

Magic moments

Since 1967, Formula Ford regulations have stipulated that cars must run spaceframe chassis, blueprinted motors and narrow steel wheels. Which means that car design has stagnated, or does it? Veteran of over 250 races, ex-Formula Ford star Tiff Needell did the bulk of our Snetterton testing, courtesy of a new 1980 Van Diemen and an old Lotus 51, while local boy (and 1979's double Formula Ford champion) David Sears, added his perceptive comments. With all this talent around, Triple C's resident Canadian, Graham Jones, had a hard day.

The very first Formula Ford race was held at Brands Hatch in August 1967, and it began as it was to continue – the man on pole position, one George Lewis driving a Lotus 51, spun off at Paddock Bend on the first lap and smote the barriers, much to the consternation of those following him.

So how have things changed in Formula Ford, if at all? Is it still the required training ground for young motor racing hopefuls that it once was, and if a driver should decide to take the plunge and get involved in FF, what are the pitfalls of which he should be aware?

In order to try and determine the answers to these questions, *Triple C* staff ventured out to deepest Norfolk and spent an evening chatting with Tiff Needell about his career in FF. The next day the plan was for Tiff to sample the latest Van Diemen RF80 as well as an original Lotus 51 at Snetterton, a developmental exercise which he summed up concisely: "the only real development came in 1974, when the Crosslé 25F came on the scene with its torsionally rigid chassis. That is the *only* big change to have occurred in FF."

As with the design of any racing car, the prime objective in Formula Ford is to put power down on the track as efficiently as possible, and this was revolutionised by having a stiffer chassis. Tiff went on, "it was purely by accident that Crosslé got it right, but later designers realised what the key was and incorporated the idea in their own cars. Basically, the stiffer chassis gets rid of a lot of wheelspin, which a driver may not even realise he has, but is effective in slowing the cars down."

Early Formula Fords, such as the Lotus 51, employed a tubular chassis, but gradually there was a switch by the manufacturers to

square tube, with fore and aft bracing of the rollover hoop and extra bracing in the engine bay which lessened the amount the chassis was able to flex under hard cornering. By reducing this factor to a minimum – it is impossible to eliminate it completely – the designer was able to have the roll taken up in the corners of the car by variables such as springs, dampers and anti-roll bars, in the suspension. In fact, a glance at the suspension layouts of some early Formula Fords verifies that they were not unsophisticated; it was just that they did not work as effectively as they might have due to the degree of chassis flex that was taking place.

As a concrete example of how this design improvement had affected the performance of a modern car, Tiff cited the case of Bottom Bend at Brands Hatch, which has been taken flat out by FFs since 1972, and perhaps even earlier: "when you drove through the adverse camber part of the track in an early car, you would hear a small rev rise and you would think, 'well, I can't go any quicker through there. I'm going flat out.' But then, when you went through the same corner in a later car, there was no rev rise at all and your speed along the bottom straight was suddenly a lot greater. This was because you weren't getting that very small amount of wheelspin, even in top gear corners."

So the Crosslé 25F was a breakthrough, but surely there must have been some other models which could be characterised as milestones in the developmental journey of Formula Ford. Tiff conceded that the 1976 Hawke DL15 might have been a breakthrough in a way, since it was the first car to have inboard front suspension combined with a very rigid chassis, a slim, narrow nose, and

side mounted radiators.

Even at that, he said, the DL15, and perhaps the Royale RP21 brought out a year earlier and used to great effect by Geoff Lees, were still only equal to the Crosslé, which had first appeared in 1974. But how much better is this new generation of cars? The fact is, we are talking of subtleties here – perhaps tenths of seconds – which could be measured on a stopwatch but which would be very difficult for any but the most experienced of drivers to be able to detect from behind the wheel.

Getting away from the cars for a moment, and turning to personalities, Tiff found that the prime movers of Formula Ford in the last decade were easy to name; the four names he picked being Ralph Firman of Van Diemen, David Lazenby, formerly of Hawke, Rory Byrne and Pat Symonds. Ralph Firman has always been very close to the forefront of FF design: "he's the sort of chap who sits back, sees what the others are up to, and then skilfully improves upon it." Lazenby, on the other hand, proved himself to be a Colin Chapman-style innovator during his time at Hawke. Indeed, he worked under Chapman as a mechanic on Jim Clark's Indianapolis cars, so it is more than conceivable that some of the maestro's penchant for fresh thinking rubbed off. Whatever the reason, Lazenby penned the DL15 which, as we have said, broke new ground in FF with its inboard suspension.

