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Note: Applicants who wish to join part-way through the year will be charged a pro-rata membership fee based on the number of months left in the membership year. See the application form for details.

**Meetings**

Southern members meet on the final Tuesday of each month, January through to November, at the Civic Club, 134 Davey Street, Hobart.  
The committee meeting is held between 6.30-8.00 pm. Drop in any night.

CMI's AGM is generally held at 7 pm on the last Tuesday of November at the Civic Club, Hobart.

All contributions to Veloce Nota are welcome and when published earn points towards the Clubman of the Year Award.

Please send all letters and contributions to The Editor: [cmi.editorial@gmail.com](mailto:cmi.editorial@gmail.com)

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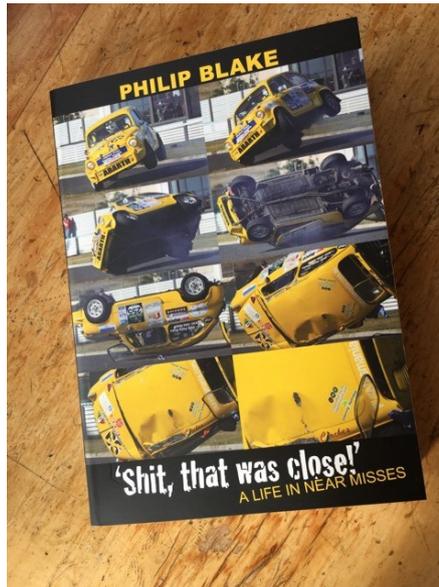


This issue has been put together in a bit of a hurry, due to two weeks of April being taken up for me with the Mt Baw Baw Sprint and Targa Tasmania.

I have also been busy dealing with the publication and launch of my new book, *'Shit, that was close!'*—a life in near misses - a title which needs little explanation.

I'm told by the few people who have read it in manuscript form that it's entertaining. After ten drafts I can't tell any more .

It's available to club members and their friends for \$20 direct from me, or \$25 if you prefer a bookshop. Italian machinery features prominently—the Piglet on the front and my Ducati 900SS on the back.



During the last week of April John, Michael, Mary and I will be involved in Targa Tas in various roles, so we may see you

during the event.

I am pleased to welcome John Madigan as our youngest contributor, with an interesting piece on sim racing. If you've seen John Bowe's latest Meguiar's track day tips you will be aware that he is a big fan of sim racing as a tool for getting the vital practice that makes race car control a natural, flowing thing—rather than a series of desperate attempts to avoid or correct mistakes.

Saw this coming back into Melbourne...



## Presidential Patter

It has been a big couple months since the last edition of *VeLoce Nota*. I caught and recovered from COVID, the club held its combined hillclimb and supersprint, and I made progress on the Alfasud restoration.

The combined hillclimb event on 19 March was a first for the club. We have run both events separately but not together and it seemed to work really well. From my perspective it provided a variety in competition and minimised the need for sighting runs and practice runs which typically eat up a lot of time. Judging by the reactions of the competitors they also felt the day was very successful. Thanks to David Button for doing the paper work and to all the officials who came out on the day and ran the event so well. It was nice at the end of the day to overhear a competitor saying

this was the first event he had been to where the officials seemed happy and weren't complaining.

The restoration of the 1976 Alfasud threw up another unex-



pected – but at least this time explainable – problem. Long story short, one of the bolts going through a front suspension bush had bonded to the metal tube running through the centre of the bush. Normally this wouldn't be too much of a worry but the combination of captive nuts, limited access and fairly thin suspension mounts made me nervous. After trying various methods to free the two parts I reluctantly turned to the angle grinder and with great care was able to cut through the bolt and remove the suspension arm.

I hope the last few months have been kind to you and I look forward to seeing you at a club event in the near future.

Rob

## Baskerville hillclimb/supersprint



Our combined hillclimb/supersprint At Baskerville on 19 March was a new venture for the club, and a very successful one, helped out by excellent weather, a good horde of volunteer officials and a lack of incidents and accidents. Clerk of the Course for the day was Kim Briggs, dipping his toe in the water again after a long absence and doing a very capable job. (Kim was our first Clerk of Course back when we started running motorsport events about 20 years ago.)

