United States District Court,
S.D. Texas, Houston Division.

KOTHMANN & KOTHMANN, INC,
Plaintiff.
v.
TRINITY INDUSTRIES,
INC. Defendant.

Sept. 3, 2003.

Owner of patents for roadside guardrails sued competitor for infringement. Construing claims, the District Court, Rosenthal, J., held that: (1) "terminal" was device attached to end of elongated barrier that was anchored to roadside, or attached to end of fixed roadside hazard; (2) requirement that energy-absorbing terminal include "one of" cutting section and cuttable member, meant that terminal had to include either cutting section or cuttable member, and could include both; (3) requirement that cuttable member be horizontally mounted "between" two parallel guardrails meant that member had to be mounted in space that separated guardrails; and (4) "wherein" clauses contained sufficient structural limitations to avoid means-plus-function treatment.

Claims construed.

See also 2003 WL 22439822.

6,022,003, 6,505,820. Construed.

Max Lalon Tribble, Jr., Susman Godfrey, Charles J. Rogers, Winstead, Sechrest & Minick, Houston, TX, Andrew Paul Mouton, Mouton, Mouton et al., Big Spring, TX, for Plaintiff.

Russell Clay Brown, Wellborn Houston Adkinson et al., Henderson, TX, Guy V. Manning, Attorney at Law, Fort Worth, TX, Steven E. Ross, Gardere Wynne et al., Dallas, TX, for Defendant.

ORDER

ROSENTHAL**, District Judge.**

Kothmann & Kothmann, Inc. ("KEI"), alleges that two devices manufactured by defendant Trinity Industries, Inc. ("Trinity") infringe claims 6, 8, and 12 of United States Patent No. 6,022,003 (the " '003 Patent") and claims 3, 4, 11, and 14 of United States Patent No. 6,505,820 (the " '820 Patent' "). (Docket Entry No. 65). The parties seek construction of several claim terms contained in the asserted claims. This court held a hearing on August 25, 2003, during which the parties presented evidence and argument in support of their proposed claim construction. This court now construes the claim terms as a matter of law

under Markman v. Westview Instruments, Inc., 52 F.3d 967, 976 (Fed.Cir.1995), *aff'd,* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996).

I. Background

This case involves roadside safety devices designed to reduce injury and damage resulting from vehicles impacting guardrails, concrete barriers, and other objects on or alongside highways and roads. KEI sued Trinity, Inc., alleging that two products that Trinity manufactures and sells-the Mobile Protection System ("MPS 350"), a truck-mounted attenuator, FN1 and the Trinity Attenuating Crash Cushion ("TRACC") FN2-infringe United States Patent No. 6,022,003.

FN1. The Transportation Research Board National Research Council National Cooperative Highway Research Program Report 350 ("NCHRP" Report 350) defines a truck-mounted attenuator as "[a]n energy absorbing device attached to the rear of a truck or utility vehicle ... designed to provide a controlled stop of a vehicle impacting the rear of the truck." (Def.'s Prel. Inj. Hrg. Ex. 11, T00696).

FN2. The NCHRP Report 350 defines a crash cushion as "a device designed primarily to safely stop a vehicle within a relatively short distance." (Def.'s Prel. Inj. Hrg. Ex. 11, T00695).

A. The '003 and '820 Patents

KEI alleges infringement of claims 6, 8, and 12 of the '003 Patent. Claim 6 describes the following invention:

6. An energy-absorption system comprising:

a terminal including an impact head;

a cutting section; and

a cutable member having an axis;

said energy-absorption terminal including one of the cutting section and cutable member;

said one of said cutting section and cutable member being positioned in the energy-absorption terminal aligned with the impact head and the other of said cutting section and cutable member;

said energy-absorbing terminal including one of the cutable member and the cutting section aligned with each other wherein the cutable member, and cutting section are forced together when the impact head of the energy-absorbing terminal is impacted by a vehicle;

said cutting section including cutting means positioned to cut said cutable member as the cutable member and cutting section are moved with respect to each other by the impact head.

('003 Patent, col. 9, ln. 50-col. 10, ln.2). Claim 12 reads the same as claim 6 but adds a further limitation not present in claim 6: "the cutting section including at least one blade horizontally mounted to face the cutable

member." (Id. at col. 10, ln.48-col. 11, ln.2).

The '820 Patent was filed as a divisional application of the '003 Patent on October 1, 1999. (Def.'s *Markman* Ex. 78 at T01956, T01963). Claim 3 of the '820 Patent describes the following invention:

An energy-absorption system for positioning along a roadway to absorb the energy of an errant vehicle, the energy-absorption system comprising:

an impact head;

an angled cutter; and

an elongated cuttable member horizontally mounted between two parallel guardrails;

wherein the energy absorption system is positionable along a roadway to cooperate with the upstream portion of a roadside hazard; and

wherein the impact head is in operational connection with the cutter and the cuttable member such that the impact of an errant vehicle with the impact head will cause the cutter to cut at least a portion of the cuttable member to absorb the impact energy of the errant vehicle.

(Pl.'s *Markman* Ex. 126, '820 Patent, col. 9, ln.22-ln.42). Claim 4 claims "[t]he energy-absorption system of claim 3 wherein each of the two parallel guardrails is constructed of overlapping guardrail sections." (Id. at col. 9, ln.43-ln.45). Claim 11 claims "the energy-absorption system of claim 3 wherein the angled cutter comprises a cutter that is positioned such that at least one edge of the cutter approaches the cuttable member at an acute angle." (Id. at col. 10, ln.1-ln.4). Claim 14 claims:

An energy-absorption system for positioning along a roadway to absorb the energy of an errant vehicle, the energy-absorption system comprising:

an impact head;

an angled cutter;

two parallel guardrails, each of which is constructed of overlapping guardrail sections; and

an elongated cuttable member mounted horizontally between the two parallel guardrails;

wherein the energy absorption system is positionable along a roadway to cooperate with the upstream portion of a roadside hazard; and

wherein the impact head is in operational connection with the cutter and the cuttable member such that the impact of an errant vehicle with the impact head will cause the cutter ti cut at least a portion of the cuttable member to absorb the impact energy of the errant vehicle.

(Id. at col. 10, ln.11-ln.28).

The "Background of the Invention" section of the '003 and '820 Patent describe the inventions:

This invention relates to guardrails intended to be positioned along a highway to reduce injury to the driver and passenger of vehicles that may accidentally tend to leave the highway.

In one class of guardrail system, each guardrail system includes an elongated barrier and at least one energy-absorbing terminal. The elongated barrier extends parallel to the roadway along the side of the roadway and ends in a terminal. The terminal cooperates with one or more components of the barrier to absorb energy when a vehicle hits the terminal itself.

The terminal is constructed to stop the vehicle without subjecting the occupant to excessive forces and to avoid impaling the passenger compartment of the vehicle or redirecting the vehicle in a dangerous direction or permitting the vehicle to continue in a dangerous direction at a dangerous speed when the vehicle hits the terminal itself. The barrier is designed to redirect the vehicle in a safer direction and impede its progress when the vehicle hits the barrier itself.

The terminals and barrier of the energy-absorbing guardrail are designed so that: (1) when the vehicle hits the barrier itself, the barrier is anchored by a cable or similar component with tensile strength to support the vehicle from moving excessively in a direction perpendicular to the roadway; and (2) when the vehicle hits the terminal, the cable or other support member is released to avoid pulling the barrier out of its alignmentwith the terminal which would prevent movement of the terminal and barrier together to absorb energy.

('003 Patent, col. 1, ln. 1-ln.30; '820 Patent, col. 1, ln. 1-ln.30.). The allegedly infringed claims describe inventions that absorb the energy of impact, in part, by using cutters to cut into a guardrail or other material, slowing the impacting vehicle's movement.

The '003 and '820 Patents contain the following illustrations of preferred embodiments, which are helpful in describing the patented invention:

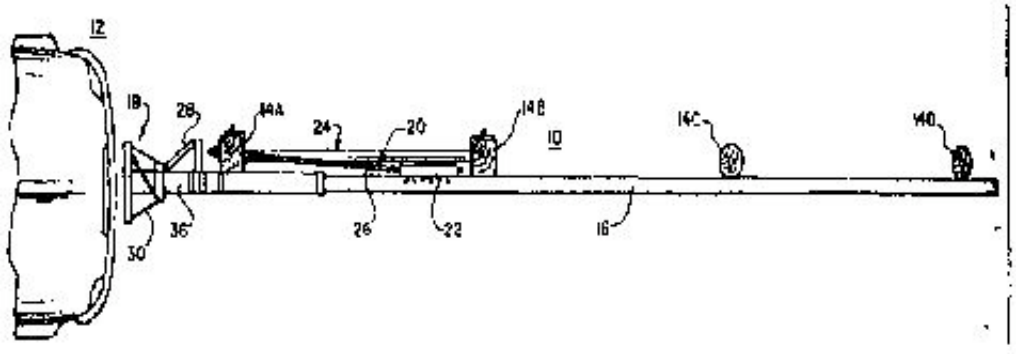

Figure 1

Figure 1 shows an embodiment of the '003 Patent and the '820 Patent from above, with a vehicle positioned to hit the terminal end.FN3 The guardrail is mounted to a series of posts, parallel to the roadway.FN4 The

vehicle hits the impact head (30), pushing the cutting section (36) forward. Cutters are positioned inside the cutting section to cut along the guardrail (16) as the cutting section moves forward, absorbing the energy of impact and slowing the vehicle.

