

Counterfeiting and traceability

Counterfeiting has been with us since time immemorial which is why, when coinage was still made using gold and silver, people would bite a coin to see whether it felt genuine or not. Now that products and materials have become far more complex, the opportunities for substitution and misrepresentation have grown exponentially, as too has the difficulty in detecting them and bringing perpetrators to justice. The modern phenomenon of branding everything has only encouraged the problem as it creates a perfect target for counterfeiters. Furthermore, the extended supply chains that have resulted in so much manufacturing moving to China and Southeast Asia have created more opportunities for them to operate.

Take Camtex Fabrics Ltd. as an example. Almost everyone in the industry must be aware that despite the Cambrelle name and distinctive embossing, its highly successful non-woven lining material has long been a target for counterfeiters. Despite having an extremely aggressive policy over protecting its trademark piqué finish, it has encountered numerous difficulties with regard to counterfeiting. Although

well aware of infringements from as early as 2003, it was not until two years ago that it succeeded in winning a landmark decision in a Chinese court against a Chinese company that had infringed its intellectual property rights. The court found that Wenzhou Superteng had infringed Article 57 of the trademark law of the People's Republic of China. It had previously confiscated 6.2 tons of imitation fabric along with an embossing roll the company had used to copy the trademarked design. The company appealed, lost and was heavily fined.

Camtex Fabrics' managing director, Kieran O'Hare, decided to press charges having caught the company brazenly selling material it claimed was Cambrelle at the INDEX exhibition in Geneva in 2014. Not only was it exhibiting imitation fabric, it also had the Cambrelle logo on posters and business cards. At the Cinte Techtextil China exhibition later in the year, he again saw Wenzhou Superteng openly promoting and claiming to sell Cambrelle. On this occasion and with the assistance of a local law firm, he was able to have the product removed from the stand and to initiate a legal case against the defendant in China.

Without the help of local partner Cosmo in Hong Kong and Chinese lawyers the odds are that he would have failed due to the ambivalent attitude prevalent in China towards intellectual property. Furthermore, in this instance, the abuse was blatant; in most instances it is far more difficult to detect and prove.

SEWING THREADS

High performance sewing threads, for instance, have also long been a target. Some years ago, there was a story doing the rounds regarding a scam in China whereby thread specified by leading sports shoe brands was being replaced by locally produced thread which did not meet the same performance standards. The clever part was that the substitute thread was being wound onto used cores from genuine specified threads which made it very hard to detect. Suspicions were only aroused when too many seams started to fail in wear due to a lack of tensile strength and resistance to fraying through surface abrasion. At the time, there was no easy way to determine whether a thread was genuine without comparative physical testing in a laboratory, which was both expensive and time consuming. Things



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Despite having a registered trade mark embossed finish, Cambrelle has been a frequent target of counterfeiting.

CREDIT: CAMTEX

are now changing for the better.

In May this year, industrial thread manufacturer American & Efird (A&E) introduced a new line of advanced identification threads under the brand name 'Integrity'. These have been developed in collaboration with another American company, Applied DNA Sciences (ADNAS), based on that company's CertainT authenticity platform. Echoing Kieran O'Hare of Camtex, A&E president Chris Alt says, "One of the big challenges brands face today centres around authenticity. Loss of revenue, reputation and brand trust are some of the potential outcomes of counterfeit products."

The two companies first announced they were collaborating on an anti-counterfeiting platform for sewing thread in early 2018 and their aim was to help brands protect their products. A&E has said its Integrity thread line offers the opportunity to add 'advanced identification' to a product, allowing greater transparency in the manufacturing process. Dr James Hayward, CEO of ADNAS, feels that, "Our collaboration with A&E to adopt the CertainT platform globally is a key breakthrough for brands, which have not had the benefit of forensic systems to help them resolve counterfeit and diversion in their supply chains." Hopefully, it will solve the problem.

TRACEABILITY OF HIDES AND LEATHER

Where sewing threads and similar footwear materials have been in need of a simple method of detecting counterfeiting products, leather has faced increasing demands for effective traceability. This has proved even more challenging due to the complexity of its supply chain from farm to finished upper leather. Last year, ADNAS and Eurofins BLC Leather Technology Centre in the UK, completed a successful research project to develop a comprehensive traceability platform for



Tony Benson, ADNAS' managing director for the EMEA region, has been a driving force behind the DNA traceability project.

CREDIT: ADNAS

leather. They have since signed an agreement to work on the commercial implementation of the system based on ADNAS's SigNature T technology, which has already been applied to cotton, wool and synthetic textiles. First, however, they had to prove the feasibility of the project in three key areas:

- Synthesis of DNA markers for animal skin and leather;
- Compatibility of DNA markers with leather manufacturing processes;
- Use of DNA markers and their subsequent recovery at the farm, abattoir, wet blue stage, finishing plant and finished product manufacturer.

The system they have developed is based on the application of a unique molecular tag in a way that is said to be impossible to counterfeit but is still cost effective. The molecular tags are based on the use of short, unmodified DNA molecules generated biochemically by large-scale polymerase chain reaction (PCR) processes. These are synthesised from standard DNA building blocks to create unique and secure DNA taggants that can be authenticated using simple, portable in-field testing methods.

