BMW Motorrad Motorsport: New involvement in off-road racing.
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1. Intensification of off-road sports involvement: Competitive participation with the 450 cc BMW sports enduro in 2007.

Off-road racing is inseparably linked to BMW motorcycles. The multiple victories of BMW motorcycles in the Paris-Dakar rally are still in recent memory, but the tradition goes much further back than this. Over the last eighty years, not just success in road racing but also outstanding results off the asphalt have attracted great interest.

After the success of the HP2 sports flat twin enduro in competitions such as the German Cross Country Series, the race at Pikes Peak and the Erzberg, BMW is now expanding its off-road involvement to include the attractive and prestigious E2 class, in which 450 cc 4-stroke machines and 250 cc 2-stroke sports enduros will be entered for competition. In this class, BMW will be testing the concept of a 450 cc single cylinder enduro machine which is mainly designed for sports use. Here, BMW is not content simply to implement the design features typical of the class but combines these with completely new technological solutions which are characteristic of BMW in terms of engine and chassis, thus continuing its off-road sporting tradition and giving the brand a striking, distinctive profile in an off-road context, too.

In the 2007 season, the innovative, patented technology of the single cylinder sports enduro concept will be put to the acid test in numerous competitive races. What is more, BMW has been able to secure the services of experienced off-road professionals Sascha Eckert, Joel Sméts and Simo Kirssi who will contribute their skill and experience to the process of testing under the toughest conditions, as well as the harmonisation and further development of the concept.

2. The fascination of enduro sport: Single-cylinder sports enduro concept with innovative technology.

The concept for the new BMW sports enduro started with an idea: if the mounting axis of the rear swing arm were to coincide with the axis of rotation of the drive chain pinion, there would be no change in length of the chain on compression and rebound. Then, without changing the wheelbase, one could realise a longer swing arm, position the engine further to the rear, tilt the cylinder more and thus create space for long, straight induction tracts with a dual throttle valve system so as to meet the requirements of the Euro III exhaust gas norm. The fuel tank could be placed directly beneath the rider, the clutch could go on the crankshaft, with the frame tubes straight ahead of the swing arm pivot, and the airbox could be placed as high as possible for optimum protection. In short: it would be possible to create a package with significant benefits in terms of traction, centralisation of masses and stability and with a low weight, important for an offroad motorcycle.

The man who put this idea into practice was Markus Theobald, a BMW Motorrad development engineer with off-road experience and one of the fathers of the successful BMW HP2 Enduro. He thought through the concept and consistently implemented the advantages: the swing arm, made of welded light alloy profiles, is 30 mm longer even though the wheelbase was at competitor level – thus improving traction properties. And the shift of the clutch onto the crankshaft creates constructional space behind the engine allowing a new straight frame and ideal support for the swing arm pivot against the steering head. This concept idea was registered for a patent by Markus Theobald for BMW in 2005. The first prototype was instantly impressive and reflected the benefits in practice. Thus the green light was given to test the concept under the tough conditions of competitive enduro racing and to develop it in further detail.

Technical features of the racing bike:

The racing motorcycle has been designed based on these ideas. The frame forms a composite triangle made of high-precision premium steel tubing actually developed for crash structures and rarely used in motorcycle construction. Two arched tubes lead from the steering head via the engine to the swing arm pivot. The swing arm pivot is supported via the shortest possible distance by the steering head, pointing at an angle towards the front via two straight tubes. This construction requires minimum use of material and thus allows a hitherto unequalled relationship between rigidity and weight. This frame layout is only possible in conjunction with the clutch position on the crankshaft as mentioned above and a cylinder which is tilted far forward. The rear frame is formed by lightweight square profiles made of light alloy which are bolted to the main frame.

The coaxial mounting of the swing arm and the chain pinion had to be solved in a practical manner. In the current design, the swing arm pivot mounted on the frame leads through the hollow gearbox output which bears the drive pinion. To change the pinion, the motorcycle is jacked up, the swing arm pivot is pulled out and the swing arm with mounted wheel is folded backwards. A practised mechanic can do it in 15 minutes.

The other chassis elements are conventional and are in keeping with the high standard of the class. The front wheel control is provided by an adjustable upside-down fork by Marzocchi with a spring travel of 300 mm. Suspension and damping of the rear wheel is taken care of by a directly linked, progressively operating Öhlins suspension strut with a spring travel of 320 mm. Set at a slant, it is supported directly by the rigid main frame.

The engine of the competition prototype is 450 cc high-performance single cylinder 4-stroke engine designed by BMW with two upper camshafts and dry sump lubrication. A special feature which is unique in this class is the fuel injection and oxygen sensor regulation. The position of the cylinder, tilted far forwards, enables virtually straight intake air ducting into the large-volume airbox positioned above the engine. This provides excellent conditions for optimum engine performance tune-up. This favourable overall arrangement was made possibly by the fuel tank position below the rider's seat, familiar from the existing single cylinder models, with all its advantages in terms of the centre of gravity.

