

# The History of Achilles Inflatables

Herm Hoops - 2017

In 1974 at a time when manufacturers like Avon, Campways and Udisco were just discovering the potential of the recreational whitewater inflatable market, Achilles was making and marketing a series of high quality river boats.(17)(#b.)

After WWII it didn't take Japan's post-War industries to recover. In less than two years the Kohkoku Chemical Industry was founded to manufacture fabric and rubber products. Soon after its founding, the company branched into the field of vinyls. By 1955, it was one of Japan's leading manufacturers of rubberized cloth, rubber footwear, and supported and unsupported vinyl sheeting. By 1961 they were manufacturing inflatable sport boats and tenders made from Butyl Rubber for the European Market. Achilles USA, Inc. was established in 1973 as a PVC fabric manufacturing plant in Everett, Washington. Inflatable Boats made from Neoprene were displayed at the opening ceremony marking the introduction of Achilles Inflatables to the US market.(1,2,4)(#g.) In 1982 the Kohkoku Chemical Industry changed its name to Achilles Corporation.(2,3)(#a.)

The Marine Division of Achilles USA, Inc. is unique in that they sell the only "branded" product of the company, Achilles Inflatable Boats. The boats are manufactured in Japan, and to a lesser degree in the very recent past, in China and are the only finished products that are sold as an Achilles brand. Therefore it is an important part of the company's history, and it offers a great sense of pride to the parent company in Japan as well.(4)(22)(#f.)

The year 1984 represented the pinnacle of Achilles inflatable boat sales in the U.S. selling over 10,000 inflatable boats into the U.S. market. The whitewater river inflatable boat unit is only a small part of the Achilles Marine Division. The final margins for Achilles inflatables are small, Tony Dunning, who started with Achilles in 1982, explains: "The rubberized cloth factory sells the fabric to our factory that builds the boats. Then the factory that builds the boats sells finished boats to our division in Japan and Japan sells the boats to us. So there are a lot of mark ups, and then we have to mark them up to sell them, so we have a real small profit margin and where the people who are importing direct have double the profit margin and they can play with the sales amount numbers but half of our profit stays in Japan. Each division, the rubberized cloth division, then the marine division, then the marine division in the U.S. has to show a profit."(2) Today Achilles sells several thousand inflatables, mostly sport boats and tenders, in the United States market. It is perhaps the requirement of mark ups that limits sales in the United States, but Achilles sales also suffered when it reduced the number of company representatives in the United States.

{Numbers in parenthesis (1) are REFERENCES; letters in parenthesis (#a) are described in SIGNIFICANT NOTES.}

Achilles is one of the few inflatable boat manufacturers that produces their fabric. They buy the nylon inner fabric from Germany and then manufacture the coatings in Japan. Since 1980 Achilles Inflatables are manufactured using chlorosulphonated polyethylene, or CSM fabric that is made by the Achilles Corporation in Japan. CSM, or Hypalon, is a synthetic rubber compound that is used in the outer coating of the Achilles fabric. Because of the physical characteristics of CSM, the boats need to be glued by hand. Despite the fact that Achilles is a world leader in the manufacture of PVC, they make their inflatable boats out of CSM because they believe it is a better fabric despite its cost (both as a fabric and because of the increased labor costs for producing a hand made product).(#c.)

CSM fabric is manufactured by a calendaring process, and Achilles' final product consists of four layers. There are two inside layers of chloroprene, or neoprene, for air retention, a supporting layer of core fabric (either Nylon or Polyester and Achilles has used kevlar), and an outside coating of CSM. It is a multi-step process, and the end result is a very strong supported fabric.(2)(#c.)

By 1974 they introduced their own line of 14' and 15' whitewater boats.(5,17) In the late 1970s and early 1980s there was an explosion in the interest of river running. Achilles Corporation recognized that there was a whitewater inflatable market as well as their lines of yacht tenders and sport boats and Achilles entered the business and opened dealers in the United States. In 1976 Achilles came out with their RV Series that was oriented toward outfitters. Hatch River Expeditions had been using Udisco boats on their Salmon River and Selway River operations in Idaho until the late 1979 when they replaced their Udiscos on the Selway with a new brand just out on the market, Achilles.(6,21) They were small tubed and had to be bailed, but were very well built and much more rigid than the Udiscos.(21)(#e.)

