

BMW 328 Kamm-Coupe – Built for a Single Race

History of the fast BMW Mille Miglia race cars

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The Motorsport Department of BMW in 1940 had but one focus for that year's Mille Miglia: Overall victory! Preparations for the event ran at full speed - no big surprise, as the team had a very promising basis for success with its BMW 328.

The Beginning

On June 14, 1936 Ernst Henne, the motorcycle world-speed record holder, entered the International Eifelrennen on the famed Nürburgring track with the brand new prototype BMW 328: BMW had not announced or disclosed any information about this car prior to this event, presumably as those responsible did not want to subject themselves to unnecessary pressure. Regardless of the reason for this secrecy, BMW entered the race with this prototype. The courage of those responsible was duly rewarded: Ernst Henne led the race from start to finish, winning with an average speed of 101.5 kph (63.4 mph). The assembled reporters were incredulous! It was the start of a new era in motor racing, though none of the motor journalists present were aware of that.

Starting with this race in 1936 it became very difficult for any competitor to get past the BMW 328. But those hoping to participate in future events with one of these cars had to be patient: production of the 328 did not start until the end of April 1937.

BMW and the Mille Miglia on April 3, 1938

155 cars had been entered for this world famous race. The 1,000 mile route, in the form of an „8“, started and ended in Brescia. This was a difficult 1,600 kms on Italian roads, which were driven at full race-speeds.

The organizers had reworked the classifications for 1938: Sports Cars - National, Sports Cars - International, with and without compressors. The smallest international class was for a displacement of 2 liters. The new rules were intended to enhance the chances of the Italian competitors.

From Germany only 4 entries had registered, all with BMW 328s. Three cars were entered as a team. One BMW 328 had Prince Max zu Schaumburg-Lippe at the helm with Count Giovanni Lurano Carnuschi as co-driver. The factory cars were driven by Uli Richter with Dr. Fritz Werneck and by A.F.P. Fane with William James. The fourth car was driven by Count Heinrich von der Mühle-Eckart, teamed up with Theodor Holzschuh

from the BMW Sports Car Service Department as a mechanic.

The drivers of the BMW 328s had Europe's best under-2 ltr. racers, and they knew it. Just how competitive they were against Fiats, Rileys and Aston Martins was soon to be demonstrated. The standard version of the BMW 328 was very fast with its 80 HP engine, but in racing tune the engine produced 110 HP! With its light weight the cars handled fabulously.

Prince Schaumberg was the first of the BMWs to start, at 4:30 a.m., followed by Richter, Fane and Mühle-Eckart. All four cars immediately drove at hellish speeds. Shortly past the half-way mark after Rome the last of the 2 ltr. competitors dropped out. Rather than reducing speed, the four BMWs stepped on it to now go after the larger cars.

Late in the afternoon the first cars began arriving in Brescia. As expected these included the large Alfas, Delahayes and Talbots. Amazingly Fane placed 8th overall, with the other BMWs placing 10th, 11th and 12th. BMW won the 2 ltr. class with positions 1 through 4, and the team-prize for consistency, as well as awards for the best-placed foreign drivers. This success was BMW's big break-through in international motor racing!

Following the 1938 Mille Miglia the Italian



The newly recreated Kamm-Coupe at Villa d'Este

authorities had refused permission to continue running this 1,000 mile race. The many serious road accidents were given as reason for this very unpopular decision.

Development of the idea of the Coupe

Encouraged by the Mille Miglia success, BMW's engineers brainstormed about how they could make their fast 328 even faster.

With the race version of the 328 engine already tuned to produce approximately 110 HP, little hope was given to further increasing this output.

The next consideration addressed the possibility of reducing the car's weight; however with the already very low weight of 830 kg (1,826 lbs) there was little opportunity for further gains in this area.

The only real possibility for progress was seen in the reduction of air resistance, i.e. streamlining the car.

Based on the dramatic success of the



Three of the four Mille Miglia BMW race cars from 1940 on display at Villa d'Este

Adler cars at the 1937 and 1938 Le Mans 24-hour races, the effect of streamlining had been well demonstrated. However there was one major hurdle: The streamliners were closed cars, which, according to German racing rules of the time, were not permitted in sports car events.

