The law has traditionally levied punitive damages against wrongdoers who act in bad faith or with willful intent.\(^1\) These damages serve a dual role of punishing blameworthy conduct and deterring undesirable behavior before it happens.\(^2\) Patent law provides for punitive damages under the doctrine of willful infringement. While the Patent Act does not expressly address willfulness or intent, § 284 provides the statutory basis for an award of up to treble damages for infringement.\(^3\)

The doctrine of willful infringement came of age in response to perceived underenforcement that allowed competitors to copy patented designs in "flagrant disregard" of the owners' property rights.\(^4\) Congress was concerned that, in the absence of a secure monopoly on their technologies, inventors would hesitate to share their ingenuity with the public, thus undermining the Patent Act's incentive to disclose.\(^5\) The courts interpreted and addressed this concern by awarding enhanced damages in cases where an infringer acted with willful intent.\(^6\)
Due to the lack of explicit statutory guidance in § 284, the factors involved in finding willfulness and in determining damages emerged from common law.\(^7\) The Federal Circuit has repeatedly instructed courts to look to the “totality of the circumstances” in determining willfulness.\(^8\) However, as the doctrine evolved, the duty to obtain an opinion of counsel before initiating any possible infringing activity gained prominence over other factors.\(^9\) With its 1986 opinion in Kloster Speedsteel AB v. Crucible Inc., the Federal Circuit elevated the advice of counsel defense above other evidence of good faith, stating that an accused infringer’s failure to obtain advice of counsel or to submit the advice to the court would lead to a presumption of bad faith.\(^10\)

Kloster-Speedsteel’s “adverse inference” has since encouraged undesirable conduct on the part of patentees, their competitors, and attorneys. For example, the adverse inference discourages innovators from reading patents,\(^11\) encourages patentees to harass competitors,\(^12\) and inhibits communication between innovators and their attorneys.\(^13\) Numerous commentators have criticized the modern willfulness doctrine, contending that willfulness charges do not effectively deter direct copying or punish truly

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\(^7\) See, e.g., Read, 970 F.2d at 826-27; Gustafson, Inc. v. Intersystems Indus. Prods., Inc., 897 F.2d 508, 510 (Fed. Cir. 1990); Rolls-Royce Ltd. v. GTE Valeron Corp., 800 F.2d 1101, 1110 (Fed. Cir. 1986).

\(^8\) Rite-Hite Corp. v. Kelley Co., Inc., 819 F.2d 1120, 1125-26 (Fed. Cir. 1987); Rolls-Royce, 800 F.2d at 1110.


\(^10\) Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 1579-80 (Fed. Cir. 1986) (“[Defendant]’s silence on the subject, in alleged reliance on the attorney-client privilege, would warrant the conclusion that it either obtained no advice of counsel or did so and was advised that its importation and sale of the accused products would be an infringement of valid U.S. patents.”).


\(^12\) Lemley & Tangri, supra note 11, at 1093-94.

culpable behavior and that the doctrine creates unhealthy incentives for industry as well as patent lawyers. In a recent report on patent reform, a National Academy of Sciences board remarked that “the shield [of willful infringement] seems to have morphed into a sword.”

After nearly two decades under the adverse inference rule, an en banc Federal Circuit addressed the issue in *Knorr-Bremse Systeme Fuer Nutzfahrzeuge Gmbh v. Dana Corp. ("Knorr-Bremse IV").* The court reversed its own precedent and overturned the adverse inference created by an accused infringer’s failure to obtain and produce advice of counsel.

*Knorr-Bremse IV* alleviates some problems created by the adverse inference, but avoids the remaining defects in the willfulness doctrine. For example, although the duty of due care to avoid infringement remains intact, the Federal Circuit did not instruct defendants on how to demonstrate “due care” in the absence of an exculpatory legal opinion. The decision also fails to provide disincentives for unfounded claims of willfulness. Finally, the other factors in the “totality of the circumstances” test are too amorphous to guide competitors or provide certainty regarding freedom to operate. Thus, it is unclear whether the *Knorr-Bremse IV* decision will change the behavior of attorneys or clients on either side of patent infringement suits.

Part I of this Note introduces willful infringement and the evolution of the adverse inference. Part II describes the *Knorr-Bremse IV* decision. Part III discusses the problems with the willfulness doctrine in the years leading up to the case and analyzes the possible effects of the decision. Finally, Part IV presents proposals to reform the willfulness standard. It also argues that, while *Knorr-Bremse IV* signaled a step in the right direc-

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15. *NAS STUDY*, supra note 11, at 118.


17. *Id.* at 1344.

tion, additional steps would more effectively reverse the harmful incentives created by the doctrine and further the goals of the Patent Act.

I. **LEGAL BACKGROUND: WILLFULNESS DOCTRINE AND THE ADVICE OF COUNSEL DEFENSE**

A. **Willful Infringement**

Willfulness is a judicially-created doctrine that goes beyond the remedial regime enunciated by the Patent Act. A patent does not bestow the patentee with an affirmative right to use or market his invention. Instead, the inventor may seek an injunction and compensatory damages from anyone that practices his invention without permission.\(^9\) An infringer need not be aware of a patent to be found liable,\(^20\) but the patent holder may not seek damages until the accused is made aware of the patent.\(^21\) Thus, patent law is a remedial system and infringement is a strict liability offense.\(^22\)

Section 284 of the modern Patent Act provides for infringement damages "adequate to compensate for the infringement, but in no event less than a reasonable royalty... together with interest and costs as fixed by the court. ... [T]he court may increase the damages up to three times the amount found or assessed."\(^23\) A patent holder may also attempt to seek compensation for attorney’s fees, even if he is unable to show that he suffered measurable damages.\(^24\)

1. **Historical Background of the Willfulness Doctrine**

While much of the Patent Act of 1836 was aimed at Patent Office reform, inclusion of the discretionary treble damages clause demonstrated