Scoring was based on the sum of the best times for the hillclimb and supersprint for each competitor, and the scores make interesting reading. Some competitors did better on the hillclimb than others, only to be overhauled on the complete lap – and vice versa.

The cars varied from the very quick to the not so very quick,



and the competitors likewise. But all were doing their best with what they had, and nobody made a major mistake, so we all got plenty of fun and runs.

Your editor had a couple of very close sessions with Michael Sullivan in the ex-Chris Edwards Westfield Eleven. After one of these I arrived breathless at the tower to check the times, as I was sure I couldn't go any faster and was looking forward to a

personal best. A string of 1.14s greeted me. So I was right about not being able to go any faster; but I was four seconds down on my personal best.

This, I realised, was because the new gearbox and the new Weber 45s were not yet compatible: the carburettors come on song at 4500 rpm or so, and the change from 7000 rpm in second turns into 4000 or so in third – which ain't enough. You're not supposed to change two things at once, and I didn't really. But there was insufficient development of the carburation before I put the gearbox in. I think I know what to do ... Does anyone have a spare Volkswagen AT gearbox?

Photographs are by John Hanley, who also gave a number of people a drive of his luscious and rapid Tesla.



*Darryl and Mary studying the form*

## CMI Baskerville Hillclimb &amp; Supersprint - held on 19th March 2022 - Official Results - Aggregate

Comp #	Driver	Car	Class	Outright	Aggregate	Hillclimb	Supersprint
6	Omar Hasan	Porsche Cayman white 3800	D1	1	104.48	46.06	58.42
44	Ashley Bell	Mitsu EVO4 white/red 2000T4WD	F1	2	106.93	47.70	59.23
18	Ben Bradley	Mini cooper S grey 2000T	D2	3	107.45	47.76	59.69
59	Allan VanDullerman	Mitsu Starion reddish 1995T	D3	4	109.19	48.43	60.76
37	Mick Watt	Mazda 3 MPS silver 2260T	E1	5	110.59	48.73	61.86
11	Ritchie Thimm	Mazda 3 black 2000	B1	6	110.77	49.17	61.60
31	Angus Haydon	Nissan Skyline white 3000T	E2	7	110.93	49.04	61.89
42	Todd Elliott	Mazda RX7 white 2616R	D4	8	112.37	49.58	62.79
7	Jack Perry	Leyland mini green 998	A1	9	113.34	50.37	62.97
287	Michael Kent	Holden C/dore ute red 5700	E3	10	113.74	50.03	63.71
97	Chris Wiggins	Fiat 124 Sports red/silver/black 3800	B2	11	114.36	50.70	63.66
28	Paul Baily	BMW E36 325 red 2500	C1	12	115.50	51.44	64.06
35	Andrew Hayhurst	Chrysler Lancer blue 2600	C2	13	118.30	52.60	65.70
2	Rob VanDerNiet	Honda CRX white 1590	A2	14	119.15	53.18	65.97
8	Jason Winter	Datsun 260Z blue 2800	C3	15	120.30	52.98	67.32
33	Phil Sawers	Holden Torana white 3300	C7	16	120.36	53.26	67.10
479	Damien Tressider	Honda Integra blue 1800	B3	17	121.16	55.09	66.07
159	Geoff Storr	Alfa Romeo Alfetta GTV bianco 1962	B4	18	121.58	53.70	67.88
22	Nick Papastamatis	BMW E30 318is white 1800	B5	19	122.57	54.60	67.97
41	Andrew Piper	Mazda 3 SP23 grey 2300	C4	20	122.96	56.02	66.94
4	Bruce MacLean	VW Golf R black 2000T4WD	F2	21	124.29	54.01	70.28
19	John Pavic	Nissan Stanza blue 2000T	D5	22	124.40	52.62	71.78
280	Johanna Trouw	Toyota Yaris GR white 1600T4WD	F3	23	124.41	55.62	68.79
86	Craig Wright	Toyota 86 white 1998	B6	24	126.45	55.76	70.69
100	Daryl Bennett	Suzuki Swift Gti red 1300	A3	25	130.08	56.69	73.39
51	Michael Sullivan	Westfield Lotus 11 replica green 1340	A4	26	130.13	56.22	73.91
5	Shaun Kirk	Holden C/dore VN white 5000	E4	27	130.60	56.93	73.67
55	Franklin Trouw	Mazda MX5 silver 1995	B7	28	130.76	57.89	72.87
9	Warwick Hobart	mazda MX5 silver 2000	B8	29	130.87	61.28	69.59
15	Ian Cunningham	Morris minor cream 2616R	D6	30	131.18	57.18	74.00
88	Philip Blake	Fiat Abarth OT1600 giallo/rosso 1608	B9	31	131.68	57.37	74.31
75	Graham Mitchell	Alfa Romeo 75 argento 2500	C5	32	131.75	58.29	73.46
750	John Madigan	Afa Romeo 75 argento 2500	C6	33	132.19	58.28	73.91
49	John Dowling	Alfa Romeo 147 argenta/rosso 2000	B10	34	132.24	59.40	72.84
94	Richard Hobart	Mazda MX5 silver 2000	B11	35	133.09	65.03	68.06
17	Owen Biggs	Ford Falcon yellow/blue 5400	E5	36	134.45	60.65	73.80
128	Ben Marshall	Fiat 128 bianco 1498	A5	37	136.76	61.49	75.27
10	Mary White	Suzuki Swift Gti red 1300	A6	38	143.78	63.32	80.46
52	John King	MG B yellow 1800	B12	39	149.58	65.42	84.16
16	Michael Muldoon	Mazda MX5 red 1800	B13	40	150.10	67.01	83.09
103	Tyler Van Gils	Subaru Impreza red 2999T4WD			DNF	48.13	DNF
21	Chris Haugland	Mazda 3 black 2000			DNF	49.24	DNF
12	Roxley Woolley	VW Golf Gti black 1997T			DNF	56.62	DNF
525	Bruce Heron	Triumph Dolomite yellow 2000			DNF	57.10	DNF
130	Gary Lucas	Fiat Abarth 130TC nero 2000			DNF	58.63	DNF
121	Anna Wrobel	Mazda 121 jellybean red 1600			DNF	65.71	DNF

