VOLUME 39

SNAKESKIN

COBRA CAR CLUB OF WESTERN AUSTRALIA

JULY 2013

In This Issue

Peter Gray – Time for Rego

Peter has been a regular contributor during his cobra build and now we can all see what a great job Peter has done. The car is ready for Registration and it shouldn't be too long before we see it out on one of the club runs.

See the next to last installment of Peter's build on Page 4

Congratulations Dave Kent 10 years as your club President

PRESIDENTS REPORT 2012/2013

BY DAVE KENT

Well what can I say about ten years at the helm of the club. It doesn't seem like a day over twenty (years that is). I am, I must say, truly humbled at the privilege of being able to preside over the clubs direction for so long. Thank you one and all.

I look back over those ten years and am pleased to recall the steady growth of the club to the strong levels we have witnessed in the past few years. Also pleasing is the number of wives and partners who have become more involved in the club and its various functions. I must also say how honored myself and Ron McNally, were with life membership to the club this past year, which was certainly a highlight and a surprise. Ten years ago the cars in the club were almost exclusively either RMC or G Force derivatives but these days we now see offerings from DAX, Backdraft, Factory Five, Gardner Douglas and DRB to name a few.

As I have done for many years whilst in this position I must pay particular thanks to our hard working club secretary, Ron McNally, for the tireless work he puts into the club without a hint of complaint. At least not to me anyway but Nola might be able to tell a different story.

On that note I should extend a big thank you to all the wives and partners of the executive who put up with the demands of the club placed upon their respective partners.

Thank you also to all the members for your involvement in the various club activities throughout the year, whether it be club runs, track days, shed runs or the show & shine, as this is what makes a club successful.

Thanks again to Eddie Terrell for his efforts in the production of the Snakeskin again this year. Great job Eddie and I hope you will continue with your efforts. Thank you to Tony Forder also for keeping the website updated throughout the year.

I would be remiss if I didn't thank two less visible but important contributors to the club in Graham Dowsett for making sure there were always tea, coffee and biscuits etc. on hand at our meetings and for his efforts in providing the fare which we will enjoy later tonight and of course to Dick Hoges for his efforts on the tongs throughout the year even though he missed a couple of meetings and there were endless complaints about the quality of the cooking on those occasions.

In closing I would like to say a sincere thank you to the entire committee for your contributions, big or small throughout the year, they have very much appreciated.

Thank you

Dave Kent

President

CCCWA 2012 / 2013 Club Calendar						
Updated 19/08/12	**Club Runs**		**Event**	**Depart / Start Time**	**Information**	**Organiser**
	Day	**Date**				
April		13	Graham Sach Memorial Run	8:00 AM	Coca Cola Café Tood-yay for Breakfast	Graeme Ullock
April		24	Veteran Car Club (BBQ)	6:30 PM	BBQ and April General Meeting	Club
May		5	Waroona Run	9:00 AM	Cockburn Central East to a Winery for Lunch	Dragan Simic
May		22	Veteran Car Club (BBQ)	6:30 PM	BBQ and May General Meeting	Club
May		HOLD	Carroll Shelby Memorial Run		Navigation Rally	Eddie Terrell & Miles Wood
June		8	Chittering Val-ley	10:00 PM	Depart Caltex Midland to Stringy Bark	Alan Dewar
June			Barbagelllo Tuning Day	TBA	Find club to play with	
June		26	Veteran Car Club	6:30 PM	BBQ and June General Meeting	Club
July		14	Cape Bouvard Run	8:30 AM	Depart x to Cape Bou-vard Winery	Ron McNally
July		24	Veteran Car Club	7:30 PM	AGM Followed by the July General Meeting and supper	Club
August		10	Parkerville Run	8:30AM	Depart Gingers via Toodyay to Parkerville for pub lunch	
August			Belmont Indoor Karts		Club Kart Champion	Alan Dewar
August		28	Veteran Car Club (BBQ)	6:30 PM	BBQ and August Gen-eral Meeting	Club

OFFICE BEARERS FOR 2012

Position	Name	Email	Phone
President	Dave Kent	daveandjak@bigpond.com	0409 979 479
Vice President	Miles Wood	hoggiesmindarie@bigpond.com	0439 900 242
Secretary	Ron McNally	mcnallyr@tpg.com.au	0402 200 224
Treasurer	Alan Dewar	admin@workclobber.com.au	0419 908 095
Club Captain	Dragan Simic	arcforce@bigpond.com	0409 445 266
Web Master	Tony Forder	tonyf@tech-source.com.au	0412 202 641
Committee	Graeme Dowsett		
Committee	Jessie Kent	daveandjak@bigpond.com	0409 979 479
Committee	Troy Kent	nudgebar7@hotmail.com	0416 910 020
Snakeskin	Eddie Terrell	eterrell@motherwell.net.au	0400 599 168

GARDNER DOUGLAS BUILD - BY PETER GRAY

the end seems to be in sight...

Following on from the last report the residual jobs were to finish some of the detail trim, wait the arrival of the smiths capillary seal washers and a general sort over the whole car in readiness to drive it.

March started off well with a whole pack of my capillary seal washers turning up from the UK [FOC !] - a significantly better value proposition than one from another Australian state for A$29 [each] !

With the new seal in place the oil pressure gauge could be returned to the dash and the dash bolted back into place.