The aim is to have 300 million square feet of DNA-tagged leather under contract over the next five years. This could be achieved through partnerships with project sponsors and other tanneries. Nicholas Muirhead, managing director of Muirhead Leather, part of UK-based Scottish Leather Group, who was an early sponsor says that, "Traceability in our manufacturing process is already robust and we consider ourselves industry leaders in this regard. Giving customers the option of using advanced DNA tagging allows them to build in more confidence in their own manufacturing streams."

HOW IT WORKS

Depending on exactly what an end customer wants, the DNA tag can be added at various stages. It can be at the farm to trace from farm to tannery, at the tannery to trace between tannages, at the finishing plant or even within the finishing process itself. It was found early on that DNA tagging on the hair of the animal was soon lost after the unhairing process. This was more a physical issue rather than degradation of the DNA itself but still provided traceability between farm and slaughterhouse. In the tanning phase, the DNA penetrates the hide and is detectable in both the grain leather and wet blue split obtained from it.

The amount of DNA used in the tagging has to be calculated very precisely. In the pilot project, a great deal of time was spent getting the dosing right so as to hit the 'sweet spot' for having the right amount present without excess that could create issues of possible cross-contamination. In terms of volume, it involves working with parts per billion so, for leather production, the product must be bulked out in order for its application in the processing vessel to become practical. The tag remains intact through the tanning process because DNA by its very nature is quite robust and, through addition at the right stages, is able to withstand the processing conditions involved.

The point in the supply chain where traceability starts is entirely at the discretion of the customer. Thus, there have not been too many who have wanted traceability to go all the way back to the farm; determining wet blue split origin has, however, been quite a common request.

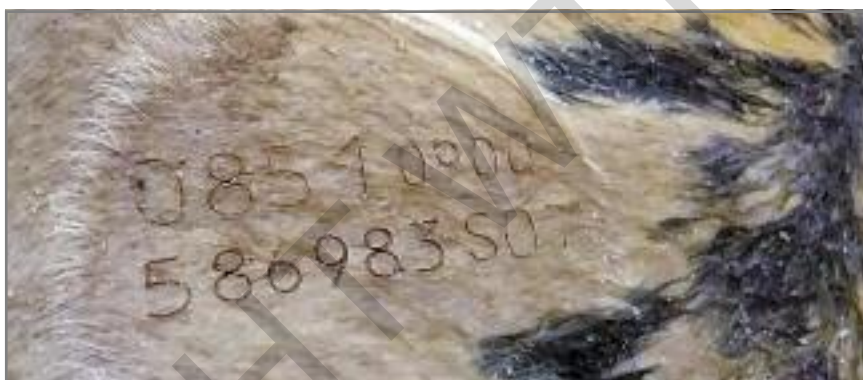
Understanding the reasons for wanting traceability is key and for most people it is about minimising risk. If it did become necessary to track an animal through the entire process, ADNAS considers one of the most reliable ways would be to use an ear tag impregnated with DNA as well. Conventional ear tags can be removed and copied but the DNA used is unique and there is absolutely no way it can be reproduced.

Detection is quite straightforward. The leather is swabbed and the swab placed in a detector. After about 30 minutes, the analysis is complete and is displayed graphically to show

whether the DNA has been detected. Results are also uploaded to a database where information can be gathered from around the world. For any given product, testing throughout the process allows for a 'molecular certificate' to be generated which can identify the test location, DNA code issued and machine used in order to provide the customer with complete traceability.

Tony Benson, ADNAS managing director for the Europe, Middle East and Africa (EMEA) region, has said, "We are ready for business and are in a position to sell. All the trials in the

pilot-scale tannery at BLC proved the scope and we have done some commercial-sized work at the sponsor tanneries to demonstrate that it works in that environment too. There's still a little bit of technical work to do and we are pulling together the commercial side of it all as well." The ability to be able to use DNA in order to trace a product or material right back to its source in a simple and foolproof manner could become a major tool against counterfeiting and malpractice in the future. It is a development to be welcomed and one that has long been needed. 



French leather and footwear research and testing body CTC has been developing its own traceability solution for leather in conjunction with a number of tanneries and abattoirs. In this instance, carbon dioxide (CO₂) lasers are used to mark a unique code on the hide. Cattle identification is widely carried out through the application of ear tags containing information about birth department, breeder number and the animal's own identifier. This compulsory traceability format is in place in the majority of European countries and is a matter of food safety. At the point of slaughter, the individual identifier is linked to a slaughter number specific to that slaughterhouse. Although this stays with the carcass, the identification is not carried over to the hide.

CTC has undertaken a CO₂ laser marking pilot. This allows for the skins to be labelled with either a one-dimensional barcode or a two-dimensional data matrix code with up to 14 characters. The label can be identified using a specialist barcode reader. Since April 2017, it has tested more than 6,000 skins at three slaughterhouses. The non-contact marking of the hides/skins takes into account the uneven nature of the material. It takes less than two seconds for 14 characters to be marked. Reading of the identifier, which takes place at the acquisition station, is automated using decoding software that can be installed on a computer. Trials have shown a successful read rate of more than 95%. In the case of the alphanumeric marking, any loss of information can be manually input into the system.