**Awards**

Class A	Jack Perry
Class B	Ritchie Thimm
Class C	Paul Baily
Class D	Omar Hasan
Class E	Mick Watt
Class F	Ashley Bell
Italian A	Philip Blake
Italian B	Chris Wiggins
Best Presented	Jason Winter
Driver of the Day	Ben Marshall



## Mt Baw Baw Sprint

Early in April I teamed up with Jeffrey Wilson (Subaru WRX STi) to compete in the Mt Baw Baw Sprint tarmac rally in Victoria. This was our third or fourth attempt to get together, all the others having been foiled by Covid-19.

Jeffrey is my son Michael's driver in Targa Tasmania, and we have spent a lot of time together on recce. He is fairly new to motor sport, having retired from a busy law practice some years ago and bought the WRX with a friend. They use it more or less alternately.

The two-day Mt Baw Baw Sprint uses the road to the Mt Baw Baw ski resort, and is based there. The road is 32 km long, and is broken into various sections for the event, culminating in a blast the whole way down and the whole way back up on the Sunday afternoon. The transport sections between stages are very short, and mostly involve turning around and coming back to run the same stage in reverse.



The only eating option apart from cooking in your ski lodge is the café restaurant, which has excellent and varied food.

The field was small – only about 35 cars altogether, including ten on the Tour. By the end of the event two days later, there were only 13 competition cars left.

Nobody crashed, so the retirements were mostly mechanical. What caused this, I think, was the road. It is extremely steep, twisty, narrow and in places bumpy, so the suspension and chassis need to be up to the job.

The Subaru soaked it all up, as did the other two cars that finished ahead of us in the Challenge (under 130 km/h) competition – a Porsche Cayman and a Mitsubishi Lancer. The only thing we had to do was change the shock settings a little to allow for rain and stop it bottoming on bumps.

We thought we had brought enough fuel (there is none within 40 km), but reconsidered and drove down to Warragul for more on the Friday. We then got off to a flying start by missing the drivers' briefing, but after a





surprisingly polite re-briefing from the Clerk of the Course, we were ready to go.

We never saw which way the Lancer went, but on one of the longer downhill stages we caught the Porsche, so we were

quietly confident. We shouldn't have been; they were also taking lumps out of us on many stages, and by the end of the rally they had built a two-minute lead.

A well-organised and fun event, run by Australian Tarmac Rally

(Brittany Smith and Pam Stables); well worth the trip to Victoria.