It was a bit of an odd moment and I had to think a bit to suddenly realised that at that point the whole car was [mostly] done, finished - OK…….. lets fire it up and see what happens

I poured 10ltrs of super unleaded into the tank, ensured I had a hose and fire extinguisher to hand and then tried the key - the engine had not run for six months but fired instantly and the oil pressure came straight up.

Unfortunately all did not go exactly to plan as after a couple of minutes there was an almighty bang as the fuel tank sheets flexed - a quick look into the boot confirmed the tank was flexing and the hissing from the fuel filler suggested that all was not as it should be so everything was swiftly shutdown. Further checks revealed that the rate that the fuel tank vapor was being sucked from the tank by the carbon box was significantly greater than the max flow

GARDNER DOUGLAS BUILD - BY PETER GRAY

available to provide make up through the fuel filler breather with the result that the whole tank was being pulled down to an ever increasing negative pressure. Once identified the problem was easily fixed and subsequent starts and running have proved to be completely free of any dramas…

As I was happy with the engine it was time to tidy up the remainder of the snagging list - no real dramas to deal with - just a few items that I had parked until I had sufficient time to concentrate on them….

- Re-bleed and bed in the brakes – soon as ! - the brakes had a slightly soft feel to them.. but having no servo assist means they have a very different feel to them and they needed properly bedding in and material transfer onto the rotors. Probably best to wait until I had my 48 hour temporary movement permit and could carry out a series of med to high speed stops to bed the pads properly.….
- The washers parked 180 degrees out - cannot believe this happened - I was sure I had worked this and checked it out - but no - got it wrong. Simply it meant that *yet again* the dash has to come out along with a lot of other 'stuff' to release the spindles, bundy tube and motor so I could reverse the park mechanism.
- I had no speedo - not a good plan - it had been working, although way out of calibration, so I suspected I had a wiring brain fade when I had reassembled the dash wiring
- The washer pump did not work
- The steering column had no self-cancel mechanism for the turn indicator.

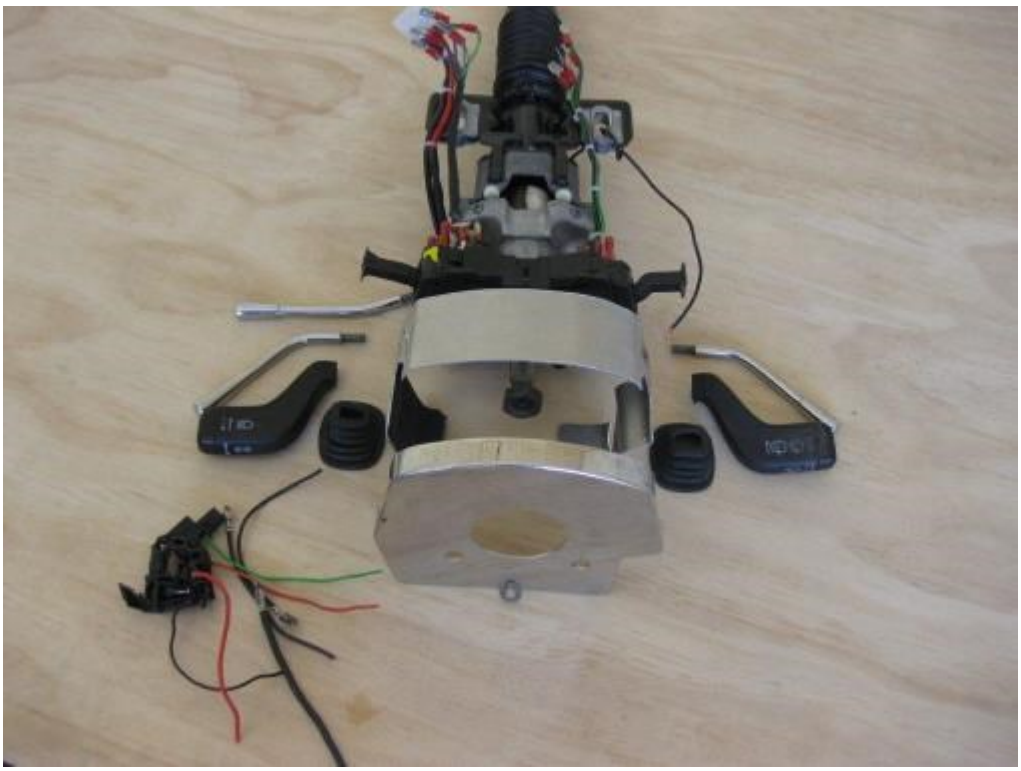
The following weekend was spent doing a lot of tidy up work and sorting the items from the snag list. The brakes were re-bled. An easy operation with the Gunson Eezi-bleed system.. that managed to get a few resistant bubbles out..

The brakes feel much improved now and ready to be bedded in properly once I can drive the car for a decent distance. Next it was steering column out - remove dash – unclip all the fixings for the heater and screen ductwork - disconnect the five loom connectors to gain access to the wiper system. With the wiper motor on the bench it was a matter of removing the gear cover plate, prizing out the gear wheel. The park mechanism is a simple piece of plastic that has to be levered out of position on the main gearwheel and then refitting 180 degrees from its original point. The whole process only took a few minutes and then it was a couple of hours to replace the motor clamps/ spindles/tubes etc and then put in some temporary wiring to make damn sure it parked in the correct position before even thinking about putting the dash back in. While the dash was out I had to look round to find out why my speedo had stopped- sure enough an earth had been dislodged in the last assembly - quick re-crimp of the blade and refit and it was back as should be. The washer pump was slightly different in that it required a complete wiring change. Several hours, a couple of blown fuses , several electric shocks and a number of electric 'frights' later it was working as required.