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21. 35 U.S.C. § 287(a). The patentee can constructively give notice by affixing his patent number to the invention or its packaging. Notice may also take the form of a complaint letter from the patentee. *Id.*
22. See id. § 271(a); Powers & Carlson, *supra* note 6, at 56-57 ("[I]nfringement is a strict liability tort.").
24. *Id.* § 285 (authorizing the court to award attorney’s fees to the prevailing party in exceptional cases). The Federal Circuit has held that "[b]ad faith litigation, willful infringement, or inequitable conduct are among the circumstances that may render a case ‘exceptional’ for purposes of § 285." Knorr-Bremse Sys. Fuer Nutzfahrzeuge GmbH v. Dana Corp., 133 F. Supp. 2d 843, 864 (E.D. Va. 2001) [hereinafter *Knorr-Bremse II*] (quoting Mahurkar v. C.R. Bard, Inc., 79 F.3d 1572, 1580 (Fed. Cir. 1996)).
early congressional recognition of willful infringement.\textsuperscript{25} The Senate Report that accompanied the bill noted widespread copying, where the culprit would build the claimed invention from an issued patent and then patent an identical or trivially-modified version for himself.\textsuperscript{26} The Report commented that patentees faced difficulty and expense in trying to enforce their rights and that, due to limited record-keeping capabilities, the Patent Office was unable to effectively access the prior art to determine novelty of these copy-cat patents.\textsuperscript{27}

Eighteen years after its passage, the Supreme Court, in \textit{Seymour v. McCormick},\textsuperscript{28} stated that the Act left "the power to inflict vindictive or punitive damages . . . to the discretion and judgment of the court within the limit of trebling the actual damages."\textsuperscript{29} The Court distinguished discretionary treble damage awards from actual damages, where the latter was to be determined by the trier of fact without regard for intent. In the wake of \textit{Seymour}, courts generally imposed enhanced damages only where there was evidence of deliberate copying or other bad faith behavior.\textsuperscript{30}

\textbf{2. Modern Cases}

The Federal Circuit, after its formation in 1982, developed willfulness into a doctrine that posed a formidable threat to accused infringers. In \textit{Underwater Devices, Inc. v. Morrison-Knudsen Co.}, the nascent court ruled that once a potential infringer discovers a patent, he has an affirmative duty of due care to avoid infringement.\textsuperscript{31} He may become aware of a patent (i) by receiving notice from the patentee, either in a cease-and-desist letter or a licensing offer; (ii) from the U.S. Patent and Trademark Office (PTO), perhaps during prosecution of his own patent; or (iii) independently, such as while researching his field of interest.\textsuperscript{32}

The Federal Circuit emphasized the importance of an opinion letter to prove due care, but noted that it would not exonerate the client if he relied

\begin{itemize}
\item \textsuperscript{25} Powers & Carlson, \textit{supra} note 6, at 64-66.
\item \textsuperscript{26} S. Rep. No. 24-239 (1836), \textit{reprinted in 9 CHISUM, supra} note 4, app. 12 at 12-4.
\item \textsuperscript{27} One can imagine that modern information accessibility and cataloguing ameliorate these problems to a large extent.
\item \textsuperscript{28} 57 U.S. 480 (1854).
\item \textsuperscript{29} \textit{Id.} at 489.
\item \textsuperscript{30} See, e.g., Powers & Carlson, \textit{supra} note 6, at 68-70.
\item \textsuperscript{31} 717 F.3d 1380, 1389-90 (Fed. Cir. 1983) ("Where, as here, a potential infringer has actual notice of another's patent rights, he has an affirmative duty to exercise due care to determine whether or not he is infringing. Such an affirmative duty includes, \textit{inter alia}, the duty to seek and obtain competent legal advice from counsel \textit{before} the initiation of any possible infringing activity." (citations omitted)).
\item \textsuperscript{32} Lemley & Tangri, \textit{supra} note 11, at 1090.
\end{itemize}
on it unjustifiably.\textsuperscript{33} Thus, not only must the accused show that he relied on the opinion, but he must also satisfy the more objective inquiry of whether he was reasonable to do so.\textsuperscript{34}

The accused infringer in \textit{Underwater Devices} refused a license from the patentee, based on the advice of in-house counsel to "refuse to even discuss . . . royalties" because patents are held "invalid in approximately 80\% of the cases."\textsuperscript{35} The court noted the defendant's disregard for the patent right in finding willful infringement.\textsuperscript{36} Disrespect for patent validity, rightful or not, provided the original motivation for the willful infringement doctrine.

The cases following \textit{Underwater Devices} further defined the duty of due care. In 1986, in \textit{Bott v. Four Star Corp.}, the Federal Circuit provided a nonexclusive list to help the trier of fact decide whether infringement was willful.\textsuperscript{37} The list included:

(1) whether the infringer deliberately copied the ideas or design of another;
(2) whether the infringer, when he knew of the other's patent protection, investigated the scope of the patent and formed a good-faith belief that it was invalid or that it was not infringed, and
(3) the infringer's behavior as a party to the litigation.\textsuperscript{38}

The second factor provided the basis for the advice of counsel defense that has subsequently become so central. Similar to \textit{Underwater Devices}, the court in \textit{Bott} accorded substantial weight to this defense, deciding that the defendant had not acted in good faith, and noting that it did not seek independent counsel to determine infringement. Moreover, defendant's in-house attorney only imparted an oral opinion "consist[ing] merely of conclusory statements without supporting reasons."\textsuperscript{39}

\textsuperscript{33} \textit{Underwater Devices}, 717 F.2d at 1390.
\textsuperscript{34} \textit{Id.} The court suggested that a competent opinion would be independently rendered, directed toward infringement and validity of the patent at issue, and based on probative sources. \textit{Id.}
\textsuperscript{35} \textit{Id.} at 1385.
\textsuperscript{36} \textit{Id.} at 1390 ("Had [the memo] contained within its four corners a patent validity analysis, properly and explicitly predicated on a review of the file histories of the patents at issue, and an infringement analysis that, \textit{inter alia}, compared and contrasted the potentially infringing method or apparatus with the patented inventions, the opinion may have contained sufficient internal indicia of creditability . . . .").
\textsuperscript{37} 807 F.2d 1567, 1572 (Fed. Cir. 1986).
\textsuperscript{38} \textit{Id.}
\textsuperscript{39} \textit{Id.}
Bott and Underwater Devices provided guidance for the trier of fact to determine willfulness. Yet § 284 leaves the decision of whether, and by how much, to enhance damages to district court judges, who had little guidance on this issue until the Federal Circuit's discussion in Read Corp. v. Portec, Inc.40 Continuing from the Bott factors, Read added:

(4) Defendant's size and financial condition.
(5) Closeness of the case.
(6) Duration of defendant's misconduct.
(7) Remedial action by the defendant.
(8) Defendant's motivation for harm.
(9) Whether defendant attempted to conceal its misconduct.41

While Bott spoke to the willfulness determination and Read to the amount of damages, courts and juries have since used all nine factors in deciding both questions.42 However, the list is not exclusive and the "totality of the circumstances" should be examined for willfulness and setting damages.43

B. The Advice of Counsel Defense

Despite the totality of the circumstances test, courts tended to favor the second Bott factor, considering an attorney's opinion of non-infringement or unenforceability particularly strong evidence against willful infringement.44 The Federal Circuit formalized this defense in subsequent decisions to create a presumption of bad faith in the absence of such an opinion.

