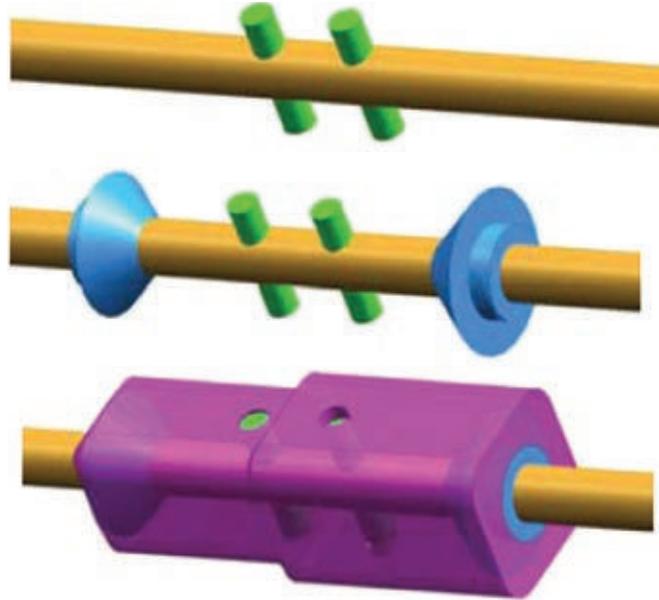


Plastics have cables under control

Newly developed overmoulding process technology is designed to enable manufacturers to replace steel control cables in automotive and cycle applications with lightweight and corrosion-free polymeric alternatives.

The new Wirelution process has been developed by German moulder Kunststoff Helmbrechts (KH) and braided cord manufacturer Liros Tauwerk. It enables an end fitting to be applied securely to the polymeric cord, a challenge that has to date prevented polymers making headway against steel in areas such as automotive window lifter mechanisms or bicycle gear shift systems.

Polymers such as PA, PES and UHMWPE provide the strength required to replace steel in braided cable applications. However, control cords are only as effective as the end fitting, say the developers. Traditional overmoulded fittings fail at around 3% of the cord breaking strength, which can be enhanced to



The three steps in the Wirelution process for creating control cable nipples

around 5% if suitable adhesion enhancers are used, says KH project manager Michele Ettore.

The Wirelution technology combines mechanical fixings and overmoulding. In the first stage, two steel pins are inserted through the braided cord. This is followed by an overmoulding stage, where two plastic discs are

applied around the cord at a precise distance from the pins. This assembly is then placed into a second injection mould where the cord, pins and discs are overmoulded again to form a nipple that is so tightly bonded to the cord that it takes a force of 400N to move it.

Taking the example of a



Finished Wirelution fittings by KH

1.5mm diameter cord, Ettore says the plastic type provides a much tighter minimum bending radius of 22.5mm against 60mm for steel. Weight saving potential is considerable: steel control cables weigh 13.8kg/1,000m against 1.7kg/1,000m for plastics. The plastic cords are also claimed to outperform steel in terms of breaking resistance, reversed bending strength and corrosion.

Elongation can be an issue. PA, PES and PP cords display a relatively high elongation at break – in the range of 10-25% – compared with 3% for steel. However, synthetic fibres such as Dyneema UHMWPE provide elongation at break of less than 5%.

Stretching the potential for electronics

Researchers at the Fraunhofer IZM institute for micro-integration in Berlin are claiming a first with their integration of an electrically-conductive circuit into a flexible thermoplastic polyurethane (TPU) film.

Working for the EU-funded Stella project to develop stretchable electronics for large area applications, the researchers have replaced conven-

tional straight tracks with a network of wave-form circuits that snake across the TPU foil. This arrangement allows the foil to stretch by as much as 300%.

The stretchable circuitry is expected to be ready for the market this year. Pro-

cessing is not difficult, say the developers, as the base material can be applied to a rigid laminate and handled as a rigid circuit board during production, then peeled away at the end of the process.

Fraunhofer IZT see applications in intelligent clothing – such as movement sensors in firemen's uniforms – in long-term wearable electro-cardiograph monitors, intelligent plasters, or pressure monitoring shoe inserts. Project team member Interuniversitair Micro-Electronica Centrum (IMEC) in Belgium has



A novel cocktail dress using the Fraunhofer technology to integrate movement-sensitive LED lighting won first prize at the 2009 Avantex new fashion innovation category at the Techtextil fair in Frankfurt last year.



Fraunhofer researchers have developed wearable electronics on plastics

already developed a stretchable thermometer.