

## **Innovation - *innovatus, innovare* - To Renew or Change .....**

Autotype is rooted in innovation. Our earliest technology was invented by Sir Joseph Swan. He patented the electric light bulb - a year before Edison did. He invented photographic bromide paper and a process for extruding cellulose fibres which is the basis for much of the synthetic textile industry in the world today. He also invented a process for photosensitising gelatin to allow the economic manufacture of beautiful and durable continuous tone black and white images. Autotype was born in 1868 to make these images ("Autotypes") for people to hang on their parlour walls.

Over the decades that followed, Autotype continued to innovate to grow; to accommodate and embrace technological change. Silver halide chemistry began to dominate the photographic market and Autotype began making bromide papers. The gelatin chemistry was adapted to make gravure printing etch resist. The same chemistry was found to be useable as a screen printing stencil and through the 20th century Autotype became a leading developer of novel photochemistry; gradually moving away from natural products like gelatin towards more tightly controlled synthetic materials. We moved from coating paper to coating polyester film as an early adopter in the 1950s and having discovered the huge benefits of the product we moved to coating masking films onto the new film for pre-press applications. This required a complete change in our process technology - we began for the first time to use solvent-based chemistries. This drove an explosion of growth and by 1980 Autotype had become truly a global player in the field of reprographics.

The world was changing at an ever-increasing rate so the pace of our innovation had to match. Traditional photomechanical reprographics began their slow inevitable decline in the face of the burgeoning electronics revolution. Autotype's entire business was based on this area and we needed to move on. Uniquely amongst our peers we recognised an opportunity to take polyester film and coat it with hard, durable and aesthetically attractive surfaces which could be used to make membrane switches. We found that the primer technologies which existed were inadequate to the job of keeping the inks in place through the extreme process and duty cycle stresses in the long life of a membrane switch, so we developed new primer chemistries which set new standards for the industry. This work was recognised when we received the Queen's Award for Technological Achievement in 1994.

Screen printers need lower and lower stencil profiles (EOMs) combined with low Rz. We responded with Capillex CP and CX photostencil films which combine a very low profile with immense on-screen toughness. These films are perfect 'Critical Deposit' applications ranging from Optical Media to Biosensors. In the field of Screen chemistry our CPS division uses novel chemistry to deliver new green products delivering excellent performance with minimal environmental impact.

The world of Film Insert Moulding became our next target, and we developed novel formable hardcoated films which resulted in receipt of the Queen's Award for Enterprise in 2005. Today, our R&D teams remain highly active in developing against ever more challenging specifications for all of these areas and for new applications in many fields.

When we talk casually about innovation, we generally think in terms of new products - the latest iPhone, the new Ferrari, 3D TV. At MacDermid, we talk about all those products mentioned above. For sure this is the sharp end of innovation, but innovation means so much more. Our products, both new and old are the tip of a huge iceberg of innovation within our organisation and within our associated industry.

Our earliest product required special coating and drying equipment - gelatine must be chilled before drying, and then the water evaporated without allowing the temperature to rise. The equipment needed to do that is highly specialised and even in our up-to-date plant the

gelatine driers are spectacular in their length and capabilities.

To continue to coat solvent-based materials we had to innovate to ensure that we are fully compliant with the evolving regulatory requirements locally and globally. This involves investment in state-of-art technology to eliminate VOC emissions, but also a need to completely redesign our management processes to ensure the continuous improvement in compliance levels required by ISO14001.

The introduction of hardcoating to our product portfolio required the invention of a completely novel coating process and all of the process design, development and refinement that entails. The ever-increasing demands on cosmetic performance required development of cleaner processing conditions and working practices throughout our manufacturing plants. Beyond the manufacturing area, we needed a new business model to enable us to access the major new markets; to sell directly to key accounts and to provide a high level of technical support to the processors of our products to enable them to get the very best results.

Film Insert Moulding requires our customers to invest in highly complex precision processes. This takes the technical support requirement to ever-higher levels and requires us to invest in our own in-house FIM process cell to enable us to engage in ongoing process development in support of our customer partners. Yet again our business model had to evolve to encompass specification selling to designers in the Telecommunication and Automotive supply chains. The challenges of scaling production to meet the volatile demand in the mobile phone industry were huge and involved our manufacturing and engineering teams in immense efforts. Our move into the automotive industry presented huge challenges to our Quality systems which required rapid and dramatic change to meet the needs of this demanding industry.

We drive innovation both in our customer base, and also with our suppliers. Our major film supply partners will acknowledge that we have presented the most demanding challenges for quality improvement and have worked together with them to ensure the best possible specifications to meet the needs of our customers.

The environment we operate in has become immensely complex and even our innovation processes themselves have required innovative change, with the introduction of stage gate disciplines and project evaluation protocols to enable us to focus limited resources on areas of maximum benefit for us and for our customers.

Innovation involves and includes everyone and every function in our company and in our broader industry. We embrace and celebrate innovation in this widest sense within our business.

*Mutatis mutandis* - the necessary changes having been made - we move on to a new and ever more challenging future.

Tim Wright  
R&D Director  
MacDermid Autotype Ltd, Wantage