



Photo Courtesy of US Army

Almost all categories of footwear manufacturing in the USA are either in serious decline or have become non-existent. One area, however, is on the increase—military specified boots and shoes.

US military boots 'quick march'

Mel Cheskin

Increasing American military involvement around the world has created a steadily growing demand in all areas of military equipment. This naturally includes footwear, as despite advanced weaponry, combat soldiers still spend a great deal of time on their feet.

Thanks in large degree to the Berry Amendment, a government ruling that all US forces must be supplied with equipment originating from US boot manufacturers and made from US materials wherever possible, military boots are 'quick marching' off the production lines at several US factories.



A good example

In late 2003 alone, military boot maker Altama was awarded a three-year contract worth approximately \$40 million to supply the United States army, marines, air force and navy with three models of combat boots amounting to some 700,000 pairs.

The contract also contained a 'production surge' clause that was invoked during the performance of the base year in 2004. This led to the supply of 100,000 additional pairs to the US Department of Defense. Since 9/11, the company has increased its workforce to 350 and increased revenues nearly three-fold. This in ➔

Altama desert tan combat boot with ridged sole.

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turn led to it being bought by the Phoenix Footwear Group, Inc. in July 2004.

Altama is among a number of US manufacturers licensed to produce boots under strict specifications by one of the Departments and Agencies of the US Department of Defense (DoD) Index of Specifications and Standards (DoDISS). Less than fifteen such DoD licensees remain. Business is therefore good for names such as Addison, Bates (Wolverine World Wide), Belleville, Capps, Cove (H.H. Brown), Danner, McRae, Wellco and Weinbrenner.

MilSpec

How strict is the MilSpec specification for US military footwear manufacture? A typical example is that for Hot Weather Combat Boots which come in two types; type 1 – for wet conditions and type 2 – for dry environments. Both are covered by thirty-six full pages of materials specifications and construction details. All boots made under DoD contracts are held to strict military specifications adhering to ASTM, ISO and SATRA standards. Furthermore, quality assurance representatives separately inspect, approve and purchase each part order.

Performance is clearly paramount in military footwear, as nothing can be left to chance. One reason why all military equipment is so expensive is the large amount of research and development that goes into design, materials, construction and the search for new and improved technologies.

Finding a last

In military, as in all forms of enclosed footwear, the last plays a major part in determining the comfort of the finished boot. In regard to military footwear, the term 'Uniform' has often been the cause of much discomfort. An army of uniquely shaped individuals cannot be issued with the same style of boot and all, or even most, be expected to find it comfortable. The specialised development and testing centre at Natick, Massachusetts, has developed and approved specific lasts for military use over years of field testing with thousands of military personnel.

One of the contract requirements may be to use a certain DoD approved last. In



Cove Shoe desert tan hot weather combat boot.

this instance the government may agree to supply a set of lasts to be returned once the order is complete. The Addison Shoe Company has traditionally used this system for making specialised aircrew boots for helicopter pilot and parachute boots for military purposes.

Wellco recently developed the new RS300 last in conjunction with moulding machine maker Desma and last maker Fagus, which they claim provides the best available fit for combat boots. One MilSpec last that has a proven 'field tested' record is the Garrison Army Munson last developed at Cove Footwear for their Corcoran brand by a certain Mr. Munson during WW2 and is still in use today. It is a good example of the old dictum that 'If it works – leave it alone'.

Ensuring comfort

The inside comfort of a boot depends on a range of physical attributes of the materials, the components and how they are assembled. While military personnel generally agree that the most important performance factor is fit, there are other key parameters such as water resistance, thermo-physiological properties of the materials, overall construction and the ability to control the temperature inside the footwear and to remove moisture from around the foot.

Established lining materials such as Thinsulate for improved insulation, Cambrelle for maximum moisture

wicking and GoreTex breathable membranes are now well accepted and often specified for certain weather conditions. The more recent Dryz IntelliTemp Phase Change insulation has been applied to Cove's Corcoran Historic 1510 Boot. On the other hand, tradition is still revered in military footwear, so this boot is still proudly advertised as being made from 'Spit Shineable' chrome tanned leather.

The essential truth is that if your feet hurt you cannot fight efficiently. This is a relatively new concept in military terms.

Less than one hundred years ago, in the First World War, millions of men were forced to fight in terrible conditions with inferior and ill-fitting uniforms and boots that were not subject to any real quality control. The Second World War saw some significant improvements towards the end. It is only since then that any real advance has been made and the soldier's lot has become increasingly comfortable in regard to his boots.

Basic types

There are essentially three grades of military footwear available on the market. This is why prices at army surplus stores can vary from \$19.95 for a basic model to US-contracted MilSpec boots at \$130.00. The title of Military Spec or Military Grade is often used to market 'look alike' boots. Another grade of MilSpec boot may be genuine military specified but made for a government that does not apply quite the same high standards as for US, Canadian or British forces' footwear.

Authentic US military specified boots from an officially contracted supplier are not directly available to civilians and, although it is not illegal to own a pair outside the forces, they are also not readily sold commercially. In fact, although most companies are proud to state they are an Official US Department of Defense Government Manufacturer, they do not list these actual boots in their catalogues. Despite this, production of US MilSpec boots was expected to reach around 2.6 million pairs during 2004.

Technology

Cove Shoe is a typical example of a ➔

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Bates (WWW) black patent dress shoe.

military contractor. It has 425 employees making contract boots and shoes for police and military use under the Matterhorn and Corcoran brands as well as private label industrial footwear. Most of the 600,000 to 700,000 pair annual production is sold within the USA itself, with some exported to foreign governments.