The idea of a streamliner project gained new momentum, and indeed urgency, as a result of the German / Italian decision to stage a high-speed race from Berlin to Rome in October 1938. (GEP note: This race did not take place in 1938; it was postponed into 1939, and following the start of WW II subsequently cancelled.)

Rudolf Fleming, who had been a member of the 328 development team, was given the assignment to develop a light-weight racing coupe. Fleming put a very light „birdcage“ on a 328 chassis and assembled a thin aluminum skin over this frame. This car, developed in Eisenach, achieved enormous speeds, but was unstable, so that it was not accepted. At the same time Professor Wunibald Kamm, head of the Research Institute for Automobiles and Automobile Engines at the University of Stuttgart, was conducting wind-tunnel tests with BMWs.

Essentially at the same time the N.S.K.K. (Nationalsozialistisches Kraftfahr-Korps = National-Socialist Vehicle Corps) had assembled its own racing team. This team considered itself Germany's national sports-car racing team and planned to represent Germany with its own fleet of BMW 328s in international motoring events. BMW was under contract to technically maintain the N.S.K.K. cars at the latest, highest standard. The racing coupe under development by BMW was viewed as a significant potential competitor, and it was understood that under no circumstances could a work-team be put into a position to challenge the N.S.K.K. dominance.

Prince Schaumburg-Lippe, the head of the N.S.K.K. team, inquired at BMW whether he too could get a streamliner for the planned start at the June 17 – 18, 1939 Le Mans endurance race, which BMW regrettably declined due to insufficient capacity.

The Touring Coupe.

Max zu Schaumburg-Lippe, having been turned down by BMW, reflected on his good contacts in Italy, where he had seen a number of low-powered cars achieve amazing speeds due to their streamlined bodies. He requested a proposal from Carrozzeria Touring in Milan, which had experience from building a similar car for Alfa Romeo. This design was easily adaptable for use with the BMW 328 chassis, and as Touring's concept, details, price and time-line convinced the Prince, he ordered a car which was completed within four weeks.

As there was insufficient time for wind-tunnel testing this new design, no such tests were performed. Touring had developed this design rather intuitively, but evidently with considerable success: The 780 kg (1,760 lbs) car achieved a top speed in ex-

cess of 200 kph (125 mph), and it behaved quite stably.

Le Mans, June 18, 1939: After 24 hours and 3,188 km (1,992.5 miles) Prince Max zu Schaumburg-Lippe and his co-driver Hans Wencher won the 2 ltr. class with an average speed of 132 kph (82.5 mph) and placed a sensational 5th overall.

The researchers at BMW had not remained idle: extensive testing revealed that the in-house developed body did not fit with the 328 chassis. In order to improve the car's stability the newly created department „Artistic Creations“ extended the 328 chassis by 20 cm (7.87 inches) and the tubular frame was newly designed and made of high-strength „Elektron“, weighing only 30 kg (66 lbs)!

Even though the new Kamm-Coupe was noticeable larger than the Touring Coupe, it nevertheless weighed 20 kg (44 lbs) less.

During the late-summer of 1939 the car was extensively tested on the Autobahn between Munich and Salzburg; after each day of testing details were modified and improved. The investment in manpower and materials paid handsome dividends: the Kamm-Coupe had far better straight-running characteristics and was far less sensitive to cross winds than the Touring Coupe. The Cw value established through use of a model was 0.25, far below the value of the Touring Coupe, which, based on today's techniques, had a still excellent Cw value of 0.35.

In terms of top speed, the Kamm-Coupe achieved an incredible 230 kph (143.75 mph). To deal with these

Right from the top: One of the early steps in re-creating the Kamm-Coupe was the construction of a fiberglass model. Assuring that the car would be exactly symmetrical, left and right. Application of one of the early undercoats. Detailed fitting of panels and parts took many hours.



speeds the car was equipped with Alfin

drum brakes mounted on air-cooled magnesium anchor plates.

