Bicycle accessory manufacturer relies on tie-bar-less machines with energy-efficient drive technology

Advantage green technologies

16 million inhabitants but 20 million bicycles. There is probably no other nation in Europe that loves its bicycles and cycling as much as the Dutch. And probably no other nation that invests more heavily in new technologies and accessories for their bikes. At the heart of this dynamic market, Widek develops and produces accessories for leading cycle brands worldwide. To continue expanding its competitive advantage, the company relies on its innovative strength and efficient, sustainable production technology.

"We don't get involved in price cutting, but rely on innovative specialist products, on quality and our technology competency", emphasises Wim de Kwant, the CTO with Widek in Krimpen aan den Ijssel near Rotterdam. The company founder's grandson – an enthusiastic cyclist himself – continually analyses the requirements and wishes of bicycle manufacturers and consumers in collaboration with a team of two developers, and is thus often the first to launch technical innovations onto the market. The latest example is the bicycle grip with an integrated bell. The metal housing of the bell fits around the handlebar; the bell itself is actuated by pressing a rotating plastic ring with your thumb.

The bicycle grip is not just an innovation on account of the design integrating the function; Widek's new development solves two problems that repeatedly affect legacy bicycle grips at the same time. "Everyone has experienced how grips slip off the handlebars after a certain time, which can lead to an accident in the worst case," says de Kwant describing problem number one. This was solved by means of a metal circlip on the inside of the grip sleeve which can be tightened by means of a screw from the outside to permanently fix the grip in its position. The second problem was one that affected bicycle manufacturers. Legacy grips require a great amount of force to mount them on the handlebars, and this
meant that staff often complained of pain in their lower arms and hands. Thanks to a smooth thermoplastic inner surface, the new grip is very easy to push onto the metal bar.

**Large moulds on small machines**

The sleeve and the end cap of the cycle handle are manufactured in two-component injection moulding on an ENGEL victory 125 combi. The process materials are polypropylene for the hard inner sides and SEBS for a pleasant tactile experience of the grip surface. Both parts are manufactured in the same mould. The mould core is replaced for the product change. Widek works with a vertical rotary table for the combimelt process. The three-cavity mould measures 800 by 800 millimetres, but it still fits on an injection moulding machine with a clamping force of 130 tonnes. All this is possible thanks to the tie-bar-less design of the ENGEL victory machines.

In 1996, Widek started to use multi-component injection moulding. Initially in order to give its products a unique selling point compared to competitors due to multiple colours, before combimelt technology was then extended to cover hard/soft bonds a few years later. Even then, the objective was to run large multiple component moulds on as small an injection moulding machine as possible. The clamping forces the applications needed were comparatively small, and the manufacturer wanted to keep the footprint and costs of the machines as low as possible. The tie-bar-less victory series developed by ENGEL Austria in 1991 hit the bullseye. Ever since, the legacy machines by other manufacturers have successively been replaced by ENGEL victory injection moulding machines. And the barrier-free mould mounting space is almost more important today than it was 15 years ago. "We now purchase many moulds in China", de Kwant reports, "and they build moulds bigger than in Europe over there. Without tie-bar-less technology we would need to buy bigger machines, although our applications don't need the higher clamping forces."

The benefits of the tie-bar-less design are also apparent when it comes to mould changes as the moulds can be removed and mounted extremely quickly. This means that Widek can
reliably compensate for production peaks. After all, Widek doesn’t produce for the stockpile, but on demand. One million bicycle grips – across all models – leave the works in Krimpen year by year. The purchaser of the new model with the integrated bell is Gazelle, the largest bicycle manufacturer in the Netherlands.

**Servohydraulics save costs**

Bicycle handlebars are a separate division at Widek. The other divisions include bicycle bells, luggage straps, plastic parts such as spoilers, cable guides or mudguards, accessories for children's bicycles and – starting in autumn 2010 – children's seats. "We noticed that many children were too big for the popular models", says de Kwant. "The new Qibbel brand offers the largest seat surface on the market."

Bicycle turnover will continue to increase; this is one thing that Wim de Kwant is sure of. "Riding a bicycle is the most sustainable form of mobility and is thus absolutely in line with current trends." As one of the leading companies in this green field of business, it is a matter of course for de Kwant to continually optimise manufacturing processes taking the aspect of sustainability into account. One thing that he focuses on is the energy efficiency of the injection moulding machines.

Because of this, he ordered the first victory machine with the servohydraulic ecodrive from ENGEL in 2009; this was a 220 tonnes machine which is now used for manufacturing the foot shells for children's seats. "The concept of the machine only using energy when it really needs it is something that convinced me right from the outset", says de Kwant. ENGEL ecodrive on the ENGEL victory machines consists of a servomotor with fixed displacement pump, instead of a permanently running asynchronous motor with a variable capacity pump. This approach improves energy efficiency by reducing the energy loss that occurs in legacy, hydraulic machines. During standstill times, cooling for example, the machine does not consume any power. The ecograph analysis tool makes this transparent by identifying the energy consumption of the individual functions. "We were surprised how
much energy clamping force build-up consumes on its own", de Kwant reports. "Our machine operators now reduce the clamping force in many applications."

At Widek, ecodrive saves 50% energy compared with a legacy, hydraulic injection moulding machine, thus achieving consumption figures comparable with the fully-electric machines. On top of this, ecodrive can do without oil cooling in this application. "The oil temperature is an indicator of the machine's energy efficiency", stresses Franz Pressl, product manager for the ENGEL victory range at ENGEL Austria in Schwertberg/Austria. Typically, the portion of supplied energy that is not applied as movement energy for individual machine movements is transformed into heat and then dissipated into the hydraulic oil. "The oil temperature of the machines equipped with ecodrive never rises above 25 °C at any time", says de Kwant. This fact saves Widek a lot of money, and not only thanks to reduced energy and cooling water consumption. When injection moulding production was extended, the planning deliberately did without oil cooling equipment, because tie-bar-less ENGEL victory machines with ecodrive are also deployed in the new production shop.
The integrated bell is virtually invisible at first glance. (Fig.: ENGEL)

Widek’s machine park in Krimpen in South Holland comprises 15 injection moulding machines with clamping forces of between 25 and 220 tonnes. (Fig.: ENGEL)
Widek produces one million cycle handlebar grips in different designs annually. (Fig.: ENGEL)

The rotary table for the ENGEL combimelt process has four positions at Widek. (Fig.: ENGEL)
Large moulds on comparatively small machines: the tie-bar-less design of the ENGEL victory machines makes this possible. (Fig.: ENGEL)

An employee assembling the new bicycle grip with integrated bell from three components and testing its function. (Fig.: ENGEL)
Ecodrive inside: thanks to the new servohydraulics, Widek can save both on operational costs, and on investments in equipment for the new production area. Oil cooling equipment is not needed. (Fig.: ENGEL)

Widek's entry into the business-to-consumer market with Qibbel children's seats. (Fig.: Widek)
Successful cooperation for 15 years: Franz Pressl, product manager ENGEL victory with ENGEL Austria, Wim de Kwant, CTO with Widek, and Bas de Bruin, account manager with ENGEL Benelux (left to right) and a child's seat of the new Qibbel brand. (Fig.: ENGEL)

"Innovative specialist products, quality and technical competency are our strengths", says Wim de Kwant, CTO with Widek. (Fig.: ENGEL)