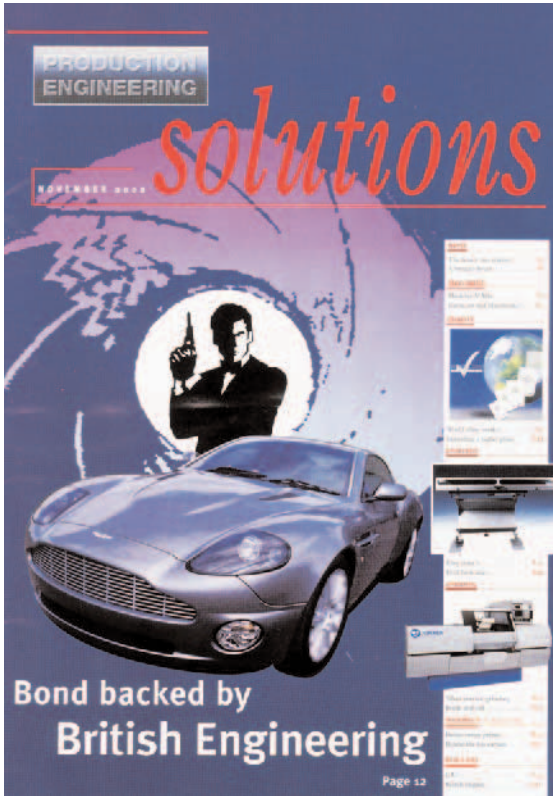


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Bond backed by British engineering

As the quintessential Englishman, it is good to see Ian Fleming's world famous secret agent, James Bond, back in an Aston Martin for the latest film, Die Another Day. After a break of nearly eight years, the super-spy's chosen transport is the new Vanquish, and it is not just the good guy who is looking to British engineering to give him the edge, the movie's villain Zao, will be driving a modified 400 bhp Jaguar XKR convertible. Solutions reports.



Due for general release this month, the new Bond movie, Die Another Day, sees James Bond back where he belongs, behind the wheel of a British car, Aston Martin's latest addition, the new Vanquish. Die Another Day is the 20th release in the most successful film franchise of all time.

Of course, the Bond cars are very special. Three real Aston Martin Vanquish cars were used for close-up shots in the film. However, with one of the most spectacular elements of the movie being an ice chase scene filmed on location in Iceland, four very special 'Vanquish' cars were also built for the film. From the outside they look just like the real thing, but under the sleek skin there is a Ford Explorer 4x4 chassis fitted with a Ford V8 engine. The all-wheel drive set-up is an obvious requirement for the extra grip needed for the chase across the frozen set, but the smaller engine was fitted to free up some space under the bonnet for the heat-seeking missiles located behind the grille, as well as other special effects fitted to the car. These modifications were all made by a team of special effects engineers, in a top secret building at Pinewood Studios.

Two of the four 'specials' were destroyed during filming, one in an accident involving an iceberg, and the

other after sliding on its roof for one of the stunt sequences. One of the remaining cars used in the film was given centre stage on a 007 display at the British International Motor Show 2002, held at the NEC, Birmingham, from the 23 October to 3 November 2002.

The Vanquish that Pierce Brosnan drives in the movie is finished in silver, just like the first Bond Aston Martin, which was a DBS used by Sean Connery in his battle with Auric Goldfinger back in 1966. The same car featured in the later Thunderball movie, and the Aston Martin made a comeback in the 1995 film GoldenEye.

There is no doubt that James Bond and Aston Martin represent one of the oldest and most successful product associations of all time. After Goldfinger was released in 1966, Aston Martin sales doubled, and the carmaker will be hoping that interest in the Vanquish will be raised following the release of Die Another Day. In fact, no money changed hands in the deal between Ford's Premier Automotive Group - which supplied all of the Aston Martins, Jaguars and even the new Ford Thunderbird driven by the latest Bond girl, Halle Berry - and film producers, EON Productions and MGM. Instead a contra-marketing arrange-

ment with Ford, Jaguar and Aston Martin providing support for the new movie was established. But Pierce Brosnan has put his hand in his pocket - he liked the Vanquish so much that he has now bought one.

Unlike the DB7, which was partly based on the Jaguar XJ-S, the Vanquish is an all-new car, packed with new materials and new technology.

Q-Branch extras

- Two under-bonnet mounted auto-aiming machine guns
- Front firing heat-seeking missiles behind the main air intake grille
- Seat equipped with spring-loaded ejection system
- Enhanced waterproofing
- Under-chassis air cannons
- Control system mounted in the central console



It replaces the old Virage/V8 series, the company's last link to its cash-strapped past. Under Ford's guidance, the Vanquish is intended to re-establish Aston Martin as a forward-looking, ultra-modern carmaker. With a forecast build rate of just 300 vehicles per year, of which around 70 per cent will be exported, the Vanquish is already claiming a two-year waiting list.

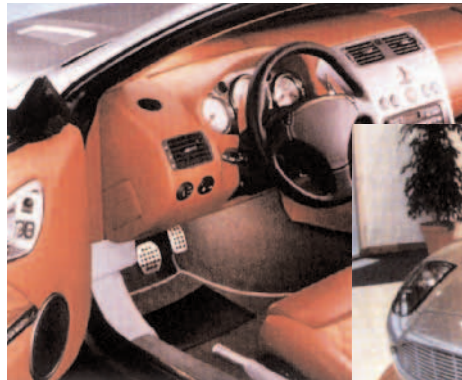
Only skin deep

In developing a British thoroughbred with all the traditional values of a classical sports car, but with 21st century production techniques, Aston Martin has employed a build method exclusively developed by Lotus Engineering. The shape is unmistakably Aston Martin and aerodynamically optimised, with a completely encased underfloor.