Due to the start of World War II on September 1, 1939 the future use of the two racing coupes came very much in doubt.

The BMW 328 Roadsters

Under the direction of Wilhelm Meyerhuber, design proposals for a streamlined roadster were developed. The lines of the design reflected speed and agility even at standstill. A model of the body was extensively tested in the wind tunnel of the University of Stuttgart. In the fall of 1939 the body was assembled with a new tubular frame and mounted on the 1938 Mille Miglia 2 ltr. class winning chassis driven by Fane. Based on its shape the car very quickly received the nickname „Buegelfalten-Roadster“ (creased

planning with military-like precision. He reviewed and revised race strategy and determined the optimum location for the gas and oil stations along the route. It was determined that the cars would burn about 20 ltr. per 100 km (11.9 mpg). Since the cars had a little more than 100 liters (26.3 gallons) of fuel on board, Loof divided the race into three segments, with the town of Castiglione as an ideal refueling stop, as it was about 25 km (15.6 miles) from Brescia. It was a perfect solution for BMW's race strategy and the size of the 328's fuel tanks.



The Race

On April 28, 1940 at 6:40 a.m. the Touring-Coupe #70 with Fritz Huschke von Hanstein at the helm was the first of the BMWs to start. The other BMWs followed. Huschke von Hanstein pushed his car to the limit, achieving an average speed of 174 kph (108.75 mph) on his fastest lap around the triangular course. None of his competitors, nor any of his team mates could keep up with him.

Somewhere near the half-way mark of the race an argument developed between the „flying baron“ and his co-driver: Huschke von Hanstein was determined to win, and he refused to follow through on the pre-arranged change of drivers.

The Kamm-Coupe suffered a DNF in the 7th of 9 race laps. After repeat problems with the carburetors and oil pressure, the two Italians had to quit.

A few kilometers before the end of the race there finally was a driver change in the leading BMW: The head of the N.S.K.K. Hühnlein was able to persuade Huschke von Hanstein to turn the helm over to his co-driver Bäumer. Consequently Bäumer had the pleasure of taking the Touring-Coupe across the finish line as overall winner, albeit to hardly any applause!



The pictures above and to the left show the completed tubular frame before assembly of the aluminum body panels.

Below right: The chassis and suspension parts are original BMW 328, the brake drums were newly manufactured for reasons of safety. The engine block (temporary EMW) serves as benchmark for dimensional fine-tuning and checks.

During the three days preceding the start of the race the race cars assembled on the Piazza della Vittoria. Five BMWs painted silver were presented for the technical inspection.

In addition to the 70 Italian entries, there were also two French teams, however both driven by Italians.

The world expected a win by Alfa Romeo while the Germans were very confident of victory. In order not to irritate their Italian friends too much, two Italian drivers were entrusted to drive the Kamm-Coupe: Count Giovanni Lurani Cernuschi and Franco Cortese. The three streamlined roadsters were driven by the N.S.K.K. teams: Car #71 was driven by Hans Wencher and Rudolf Scholz; #72 was driven by Willi Briem and Uli Richter and #74 by Adolph Brudes and Ralph Roes. These three teams were ordered not to drive all-out, but to be sure to complete the race and win the team prize.

The ONS (Oberste Nationale Sportbehörde = Top National Sports-Authority) entered famed driver Fritz Huschke von Hanstein and co-driver Walter Bäumer for the Touring Coupe.



fender roadster).

In freezing weather the Munich race driver Uli Richter sped the car up and down the Autobahn to optimize the suspension. However because of severe bottlenecks in BMW's bodyshop, the project aimed at preparing cars for the 1940 Mille Miglia got into serious schedule problems. Therefore BMW sent its two half-finished racers to Milan to have them completed by Touring who had no problem at all getting the cars finished on time.