Just take plenty of fuel and warm clothes.



Unlike the usual Targa events that I service at, Targa Florio Australia is set at a lower level of car and crew preparation than a Targa Tasmania requires, and that is a very good thing. There is certainly room in the calendar for both types of events and some competitors will be quite prepared to accept the unique challenge of either event. The Targa Florio style of event doesn't require the super grippy tyres, massive brakes, a roll cage, helmets, harnesses and driving suits because the event stays well within the legal road speeds at all times when on public roads. The 2022 Targa Florio comprised some very classy classic vehicles, being exercised instead of just appearing at car displays. Therefore, many of the crews were married couples, a welcome attraction to truly test the relationship under the pressure of the tests they would encounter during the four days of the event.

Like many activities, this Targa Florio had been previously postponed by the interference of COVID in our lives. New to this type of Targa rally, Jack Waldron had entered his well-seasoned FIAT Abarth 750GT, a veteran of 25 Targa Tasmanias as well as many other similar events. This car is the Abarth development of the venerable FIAT 600 of 1958, with further development and improvements by Jack, over the time of his ownership. This Abarth retired from those active Targas a few years ago, when the speeds required to be competitive were becoming more than the then 60-year-old car could be expected to safely maintain. A less stressful Targa Florio event would be well within the capability of the vehicle and so it was brought out

of its retirement, to further justify its existence to continue in the Waldron collection.

Preparation of the Abarth was minimal as Jack has always kept it 'Battle Ready' since its retirement. Jack and his friend, John would take the opportunity to further develop their PAVAS system that Jack has been using very successfully in the high-speed Targa events. For a few weeks before the Targa Florio event, the organisers run training courses where the competitors can learn the skills required to compete on an equal level amongst them all. Jack and John threw themselves into learning all they could, in the Abarth, not only doing the training courses, but several test scenarios they had designed themselves. Jack has set up four triggers on a driveshaft coupling to activate the PAVAS system installed in the cabin. The reliability of the Abarth was never in doubt for this level of Targa competition, but a service crew was still deemed desirable, if only to carry their luggage and a few spares and tools. All was going to plan until a few days before the event when the service crew were unable to participate due to a COVID issue. Fortunately, Bill (me) was available to step in at short notice to provide the service coverage that was required;

additionally, I speak fluent FIAT 600!

With more than 100 entries in the event, many of them were serious classics. Jack and John had us staying with a friend at Safety Beach on Sunday night and again on Monday night, although the event would start from Pt Leo late on Monday. On the leisurely cruise on the free-ways, before we got to Safety Beach the Abarth started pumping out the cooling water and getting hot. A quick emergency top-up of water had us on our way again but we were perplexed as to why the well proven cooling system would start to play up. A late morning drive across to the winery start at Pt Leo had the problem resurface, causing us to stop to investigate further. Fearing that we had blown the head gasket, Jack made the decision that we needed to replace it (we had one spare with us) and so we set to on a level area at the front of a property, on the side of the road. Fortunately, it was spitting a little rain, so we didn't have too much of a dust problem. There would be no opportunities to retorque the head during the event. However, as the block was 'O' ringed when I built it about 25 years ago, plus with the generous addition of sealant around all the water galleries,



*The Abarth in the heat of battle, Targa Tasmania 2011*

we decided we might just get away without a retorque. Fortunately, we did! Later inspection of the gasket failed to show any problems with it, but changing it before the event was the correct decision!

John advised the event organisers by mobile phone that we were running a little late with a minor mechanical issue, but we were definitely coming. With the gasket replaced and the top of the engine re-assembled, we continued on to the start location for scrutineering and lunch. Now an event like Targa Florio is not expecting any service crews to be present, so my appearance in the red Falcon Ute was a surprise to many, including the FIAT club members that were entered. Therefore, there were no service crew instructions available to me, so I would have to rely on whatever route information John would supply to me. On the first day, I just followed the Abarth along the various roads that were used, without risking throwing the ute into the scenery trying to keep up. That just worked for me on the first day, but was totally unworkable on the second day when we eventually transferred to overnight in Inverloch and because of traffic, I lost the Abarth very early and so I made the decision to (hopefully) leap ahead and wait for them to travel through Tooradin.

