appeal be dismissed with costs.