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PETER BROCK'S B.R.E. SAMURAI

The design of competition prototypes, a speciality of Peter Brock, the noted Californian designer/constructor, seems to be having some effects on the world's manufacturers of G.T. cars, resulting in contracts from both English and Japanese firms. The first of these, a G.T. car, built to F.I.A. Group 6 specifications, is the "Samurai": an under 2 litre coupé designed to serve a dual purpose. As a racing prototype, it had to set new lap records for its engine size, with a new production engine 1.3-litre built by Hino Motors Ltd. The car showed its true capacity for speed on Japanese circuits in private tests. (Editor's note: The all-aluminium bodywork was done by Emil Diedt and Dick Troutman at the Troutman-Barnes shop in Culver City, Calif. After the take-over of Hino by Toyota, Brock equips the same car with a choice of Alfa Romeo, Ford Cosworth, Coventry Climax or BMW engines).

Secondly, the overall styling, appearance and finish had to conform to the extremely high standards of a show car, as the "Samurai" was to be exhibited at several international auto shows in 1967-68; its official début took place at the Los Angeles International Motor Show last September.

One's first reaction to the "Samurai" is to its extremely low silhouette. It seems almost impossible that a car of such minimum dimensions could indeed be comfortable. One resists the temptation to get in immediately, as the exterior surface is so full of unexpected and subtle shapes that the car must be thoroughly studied before the design and metalwork can be fully appreciated. Everywhere is the attention to detail and aerodynamics that have become the trademark of the American designer. The flow of air over the car has been treated with utmost care and study, and it is difficult to conceive that burbles of turbulence or drag could appear anywhere.

Of most technical interest is the "ring airfoil", first seen on an earlier Brock design, the "Ghia-De Tomaso 5 Litre" (see Style Auto n. 9, pp. 27-32). This time, the "foil" has been integrated even more successfully into the overall form by use of slight light breaks or creases, that come off the leading edges of the fins and travel forward on the rear fenders. As the eye travels forward, the light breaks radii form and becomes larger and expands into the main highlight line for the front fenders.

Whereas the Ghia De Tomaso's rear end treatment gave a feeling of solidity and power by placing the heayiest masses at the bottom, the same ring airfoil theme has been used in a completely different manner on the "Samurai". Here, the lower surface at the sides tucks in, divorcing the mass from the ground and creating a sense of grace rarely found in a Kamm-type rear end. The long horizontal opening at the rear is interesting in that it is left completely open so the beautiful inner structure of the car may be seen. This gives a feeling of lightness or "inner space" and is in perfect harmony with the large rear glass area which almost creates a showcase for the beautifully detailed engine.