Before Northwest River Supply (NRS) began manufacturing in Mexico Bill Parks began working with Carl Korima, and Tony Dunning to have Achilles manufacture a personal, multi-day river boat for NRS. Achilles had been building a 14' whitewater boat since 1974(#b.) and later a 16' boat with 16" diameter tubes. Parks wanted bigger tubes and the new NRS dimensions were 20" diameter tubes, 14'9" long and 7' wide. NRS bought between 100 and 150 of the Achilles manufactured rafts, and called them the NRS Sport.(5)

Tim Smith's exposure to Achilles was thru his business partner Lyle Canham in 1982. Canham was a fabricator, building rowing frames for Dan Baxter and Campways/Riken. Tim and Lyle took Tony Tanooka and another Kohkoku boss down the Deschutes River in central Oregon and they had a blast. There they talked with the raft rental operations about building a better raft to replace their Campways River Riders (blue with red rubbing strake), a lighter version of Baxter's Red Line. Smith fine tuned the specifications to increase the thread count and amount of Hypalon in the RV Series 420 denier and in 1985 introduced the Achilles RS line. They are coral red, but much lighter than the RV series. Many of those boats are still on the river today, many of them retro-fitted with self-bailing floors.(26)

In 1983 Achilles worked to produce boats that were 20% lighter in weight but more abrasion resistant using 80% content Dupont Hypalon on the outer covering of the fabric. They used two layers of neoprene on the inside coating to assure air retention. The coatings were adhered to nylon woven inner fabric. In addition, when the industry standard was one-half inch Achilles seams overlapped one inch and were seam taped inside and outside. Both the RV and the RS Series used 1260 denier floors that were wrapped to the rubbing strip. The RV designed for commercial or heavy use had 4 chambered 840 denier tubes, with lace in thwarts, improved d-rings, and were red. The RS Series was designed for the private river runner market and had glued in thwarts, three chambered 420 denier tubes and were blue in color.(7,18)

<b><u>1983 Achilles</u></b>	<b><u>Length</u></b>	<b><u>Width</u></b>	<b><u>Tube Dia.</u></b>	<b><u>Rake</u></b>	<b><u>Weight</u></b>
RV126	12'6"	6'1"	18"	27.5"	100#
RV140	14'0"	6'8"	20"	30.3"	140#
RV156	15'6"	7'1"	22"	31.5"	160#
RV180	18'0"	8'0"	24"	35.4"	215#
RS110	11'0"	5'2"	16"	23.6"	60#
RS126	12'6"	6.1"	18"	27.5	80#
RS140	14'0"	6'8"	20"	30.3"	100#
RS156	15'6"	7'1"	20"	31.5"	130#

\*Rake - both bow and stern rise

In 1984 Achilles used a 50% denser fabric than on previous RV models. The floor was partially wrapped up the tube and the RV Series was given larger tubes. Achilles added the SV Series, designed for recreational boaters, that used a 43 oz. tube material and was less expensive. In 1984 Achilles also added the PV Series using a calendered 80% Hypalon on a 420 denier tube and 840 denier floor fabric with a high density neoprene inner coating. The floor on the PV Series was partially wrapped up the tube to help protect the lower tube.(8) By 1984 the Achilles KSB-94 inflatable kayak was a decade old featuring an inflatable I-beam self-bailing floor. The inflatable floor sat on another sheet of fabric, giving it the look of a non-self-bailing boat. Although the flat bottom of the floor made turning easy and gave the I-beam section protection it collected water and debris adding weight.(7,9)

<b><u>1984 Achilles</u></b>	<b><u>Length</u></b>	<b><u>Width</u></b>	<b><u>Tube Dia.</u></b>	<b><u>Rake</u></b>	<b><u>Weight</u></b>	<b><u>Price</u></b>
PV126	12'6"	6'1"	18"	10"	75#	\$1,100
PV140	14'6"	6'10"	19.5"	9"	100#	\$1,345
SV126	12'6"	5'10"	17"	7"	90#	\$1,215
SV140	14'0"	6'8"	19.5"	10"	120#	\$1,550
SV156	15'6"	7'0"	21"	11"	165#	\$1,845
RV130	13'0"	6'1"	18"	8"	128#	\$1,530
RV140	14'0"	6'8"	20"	10"	155#	\$1,795
RV143	14'5"	6'8"	20"	10"	165#	\$1,980
RV160	16'0"	7'6"	23"	11"	185#	\$2,295
KSB94	9'4"	3'2"	11.2"		34#	\$1,099

By 1986 Achilles renamed the PV Series as the CV Series. In 1987 Wild Rivers bought four 16' and four 18' grey Achilles and they were in daily use until 1999(12). Western River Expeditions launched a large fleet of the RV Series inflatables.

