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June 2006



30 days to sebring

The Mantis Cayman S Project - Part 2

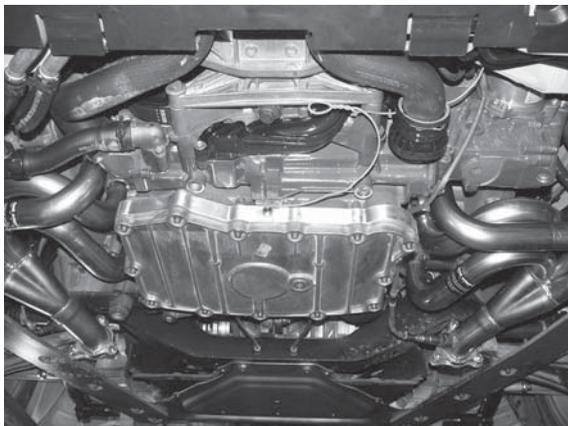
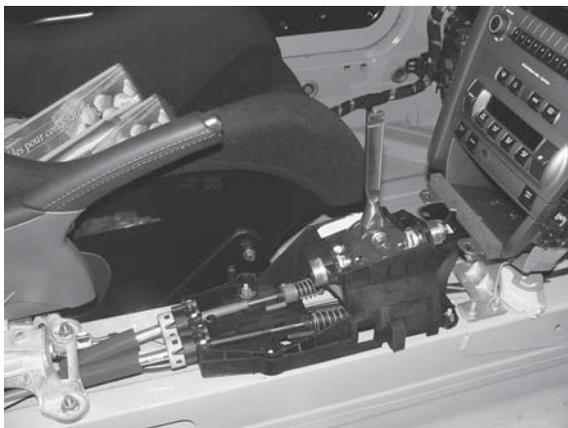
By Ernie Jakubowski and Stan Carmichael; Photos courtesy of the authors

Part – 4 Work Begins

Stan: We often meet for breakfast at a little diner not far from the shop on Saturday mornings. Mantis doesn't open for business until 9AM on Saturday's, it's a nice way to start the weekend. On Saturday, January 14th, there were four of us, Scott Gerard, Richard Burpee (one of Mantis' talented technicians) Ernie and I. Bill Comat was vacationing in Florida; he would return just after the Daytona 24 hr. race. It was here it finally dawned on us what we were preparing to do. Up until now it was just talk, talk that started a few months ago. Not much different than most of the oral dreaming and scheming that makes bench racing such a popular past-time. As Ernie looked at his watch, announcing it was time to leave, there was no looking back, now the work begins.

The beautiful new Cayman S sat on the alignment rack in the corner of the Mantis shop; we had placed it there the night before to measure the weight. The finished car will have to weigh 2954 lbs minimum according to the rules. It weighed in at 3061 lbs and had perfect front to back balance, 45% on the front and 55% on the rear. Ernie works the front counter on Saturdays; he would join me after lunch when the shop was closed. Richard began his daily duties working on customer cars. I started to remove the interior from the Cayman S, without damaging it, as it would have to be re-installed to meet the PCA Club Racing rules for stock classes.

As I began to remove the obvious bits, front trunk trim, rear



> carpeting and the engine cover, I marked each one with masking tape and identified what it was and where I found it. I also had boxes of Baggies for the fasteners and smaller parts so we could identify them when we needed to re-install them into the car. Immediately I realized that this was not a 911 or 944, the interior was much different, pieces snapped together and it was challenging to snap them apart in fear of damaging them. But it is a Porsche and the parts are very well engineered and constructed, they came apart intact.

When Ernie joined me he was surprised to find I was talking to the car. Only a couple of hours into the project and Stan has gone crazy! "Who the**** Is Hans?" he asked me. Well, Hans was my nickname for the design team that created the Cayman S. References like "Hans, you crafting Hun, how did you put this in?" or "Hans is a clever Hun, look at this?" became our release commentary for the rest of the project. If something wasn't right or we didn't understand something, we just blamed Hans. Our relationship with Hans solidified on Saturday evening. After listening to Ernie criticize me for taking two hours to remove the centre console (including putting the first blemish on the car as I drilled a hole to access one on Hans' hidden screws – well, it's a race car now), I patiently waited until he had two hours into removing the steering wheel airbag. Ernie had met Hans, Hans had won, and Hans was now an official team member.

Ernie: By Sunday afternoon we had the interior out of the car, we had plenty of help from my brother Bob, and my nephew Duncan came up from Ft. Erie to see Ernie's new car. The car was still on the alignment rack and the interior bits filled the area behind it. All the way to the back door! Before we began to clean up and store the parts (Mantis had to open for business on Monday), we weighed the car, 2600 lbs, there was over 400 lbs of interior parts spread across the floor of the Mantis shop. Now Ernie can begin to build his racecar.