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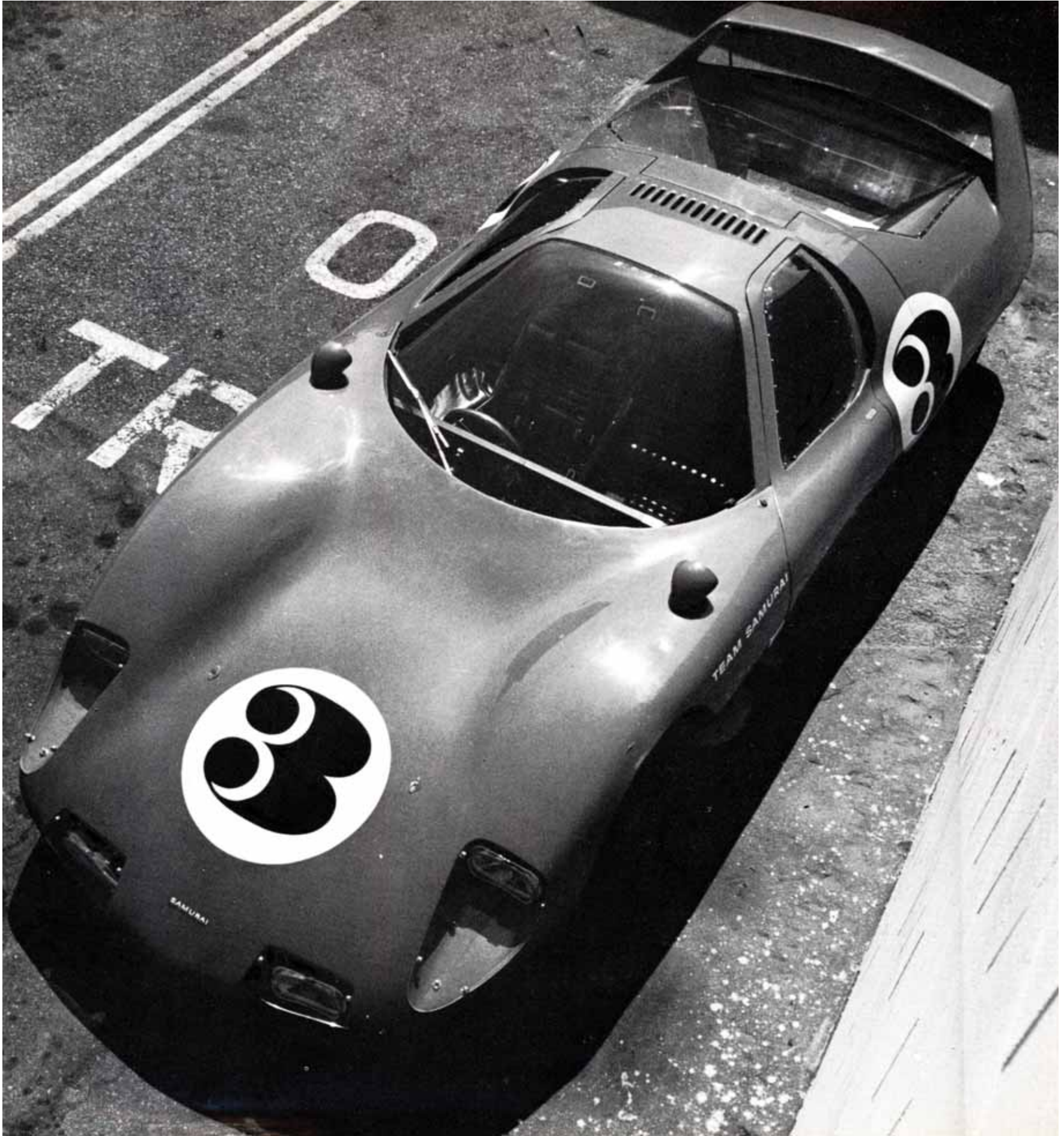
SAMURAI


TEAM SAMURAI
SAMURAI

The windscreen and side glasses reflect another design trademark of Peter Brock; the theory of continued shape and "expanding line". The purpose here is to reduce turbulence around the windows to a minimum, so the windscreen is modeled into the overall shape instead of creating a new line. As the windscreen's bottom line reaches the pillar, it keeps expanding so the side window become, in effect, part of the windscreen line. When viewed from the front, the whole mass of glass area is seen as a whole form that blends smoothly from leading edge to its disappearance into the boundary layer intakes without separating from the surface. When asked about the evolution of this detail, Brock stated that an earlier design of his, the "Daytona Cobra" coupé, had experienced trouble in this area as a result of too abrupt a transitional change from windscreen to side window. Small plastic vanes were fitted to the pillars to control the breakaway but naturally they created drag. Now all current Brock designs incorporate a gradual radius and constantly expanding line to overcome this problem. The treatment of air exiting the radiator is also unique, in that Brock has been