But getting back to the Monday evening, the decision was taken to not enjoy the evening meal on the west coast of the Mornington peninsula, but instead we would grab some fish and chips at Dromana while we pondered whether we had solved the overheating issue that we had changed the head gasket to eliminate. Being close to Arthurs

Seat, Jack decided that driving up that climb would prove to us that we could continue in the event. Therefore, the Abarth was driven up and down a few times, followed by the ute, in both directions. Jack didn't thrash the Abarth, he just drove it like any other car would attempt the climb and proved to his satisfaction that the Abarth was behaving normally. Thus, we decided to remain in the event and we went to bed (in Safety Beach) satisfied that the issue of overheating had been eliminated. Another unexpected problem to solve was that the driver's door lock broke internally, and being suicide doors, the decision was made, by Jack, to tie the door (with cable ties) to the aluminium roll bar, thereafter John would need to vacate the cabin before Jack could climb out that side. That happened on Day 1!

An early start to get across to Day 2 in Pt Leo had us arrive with time in hand to ensure we were ready for the competition to step up to the next level. Having to mix with workday traffic presented me with a few problems of having to give way at roundabouts, missing traffic lights or getting stuck behind slow moving trucks, thus it was easy falling off the rear of the Abarth. I grabbed a very early lunch in Tooradin while I waited for the Targa Florio cars to travel past. I knew where the cars were all going to be on display in Inverloch and despite many intersections being labelled with a red arrow to show the crews which direction they should take, they were not on every major tee intersection and frequently I chose the wrong way for a few kms before turning around and picking up the cor-

rect roads. By now I had discovered that I couldn't keep up with the Abarth, or the Bartold X1-9 on the many winding roads! The fragility of some of the classic cars was starting to show through. The Judd FIAT Dino Coupe had a leaking radiator that could be repaired in nearby Wonthaggi, hopefully before day's end. David and Rob drove it over to action that repair and I was on stand-by to collect them if it couldn't be done that evening. Fortunately, the repair was done in time and David and Rob reinstalled the radiator so that they were mobile again. Frank Marinelli, also in a FIAT Dino had the brake light switch stop working, so was putting the parking lights on to indicate he was stopping, every time in traffic!

That night I advised Jack that our situation needed to change for me to effectively service/support the Abarth. While Jack and John went off to the evening meal at the RACV retreat, I had decided to just grab a more low-key meal at the local pub, in easy walking distance to the motel. In discussion with my son Paul about the servicing problem I was enduring, he offered to text me all the major locations where the cars would be tested on the following day (Wednesday) so I could plot my way around the state and be where I would be useful. Six separate texts were then transferred into my A4 note book later that night and I was able to plan my route through Leongatha to catch the field at Mirboo North. While traversing through Leongatha, I stopped and purchased a simple switch, insulated connectors and some heavy gauge wire to ease Frank's brake light problem. I assembled

the switch and wire into a 'plug and play' swap that we could install at Bryant Park where lunch would be supplied. Ian Maud was intending to be present and I was able to have him help Frank install the hand-operated switch onto the gear lever, as the Abarth was about to leave just after the Dino arrived at the venue. Frank was surprised and delighted that I had provided a means of him having brake lights again. That's what service crews do, find solutions to problems.

I leap-frogged another test area at Willow Grove, instead planning to be ahead of the Abarth at Noojee Heritage Centre. There I had a 20-litre fuel churn ready, just in case the Abarth needed to grab some fuel on the way to the RACV Healesville retreat. I dipped the tank and Jack was confident that there was enough in the tank for him to get through to Healesville. At the RACV retreat, they wanted all the Targa Florio cars to remain on site overnight, thus we squeezed the three of us into the ute cabin to find our accommodation nearby and then come back for the evening meal in the large dining room. We tried very hard not to have a very late night, as the final day would have the cars going to Yarra Glen, Yea, Seymour, Romsey and finally to do some display driving at the Albert Park GP track. Paul sent another five

texts through to me that night, so I could plan my travels with ease and be wherever I may be needed.