40. 970 F.2d 816 (Fed. Cir. 1987).
41. Id. at 826-27 (citations omitted).
42. Knorr-Bremse IV, 383 F.3d 1337, 1346 (Fed. Cir. 2004) (en banc); Sharper Image Corp. v. Honeywell Int'l Inc., 222 F.R.D. 621, 629-30 (N.D. Cal. 2004). The judge and jury play "curiously blended" roles in willful infringement. A "jury determination of this 'fact' question is only advisory [and] a judge is not required to enhance damages." Sharper Image, 222 F.R.D. at 629 n.15.
43. See, e.g., Knorr-Bremse IV, 383 F.3d at 1346; Gustafson, Inc. v. Intersystems Indus. Prods., Inc., 897 F.2d 508, 510-11 (Fed. Cir. 1990) (finding that the actor's willful intent "must be inferred from all the circumstances"); Rite-Hite Corp. v. Kelley Co., 819 F.2d 1120, 1125-26 (Fed. Cir. 1987); Rolls-Royce Ltd. v. GTE Valeron Corp., 800 F.2d 1101, 1110 (Fed. Cir. 1986) ("In respect of willfulness, there cannot be hard and fast per se rules."); Underwater Devices, Inc. v. Morrison-Knudsen Co., 717 F.2d 1380, 1390 (Fed. Cir. 1983).
44. See, e.g., Comark Communications, Inc. v. Harris Corp., 156 F.3d 1182, 1190-91 (Fed. Cir. 1998).
1. The Adverse Inference Before Knorr-Bremse IV

With Kloster Speedsteel v. Crucible Inc. in 1986, the Federal Circuit elevated advice of counsel above the other Bott factors. This holding permitted courts to infer that an accused infringer had acted in bad faith if he did not commission a legal opinion. From this, a court could presume (1) that a defendant either knew that he was infringing and did not want to commit such an opinion to paper or that (2) he was acting with willful ignorance. The court further held that where the accused obtained an opinion but refused to waive the attorney-client privilege, courts could negatively infer that the opinion was incriminating.

Kloster Speedsteel thus signaled the era of the adverse inference. Under the rule, a party that becomes aware of a patent must decide whether to spend resources investigating and securing legal counsel or to proceed and risk enhanced damages. Moreover, accused infringers are not necessarily shielded from a willfulness claim once they seek an exculpatory legal opinion. The defendant must show that he reasonably relied on the opinion and that it was competently rendered. Such an analysis relies on the jury's more objective determination of whether the accused was reasonable to rely on the opinion and its more subjective analysis of whether the accused acted in good faith based on the specific circumstances.

45. 793 F.2d 1565, 1579-80 (Fed. Cir. 1986); see also Fromson v. Western Litho Plate & Supply Co., 853 F.2d 1568, 1572-73 (Fed. Cir. 1988) (quoting Kloster Speedsteel and finding willful infringement where the defendant did not turn over its opinion of counsel).

46. See, e.g., Sharper Image, 222 F.R.D. at 632.

47. Kloster Speedsteel, 793 F.2d at 1579; see also SRI Int'l v. Advanced Tech. Lab., 127 F.3d 1462, 1465-67 (Fed. Cir. 1997).


49. Comark Communications, 156 F.3d at 1191; Read Corp. v. Portec, Inc., 970 F.2d 816, 829 (Fed. Cir. 1992).


52. Sharper Image, 222 F.R.D. at 632.

53. Underwater Devices, 717 F.2d at 1390.
2. Advice of Counsel as Evidence of Good Faith

If a defendant chooses to rely on his attorney’s opinion to show good faith, the court considers his attorney-client privilege waived and requires production of the once-confidential advice to examine its reliability. The waiver extends beyond the opinion letter, as courts have compelled additional communications and work product from the attorney. Understandably, this broad effect of producing counsel’s opinion has been the source of considerable controversy.

The attorney-client privilege is supported by years of jurisprudence, and is nicely summarized by then-Justice Rehnquist in *Upjohn Co. v. United States.* The privilege is intended “to encourage full and frank communication between attorneys and their clients and thereby promote broader public interests in the observance of law and administration of justice.” Clients will only be willing to fully disclose information to their attorneys if they do not fear its revelation. Kloster Speedsteel and its progeny suggest that the possibility of willful infringement presents a special exception to the policy: The patentee’s need to inquire into the defendant’s intent outweighs the accused infringer’s right to confidential communications with his attorney. Regardless of the accuracy of that statement, the cost of the adverse inference is high, and accused infringers often decide to waive their privileges in order to avoid the adverse inference.

3. The Scope of the Waiver

In practice, once a defendant waives his attorney-client privilege, there is wide variation in what a court may require him to produce. Courts have hesitated to compel attorney work product not communicated to the client.

54. Sharper Image, 222 F.R.D. at 625 n.4. This assumption is designed to prevent defendants from using legal advice to defend against a claim of bad intent and then refusing to allow discovery of the content of the advice.

55. See id. (summarizing situations where attorney work product has been compelled).

56. Critics generally cite Fed. R. Civ. P. 26(b)(3), which details work product immunity and protects materials generated in preparation for litigation in the absence of “substantial need” on the part of the plaintiff.


58. Id. at 389.

59. Id.

because it may not truly reflect the party’s intent. However, the waiver has been stretched to include uncommunicated work product, especially when investigating whether an attorney provided a non-reproducible verbal opinion to the client to avoid damaging, written evidence.

Subject matter may also determine what material a court demands. The court may require the defendant to present only those opinions that cover the patent at issue. Alternatively, the court may request opinions on related patents. Further, if the defendant does not claim invalidity, the court might only compel opinions that address infringement.