In the late 1980s the Federal Reserve Bank de-valued the dollar which resulted in much higher prices for Japanese products. Achilles, for a short time went to California Inflatables (CICO) to make their boat tenders and sport boats, and possibly a few whitewater rafts. The product was made with either blue or red non-Kohkoku Hypalon material, and the red quickly sun faded to an ugly light pink (not to be confused with salmon color,) and Achilles quickly cancelled production by CICO.(26) California Inflatables failed to maintain the quality Achilles demanded and the agreement was terminated(26)(#f.)

Achilles has made few changes in their inflatables over the years - a testimony to their good design. They went from metal military to nylon military valves around 1985. The Achilles parent company was reluctant to use Leaffield valves as the military style valves were made by a company with close ties to the parent company and they didn't want to put Japanese people out of work.(23)(#d.) In 1989 they introduced laced-in self-bailing floors and Leaffield valves on some models.(7,19,20)(#d.) The early self bailing floors copied Campways I-beam floor. The septums ran crosswise in the bow and stern, and lengthwise down the center. It was changed to a full length I-beam a few years later. The self-bailing system was fully wrapped, with reinforced floors. Achilles used the lace-in self-bailing floor, so they could be replaced if damaged. Floors were also available for retro-fitting standard floor boats. The boats came with D-rings, rub strake, frame wear patch, lifting handles and lace in thwarts.(26)

<b><u>2015 Achilles</u></b>	<b><u>Length</u></b>	<b><u>Width</u></b>	<b><u>Tube Dia.</u></b>	<b><u>Rake</u></b>	<b><u>Weight</u></b>	<b><u>Capacity</u></b>
RS110	11'0"	5'2"	16"	23.6"	72#	4
RS126	12'6"	6'1"	18"	23.6"	103#	7
RS140	14'0"	6'8"	20"	30.3"	120#	9
RS156	15'6"	7'1"	22"	31.5"	149#	12
RV110	11'0"	5'2"	16"	23.6"	85#	4
RV126	12'6"	6'1"	18"	27.5"	112#	7
RV140	14'0"	6'8"	20"	30.3"	134#	9
RV156	15'6"	7'1"	22"	35.4"	165#	12
RV180	18'0"	8'0"	24"	35.4"	231#	18
RV110SB	11'0"	5'2"	15"	24"	88#	4
RV126SB	12'6"	6'1"	18"	27.5"	129#	7
RV140SB	14'0"	6'8"	20"	30.3"	153#	9
RV156SB	15'6"	7'1"	22"	31.5"	184#	12
RV180SB	18'0"	8'0"	24"	35"	272#	18
KSB94	9'4"	3'1"	11.2"	20.5"	37#	1
KSB116	11'6"	3'1"	11.2"	20.5"	47#	2

{Capacity in persons, assuming not multi-day capacity loading; SB + Self Bailing Model with lace in floors; KSB = Self Bailing Inflatable Kayak; RS Series = Recreational Series, blue with glued in thwarts; RV = Commercial Series red or gray with lace in thwarts; All above models come with 2 thwarts, RV Series has option for 3 thwarts}

Achilles continues to be a world leader in the inflatable industry constantly improving existing models and introducing new models to the market. Many of Achilles competitors use PVC based fabric for manufacturing their boats because of the cost savings involved in materials and manufacturing. There are many boats on the market similar to Achilles available at half the cost which makes marketing challenging, but it is actually a good sales and marketing tool because Achilles has always had the reputation for manufacturing one of the highest quality inflatable boats in the world. Currently their niche in the market is being the best value in a CSM inflatable. Achilles Marine continues to work with the parent corporation in Japan to adapt quickly to market changes to remain successful and competitive in all aspects of the inflatable industry in the U.S. in the years to come.