FN3. The '820 Patent, a divisional application of the '003 Patent, contains the same figures as the '003 Patent.

FN4. The posts and the post-breaking mechanism are not relevant to claim 6.

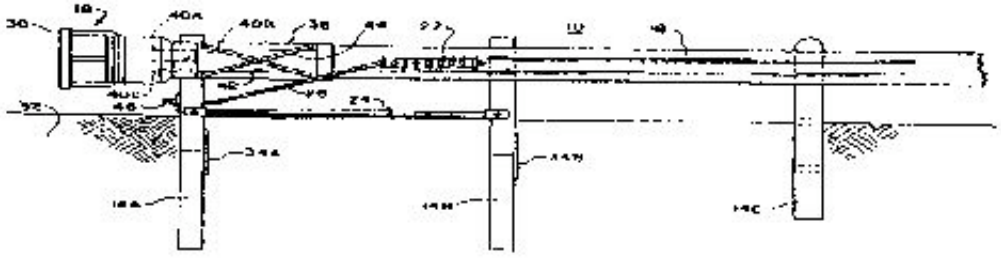

Figure 2

Figure 2 is a side view of the system shown in figure 1. In figure 2, the cutting section contains three cutters (40A-40C) positioned to cut the guardrail in three parallel lines as the cutting section moves along the guardrail. The cutters are parallel to the roadway and perpendicular to the guardrail.

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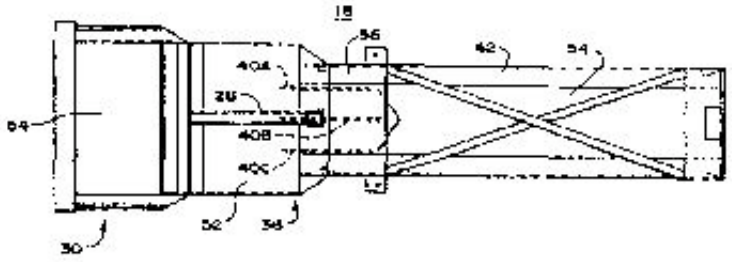

Figure 5

Figure 5

Figure 5 is a side view of the terminal assembly in figure 1, showing a hollow impact head (30) and a cutting section (36). The cutting section contains cutters (40A-40C) "welded within it to be horizontal when the terminal assembly 18 is mounted in place. The cutters may be three steel blades ... parallel to each other and positioned to be received by the W-beam [guardrail] in a V-shaped notch in the vertically mounted rail to cut the rail." ('003 Patent, col. 5, ln. 56-62; '820 Patent, col. 5, ln. 66-col. 6, ln. 2). The cutters cut the guardrail to absorb the energy of impact, slowing the vehicle in a controlled fashion.

The '003 Patent describes two embodiments of the claim 6 and claim 12 "cutting means." The '820 Patent describes the same two embodiments of the "angled cutter" in claims 3 and 14. The patents depict these embodiments as follows:

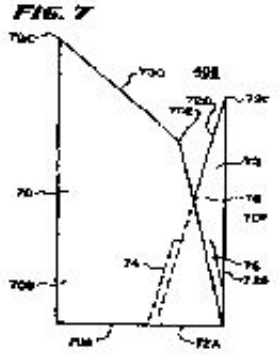

Figure 7

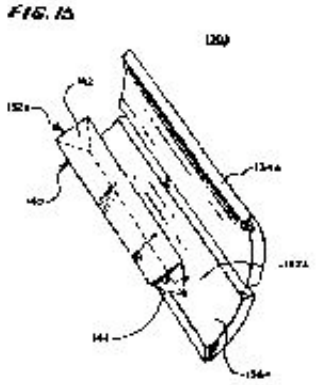

Figure 15

('003 Patent, Figs. 7, 15; '820 Patent, Figs. 7, 15). The parties refer to the embodiment shown in Figure 7 as the "shear type" or "scissors type" cutter or "angled steel plates." A more descriptive label the parties also use for Figure 7 is the "dual plate cutter." The dual plate cutter consists of two metal plates positioned in parallel planes and welded together to form an acute angle (76). Figure 15 shows the "single steel wedge" cutter, referred to as the "wedge shaped cutter."

Dr. Dean L. Sicking and Brian G. Pfeifer ("the applicants") filed an application for the '003 Patent with the United States Patent and Trademark Office ("PTO") on November 7, 1994. The applicants amended their application to add claim 17, which became claim 6 of the '003 Patent, on June 3, 1996. Although the applicants initially directed their invention to cutting a guardrail, they amended their claim to extend to cutting a "cutable member." The patent examiner issued a final rejection of claim 17 based on two grounds: (1) the claim was anticipated by U.S. Patent No. 4,655,434 (the "Bronstad Patent"); and (2) the claim was obvious in view of the Bronstad Reference in combination with U.S. Patent No. 5,078,366 (the "Sicking *et al*. Patent"). (Def.'s Prel. Inj. Hrg. Ex. 2, tab 17).

The Bronstad Patent discloses an energy absorbing terminal consisting of a set of horizontally extending

guardrails, with the guardrails positioned so that their ends overlap. (Def.'s Prel. Inj. Hrg. Ex. 4). Rounded "splice" bolts extend through the overlapping ends of adjacent guardrails. The bolts are aligned with a series of "spaced openings," or holes in the guardrails. When a vehicle impacts the nose of the terminal, the splice bolts "shred out the rail material between the spaced openings to absorb the kinetic energy of the impacting vehicle." (Id. at col. 1, ln. 67-col. 2, ln. 2).

The applicants appealed the patent examiner's rejection of claim 17. The applicants distinguished the Bronstad Patent on several grounds. They argued that the Bronstad Patent was "a clumsier and more expensive arrangement." They also asserted that the Bronstad bolts had blunt sides that "shredded" the guardrail rather than cutting or "shearing" it like the dual plate cutter or the wedge shaped cutter disclosed in the '003 Patent. (Def.'s Prel. Inj. Hrg. Ex. 2, tab 12, pp. 3-6, tab 16, pp. 7-8, tab 24, pp. 17-18).

The PTO Board of Patent Appeals reversed the patent examiner's final rejection of claim 17, explaining that:

We agree with the applicants that the claimed "cutting means" is not readable on the bolts [ ] of Bronstad. In that regard, the claimed "cutting means" must be given its broadest reasonable interpretation consistent with the specification, and must be read in light of the specification as it would be interpreted by one of ordinary skill in the art.... In this case, the specification discloses (1) the cutters are wedge shaped (p. 7), and (2) the cutters slice the rail [ ] with a "shearing" action. In our view, an artisan would readily recognize the basic difference between cutting as disclosed in this application and the shredding disclosed by Bronstad. Accordingly, it is our determination that the claimed "cutting means" is not readable on the bolts [ ] of Bronstad since the bolts [ ] will shred out rail material, not "cut" the rail material.

(Def.'s Prel. Inj. Hrg. Ex. 2, tab 26, p. 7). On February 8, 2000, the PTO issued the '003 Patent to the University of Nebraska Board of Regents as the assignee of the individual inventors, Dean L. Sicking and Brian G. Pfeifer. ('003 Patent, p. 1).

Sicking and Pfeifer filed an divisional application for the '820 Patent with the United States Patent and Trademark Office ("PTO") on October 1, 1999. (Def.'s *Markman* Ex. 78 at T01956). The examiner rejected that application as anticipated under section 102 and obvious under section 103 in view of the Bronstad Patent. (*Id*. at T02010-T02014). After several amendments and rejections, the examiner issued a final rejection of the '820 Patent on January 17, 2002. (Id. at T02155). The examiner stated that the Bronstad Patent set forth an energy absorption systemcomprising an impact head, a cutter, and a cuttable member. (Id. at T02157). The applicants filed a Request for Continuing Examination, amending the pending claims and traversing the examiner's rejection on the basis of the Bronstad Patent. (Def.'s *Markman* Ex. 77). The applicants stated:

Applicants again submit that Examiner has failed to provide a *prima facie* showing of anticipation by Bronstad. Applicants further submit that Bronstad does not anticipate Applicants' claimed invention. Applicants further submit that Bronstad does not anticipate Applicants' claimed invention. Applicants respectfully direct Examiner to the decision of the United States Patent and Trademark Office Board of Patent Appeals and Interferences regarding Bronstad and the parent application and patent in this case, Appeal No. 98-1461; Application No. 08/335,153 [which became the '003 Patent]. Examiner is respectfully reminded that Bronstad does not disclose the "cutting means" claimed in the parent application and patent. Applicants therefore submit that Bronstad likewise does not disclose a "cutter" as suggested by Examiner. It is therefore respectfully requested that Examiner withdraw the outstanding rejection.