I had two options for the turn cancel – one was to ignore the cancel but fit a speaker or some other mechanism that sounded as the indicators flashed - just to warn the driver that the indicators were still operating and then apply a manual cancel. The other option was to arrange for the mechanical cancel to work on the column itself. As these cars can be a tad noisy and I'm getting a bit deaf these days - or so an

GARDNER DOUGLAS BUILD - BY PETER GRAY

ever growing number of people tell me……I decided to go for the mechanical cancel solution. My steering column uses some original GM control stalks and crush column which includes a small plastic peg that appears when the turn lever is activated. It stays relaxed and flexible in the same direction as the turn but then becomes rigid and locks in position on the 'return stroke', as the wheel straightens up the force is sufficient to trip the peg and the indicator is cancelled. All that was required was a couple of pins on the steering wheel hub to move past and operate the lever. The slight problem being that there are absolutely no reference points of true datum points to measure from and the lever is mounted at an oblique angle relative to the steering boss axis. After hours of measuring - sketching measuring again I was [pretty] confident I knew where the pins needed to be - it was then a matter of drilling the steering boss and running an M5 tap through after which I could cut down a couple of M5 machine bolts to act as the activation pins…



The whole thing fitted and worked perfectly first time so I finished up feeing quite proud of myself…

So now I have a finished car [except for the final dash cover and the boot carpet.

Time for a drive. Unfortunately I still had the 5 gas test, engineering check and over pit inspection to complete before the thing is registered or road legal so I could not drive it.

If I had been a bad boy and decided to drive it without any documentation I would have probably reported that there are absolutely no squeaks or rattles – the steering is not over heavy but very direct, the ride is excellent, it's a real head turner, quite noisy and very comfortable- and the speedo was very inaccurate as I had calculated the pulses per mile rather than kilometer- I would have to fix that – if I had driven it ….…

After a conversation with Ricky Virago [who has been a wealth of knowledge and advice in the final testing / registration process - thank you Ricky !] I booked the car into Roadbend to have a 5 gas analysis test - as I would be in the general area following the test I contacted Terry Southam and it was decided that I would go straight from Roadbend to Terrys garage where the engineering inspection could happen and complete the whole thing in one morning.

Armed with my "permission to move permit" I arrived at the Roadbend garage on a Saturday morning only to cause something of a traffic jam as the car was parked up outside while I went to check where to go. I returned to the car to find a dozen or so cars parked up jamming the access and people walking round and inspecting the GD.

The test took only a few minutes and – it failed - the idle figures were all spot on and everything was well within tolerance at 3000rpm except for one element , NOx was 79ppm, some 49ppm over the allowable limit.

I drove off to Terry Southam's Garage who did an inspection and brake test. He declared all OK except for a couple of very minor things to attend to and one big one - my noise levels were way over (as I suspected they would

GARDNER DOUGLAS BUILD - BY PETER GRAY

be) - somehow I have to loose 10dBA.

Back home over the next couple of weeks it was wind up the springs to get to 110mm ground clearance. I also had a dig around in my bits and bods from my old racing days and found the original diffusers I used on my early TVR Tuscan to get through scrutineering, - That was a John Wolfe prepared 4.9ltre V8 and on their own they would knock the levels off by 8 dBA so wrapping the diffuser in loose glass, stuffing wire wool, and swarf wrap down the tubes I was happy to see that the level dropped to 89dBA/4000rpm.

The NOx and mapping issue was a different matter… Despite numerous phone calls not a single tuner in the Perth area was interested in helping map/tune the ECU - the total lack of interest or support unless I intended to spend A$10k plus with them was a real eye-opener….

I ended up sat in the car from 11pm to 2 am on Skype with the engineers in Texas with the Mast system running and a small program that allowed them to view my screen whilst they talked me through the mapping and the operation of the Mast system ECU. At the end of the session I had a fundamental understanding of the system and how it operated and the interactions between the various pages and we had a plan which consisted of (a maximum) of 14 steps / changes that we believed would map the system to deliver a 5 gas pass..

A return trip to Roadbend to see if the remapping would work.. and I set off for an extended vacation in Europe - so the final report will have to wait until next time.

Whilst in the UK I visited GD and was lucky enough to have a good look at the latest T70 fitted with the dry sump LS7 and over 650(RW)hp - the ultimate track day car…..See the pictures below and on the following page.

Gardner Douglas Lola T70

GARDNER DOUGLAS LOLA T70 - PHOTOS BY PETER GRAY

STRINGY BARK RUN - BY AL DEWAR

The CCCWA annual Stringybark Vineyard run is always held every June. And every June we look nervously to the weather reports in the week leading up the event and contemplate which car we'll be taking. This year was no different. Depending on which weather source you studied the forecast varied from "cold but clear" to "possible light showers" or even "thunderstorms".

A tentative booking for 12 people had been made, with updated numbers to be advised closer to the date and final numbers phoned through to Stringybark as we departed Gingers roadhouse.

As it turned out, in the weeks leading up to the run the number of cars attending varied wildly as different folk advised that they were either "in" or "not sure" and then, for an assortment of reasons, were ''out" again. In the end we were expecting 12 so no adjustments needed to be made to the booking.