The 1940 Mille Miglia – The most important triumph for the BMW 328

To be able to again run the Mille Miglia in 1940 there were extensive negotiations between the Mille organizers and the Italian authorities. A breakthrough was finally achieved with the adoption of a new race venue, which involved a new and much shorter triangular route. The new route went from Brescia to Cremona to Mantua and back to Brescia, 167 km (104.4 miles) in all, which had to be lapped 9 times. The road involved many more straights, and was in very good condition. The race also was renamed: „1. Gran Premio Brescia delle Mille Miglia“.

In March 1940 race director Ernst Loof transferred to Italy the two coupes and one roadster in order to gain exact knowledge of the route. Director Loof undertook the

More than a quarter of an hour passed before the second car crossed the finish line: Farina / Mambelli in their red Alfa Romeo came in second to great applause from their compatriots. The third place finishers was the Brudes / Röse team, so that two of the podium finishers were BMW teams. – The team prize was awarded to the N.S.K.K. entries. Mission accomplished. Upon the BMW team's return to Munich they were enthusiastically celebrated at the Odeon Square downston.

with him, which eventually ended up in the collection of Jim Proffitt. As Mr. Proffitt rejected multiple offers to sell the car back to BMW, the company eventually decided to order a fully operational replica of the Coupe from the German firm René Große. Once the replica was finished, Jim Proffitt finally decided to sell his car, so suddenly BMW owned two of these coupes, the original as well as the replica.

detail provided the basis for further progress. As the next step a volumetric model was calculated, and using a 5D CNC milling program a full-scale model was produced from high-density synthetic material.

At the same time a restorer was contracted to extend an original 328 chassis by 20 cm (7.87 inch), and to build a steel tubular frame based on the available photos.

A short time later the project was interrupted by BMW. In connection with the development of the new BMW Museum, it was decided to use the tubular frame of the Kamm-Coupe as an exhibit in the area of light-weight designs. A specialist near Munich produced an exact copy of the frame from aluminum, which was never intended to be used in a car, but the idea lingered.

Then a team of experts engaged in a joint project with BMW at the Meisterschule für Karosserie- und Fahrzeugbau (Tradeschool for Automotive Body- and Vehicle Production) in Leipzig-Leisnig-Erlbach got the ball rolling again: the experts from the school were to form the aluminum skin over the existing tubular frame, in order to recreate the shape of the car. The product of this endeavor has since served as an exhibit at the new BMW plant in Leipzig.

In view of the forthcoming 70th anniversary of the 1940 victory at the Mille Miglia, BMW Classic (formerly BMW Mobile Tradition) was fully determined to finally realize the recreation of the Kamm-Coupe.

Consequently one of the top German restoration shops, the firm René Große, **Left: preparation of the aluminum body before application of the first undercoat.**



Interim trial fitting of the body on the tubular frame.

The Period following the Success

During the war BMW hid the race cars in the countryside, where they survived the war years essentially unharmed. Right after the war Allied soldiers discovered the three roadsters, and they disappeared to Russia, England and America.

The Touring-Coupe was used by a number of soldiers, but then was discovered by a senior employee of BMW, slightly damaged, in a ditch near Munich, and was saved. Some years later, when same gentleman emigrated to the U.S., he took this coupe

Ernst Loof, the former race director of BMW, acquired the Kamm-Coupe and used it as his personal car for some time. Loof, who from 1947 to 1953 built sports cars and sports race cars under the name „Veritas“, sold the Kamm-Coupe in order to raise funds for his fledgling company. The new owners of this one-of-a-kind car did not enjoy their purchase for very long: They crashed the car in 1953 following which the car was crushed in a junk yard. Actually this should have been the end of the story. However in the mid-1990s a new awareness of the importance of its racing history developed at BMW. The company was interested in recreating the race car, which however at the time was not (yet) possible, as there were no design drawings and only very few photographs of the car available. A breakthrough came about when a Munich collector came forward with photos of the car from various angles, and which revealed the tubular frame of the car in detail.