(*Id*. at T02172). In response, the Examiner withdrew his objections and allowed the '820 Patent on November 1, 2002. (Def.'s *Markman* Ex. 78 at T02181-T02182).

The parties dispute the construction of the following claim terms and elements:

"terminal" (claims 6 and 12 of the '003 Patent);

"impact head" (claims 6 and 12 of the '003 Patent and claims 3 and 14 of the '820 Patent);

said energy-absorption terminal including one of the cutting section and cutable member (claims 6 and 12 of the '003 Patent);

said one of said cutting section and cutable member being positioned in the energy-absorption terminal aligned with the impact head and the other of said cutting section and cutable member (claims 6 and 12 of the '003 Patent);

said energy-absorbing terminal including one of the cutable member and the cutting section aligned with each other wherein the cutable member, and cutting section are forced together when the impact head of the energy-absorbing terminal is impacted by a vehicle (claims 6 and 12 of the '003 Patent);

"angled cutter" (claims 3 and 14 of the '820 Patent);

an elongated cuttable member horizontally mounted between two parallel guardrails (claim 3 of the '820 Patent);

an elongated cuttable member horizontally mounted between the two parallel guardrails (claim 14 of the '820 Patent);

wherein the energy absorption system is positionable along a roadway to cooperate with the upstream portion of a roadside hazard (claims 3 and 14 of the '820 Patent); and

wherein the impact head is in operational connection with the cutter and the cuttable member such that the impact of an errant vehicle with the impact head will cause the cutter to cut at least a portion of the cuttable member to absorb the impact energy of the errant vehicle (claims 3 and 14 of the '820 Patent).

This court must construe these claim terms and elements as a matter of law.

II. The Law of Claim Construction

[1] [2] A court begins claim construction analysis with the ordinary meaning of the disputed claim terms. Inverness Med. Switzerland v. Princeton Biomeditech Corp., 309 F.3d 1365, 1369 (Fed.Cir.2002). "The terms used in the claims bear a 'heavy presumption' that ... they have the ordinary meaning that would be attributed to those words by persons skilled in the relevant art." Texas Digital Sys., Inc. v. Telegenix, Inc., 308 F.3d 1193, 1202 (Fed.Cir.2002); *accord CCS Fitness,* 288 F.3d at 1366. A court must give a claim term the full range of its ordinary meaning as understood by persons skilled in the relevant art. Texas Digital Sys., Inc., 308 F.3d at 1202.

[3] [4] A court initially relies on intrinsic evidence-the claims, the written specification, and, if in evidence, the prosecution history-to learn the meaning of the terms. CCS Fitness, Inc. v. Brunswick Corp., 288 F.3d 1359, 1366 (Fed.Cir.2002). "In most situations, an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term. In such circumstances, it is improper to rely on extrinsic evidence." Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1583 (Fed.Cir.1996) (citing, *e.g.,* Pall Corp. v. Micron Separations, Inc., 66 F.3d 1211, 1216 (Fed.Cir.1995)); *see also Bell & Howell,* 132 F.3d at 705-06.

[5] "The specification contains a written description of the invention which must be clear and complete enough to enable those of ordinary skill in the art to make and use it. Thus, the specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." Vitronics, 90 F.3d at 1582; Teleflex, Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313, 1325 (Fed.Cir.2002)(citing *Vitronics*). "The general rule, of course, is that the claims of a patent are not limited to the preferred embodiment, unless by their own terms." Karlin Tech., Inc. v. Surgical Dynamics, Inc., 177 F.3d 968, 973 (Fed.Cir.1999).

[6] [7] [8] "The prosecution history may demonstrate that the patentee intended to deviate from a term's ordinary and accustomed meaning, i.e. if it shows that the applicant characterized the invention using words of manifest exclusion or restriction during the administrative proceedings before the Patent and Trademark Office." Teleflex, 299 F.3d at 1325. "The prosecution history gives insight into what the applicant originally claimed as the invention, and often what the applicant gave up in order to meet the Examiner's objections." Lemelson v. Gen. Mills, Inc., 968 F.2d 1202, 1206 (Fed.Cir.1992). "Arguments made during the prosecution are given the same weight as claim amendments." *Elkay Mfg.,* 192 F.3d at 979; *see also* Teleflex, 299 F.3d at 1326 ("Arguments and amendments made during the prosecution of a patent application and other aspects of the prosecution history, as well as the specification and other claims, must be examined to determine the meaning of terms in the claims."). "[T]he prosecution history (or file wrapper) limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance." Teleflex, 299 F.3d at 1326 (citation omitted). "[T]he standard for determining what subject matter was surrendered is objective and depends on what a competitor, reading the prosecution history, would reasonably conclude was given up by the applicant." *Insituform Techns.,* 99 F.3d at 1107-08 (citing Mark I Mktg. Corp. v. R.R. Donnelley & Sons, 66 F.3d 285, 291 (Fed.Cir.1995); Haynes Int'l, Inc. v. Jessop Steel Co., 8 F.3d 1573, 1578 (Fed.Cir.1993)). "Explicit arguments made during prosecution to overcome prior art can lead to narrow claim interpretations because '[t]he public has a right to rely on such definitive statements made during prosecution.' " Rheox, Inc. v. Entact, Inc., 276 F.3d 1319, 1325 (Fed.Cir.2002) (quoting Digital Biometrics, Inc. v. Identix, Inc., 149 F.3d 1335, 1347 (Fed.Cir.1998)).

[9] [10] A court may refer to dictionaries to determine the proper definitions of claim terms, including technical dictionaries, encyclopedias, and treatises that establish specialized meanings in particular fields of art. Inverness Med. Switzerland, 309 F.3d at 1369. The courts do not categorize dictionaries, encyclopedias, and treatises as "extrinsic evidence." A court may consult such references whether or not a party has offered them. Texas Digital Sys., 308 F.3d at 1203; Teleflex, Inc., 299 F.3d at 1325. If a claim term has multiple meanings, the court must interpret the term to encompass all consistent meanings, based on the intrinsic evidence. Texas Digital Sys., Inc., 308 F.3d at 1203 (citing Renishaw PLC v. Marposs Societa' per Azioni, 158 F.3d 1243, 1250 (Fed.Cir.1998)).

[11] A court examines the intrinsic evidence to determine whether the presumption of ordinary and customary meaning is rebutted. Id. at 1204. Intrinsic evidence can limit the ordinary meaning of a claim term in at least four ways. A claim term will not be given its ordinary meaning if the patentee acted as his

or her own lexicographer by clearly defining the term in the specification. CCS Fitness, 288 F.3d at 1366. The claim term will not be given its ordinary meaning if the patentee distinguished that term from prior art on the basis of a particular embodiment, expressly disclaimed a particular subject matter, or described a particular embodiment as important to the invention. Id. at 1366-67. The claim term will not receive its ordinary meaning if the term the patentee chose so deprives the claim of clarity as to require resort to other intrinsic evidence for a definite meaning. Id. at 1367. Finally, a claim term will cover nothing more than the corresponding structure or step disclosed in the specification, as well as equivalents, if the patentee phrased the claim in means-plus-function format under 35 U.S.C. s. 112, para. 6. *Id*.

[12] "In most situations, an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term. In such circumstances, it is improper to rely on extrinsic evidence." Vitronics Corp., 90 F.3d at 1583 (citing, *e.g.,* Pall Corp. v. Micron Separations, Inc., 66 F.3d 1211, 1216 (Fed.Cir.1995)); *see also Bell & Howell,* 132 F.3d at 705-06. "The court may receive extrinsic evidence to educate itself about the invention and the relevant technology, but the court may not use extrinsic evidence to arrive at a claim construction that is clearly at odds with the construction mandated by the intrinsic evidence." Elkay Mfg. Co. v. Ebco Mfg. Co., 192 F.3d 973, 977 (Fed.Cir.1999) (citing Key Pharms. v. Hercon Labs. Corp., 161 F.3d 709, 716 (Fed.Cir.1998)).

"Extrinsic evidence consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." Markman v. Westview Instr., Inc., 52 F.3d 967, 980 (Fed.Cir.1995). "This evidence may be helpful to explain scientific principles, the meaning of technical terms, and terms of art that appear in the patent and prosecution history." *Id*.

III. The Claim Construction Analysis

A. "Terminal"

[13] The parties dispute the construction of the term "terminal" in claims 6 and 12 of the '003 Patent. The dispute centers on whether devices attached to the rear of a truck and designed to absorb the energy of a collision constitute "terminals." KEI proposes the following construction of the term "terminal":

The claimed 'terminal' is a part that forms the end of an elongated barrier or other similar roadside hazard, and cooperateswith the barrier or hazard to absorb energy when a vehicle hits the terminal itself. (See, e.g., '003 Patent at col.1, ln.7-12.) The claimed terminal must also include an impact head, and numerous other requirements as follows [in further language of claim 6].