The plan was to depart from Burswood at 10:30 and meet up with cars from the northern suburbs at Gingers for a short break and then push on to the vineyard arriving shortly before 12:00. After a long wait at Burswood for Dave & Jess a quick phone call revealed that they were already waiting at Gingers for us (my mistake) so we departed Burswood in a rush with myself & Anna and John & Terri in Cobras and Alan & Ronnie a shiny yellow Corvette.

Traffic was light on the run up Great Eastern Highway and onto the Great Eastern Highway Bypass left onto Roe Highway around to the east and north of Midland and then up Great Northern Highway to Gingers where we had a 2 minute stop to meet up with John & Jill in another Cobra and Dave & Jess in a Japanese ute. The weather was cool but otherwise perfect for Cobras but caution was the word as the roads were still a little damp from the previous nights' rain as we wound our way through the hills north east of Bullsbrook and into the Chittering Valley to the vineyard.

We hadn't even sat down and we heard the unmistakable rumble of something special cruise into the car park. Not known for being bashful, Miles arrived in his shiny new red Corvette fresh from a star performance at Targa Southwest the previous weekend. After a quick inspection of this fantastic piece of nostalgia (the car not Miles) it was back into the restaurant for a sumptuous 3 course lunch in front of an open log fire. We all kept a constant vigil out the window on the lookout for the threatened rain and as the meal progressed the skies darkened. Just as we were paying the account somebody looked out the window and yelled "rain!" and then it was almost every man for himself. Of course the two Corvette's had lids so they just dawdled to their cars and chuckled to themselves as they headed home with the heaters on and the windows up.

STRINGY BARK RUN - BY AL DEWAR

The rest of us scrambled light fighter pilots to get out on the road and get the rain blowing across the top of the cars.

Fortunately the rain was only very light and had cleared completely before we got back to Midland so it was a pleasant run home as we all went in different directions. I think I had the furthest to go and Anna & I couldn't quite get home before the skies opened up and we got thoroughly dumped on as we turned from the southern end of Roe Highway onto the Kwinana Freeway north. We made it home a bit wet and my hair was a mess but all in all a very pleasant day was had by everybody. The only casualty was the car, which was filthy from the wet roads but that'll just give me something to do next weekend…

From the Editor

Well we managed to get through another year of the Snakeskin thanks to the contributions of our club members.

Please keep sending through any articles that you think will be of interest to others, and if you have the chance take pictures of your builds or upgrades. There are always new members looking for ideas and the club magazine can be very useful in solving some of the mysteries when building a new car.

A special thanks to those who have provided support towards the cost of producing the magazine, namely Hogs Breath Café (Miles Wood) , NA.SA Electrical (Neil Atwell), Motherwell Automation and the latest addition to the list Total Supplies (Trevor Percival).

Total supplies are supplying all of the paper to produce the magazine and the envelopes for the magazines that get mailed out..

Again thanks for your support and lets work to make the next year even better. Ed

BOB BONDURANT BY SPORTS CAR DIGEST

Continued from Volume 38

SCD: Didn't you have some involvement in the Cal Club-SCCA battles?
BB: I was SCCA Vice President on the West Coast. Cal Club decided to have a race the same weekend and before the race they said anyone who races for SCCA is banned from Cal Club. I was Vice President, so I raced and I won. I got a letter saying I was banned from Cal Club. I called Lou Ventura, the Cal Club organizer, and said, "Lou, I have a question for you. If someone took away the thing you loved most in life what would you do? Well you took away the thing I loved most, which was racing with the Cal Club as well as SCCA, and that's why I am so upset and mad at you. We both did it. You said you would ban members for racing with the other club, but you never did it, I was the first one." He said, "We are having a meeting in about a month and I'll bring it up at the meeting. Call me then because the ban is for six months." I said, "As far as I am concerned, if you ban me for one day it is too long." So I said screw it and I got interested in helicopters. There were a lot of helicopter places in Southern California, so I looked them all up and went over and introduced myself and said I would like to learn how to fly. They had heard that I was racing Corvettes and all that, so they let me hop in and it was my first seat. He asked me if wanted to learn how to fly, and I said yeah. He said, "I'll give you the controls, but I'll stay on with you." That is how I learned to fly helicopters. Then I went to work at Compton Copters at San Fernando Airport. They rebuild wrecked helicopters. I never actually went to a school. I got to where I could do a great job, but I was having a difficult time hovering. When driving racecars I always sat up straight. In the helicopter I would lean over a little bit trying to hang on to it, and I went to bed one night thinking that with the Corvettes I sat up straight, and so I did that the next day and all of a sudden I could hover. I got to be a good helicopter pilot and have a fantastic 341 Gazelle, an ex-Army helicopter. It tops out at 119mph. Most of those do 147 or 148mph. I brought that down here in Phoenix and learned to fly it and I had another helicopter before that.
One time I was going to Sears Point, and the guy who ran the helicopter place said there was an FAA guy who liked to fly Gazelles and he could run me up to Sears Point and I said OK. So we got up over Southern California and were flying along the beaches looking at the girls on the beach, and I said, "I like your flying, it is really, really smooth." And he said, "Thank you, would you like to really learn how to fly it?" I said, "I think so," and so he said, "I will teach you how to fly." So we got by Watsonville and by the winding river and he said he wanted me to go down to the river and follow the river and fly 50 feet above the river. I said something about the wires and he said he would watch for them with me. I was flying 100 feet and I thought it was 50 feet, and he said, "Down." So we got down there and I really learned how to fly that thing fast and maneuver it. He asked me if I ever had a stall in it. I said in an airplane I had, but a helicopter will not stall. I didn't know it would, most people don't. He said, "Let's take it up to 5000 feet and I'll stay on the controls with you and I will show you how to do a stall." And I thought if he fucks up it will be me and he and the helicopter. So we got there and all of a sudden he is flying backward down! I said, "Holy shit," but he clicked a switch on the left panel and that is how you get out of a stall. So he did about four of them and he said, "It is your turn." I said, "I don't know if I can do this." It took about half an hour to get to where I could really do it, and I said, "Why are you teaching me this stall?"
And he said, "Very seldom you'll get into it, but you'll get into the mountains that are fairly low and you'll get a lot of wind that will come down the top of that mountain and you'll get into that situation and it could put you in a stall." About five or six years later I was flying back to California, I had my son with me, and we were flying low in the mountains and all of a sudden the blades were up and down about ten feet and I said, "Holy shit were getting into a stall." I saved it, and my son said, "Holy shit dad, we almost crashed," and I said no, this guy taught me that. So we're flying back to San Francisco with the FAA guy and he said, "I understand you race cars at the racetrack." He said one thing I could learn to do is follow them around the track. So I dropped him off in San Francisco and I went on up to the school at Sears Point. I flew the helicopter every day. I got to where I would chase the students around.