The scope of the waiver may also vary according to time. The court may compel opinions commissioned before the defendant began the allegedly infringing behavior, extend the waiver to opinions sought after the defendant had notice of the patent at issue, or reach to compel opinions rendered after the patentee served the defendant with an infringement complaint. “Infringement is a continuing tort” and the court may look for evidence of the defendant’s intent over time, even if it appears he originally infringed innocently.

A party accused of infringement will frequently retain separate firms to render the infringement opinion and to litigate the suit in order to avoid disclosing communications with his preferred litigation counsel that could put him at a competitive disadvantage with his accuser in the marketplace or in court. Occasionally however, courts require material from both the opinion counsel and the attorney representing the accused in the infringement suit—for instance, where continuing infringing activity is an issue. This expansive view of waiving the attorney-client privilege has been criticized. In Sharp Image Corp. v. Honeywell International, Inc., the
district court stressed the right of the accused to have confidential litigation counsel, noting that revealing materials from litigation counsel would put the defendant at a distinct competitive disadvantage, for example, in negotiating a settlement with a powerful plaintiff.\footnote{22}{Sharper Image Corp. v. Honeywell Int’l Inc., 222 F.R.D. 621, 643-44 (N.D. Cal. 2004).}

In summary, prior to Knorr-Bremse IV, a party accused of willfulness, and either without a favorable opinion of counsel or willingness to waive privilege on the opinion, was subject to automatic disadvantage and dealt a “virtual death blow.”\footnote{23}{Lee & Cogswell, supra note 60, at 419.}

II. \textit{Knorr-Bremse IV}

A number of stakeholders have criticized modern willfulness doctrine and the chilling effect of the adverse inference in the years leading up to the \textit{Knorr-Bremse} cases. Thus, conditions were ripe for the Federal Circuit to address whether an accused infringer’s failure to secure a legal opinion and his reliance on the attorney-client privilege should give rise to a negative inference.

A. Background


Haldex Brake Products AB is a Swedish company that designs air brakes in cooperation with its American subsidiary, Haldex Brake Products Corp. (collectively "Haldex"). Haldex made the prototype for its Mark II model brake in 1996, and agreed to collaborate with Dana Corporation ("Dana"), another American company, to sell Mark II brakes in the United States.\footnote{25}{\textit{Knorr-Bremse II}, 133 F. Supp. 2d 843, 849-50 (E.D. Va. 2001).}

Beginning in 1997, Haldex sent a number of the brakes to Dana from Sweden, free of charge, for initial testing.\footnote{26}{Id. The collaborators installed the Mark II brakes on both Dana trucks and those of potential customers for free, and kept performance records. They also advertised the brakes in trade shows and publications during 1997-2000. \textit{Knorr-Bremse IV}, 383 F.3d 1337, 1341 (Fed. Cir. 2004) (en banc).}

In 1998, Knorr-Bremse orally notified Dana of its pending U.S. patent and of patent disputes that had arisen with Haldex in Europe. In 1999,
shortly after the '445 patent issued, Knorr-Bremse notified Dana in writing, and again noted the European patent disputes with Haldex.\textsuperscript{77}

In May 2000, Knorr-Bremse commenced an infringement suit against all three entities, who denied infringement and counterclaimed invalidity based on obviousness and indefiniteness. During discovery, the defendants presented the Mark III as a good-faith attempt to design around the patentee's brake and moved for summary judgment of non-infringement in September 2000.\textsuperscript{78} After a Markman hearing, the district court held that the Mark II literally infringed the '445 patent. The court granted defendants' motion against damages, as the patentee could not demonstrate harm from the testing of Mark II brakes on Dana trucks.\textsuperscript{79} At trial, the court also held that the Mark III literally infringed the '445 patent and that the claims were valid and nonobvious.\textsuperscript{80}

As to the issue of willfulness, the court noted that Knorr-Bremse discussed both the German and U.S. versions of the '445 patent with Haldex in 1999. Subsequently, Haldex obtained a copy of the '445 patent and contacted European and American counsel on the issue of infringement. However, defendants continued to display, promote, and test their Mark II brakes after receiving notice.\textsuperscript{81} In spite of evidence that Knorr-Bremse orally notified Dana of the '445 patent in 1998, the district court allowed that Dana was not aware of it until Knorr-Bremse filed the infringement suit in May 2000.\textsuperscript{82} However, Dana did not obtain a legal opinion on infringement or investigate the '445 patent at that time, opting instead to rely on Haldex to handle the matter. Dana continued to test and promote the Mark II brakes, even after the company was charged with infringement.\textsuperscript{83}

The court relied on the adverse inference to find willful infringement, as Haldex did not turn over the opinion of its U.S. attorney for discovery and Dana did not retain counsel.\textsuperscript{84} Moreover, additional \textit{Read} factors weighed against the defendants. They did not have a substantial defense to infringement, given the lack of convincing evidence of obviousness\textsuperscript{85} or

\textsuperscript{77} Knorr-Bremse \textit{IV}, 383 F.3d at 1341.
\textsuperscript{78} Knorr-Bremse \textit{II}, 133 F. Supp. 2d at 849-50, 857.
\textsuperscript{80} Knorr-Bremse \textit{II}, 133 F. Supp. 2d at 859-62.
\textsuperscript{81} See Knorr-Bremse \textit{IV}, 383 F.3d at 1341.
\textsuperscript{82} Knorr-Bremse \textit{II}, 133 F. Supp. 2d at 857.
\textsuperscript{83} Id. at 857-58.
\textsuperscript{84} Id. at 862-63.
\textsuperscript{85} Id. at 856 ("Significantly, defendants offered no expert testimony or persuasive lay testimony concerning (i) the level of ordinary skill in the art at the time of the inven-
indefiniteness; they did not discontinue their allegedly-infringing behavior or take remedial action upon learning of the '445 patent; and finally, defendants continued their activities even after the Mark II was found to literally infringe. Despite the finding of willfulness, the court could not require enhanced damages, because Knorr-Bremse did not suffer measurable damages. But in light of the defendants' willful behavior, the court awarded attorney's fees to Knorr-Bremse in accord with § 285.87

The Federal Circuit sua sponte granted en banc review,88 and requested amicus briefs on three questions:

1. When the attorney-client privilege and/or work product privilege is invoked by a defendant in an infringement suit, is it appropriate for the trier of fact to draw an adverse inference with respect to willful infringement?
2. When the defendant has not obtained legal advice, is it appropriate to draw an adverse inference with respect to willful infringement?
3. Should the existence of a substantial defense to infringement be sufficient to defeat liability for willful infringement even if no legal advice has been secured?89

Hence, the court not only indicated that it would reconsider the adverse inference, but signaled a possible safe harbor for defendants in willfulness cases.

