

## Georg Fischer wins the race

KTM banks on integral cast components made by the Swiss industrial corporation

Successful Austrian motorcycle manufacturer KTM has an ambitious vision: to become the largest European manufacturer in its field. And in this “high-powered” race to catch the leaders, the company is putting its trust in cast constructions made by Georg Fischer. More specifically, in the highly stressable swing arms for the rear suspension. The majority of manufacturers make these as welded constructions, as until now the cast version has been deemed too brittle. But no longer! And all thanks to High Strength Casting (HSC), a modified gravity die-casting process.



Even contemporaries who have no interest whatsoever in motor racing know about the high dynamic load experienced by trial and motocross bikes. Due to this extreme load, frequent use is made of welded constructions whose manufacture is both time-consuming and labour-intensive. Furthermore, these parts are seldom elegantly proportioned.

With High Strength Casting (HSC), GF Automotive has now developed a convincing cast construction which has won over, among others, Austrian bike manufacturer KTM. As a result, the latter is now making the rear swing arms for its machines out of aluminium moulded via gravity die-casting.

### **Aesthetics and functionality**

With the HSC process, practically any shape can be cast. This means that the KTM machines also satisfy via their elegant suspension with its uniform, smooth surface. This aesthetic aspect is especially important in sports models, and

can be the decisive factor in a sale. Another advantage of HSC is the better material properties it offers. But let's start from the beginning! Georg Fischer Kokillenguss GmbH in Austria developed HSC on the basis of conventional gravity die-casting processes. Its aim was to lower manufacturing costs on the one hand, and to obtain better material properties on the other. It was successful on both counts. The designers exploited the opportunities presented by casting in an ideal way, making it possible to manufacture trial and motocross bike rear swing arms capable of handling high dynamic loads as integral cast components.

### **Advantages of some weight**

A number of advantages emerged compared to the existing welded constructions. For example, a component complete with every detail required for mounting and securing the brake caliper, the suspension strut and the rear axle can be produced in a single operation. These components are machined in the foundry in order to make available fully finished components. This results in shorter lead times and low costs for the vehicle manufacturer. A further advantage is the consistency of material and structure within the component.

Close cooperation between GF and KTM – with whose machines numerous world titles have been and are still being won – led to the optimization of the existing construction of the component and mould. In this way, a one-piece cast component which looked good and functioned reliably was created, replacing a welded construction made from aluminium components. The optimization exercise succeeded in significantly enhancing the strength of the cast component in comparison with the welded version while keeping its weight virtually identical. This has prepared the ground for further applications of this technology, also in firms which have not yet broken through into the world championship league.

## The bottom line

# Promising alternative

“High Strength Casting is a promising alternative for highly stressable chassis parts, which, as safety components, are subject to particularly high demands.”

Egon Neuwirth, Georg Fischer Kokillenguss GmbH, Herzogenburg, Austria

## The user – a several times world champion

# Ready to race

<b>Company profile</b>	KTM was founded in 1934 in Mattighofen, took its first steps as an official motorcycle supplier in 1937, and developed into one of the biggest motorcycle and car repair workshops in Upper Austria. 1953 – introduction of the first production series of KTM motorcycles and entry into the world of motor racing. 1993 – rally commitment begins. 2004 - worldwide sales of over 50,000 motorcycles. Turnover of EUR 400 million. 1,500 employees. In 2005, KTM reports 20 world championship titles and 107 titles overall.
<b>Product range</b>	Racing-oriented off-road segment as premium brand as well as sporty KTM road models.
<b>Market position</b>	Second largest European sports bike manufacturer.

## Targeted research and development

# Close to the market and to the customers

<b>In several disciplines</b>	GF Automotive invests between three and 3.5% of sales revenue in research and development. The central R&D laboratory in Schaffhausen is supported by decentralized development departments, as closeness to markets and customers is crucial in the development of new products and materials. The R&D staff in Schaffhausen are active in a number of disciplines: materials and process development, product development and component testing.
<b>Mass production and niche markets</b>	Alongside its line production, GF Automotive also occupies forward-looking niche positions. One growth market is for substitutions – for example the replacement of welded constructions with cast components. GF Automotive transforms circa 425,000 tonnes of cast iron and 75,000 tonnes of light cast metal per year into power train, chassis and body components.

## «Adding Quality to People’s Lives»

# Safety through innovation

<b>From HSC...</b>	With its innovative concepts, GF Automotive is constantly strengthening its industry leadership. High Strength Casting (HSC), for example, is eminently suited to making highly stressable chassis parts, which, as safety components, are subject to high dynamic loads.
<b>... to Sibodur</b>	Modern axle constructions ensure a high degree of safety. In multi-link designs, these constructions require chassis components with complicated geometry, high resilience and significant damage tolerance. Ideal for this purpose are components made of Sibodur, developed by GF Automotive and already being used in production vehicles.