BOB BONDURANT BY SPORTS CAR DIGEST

SCD: Let's go back to the 1963 Stingray. What can you tell us about that car?
BB: It had drum brakes, because the brakes weren't that great. At the time, well, I had retired from racing because of that Cal Club deal, had the helicopters, but I had raced with Shelly Washburn, who was a Corvette dealer up in Santa Barbara, and had done real well with him. He asked me to do just one race, and I said I would do that for him. That one race was at the same time that Shelby got the Cobra together for the first time. Blew us all off. The handwriting was on the wall, Dave MacDonald and I tried real hard all the time. Sometimes he would win and sometimes I would win, he was a fantastic driver. We really got to know each other really well, friends on the same trip. We were really racers. So the Cobra dropped out of that race with a broken shaft or something, but they took it home and fixed that. The Cobra was a very good racecar and I raced against it all the time. I out qualified Davey McDonald that year, and he was by then in the Cobra. My car always worked perfectly. I did a warm up Sunday morning like we always did and I was quicker than Davey. He had that car jacked up on stands because he couldn't believe it. No way. So I felt good, but when I went to fire the car up it wouldn't start. I thought, "Holy shit what happened!" The smog had damaged the O-rings and so it wouldn't start. So I got on the PA and I asked anybody with a Corvette to let me borrow their fuel injector so I could race against Davey. So two guys came over and said, "Take it and put it on your Corvette." I had to hold the race up a little bit for it, but finally they said they couldn't hold it up any longer. Just as I got it on, they had started the race, so Davey is already in Turn 1, Turn 2. I started dead last, caught up with him on the last two laps but couldn't pass him because the brakes were bad, the Cobra had better brakes and was lighter. The Cobra handled better, but he knew how to drive it really well.

After that is when I got a call from Carroll Shelby, who said, "You're driving Ken Miles' Cobra." I told him I didn't say if I wanted to or not. That is just the way he talks. He said he was at such and such a hotel and I said, "Am I driving for you?" And he said, "No, just this one race," and I said, "Well I don't know if I want to drive just one race. If I drive it I will find the weak points in the Cobra and then I will jump back into my Corvette and beat Dave." This was at Continental Divide, in Colorado. So I drove the race, Davey ran too, but I won the race. Carroll said, "Great job." And I said, "Am I driving for you?" And Carroll said, "No." Then I got a call two or three weeks later from Carroll, and he said, "You are driving a long distance race at Elk Grove." So we ran the race together, I won the class. Then I finally started driving for Carroll. The next time was the L.A. Times Grand Prix at Riverside, really a big race. There was a preliminary race before the big race, with everything including Ferraris and it was real fast. I made a deal with Shelby, I said, "If I win the pre-race will you enter me in the Times Grand Prix?" He said sure. Dan Gurney and I and Lou Spencer were on the front line. Lou was driving the 289 Roadster. Dan got a great start, Allen Grant got a great start, and Lou was third in line and coming up on Turn 6 I got right behind and he starts to lose it. It looks like I hit him, but I never did. Allen I never hit you. Even 50 years later he claims I hit him! I never hit him. He had a Cobra too, but had more power because he had a bunch of guys build a special engine for him. He was sure he was going to beat all of us. Dan was in the lead, and probably about five or eight laps into the race the coil wire fell off of Dan's car so he pulled off on the straightaway and jumped out and put it back on. I went on by, and ended up winning the race. As I came across the finish line I blew a left rear tire so I am sitting there by the side of the track on the dirt and Dan comes by laughing like hell. Dan came in second and Allen was third. So I started dead last in the main event and finished eighth. That car was a good car and I learned how to drive it. You really had to learn how to drive a Cobra.