## **REFERENCES**

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- (3) Achilles Corporation: [www.bloomberg.com/research](http://www.bloomberg.com/research);
- (4) Achilles Company History;
- (5) Bill Parks, NRS; Oral Interview with Herm Hoops; Moscow, ID; September 18, 2015;
- (6) Barry Hatch Email to Herm Hoops; October 14, 2012;
- (7) 1990 River Runner Magazine - Rafts & Pumps; page 14; Herm Hoops Collection;
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- (13) Richard Martin Email to Herm Hoops (valves); 03/26/2016;
- (14) Barry Hatch Email to Herm Hoops (valves); 03/27/2016;
- (15) Dick Gilmore Email to Herm Hoops (valves); 03/27/2016;
- (16) David Evans, (Technical Sales, Leaffield Marine Limited) Email to Herm Hoops; 03/30/2016;
- (17) 1976 River Catalog, Herm Hoops Catalog Collection;
- (18) 1983 Achilles Brochure, Herm Hoops Catalog Collection;
- (19) 2015 Achilles Catalog, Herm Hoops Catalog Collection;
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- (23) Tim Smith, Achilles Representative (retired) phone call with Herm Hoops; 12/27/2016;
- (24) Zach Baird (Raftfix) Email to Herm Hoops; 12/21/2016;
- (25) Rob Martin Email to Herm Hoops; 12/20/2016;
- (26) Tim Smith, Achilles Representative (retired) Email to Herm Hoops; 02/01/2017;



### **MISCELLANEOUS**

- USCG Hull Code: ACH (ACHU the "U" was for boats made in US.)
- Achilles Coretech Company, Ltd. 22-5 Daikyo-Cho 160-8885, Tokyo, Japan;
- Achilles Inflatable Craft, Division of Achilles USA, Inc., Headquarters & West Coast Sales - 1407 80<sup>th</sup> Street, S.W. Everett, WA 98203; (800) 829-2912; Tony Dunning, West Coast Sales Manager; (2016) - Email: [boats@achillesusa.com](mailto:boats@achillesusa.com) Website: [www.achillesboats.com](http://www.achillesboats.com)
- Achilles Eastern Sales Office - 355 Murray Hill Parkway, East Rutherford, NJ 07073; (201) 438-2618; (2016)
- Achilles Inflatable Craft; (1980) 25 Branca Road, East Rutherford, NJ 07073; (Joe H. Hedges, Manager; Sonny Panzarella, National Sales Manager; Achilles Inflatable Craft; Division of Kohkoku USA, Inc.
- Alpenglow Mountain Sports (dealer), 393 Washington Street, Golden, CO
- Four Corners Marine (dealer), Durango, CO
- Backeddy (dealer), Colorado Springs, CO
- AAA Inflatables (dealer), 5610 Lamar Street, Arvada, CO. 80002-2624; 303-296-2444
- Marita Sea & Ski/Alaska Power Sports (dealer), 1340 Rudakof Creek, Anchorage, AK 99508

### **SIGNIFICANT NOTES:**

#### **(#a.) Kohkoku Chemical Industry:**

In May 1947 the Kohkoku Chemical Industry (currently Achilles Corporation) was founded with 2 million yen in capital. Production and sales of rubber products begin with the head office located in Nihonbashi, Chuo-ku, Tokyo and the factory in Ashikaga, Tohigi, Japan. The rubberized factory division manufactured material primarily for rainwear. By April, 1948 PVC product production began. Within a short time the company expanded into the manufacture of plastics, synthetic rubber, foam, fake leather and other fabrics. Their original competitor was Toyo Rubber, who manufactured Rogue Inflatables for B.A. Hanten of Oregon in the 1970s.

In 1977 Achilles Corporation in Japan began producing CSM Fabric Boats in Japan and in 1981 a factory solely dedicated to the manufacturing of CSM Inflatable Boats was established. Today Achilles is a diversified multi-national group of companies, involved in footwear, plastics and industrial materials. Achilles Corporation has approximately 31 subsidiaries and five associated companies. The company operates in three business segments that manufacture a huge assortment of products. Achilles USA is a wholly-owned subsidiary of Achilles Corporation.

Tony Tanooka, a black sheep of the Kohkoku family, was sort of exiled to the US by Kohkoku. He was in charge of all inflatables. His sales manager was Mike Engstrom who was the West Coast Representative as well as "special projects coordinator" as in riverboats. Tim Smith began work for Engstrom in 1982 in boat design and sales.(26) Tony Dunning, who also began work for Achilles in December, 1982 eventually became the Westcoast Sales Manager, Achilles USA Inc. and (2016) has worked for Achilles for 34 years.(22)

For a very short time Achilles also marketed a variety on non- river craft manufactured by South Africa's Conquest Inflatable Craft.(26) Conquest Inflatable Craft were selling eight and 10-foot inflatable powered support dinghies through Achilles in 1996 and 1997. As of 2015 Conquest Inflatable Craft is no longer in production.