The other two men, Rory Byrne and Pat Symonds, "real working engineers", both had ties with Royale; Byrne producing the very successful RP21, Symonds moving across from Hawke to replace Byrne and design the widely used RP26. Most of the others, Needell reckoned, "are copiers and takers of the good ideas. That is not to say

there is anything intrinsically wrong with that, because most of Formula Ford progress has been about copying, which has led to small improvements, and therefore progression."

The original Fords used Firestone F100 radials which gave good handling characteristics up to the point where they broke away. Once that point had been reached, though, there was nothing left in reserve. In an effort to get a more progressive breakaway, the late Gerry Birrell fitted a set of Avon crossplies to his Crosslé 16F, and suddenly everyone switched to Avons. These were genuine, off-the-shelf production tyres which, although they may not have had quite the ultimate adhesion of the F100s, were more forgiving and therefore easier on which to race. They had an added bonus for the impecunious Formula Ford owner in that, because they were originally designed for use on roadgoing cars, they tended to last for a considerable length of time when fitted to the lightweight Fords. Tiff still fondly remembers a set he had on the Lotus 69F he first raced: "I had to throw them away because I couldn't wear them out. They would have lasted for years."

At this point, Firestone was not too happy that all the favoured runners had deserted the fold, so they replied with the Torino, a specialised tyre of very soft compound designed expressly to beat the Avon. "It was a fantastic tyre for racing, but actually the Dunlop rule was the best thing that could have happened because we were getting to a very silly stage, using surforms - like a thick file - to take off half the tyre! You would skin your tyres down because they were so much quicker when they had only a little tread left."

The Dunlop rule decreed that all Formula Fords had to run a standard tyre, best described as an intermediate compound Dunlop racer. The aim, of course, was to stabilise tyre costs for the competitor as well as to create closer racing. The only criticism Needell had of these new tyres centred around their characteristics in damp or greasy conditions: "when we changed to the Dunlop, the biggest problem was that on a slippery track they were lethal. I think the modern Formula Ford drivers are real heroes in the wet because those tyres have only negligible grip."

Having disposed of some of this history, is FF still the right place for a young driver, with pretensions to becoming a professional, to start his racing career? Without hesitation, Tiff replied that it most certainly was, although he added the proviso that it is also an exceedingly good idea to go to a racing school before rushing out to buy your first car.

"The whole thing is, that when you sit down to think about what formula you are going to start racing in, if you are talking about being a serious racing driver, then you *must* get into Formula Three. That is the first area in which you start to get noticed internationally. All you are doing in FF1600, FF2000, or even the new Formula Talbot, is giving yourself sufficient experience so you can race wheel to wheel in Formula Three when the time comes, and hopefully gain enough success to find a sponsor."

Tiff added that he did not think the alternative formulae, such as Formula Vee, Super Vee, or Formula Four, were really of much use to the young driver, simply because they lacked the wheel-to-wheel element so necessary for success in Formula Three. What about FF2000? "You don't really need the experience of FF2000 to get into Formula Three, but if, due to financial circumstances or whatever, you have spent

several years in Formula Ford 1600 and you haven't made the grade because you haven't got sufficient experience or the best car, then you are better off winning in FF2000. Otherwise, if you suddenly start winning in FF1600 after three years of trying, the critics will just turn around and say, 'Well, you ought to be winning; you've been there long enough'."

FF2000 has the added benefit of imparting knowledge about wings and slicks, important considerations with cars in the upper formulae. Certainly, Tiff felt the time he spent in FF2000 helped him when he got his Unipart ride in Formula Three; the experience of driving on slicks in greasy conditions being particularly useful: "If you have only ever driven 1600, it's a revelation the first time you encounter slippery conditions in a slick-shod car."

"The whole secret of motor racing is that you cannot afford to spend too long in any one formula during your bid to get to the top. You must *appear* to be moving up, however slowly, to those people who are your potential sponsors."

"To my mind, there ought to be a rule or a law to keep people from participating in FF1600 for too many seasons. If FF2000 hadn't been created, I would have spent six seasons in Formula Ford before I got the break."