(Pl's *Markman* Hearing Slide 11). Trinity proposes the following construction of "terminal":

A 'terminal' is a device attached to the end of an elongated barrier to prevent an impacting vehicle's perpendicular movement. A device attached to a truck or work vehicle is not a terminal.

(Docket Entry No. 76, p. 7). Trinity contends that ordinary persons skilled in the art of highway safety design would not consider a truck-mounted device to be a "terminal."

In the Findings of Fact and Conclusions of Law Denying [KEI's] Application for a Preliminary Injunction, this court stated that "the intrinsic evidence, particularly the specification, suggests that a 'terminal' is attached to an elongated barrier that is anchored to prevent the impacting vehicle's perpendicular movement and does not include a truck or work vehicle." (Docket Entry No. 62, p. 37). In its opening *Markman* brief,

KEI states that it does not contest this court's construction of a "terminal" as "[a structure] attached to an elongated barrier that is anchored to prevent the impacting vehicle's perpendicular movement." (Docket Entry No. 75, p. 9). KEI disputes this court's additional statement that a "terminal" "does not include [a device attached to the end of] a truck or work vehicle."

1. The Ordinary Meaning of "Terminal"

To determine the ordinary meaning of a technical term to persons skilled in the art, courts may consult scientific dictionaries and technical treatises. Dow Chem. Co. v. Sumitomo Chem. Co., Ltd., 257 F.3d 1364, 1373 (Fed.Cir.2001). The National Cooperative Highway Research Program ("NCHRP") produced NCHRP Report 350, entitled "Recommended Procedures for the Safety Performance Evaluation of Highway Features," in 1993.FN5 (Def.'s *Markman* Ex. 85). The 350 Report "contains recommended procedures for evaluating the safety performance of various highway safety features." (*Id*. at T00517). The forward to the report states that "effective traffic barrier systems, end treatments, crash cushions, breakaway devices, truck-mounted attenuators, and other hardware must be used to achieve the highest levels of highway safety." (*Id*.). The report contains a glossary, which defines "terminal" as follows:

FN5. The NHCRP Report 350 is referred to as the "350 Report."

A device designed to treat the end of a longitudinal barrier. A terminal may function by (a) decelerating a vehicle to a safe stop within a relatively short distance, (b) permitting controlled penetration of the vehicle behind the device, (c) containing and redirecting the vehicle, or (d) a combination of (a), (b), and (c).
(*Id*. at T00696). The 350 Report defines a "longitudinal barrier" as:
A device whose primary functions are to prevent vehicular penetration and to safely redirect an errant vehicle away from a roadside or median hazard. The three types of longitudinal barriers are roadside barriers, median barriers, and bridge rails.

(*Id*. at T00695).
The 2002 Roadside Design Guide, published by the American Association of State Highway and Transportation Officials, similarly defines a longitudinal barrier as:

A barrier whose primary function is to prevent penetration and to safely redirect an errant vehicle away from a roadside or median obstacle.

(Def.'s Ex. 87 at T01948).

According to the 350 Report, the three types of longitudinal barriers are roadside barriers, median barriers, and bridge rails. The Roadside Design Guide provides the following definitions of "roadside barrier," "median barrier," and "bridge rails":

Roadside barrier-A longitudinal barrier used to shield roadside obstacles or nontraversable terrain features. It may occasionally be used to protect pedestrians or "bystanders" from vehicular traffic.

Median barrier-A longitudinal barrier used to prevent an errant vehicle from crossing the highway median.

Bridge railing-a longitudinal barrier whose primary function is to prevent an errant vehicle from going

over the side of the bridge structure.

(*Id*.).

The 350 Report distinguishes truck-mounted attenuators from other safety devices, such as end treatments, crash cushions, and traffic barrier systems. (Def.'s Ex. 85 at T00517). The 350 Report defines a truck-mounted attenuator as "an energy-absorbing device attached to the rear of a truck or utility vehicle. A [truck-mounted attenuator] is designed to provide a controlled stop of a vehicle impacting the rear of the truck." (*Id*. at T00696). This supports Trinity's contention that a device mounted to a truck or work vehicle is not a "terminal."

According to the 350 Report, "terminals" are only applied to the end of longitudinal barriers. The definitions of "roadside barrier," "median barrier," and "bridge rails," the three different types of longitudinal barriers, suggest that they are fixed to the ground. The Roadside Design Guide uses culvert inlets and trees, both of which are fixed, as examples of roadside obstacles protected against impact by roadside barriers. (AASHTO Roadside Design Guide at p. 5-2). Devices protecting against crashes into these roadside obstacles are also fixed. Median barriers are "most commonly used to separate opposing traffic on a divided highway," and are also used to separate high occupancy vehicle lanes from general purpose lanes. (*Id*. at p. 6-1). These barriers are fixed. Bridge railings are usually constructed of concrete and metal and are an "integral part of the [bridge] structure." (*Id*. at p. 7-1). The fact that roadside barriers, median barriers, and bridge rails are fixed also supports Trinity's argument that a device mounted to a truck or work vehicle is not a terminal.

The written specification also supports Trinity's argument. Each of the embodiments of the energy-absorbing system described in claims 6 and 12 of the '003 Patent is applied to a fixed roadside obstacle. In one embodiment, the roadside obstacle is a guardrail, a longitudinal barrier, connected to the ground by posts. ('003 Patent, col. 4, ln.6-7, Figs. 1-4). In another embodiment, the roadside hazard is a "hard structure such as an overpass or the like." (Id. at col. 8, ln.5-7). Figure 14 of the '003 Patent shows a terminal attached to a concrete structure. An "overpass and the like" are fixed structures. Nowhere in the written specification is there a description of an embodiment of the invention that can be applied to a parked or slow-moving truck.

KEI contends that the 350 Report is not a dictionary, encyclopedia, or treatise that can be relied on in construing the term "terminal." Sicking testified that the 350 Report used terms narrowly because it was creating testing protocols for different devices. (Transcript of *Markman* Hearing on August 25, 2003, p. 12, 1.13-1.21). Sicking argued that the distinction the 350 Report drew between the terminal of a longitudinal barrier and a truck-mounted attenuator did not apply to the '003 Patent. The AASHTO 2002 Roadside Design Guide, however, repeatedly refers to the 350 Report in its chapters on the requirements for different safety devices, such as roadside barriers, median barriers, and bridge railings. (Roadside Design Guide at pp. 5-1, 6-1, 7-2). The Roadside Design Guide, a general guide to highway design, states that the 350 Report sets out a "series of standard crash tests." The Roadside Design Guide's definition of "longitudinal barrier" is nearly equivalent to the 350 Report definition. The 350 Report is commonly used in the highway safety industry to test highway safety devices. This court may consult the 350 Report and the 2002 AASHTO Roadside Design Guide to determine to ordinary meaning of the term "terminal" to one skilled in the art of highway design. Dow Chem. Co., 257 F.3d at 1373; Maxwell v. J. Baker, Inc., 86 F.3d 1098, 1105 (Fed.Cir.1996) (citing a book on footwear design to determine ordinary meaning of shoe industry term in case involving shoe technology patent). The 350 Report and the Roadside Design Guide support the argument that the longitudinal barriers protecting against roadside hazards are fixed to the ground and do not

move.

The written specification of the '003 Patent is consistent with this interpretation. The specification states that "[t]his invention relates to guardrail systems intended to be positioned along a highway." ('003 Patent, col. 1, ln.7-9). The specification refers to a "terminal" as being at the end of an "elongated barrier." (Id. at col. 1, ln.7-13). The specification describes the elongated barrier as "anchored" to the roadside to prevent the vehicle from moving perpendicular to the roadway. (Id. at col. 1, ln.22-27; col. 2, ln.34-42). The specification describes one embodiment of the invention, in which the "terminal" is attached to the end of a guardrail, and an alternative embodiment in which the terminal is attached to a "concrete structure" "such as an overpass or the like." (Id. at col. 4, ln.8-21 and Fig. 1 (guardrail embodiment); col. 8, ln.5-18 and Fig. 14 (concrete structure embodiment)). The guardrail embodiment is fixed to the roadside by posts, preferably made of wood. (Id. at col. 4, ln.14-18). A concrete structure "such as an overpass or the like" is also fixed to the roadside. The specification supports limiting "terminal" so that it is attached to a structure that is in turn fixed or anchored to the ground.

2. The Prosecution History

Trinity argued in the *Markman* hearing that the prosecution history shows that the applicants for the '003 Patent limited their invention to guardrail systems. Trinity emphasizes the statement in the specification that states that "[t]his invention relates to guardrails intended to be positioned along a highway." (Id. at col. 1, ln.3-4). Trinity also contends that language in the applicant's brief appealing the patent examiner's final rejection of the '003 Patent to the Board of Patent Appeals and Interferences limits the invention to guardrail systems. The examiner rejected claim 17 of the application (which became claim 6 of the issued '003 Patent) on the ground that claim 17 was anticipated and obvious in light of the Bronstad Patent. In arguing that claim 17 was not anticipated or obvious in light of the Bronstad Patent, the applicants stated:

Claim 17 is directed to a guardrail terminal in which a cutting section includes cutting means positioned to cut a cutable member as the cutable member and cutting section are forced together by the impact of a vehicle. Neither the patent to Sicking, *et al*. nor the patent to Branstad [*sic*] disclose a cutting section and a cutable section so that the cutting section and cutable section would move together to absorb energy.... The cutting section can be arranged to cut at different locations and each location will provide a different moment of inertia when bent. Moreover, it is relatively easy to change the design of the cutting section to absorb more or less energy as it cuts.