**(#b.) 1976 Achilles River Boat:**

RV 140 - 13'9" long and 6'8" wide advertised as "Miwok Size" and promotional retail price \$1225.00.(17)

**(#c.) Fabric - CSM, Hypalon, Neoprene and PVC Fabric:**

Hypalon is the trade name for chlorosulfonated polyethylene made by DuPont. DuPont stopped manufacturing Hypalon in 2010. The generic name for Hypalon is CSM. Tosoh Corporation from Japan makes CSM which they call Toso-CSM. A Chinese manufacturer of CSM - Hongrun Chemical Company, Ltd. of Jiangxi Province, China will begin to fill the demand for CSM.

Hypalon (CSM) coating for fabric is perfect for inflatable boats because it has a high UV tolerance (which means it doesn't harden when left out in the sun), it is resistant to chemicals (which means no big deal if you spill fuel or oil in your boat), it is easy to repair (which means you can apply a patch while in the field), and it has good abrasion resistance (which means you are less likely to get holes when beaching your boat). The only problem with Hypalon (CSM) is it doesn't hold air very well.

To address that problem the material used in inflatable boats is coated on the inside with Neoprene and on the outside with Hypalon (CSM). Neoprene holds air very well. Between the Neoprene and Hypalon layers is a fabric layer, either nylon or polyester. Several internet posts claim that Achilles used a Hypalon outer coating over a high quality neoprene inner coating to retain air. This claim is patently false.(2, 23) If you visit the Achilles website, they show their fabric is coated on the inside with chloroprene, which is a shortened name for polychloroprene, a man-made rubber which is also known as Neoprene. Neoprene is actually DuPont's trade name for polychloroprene.

Neoprene, or polychloroprene, one of the first man made rubbers, is very air tight, and has a long life. Some of the first inflatables were made of Neoprene coated cotton. The only problem was the cotton canvas core fabric would rot even though the Neoprene was still good.

There are many conflicting views about the properties of different boat fabric coatings, here are the pros and cons of Hypalon (CSM):

- Hypalon is more abrasion resistant than PVC but less abrasion resistant than Polyurethane. Some manufacturers report the dry abrasion resistance of Hypalon (CSM) is higher than PVC whereas the wet abrasion resistance of Hypalon (CSM) is lower than PVC. Hypalon is more chemical resistant than PVC and is more UV resistant than PVC. Hypalon does not get brittle over time and is relatively easy to repair. But Hypalon is the most expensive coated material and it is labor intensive as it must be cold glued by hand. Hypalon material gets dirty over time, because the material is porous and the dirt penetrates into the coating. This is more obvious with light colors like yellow. Hypalon fades when left out in the sun - more noticeable on colors like blue or orange.

Some brands of Hypalon (CSM) coated fabric used in inflatable boats are:

- Achilles Wendt Argenturen B.V. - website shows a 4 layer material 2 chloroprene inside, 1 fabric, 1 Dupont Hypalon (CSM) exterior layer
- EoL by Stafford Textiles
- Novurania - ISO 14001 and 9001 manufacturer of Hypair® - website shows 3 layer material 1 Neoprene, 1 polyester fabric, 1 Hypalon (CSM) - manufactured in USA and Italy
- Orca CSM by Pennel & Flipo - 5 layer material - 2 Neoprene, 1 fabric, 1 Neoprene, 1 CSM exterior layer
- Zenith Industrial Rubber Products - website shows a 3 layer material - 1 chloroprene, 1 fabric, 1 Hypalon (CSM).

**(#d.) Achilles Valves:**

Achilles river boats used metal military style inflation valves until 1984/85 when they changed over to a similar nylon replacement made by the same company (The valves were different than the standard military valves and only fit Achilles or riken boats). They continued to use the nylon military valves through 1999, and they continue to use the military style recessed valves on their RS Series.(12, 13, 14,15,19,23) Later Achilles may have used Halkey-Roberts AD-2 on the RV Series. Around 2000 Achilles began using Leaffield valves on all but their RS Series.(11) Information on the changeover to Leaffield valves on Achilles rafts is difficult to find. “We don’t have an awful lot of information to go on as we implemented an electronic system a few years back which meant that we got rid of any paper copies or photographs not to mention with various office and factory moves over the years I am afraid I think the old brochures were disposed of ! Achilles USA was added to our computer system in April 2001, Japan was added June 2004. We sent USA sample C7 and A6 in April 2001. First order to Japan was paid for and sent in June 2000.” (David Evans, (Technical Sales, Leaffield Marine Limited)(16) In 2015 Zach Baird of Raftfix received a new replacement floor that had a raised nylon military valve on the floor and a PAM PRV.(24)

