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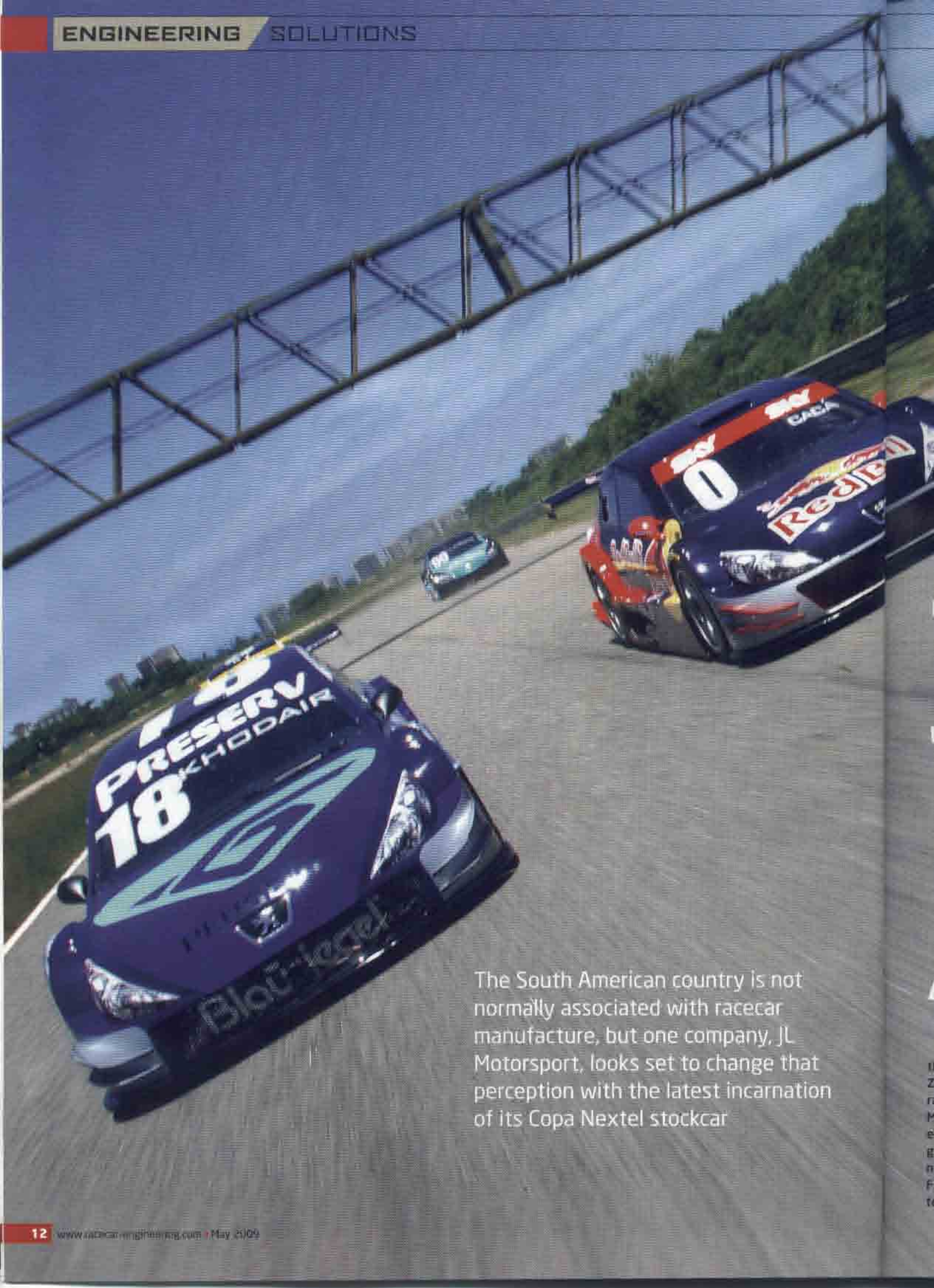