With these documents in hand, the challenge became to create an overall design of the car. As the first step, the computer specialists of BMW's design department scanned the various photos. These scans in turn fed a 3-D program, which produced detail dimensions such as for the rims, the headlights, door handles, central locks for the wheels, trafficators, the BMW emblems, etc. Each new



Above: Final assemble, - during a break.

resumed pursuit of the vision „Recreation of the BMW 328 Kamm-Coupe“. The company produced a fiberglass copy of the synthetic model. This model was internally reinforced with wooden ribs, and modified into two halves of a housing. The individual pieces of the tubular frame of cold-hardened aluminum alloy were assembled into these housing halves, a process, that had to be





In contrast to the Italian Superleggera bodies this design provided for very delicate edging in the Kamm-Coupe. This detail as well as the design of the hinges for the hood and the doors, had originally been patented by BMW, so that original documentation was available and allowed for the exact replication.

original 328 roadsters, and the rear axle does not correspond to the design of the standard 328.

A few months before the planned completion the team working with René Große realized that the synthetic model could not possibly correspond to the original car in the area of the A-pillar. To the horror of the team each of the A-pillars had to be moved out about 1.5 cm (approx. 0.6 inch)! It was decided to adhere to the original design as much as possible, which meant that the bodywork had to be corrected. The doors, door sills, roof, dashboard and windows had to be modified once more and carefully refitted.

In March of 2010 the recreation of the Kamm-Coupe was finally completed. Klaus Kutscher, the technical head of the workshop at BMW Classic commented: „I have accompanied the recreation of the Kamm-Coupe since the 1990s. It is incredible that we have now finished this project. Not only did we have to reconstruct a car, we had to try to get into the heads of the BMW engineers and technicians who had developed the original design, to understand the design.“ Karl Baumer, the head of BMW Classic, was thrilled about the car: „We are very proud to be able to present this car to the public!“

With the first public presentation of the Kamm-Coupe at the Concorso d'eleganza Villa d'Este 2010 BMW celebrated its great triumph at the 1940 Mille Miglia.

There was not much time left before the planned start at the 2010 Mille Miglia from May 5 to 9. The newly constructed racer had been prepared for the race with extreme care. Karl Baumer and German ex-Foreign Minister Joschka Fischer had been designated as the team for this car. Joschka Fischer traded his place in the Kamm-Coupe with D. Dräger and thus experienced the 2010 Mille Miglia in a roadster next to Dr. Ing. Klaus Dräger.

Karl Baumer and his co-driver D. Dräger completed the event without any problems, and placed 300th out of a starter field of 375. As a courtesy to the organizers the team declined to be scored. Replicas are not normally allowed to be entered; in this case the organizers had made an exception in view of the 70th anniversary of the 1940 win of the Mille Miglia in 1940. BMW emphasized that the company normally participates in the race with original cars. – The winner of the 2010 Mille was Giuliano Cané driving the BMW 328 Mille Miglia Coupe with his wife as co-driver.

Above left: After application of the final undercoat the body is lowered on to the tubular frame.

Left: Four of the five BMW 328 Mille Miglia cars from 1940 returned to Italy 70 years later for the Concorso d'Eleganza Villa d'Este in Cernobbio on Lake Como.

accomplished with extreme precision, since there would be no opportunity for modifications of the aluminum skin. The weight of the completed aluminum frame was planned in accordance with the weight of the original, i.e. approximately 30 kg (66 lbs). The later assembly of the second manufactured aluminum body shell in Leipzig fit perfectly on this tubular frame.

Various sheet-steel components, such as the fire wall, inner fenders, dashboard and gas tank and the double floor had to be formed and fitted. One technically very interesting detail was the forming of the 4 cm (1.57 inch) wide aluminum strips, which were welded to the tubular frame in the areas of the wheel wells, doors, hood and windows. The aluminum body panels later had to be formed around these strips.

„To reconstruct such a car is an extreme challenge and a distinct honor“ commented René Große some time later. „Computers can calculate, but building the car one has to do oneself“.

Often one recognizes problems only when confronted by them. Mr. Große continued: „For example, when the hood was completed we had no information about how to latch it“. The Kamm-Coupe caused me many sleepless nights. However with the first test drive all that was forgotten.“

Also technically, the Kamm-recreation provided many challenges for the Große-team: The engine, radiator and transmission were moved back compared to the

