



PHOTO CREDIT: RHENOFLEX

Recycling where least expected

Among the most overlooked components of a shoe are the toe puff and counter yet, in most instances, they are essential for preserving its shape, providing protection to the wearer's toes and support around their heels. They, or more particularly the materials they are made from, are however seldom considered important in terms of innovation as are upper leathers or soling materials. Nevertheless, important changes do take place and the most recent one concerns both sustainability and recyclability.

BK Giuliani GmbH, Business Unit Rhenoflex of Luwigshafen, Germany, has been a major supplier of toe puff and counter material to the industry since 1952 and celebrates its 60th anniversary later this year. The original materials had fabric substrates saturated with urea formaldehyde resins that could be water-activated on the shoe factory production line. Toe puffs and counters cut from these

materials contrasted favourably with the more normal solvent-activated types as they were easier to handle, did not affect operators' hands and, above all, did not give off unpleasant fumes. The fact that they were also relatively environmentally friendly was not a consideration taken into account 60 years ago. They did however perform well in the shoe and, as a consequence, manufacturers who tried them also liked them.

Experienced shoe technicians were hired to introduce the new products into shoe factories' production systems and Rhenoflex toe puffs and counters quickly became popular throughout the German footwear industry. Building on this base, the company opened its first laboratory in 1953. Ever since then the Rhenoflex Research Laboratories have been the driving force that has enabled the company to introduce a number of significant advances in terms of both technology and, increasingly, recycling and sustainability.

NEW TECHNOLOGIES

The mid-1950s also saw the introduction of the first counters to be coated with a heat-activated thermo-adhesive. These were generally made from leather board and pre-moulded to shape. Rhenoflex, however, continued to use saturated woven or non-woven type substrates. The big advantage here was that counters could be cut from flat sheets and edge skived within the shoe factory in the same manner as toe puffs, rather than being ordered as a complete component. This offered a greater degree of flexibility and economy. By the end of the 50s, the company was supplying toe puffs and counters based on this principle for almost all types of footwear other than safety toe caps.

The next innovation, as far as product was concerned, came in 1980 with the introduction of the patented RX3000 range. This was a major breakthrough in that the adhesive was contained within the material itself rather than being an outer coating. This meant that the

skived edges would also stick to the upper material, thus improving the bonding area. The material was also easier to handle when hot, as it did not stick to the operator's fingers. The fact it was made using a powder system with synthetic fillers and polyester fabric meant it was also recyclable and thus environmentally friendly.

A final refinement introduced in the 80s was Rhenoprint, still widely used today. This was totally powder-based and, although it again contained fillers, there was no longer any woven element. Where it really scored was the fact that it could be moulded to the required shape with all edge reductions included so that no skiving is required. Equally importantly, it also effectively eliminated all waste as everything can be re-ground and re-used as prime raw material.

The RX5000 range, introduced in 2005, took this idea a stage further by replacing the synthetic fillers with natural ones. This made the product even more environmentally friendly as well as totally recyclable. Remarkably, wood and straw are cleverly used as the basis for these fillers and one really begins to wonder just what else can be exploited as fillers in the various materials the footwear industry uses. In addition, the manufacturing process is entirely solvent-free and no additional adhesive is required during processing in the shoe factory.

It also has an exceptionally long open time that can accommodate delays of up to ten minutes between toe and seat lasting. This is significant as it reduces the need to reheat that has been a problem with many thermoplastic puffs, and counters in the past and saves both time and energy consumption in the factory.

The latest product innovation is 3700RX Bio and is made from recycled bio-plastics. It is fully biodegradable and, the company claims, is therefore an absolutely unique product as it combines manufacturing efficiency with minimal environmental impact. Following on from the RX3000 and RX5000 materials, it is a further stage in taking care of our environment. The raw materials used to produce it actually originate in the medical and packaging industries and possess some very useful features such as total moisture resistance, hardly any flammability and excellent colour fastness. From a processing point of view, it again has a long open time and, in addition, can be softened prior to lasting or moulding at temperatures as low as 60°C.

Quite how these sources of recycled materials that also offer technical improvements to the final materials they are used to produce are identified is something of a mystery to many of us. Who or what sparks the idea of where to look in the first place? The fact that it must also take considerable time and effort is obvious. And time costs money, so it also takes considerable faith for any company to embark on such a programme for a final product that the end consumer is largely unaware of.

Like some other successful companies in today's footwear industry, Rhenoflex has nevertheless based its business on developing ideas and technologies that not only help produce quality footwear but to also maximise the potential cost savings that can be made through the use of recycled materials. When every penny counts, even such relatively small hidden components as toe puffs and counters can play their part. 

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