BOB BONDURANT BY SPORTS CAR DIGEST

SCD: How good was the Cobra out of the box, or did you have to do a lot to make it win?
BB: Shelby-American built the car and then did all the modifications on it. Then it had problems in the early part and they finally got it sorted out. Over the years it won everything. When I was over in Europe I won the GT class at Le Mans (1964) with Gurney, which was fantastic! The first time I had won. Dan asked how many times I had run at Le Mans, and I said six times. Never did finish. I said the car seems to be really good. It was just finished when I got over there, had not turned a wheel yet. So I took it out and said it runs good, handles good. I had never run that fast before. And according to the data we were running 179 mph down the Mulsanne Straight. That was 1964. I said to Dan, "Do me a favor, if we can drive it a little bit smoother, and a little easier, I'll drive it as fast as I can driving it smooth, and I bet we can win. Can you do that?" He said, "I don't know, I'll try."

So we were winning the race and had a nice lead against the Ferrari GTOs. They were really good, they had never been beaten before. But at 4 a.m. I had an oil cooler go bad and did not have a spare, so we had to bypass it to make sure we finished. I was at the wheel as we were running to the finish, fourth overall, several laps ahead of the GTOs. So all of a sudden I saw the third-place car go off the road and stop, and another lap or so I saw the second-place car go off and stop. Were they having mechanical problems? Then the lead car pulled off the road, so I said, "Shit, are we going to win this race now?" It was about 4 o'clock when we finished, and they all finished three abreast over the finish line at the same time. No one ever told me that you slow down when you go across the finish line. We had lost track of the GTOs and how much further behind they were, so I was still running flat out when I came into the last corner, and Holy Shit! I started braking and downshifting to stop before I ran into all the slow cars, and we won. It was the most fantastic period of my life, winning at Le Mans. Just two of the Cobra Daytona Coupes were in that race, The other one had Chris Amon and Jochen Neerpasch driving, and they were in the number 6 car and we were in number 5. They came in and somehow the battery got drained, but you can't put another battery in, so they were out.

BOB BONDURANT BY SPORTS CAR DIGEST

SCD: That was a Shelby team car, wasn't it?
BB: Yes, in 1965 he was over there because most of the races were over there. The Targa Florio was the first race I drove in Europe. He said he wasn't going to send me over there because I would never learn it. I said I would learn that son of a bitch. Almost a thousand turns and 42 miles a lap, so I went over there two weeks early and drove it every day, eight hours a day every day. Then I would go out in the morning and race three villages, and in one of them I'd see the horses go out in the morning with their mules and load the mules up and they would go this way and I would go that way, lines in the road, and I came around a corner and here is a mule and I said, "Oh shit!" I had to get over to the side of the road.

SCD: What were you driving for a training car?
BB: A Cortina. Later on they had a Falcon rally car, so I could really drive it. I was going pretty fast through villages because I heard they all knew the race was coming up and they were used to it. Masten Gregory got there a day before I got there, and he said, "I will show you how to learn this thing so you will know it." So we drove 12 kilometers and then we would turn around and go back. Once you saw the road and the little pits, then we would go back. Then we drove 24 kilometers and did the same thing and went back. We drove the whole circuit like that. It must have been three or four days and then I just started driving the circuit. Over here most of our circuits are just two miles long, Elkhart Lake is four. To do that and go quick it is total concentration. So again, I drove it every day, ten hours a day, seven days a day. Shelby arrives and Jerry Grant arrives—he had never been there before and he spent a week driving around—and Phil Hill and myself. We did not know who Shelby was going to push, I thought it would be Dan because they both had run the circuit. I was doing my best to qualify, and they sent Dan out and he was a couple of tenths faster than I was. Then Shelby put me with Phil Hill. Phil knows that track like the back of his hand, and Dan does too, but he taught me so much about racing over there and different things you want to look for whenever you can and get out there and learn the track. We were racing Cobra roadsters mostly. We didn't run the coupes except at Le Mans and the Tour de France. We were there to learn the circuit well so we had a chance to win the race. Phil is always nervous before a race, and he was saying Dan was going to beat us. I told him, "No he is not. You're fast and I am fast. Jerry hasn't driven the track and the lap time is like 42 minutes, so six laps." So Phil started, and Dan caught him right at the end of the first lap, then it was my turn and I was going great. When it came to be Jerry's

BOB BONDURANT BY SPORTS CAR DIGEST

turn to get in the car I passed them and then Jerry started and then we were doing really well, probably because Jerry wasn't driving really well, he didn't know the track as well as I did. In the end we lost a bushing in the rear suspension, so they won and we took second.