Cove's original relationship with the US army was extended in 1988 when Matterhorn boots were approved as an alternate-use product. These feature waterproof full-grain upper leathers, Thinsulate foot insulation, GoreTex membranes and Vibram outsoles combined with a Goodyear welted construction to provide maximum comfort, dry feet and a product able to withstand combat conditions.

A more recent development from Cove has been the new waterproof Infantry Combat Boot (ICB) issued in spring 2003 to replace the standard DMS issue boot. This features a lace-to-toe design for improved fit, nylon Cordura quarter panels, waterproof full-grain dyed through leather, a waterproof membrane, a new Vibram rubber soling compound and removable inserts.

Athletic shoe technology

One advantage of being part of a large corporation is the potential to transfer know-how and technology from one division to another. Through its earlier acquisition of Brooks Athletic Shoes in the '80s and then Merrell in the '90s, Bates (WWW) has enjoyed ready access to a variety of athletic shoe technologies. A direct result has been the recently added 8 inch Tropical Uniform Steel Toe Boot,

which has raised the expectation of what military personnel expect from uniform footwear.

This has DuraShock comfort technology, which uses patented compression pads in the forefoot and heel to absorb shock. It also has a removable full-cushion dual-density polymer footbed and a sport tread pattern on the outsole. Still one of the largest uniform footwear companies in the world, Bates is also one of the oldest, producing more than 1.5 million pairs of uniform boots and shoes per year, with an emphasis on Uniform Dress Oxfords for men and women.

Wellco Enterprises, Inc. (founded 1941) also has a long history of manufacturing under military contract. All leathers used here are from domestic animals and either Type 1 or Type 2 as defined in MIL-PRF-3122J. Treatment A or AB, depending on the degree of waterproofing required, allows a minimum moisture vapour transmission rate of at least 500 grams/square metre/24 hours.

Wellco also uses its V-TRAX sole on combat type boots. This is designed to provide maximum abrasion resistance, traction and durability in the many diverse environments in which military personnel must operate. It is further combined with a TUFFkushion direct injected polyurethane compound midsole to provide a lighter construction, increased wear-time and less fatigue. It also improves shock-absorption and compression set to return more energy to the wearer. This development is now fundamental for combat boots and has resulted in a 30% reduction in injuries.



Sierra boot sole.

Outsole design

The outsole is clearly also of extreme importance in military footwear in terms of traction, wear and overall efficiency. The days of studded leather soles and simple direct vulcanised rubber soles have long gone. Sophisticated compounds and designs now rule and are again the domain of specialist producers.

Italian company Vibram has an established reputation for the very best in design and production of high-performance rubber outsoles and the Quabaug Rubber Company in Massachusetts is its licensed manufacturer in the USA. Through its work with the Natick Army R & D Center, Vibram holds many compound and design patents and is specified on more MilSpec contracts than any other outsole producer. As a result, Quabaug currently produces twelve MilSpec approved products, typified by the following:

#1275 Olympia—a composite sole for rugged outdoor footwear. The unique design and location of multi-directional and ladder-grip lugs, plus ergonomic flex grooves, provides maximum traction on a multiplicity of terrain. It is available in both single or dual hardness compounds.

#1276 Sierra—a black or tan composite flat sole for hot wet through to desert conditions with ergonomic flex grooves, multi-directional and ladder-grip lugs for gripping roots and branches. An exclusive compound also guarantees maximum traction on a variety of terrain including wet and cold surfaces.

#1307 Offset Chevron has a traditional chevron design in both heel and forepart to provide maximum slip resistance while reducing FOD (Foreign Object Debris). Variations include the #7136 Chevron IRT for Navy personnel, the #1303 Uniform Dress Oxford sole and heel, and the #134AR & TL version with self cleaning lugs, large heel and toe pad for stability.

#134 Tech Lug Sole is a composite sole for use on outdoor and work footwear. There are no right angles—as in traditional lug soles which make it self-cleaning and provide maximum traction. This design is available in a TL version to

incorporate EVA for shock absorption.

#148 Kletterlift has a centre medallion of traditional carrarmato lugs to maximise traction. These are angled to promote both grip and braking. Because the heel is built up with a micro-cellular material wedge, it provides lightweight comfort as well superb shock absorption.

All these soles and heels are made to exact MilSped standards and in compounds that offer high abrasion, oil resistance, traction, comfort, flexibility and durability. They can be used in welted, DMS, stitchdown and cemented construction footwear. It goes without saying that the most careful sole and upper preparation and adhesive application are paramount in view of the hard wear the final product will receive.

The future

What will tomorrow's computer driven, stealth equipped military forces be

wearing? While work in the USA is well under way to design the ultimate Modular system, other countries are also exploring new technologies. Russia has come up with a motorised boot whereby the wearer bounds along somewhat like a kangaroo. Not such a good idea perhaps.

The Defence Science and Technology Agency in Singapore, on the other hand, has apparently developed an in-shoe power plant that generates added energy as the wearer steps on cells embedded in the soles of the boots. That certainly sounds like a useful new weapon for the advanced combat soldier.

We have always had international strife and the armies needed to fight the battles. The current state of the world suggests that this is unlikely to change in the foreseeable future. The demand for military boots is, therefore, likely to remain strong and one can only hope there might also be technical spin-offs for everyday footwear such as we have seen with sports shoes. 



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