Stan had the interior removed and was busy organizing the pieces so we could find them when we needed to. Now I could see the car. I have to say I always thought that 944's were over-built; I wasn't prepared for what I saw in the Cayman S once we had it stripped. Most car companies design coupes or sedans and then cut the top off and re-enforce the chassis. The Cayman S is a coupe built on a convertible chassis, the Boxster. Porsche didn't lighten or modify the Boxster's chassis; they added the hardtop with the same level of material or more. The roofline pillars are three layers of 1/16" steel with the roof attached on top; there is enough material here you could weld to it. I found two cross tubes under the front dash that run the width of the car and another tube that connects the rear shock towers. This car is very well built.

The first task was to mount a race seat and fit it for driving position. I had removed the steering wheel and was surprised to discover that we could not mount our standard quick release hub to the steering column. On the new cars there is a steer-



ing position sensor built in to the steering system, this is for the PSM (Porsche Stability Management). I gave the brand new steering wheel to Scott Gerard and told him to cut it apart, I only need the mounting plate. (I was relieved to find out our friends at Bartling/Group 88 had the same problem with their new 997 and solved it the same way). We could have used the stock steering wheel but I have a favourite MOMO model I am accustomed to in the car and I also find that a removable steering >

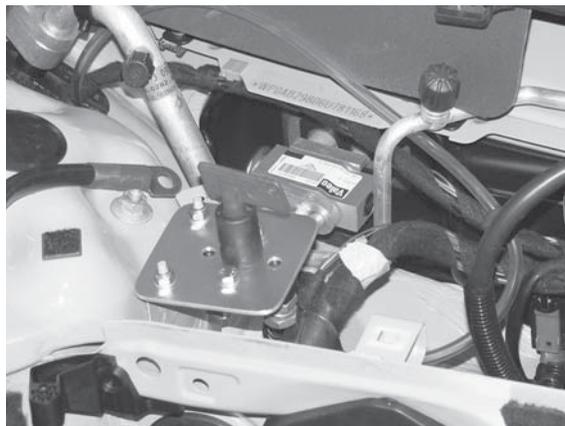
> wheel makes getting in and out of a racecar much easier. With the seat now roughly in place I checked the pedals and steering wheel position and marked the seat mounting position. We then fabricated our own seat mounts; we won't need an adjustable seat, as the Cayman S has an adjustable steering column and without adjustable seat rails, the driver, and his weight, is positioned lower in the car.

Now is the time I take a first look at the roll cage design. With the seat in position, I can check the clearance for tubing, we had more clearance than I expected, but I am concerned about access to the engine belts that are located behind the seats on the firewall. I have also not come up with a good idea on how to deal with the dashboard; we'll tackle other problems for now.

I mentioned previously that I have concerns with oil starvation with Porsche's new "semi-dry sump" engines. I designed a sump extension to help deal with this problem. I disassembled the sump of the engine so that our machinist could model the extension pieces we needed. I also removed the headers so that we could have a new header plate design, one I could weld my own header system to. It would be a week before I would have these back.

