



Leather – a sustainable choice

Over 70 people were in attendance at the company headquarters of leather chemicals manufacturer Lanxess in January to take part in the company's fourth annual leather symposium. The attendees, drawn from brands and associated leather industries, were brought together in Cologne as a result of their continued use of leather in their finished products and their desire to learn more about this sustainable material.

Dr Dietrich Tegtmeier, Lanxess's vice-president for leather industry relations, gave a short opening introduction, discussing the advancement of sustainability and how this has made leather from a 'nice to have' to a 'must have' in the eyes of the consumer and the producer.

Dr Martin Kleban, Lanxess's director of health, safety, environment and quality, offered an update on regulatory requirements that affect leather. The presentation covered several topics including carcinogenic substances in textiles, restrictions on the use of isocyanates, biocidal product regulation and as well as REACH regulations, both inside and outside of Europe.

The EU-wide REACH regulations came into force nearly 12 years ago, in 2007, at which time registration deadlines based on production volumes were specified. The final registration deadline was passed in May 2018. Dr Kleban said that in by then over 21,000 substances were registered by 13,000 companies. It is estimated that it will take the European Chemical Agency (ECHA) 20 years to evaluate the 88,000 dossiers that were submitted. Pre-registration

information suggested an additional 25,000 substances would be registered in the final phases, which ran until May last year, but only 7,000 were recorded.

The presentation delivered by Andreas Weckmann, also of Lanxess, was entitled 'Biocide Update and BPR Online Training'. It built on the talk he gave a year earlier. One part of the Biocidal Products Regulation (BPR) that concerns the leather industry is TCMTB, a common biocide. When TCMTB breaks down, MTB is released. Although sometimes used as a fungicide, under BPR guidelines MTB is only compliant if present as a by-product rather than as an applied biocide.

VOC challenges

Andreas Burminster of German footwear group Wortmann addressed the topic of Volatile Organic Compounds (VOCs) in shoe manufacturing. VOCs come from a range of sources and can have severe health implications. Fumigation, workplace regulations and risk-based action plans were all offered as potential measures to reduce them, but the elimination of VOCs in adhesives was held up as the main aim. One way to do this is by increasing the use of water-based adhesives. Wortmann's goal is to reduce VOC consumption to below 25 grammes per pair of shoes. Typical current consumption is 36.5 grammes.

Dr Volker Rabe, head of technical product management for tanning technology at Lanxess, continued the theme of VOCs, this time in relation to automotive upholstery. He also addressed odour, commenting that while VOCs are entirely



Dr Martin Kleban, Lanxess's director of health, safety, environment and quality, opens the programme, offering an update on the regulatory requirements that affect the leather industry. ALL CREDITS: LANXESS



Peter Erren, of Dutch company Erren Recondition, gives information about the services his company offers in relation to products that have failed a Chrome VI test.

predictable, odour is not. This is the latest challenge for the leather industry. He explained that while there are many specific test methods for VOCs, there is really only one test for smell – the human nose. As a purely subjective test, this can give varying results across people and regions. Over the past 10 years, smell ratings have increased, at least in part due to the fact that VOC limits have become stricter, making odour emissions more obvious.

Navigating regulations

Deborah Taylor, from The Leather Working Group (LWG), gave a round-up of the organisation's current position and of its Chemical Management Module (CMM). The LWG has seen a 45% increase in brand members since 2015, while its supplier member numbers have tripled during that time. The CMM was introduced in 2017 to improve the impact of chemistry on the leather manufacturing process. To this end, it is currently exploring the viability of accessing the ZDHC Chemical Gateway, an interactive platform where suppliers provide information about their products, in order to eliminate the need for multiple audits from leather manufacturers supplying to LWG-ZDHC crossover brands.

Alessa Tortorra of ZDHC followed Ms Taylor to give an inside view of the organisation's new leather wastewater pilot for tanneries. This forms part of a project to develop standardised wastewater regulations, a reaction to the fact that regulations differ greatly from region to region and from brand to brand. The goal is to set a single wastewater discharge quality regulation that goes beyond current regulatory standards. During the leather wastewater pilot, many of the detected substance were very near to accepted limits but some were found in greater quantities. This led to the conclusion that some tanneries are not yet familiar with MRSLS (Manufacturing Restricted Substance List)

parameters or how to run an effective and efficient effluent treatment plant.