Is there an age beyond which a young man with pretensions to becoming a Grand Prix star should forget the idea and think about finding another career? Needell was again succinct in his answer: "I honestly believe that anyone who wants to be a serious GP driver should not kid himself about entering his first year of Formula Ford unless he is under 25."

"If you have the backing you could theoretically start in Formula Ford at 25, spend a year in each class, and make it into a Grand Prix car by the age of 28. You would be very lucky to do it, but it is just possible. Ideally, however, it would be better to be 19 or 20, but 25 is about the latest you could seriously start working at being a Grand Prix driver."

"Actually, 12 years old is the best age - go kart racing."

On the subject of racing schools, by modern standards the £300 or £400 that such an establishment charges for a full course of lessons seems to be money well spent. "It calms you down, and gives you perspective. It also takes you down a notch or two so you don't go into FF racing like a bull out of a gate."

"I remember watching Tony Brise at Paddock Bend, throwing his car sideways at the top of the hill and then getting the power in, and thinking, 'I'm never going to

be that quick. I might as well give up now.' The fact is, I was able to drive like that after a couple of years. The whole thing is experience, and it counts for a lot. I got quick, but in my ninth race with the famous Lotus I went end-over-end out of Russell bend at Snetterton, and that was due totally to inexperience."

"Experience also teaches you to use the right gear ratios, get your brake balance right, and set your car up correctly."

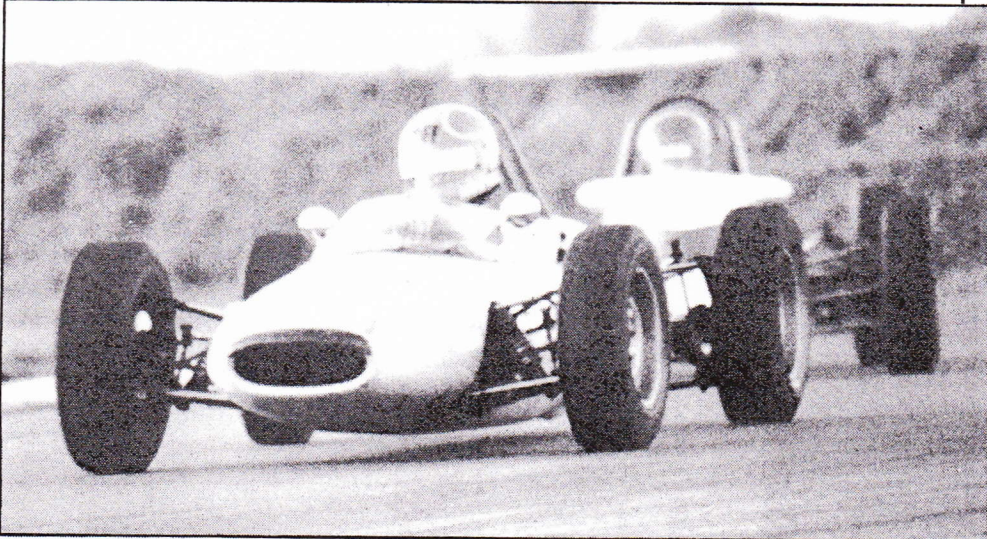
As the evening progressed and the suspension diagrams in the beer suds began to fade, we moved on to a subject about which Tiff feels particularly strongly and which ambitious young drivers may not be particularly aware of - money and the need for personal promotion. Tiff's argument - and, sadly, it's true in the majority of cases - is that it is not driving talent alone which takes you to the top these days. It is a combination of talent, money and luck, and not putting too fine a point on it, "if you trace back the careers of any number of Grand Prix drivers - say, Derek Daly, John Watson, James Hunt - you will discover that it was one individual wealthy backer who set them on their way. Either that, or they must have had access to a family fortune, as in the recent well publicised case of de Angelis buying his way out of a Shadow contract in order to drive for Lotus."

"Young drivers must be made aware of this fact, plus the large element of luck involved, before they embark on a motor racing career with stars in their eyes. It goes without saying that you also need to have the driving talent in order to attract the potential sponsor who may conceivably give you your break."

The other aspect - that of promotion - struck rather close to home since Tiff argued that the motor racing journalist plays an absolutely vital role in the career advancement of an up-and-coming driver. "One thing I always tell younger drivers," he said, "is that they must make themselves known to journalists. People have made it without the help of the press, but to my mind, it is much easier if they are behind you. It helps you to sell yourself to sponsors."