The South American country is not normally associated with racecar manufacture, but one company, JL Motorsport, looks set to change that perception with the latest incarnation of its Copa Nextel stockcar

The boys from Brazil

BY SAM COLLINS

'We are not a rich nation and that means we have to keep the costs very low,' explains Zeta Giaffone of Brazilian racecar manufacturer JL Motorsport. Brazil is well enough known for producing great racing drivers, with names like Senna and Fittipaldi springing instantly to mind, but it is not known for producing competition cars of any sort. But Giaffone comes from a racing family - his father won the famous Mil Milhas race on five occasions, his brother raced in Indy Lights and Indy Car, and he himself has raced in F3000. Today, however, the Giaffones do little racing as drivers, as their family business has become the largest racecar manufacturer in South America, yet they only supply one series: Brazilian Stockcars.

The series was launched in 1979 and, over the years, has evolved from road car-based vehicles to spaceframe specials. Every car competing in the championship wore a Chevrolet name plate until 2005, when Mitsubishi joined the series, followed two years later by Volkswagen and Peugeot. However, only Peugeot and Chevrolet remain for the 2009 season. As well as the main series, known as the Copa Nextel (Nextel Cup), there is a 'First Division' championship using similar specification cars, known as the Copa Vicar, as well as a pick-up series.

As the cars morphed into spaceframe silhouettes, vaguely aping the body styles of various manufacturers' models, performance increased, as did the professionalism. 'We

TECH SPEC

BRAZILIAN COPA NEXTEL CAR (JL G09)

Design: spaceframe, constructed of laser cut, TIG-welded 4130 steel tube, side impact protection, silhouette-style, composite bodywork

Engine:

Type: Dodge-based V8, pushrod, two valves per cylinder

Engine management: MSD 6AL

Lubrication: Mobil

Capacity: 350ci / 5.7-litres

Power: currently 480bhp

Torque: 62kg

Drivetrain/transmission:

Type of transmission: Xtrac

Clutch: Ram

Gearbox: Xtrac six-speed sequential, longitudinally mounted

Differential: hypoid spiral bevel final drive

Driveshafts: JL

Chassis: JL

Steering: JL

Suspension: twin collover dampers, pushrod actuation, spring choice free

Dampers: Koni 2812

Brakes: Fremax discs, AP Racing calipers

Wheels: OZ Racing, cast magnesium, 18 x 11in front and rear

Tyres: Goodyear Racing

Dimensions/weight:

Length: 2800mm (between axles)

Width: 1900mm

Height: 1300mm

Minimum weight: 1270kg, including driver

Tank capacity: 60 litres (ATL, centrally mounted)

Safety:

Fire suppression: SPA

Seatbelts: Sabelt

DETAIL IN DESIGN

Figure 1

CGI shows car's flat underside with tunnels to the sidepods and an integral diffuser