**(#e.) Hatch River Expedition’s Achilles:**

Don Hatch purchased 5 - 13.5' Achilles for around \$800 in 1979 or 1980 to be used on the Selway River. John Hatch ran the Middle Fork, Green and Yampa numerous times in their Achilles boats. Mel Hughes and Larry Mcgowan helped select and rig up the boats. The frames were carbon steel tubing and could be taken apart and hauled in a plane or trunk of a car if needed. Because of the Achilles small tube diameter and surface area one would quickly learn the importance of running a dry boat to avoid as much bailing as possible. As time went on the Achilles were seldom used although one was converted to a paddle boat. Two were sold in the mid-80’s and John purchased two from his mother (Meg) before she sold the company. One has a blown baffle and the other is called “Cherry.”(21)

**(#f.) Manufacture of Achilles River Rafts:**

Some people claim they have Achilles river rafts made in the United States. Achilles only manufactured the rafts in Japan. They began doing some assembly in China beginning in about 2011, but the fabric is still made in Japan. In 1994/95 Achilles did some U.S. production of sport boats, but Tony Dunning doesn’t believe Achilles manufactured any rafts here. They tried using a new red color and all the rafts turned pink in a short time and they replaced a lot of them, it is possible that some self-bailer floors by themselves were made in the U.S.A. at that time and a few boats were assembled by a Los Angeles firm (California Inflatables). Those boats would have had the nylon military style valves, not metal ones. In 1995 Achilles sued the U.S. manufacturer and they filed bankruptcy. In 1997 Achilles started importing from Japan again. Rafts with a serial number that starts with ACHU, the “U” identified the boats made in US.

Richard Martin owned two Achilles 16 foot boats - one, grey, that was made in Japan, the other blue (named *Naked Katie* after Katie Lee) he believes was made in the U.S. The valves in both boats were “military” - but those on the second boat were different, made from a higher grade metal and machined. Their designs were radically different with the blue having much bigger tubes and more radical kick with a shorter flat floor that made for faster turning. As of 2016 he still has that boat, and a second which he bought from Gary’s Boat Supply in Idaho. It was a second because it was manufactured with only three chambers. Both boats were made from very high grade Hypalon. Gary’s Boat Supply had a line on these boats and a number Richard’s friends bought 12’ and 14’ boats from them. One was a SB - Martin’s was a bucket boat, as were most his friends. They were all orange, which faded to an ugly pink. The Hypalon the U.S. boats was different than on Richard Martin’s Japanese boat, which seemed coarser. The U.S. ones were super slick which made climbing in a little difficult. Tom Martin also bought a used 16’ Achilles from a Camp Verde and he still has it. It was orange, but it hasn’t faded like the others. Rob also thinks the boat was made in the U.S.A. but the hull design was more like his grey boat.(25)

**(#g.) Achilles**

No one, including the folks at Kohkoku or Achilles can tell me how the name Achilles was chosen. However, since the company’s establishment they have been working to create shoes and their success in the market is based on years of experience in developing shoes. Thus it would be reasonable to relate the name “Achilles” to their production of shoes, in particular sport shoes.

In Greek mythology Achilles was a Greek hero of the Trojan War and the central character and greatest warrior of Homer’s *Iliad*. Achilles’ most notable feat during the Trojan War was the slaying of the Trojan hero Hector outside the gates of Troy. Although the death of Achilles is not presented in the *Iliad*, other sources concur that he was killed near the end of the Trojan War by Paris, who shot him in the heel with an arrow. Later legends (beginning with a poem by Statius in the 1st century AD) state that Achilles was invulnerable in all of his body except for his heel. Alluding to these legends, the term "Achilles heel" has come to mean a point of weakness, especially in someone or something strong.

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- Tim Smith, Achilles USA Inc. Representative (Retired)
- Jim Pearson & Frank Sullivan

{ 1<sup>st</sup> draft 12/15/15 - 1968; words; 2<sup>nd</sup> draft 03/30/16 - 3175; 3/2017 - 4494 }