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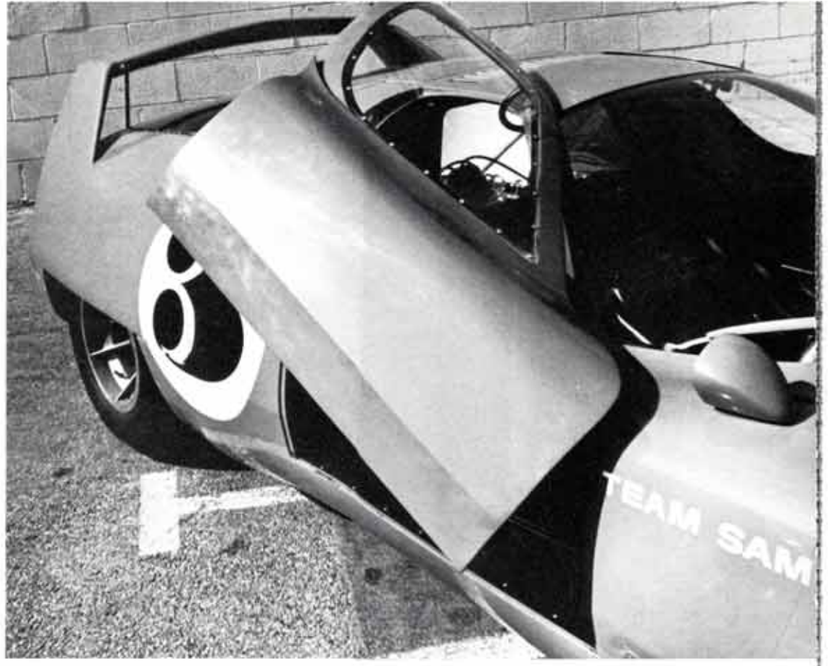

able to turn a normally high pressure area at the base of the windscreen into a low pressure area to aid in extraction of air from the radiator with a minimum of turbulence. The extremely raked windscreen angle already slightly brakes the fillets' flow; by creating then a smooth raised surface just before the windscreen's baseline, a negative pressure slot was formed which extracts interior hot air and uniformly directs it to the total air flow.

The extractor slots for cockpit air placed just over the driver's head are in an area of minimum pressure and consequently form a constant vacuum action to remove air from the cockpit while the car is moving. Pressure vents into the cockpit keep driver and passenger breathing fresh air without having to open the windows.

French aerodynamic influence is very evident around the front wheel arches as the line of wheel openings is very crisp until the line reaches its zenith. The line then becomes a radius which swells to generous proportions as it travels down the rear part of the opening. In this manner air is never caught on the edge of the wheel opening and turbulence along the side of the car is greatly reduced.

The tires too have a strong influence on the front fenders; the current trend is toward extremely low profile designs. The "Samurai's" front fender section over the wheels is almost rectangular and this is accentuated at the leading edge with rectangular section Cibie headlamps with perspex covers. The swelling just before the rear wheels increases the sense of power and motion of the car. The beltline then rises gradually as it goes forward creating statically that line which occurs only instantaneously when the car is accelerated with a transference of weight from front to rear. The car thus imparts that rarity in automotive design, a true sense of motion!

The manner in which the doors are hinged is especially interesting, as it is the result of the disastrous effect of "gull wing" type doors. Air, rushing over a curved surface, creates a low or negative pressure which tends to pull or expand the surface. If a door cut line occurs in the middle of such a curved surface, as it does on the "Samurai", the results at high speed can become most unnerving. The door is forced outward

from the negative pressure and then suddenly the airstream gets under the door and it's gone. At Le Mans in 1965, for example, a couple of the Ford G.T.'s lost their doors!Brock has hinged the "Samurai's" doors along the line of the windscreen pillar so that it is impossible for the door to be distorted at highspeed. This arrangement, together with the shape of the doors, facilitates cockpit access.

The functionality of the interior design is enhanced by the beautiful workmanship. Most surface panels are finished in black wrinkle finish or matte black. The racing type seats are designed to support the back and the driver and passenger are in a semi-reclining position; nevertheless forward visibility is excellent: the windscreen contour is almost behind the line of sight. Once in motion one feels that some invisible shield is diverting the wind.

At this point, the lightness and sensitivity of the car at speed can only be indicative of the beautiful form and its functions. Truly a beautiful prototype and one that should focus more international attention on this Californian designer.

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