B. The En Banc Decision

The Federal Circuit released its opinion in September 2004, after input from not only the parties, but many other groups as well. Industry, trade groups, and academics submitted twenty-four briefs, resoundingly in favor of the defendant-appellant and critical of the adverse inference. The Federal Circuit agreed and eliminated the adverse inference from the willfulness inquiry.

Judge Newman's opinion stated that a party accused of willful infringement: (1) does not draw an adverse inference in claiming attorney-

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86. Id. at 863.
87. Id. at 864.
89. Id. at 1336-37.
client or work product privilege to protect a legal opinion; (2) does not
draw an adverse inference by not obtaining an infringement opinion; but
nonetheless (3) may be held liable for willful infringement even if he had
a substantial defense to infringement in the absence of a legal opinion of
invalidity or non-infringement.

Through *Knorr-Bremse IV*, the Federal Circuit overturned the adverse
inference advanced in *Kloster Speedsteel*, and returned to the totality of
the circumstances standard by stating that “the trier of fact [is] to accord
each factor the weight warranted by its strength in the particular case.” 90
Citing *Rolls-Royce,* 91 the court rejected application of a per se rule, and
opted for a balance of factors such as those enumerated in *Bott* and *Read.*
92 The majority explicitly declined to address the issue of whether the jury
should be told if a defendant commissioned an opinion of counsel when
the defendant invokes attorney-client privilege. 93

Judge Dyk filed a separate opinion, concurring-in-part and dissenting
on the issue of a potential infringer’s affirmative duty of due care. 94 His
opinion stated that patent law diverges from other aspects of law where
violating a duty of due care is akin to negligence, and he argued that a
finding of willfulness, with its punitive consequences, should be reserved
for truly culpable behavior. 95 Finally, he noted that the due care standard
does not benefit the patent system, given that the patentee is compensated
for infringement damages regardless of the offender’s intent, and because
the outcome of infringement cases is so difficult to predict. 96

By removing the adverse inference, *Knorr-Bremse IV* reduced the
negative connotation of not invoking the advice of counsel defense that
had grown for the last twenty years. 97 While *Knorr-Bremse IV* will be wel-

91. *Id.* at 1346; *Rolls Royce, Ltd. v. GTE Valeron Corp.*, 800 F.2d 1101, 1110 (Fed.
Cir. 1986).
92. *Knorr-Bremse IV*, 383 F.3d at 1346. The court remanded the issue of whether
defendants should be liable for willful infringement in this particular case. The court also
dismissed defendants’ assertion that attorney’s fees are punitive in the absence of dam-
age, noting that attorney’s fees are compensatory and well within the discretion of the
district court on remand. *Id.* at 1347.
93. *Id.* at 1346.
94. *Id.* at 1348 (Dyk, J., concurring-in-part and dissenting-in-part).
95. *Id.* at 1348-52 (Dyk, J., concurring-in-part and dissenting-in-part) (citing recent
and *BMW of N. Am., Inc. v. Gore*, 517 U.S. 559 (1996), which limit punitive damages in
the interest of due process).
96. *Id.* at 1351-52 (Dyk, J., concurring-in-part and dissenting-in-part).
97. *Id.* at 1344-45.
comed by practitioners, the Federal Circuit declined to supply defendants with a safe harbor by holding that a substantial defense to infringement would not necessarily preclude a finding of willfulness. Moreover, *Knorr-Bremse IV* left some troubling aspects of the willfulness doctrine untouched.

### III. DISCUSSION

*Knorr-Bremse IV* developed in the midst of broad-based efforts to reform the patent system. Willful infringement is among the least popular patent doctrines, criticized as an ineffective deterrent for deliberate infringement, inaccurate punishment for truly malicious actors, and the motivation for evasive, undesirable behavior on the part of competitors and their patent attorneys. Even though *Knorr-Bremse IV* removed the adverse inference, it is unlikely to alleviate these criticisms to any great extent.

#### A. Problems with the Willfulness Doctrine Prior to *Knorr-Bremse IV*

1. **Deterrence**

One of the rationales for rewarding enhanced damages for willfulness has been deterrence of intentional violation of patent rights, based on the concern that those rights are underenforced. Presumably, the specter of an increased penalty will encourage potential infringers to exercise due care and prevent blatant copying of competitors’ patents. However, of the nine willfulness factors listed in *Read*, only “deliberate copying” guides the economically-cautious innovator in knowing how to circumvent en-

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98. *Id.* at 1347.


100. FTC REPORT, *supra* note 14, ch. 5, at 29.

101. See Powers & Carlson, *supra* note 6, at 100-01.

102. *Id.* at 95-96.


104. Cotter, *supra* note 18, at 21-23. The underenforcement concern that motivated the Patent Act of 1836 and the subsequent willfulness doctrine was largely based on search limitations at the early Patent Office. See, e.g., Powers & Carlson, *supra* note 6, at 100-01. Hence, the majority in *Knorr-Bremse IV* noted that “the ‘conceptual underpinnings’ of this precedent . . . have significantly diminished in force.” 383 F.3d at 1344 (citation omitted); *see also id.* at 1352 (Dyk, J., concurring-in-part and dissenting-in-part).

hanced damages. The other factors are not easily defined or instructive to a party that wants to steer clear of the risk, and focus instead on punishing culpable behavior *ex post facto.*\(^{106}\) For example, where the accused is not made aware of the patent, the determination of "whether the defendant attempted to conceal his conduct" would not apply or help the accused know how to avoid liability. Thus, the nine willfulness factors may not effectively avert the undesirable behavior that the doctrine was designed to prevent.

2. *Punishment*

Penalizing culpable behavior is another rationale for the doctrine. However, willful infringement, especially with the adverse inference, does not serve as fair punishment because it does not necessarily address an infringer's actual intent.\(^{107}\) The Federal Circuit has acknowledged the difficulty in distinguishing good faith efforts to design around a patent (which is encouraged by the Patent Act) from willful infringement.\(^{108}\) A naïve innovator may not realize he must procure advice of counsel to avoid an unmerited presumption about his intent. Additionally, where one commissions an opinion, he may want to keep it from his competitors, not to hide unfavorable information, but to hold back confidential or strategic business information. Furthermore, a blameless innovator may face financial ruin simply by sharing the field with a patentee that uses notice letters to harass competition.\(^{109}\) Finally, once a defendant waives attorney-client privilege, the court may examine attorney work product that the client never saw or acted on. Thus, the willfulness doctrine as it stands may improperly penalize or harass blameless parties.