The potential young hero, then, must be driver, salesman, public relations expert and fund raiser, all rolled into one, if he is to have any hope of making it to the top. The hard truth of the matter, though, is that he must realise very quickly that he is in the business of finding money. "It is a long, hard road, and it is easier to fall by the wayside than to succeed."

Finally, what did Needell expect to find as a result of driving a present generation Formula Ford? He replied that he would probably discover that the newer cars have



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considerably more traction than their predecessors as well as increased high speed stability, mainly because the designers of the early Formula Fords had not contemplated concepts such as bump steer around high speed corners, and rapid camber changes. "Around somewhere like Coram, I would expect the car to be very stable, whereas the old Fords in that corner twitched here, there and everywhere."

An unknown factor, of course, in making such a head-to-head comparison is the state of engine development. It would seem reasonable to assume that as the chassis have been improved and gradually refined, the same has happened with the faithful Ford 1600 crossflow unit. The only way of determining the actual extent of chassis improvement would be to construct, say, a brand new Royale RP21 and then make a direct comparison with a 1980 chassis, such as the Van Diemen RF80, making sure that both cars had as nearly equal engines as possible. It goes without saying that such a test would be well nigh impossible to arrange.

"What I hope to find tomorrow is that the Formula Ford stars of today are driving really well. If their lap times are quicker than mine, then it will prove the present Fords are difficult cars to drive. If I can easily go as quickly as the current crop of FF stars, then it will be disappointing because it shows the cars are not that difficult to drive. Winning races then becomes more a question of having a good chassis that's well prepared and having a good engine, rather than being a good driver.

"Hopefully, all FF chassis nowadays are so equal, due to the revolution in 1974, that it is the driver who is coming out."

... Needell was being strapped into a navy blue projectile by Mike Galter, Van Diemen's chief works mechanic, as we drove up to the pits. As Tiff pulled out of the pit lane for some exploratory laps of the circuit, I noticed that Ralph Firman of Van Diemen was keeping a watchful eye on the proceedings. We spoke briefly and his thoughts served to reinforce what Needell had said during our chat the previous evening.

The biggest change to have taken place in Formula Ford, according to the Van Diemen boss, has been the evolution and involvement of the works teams. "The factor which makes FF so competitive is that these days manufacturers are taking much more of an interest in winning races." Van Diemen, he claimed, was the first company to run a proper factory team in Formula Ford, backed by and running out of the works, and gradually other manufacturers have followed suit.

As for the engineering side, he felt that the situation had settled down since 1975, when the Dunlop rule was brought in, and the designers now just continue to work away at the problems, "changing small things here and there, and gradually, the cars appear to be getting quicker."

One point which did upset him was the rumour that there are moves afoot to tighten Formula Ford rules even more. That, he felt, would be most definitely a retrograde step since, if the regulations were to become even stricter than they are at present, the result would simply be to eliminate any ingenuity on the part of the designer.

With such features as inboard and outboard disc brakes and front and side-

mounted radiators periodically being in vogue and then disappearing from the scene when the following year's crop of FF chassis appear, one has a certain amount of difficulty evaluating the true worth of certain fads. Firman confirmed what I had suspected for some time - that it is very much a case of "suck it and see" on any new chassis configuration. "Each of these things has to be tried," he said, "and at the end of the day, whether it is an advantage or not depends on whether the car is going quicker."

Van Diemen fitted a front-mounted radiator for the first time on its 1979 car in an effort to improve weight distribution and engine cooling, the 1600 engine working best when it is running at a low temperature. "As it has turned out, though, there was very little advantage to be gained from the point of view of cooling, but as far as other advantages go, it seems to work quite well." You may draw your own conclusions from that somewhat mysterious statement.

Firman feels that the best bet for a young driver with very limited experience would be to purchase a one-year-old car. That, he felt, would allow the driver to contest perhaps 30 races and do a lot of testing with the least possible bother and expenditure. Anything older than that, he says, would be at least half-a-second off the pace at most tracks, and would probably require expensive maintenance work to replace worn-out components.

