Staying upright on the mountains

Measuring grip has always been a problem for industrialists whether it is to avoid slipping when working on the wings of an aircraft, or checking that a US football glove does not break the rules by gripping too well.

France-based CTC Research and Development Centre has been working on grip and slippage in footwear for some time. According to its researchers slipping is one of the greatest dangers that can befall a human being moving from A to B, whatever shoes are worn. It can occur whenever there is movement and two surfaces are in contact with each other.

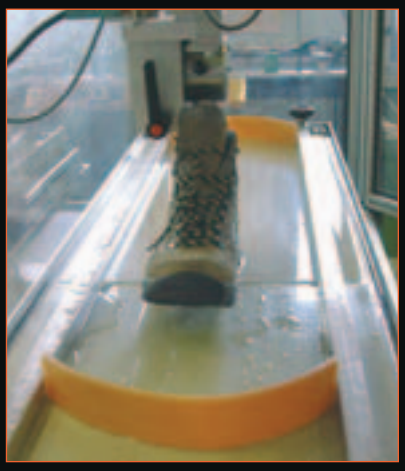
Slips occur due to:

- a lack of adherence between the sole and the ground, in cases where the sole is not suited to the surface in question (i.e. dry, wet, dry or wet ice, or oil)
- environmental factors (i.e. an irregular surface, humidity, presence of slippery elements on the surface)
- and, of course, people simply not paying attention.

The foot can slip immediately as the foot touches the ground, while the foot is on the ground or during the intermediary stage. It may happen when walking around town, whilst playing sport, or in many other circumstances. It was the cause of one accident in five in 2000, and the cause of death for one in every five people over the age of 65.

The shoe as a protective factor

From the standpoint of protection, the importance of the sole is evident, both in terms of the choice of materials and surface characteristics and shape. The sole's slip-resistance must first be determined, and there are two important conditions that must be fulfilled to prevent slipping. The initial slipping movement must be contained (static rubbing) and the speed of the slide must be limited so as not to lose balance (dynamic rubbing). Within the framework of European standards on slip-resistance for professional footwear (NF EN 13287), CTC has developed testing equipment that has since been used to test urban footwear.



Testing at CTC.
CTC

When the machine was developed, CTC deliberately made it adaptable for other types of footwear, with the possibility to adjust parameters such as the pressure exerted on the shoe, the speed of rubbing, the combination of the type of surface and lubricating agent used, or the angle. The machine is run by CTC's specially developed software that controls all of these parameters, and runs the machine.

Trekking in laboratory conditions

The machine encompasses the three phases of walking: the shock absorbed by the heel, the moment the foot rests on the ground, and the impulse created by the ball of the foot.

Comfort is a major factor in a trekking shoe, if for no other reason than it will be worn for long periods of time, often without the opportunity to

stop if problems arise. The shape and relief of the soles of trekking shoes were observed to help to examine the evacuation of fluids – the orientation, depth and relief of the various indentations, the flexion of the front of the shoe and the angle at which the heel of the shoe hits the ground. To reproduce "slipping conditions" a number of solutions were tried including a steel plate with glycerine and a ceramic plate with lauryl sulphate.

Tests were carried out on a representative sample of 41 models of men's trekking shoes in sizes 39/40, 41/42 and 44/45. For each different condition, the shoes were passed through the system five times each with a total of 1,800 entries inputted into the database.

The footwear samples were classified according to their average 'slipping value', whether the foot was flat, or whether the heel or the front of the shoe was on the ground. Of the two types of tests run (steel/glycerine and ceramic/lauryl sulphlate), the first method gave heterogeneous results, which seemed immediately relevant. From the 'slipping averages' for the foot in the three positions it proved possible to rank the sample models in order of performance. The second method, the ceramic/lauryl sulphate solution, gave different, more homogeneous results, and consequently does not seem to be the most suitable one.

Future tests

CTC will now proceed by testing the soles on different surfaces. Analysis will include the hardness of the sole, and the studs. This will allow the various parameters connected with slip to be correlated. Further tests will be made imitating damp or wet rocks, to test shoes in more realistic conditions. The angle of the heel and the ball of the foot will be adapted as closely as possible to imitate climbing conditions. Finally, tests will be carried out in real-life conditions.

La Sportiva Testarossa with the new VibramXS Grip rubber.

La Sportiva

Vibram's Alien.

Vibram

Vibram climbs high

Founded some 70 years ago as the result of a fatal accident that was very much real life, grip is the business of Vibram .The first Vibram climbing compound appeared in the 1980s and it has since undergone a number of modifications which have systematically pushed back the limits in terms of grip and performance. One interesting area goes beyond just soles and compounds to new technical solutions for the uppers of free-climbing shoes offering comfort, grip and precision. The company has done well in this area and the qualities of the material are demonstrated by the many prizes won in competition and the remarkable performances of the best climbers, for example the first 9a/9a+ by a woman in June 2005 (Josune Bereziartu, Bimbaluna route, Saint-Loup cliff wearing Tenaya shoes).

In its continuous quest to obtain the perfect balance between grip and resistance on micro-holds, sensitivity and rigidity, performance and durability, Vibram now offers XSGrip, a new generation of climbing rubber. In developing this, the company deliberately selected a new route in development. To measure grip, an innovative method based on the push/pull factor of the rubber was used. Using physical and mechanical parameters simulating a wide range of climbing situations, this new method made it possible, step-by-step, to produce a formula offering 30% more grip than previous compounds.

Scaling new heights

In parallel with laboratory work, tests in the field were set up according to a very strict organisation with the Vibram Tester Team such that the Tester Team members did not know when they were using the new compound. They used a team of 32 climbers, men and women, with different climbing abilities, and worked to achieve year-round tests on many different natural and artificial surfaces using a single shoe model.

After 16 months of testing, the 32 climbers, through an objective process of elimination, agreed on the new compound XSGrip.

Getting a grip

Taking the concept of grip and traction further, contrary to other heels, Vibram Alien has a tapered structure that protects the shoe from heel to toe. This 'shell' provides maximum traction in the rear and strong grip in the front, characteristics that contribute to the overall quality of the shoe and make it extremely versatile. It is in the heel that Vibram Alien demonstrates its full potential. The high-grip tread reinforces traction in the rear and expands the possible applications of the shoe. The most extreme movements have found a new ally. This new product, Vibram Alien, combined with its new compound XSGrip in the front, will appear in climbing shoes at the end of 2006. The futuristic new sole is said to offer climbers a level of performance and versatility that has never been reached before.