3. *Innovation*

The willfulness doctrine also undermines the incentives to innovation that animate the patent system. Inventors are discouraged from fully educating themselves about the state of the art for fear that awareness of a

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106. Cotter, *supra* note 18, at 25-28, 44-46 (showing that in many cases, enhanced damages are efficient only where they actually deter infringement).

107. See, e.g., Gustafson, Inc. v. Intersystems Indus. Prods., Inc., 897 F.2d 508, 511 (Fed. Cir. 1990) ("[P]atentees are authorized to sue 'innocent' manufacturers immediately after their patents issue and without warning. To hold such patentees entitled to increased damages or attorney's fees on the ground of willful infringement, however, would be to reward use of the patent system as a form of ambush.").


patent will be used against them. Thus, the very reason for requiring disclosure is subverted, and technology cannot progress at an optimal rate.\textsuperscript{110}

Settlement and licensing negotiations are also upset by willfulness because of defendants' desire to avoid revealing confidential or damaging information. The harm is two-fold. First, the competitive balance is skewed because patentees can force defendants to make financial outlays with very little basis. Second, in trying to minimize revelations and time spent in litigation, defendants likely leave potentially-invalid patents unchallenged.

Furthermore, the willfulness doctrine wastes both innovative and judicial resources. Inventive enterprises redirect money from development to legal efforts. Since patentees risk nothing in pleading willfulness, it is almost always asserted, requiring defendants to spend more time and money to defend against the claim.\textsuperscript{111} Furthermore, evidence showing willfulness tends to prejudice juries toward a finding of infringement, whether knowingly or not. Indeed, this effect can be so strong that courts occasionally allow bifurcated trials.\textsuperscript{112}

4. Loss of Privilege

The adverse inference undermines the honest and open communications between a lawyer and his client that benefit both the legal effort and society. Faced with a potentially broad waiver of confidentiality, a client might be less than candid with his attorney for fear of having to disclose damaging information to his competitor. Where parties counter this concern by commissioning separate firms for litigation and for rendering an infringement opinion, neither the client nor his legal representatives can base their decisions on the most accurate, complete information.\textsuperscript{113} Finally, attorneys are aware that clients require an exculpatory opinion, and thus may hedge their appraisal of potential infringement.\textsuperscript{114} This behavior

\textsuperscript{110} 35 U.S.C. § 112 ¶ 1 (2000) (requiring both a written description of the invention and an enabling disclosure); Lemley & Tangri, \textit{supra} note 11, at 1100-02.


112. Lemley & Tangri, \textit{supra} note 11, at 1107-08.

113. Brief for Amici Curiae Association of Patent Law Firms at 7-8, \textit{Knorr-Bremse IV}, 383 F.3d 1337 (Fed. Cir. 2004) (Nos. 01-1357, 01-1376, 02-1221, 02-1256) (discussing conflict of interest walls that may be required between firms serving the same client), \textit{available at} 2003 WL 23200560.

114. Lemley & Tangri, \textit{supra} note 11, at 1092-93. An attorney may also hedge by offering a verbal warning instead of a written opinion. \textit{Id.} at 1103-05; Posting of Greg
is harmful in two respects. First, a client may infringe thinking that his attorney has cleared him, and secondly, the credibility of a judicial system that depends on suspect opinion letters is compromised.

B. Implications of Knorr-Bremse IV

Knorr-Bremse IV helps to restore the patent system’s goals of promoting disclosure and innovation by deemphasizing the advice of counsel factor. In particular, removal of the adverse inference will reduce instances of unfair punishment, aid innovation by reducing the resources spent on opinions and clarifying freedom to operate, and help restore the attorney-client relationship, thereby reducing undesirable, evasive behavior.

The finder of fact will no longer be able to presume malicious intent based on an accused infringer’s failure to consult counsel or claim privilege. Thus, the ruling may lead to a more just allotment of punitive damages. Knorr-Bremse IV may also give inventors more room to read patents and proceed from a disclosure that the PTO has already found to be inventive and enabled. If a potential infringer becomes aware of a patent on his own, he is now more empowered to make a good faith assessment of whether he should seek legal advice, leaving him with more time and money for innovation.

Knorr-Bremse IV also harmonizes the patent system with other aspects of the law by restoring the attorney-client and work product privileges. The majority pointed out that the Federal Circuit had never explicitly held that the attorney-client privilege did not apply in a patent case, but admitted that the adverse inference “distort[ed] the attorney-client relationship.” In light of the ruling, clients are more apt to commission opinions from their usual counsel, which can render more valid and honest ad-

Aharonian, patnews@ns1.patenting-art.com (Sept. 15, 2004) (copy on file with author) (arguing that uncertainty with claim language interpretation allows for a wide range of infringement opinions and quoting two practitioners about the cottage industry of favorable opinion writers), at patents@world.std.com.

115. An unscientific survey on the Internet Patent News listserv asked readers whether a party could safely keep an updated database of its competitor’s patents. While past results have been evenly split between yes, no, and maybe, the results after Knorr-Bremse IV were 50% yes, 50% maybe. Posting of Greg Aharonian, patnews@ns1.patenting-art.com (Nov. 24, 2004) (copy on file with author), at patents@world.std.com.


117. See Knorr-Bremse IV, 383 F.3d 1337, 1344-45 (Fed. Cir. 2004) (en banc).

118. Id. at 1344.
vice. Hopefully, this result will benefit the legal profession by preventing clients from infringing on the basis of an inaccurate opinion.

C. Issues Remaining After Knorr-Bremse IV

Time will tell just how safe competitors are from the adverse inference in light of Knorr-Bremse IV. The court left much of willfulness doctrine, and its resulting uncertainty, intact.\(^{120}\)

The Federal Circuit addressed deterrence and underenforcement concerns by holding that a substantial defense to infringement, such as a good faith belief of invalidity, would not preclude a finding of willfulness. While this ruling certainly discourages deliberate infringement,\(^{121}\) it does not tackle the assertion that many patents are invalid.\(^{122}\) Hence, competitors are improperly excluded from areas covered by invalid patents. Because accurately determining patent validity is quite complicated, the holding suggests that defendants face an uphill battle in demonstrating good faith without a convincing legal opinion.