Neither of these concepts are taught by Sicking, *et al*. nor by Branstad [*sic*]. Sicking, *et al*. extrudes guardrails in an extruder as the guardrail and extruder are moved together. Bronstad does not have a cutting section but does have bolts in slots connected to posts. Bronstad's concept is that the material between the slots will be broken as the guardrail is moved. The Examiner erroneously concludes that the bolts extending through the rails is a combination of a cutting section and a cutable section. It is not and Bronstad has no such teaching.

In most configurations using Bronstad's teachings, the guardrail fails by buckling.

(Def.'s *Markman* Ex. 96, pp. 20-21).

The Board of Patent Appeals and Interferences overruled the examiner's rejection of claim 17 of the '003 Patent application. The Board stated:

In this case, the specification discloses the cutters are wedge shaped, and (2) the cutters slice the rail 16 with a "shearing" action. In our view, an artisan would readily recognize the basic difference between cutting as disclosed in this application and the shredding disclosed by Bronstad. Accordingly, it is our determination that the claimed "cutting means" is not readable on the bolts 50 of Bronstad since the bolts 50 will shred out rail material, not "cut" the rail.

(Def's Prel. Inj. Hrg. Ex. 2, at Ex. 25, p. 7).

Although the applicants stated that claim 17 was "directed to" a guardrail in their brief to the Board of Patent Appeals and Interferences, they focused on the functional difference between the "cutting" of the "cutting means" and the "shredding" by the "bolts" in Bronstad. The applicants distinguished the cutting failure mode of their application with the buckling failure modes used by the Bronstad bolts. In reversing the examiner and allowing claim 17, the Board relied on the functional difference between "shearing" of a "cutting means" and "shredding" of the Bronstad bolts. The Board did not rely on the applicants' statement that claim 17 was "directed to" a guardrail terminal in overruling the examiner's rejection. The applicants' statement that claim 17 was directed to a "guardrail terminal" was not a clear disavowal of claim scope made to gain claim allowance. The distinction the applicants drew between "cutting" or "shearing" and "buckling" or "shredding" was critical to the allowance of claim 17. Teleflex, 299 F.3d at 1326 ("[T]he prosecution history (or file wrapper) limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance."). "We have ... declined to apply the doctrine of prosecution disclaimer where the alleged disavowal of scope is ambiguous." Omega Eng'g, Inc. v. Raytek Corp., 334 F.3d 1314, 1324 (Fed.Cir.2003); *see also* Vanguard Prods. Corp. v. Parker Hannifin Corp., 234 F.3d 1370, 1372 (Fed.Cir.2000)(refusing to narrow the asserted claim because "the prosecution history does not support [the infringer]'s argument that [the inventors] 'expressly disclaimed' claim scope beyondproducts made [using a particular process]").

The specification also includes an embodiment of the invention that is attached to a concrete structure. ('003 Patent, Fig. 14). The word "terminal" is not limited to the end of a guardrail by the specification and prosecution history, as Trinity asserts.

3. The Negative Limitation on Devices Attached to Trucks and Work Vehicles

In its Findings of Fact and Conclusions of Law Denying [KEI's] Application for Preliminary Injunction, this court stated that a terminal "does not include [devices attached to] the back of a truck or work vehicle." (Docket Entry No. 62, p. 37). KEI contends that this court should not include this negative limitation in its construction of the term "terminal." KEI asserts that such a construction would decide issues of infringement properly left to a jury.

[14] A court may not give a claim "whatever additional precision or specificity is necessary to facilitate a comparison between the claim and the accused product. Rather, after the court has defined the claim with whatever specificity and precision is warranted by the language of the claim and the evidence bearing on the proper construction, the task of determining whether the claim reads on the accused product is for the finder of fact." PPG Indus. v. Guardian Indus. Corp., 156 F.3d 1351, 1355 (Fed.Cir.1998). "When the claims are applied to an accused device, it is a question of technologic fact whether the accused device meets a reasonable meaning of "about" in the particular circumstances." Modine Mfg. Co. v. United States Int'l Trade Comm'n, 75 F.3d 1545, 1554 (Fed.Cir.1996). In this case, the question whether a device attached to a

truck is a "terminal" is essential to the issue of infringement. Construing the term "terminal" as expressly excluding a device attached to the back of a truck or work vehicle would remove this issue from the jury. This court must construe the term "terminal" with particularity, based on the patent language and intrinsic evidence. The jury should decide whether, based on this court's construction, a device attached to the back of a truck or work vehicle is a "terminal."

The claim language, technical treatises, written specification, and prosecution support construction of a "terminal" as being attached to an object fixed to the roadside. This court construes the term "terminal" as:

A device attached to the end of an elongated barrier that is anchored to the roadside, or attached to the end of a fixed roadside hazard, that prevents an errant vehicle's movement perpendicular to the roadway and, in cooperation with other components and the barrier or hazard, absorbs energy when a vehicle hits the terminal itself.

B. Impact Head

[15] One element of claim 6 of the '003 Patent is "a terminal including an impact head." Claims 3 and 14 of the'820 Patent also include an "impact head." The parties agree that this court should give the term "impact head" the same construction in the '003 and '820 Patents. KEI proposes the following construction of the term "impact head":

An "impact head" is a device designed to spread the load of an impact over an impacting vehicle to prevent penetration of the vehicle's body and to provide a mechanical interlock between the energy-absorption safety device and the impacting vehicle to prevent the impacting vehicle from sliding up, down, or sideways along the impact head.

(Pl's *Markman* Hearing Slide 18).FN6 Trinity proposes the following construction of "impact head":

FN6. KEI's proposed construction of the term "impact head" presented at the *Markman* hearing was a condensed version of the construction KEI proposed in its *Markman* brief. That construction stated:
An "impact head" is a device designed to take an impact from a randomly oriented surface and control loading application between the impacting surface and the energy absorber. An impact head spreads the load over a portion of the impacting vehicle and provides a mechanical interlock between the energy-absorption safety device and the impacting vehicle. The impact head is designed to prevent the safety hardware from punching through the impacting vehicle and prevent the impacting vehicle from sliding up, down, or sideways along the impact head.

(Docket Entry No. 75, p. 13).
An "impact head" is a unitary component that has a wide end facing the flow of traffic that is large enough to receive an impact from a vehicle without penetrating the vehicle's body, and that has a narrower end facing away from the flow of traffic.
(Docket Entry No. 76, p. 8). KEI contends that Trinity's proposed construction is overly narrow because the invention does not require the impact head to be a "unitary component" and does not require the end facing away from traffic to be narrower than the end facing traffic.
Trinity contends that the ordinary meaning of the word "head" supports its proposed limitation that the wide end of the impact head face traffic and the narrow end of the impact head face away from traffic. To

support its argument, Trinity points to the dictionary definition of the word "head" as "the uppermost extremity or projecting part of an object." (WEBSTER'S THIRD NEW INT'L DICTIONARY, 3d ed. (1993)). Trinity also emphasizes the statement in the specification that "[t]he impact head 30 is a strong wide-mouthed section having its wide portion facing outwardly from the guardrail 16 to receive a vehicle such as 12 and its narrower end connected to one end of the cutting section 36." FN7 ('003 Patent, col. 4, ln.22-27). KEI responds that the claim language does not require the end of the impact head facing away from traffic be narrower than the end facing traffic and that nothing in the claims or specification require the impact head to be a "unitary component."

FN7. The numbers refer to Figure 1 of the '003 Patent.

[16] Claims must be read in view of the specification, but limitations from the specification may not be read into the claims. Teleflex, 299 F.3d at 1326. Although the specification describes an embodiment in which the end of the impact head facing traffic is wider than the end facing away from traffic, the claims do not require such a construction. The specification teaches that the impact head is sized "(1) to engage a sufficient area of the vehicle that hits the impact head to avoid penetrating the vehicle body; and (2) to avoid any dimension that would permit the impact head to project sufficiently to block the roadway." ('003 Patent, col. 5, ln.47-55). The specification does not provide any design requirements for the end of the impact head facing away from traffic. The end of the impact head facing away from traffic could be as wide as the end facing traffic, or possibly wider, depending, for example, on the type of hazard to which the device is attached. This court cannot construe the term "impact head" as requiring the end of the impact head facing away from the traffic to be narrower than the end facing traffic; to do so would impermissibly read limitations from a preferred embodiment into the claim.