SCD: What can you tell us about running at the Nürburgring?
BB: The Nürburgring was a new race for me. I had never been there before, they were all new circuits. It was 14 miles a lap, 176 turns. When I got there I found out there was a Hanseat Driving School there, so I enrolled in it. One of my instructors, Jochen Neerpasch, had raced there and he already knew about the Cobras, that they were very fast and very competitive. What they were doing at the school was teaching people who bought Porsches how to drive, so they teach them the safe line. Because he knew I was going to race, Jochen said, "I'll show you the real line." So I learned the real line and it was different. That took about four days. At night I would have dinner there at the hotel restaurant and then you could go do a lap, so I would have dinner and then do a lap every night. The first night I was there I met a guy, a really good driver, very fast, can't remember his name. He said would you like me to show you the track, I said sure. Pouring down rain, scared the hell out of me, he was really fast and sliding through the corners. "Holy shit," I thought, "this is going to be a tough job."
What Shelby would do in every single country where we raced, he would hire two of their best drivers to drive the fourth Cobra. So I knew he was going to hire two guys, and I said that I had gotten to know Neerpasch and he is really good, and so we hired him. We were doing really well. At the first Le Mans start we learned never to use seat belts, the others just fired up and went, but I was putting my seat belt on and the other drivers were driving away. It was a poor start. Before the race I was talking to a German driver and he said, "Is your name Bondurant?" And I said, "Yes, Bob Bondurant," and he said, "You think you're pretty darn fast?" I said, "No, actually I haven't driven here before." I started out quick and he didn't, but there was one steel post by the track and he came up behind me and hit me and put me into that post and blew my tire out. So I had to drive 14 miles around with a blown tire. I thought, "If I ever see that guy again I am going to put him out." The mechanics cut the fender out and put a new wheel on and I took off. We were pretty quick. I finally saw the guy up ahead, but he had blown his engine and dropped out, because he hit me so hard it blew his radiator out. I said, "Thank you God, you didn't have to do that." So I went on by, but then we lost a crankshaft and did not finish. The second year, 1965, we went back with three Daytona Coupes and one roadster. I was in a Coupe and I had three laps to qualify. The first lap was 9:23, the second 9:21 then 9:18.5. I hadn't got down to shaving tenths of a second yet. Those were our qualifying times and they were the fastest. Then we ran the race and won, Neerpasch and I, and it was really nice because he had never won. Everyone loved the Daytona Coupe. An American car, wow! Going that fast, unbelievable. Beating the Ferraris, wow. That was so cool! About 1980 I had a guy go through my racing school at Sears Point and he said, "You know your record just got broken last weekend!" I said, "You have to be kidding." It lasted for 15 years, I was amazed. When next I saw Jochen and his wife, he said he was surprised it lasted that long.

To be continued: Volume 40

OLD COAST BREWERY RUN—BY RON MCNALLY

The run was always going to be a bit dodgy with the weather and as Nola and I were about to leave Dawesville to meet up with some other 'must be crazies' in Pinjarra the rain that we were watching on the radar arrived. So, watching the radar and what was happening around us we timed our departure to the minute – hoping to get most of the way to Pinjarra without too much wet.

On arriving at Pinjarra, we found Alan & Ronnie (Corvette), Pat & Tony (Prado) and Harry (Ute) had finished breakfast and about their 3rd coffee …. Nola and I into the Coffee straight away, Ricky (Daytona) came for a coffee while Mum & the kids were away and then Dragan and Jean arrived (Cobra) dodging the clouds. So there were two Cobra's.

After topping up with Coffee, Ricky headed home to do some work while the rest of us headed off for a 'backroads' through the back of Coolup, Waroona and Havey to the Old Coast Road Brewery in Myalup … bit of rain but nothing like getting to Pinjarra and some good Cobra roads in patches of sunshine.

Thought we would be pretty safe to arrive at the Brewery without a booking …. Wrong. Every in-door table had a "reserved" sign with a name on it so we were relegated to the back outdoor. The pictures can tell the story from here. Needless to say the ride home for some of us was wetter than the ride there.

Tucker - good, company – great ….. Old Coast Road Brewery – CCCWA Recommended.

Compression Ratio Calculations - by Carcraft.com

You'd think that the pistons listed for a 10.5:1 compression ratio would actually give you 10.5:1. But it's usually not that simple. Perhaps that's why so many car crafters have a foggy or incomplete understanding of compression ratios. To clear things up, this story will define what compression ratio is, let you know how to alter it, and show you how to calculate it for any engine.

Throughout the story we'll use the example of a typical 350 Chevy (4.000-inch bore, 3.48-inch stroke) with a 0.015-inch deck height, a head gasket with a 4.100 gasket bore and 0.038-inch compressed thickness, 76cc heads, and pistons with 4.5cc valve reliefs--and you'll see what these numbers mean as we go.

What Is Compression Ratio?

Remember what happens during the compression stroke of the four-stroke cycle: Both the intake and exhaust valves are closed so no air can escape, and the piston moves upward from bottom dead center (BDC) to top dead center (TDC) so that the air/fuel mixture in the cylinder is compressed into the combustion chamber. Compression ratio is the relationship of cylinder volume (or displacement) with the piston at BDC to cylinder volume with the piston at TDC. If the volume of the cylinder with the piston at BDC is 10 times greater than the volume of the combustion area with the piston at TDC, then 10 units of volume get squeezed into 1 unit of space, and the compression ratio is 10.0:1.

There are five factors that affect compression ratio: cylinder swept volume, clearance volume, piston dome or dish, head-gasket volume, and chamber volume.

Cylinder Swept Volume

The swept volume of the cylinder indicates how much air the piston displaces as it moves from BDC to TDC. Increasing the cylinder volume without making any other changes will increase the compression ratio because it enlarges the cylinder volume without increasing the combustion chamber volume. In other words, the piston will have to cram more air into the same amount of space. Cylinder volume is calculated using the bore and stroke of the engine with this formula: Cylinder volume = 0.7853982 x bore2 x stroke

On a standard 350 Chevy, the bore is 4.00 inches and the stroke is 3.48. Apply the formula, and you'll find that one cylinder is 43.730 ci (multiply this times eight cylinders and you get 349.84, which is rounded to 350 for total engine displacement).

