7th Afera Technical Seminar (13-15 April, 2015)
editorial by Michael Gerstenberger

Tying in with its well-established tradition, the 7th Afera Technical Seminar summoned more than 100 delegates from 12 countries to their well-known meeting place in Brussels.

In the following, I provide an abbreviated review of the more than 20 contributions that were presented. As usual, my selection does not indicate any kind of favouritism.

P. L. Geiß (University of Kaiserslautern, Germany) elaborated on "Mastering Viscoelasticity of Pressure Sensitive Tapes in Engineered Assemblies." Starting from a historical view on linear and non-linear viscoelasticity, the author stressed the importance of the latter for real-world cases resulting from either non-isotropic material properties and/or a non-uniform stress field due to interfacial constraints. Special attention was devoted to the evolution of defects within the adhesive joint resulting from continuing load cycles. It was concluded that Dynamic Mechanical Analysis indeed can be well applied to adhesively bonded assemblies, fatigue resistance compliance/loss factor balance is an important performance criterion, and deviation from linear viscoelasticity may be an indication of failure as a result of creep and fatigue.

B. Hövel and A. Roser (BASF, Germany) pursued the question "Can Tailored Stabilisers Improve Hot Melt Tack?" There is no doubt that thermal stress does cause processing problems through adhesion failure. On the other hand, performance requirements imposed on hot melt adhesives are ever increasing, i.e. lower melt temperature, longer temperature resistance, higher bond strength. Given this, the selection of effective stabilisers needs to take into account all adhesive components, i.e. polymers, tackifiers, extenders. In particular, tack and shear strength of the adhesive is positively influenced by choosing the right stabiliser. Well-tailored stabiliser blends decisively also improve the colour if the formulations are aged, e.g. at 177°C for 8 hrs. Selecting the best additive package clearly results from focussing on tack as the predominant criteria.

A. Schneider (Henkel, Germany) addressed an often underestimated topic: "Solvent-Based Acrylics in a Changing Environment." Solvent-based acrylics still account for more than 40% of overall PSA and about 30% of the global tape market (demand figures). Reasons for this are revealed by a technology comparison exercise: Particularly in terms of cohesion and aging properties, solvent-based acrylic PSA clearly outpaces competing technologies such as water-borne species and hot melts. Consequently, such products are employed in applications such as graphic and

protective films, durable and removable labels, and medical and high-performance tapes. Solvent content can be between 45 and 65%; typical solvents used comprise alkanes (hexane, heptane), alcohols (ethanol, isopropanol), acetone, and acetates (ethyl, isopropyl). Such solvents play an important role in the production as well as in the converting process. Future development of respective adhesive systems point towards ever higher performance, e.g. increase of heat resistance.

D. Robbeling (Olbrich, Germany) introduced the "Next Generation Equipment for the Precision Coating of Performance Film, Foil and Paper." Improved machinery solutions are required, especially for high-end products in such areas as automotive, battery, medical, optical, and graphical applications. Examples of next generation equipment were presented, e.g. a multi-purpose coating and laminating line (web width up to 500 mm, line speed up to 150 m/min) or a state-of-the-art laminating and embossing line (material width up to 1,000 mm, line speed up to 100 m/min). Coating precision can be controlled with optical interference technology such as a non-destructive, non-contact inline real-time measurement method. Providing a precision coating process inevitably means knowing the process inside out and transforming the requirements of the idea into machinery, finally obtaining full control through measurement and evaluation of coating profiles with suitable web inspection systems.

When talking release materials, most people think silicone stock. A. Agina (Ichemco, Italy) impressively introduced alternatives: "Ichemco Release KB 100: The Clear Solution," that is made of carbamate materials, which offer some noteworthy advantages. Testing of this new species followed the trajectories of release power, melting point, and solubility. Regarding the crucial issue of release, it was demonstrated that the new generation of products display excellent performance with natural rubber (NR) PSAs, and even outperform classic competition if employed in combination with acrylic adhesives. With hot melts no significant differences are observed. The melting points of the new release agents can be adapted to meet market needs. Solubility in organic solvents (e.g. toluene) is excellent, avoiding any kind of precipitate or haziness, the same is observed if employing aliphatic solvent combinations (e.g. octane / isopropanol). Hence, it turns out possible to formulate printing inks without use of aromatic solvents.

I. Greuens´ (Avery Dennison, Belgium) presentation on "High Performance Pressure Sensitive Tapes for Lightweight Damping Applications" dealt with the ultimate aspect of passengers´ comfort and safety in modern vehicles. Several means are available to dampen noise such as post-treatment ("killing the noise", e.g. through open cell foams, felts, etc. or by encapsulating the source of noise, e.g. a vehicle motor) or pre-treatment with the special technology of constraint layer damping. The latter is effectuated by sealing together two stiff material layers (creating a stiffness higher than aluminium) with a visco-elastic layer in between, i.e. a PSA tape. The PSA has to be formulated in a way to exhibit damping functions and sufficient PSA properties at the same time. Mathematical visualisation is obtained by employing a so-called nomogram. Effectiveness of the structure is realised through the vibrating beam test method (VBT) or by comparison of the particle velocity vs. frequency plot before and after applying the damping measure. Resulting PSA tapes offer a combination of advantages, such as damping noise vibrations, fulfilling requirements of temperature and vibration frequency, as well as various parameters of bonding performance.

P. O´Loughlin (Omicron Adhesive Materials, UK) elaborated on “A Novel Approach to Extending the Possibilities of Hot Melt Acrylic Formulation.” Omicron´s Acrynax® acrylics are dedicated to industrial as well as medical PSA applications and are composed of the same monomeric moieties differing only by individual molecular weight. A number of favourable properties such as water and plasticiser resistance, optical clearness, high adhesion to a wide range of materials, as well as excellent UV resistance, make this product class an interesting species to a wide range of applications. Good miscibility with a number of UV-cured hot melts renders the polymers desirable blending components.

Afera´s seventh edition of its broadly recognised Technical Seminar continued a well-established tradition of pairing an educational session with a valuable networking event. In the words of E. Smit, Afera´s Technical Committee Chairman, it “serves to create and maintain lines of communication within the adhesive tape industry.”