DISRUPTIVE DESIGN – GORDON MURRAY AT REVS



Gordon Murray, the extraordinary car designer [Link], visited the Revs Program today.



Gordon was chief designer for the Brabham Formula One team from 1969 to ’86, and Technical Officer for the McLaren team from ’87 to 2006. His remarkably innovative designs of supercars included the infamous road-going McLaren F1 and the Mercedes-Benz SLR McLaren.

But Gordon wasn’t here to talk about high-end racing. Gordon is now working on a new kind of supercar – a small, light, cheap city car based upon a radically new modular approach to vehicle manufacture. The T-25 and T-27, based around the iStream platform and production process.



Gordon's obsession with design from first principles applied to light and agile cars.

Formula One experience and expertise translated into a people's car!

I am fascinated by this translation and I got a chance to quiz him about his approach to design (see also Nigel Cross's insightful new book about design thinking – [Link]).

Gordon himself doesn't drive the likes of a McLaren F-1 everyday. His main car is a Smart Roadster, the small, light and very agile sports version of the Smart Car.

Why? – because it is fun to drive (the combination of power-weight ratio, distribution and wheelbase), and makes sense around a congested city like London in the same terms of size, weight, and fuel consumption.

Gordon begins with this human experience. He has an obsession with weight as a fundamental principle in car design, and points out the madness we see all the time around California of mom's taking kids to kindergarten in a multi-ton steel monster

of an SUV. Of course, it was also a fundamental concern when he was designing racing cars. There he developed another obsession – with composite materials. This involved learning from other industries, like aero-astro, where weight and strength were also major concerns. Carbon fiber, various kinds of plastics and metals, and combined in various ways, offer all sorts of new design and manufacturing possibilities, because of the properties of the material and the way you handle manufacture with such materials.

Inherited, of course, from millennia-old design of wheeled transportation, cars first adopted the design principle of combining a frame (chassis, power train, steering) with body work (seating and exterior added by coachbuilders). The second half of the twentieth century saw the adoption of monocoque bodies made of welded stamped steel panels that did away with the frame/body combination. The iStream process under development by Gordon abandons both for a structure comprising lightweight tubing and integral composite panels. It is a modular platform because many different kinds of vehicle components (engines, gear boxes, seating) can be inserted into the same structure.

Contrast current vehicle manufacture where a single model production line based upon stamped steel panels will cost around $400 million to set up, and $100 million to retool and modify when the model receives a facelift. The iStream production line costs a fraction because it's not based upon combining many stamped steel panels into a specialized monocoque that can be used for a few models at most. The iStream city cars are small and efficient, as well as open to all sorts of styling and individual personalization, because the design is precisely a *platform of potentia*l as much as a finished item.

This is why iStream is disruptive design.

It's an example of what Gordon calls *designing from first principles*, rather than from accepted solutions and the search for incremental improvement.

So I asked Gordon whether he designed cars. He hesitated – the iStream is process and platform.

When he was with Brabham, Gordon introduced the practice of planned pit stops in a race. Previously cars carried as much fuel as possible to cut down on time lost in the pits refueling and to keep the cars doing what they are supposed to do – race.

But races are not just cars driven at high speed. There's also the logistics of supplying the car with what it needs – research and development, expert driver, maintenance crew, transport too and from races, and then the apparently simple matter of adding fuel and tires. Fuel adds weight. Gordon figured that a lighter car, carrying less fuel, would accelerate faster and be more agile. If the time in the pits could be reduced, the increase in acceleration and agility could be a winning advantage. So the team looked to replacing tires and getting 100 liters of fuel into a car as quickly as possible, and even heating up tires to maintain performance.

This was an approach to racing as a *system and process* distributed in many fields beyond the car driven around a track at high speed.

Some other points about the work of the designer emerged in this encounter with Gordon's world.

Gordon is a charmer. Open, human, communicative. A persuader who roams freely across mechanics, materials science, industrial process, the necessity of sustainable design in a world facing unprecedented challenges precipitated by two centuries and more of industrial urbanization, business viability. He emphasizes the teamwork in design – the *sociality*, the need to involve everyone in a transparent community of innovating and making.

When I asked him about motivation, he immediately referred to the qualities of human experience in mobility and driving – that's where it starts and ends. Crucial also is real-world pressure to deliver. The constraints of the rules at the heart of Formula One precipitate highly innovative solutions to getting a car round a track as fast as possible. Constraints and limitations inspire and motivate. The necessity of going from idea to implementation (it has to happen before the end of the race) is an emphasis on practice and trial, getting on with things, combining first principles (weight) with analytics (time and motion in a pitstop) with rehearsal and delivery (making the pressured fuel delivery system, the tire heaters, practicing the moves).

All this has given me much food for thinking again about the T-character in the design process [Link] [Link] – I'll follow up on this in another post. [Link]



Carrie Bobier, Stanford Dynamic Design Lab, and Gordon Murray in a student experimental vehicle at VAIL (Volkswagen Automotive Innovation Laboratory), home of the Revs Program