If you overbore our sample 350 from 4.00 inches to 4.020 inches and make no other changes, the compression ratio will increase from 8.84:1 to 8.90:1 because the volume of the cylinder has increased. When overboring an engine, the percentage of gain in compression ratio decreases as you add clearance volume and increases as you remove clearance volume, as we'll describe next.

Clearance Volume

Clearance volume is determined by the distance from the cylinder block deck to the top of the piston flat (not counting any dishes or domes) when the piston is at TDC. In many engines, especially 350 Chevys found in cars, the pistons don't come all the way up to the height of the deck--they can be anywhere from 0.003 to 0.020 inch below it. This amount is known as the piston deck height, and it affects compression ratio because it affects the volume of air in the combustion area when the piston is at TDC. If the piston is farther below the deck, then clearance volume is increased and the compression ratio is reduced. If the piston is closer to the deck, clearance volume is reduced and compression ratio is increased.

Here's how to calculate the clearance volume once you know the piston deck height: Clearance volume = 0.7853982 x bore2 x deck height

In our sample 350 with a deck height of 0.015 inch (meaning the top of the piston is 0.015 inch below the deck of the block), the clearance volume is 0.188 ci.

If the deck height of our sample engine was increased to 0.020, compression would drop from 8.84:1 to 8.75:1. If the deck height of our sample engine was decreased to 0.003, compression would increase from 8.84:1 to 9.05:1.

Piston Dome

Note that clearance volume does not take into account any pop-up domes or sunken-in dishes on the head of the piston. These configurations also increase or decrease volume in the combustion chamber and affect the compression ratio. The manufacturer's catalog will list the displacement in cubic centimeters of the dishes or domes on the piston, but we've found that it's not consistent whether they express the cc's of a dish as a positive or a negative number. For the purposes of calculating compression, we prefer to view the cc's of a dish as a positive number because a dish adds volume to the cylinder (and reduces the compression ratio); a dome is a negative number because it subtracts volume from the cylinder (and increases the compression ratio).

Another confusion with piston designations is that they're listed in cubic centimeters, but we use cubic inches to calculate compression ratio. You can convert to cubic inches with this formula: Piston dome or dish in cubic inches = cc's x 0.0610237

Since our sample engine uses pistons that have 4.5cc dished valve reliefs in them, then they increase the volume of each cylinder by 0.275 ci. If we changed to pistons with a dish of 22 cc (1.34 ci) and made no other changes, then the compression ratio would drop from 8.84:1 to 7.58:1. If we used pistons with a dome of 12 cc (0.73 ci), then the compression would increase from 8.84:1 to 10.56:1.

Head-Gasket Volume

Head-gasket volume is determined by the compressed thickness of the gasket. A thicker gasket adds volume and reduces compression; a thinner gasket reduces volume and increases compression.

A gasket's compressed thickness is listed in the manufacturer's catalog and ranges from 0.051 inch to 0.015 inch. Also, the gasket bore is often larger than the engine bore; a 4.100-inch gasket is common. In our example, we assumed a head gasket with a 4.000-inch bore. Once you know the compressed thickness and gasket bore, here's how to calculate the volume that the gasket will add to the combustion area: Head-gasket volume = 0.7853982 x gasket bore2 x compressed thickness

In our example with a 0.038-inch thickness and 4.000-inch bore, the gasket adds 0.478 ci to the volume of the cylinder. If we used a thinner 0.015-inch gasket and made no other changes, the compression ratio would increase from 8.84:1 to 9.27:1.

Compression Ratio Calculations continued

Chamber Volume

The volume of the combustion chambers is the final factor in determining compression ratio. The larger the chamber, the more volume is added to the cylinder and the lower the compression ratio; smaller chambers reduce volume and increase the compression ratio.

For small-block Chevys, chamber sizes range from around 58 cc to 78 cc. However, the volume of the chambers can vary greatly depending on the type of heads and valves used, the amount the heads may have been milled, the number of valve jobs that have been performed, and any custom chamber grinding that has been done. Manufacturers of cylinder heads will tell you the range of sizes of the chambers in their heads, but for any used or custom-machined heads, the only way to know the size of the chambers is to have a machine shop check. Once this number is known, here's how to convert it from cubic centimeters to cubic inches: Chamber volume in inches = cc's x 0.0610237

Therefore, the 76cc chambers in our 350 have a volume of 4.638 ci. If we were to use cylinder heads with 58cc chambers and make no other changes, the compression ratio would increase from 8.84:1 to 10.72:1.

Add It Up

Once you have all the information listed above, you're ready to calculate the compression ratio of the engine you're building. First you add up the volume of the cylinder with the piston at BDC, then divide it by the volume with the piston at TDC. Here's the formula:

Compression Ration =

Cylinder vol. + clearance vol. + piston Comp. vol. + gasket vol. + chamber vol. **divided by** Clearance vol. + piston vol. + gasket vol. + chamber vol.

Apply this to our example of the Chevy 350 with the 3.48-inch stroke, 4.00-inch bore, 0.015-inch deck height, 0.038-inch head gasket with a 4.000-inch bore, 76cc heads, and 4.5cc dished pistons, and here's what it looks like:

43.730 + 0.188 + 0.275 + 0.478 + 4.638 **divided by** 0.188 + 0.275 + 0.478 + 4.638 =8.84:1

This engine has an 8.84:1 compression ratio. When using this formula, don't forget that the displacement of domed pistons should be expressed as a negative number.

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