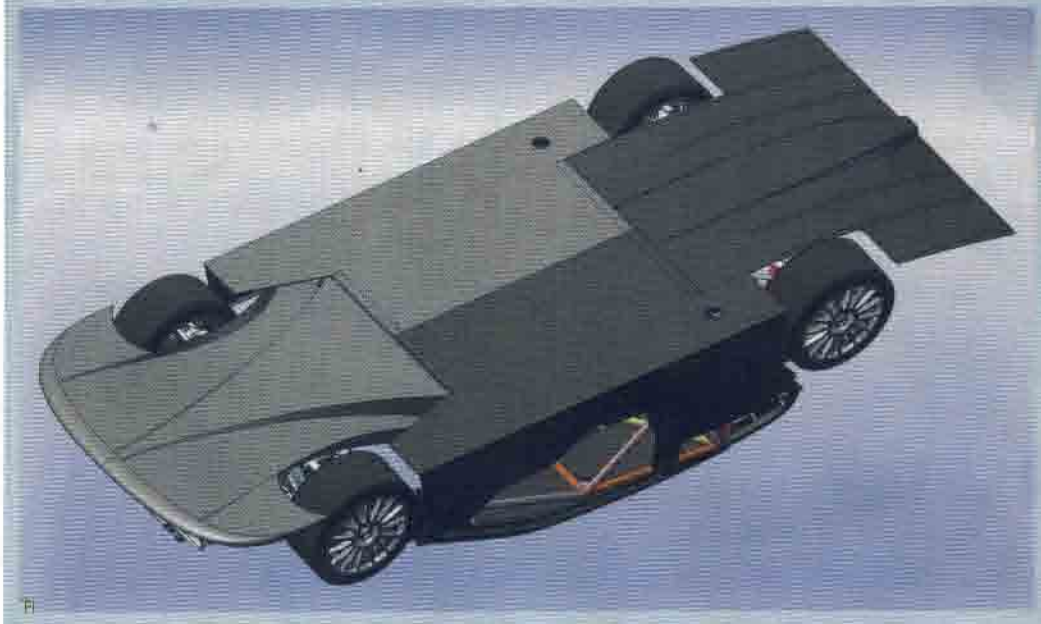


Figure 2

The latest FEA analysis techniques were used in developing the racecars, shown here the bulkhead area

Figure 3

Complete, removable front ends are largely generic and all have the same frontal area, though