I bypassed Yarra Glen, instead heading straight out to Yea, where I was able to buy some foam as the Vin Gregory sized navigator seat was a little bit tight on John's hips and posterior, with still half a day to go. The foam was cut and shaped to adjust the seat and then we all headed to Seymour for some further tests and then morning tea. I was again able to cut and run to arrive at Romsey ahead of the Abarth, whereupon the Bartolds advised me that the Judd Dino Coupe was seen stopped on the side of the road. A quick phone call to David advised me that they were just finishing up fixing a blocked fuel filter and so wouldn't need my assistance. David initially answered my phone call thus, 'Too Bloody Late', before laughing and advising that they had made the repair and would be on their way soon. I think they all probably appreciated that my help was available should they need it, but fortunately, most of our members didn't. With all the Targa Florio cars heading to Albert Park GP track, my mission was over and thus I headed to Dandenong to swap vehicles and get my life back. As I knew Jack would be quite tired by the time the festivities at the GP were completed and he had battled

traffic to get back to Dandenong, I made sure that the (dedicated LPG) gas tank was filled up before parking it at his property in Dandenong where he collected it later.

The troublesome Debi and Rob Judd FIAT Dino Coupe finished third, the Robin and David Judd FIAT Dino Spider finished fifth and the Lyn and Peter Bartold X1-9 also finished well, the three crews winning the teams prize for our club. Jack and John finished despite all the totally unexpected little dramas with the Abarth. The Marinellis' FIAT Dino also finished, as did the Toni and Tony Romeo FIAT 500 Abarth. This is a style of event that any car can participate in. There is no special type of preparation required, thus it seems an ideal event for even the very desirable classics to be involved with, yet there is very little probability of them being damaged. Just need to remember that with any club plated cars, the permit book needs to be filled in at the start of every day. We visited three of the RACV retreats over the course of the event and despite the RACV being the largest car club in Victoria I couldn't find any car race tracks at their venues, instead they all have golf courses. Why?

For an event that had been hardly on my radar, I enjoyed the experience of driving around on more of the fabulous driving roads in this state. Rarely were we more than three hours from Melbourne. I was glad to be of assistance to keep the Abarth in the event and right now I'm currently preparing to service with Ian Maud, for Jack and Vin and their Mitsubishi Stigma at Targa Tasmania at the end of April.



*Fiat Dino coupe*

I think I've found my new favourite thing to do other than driving on track – race against other people in 1930s F1 cars. It is sim racing of course but it's very realistic and huge fun. The races – a 40-minute and a 20-minute one with a 5-minute break between – are held every two weeks. It is unfortunate the league is based in Europe as it means a 4:30 wake up for me but it is worth it. A run-through of my most recent race day follows.

I was starting 3rd after a good race last time (your finishing position from the last race sets your grid position). After nearly stalling off the start line I got caught up in a five-way fight for 3rd for around nine laps; at one stage there were four cars side by side going into a hairpin, somehow without any collisions. Knowing I had more pace than the others, I stopped battling for position as I was losing a second a lap, settled for fourth and tried to go with the guy in 3rd and pull a gap to the others behind. Fortunately, after a couple of laps of applying pressure to the driver in front he made a mistake and ran wide allowing me

to slip through. After that I got a bit lonely, pulling away from fourth behind while 1st and 2nd were pulling away from me. Happy to claim a podium!

The second race was more dramatic. With only half the laps of the first, and reverse grid for the top six finishers, everyone was more committed trying to gain as many places at the start as possible. What could go wrong? Having not learnt from my previous start I went from 3<sup>rd</sup> down to 5th before the first corner, after fending off attacks by a feisty midfield trying to eat me up; I sent the car deep under brakes to close the gap to the guy in front, only to have the leader have an exceptionally poor exit causing a concertina effect and leaving me to take avoiding action and spinning off on the second corner of the first lap. After I got going again, I found myself in 13th place, a solid 15 seconds off my rivals. Fortunately, this led to a very exciting race trying to gain as many positions in as short a time as possible. The 100 laps of practice I had done paid off and I found myself being around two seconds a lap faster than the next

couple of drivers. I cleared them and then went in pursuit of the midfield pack. After having some good battles, beating my own PB by around 4 tenths, and seeing some people in front have some 'interesting' encounters with the barriers, I found myself caught up with a much more competitive midfield. After fighting my way up into 8th, I was slowly catching the car in front, but then I saw the lap counter, and there were only 2 laps left. I thought that was it (my goal was to finish 6<sup>th</sup> or higher), but I didn't feel there was any way that was going to happen. But going into the last lap, I saw a car re-joining the circuit and scooped up that place; then one of the leaders ran out of fuel. There I was, sixth!