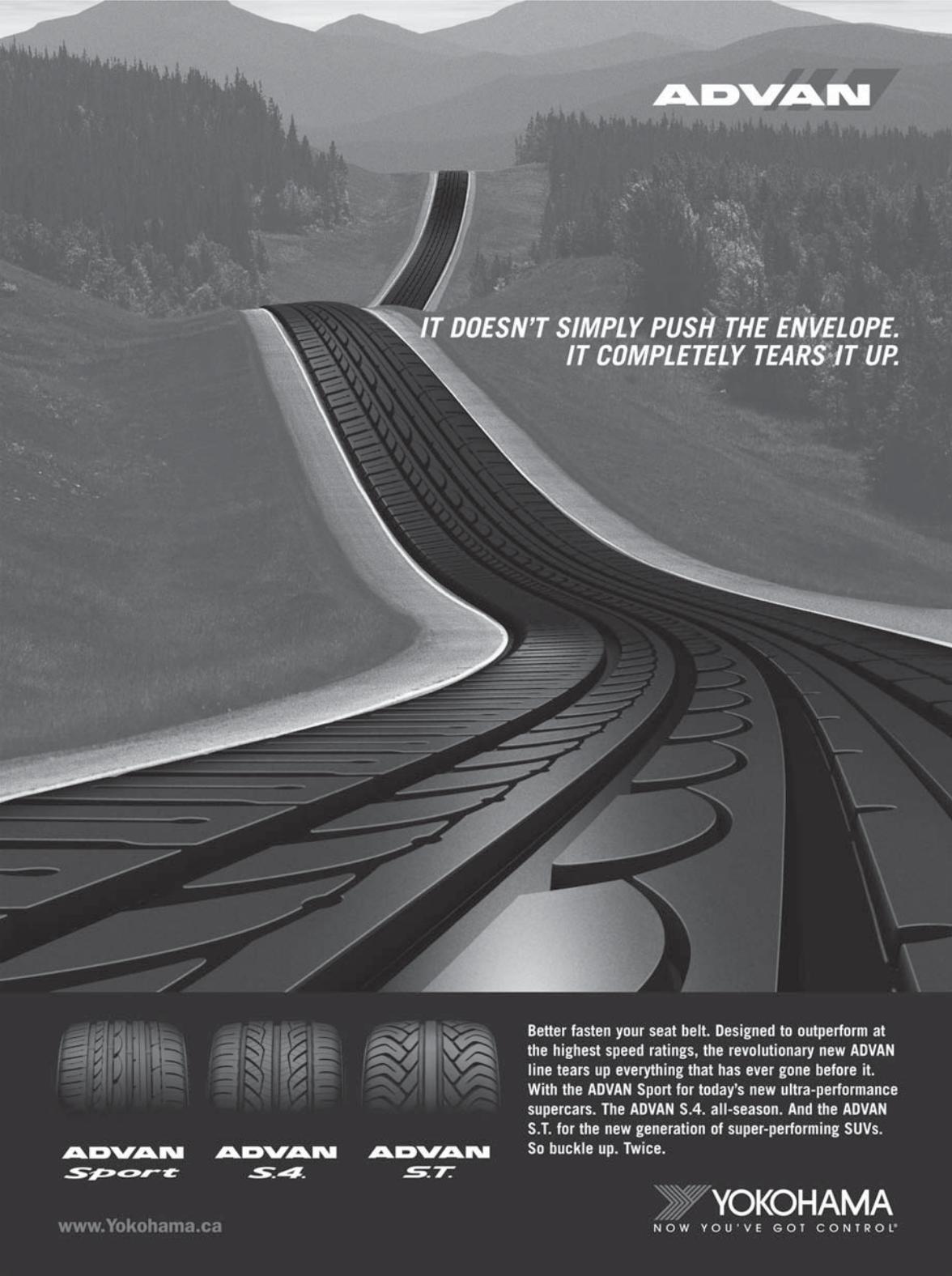
Stan and his new friend Hans (I think Hans is an acronym for Help and Assistance Needed by Stan) were removing the front bumper and undercarriage trays so we could have access to what was hidden underneath the car. We decided to remove the fog lamps and place screening in front of the air intakes for the radiators located in front of the wheel wells. The inner fenders had plastic louvers to exhaust the cooling air; we cut these out and replaced them with screening as well. The radiators were now protected from bits of rubber and debris from both sides. The centre fixture of the front bumper is a concave plastic insert, very deep; we replaced this with an aluminum cover to improve the aerodynamic performance.

On the topic of aerodynamic performance, I have always paid particular attention to this when developing a competition car. Optimizing down-force and reducing drag is free traction and horsepower. The former allows me through a corner faster; the latter gets me to the next corner quicker. I have refined this on 911's and 944's using front splitters, or diffusers, to control the air under the car. I discussed this with Stan and the guys on several occasions and we could not come to consensus on how we would do this on the Cayman S. Stan kept suggesting that we should not change the air flow drastically on the front, he saw similarities with the new Porsche RS Spyder and Audi R10 in the design. I know that Porsche invests a lot in wind tunnel testing, I decided that we would do nothing until we have a reason to, we don't have the resources to prove Porsche wrong. With the car lowered we would have improved aerodynamic performance and I didn't want to upset the fore and aft balance I enjoyed on our test drive and as we are not allowed (under the rules) to modify the rear wing on the Cayman S to compensate



for changes we might make on the front.