"Year-old cars are reasonably cheap, it has got to the point now where more people are buying new cars, and therefore there are more reasonably priced older cars on the market. Now that's all right for the young bloke to learn on, but for his second or third season, when he really wants to prove himself, he has got to have a new car."

What, then, constitutes "reasonably priced"? I'm afraid that for us old timers who can still remember when you could put a competitive Formula Ford on the track for around £1000 (it wasn't *that* long ago), the present prices are a good cause for sharp intakes of breath. A shiny, new Van Diemen RF80, for example, minus the dreaded VAT, would set you back a sum not unadjacent to £5400, while a one-year old version, checked over and refurbished at the works, would cost about £4250. The absolute rock-bottom price, if you were to buy privately, would be about £3500. So much for cheap racing.

During the time we had been talking, Needell had been pounding around the track getting used to the Van Diemen and bringing his lap times down fairly steadily. Now he came in, and transferred to the waiting Lotus 51, which had been wheeled over from the nearby Jim Russell school by John Kirkpatrick and his helpful band of assistants; while David Sears acted as the hare to give our tester something to aim for.

Amazingly enough, this 51 is one of several such cars used daily by Jim Russell school pupils for skid-pan instruction. Considering the fact that the cars are 11-years old, were formerly driven in active competition by Dave Walker and Mo Harness, and have not exactly led a sheltered life since that time, I think one can draw some general conclusions about the robust construction of Formula Fords.

In any event, after circulating in close company for about a dozen laps, Needell and Sears came in. Tiff prefaced his comments by pointing out that the track had remained damp, and somewhat greasy in patches during the whole of the test period, which made it difficult to sort the car as well as to get a feel for it when being driven at ten tenths. Still, he said, he had come

to some conclusions.

"I'm afraid the poor old girl (Lotus 51) is just a little past it really - the dampers, for example, have had it. But until it started sliding too much, it felt quite good. It was quite nostalgic sitting up there in the airstream.

"The big difference, though, between the FFs I last remember driving and this latest Van Diemen is that the braking is very, very good. For instance I'm down to about 90 yards now, and Sears is down to 75 yards when he gets going.

"As for the chassis stiffness we were talking about, my old Crosslé 25F was quite similar to this Van Diemen through the esses. In an earlier car, it would have been all sideways and wheelspin out of a tight corner like that, but with this one, it is difficult to put it sideways purposely."

Was this new car easier to drive than the Formula Fords of Tiff's recollection? "No, I wouldn't say so, because it still has that friskiness and lightness about it. Basically, a Ford, when it's going quickly, is sliding all the time. It's always moving; it's always sliding, and that hasn't changed at all."

He then brought up a point which had been drilled into me at driver training sessions, and that is you can try too hard in a race car and end up going slower. "We have learned today that these cars will still respond to being driven smoothly, which is important if you are grooming a racing driver. This Van Diemen also handled very consistently, like a single-seater on slicks. When I came in and moved the front bar by one inch, the car responded in exactly the way I expected it to. I was able to knock four tenths off my best lap time up to that moment, merely by making this one alteration."

A final point on which Tiff remarked concerned the Auriga engine fitted in the Van Diemen, and how its characteristics affected a choice of gearing: "towards the end of my years in Formula Ford, engine tuners were starting to make engines rev higher and higher. In fact, at one point they were using 6600rpm for a red line. It's interesting to note that they are now back to using about 6200rpm."

The aim of using more revs was quite often simply to be able to run better gear ratios. Tiff noted that there was a huge rev drop in this case between second and third gears, although he felt that a lower second gear might be a good idea for the esses since the car still seemed a bit flat coming out of that section.

In the mid-seventies, the common set-up was to have lower third and fourth gears in order to bring all the ratios closer together and eliminate any big gaps, the higher revving engines being quite capable of withstanding the lower gearing. "An example of this is that we used to go into top before entering Coram, and then we would hold top all the way, using it for Riches; but we were then pulling 6600 or 6700rpm down the straight.

"Now they've gone back to the formula used in the early 1970s of a tall third gear for going all the way round Coram, and then changing up to top for Russell and down to third again for Riches. But the engine seems to be able to cope with that rev drop, so it's all right. It's funny, but engine development almost seems to have gone back on itself."

So there you are, superstars of the future; words of wisdom from the men who should know. And just in case you are one of those perverse types who reads the end of an article before the beginning, the message is: "Go Formula Ford, young man!"