detail in the lights and nose panel distinguish marques

Figure 4

CAD image of the full chassis. Note the routing of the exhaust and the centrally-mounted fuel cell

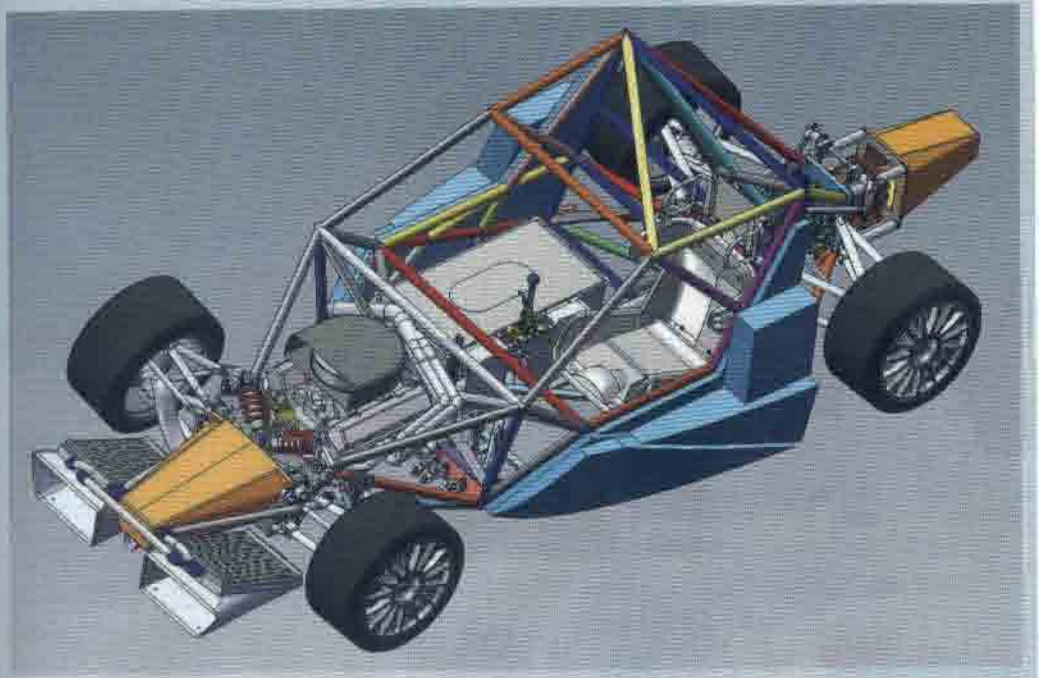
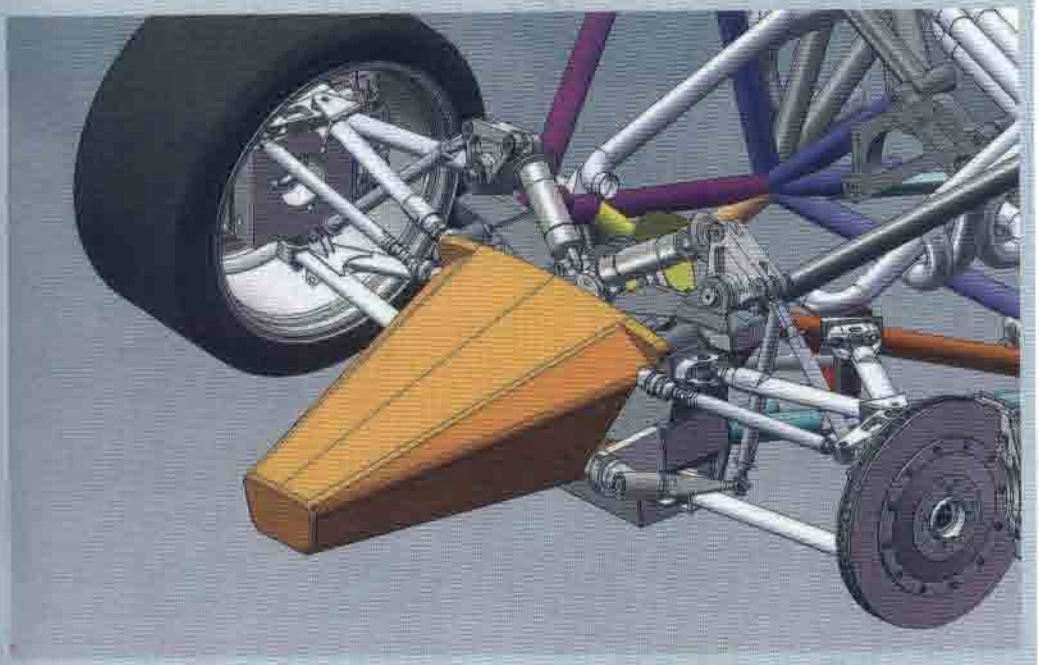