Despite Judge Dyk's dissent, the duty of due care to avoid infringement stands.\(^{123}\) While defendants will no longer be punished for a presumed intent, the court did not clarify how an accused party could demonstrate lack of intent—that is, good faith. For example, courts may accept an institutional policy for addressing potential infringement issues as evidence that the accused was exercising due care. However, the Federal Circuit has looked skeptically at in-house procedures in the past,\(^{124}\) thus com-

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119. Knorr-Bremse: The Federal Circuit Changes the Law on Opinion of Counsel, Foley & Lardner LLP, available at http://www.foley.com/publications/pub_detail.aspx?pubid=2396 (last visited Feb. 17, 2005) ("[After Knorr-Bremse], accused infringers may be able to choose to have their opinion counsel serve as litigation counsel if they so desire.").

120. See Knorr-Bremse IV, 383 F.3d at 1352 (Dyk, J., concurring-in-part and dissenting-in-part); see, e.g., Walter C. Linder & William L. Roberts, Do You Want My Opinion?, Faegre & Benson LLP, available at http://www.faegre.com/articles/article_1428.aspx (last visited Feb. 17, 2005) ("Like the court's decision in the Festo case on the doctrine of equivalents, it may take further court actions in the coming years to determine the full effects of the Knorr-Bremse case.").

121. The court may be attempting to prevent potential infringers from proceeding with the assertion that most patents are invalid anyway. See, e.g., Underwater Devices, Inc. v. Morrison-Knudsen Co., 717 F.2d 1380, 1385 (Fed. Cir. 1983).

122. FTC REPORT, supra note 14, Executive Summary, at 5-14; John R. Allison & Mark A. Lemley, Empirical Evidence on the Validity of Litigated Patents, 26 AIPLA Q.J. 185 (1998). This issue will be revisited in the next part.

123. Knorr-Bremse IV, 383 F.3d at 1344.

124. See Bott v. Four Star Corp., 807 F.2d 1567, 1572 (Fed. Cir. 1986); Underwater Devices, 717 F.2d at 1390. In addition, while a defendant might be just as protective of an
panies should use caution in drafting such plans. Even after *Knorr-Bremse IV*, defendants are left with a difficult decision: Should they trust the reversal of the adverse inference, decline to turn over infringement opinions, and try to prove good faith some other way, or should they take their chances in asserting the defense and waiving privilege? Until the Federal Circuit revisits the issue to address the scope of material made accessible under the waiver or until more cases provide reassurance that the adverse inference is dead, defendants will likely remain cautious and commission infringement opinions.

Though *Knorr-Bremse IV* helped level the playing field for willfulness charges, it stopped short of requiring any evidentiary basis for claiming willfulness, so patent holders still do not risk much in seeking enhanced damages. The number of willfulness cases and the load on the judiciary is thus unlikely to drop. Further, and perversely, removing the inference might actually make cases more time-consuming.

Finally, the Federal Circuit specifically set aside the question of whether to inform the jury if the defendant commissioned an infringement opinion. In light of the main holding, the presence or absence of an infringement opinion should be only one factor in determining willfulness. However, an opinion of non-infringement or invalidity is still powerful evidence to a jury. If a court informs a jury that defendants have chosen to rely on privilege, for whatever reason, the jury might perceive that probative evidence is being “hidden” from them and hold some prejudice against the concealing party. Policy justifications exist on both sides of this question. Informing the jury of the presence or absence of a protected opinion provides them with more information to decide based on the totality of the circumstances, while withholding the information saves accused infringers from undue prejudice.

**IV. RECOMMENDATIONS FOR ADDITIONAL REFORM OF THE WILLFUL INFRINGEMENT DOCTRINE**

The *Knorr-Bremse* holding provides a step in the right direction for promoting innovation and disclosure, reducing the amount of resources wasted on legal opinions and litigation, and restoring client privileges. However, it fails to create a predictable standard for competitors in assess-
ing their freedom to operate. Thus, current efforts by policy makers and practitioners to reform the doctrine should continue.

A. Improvement Objectives

Harmonizing the doctrine of willful infringement with policies within and outside of patent law will assist parties on all sides to make informed decisions. Successful reform will seek to achieve the following goals:

1. Promote innovation\(^{127}\) by:
   (a) directing resources away from litigation;
   (b) encouraging inventors to read patents so society can benefit from the public disclosure;\(^ {128}\)
   (c) encouraging competition by leveling the balance of negotiating power between parties;\(^ {129}\)
   (d) setting a predictable, uniform standard for willfulness so that parties can make informed, strategic decisions;\(^ {130}\)
2. Preserving the rationale behind the willfulness doctrine by deterring deliberate infringement and properly penalizing egregious conduct; and
3. Restoring the attorney-client and work product privileges,\(^ {131}\) thereby improving the quality of opinions and diminishing evasive behaviors.

B. Proposed Changes

A growing list of proposed reforms seeks to address these goals. More drastic proposals include a bright line rule to reduce the number of willfulness claims and a plan to limit the intent inquiry to the moment that infringement begins. Others seek more subtle fixes for the doctrine as it stands.

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\(^{127}\) See U.S. CONST. art. I, § 8, cl. 8; FTC REPORT, supra note 14, Executive Summary, at 16.

\(^{128}\) See Brenner v. Manson, 383 U.S. 519, 533-34 (1965); FTC REPORT, supra note 14, ch. 5, at 28-31 (noting that the subsequent increase in validity challenges will improve patent quality and the public’s ability to rely on patents).

\(^{129}\) FTC REPORT, supra note 14, ch. 5, at 30, 32.

\(^{130}\) Recent Federal Circuit decisions have sought to establish more clear-cut guidelines in patent law. See, e.g., Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 730-31 (2002); Markman v. Westview Inst., 517 U.S. 370, 390 (1996) (describing that Congress’s reason for creating the Federal Circuit was that “increased uniformity would ‘strengthen the United States patent system in such a way as to foster technological growth and industrial innovation’”) (citation omitted).