Information was then given on the upcoming IULTCS International Congress, which is returning to Germany for the first time in 25 years. It will take place in Dresden in June, running alongside the Freiberg Leather Days event. A full technical programme is being put together, with a call for papers having been issued.

Chrome VI concerns

The first presentation of the second day was delivered by Anke Mondschein of FILK. It looked at fatliquoring agents, with specific focus on their iodine value and what effect this has on chrome VI formation. The concern is that with increasing iodine values, being a measure of the unsaturation of the oil, auto-oxidation of the unsaturated fatty acid could lead to Chrome III becoming Chrome VI. The best way to avoid this is to use oxidation-stable fatliquors, which usually have a low iodine value, due to having a lower content of unsaturated fatty acids. It was also shown that the use of anti-oxidants can prevent the formation of Chrome VI.

Continuing the Chrome VI theme, Peter Erren, of Dutch company Erren Recondition, highlighted the route items that have failed a Chrome VI test could go down. At his company's facility, items such as shoes, coats and even uncut leather are treated with an impregnating reducing agent in an attempt to reverse the reasons for the failure. This is only done after a successful trial and after the original test certification has been assessed. He explained that too often reports on Chrome VI are wrongly interpreted.

Lifecycle assessments

Primiano de Rosa, environmental project manager at Italian tanning industry association UNIC, spoke about the



Dr Volker Rabe, head of technical product management for tanning technology at Lanxess, discusses VOCs and odour in the context of automotive upholstery.

environmental footprint of leather. This is a complex subject as, to fully understand the lifecycle assessment, all other uses for the raw materials must be considered. For an animal by-product such as leather, this includes meat, cheese and wool production. By taking into account these factors, a Product Environmental Footprint (PEF) can be created. UNIC has attempted to do this through a pilot project. It has worked with 32 Italian tanners as part of a screening study, following this up with supporting studies with four European tanneries.

Remaining on the topic of lifecycle assessment (LCA), Chris Henzel, technical product manager at Lanxess, discussed the LCA of an enzymatic beamhouse process, examining the technical advantages, environmental sustainability and comparison of impact results. The majority of tannery wastewater comes from beamhouse effluent and incorporating enzymatic processes can greatly reduce this impact. The potential advantages of enzymatic agents are an accelerated rate of soaking, improved dehairing with proteases, faster soaking through the cleaving of polysaccharides, and improved degreasing with Lipases.

Lanxess claims that its X-Zyme enzyme-based soaking and dehairing solution can remove all surfactant and thioglycolic acid from the liming process. It also offers substantial reductions in sodium sulfide. The X-Zyme process is also said to reduce BOD, COD and total nitrogen by as much as 50%. In terms of carbon dioxide saving, it gives a value of the equivalent of 122 cars per year, based on the assumption that 1,000 raw hides are being processed per day.

Leather's ongoing battle

Peter Hughes, sustainability lead at Eurofins BLC, delivered a thought-provoking presentation about whether

the vegan alternatives to leather are sustainable. He advocated neither leather nor its alternatives, instead calling for certain myths to be dispelled so that decision makers understand materials better. It is fair to say that vegan alternatives to leather are not subject to the same animal welfare-related challenges as leather. However, there are challenges posed by vegan materials, most notably the environmental impact of waste linked to the production of plastic. From a materials perspective, addressing either of these issues in isolation can have a negative impact on the other.

Industry consultant, Karl Flowers, discussed the subject of leather biodegradability. Leather is ultimately biodegradable; there are very few examples of ancient leathers, be they Egyptian, Greek or Mesopotamian. This means that billion of tonnes of leather have disappeared over the course of history. There are various means of biodegradation, including physical, chemicals, biochemical, and physico-chemical. Leather will undergo all of these to a certain extent.

Different tannages result in different levels of resistance to degradation, with a typical shoe upper needing 45 years to degrade. Materials that resist degradation include high-performance finishes and polymeric retanning agents, as they are essentially plastics, but complex tanning agents are also challenging. Further work is needed but perhaps the tailoring of tannage type, degradation rate and product lifecycle will soon be commonplace thinking in the tannery.

The leather symposium closed with a short presentation from Rodrigo Hernandez on behalf of the Leather Naturally group. Last year was a busy one for the organisation, with membership almost doubling. The main challenge now is to dispel the mis-information that is being spread. In order to do this, Leather Naturally is aiming to raise \$1.5 million towards a promotional campaign. 🌱