



# The Alfa Brera *S* - *from the inside out*

The Alfa Romeo Brera S was a special kind of limited edition vehicle. As the advertising said it contained the 'best of Italy and the best of Britain'. It had that combination of Italian flair in its design, and it is beautiful, with the more calculated British engineering to make it drive like a sports car. My name is Peter Cambridge and I have been an automotive engineer for nearly twenty years, specialising in vehicle dynamics. I had the pleasure of leading the Brera S project when I worked at Prodrive.

The relationship between Alfa Romeo and Prodrive started in the exciting days of the 155 touring car programme when driving stars like Gabrielle Tarquini drove the red saloons, sometimes on two wheels, to many British touring car victories and the championship in 1994. More recently the company prepared and ran the press cars for the launch of the Brera and Spider in the UK.

In 2006 Nicholas Bernard, the then marketing director of Alfa Romeo UK, started a development programme to enhance the sporting character of the Brera for the enthusiastic drivers in the UK. It started with a four wheel drive V6. Enhancements were made to the engine, suspension, brakes and interior to make, what we call in the industry, an attribute demonstrator. This was a successful project. It demonstrated that the Brera chassis could be made very sporty to drive, but would retain a compliant ride, so necessary on our UK roads.

The four wheel drive Brera was a great car to drive. It had been criticised in the press for a strong understeering nature, but turn off the stability control and let the transmission do its job and what fun you can have. Initial understeer would turn to neutrality and sometimes a hint of oversteer if enough throttle was applied from the apex of a tight second gear

corner. I'm sure the roads of Warwickshire had more than their usual amount of rubber deposited on them during the development.

The four wheel drive car didn't make it to production but Nicholas Bernard decided that the attributes it demonstrated could be successfully added to the 2.2, and soon to be announced 3.2, front wheel drive petrol models to help the cars appeal to the true British Alfa enthusiasts who wanted the style and the driving pleasure. And so, in September 2007, the Brera 'S' project was born.

The brief for the project was to deliver better steering response and feedback, a very sporty drive and an enhanced sporty look. My official quotation on the subject was; "Even in standard form the Alfa Brera looks stunning and performs like an Alfa Romeo should. Our brief was simple: To take it even further."



The process of enhancing the ride and handling of a car for the road is a fun one. It entertained me for nearly twelve years at Prodrive. Detailed assessments are made of the standard car on the road and track, both independently and with the client, to understand the characteristics of the vehicle and then to decide the targets. The front wheel drive Brera has a lot of grip though when used to the full it is

accompanied by quite a lot of roll. It has the feel of being a large car to drive that is more grand tourer than sports coupe. The car had a tendency to bottom out on an undulating road when driven with commitment indicating a softness in the ride, yet smaller impacts felt quite firm. And the key aspect for Nicholas Bernard was the steering which lacked some of the response and feedback of Alfas from the past. I had also discovered that 'Alfa wander' feature. This all may sound like harsh criticism of the car but a standard Brera is a good grand tourer and we knew that we had a car that could be focused for the enthusiast.

We developed the suspension on the roads of rural Warwickshire and the test tracks at Prodrive, MIRA and Millbrook. Bilstein made a few special sets of prototype dampers with adjustable platforms to take Eibach races springs (mains and tenders). This allowed us to make rapid changes to the spring rates and ride heights to optimise the handling and make the car feel more of a small nimble sports car. It looked like a race car with these fitted and felt like one as well when we went too firm. The beauty of developing a car this way is that you can find the limits and change the balance of the car quickly which helps you reach that 'sweet spot' where everything just works.

The damping took a lot of work to perfect. We needed tight body control but wanted to retain as compliant a ride as possible. Developing these on the road is best way to achieve the result. It's real world, very random and definitely rough! The damping also has a strong influence on the steering feel and response. Improving this was a key target and in the end we had to compromise the ride slightly on the 3.2 V6 to achieve the desired steering character. We spent a few weeks driving in and out of the workshop at the









Bilstein UK Technical Centre in Broughton Astley. The dampers are individually revalved so each change means removing them from the car, stripping them and changing the many shims inside. It was a good job we had the fastest technician in the business with us. Craig Randall, or 'Oz' to his friends, may have been born upside down but he can make and fix anything. A bit like Mr T but without the attitude!

A thing we managed to do was reduce the 'Alfa wander'. At the end of a development phase we do a static geometry tuning exercise. Here we vary the front and rear toe, camber and caster, if adjustable, to optimise the steering, the phasing of the front and rear axles and the balance to an extent. This is the stage where you can dial in driver confidence and dial out a lazy initial turn in. We set the rear toe and camber to new nominal values with a tight tolerance within the factory specifications. We revised the front toe setting to have no toe out and just a little toe in. This was away from the standard Alfa settings but the Italian engineers understood why we had made the change and did not stand in our way.

And that is what really impressed me on this project. The attitude of the Italian engineers who came to the UK to drive the cars and give them their blessing. There was none of the 'not invented here' syndrome but instead there was a shared passion to enjoy driving and make Alfas more sporty. They genuinely approved of the changes we had made. 'Fantastico' was the response after the first track drive.

The wheel, that stunning piece of Alfa Romeo sculpture, came about on a plane journey from Italy. Having been across for meetings with the Italians to set up the project I flew back with Dante Zille, the then marketing manager for Brera in the UK. We were discussing a picture of the 8C on the front cover of an



Italian car magazine and came to the conclusion that the Brera S had to have that wheel. It just says Alfa Romeo! Working with the designers at Rimstock in Birmingham, and a copy of the 8C sales brochure, we developed the wheel that you see on the car today. Style lead the design but we wanted the wheel as light as possible to reduce the unsprung weight and help the ride. With great attention to detail and a significant amount of finite element analysis we came up with a design that combined with the 19" Pirelli PZero Nero tyre was almost 2.5Kg lighter than the standard 17" example.

The marketing people at Alfa Romeo UK really know their job. The marketing campaign was planned with military precision. Taster adverts for the car appeared on buildings in all major UK cities with that memorable 'green' union jack. (I was worried that the queen would object, but no letters were received from the palace!) The television adverts then

appeared, notably during the breaks in the F1 coverage on ITV. The driving for that advert, and for the 'Track' and 'Beauty' promotional videos was performed by my departmental colleague known as Axle West. A well gifted driver and instructor who is currently working with Drivers Dreams, a supercar experience company. A good match indeed! If you have not seen the videos have a look at [www.breras.co.uk](http://www.breras.co.uk). Alfa has kindly left the microsite running for us all to still enjoy.

At the end of the project we received a letter from Nicholas Bernard and Christopher Nicoll, the UK managing director, which said, "It has been a pleasure to work with the engineers and the rest of the Prodrive team over the last 12 months and although we have worked on similar projects in the past it was the first time that we have encountered a team that is extremely professional and incredibly passionate at the same time." We were proud of the result and humbled by the praise.

Engineering and managing the Brera S has given me an insight into all things Alfa. The employees I met at the time and the owners I have met since all share an amazing passion for the marque, and for driving, which is quite infectious. I've been converted! I will carry on working with Alfas and their owners developing 'best of Britain' suspension for some of the other models. Owners of the modern Alfas that are experiencing the 'Alfa wander' and high front tyre wear issues can benefit from some of the learning on the Brera S with revised static geometry settings. Please see the article by John Griffiths in this issue. I would be really pleased to hear comments from any Brera S owners and hope to meet some of you at AROC events this year. You can keep up to date on developments at [www.pcdynamics.com](http://www.pcdynamics.com)

*Peter Cambridge*