Another unique feature is the position of the clutch: it is located on the right crankshaft end and was thus given extremely compact dimensions since it rotates with the engine due to a lack of a speed-reduction ratio of the primary drive: it therefore has to transfer a lower level of torque. An intermediate shaft with integrated ventilation function transfers the power from the crankshaft to the gearbox. An electric start is obligatory.

The chain drive to the rear makes do without additional tensioning devices and channels due to the fact that chain sag is barely necessary a any longer and the chain retains a constant length – another weight-saving factor. The load-alteration effect on the powertrain is reduced, chain stress is also reduced and generous chain encapsulations become feasible.

The performance figures of the engine are at competitor level, though further details will be revealed at a later stage. This also applies to the total vehicle weight – even the first concept vehicle achieved levels in the range of the established representatives of this motorcycle class.

Racing as a tool of development.

While the motorcycle has appeared entirely in black at test runs to date, its baptism of fire in Puerto Lumbreras will see it presented for the first time in the typical BMW Motorrad Motorsport colours. Markus Theobald and the BMW team see themselves as “testing novices” at the World Cup race in Spain and at other upcoming events this season. At this development stage, it is not about racing success but about gaining well-founded testing insights which lead to development progress.

3. Rider portraits.

Sascha Eckert:
Sascha Eckert was born on September 30th 1977 in Bochum. He raced his first bike at the age of nine. 1997 he finished the german motocross-championship in 8th position, one year later he came in 6th . In 2000 he ranked 9th in the Enduro-World-Championship. 2003 he won the German Enduro-Championship and finished third in the European Enduro-Championship.2004 Sascha Eckert became German Champion of the E1-Class. One year ago, Sascha Eckert startet working for the Team BMW Motorsport Offroad.

Simo Kirssi:
Simo Kirssi was born on Oktober 3rd 1979 and now lives in Weißenburg, Bavaria. His first race took place in 1984 and in 2004 he became European and German Champion in the Cross-Country-Series. 2005 and 2006 he won the Erzberg-Proloque. Two years ago he joined the Team BMW Motorsport Offroad.

Joél Smets:
Joél Smets was born on April 6th 1969. He raced a cross-motorcycle first in 1986. After that he became famous as cross-professional. He became five times Moto-Cross-World Champion and six times Belgian national Champion. Three times he could also win the “Moto-Cross of Nations”-series. Two months ago, Smets joined the Team BMW Motorsport Offroad.

4. BMW motorcycles – an off-road tradition which goes back 81 years.

The abbreviation “GS” has stood for “Gelände” (German for “off-road”) and “Street” for the last 25 years, and the models from the first R 80 G/S through to the current R 1200 GS represent a unique success story for the Munich-based company. With the HP 2 Enduro, BMW has set new standards in the large-volume off-road class since 2005, and since the start of the 2007 season it has the first real hard enduro on the market, the 650 Xchallenge. The 450 cc single-cylinder competition concept currently undergoing race testing is even more consistently oriented towards sporting use and reaches a very high level in terms of power-to-weight ratio and unique technical features.

However, these three machines do not only consist of fascinating technology, they also reflect eight decades of experience in off-road sports on the part of BMW. It was an engineer who celebrated BMW’s very first of-road success exactly eighty years ago: in competition with the leading motorcycle brands, Rudolf Schleicher won the Six-Day Race in the UK on the R 37 he himself had designed. The young motorcycle brand from Munich gained overnight fame in the wake of the enormous press response.

In the thirties, BMW factory riders achieved impressive success in international 6-day races, making the general public aware of the robustness, endurance and power of the machines from Bavaria. The serial production of the telescopic fork developed by BMW was ultimately only possible due to the merciless testing carried out at tough off-road sports events. The same applies to the straight rear-wheel suspension which was conscientiously tested at the major off-road competitions for several years.

Famous BMW road racing motorcyclists such as Ernst Henne and Schorsch Meier started their careers as off-road riders on BMW motorcycles. There are the wonderful memories of success in the German Championships of 1955 to 1980 with riders such as Hans Meier, Sebastian Nachtmann, Herbert Scheck and Richard Schalber, who lined up at the start on forerunners of the GS models. Rolf Witthöft even won the European Championship.

The Paris-Dakar victories in the eighties were truly outstanding, when rally legends such as Gaston Rahier and Hubert Auriol celebrated off-road triumphs on the rally versions of the BMW R 100 GS. In 1999 Richard Sainct clinched the Paris-Dakar victory again for BMW on a modified F 650 single-cylinder machine. And even this was to be surpassed when BMW won a quadruple victory in 2000.

In the more recent past, Simo Kirrsi has achieved impressive results on the HP2 Enduro at events such as the German Cross Country Series, the Pikes Peak competition and the Erzberg-Rodeo.

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