A racecar must have a quick means of changing the wheels. On professional series cars they use centre-lock systems that require only one fastener. This is expensive and requires powerful tools to torque the large nut and is illegal in Club Racing's stock classes. The Cayman S comes with wheel bolts as do most new models, these are designed to lower the construction cost of the car (must save two or three dollars) and so that the wheels >



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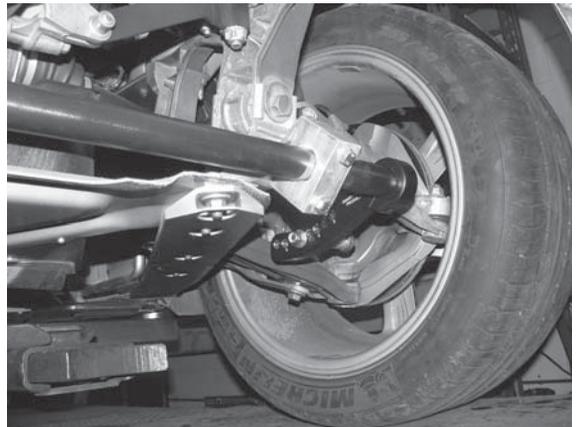
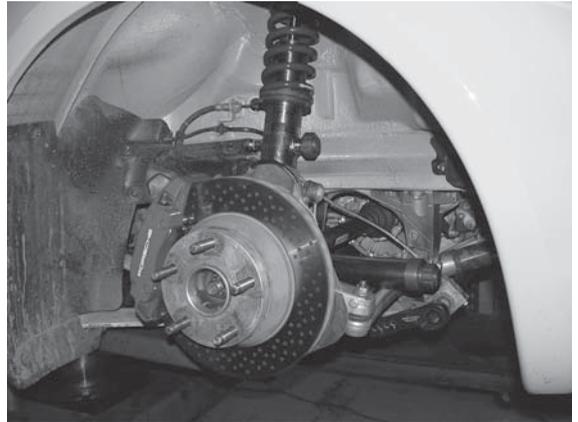
> fall off the car when the last bolt is removed. We replaced the bolts with good old-fashioned studs and wheel nuts. The studs are long enough to support the wheel without the nuts and I also added a NASCAR trick, removing the threads to allow the nuts to fit over the studs without being turned on to the threads. This will make it easier to prevent cross-threading during wheel changes.

One week has past since we began the project, Stan is claiming we are ahead of schedule but we are not. Yes, we have signed off on many of the tasks we forecasted but I don't have my springs and shocks yet, I have not made a decision on the roll cage, started the headers or figured out the sway bars.

Stan: Ernie is probably right, but we have made more progress than I had expected during the first week. We have installed the B&M short shift kit (Jay, Mantis' head technician did this job). Jay did one for a customer last year and raved about how much better it felt; Jay isn't a fan of short shift kits so this impressed us a great deal, can't wait to try this out.

Ernie's brother, Gunner, is almost finished fabricating the inserts for the front bumper and we have begun to strip all the insulation and backing off the carpeting. The seat mounts are finished and have been fitted for both driver and passenger seats; PCA Club Racing required two seats. Ernie is getting anxious because a lot of the tasks we had hoped to accomplish during the first week are missing one little part or something and we don't know when they will be here. OK Ernie, headers or roll cage, pick one! He chooses the roll cage.

To see Ernie do a cage is amazing, I don't know why I still think this way as I have helped him on many over the last few years. Tubing is cut, moved it in and out of the car, hold it here, measure this, now here and no explanation of why or what. Then we do it again and maybe again. Finally Ernie takes a marking pen and asks me to remove the paint and everything else in this area and that area, so he can weld something there and he disappears to cut and bend steel tubing. I am left to grind and clean the charted areas that will serve to attach whatever it is he is making. Ernie started his career as a fabricator and designer at Canadian Stock Car Products, designing and building tube frame racecars. He doesn't use drawings for roll cages, he sees them, cuts the pieces, fits them in the car and then welds them together, it works every time, but I never get it until he is done. Ernie decided on a roll bar instead of a full cage for the Cayman S, actually he calls it a half cage, as it is just the rear half and can be completed whenever he likes. When I questioned him on this he explained that he made this decision because he wasn't absolutely sure of how he wanted the front of the cage to be and PCA Club Racing rules allow for a roll bar in stock classes, he also shared with me that, since the Cayman S was so well built he felt secure in racing it with just a roll bar until he was sure of how he wanted the rest to look. And we were running out of time. The bar (half cage) is beautiful. Probably Ernie's best work



so far. We spent an entire evening carefully cutting and fitting the interior pieces that have to fit around it, when we are done it looks like the car was delivered from the factory with a roll bar. The new car is starting to take shape, our spirits are rising but there is much more to do before we have a racecar.