The lightweight monocoque Vanquish chassis is made up of bonded aluminium and carbon composite elements, providing it with extreme bend and torsion strength. The centre section forms an integral passenger safety cell, which is backed up by deformable, composite-structure energy-absorbent bonded zones at the front and rear.

The body is completely hand-built and painted in multiple coats in any desired colour. To achieve a consistent high quality body assembly, Aston Martin has invested in the FaroArm portable coordinate measuring machine (CMM) with CAM2 automotive software, supplied by Coventry-based Faro. Prior to this investment, body frames had to be physically transported to a large 3-axis CMM for checking against the CAD data, a cumbersome process that could potentially damage the assembly during transit. Due to the size of the frame and the number of points being measured, it was a painstaking process taking several hours.

Having seen the FaroArm in action at another company, engineers at Aston Martin were quick to spot how it could alleviate some of the company's measurement problems. The FaroArm's portability allows it to be taken almost anywhere within Aston Martin's Newport Pagnell facility to inspect components of any size and material. The flexibility of the arm also enables the vehicle to be measured, in situ, at any stage of assembly.



It takes more than 70 hours of labour and eight hides of leather to complete the interior of the Vanquish



The introduction of the FaroArm means that Aston Martin can confirm that the Vanquish body frames are within the manufacturing tolerances, with accuracies down to +/- 0.1 mm being achieved. Also, these large components no longer need to be transported around the factory, reducing the risk of damage.

The time saved in measurement has resulted in a payback time of just six months, and the FaroArm's flexibility is becoming an invaluable aid at all stages of the manufacturing process, as quality engineer, Robin Marlin, explains: „If a component does not appear to fit where it should, it is now very simple to discover where the problem lies and put in a procedure to ensure that this issue does not recur. This is especially useful when components produced by an external supplier are involved.“

The CAM2 automotive software allows the CAD data for the entire vehicle to be stored on a laptop computer. Individual CAD files for each part can be stored in the computer and built up on the screen to resemble the stage of manufacture of the vehicle. The car can then be checked against CAD nominal geometric and surface data at any stage of production to ensure it is within build tolerances.

The Vanquish provided the company with its first opportunity to prove the new CAM2 software, when the FaroArm was used to inspect the prototype car against the CAD data. Trim lines were also checked to ensure an even fit between, for example, the bonnet and the front wings. The measurement arm and the software allowed a direct comparison between the real car and the virtual model, and facilitated the cost-effective implementation of the necessary adjustments.

Mr Marlin says: „The whole manu-

facturing process is now regularly inspected against design data at key stages of assembly, allowing any issues to be resolved. We now have three FaroArms in use in manufacturing and development, underlining Aston Martin's belief in this technology. The measuring arm has had an immense impact on the quality and efficiency of our operation, with more accurate manufacturing and rapid determination of where problems exist, making for substantial time and cost savings all the way through the manufacturing process.“

The massive rear of the Vanquish is fitted with a lift-reducing diffuser. The car runs on 255 and 285/40ZR19 wheels with all-round independent suspension by means of double aluminium wishbones. An on-board computer continuously monitors tyre pressure and temperature.

Providing the power

From 1970 Aston Martin, the jewel in Ford's Premier Automotive Group, has produced precisely 5016 cars with eight-cylinder engines. The production of these has now ceased to make way for the prestigious V12 unit that will power the Vanquish. With a capacity of 5935 cc, four overhead camshafts and 48 valves, the engine has been jointly developed with Cosworth Technology, which is also charged with producing it.

The DB7 is currently the most successful Aston Martin. At a slightly lower power output, the V12 has been available in the DB7 Vantage coupe and Volante cabriolet since 1999. Cosworth Technology delivered 1000 V12 DB7 engines in just 15 months, a record for the carmaker. The differences between the engines for the

Vantage and the Vanquish result in a power increase from 420 to 460 bhp. Both are 6.0 litre, 60° V12s with 48 valves, but the Vanquish motor features a 4 kg lighter forged crankshaft, hollow forged camshafts, re-designed valve gear and new intake and exhaust manifolds. The engine also has improved oil circulation and a modified sump. In terms of throttle response, a full 12 kg of rotating inertia has been removed, resulting in an engine that revs aggressively up to its 7200 rpm red line.

Cosworth Technology has proved to be the ideal partner for Aston Martin, with a pedigree based on a large number of 'clean sheet' engineering design programmes. The company's engine experience is hard to beat, covering single cylinder to V12 developments and most configurations in between.

The company employs a total of around 1000 people at its facilities in Northampton, Wellingborough and

Worcester, and at its subsidiary in Michigan, USA. The head office and engineering Operation at Northampton has around 300 staff, most of which are involved with engineering activities, including design, research, development, calibration and testing. In the past 10 years, Cosworth Technology has been involved with more than 30 major new engine programmes including auto-motive, marine, aero, racing and industrial applications.

Using a precision sand casting process refined by the company over the last 25 years, the aluminium alloy cylinder heads and engine blocks for the 190 mph Vanquish are produced at Cosworth Technology's foundry at the Shire Business Park in Worcester. The foundry employs 250 people and is flexible enough to produce between three and 300,000 high integrity aluminium alloy castings per year. From here the castings are transported to



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the company's manufacturing facility in Wellingborough, Northamptonshire. With the focus on production engineering 200 people are employed as CNC operators, engine builders, quality engineers and expeditors, ensuring that the heads blocks are machined and the engines are assembled, complete with the transmission system.