1. **Bright Line Rule**

The Federal Trade Commission (FTC) and others have suggested a formalized alternative to the totality of the circumstances analysis.\(^{132}\) Under this proposal, a patentee could not assert willful infringement until he gave sufficient written notice to provide the accused with standing to challenge the patent.\(^{133}\) Accordingly, accused parties would only be liable for punitive damages if they continued the offending activity after receiving such notice. This proposal would reduce the number of willfulness claims, restore competitive balance, more fairly punish culpable behavior, and reduce the need for privileged evidence.

Where patentees risk declaratory judgment of invalidity, they will more honestly assess whether their claims will withstand the challenge. Patentees may still claim willfulness after a trial for infringement in order to benefit from juries' sympathetic perception of patent holders. Nevertheless, this proposal would weed out more meritless claims of willfulness and lighten the load for the judiciary. Not only would patentees act based on the strength of their patents, but potential infringers would as well. Allowing competitors to challenge patents that they believe to be invalid will invigorate the patent system.\(^{134}\) This in turn, will expose weaker patents, generally leaving the stronger ones in the field. As a result, the bright line rule would deter deliberate infringement based on lack of respect for patent quality.\(^{135}\)

A predictable trigger for willful infringement charges will also allow parties to plan strategically without second-guessing how a jury will view their behavior. Competing parties will be able to direct resources away from the "opinion of counsel" budget to other areas. Further, because the defendants will be on more equal footing in potential litigation, settlement and licensing negotiations will proceed with more objective, value-based motivations.

Under this proposal, enhanced damages would still be available for patentees where the accused continued the offending activity after receiv-

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133. To request declaratory judgment of invalidity or non-infringement, an accused party must have a reasonable apprehension that his accuser will initiate suit on infringement. FTC REPORT, *supra* note 14, ch. 5, at 31.

134. In response to complaints about patent quality, the FTC Report suggests a post-issue review period to allow competitors to challenge patents. See FTC REPORT *supra* note 14, ch. 5, at 17-23.

ing notice. Thus, the deterrent effect, if legitimate,\textsuperscript{136} would be preserved, and punishment would be reserved for more culpable behavior. Holders of questionable patents, however, could no longer harass their competitors with impunity.

This plan would reduce the need to access privileged evidence of intent, as the defendant’s conduct would be more probative. Where the accused continued to act without challenging his accuser, the willfulness determination could truly rely on the totality of the circumstances, as there would be no question that the defendant was on notice.

The standard arguments against formalism (making rigid guidelines)\textsuperscript{137} do not apply to willful infringement. For example, fewer willfulness charges will likely not increase the number of patents filed, increase the examination standards, or decrease certainty,\textsuperscript{138} because the willfulness factors are not as nebulous or technical as those involved in claim construction or the doctrine of equivalents.\textsuperscript{139} Courts will be provided with an easy to apply notice-or-no-notice standard and competitors will be better able to avoid unwarranted charges.

While this willfulness standard poses a large burden on a patentee to police his claims, the underenforcement concern is offset by the fact that the patentee will at least be compensated for infringement damages,\textsuperscript{140} regardless of whether he can show bad faith by the defendant. In addition, patentees in the Internet age are better able to police their own patents and determine their validity than they were when the doctrine arose. Thus, the burden would be allocated more fairly, as patentees are currently better equipped to prove willfulness than defendants are to prove their good faith.

2. Initial Intent Proposal

A second proposal suggests that willful infringement should only be available where the patentee can provide evidence of deliberate copy-
Such a system would restore the pre-1980s standard for willfulness damages. The relevant inquiry would be the defendant's intent when he began the infringing activity. This approach provides the advantages of reducing the number of claims, deterring and punishing deliberate copying, simplifying the analysis, and reducing the amount of evidence required. However, opinion letters would likely remain the most probative evidence of early intent, for example, to show that a defendant proceeded even after receiving an unfavorable opinion. Therefore, privilege would still be an issue. In addition, this plan does little to reduce a patentee's incentive to harass competitors.

Under this system, patentees could claim willfulness where they provided clear, corroborated evidence that the accused copied from their patent. While advice of counsel would remain quite relevant, juries would only consider evidence of the defendant's initial intent, so the inquiry into his legal materials would be more limited. Reducing the time required would also cut down on court costs. This proposal has the further advantage of punishing truly culpable behavior while sparing parties that began infringing unknowingly.

This proposal has a few disadvantages. Patentees may not be able to access satisfactory evidence of copying, even if it exists. Also, courts would still likely compel privileged material from defendants relying on an advice of counsel defense. Finally, innovators would still have some incentive to avoid reading patents because their awareness might be used to show copying. However, plaintiffs in clear cases of willful infringement would not be harmed and, because the scope of the inquiry would be limited, defendants would suffer less collateral damage to their businesses from the trial.

3. Less Drastic Plans

Additional proposals are more modest. For example, some have proposed tinkering with the scope of material available to the court where the defendant waives his privilege. This proposal recognizes the importance of the advice of counsel defense and seeks to reduce the damage to defen-

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141. Public Knowledge Brief, supra note 14, at 9-1; Lemley & Tangri, supra note 11, at 1116-22; Cotter, supra note 18.
142. See Powers & Carlson, supra note 6, at 68 (describing the standard as limited to cases of conscious and deliberate infringement).
143. Lemley & Tangri, supra note 11, at 1118-19.
144. Id.
dants that use it. However, it does little to address undesirable behavior by any of the involved parties. Another suggestion is to increase damage awards where infringement is hard to detect and there is a higher risk of underenforcement. This proposal has the advantage of punishing and deterring egregious behavior with more consistency. However, as courts already have discretion to set the award within statutory limits, it does little to impose real change in an unpopular doctrine.

V. CONCLUSION

By reversing the adverse inference, Knorr-Bremse helps to restore the attorney-client privilege to parties accused of willful infringement and eliminate a presumption of intent that has posed a serious obstacle to competitors’ freedom to operate. Unfortunately, the decision does not address additional problems with the willfulness doctrine. Although Knorr-Bremse represents an important step, a more predictable standard for willfulness would restore freedom to operate for competitors, more effectively deter and punish undesirable behavior, and promote innovation, all in line with the aims of the Patent Act. In light of the patentee’s ever-expanding ability to monitor the competition, there is less risk of patent underenforcement. Potential infringers, on the other hand, are faced with patent validity issues that are increasingly complex. Therefore, the balance of equities has shifted to favor a more limited willful infringement doctrine.147

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146. Lemley & Tangri, supra note 11, at 1111-25; Cotter, supra note 18.