The dictionary definition of the term "head" does not support Trinity's proposed requirement that the end of the impact head facing away from the traffic must be narrower than the end facing traffic. The "projecting" part of the definition does not suggest that the head must necessarily be the wider end of the impact head, or that the impact head must have a narrow and wide end. The dictionary definition Trinity provided includes a "ram" as having a head. A ram does not necessarily have a wide and narrow end; a blunt metal cylinder could serve as a ram. The "head" of the ram that impacts, for example, a door, can be a blunt end with the same width or diameter as the other end.

The initial portion of the definition Trinity provided, defining "head" as "the uppermost extremity," is more appropriately applied to the position of the impact head in the overall invention, meaning positioned on the end of the terminal that receives vehicle impacts. ('003 Patent, Figs. 1-2). "Head" does not imply structural features of the impact head itself.

Trinity states that the term "unitary component" means that the impact head is a separately identifiable component in the invention, not that the impact head is made of one solid piece of metal or other material. Construing the impact head as a "unitary component" is unnecessary and potentially confusing. It is clear from the claims that an "impact head" is an separate component of the overall invention. Claim 6 states that the terminal includes the impact head. There is no requirement in the specification that the impact head consist of a single piece; it could, for example, consist of two or more joined pieces. "Unitary component" is a vague term that could be interpreted to mean that the impact head is made of a single, solid piece.

KEI's proposed construction of "impact head" states that an impact head "provides a mechanical interlock

between the energy-absorption safety device and the impacting vehicle to prevent the vehicle from sliding up, down, or sideways along the impact head." Nothing in the specification teaches this limitation. Nor does the specification describe an embodiment of "impact head" that contains mechanical interlocking properties. The specification only states that the head should be made of heavy steel or other materials capable of moving the entire terminal during an impact, and that the head should be designed so that it does not penetrate the vehicle body on impact and so that it is not so wide as to block the roadway. ('003 Patent, col.5, ln.47-55). This court declines to include a "mechanical interlock" in the construction of the term "impact head." FN8

FN8. KEI cites a different patent that describes an impact head that forms a mechanical interlock with a colliding vehicle. (Pl.'s *Markman* Ex. 138, United States Patent 5,775,675 (the " '675 Patent"), col. 5, ln.38-41). The '675 Patent application was not a parent or child of the '003 Patent application. The '675 Patent is extrinsic evidence upon which it is improper to rely if an analysis of the intrinsic evidence alone resolves ambiguity in construing a claim term. Vitronics, 90 F.3d at 1583. None of the preferred embodiments of the '003 Patent are excluded by a claim construction that does not include a mechanical interlock in the "impact head." *Cf.* Dow. Chem., 257 F.3d at 1377 (rejecting district court's claim construction in part because many preferred embodiment experiments were excluded by district court's claim construction).

The claims and written specification support the following construction of the term "impact head":

A component of the terminal designed to receive the impact of an errant vehicle and spread the load of the impact over an impacting vehicle such that the safety device does not penetrate the vehicle.

C. The "One of" Limitations

[17] Claim 6 claims:

An energy-absorption system comprising:

a terminal including an impact head ["Limitation 1"];

a cutting section ["Limitation 2"]; and

a cutable member having an axis ["Limitation 3"];

said energy-absorption terminal including one of the cutting section and cutable member ["Limitation 4"];

said one of said cutting section and cutable member being positioned in the energy-absorption terminal aligned with the impact head and the other of said cutting section and cutable member ["Limitation 5"];

said energy-absorbing terminal including one of the cutable member and the cutting section aligned with each other wherein the cutable member, and cutting section are forced together when the impact head of the energy-absorbing terminal is impacted by a vehicle ["Limitation 6"];

said cutting section including cutting means positioned to cut said cutable member as the cutable member and cutting section are moved with respect to each other by the impact head ["Limitation 7"].

('003 Patent, col. 9, ln.50-col. 10, ln.2).

The parties dispute the construction of Limitations 4, 5, and 6. As to Limitation 4, KEI contends that the "energy absorbing terminal" must include at least one or both of the "cutting section" or the "cutable member." (Docket Entry No. 75, p. 18). Trinity contends that the "energy absorbing terminal" includes either the "cutting section" or the "cutable member." (Docket Entry No. 76, p. 10). As to Limitations 5 and 6, KEI contends that at least one or both of the "cutting section" and "cutable member" must be positioned in the "energy absorbing terminal." (Docket Entry No. 75, p. 18). Trinity proposes that this court construe these limitations as requiring either the "cutting section" or the "cutable member" be positioned in the "energy-absorption terminal"and that the "energy absorbing terminal" include either the "cutable member" or "cutting section." (Docket Entry No. 76, p. 11).

[18] The plain language of the limitations is imprecise. Claim 6 uses the term "comprising," which "signif[ies] that the claims do not exclude the presence in the accused apparatus of or method of factors in addition to those explicitly recited." Vivid Tech., Inc. v. Am. Sci. & Eng'g, Inc., 200 F.3d 795, 811 (Fed.Cir.1999); Stiftung v. Renishaw PLC, 945 F.2d 1173, 1178 (Fed.Cir.1991)(a claim "which uses the term 'comprising' is an open claim which will read on devices which add additional elements"). KEI contends that the limitation that the energy-absorption terminal include "one of the cutting section and cutable member" does not exclude the possibility that the terminal will include both the cutting section and cutable member.

Limitations 4, 5, and 6 also use the term "one of." Trinity contends that the phrase "one of said cutting section and cutable member" should be construed to mean that the terminal contains either the cutting section or cutable member, but not both. Trinity argues that the definition of the word "one" as "being a single unit or entire being and no more" supports this construction. (Docket Entry No. 77, Ex. F at T03027).

Trinity cites WMS Gaming, Inc. v. Int'l Game Tech., 184 F.3d 1339 (Fed.Cir.1999) in support of its proposed construction of the "one of" limitations. *WMS Gaming* involved a patent on a type of electronic slot machine that could decrease the probability of winning through electronic circuitry. Each symbol or "stop position" on the reels of the slot machine was assigned one or more random numbers. The electronics would select a number at random from the list of randomly assigned numbers to determine which position would be the stop position for a given use, that is, which symbol would appear after the user pulled the slot. The patent contained a limitation that claimed a "means for randomly selecting one of said plurality of numbers," which described the step in which the electronics picked a number from the list of randomly selected numbers to determine which symbol would appear. The *WMS Gaming* court stated that the limitation-"means for randomly selecting one of said plurality of numbers"-claimed a step in which the random number generator randomly selected a single number from the list of numbers. *Id*. at 1349. Citing *WMS Gaming,* Trinity asserts that the phrase "said energy-absorption terminal including one of the cutting section and cutting member" in the '003 Patent must be construed as including either the cutting section or the cuttable member, but not both.

WMS Gaming is distinguishable and does not apply to the facts of this case. *WMS Gaming* involved the construction of means-plus-function claims, which are not present in this case. It was clear from the invention in *WMS Gaming* that a single number was being selected; the court did not engage in an extensive construction of the term "one of." The claim in *WMS Gaming* would make no sense if it was construed as meaning that the claimed function could select more than one number; once a single number was selected

and a stop position determined, the function was complete. By contrast, it would be possible for the terminal to contain both the cutting section and cutting member. Limitation 4 requires only that one of the cutting section or cuttable member be present in the terminal; it does not exclude the possibility that both are present in the terminal.

Limitation 4 requires that "said energy-absorption terminal" include "one of the cutting section and cutting member." Limitation 5 states that "said one of said cutting section and cuttable member being positioned in the energy-absorption terminal aligned with the impact head and the other of said cutting section and cuttable member." The term "said one of said cutting section and cuttable member" refers back to Limitation 4. Limitation 4 is a list: the energy-absorption terminal must include one of the cutting section and cuttable member. The person of ordinary skill in the art must select one of the cutting section and cuttable member to include in the terminal. Limitation 5 instructs the person of ordinary skill in the art to take whichever of the cutting section and cutable member he or she selected as having to be in the terminal and position that item in the terminal such that it is "aligned with the impact head (also a part of the terminal per the language of claim 6) and the other of said cutting section and cutable member." "The other of said cutting section and cutable member" refers to whichever of the cutting section and cutable means the person of ordinary skill in the art did not select as having to be in the terminal. That element could be positioned in the terminal, but the claim limitations do not require that result. The claim limitations only require that "the other" element, which the person of ordinary skill in the art chooses not to include in the terminal, must be aligned with the element that the person did choose to be in the terminal.

A person of ordinary skill in the art might select the cutting section to include in the terminal to satisfy Limitation 4, which requires that the terminal "includ[e] one of the cutting section and cutable member." The phrase "said one of said cutting section and cutable member" of Limitation 5 refers to the cutting section in this example. This makes "the other" element of Limitation 5 the cutable member. In this example, the cutting section is placed in the terminal aligned with the impact head and the cutable member. The cutable member may or may not be included in the terminal. Limitations 4, 5, and 6 do not require that in this example the cutable member be included in the terminal, but they do not exclude the possibility that the cutable member is also included in the terminal.