Figure 5

Detail of the CAD drawing showing the front suspension, with its unequal length A-arms, inboard mounted, pushrod and bellcrank-activated dampers and adjustable anti-roll bar



got live television coverage on one of the biggest channels in Brazil, and after that the sponsors came,' explains Giaffone. 'Right now, the drivers can make money that in the past was not possible in this country. Ten years ago, it was all gentleman racers, now it's all professionals.'

FATAL ACCIDENT

For the last nine years, though, the same cars had been in use. The design was becoming an issue and there were questions about its safety. 'We had a fatal accident,' recalls Giaffone. 'Two cars were battling for position and jostling each other, one spun, ending up in the path of the field and was hit in the driver's door. Then we knew that the car had to be made safer.'

A new chassis, and a whole new car concept were required.

> **because we are here in Brazil, the car needed to last forever**

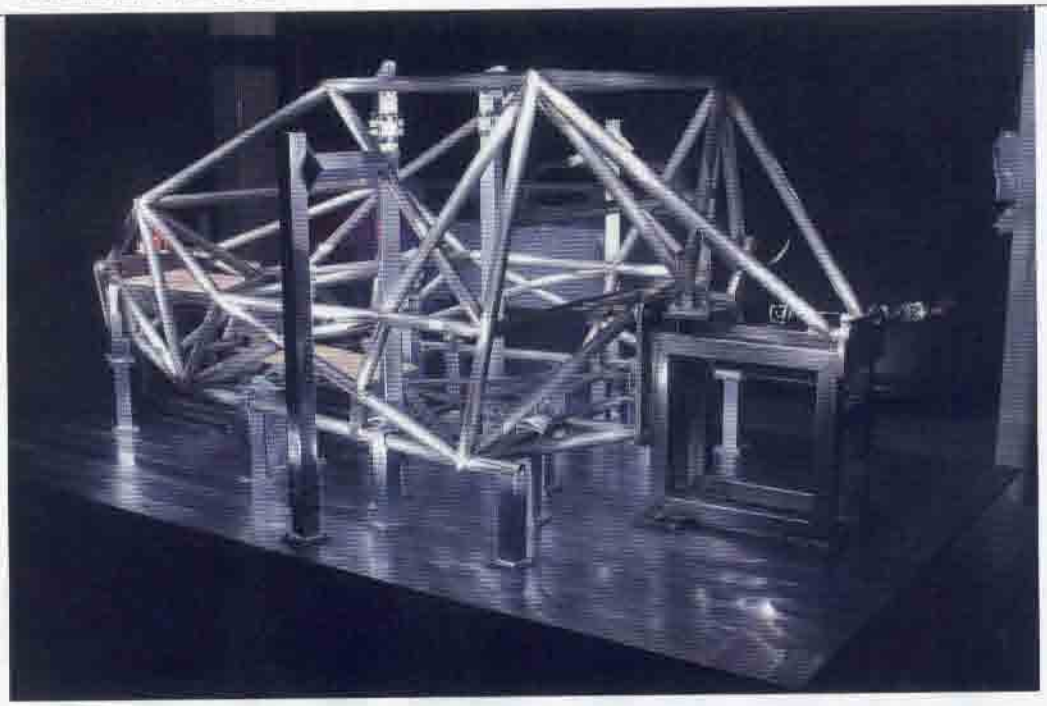
'We started to look at what we were going to do with the car and we contacted Dallara,' says Giaffone. 'But they said that to do a tubular car you have to speak to the experts, and recommended Nicola Scimeca and the Ycom Consultancy in Italy. We talked with him a little bit and then made a deal.'

Scimeca is a former project leader at Dallara, who was involved in the design and development of the World Series by Nissan car, the Infinity Pro Series chassis and the Maserati MC12. Critically, for the Brazilian project, he had also worked on a number of Audi DTM projects. In short, his experience was perfect.

JL's chief engineer, Gustavo Lehto, then spent three months working in Italy with Scimeca. 'They defined the overall design concept of the new car,' says Giaffone. 'Because we are here in Brazil, the car needed to last forever. It takes too long to ship parts from Europe all the time and costs too much. We don't care if the car is 50kg overweight or

not, and if the parts are bigger and tougher, they should last – we don't want to have to replace wishbones or similar things every three or four races.

'At the beginning, Nicola was always a bit unhappy,' adds Lehto. 'He wanted to make every part of the car perfect, to make it the best he could, but to keep costs down, we had to make things bigger and stronger.'



A completely new 4130 steel tube chassis was adopted for this season, after consultation with Nicola Scimeca at the Ycom Consultancy in Italy

Engines are now 480bhp, 5.7-litre Dodge V8s, prepared in house by JL Motorsport, replacing the straight sixes that were used previously

CHASSIS EVOLUTION

A final chassis design was done and construction started in Brazil, using five jigs. 'There was a big evolution in process to make this chassis, because the old chassis had some curved tubing, but on this car it is all straight tube, which is much better in terms of stiffness,' reveals Lehto. 'Also, with the old chassis, it took us around 10 days to make one up, now we can do it in about four hours.' The 4130 steel tubing is laser cut and TIG-welded on site. The resulting chassis has been designated the JL G09.

To provide enhanced safety for the driver, a number of measures were integrated into the design. Side impact protection has been improved with the addition of Impaxx foam inside the doors and the inclusion of NASCAR-style 'wraparound' seats. The chassis does not, however, feature stout door bars, as is sometimes the case on North American stockcars. 'We don't need them, as we do not run on ovals and our car is a lot lighter,' explains Lehto. A new-spec ATL fuel cell is also fitted centrally in the car.

The initial test hack was fitted with JRZ dampers, but the final specification racecars were fitted with units from official series supplier, Koni, along with brake callipers from AP Racing. Spring choice, by comparison, is free. While many of the car's components are imported, some home-grown parts are also to be found, including the locally made on-board air jacks.