By the end it was 6 am, I was pumped with adrenalin and I felt like I had just driven a 1930s F1 car, even if it was in my bedroom.

The sim software for this event is LFS (Live for Speed) and I designed my own livery taking inspiration from an Alfa Hot Wheels car! I was number 76 and compete under the name 'Wrapped Pigeon'.





*Above and below: pistons from tow casting maeestri—Cosworth and Ferrari*

### Heat Treatment:

Aluminium pistons, regardless of the method used to manufacture them, must be heat treated to raise the hardness to an acceptable level, to make the casting dimensionally stable and to facilitate the machining of it. T5 is the basic heat treatment of 'age hardening' and has the items stacked in an oven for about 7 hours at around 200 degrees, seeking to achieve a hardness of up to 120 Brinell. T5 was considered to be acceptable for your run-of-the-mill Holden and Ford pistons, in road engines, as some were cast with steel struts that were supposed to reduce and control the expansion of the casting and thus, they could be used at tighter clearances. Heavy duty Diesel pistons that have a cast iron 'nitresist' armoured top ring carrier cast into the aluminium casting can also only ever be heat treated to T5 to maintain the bond between the aluminium casting and the cast iron insert.

For a more durable piston assembly, cast or forged, the pis-

ton blank will have been 'solution heat treated' before the age hardening process. Pistons will be referred to as having been heat treated to either T6, or T61 which is a slight temperature alteration to the normal T6 process. This is a far more complicated process, involving a much higher temperature to a sufficiently long time for the additional minor chemical compounds that are included in the aluminium alloy to go into solu-

tion within the aluminium material, followed by a sudden water quench into very hot water. Silicon at up to 15% is one of several elements that should convert into complete solution within the aluminium alloy during this T6 process. After the further process of aging, the hardness of the cast component (Cylinder Head, Gearbox Casing, Piston etc) will be around 130 Brinell, and the overall strength of the piston plus the scuff resistance



in the pin hole and ring grooves will be very much improved. What's not to like about that for a sustained long piston life?

By air quenching piston castings immediately after removing them from the die, the effect of a T6 heat treatment can come very close to the real process as described above. It will be close enough to the real T6 process to perform as required, and will fool car company quality control testing! That will save money and should certainly make the piston manufacturers' cost accountants very happy.

Hardness testing of any aluminium casting will usually be by using the Brinell measuring machine. This will be by pressing a 10 millimetre ball indenter into any flat surface being tested, using a 1000kg load. The resulting impression into the surface will then be accurately measured using a calibrated microscope and a suitable chart. A big ball indenter is necessary to even up the variations across the casting microstructure. Any smaller indent, such as from a Rockwell tester should only be used to measure hard metals,

such as the hardness of the piston pins that will rotate in the pistons.

A piston will soften from its original hardness with use. The more extreme treatment and operation it is subjected to, the bigger the variation of hardness that will be measured across it.

When the piston is in operation, the piston crown is continuously subjected to heat from the combustion process, and thus it is tolerated and expected to have softened off more than the remainder of the piston. Aluminium alloys will lose some of their hardness when subjected to temperature over a prolonged time of operation. The higher the temperature it is subjected to the more reduction will occur across the affected area. Sustained operation at full throttle and high revs, especially with forced induction (e.g. turbocharger) can have the piston crown subjected to over 300 degrees. Even ceramic coating of the crowns and oil squirters to the under-crown will only pull a few degrees out of the piston crown. Now with lean burn parameters being built into the engine ECU on the production line it is very easy to

subject your pistons to extremes of temperature during towing or car/ boat racing. Unless an engine has been excessively overheated, there is very little likelihood that the lower sections of the piston will have lost much of their original hardness.

Thus, during any problem investigation, the area around the bottom of the pin boss will usually be considered to be very close to the hardness of the piston when originally manufactured. Whenever the crown is found to be 20 points or more softer than the pin boss, the loss of hardness will be considered to be by abnormal combustion, possibly due to unnoticed detonation. Detonation is a piston killer and can cause broken rings, ring lands and scuffing of skirts, (probably) on the thrust side first. Now with the ability of easily adjusting an aftermarket ECU or by adding a piggy-back chip, by anybody with a laptop computer, it has now become very easy to build disaster into your engine – quite expensive disaster.



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