This interpretation is consistent with the specification. The guardrail or structural pipe serving as the cutable member could be notched at the places where the cutting section will cut on impact, and the cutting section and cutable member could be fit snugly together, or perhaps even spot-welded together, such that both the cutable member and the cutting section are included in the terminal. Figure 10 of the '003 Patent shows an example cutable member with three slots into which the cutters of the cutting section fit. The cutable member and the cutting section each starts within the terminal, but only the cutting section is attached to the impact head, such that on impact, the impact head and the cutting section move relative to the cutable member and the cutting section cuts the cutable member.

This court construes the limitation stating that "said energy-absorption terminal including one of the cutting section and cutable member" as requiring that the energy-absorption terminal include either the cutting section or the cutable member, and that the terminal may include both the cutting section and the cutable member. Similarly, the limitation "said one of said cutting section and cutable member being positioned in the energy-absorption terminal aligned with the impact head and the other of said cutting section and cutable member" means that at least one of the cutting section and cutable member must be positioned in the energy-absorption terminal, and that both the cutting section and the cutable member may be positioned in the terminal. The limitation "said energy-absorbing terminal including one of the cutable member and the

cutting section aligned with each other wherein the cutable member, and cutting section are forced together when the impact head of the energy-absorbing terminal is impacted by a vehicle" requires that either the cutting section or cutable member must be present in the terminal, and both may be present in the terminal.

To summarize, Limitations 4, 5, and 6 do not exclude a configuration in which both the cutting section and cutable means are included in the terminal.

D. "Angled Cutter"

[19] Claims 3 and 14 of the '820 Patent claim an "angled cutter." KEI proposes the following claim construction for the term "angled cutter":

An "angled cutter" is an angled structure that cuts, wherein "angled" means that at least one edge of the structure is oriented other than perpendicular.

(Docket Entry No. 75, p. 22). Trinity contends that the term "angled cutter" should not be construed to have a scope that is any broader than the scope of the "cutting means" limitation of the '003 Patent. (Docket Entry No. 76, p. 12). Alternatively, Trinity proposes the following construction of "angled cutter":

An angled cutter should be construed as an angular shaped structure that cuts but does not have a blunt, rounded surface.

(Docket Entry No. 76, p. 12).

Trinity bases its argument on statements the applicants made during the prosecution of the '820 Patent. The examiner issued a final rejection of the '820 Patent on January 17, 2002, stating that the Bronstad Patent set forth an energy absorption system comprising an impact head, a cutter, and a cutable member. (Def.'s *Markman* Ex. 78 at T02155, T02157). In their Request for Continuing Examination, the applicants traversed the examiner's rejection on the basis of the Bronstad Patent, stating:

Applicants again submit that Examiner has failed to provide a *prima facie* showing of anticipation by Bronstad. Applicants further submit that Bronstad does not anticipate Applicants' claimed invention. Applicants further submit that Bronstad does not anticipate Applicants' claimed invention. Applicants respectfully direct Examiner to the decision of the United States Patent and Trademark Office Board of Patent Appeals and Interferences regarding Bronstad and the parent application and patent in this case, Appeal No. 98-1461; Application No. 08/335,153 [which became the '003 Patent]. Examiner is respectfully reminded that Bronstad does not disclose the "cutting means" claimed in the parent application and patent. Applicants therefore submit that Bronstad likewise does not disclose a "cutter" as suggested by Examiner. It is therefore respectfully requested that Examiner withdraw the outstanding rejection.

(Def.'s *Markman* Ex. 77, at T02172). In response, the Examiner withdrew his objections and allowed the '820 Patent on November 1, 2002. (Def.'s *Markman* Ex. 78 at T02181-T02182). Trinity contends that the applicants equated the angled cutter of claims 3 and 14 the '820 Patent to the "cutting means" of claim 6 of the '003 Patent. Trinity also contends that the applicants limited the term "angled cutter" to exclude from its scope any structure with a blunt, rounded surface. Trinity emphasizes the following statement made in the appeal brief of the '003 Patent prosecution:

The patent to Bronstad does not contain the overall teaching but obtains energy absorption by forcing the blunt side of bolts into sections of the guardrail and dissipating energy by breaking the separating portions between holes in the barrier.

(Def.'s Prel. Inj. Hrg. Ex. 2, Ex. 24, p. 25).

The applicants' statement in the '820 Patent prosecution history, that because the Bronstad Patent did not disclose '003 Patent's "cutting means," "likewise" the Bronstad Patent did not disclose the "angled cutter" of the '820 Patent, is not a unequivocal disavowal of claim scope. The Board of Patent Appeals and Interferences found that the Bronstad Patent did not disclose the '003 Patent's "cutting means" because of the differences between the "shredding" failure mode used by the Bronstad Patent and the "cutting" failure mode used by the '003 Patent. The same distinction between "shredding" and "cutting" exists between the Bronstad Patent and the "angled cutter" of claims 3 and 14 of the '820 Patent. The applicants referred to the Board's '003 Patent opinion in the '820 Patent prosecution to reiterate the difference between "shredding" and "cutting," not expressly to limit the scope of an "angled cutter" to the scope of the "cutting means" limitation in the '003 Patent. *See* Omega Eng'g, 334 F.3d at 1324 (disavowal of claim scope must be unambiguous and unequivocal).

Trinity's alternative argument is also unpersuasive. Figure 8 of the '820 Patent discloses an embodiment of an angled cutter with blunt faces. KEI introduced into evidence an angled cutter of the kind depicted in Figure 8. (Pl.'s Prel. Inj. Hrg. Ex. 55). That cutter had blunt, squared-off edges. The specification and prosecution contain no evidence of the applicants disavowing blunt, rounded edges on the cutters.

KEI's proposed construction of the term "angled cutter" is consistent with the specification of the '820 Patent. The two embodiments of the angled cutter in the '820 Patent are the dual plate cutter of Figure 7 and the wedge-shaped cutter of Figures 9 and 15. Both embodiments include structures that cut, where at least one edge of the structures is oriented other than perpendicularly to the material to be cut. The dual plate cutter includes two separate edges connected by a weld, for example, where both edges are oriented other than perpendicularly to the material to be cut. The wedge-shaped cutter consists of a single wedge, where the two faces of the wedge approach the material to be cut at an angle other than perpendicular. The angle of at least one of the edges must be other than perpendicular to avoid the Bronstad Patent. The applicants for the '820 Patent added the term "angled" to the cutter of the claim that became claim 3 in response to the examiner's rejection of the claim as anticipated and obvious in light of the Bronstad Patent. (Def.'s *Markman* Ex. 75 at T02150; Ex. 76; Ex. 77 at T02168).

This court construes the term "angled cutter" as:

An angled structure that cuts, in which "angled" means that at least one edge of the angled structure is oriented other than perpendicularly to the material to be cut.

E. "An Elongated Cuttable Member Horizontally Mounted Between Two Parallel Guardrails"

[20] Claims 3 and 14 of the '820 Patent include "an elongated cuttable member horizontally mounted between two parallel guardrails." FN9 The parties agree on the following construction of the term "elongated cuttable member":

FN9. The '820 Patent spells the term "cuttable" with two t's, while the '003 Patent spells the term "cutable"

with one t. This court will refer to the cuttable member of the '820 Patent with the word "cuttable" and the cutable member of the '003 Patent with the term "cutable."

An "elongated cuttable member" is a member that is capable of being cut and has a length that is notably longer than its width.
(Docket Entry No. 71, Appendix A, p. 7). The parties agree on the following construction of the term "guardrail":
A "guardrail" is the rail component of an elongated barrier that impedes the movement of an errant vehicle off a roadway and redirects the vehicle back onto the roadway.

(Id.).
The parties dispute the construction of the term "horizontally mounted between." KEI proposes the following construction of the term "horizontally mounted between":

The "elongated cuttable member" must be horizontally mounted between two parallel guardrails.

(Docket Entry No. 75, p. 36). Trinity proposes the following construction:

The "elongated cuttable member" must be horizontally mounted in the space that separates two parallel guardrails.

(Docket Entry No. 76, p. 14).

Trinity contends that the ordinary meaning of the word "between" is "in the space that separates" and "surrounded by." (Docket Entry No. 77, Ex. F at T03011). KEI contends that nothing in the specification limits the term "between" to "in the space that separates." KEI argues that Figure 14 of the '820 Patent, which shows the crash cushion embodiment of the invention protecting a concrete structure, only shows that the cuttable member is located in the horizontal plane of the two guardrails and does not limit the cuttable member's position in the vertical direction relative to the guardrails. KEI contends that the cuttable member could be above or below the guardrails.

Courts may rely on dictionary definitions to determine the ordinary and customary meanings of claim terms. Texas Digital, 308 F.3d at 1202. The term "between" is defined as "1: in the intermediate position in relation to two other objects; 2: filling the space limited by two objects; 3: through the space limited by two objects." WEBSTER'S THIRD NEW INT'L DICTIONARY 209 (1993). Another dictionary defines the term "between" as "1. in the space separating (two points, objects, etc.): between New York and Chicago; ... 17. in the intervening space or time; in an intermediate position or relation: two windows with a door between." RANDOM HOUSE WEBSTER'S UNABRIDGED DICTIONARY 200 (2d ed.2001).