The sump extension has arrived from the machine shop, it has been dry fitted twice and modified to fit perfectly. It looks like a >

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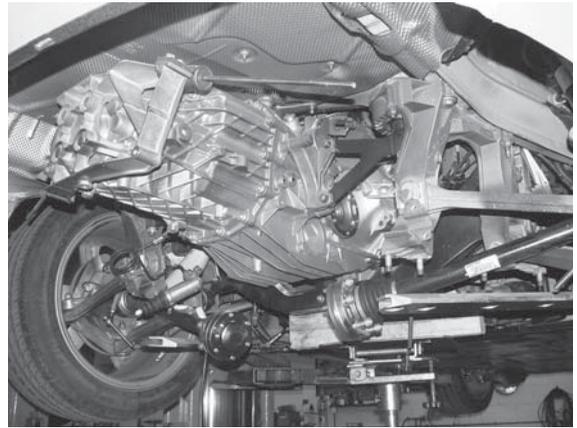
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> Porsche factory part, but there is no part number. With this fitted we now drill it to install an oil temperature sensor and install an oil temperature gauge in the dashboard. We run the wire under the centre console with the shifter cables and parking brake cables, very tidy. We have installed spherical bearings for the rear suspension and Ernie has fabricated custom pillow blocks for the rear sway bar that attach to the original location. All we need are the custom dampers from England (they are on the way we are told) and the headers and we can put the car back together again.

It is now Thursday January 26th, we are approaching the end of our second week of the project. Pfaff Porsche is holding an open house to promote the new Cayman S on Sunday and we decide we should take the new racecar up to show our appreciation for their support for our project. How are we going to do this? We have two days to make this shell of a car look like a finished racecar even if we don't have all of the parts yet. Out comes the schedule, call Greg at Creative Illusions, its this Saturday, not next, to put the graphics on the car, finish stripping the carpeting, put the interior back in, make a set of headers, install the front bumper, wash and wax the car. All in two days! Make that one day, we can't work on Friday; Ernie has a date with his family - we can all use a day off.

Saturday January 28th is the longest day we have ever worked, it is the most trying and the most gratifying time we spent on this project. We started at 9AM; Ernie and I left at 1AM. Gunner was finishing the window net; this is a requirement to prevent debris from entering the car and to keep the driver parts in the car because the window has to be open during a race. Greg arrives early and begins to install the graphics on the car. Until now I don't know what Ernie has decided on, will it be as I originally designed, or did he change it? Greg begins to lay out two red strips down the middle of the front hood and asks me where I want them. When we start to discuss and measure the position of the stripes I realize that he has prepared the graphics just as I had designed, almost two months ago. Now I am a nervous wreck, will this really work! Can't change it now.

We spend most of the morning working around each other, I don't know how many people were there that morning, but there were plenty, all in Greg's way as he was applying the final touches that would define this Cayman S as the race car we had envisioned before we even saw one. I kept re-assigning tasks to people to keep them away from the part of the car that Greg needed to be working on. We were frantically re-assembling the car. It had to be perfect tomorrow. When the graphics were complete, I called Ernie from the front of the shop, we looked at the car from every angle, just walked around it. Greg had done his magic, took my rough idea and turned into reality. It was now a stunning looking racecar. I can't begin to tell you how proud I felt when, finally, Ernie told me it was beautiful, without outlines, without green and without fancy graphics.



But it did have 001 on the doors and front and rear, a modern classic in more ways than one. Thanks Ernie, for letting me put my mark on your new racecar.

Ernie: After Stan had recovered from his anxiety attack over the cars graphics (the look on his face was worth the time wasted waiting) we began the task of completing the car for it's first public appearance. There was much work to do. I had >

> purchased a set of headers in backup, so I decided that I would use these and fabricate the secondary pipes to a set of Quiet Horsepower mufflers. I have used these mufflers for several years now on my 911; they produce close to the same power as megaphones but reduce the noise in the cockpit. This reduces fatigue for the driver, produces faster lap times, and better concentration at the end of a race. I began to design the exhaust system while Stan completed the assembly of the interior. It sounds simple now but Stan was working inside the car and I was working under it, we had to accommodate each other. Car up, then car down, but we got it done. It took a good three hours for both of us to do the final fit and assembly of the exhaust system. When I had finished the welding and the exhaust was installed we called it a night, even though it was early morning. Tomorrow morning we would put the wheels on, install the windows, clean the interior, wash the car and take it to Pfaff.

Scott joined Stan and I Sunday morning as we completed the assembly and cleaned the car for showing. We loaded the car in the trailer and on a grey and rainy January day we drove to Pfaff in Woodbridge to show off the efforts of two weeks of labour;

we are still behind schedule. We leave for Sebring in ten days. I don't have my suspension yet, the timing transponder isn't connected, the electrical cut-off switch isn't connected but it looks like a racecar now. I drove the car out of the trailer when we got to Pfaff, took it for a drive around the block, before parking it in front of the service entrance at the side of the building. It sounded great! It looked Great! I think we will make it.



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