The completed spaceframe is clad in bodywork designed in-house by Lehto. Initial work on this was carried out using the 25 per cent scale wind tunnel at USP de São Carlos, and this was followed by full-scale development carried out on track. 'We did a lot of straight-line work and wool tuft testing on the development car at the Londrina circuit, 50km from our facility in Sao Paolo,' recounts Lehto. 'It was a cheap way to get the results we wanted and to check if the cooling ducts all worked. We found a lot of things...'

> **despite different looks, aerodynamic performance is almost identical**

Two distinct body styles were developed, one for Chevrolet and the other for Peugeot. A third style could easily be added if another manufacturer joins the championship next year. Despite the very different looks of the two designs, the aerodynamic performance is almost identical.

'The cars are not a direct copy of the road cars, because if they were you could not make them equal,' explains Lehto. On both designs, the main body is identical, but the key branding areas are made to look like those of the competing manufacturers. While the Peugeot may appear sleeker and smoother around the nose than the aggressive-looking Chevy, both have the same frontal area.

POWERPLANTS

Powering all the racecars is a Dodge-based, 350ci (5.7-litre) V8, prepared by JL Motorsport and inherited from the previous car. 'On the old cars, it was initially an in-line six, but then we went to the USA and bought 40 V8 engines,' explains Giaffone. 'Now we have to build 140 engines, because every car has one spare engine in the Copa Nextel series, and we use essentially the same units in the Copa Vicar and pick-up series.' In Copa Nextel trim, the engine produces 480bhp, but the series could get a power hike soon. 'We built this car to

take 600bhp,' says Giaffone. 'On the old car, 480bhp was too much, the transmission could not take it and they were always breaking. Now we have the Xtrac 'box, we can give the cars much more [power], so we may use the GM LS3 next year. We plan to have more power than the DTM, and that should make it a really exciting series to watch.'

The longitudinal gearbox used in the stockcar was originally developed for Daytona Prototypes, with drive fed from ratios mounted behind the axle centre line through a final drive, hypoid spiral bevel gear set.

Carbon steering wheel incorporates PI Research data acquisition system

The main body structure is the same on all cars, and aerodynamic development was done with wool tufting and straight-line work

PRESSURE TO PERFORM

Despite being effectively a spec series, competing teams are still under considerable pressure to perform, with more teams vying for slots on the Copa Nextel grid than there are available. 'At one point, we had 52 cars on the grid,' says Giaffone. 'It was just too many, so we had to limit it to 32. Now if you want to get into the top series as a team, you must enter the second division championship, Copa Vicar. If you win that, then you can move into the top series. Every season, two teams go down and two go up, like promotion and relegation in football. That was introduced last year, and now the only other way to jump to the top [championship] is to buy an existing team.'

In an effort to ensure equality between cars and prevent teams trying to circumvent the series testing ban, each vehicle is fitted with a GPS tracker. This allows the organisers to restrict access to other R&D avenues, too. 'In the past, one team took its car to England to run on the Multimatic seven-post rig in Thetford,' says Giaffone. 'Of course, then they won everything, so we stopped that because the cost would be too much.'

Another move that promotes equality and cuts costs is that all teams build their cars at JL's facility. 'Everything is done on site,' Giaffone explains. 'We made all the parts for the cars, but this is the first time we have done the whole car under one roof. With the old car, we did the chassis, other people the bodywork, then teams bought parts from all over the place and went to their own shops to build the cars - it took them around 20 days to put everything together - but with this car, everything is done here. They come here and build the cars, and it only takes two or three days.' With no barriers between the teams in the build shop, there are few secrets, but that does not stop the teams trying different things. Each team is given a build assembly and operation manual, which includes the rules as to what can and cannot be done.

> **"all teams build their cars at JL's facility"**

Interestingly, one thing that is definitely outside the regulations is employing a non-Brazilian engineer. Again, in an effort to reduce costs, teams can only employ Brazilian engineering staff. However, this does not mean that the cars will never be seen outside of South America - in fact quite the opposite. JL Motorsport is keen to market and sell its product globally as a ready to go, high-performance racecar. A complete, running car with 580bhp, fuel injection engine is expected to be priced at around $220,000 (£150,000). You decide how cost effective that is.