The dictionary definitions the parties present emphasize that the word "between" connotes a limitation in space. KEI's proposed construction fails to impose any vertical limit on the position of the cuttable member. KEI's proposed construction of "between" would encompass a cuttable member that could be several feet above or below the guardrails, but would appear "between" the guardrails if viewed from above or below. KEI argues that the dictionary example of a city "between" New York and Chicago supports its argument because the city "between" could be at a higher or lower elevation. The dictionary definition, however, used that example in describing a space separating "two points or objects." The term "between" when used to

describe geographical locations usually ignores the varying altitudes of the respective locations and assumes the locations are "points" on a two-dimensional map. The ordinary meaning of the term "between" does not encompass cuttable members that appear to be "between" the guardrails when viewed from above or below, but when viewed from the side are far above or below the space separating the guardrails. The ordinary meaning of the term "between" includes both limits on the space defined by two objects.

This court construes the limitation "an elongated cuttable member horizontally mounted between two parallel guardrails," as follows:

The "elongated cuttable member" must be horizontally mounted in the space that separates two parallel guardrails.

F. The "Wherein" Clauses

[21] Claim 3 of the '820 Patent describes the following invention:

An energy-absorption system for positioning along a roadway to absorb the energy of an errant vehicle, the energy-absorption system comprising:

an impact head;

an angled cutter; and

an elongated cuttable member horizontally mounted between two parallel guardrails;

wherein the energy absorption system is positionable along a roadway to cooperate with the upstream portion of a roadside hazard; and

wherein the impact head is in operational connection with the cutter and the cuttable member such that the impact of an errant vehicle with the impact head will cause the cutter to cut at least a portion of the cuttable member to absorb the impact energy of the errant vehicle.

('820 Patent, col. 9, ln.22-ln.42). Trinity contends that the two limitations of claims 3 and 14 beginning with the word "wherein" are in means-plus-function format under 35 U.S.C. s. 112, paragraph 6.

Section 112, para. 6 provides:

[a]n element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

Section 112, para. 6 operates to restrict claim limitations drafted in means-plus-function format to those structures, materials, or acts disclosed in the specification that perform the claimed function, and their equivalents. Personalized Media Communications, LLC v. Int'l Trade Comm'n, 161 F.3d 696, 702 (Fed.Cir.1998).

[22] [23] [24] Whether claim language invokes section 112, para. 6 is a question of law. *Id*. A claim limitation that uses the word "means" raises a rebuttable presumption that section 112, para. 6 applies. Apex, Inc. v. Raritan Computer, Inc., 325 F.3d 1364, 1372 (Fed.Cir.2003) (citing CCS Fitness, 288 F.3d at 1369). By contrast, a claim that does not use the word "means" triggers the rebuttable presumption that section 112, paragraph 6 does not apply. The presumption that section 112, para. 6 does not apply can be rebutted if the claim "fails to recite sufficiently definite structure" or "recite[s] a 'function without reciting sufficient structure for performing that function.' " *Id.;* Watts v. XL Systems, Inc., 232 F.3d 877, 880 (Fed.Cir.2000). The presumption that section 112, para. 6 does not apply to a claim not reciting the word "means" when the claim "relies on functional terms rather than structure or material to describe performance of the claimed function." Apex, 325 F.3d at 1372. This burden must be met by a preponderance of the evidence. *Id*.

[25] To determine whether a claim limitation recites sufficient structure, a court examines whether the "term, as the name for structure, has a reasonably well-understood meaning in the art," even if the claim term "does not call to mind a single well-defined structure." *Id*. at 1372 (quoting Greenberg v. Ethicon Endo-Surgery, Inc., 91 F.3d 1580, 1583 (Fed.Cir.1996)). Even if a particular mechanism is defined in functional terms, that is not sufficient to convert a claim element containing those terms into a "means for performing a specified function" under section 112, para. 6. Greenberg, 91 F.3d at 1583. Trinity has the burden of producing evidence to rebut the presumption; KEI continues to bear the burden of proof "in the sense of the risk of nonpersuasion." Apex, 325 F.3d at 1372.

The recitation of the structural relationship of elements using functional limitations does not automatically place the claim in means-plus-function format. "It is good practice also to specify the functional or operational cooperation between the elements [of a claim] ... When this is done, the claim not only tells where the parts are and how they are interconnected or associated, it tells how they function together and operate on the workpiece to accomplish the result stated in the preamble." ROBERT C. FABER, LANDIS ON MECHANICS OF PATENT CLAIM DRAFTING s. 30 (4th ed.1999).

The "wherein" limitations of claims 3 and 14 of the '820 Patent do not contain the term "means," so this court must apply the presumption that section 112, para. 6 does not apply. Both of the "wherein" limitations use structural language to describe the placement of the various parts of the invention. The first "wherein" limitation states that "the energy-absorption system is positionable along a roadway to cooperate with the upstream portion of a roadside hazard." ('820 Patent, col. 9, ln.34-36). This "wherein" limitation describes a structural feature of the claimed invention, namely, that it is positionable along the roadside in a particular way to enable the invention. The first portion of claims 3 and 14 list the parts of the invention-an impact head, an angled cutter, and an elongated cuttable member. Trinity correctly points out that without further specificity as to the placement of these parts, the description of the invention's structure is incomplete. (Def.'s *Markman* Ex. 79).

The "wherein" clauses provide the necessary additional specificity. The first "wherein" clause describes where the invention must be placed relative to the roadside hazard. The energy-absorption system is on the side of the road and, specifically, in a location where it can cooperate with the roadside hazard. This limitation narrows the places on the side of the road where the energy-absorption system can be placed. This is a structural limitation. The "function" described by this "wherein" limitation is "cooperation" with the upstream part of the roadside hazard. The structural aspect of the "wherein" clause is that the invention is "positionable" to provide the "cooperation" between the invention and the roadside hazard.

The second "wherein" clause recites the structural limitations specifying the relative positions of the parts

comprising the claimed invention. The impact head is in "operational connection" with the cutter and cuttable member, in such a way that if a car collides with the impact head, the cutter and cuttable member will be forced together and the cutter will cut the cuttable member. The term "operational connection" describes the structural relationship among the impact head, cutter, and cuttable member that the claim requires for the cutter to perform the function of cutting the cuttable member when a car collides with the impact head. In other words, the impact head, cutter, and cuttable member of claims 3 and 14 of the '820 Patent cannot be arranged in any way. Rather, the impact head, cutter, and cuttable member must be arranged in a specific way to achieve the desired function.

[26] A person of ordinary skill in the art would recognize the second "wherein" clause as describing how the parts of claims 3 and 14 must fit together to perform the desired function of cutting the cuttable member upon a vehicle's impact. Trinity's expert, Malcolm Ray, stated that "what the second "wherein" clause tells us is that we need to arrange the parts as well as others that we get from the specification such that they work, such that they get the cutter to cut." (Transcript of *Markman* Hearing, p. 132, 1.3-1.8). A claim limitation describing how to "arrange" a list of parts, even if the arrangement is defined in functional terms, provides a structural limitation. Greenberg, 91 F.3d at 1583. Trinity has failed to rebut the presumption that section 112, para. 6 does not apply to the "wherein" clauses of claims 3 and 14 of the '820 Patent.

IV. Conclusion

The disputed terms of the '003 Patent and the '820 Patent are construed as follows:

CONSTRUCTION OF CLAIMS

U.S. PATENT 6,022,003

A **"terminal"** is a device attached to the end of an elongated barrier that is anchored to the roadside, or attached to the end of a fixed roadside hazard, that prevents an errant vehicle's movement perpendicular to the roadway and, in cooperation with other components and the barrier or hazard, absorbs energy when a vehicle hits the terminal itself.

An **"impact head"** is a component of the terminal designed to receive the impact of an errant vehicle and spread the load of the impact over an impacting vehicle such that the safety device does not penetrate the vehicle.

The limitations in claim 6 **"said energy-absorption terminal including one of the cutting section and cutable member," "said one of said cutting section and cutable member being positioned in the energy-absorption terminal aligned with the impact head and the other of said cutting section and cutable member,"** and **"said energy-absorbing terminal including one of the cutable member and the cutting section aligned with each other wherein the cutable member, and cutting section are forced together when the impact head of the energy-absorbing terminal is impacted by a vehicle"** require that the energy-absorbing terminal of claim 6 include either the cutting section or the cutting means, and that the terminal may include both the cutting section and the cutable member.

U.S. PATENT 6,505,820

An **"angled cutter"** is an angled structure that cuts, wherein "angled" means that at least one edge of the angled structure is oriented other than perpendicular to the material to be cut.

The limitation **"an elongated cuttable member horizontally mounted between two parallel guardrails"** means that the "elongated cuttable member" must be horizontally mounted in the space that separates two parallel guardrails.

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